CONTROL DATA CORPORATION

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1700 COMPUTER SYSTEMS

1700 MSOS 4
CUSTOMIZATION MANUAL

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Address comments concerning this manual to:

1700 PSR Coordinator
Control Data Corporation
4455 Eastgate Mall
La Jolla, California
92037

(1)

PRELIMINARY

1700 MSOS 4

CUSTOMIZATION MANUAL

Publication No. 88860300

DISCLAIMER: THIS DOCUMENT IS A WORKING PAPER ONLY, AND DOES NOT NECESSARILY REPRESENT ANY OFFICIAL INTENT ON THE PART OF CONTROL DATA.

Preface

This manual is intended to aid the user in understanding the parameterization of 1700 MSOS 4 so that he can modify his system according to his own needs if necessary. A thorough knowledge of MSOS is not assumed on the part of the reader, but a general acquaintance with the aspects of the system will be helpful.

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CHAPTER 7   METHOD OF UPDATING A SYSTEM

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LIST OF FIGURES

All figures are Data Base listings which include all possible choices for a given SYSDAT line, unless the word, sample, appears in the figure title. Samples contain only specific entries for the sample.

1K

16

18

The MSOS Data Base is a set of code from which a SYSDAT for any given installation may be derived. The selection of which card images in the Data Base are to be a part of a given SYSDAT is determined according to the information supplied by the user when he completes the 1700 MSOS 4 Ordering Form.

Each section of the Data Base, and consequently each section of a given SYSDAT, is identified by a unique combination of three letters. This identifier appears in columns 74-76 of each line of code. Each article of this chapter deals with a particular section of SYSDAT. The heading of an article indicates the contents of the SYSDAT section to be discussed and the corresponding three letter identifier. Either the original Data Base listing of the section or a listing of the section from a sample SYSDAT is found with each description. Sections AAA through AAU, sections ACR, ACT, ACV and ACW, and sections ADB through ADD are contained in the SYSDAT of every system. Other sections are contained in a given SYSDAT only if needed by the particular system.

A general description of the mandatory entries in a physical device table are discussed in Article 1.19. It is assumed that the reader is familiar with the information in this article when he reads about any specific physical device table. The individual physical device tables are described in Articles 1.20 through 1.57.

1.1 SYSDAT Table of Contents, Section AAA

Section AAA {Figure 1-1} is a list of the contents of SYSDAT. This section would normally not be modified by the user.

```
      NAM  SYSDAT          COPYRIGHT CONTROL DATA CORPORATION 1973
*     SYSTEM DATA PROGRAM  -  MSOS 4.1
*     1700 MASS STORAGE OPERATING SYSTEM VERSION 4.1
*     SMALL COMPUTER DEVELOPMENT DIVISION, LA JOLLA, CALIFORNIA
*     COPYRIGHT CONTROL DATA CORPORATION 1973
*
*
*
*                        PROGRAM BASE - MSOS 4.0
*
*          S Y S T E M   D A T A   P R O G R A M
*
*
*     TABLE OF CONTENTS
*
*          1. COMMUNICATION EXTERNALS
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*          2. COMMUNICATION REGION (INCLUDING APPLICATIONS AREA)
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*
*          8. DIAGNOSTIC TABLES (DGNTAB, ALTERR)
*
*          9. STANDARD LOGICAL UNIT DEFINITIONS AND LINE 1 TABLE
*
*         10. PHYSICAL DEVICE TABLES WITH INTERRUPT RESPONSE ROUTINES
*
*         11. CORE ALLOCATION INFORMATION (CALTHD, LVLSTR, NN≠S)
*
*         12. CORE PARTITION  INFORMATION (PARTBL, THDS, USE)
*
*         13. SYSTEM COMMON DECLARATION
*
*         14. MISCELLANEOUS PROGRAMS
*
*         15. MISCELLANEOUS INFORMATION
*
*         16. SYSTEM FILE INFORMATION
*         17. PRESET REGION
*
*         18. START OF SYSTEM DIRECTORY
*
      EJT
```

Figure 1-1. SYSDAT Table of Contents, Section AAA

1.2 Core Locations Zero and One and the Mask Tables, Section AAB

The first part of Section AAB is locations zero and one. These locations are filled by the system restart portion of the program, SPACE, at the time of an autoload. They will contain $18FF_{16}$ and zero, respectively. These two locations must not be altered.

The masks in Section AAB, Figure 1-2, are used extensively by the operating system. They must not be altered. The mask table consists of five parts:

(1) logical product masks (locations $2\text{-}11_{16}$)
(2) complements of the logical product masks (locations $12_{16}\text{-}21_{16}$)
(3) masks each with a single bit set (locations $22_{16}\text{-}32_{16}$)
(4) masks with all bits set except one (locations $33_{16}\text{-}42_{16}$)
(5) integer values that are commonly used, but which are not contained in the first four parts of the mask table (locations $43_{16}\text{-}46_{16}$).

```
*               C O M M U N I C A T I O N   R E G I O N                     AAB00100
*                                                                           AAB00200
        ORG     1                   LOCATION 0 SET TO $18FF BY SYSTEM INITIALIZER AAB00300
        NUM     0                                                           AAB00400
*                                                                           AAB00500
LPMSK   NUM     0                   LOGICAL PRODUCT MASK TABLE OF ONES      AAB00600
ONE     NUM     1                      ONE                                  AAB00700
THREE   NUM     3                      THREE                                AAB00800
SEVEN   NUM     7                      SEVEN                                AAB00900
        NUM     $F                                                          AAB01000
        NUM     $1F                                                         AAB01100
        NUM     $3F                                                         AAB01200
        NUM     $7F                                                         AAB01300
        NUM     $FF                                                         AAB01400
        NUM     $1FF                                                        AAB01500
        NUM     $3FF                                                        AAB01600
        NUM     $7FF                                                        AAB01700
        NUM     $FFF                                                        AAB01800
        NUM     $1FFF                                                       AAB01900
        NUM     $3FFF                                                       AAB02000
        NUM     $7FFF                                                       AAB02100
*                                                                           AAB02200
NZERO   NUM     $FFFF               LOGICAL PRODUCT MASK TABLE OF ZEROS (NEG ZERO)AAB02300
        NUM     $FFFE                                                       AAB02400
        NUM     $FFFC                                                       AAB02500
        NUM     $FFF8                                                       AAB02600
        NUM     $FFF0                                                       AAB02700
        NUM     $FFE0                                                       AAB02800
        NUM     $FFC0                                                       AAB02900
        NUM     $FF80                                                       AAB03000
        NUM     $FF00                                                       AAB03100
        NUM     $FE00                                                       AAB03200
        NUM     $FC00                                                       AAB03300
        NUM     $F800                                                       AAB03400
        NUM     $F000                                                       AAB03500
        NUM     $E000                                                       AAB03600
        NUM     $C000                                                       AAB03700
        NUM     $8000                                                       AAB03800
        EJT                                                                 AAB03900
*               C O M M U N I C A T I O N   R E G I O N                     AAB04000
*                                                                           AAB04100
ZERO    NUM     0                      ZERO                                 AAB04200
*                                                                           AAB04300
```

Figure 1-2. Core Locations Zero and One and the Mask Tables, Section AAB.

```
ONEBIT  NUM   1          ONE BIT TABLE                      AAB04400
TWO     NUM   2             TWO                             AAB04500
FOUR    NUM   4             FOUR                            AAB04600
EIGHT   NUM   8             EIGHT                           AAB04700
        NUM   $10                                           AAB04800
        NUM   $20                                           AAB04900
        NUM   $40                                           AAB05000
        NUM   $80                                           AAB05100
        NUM   $100                                          AAB05200
        NUM   $200                                          AAB05300
        NUM   $400                                          AAB05400
        NUM   $800                                          AAB05500
        NUM   $1000                                         AAB05600
        NUM   $2000                                         AAB05700
        NUM   $4000                                         AAB05800
        NUM   $8000                                         AAB05900
*                                                           AAB06000
ZROBIT  NUM   $FFFE      ZERO BIT TABLE                     AAB06100
        NUM   $FFFD                                         AAB06200
        NUM   $FFFB                                         AAB06300
        NUM   $FFF7                                         AAB06400
        NUM   $FFEF                                         AAB06500
        NUM   $FFDF                                         AAB06600
        NUM   $FFBF                                         AAB06700
        NUM   $FF7F                                         AAB06800
        NUM   $FEFF                                         AAB06900
        NUM   $FDFF                                         AAB07000
        NUM   $FBFF                                         AAB07100
        NUM   $F7FF                                         AAB07200
        NUM   $EFFF                                         AAB07300
        NUM   $DFFF                                         AAB07400
        NUM   $BFFF                                         AAB07500
        NUM   $7FFF                                         AAB07600
*                                                           AAB07700
FIVE    NUM   5             FIVE                            AAB07800
SIX     NUM   6             SIX                             AAB07900
NINE    NUM   9             NINE                            AAB08000
TEN     NUM   10            TEN                             AAB08100
        END                                                 AAB08200
```

Figure 1-2. Core Locations Zero and One and the Mask Tables, Section AAB (Continued)

1.3 Interactive GRAPHICS Region, Section AAC

This section appears in SYSDAT only if GRAPHICS and IMPORT are a part of the system (Figure 1-3). If section AAC is present in an unmodified state, it provides for either one or two 1744/1706/274 Digigraphic Consoles.

The number of non-zero entries in the beginning of this section is the number of digigraphic consoles used by the system. If only one console was specified in the original SYSDAT section and the user wishes to add a second console, the second entry in the console list should be set to the address constant, LU2741-LOG1A. A maximum of six consoles may be specified, however if more than two consoles are to be used, the physical device table for each console beyond console two must be defined by the user. For example, if the user wished to add consoles three and four, he might define physical device tables labeled LU2742 and LU2743. The two cards inserted in Section AAC would then be:

```
ADC  LU2742-LOG1A  CONSOLE NUMBER 1
ADC  LU2743-LOG1A  CONSOLE NUMBER 2
```

MASK44 is the mask used to clear all GRAPHICS interrupts. Each bit of MASK44 should be one except those bits corresponding to GRAPHICS interrupt lines. Each 274 GRAPHICS terminal that is used has its own interrupt line. The following table gives the standard interrupt lines and the value of MASK44 for systems with one or two GRAPHICS consoles.

Console Numbers in System	Interrupt Lines	MASK 44
1	12	$EFFF_{16}$
1,2	12,13	$CFFF_{16}$

If more than two GRAPHICS consoles are in a system, interrupt lines for additional consoles are defined by the user. MASK44 must be defined by the user according to the above definition.

```
*            C O M M U N I C A T I O N   R E G I O N
*
*            I N T E R A C T I V E   G R A P H I C S   R E G I O N
        SPC  2
        EXT  FUNC44              1744 FUNCTION ROUTINE
        EXT  IING                INHIBIT GRAPHICS INTERRUPT ROUTINE
        EXT  EING                ENABLE  GRAPHICS INTERRUPT ROUTINE
        SPC  1
*       TABLE OF 274 CRT LOGICAL UNITS
*            NOTE - THERE MUST BE SIX ENTRIES IN THIS TABLE
        SPC  1
        ADC  LU2740-LOG1A        CONSOLE NUMBER 1
        ADC  LU2741-LOG1A        CONSOLE NUMBER 2
        ADC  0                   CONSOLE NUMBER 2
        ADC  0                   CONSOLE NUMBER 3
        ADC  0                   CONSOLE NUMBER 4
        ADC  0                   CONSOLE NUMBER 5
        ADC  0                   CONSOLE NUMBER 6
*
        ADC  FUNC44              1744 FUNCTION ROUTINE
*
*       MASK USED TO CLEAR GRAPHICS INTERRUPT.   ALL BITS SHOULD BE
*       SET EXCEPT THOSE CORRESPONDING TO THE 1744 INTERRUPT LINES.
*
*                       I N T E R R U P T   L I N E
*         15 14 13 12 11 10  9  8  7  6  5  4  3  2  1  0
*          **********************************************
* MASK44   1  1  0  0  1  1  1  1  1  1  1  1  1  1  1  1
* MASK44   1  1  1  0  1  1  1  1  1  1  1  1  1  1  1  1
*          **********************************************
*
MASK44  NUM  $CFFF               GRAPHICS INTERRUPT MASK
MASK44  NUM  $EFFF               GRAPHICS INTERRUPT MASK
*
*       THE FOLLOWING ENTRIES ARE INITIALIZED BY THE INTERACTIVE
*       GRAPHICS SYSTEM DURING GRAPHICS OPERATION.
*
        ADC  0                   MCRTAB - TABLE OF   A/N MACROS (RELATIVE)
        ADC  0                   AATADR - CURRENT AAT ADDRESS
        ADC  0                   AATLNG -         AAT LENGTH
        ADC  0                   ANADR  - ADDRESS OF A/N MACROS (D1744)
        ADC  0                   ANPIK  - ADDRESS OF A/N PICK DISPLAY (D1744)
        ADC  0                   ANSFLG - GAINS COMMUNICATION FLAG
        ADC  0                   CRX    - T. C. X-COORDINATE
        ADC  0                   CRY    - T. C. Y-COORDINATE
        ADC  0                   CTRLSZ - LAST WORD ADDRESS OF D1744
        ADC  0                   DIPSTA - CURRENT STATUS OF THE 1744
        ADC  0                   STBLOV - AVAILABLE MACRO S-JUMP ENTRIES
        ADC  0                   FAVAL  - CURRENT DISPLAY BYTES END ADDRESS
        ADC  0                   INX    - X-COORDINATE OF TRACKED ITEM
        ADC  0                   INY    - Y-COORDINATE OF TRACKED ITEM
        EJT
```

Figure 1-3. Interactive GRAPHICS, Section AAC.

```
      I N T E R A C T I V E   G R A P H I C S   R E G I O N          AAC05300
SPC   2                                                               AAC05400
ADC   0               STBLSZ - SIZE OF S-JUMP ENTRY TABLE             AAC05500
ADC   0               MAXBUF - LAST WORD ADDRESS OF  1744 BUFFER      AAC05600
ADC   0               MCRBTS - TOTAL NUMBER OF MACRO BYTES            AAC05700
ADC   0               MVMCR  - CLEAR/ATTACH MACRO        FROM T.C.    AAC05800
ADC   0               MVTM   - CLEAR/ATTACH DISPLAY ITEM FROM T.C.    AAC05900
ADC   0               PLPS   - P-REGISTER   AT LAST L.P. PICK         AAC06000
ADC   0               PRX    - X-COORDINATE AT LAST L.P. PICK         AAC06100
ADC   0               PRY    - Y-COORDINATE AT LAST L.P. PICK         AAC06200
ADC   0               TMMVAD - ADDRESS OF MACRO ATTACH AREA (D1744)   AAC06300
ADC   0               TCADR  - ADDRESS OF T.C. DISPLAY AREA (D1744)   AAC06400
ADC   0               SLPS   - S-REGISTER   AT LAST L.P. PICK         AAC06500
ADC   0               TMPADR - FAVAL (SAVED BY GIDIS)                 AAC06600
ADC   0               TRFLG  - TRACKING/NOT TRACKING FLAG             AAC06700
ADC   0               XLPS   - X-REGISTER   AT LAST L.P. PICK         AAC06800
ADC   0               YLPS   - Y-REGISTER   AT LAST L.P. PICK         AAC06900
ADC   0               AD1744 - DISPLAY ITEM ADDRESS (USED BY TRACD)   AAC07000
ADC   0               MM1744 - MACRO   ITEM ADDRESS (USED BY TRACD)   AAC07100
ADC   0               PROGRS - CHARACTER COUNT      (USED BY GIANC)   AAC07200
ADC   0               LIMIT  - CHARACTER LIMIT      (USED BY GIANC)   AAC07300
ADC   0               GIANIH - I H  VALUE           (USED BY GIANC)   AAC07400
ADC   0               GIANIV - I V  VALUE           (USED BY GIANC)   AAC07500
ADC   0               NCFC   - CHARACTER COUNT      (USED BY GIANS)   AAC07600
ADC   0               CCODE  - CURRENT CALL CODE                      AAC07700
ADC   0               GRAPHE - RETURN ADDRESS FOR ALL OVERLAYS        AAC07800
ADC   0               CALFS  - CLEAR ALPHANUMERIC CONTROL BLOCK       AAC07900
ADC   0               GHLPI  - LIGHTPEN INTERRUPT PROCESSOR ADDRESS   AAC08000
ADC   0               GHKBI  - KEYBOARD INTERRUPT PROCESSOR ADDRESS   AAC08100
ADC   0               GHLKI  - LIGHTPEN KEY INTERRUPT PROCESSOR       AAC08200
ADC   0               GHIDB  - SINGLE PICK ID BLOCK   PROCESSOR       AAC08300
ADC   0               GHALF  - ALPHANUMERIC PICK PROCESSOR  ADDRESS   AAC08400
ADC   0               GHBLKA - FREE STORAGE BLOCK ALLOCATOR ADDRESS   AAC08500
ADC   0               GHBLKR - FREE STORAGE BLOCK RELEASOR  ADDRESS   AAC08600
ADC   0               GHIDBS - STRING PICK PROCESSOR        ADDRESS   AAC08700
ADC   0               GHIDBE - DELETE ID BLOCK PROCESSOR    ADDRESS   AAC08800
ADC   0               IGM    - IGNORE       MASK TABLE ADDRESS        AAC08900
ADC   0               SPM    - SINGLE PICK MASK TABLE ADDRESS         AAC09000
ADC   0               STPM   - STRING PICK MASK TABLE ADDRESS         AAC09100
ADC   0               BM     - BUTTON PICK MASK TABLE ADDRESS         AAC09200
ADC   0               MM     - MARKER       MASK TABLE ADDRESS        AAC09300
ADC   0               YGIL   - SWITCH                FOR GILPKY       AAC09400
ADC   0               ZGIL   - ID BLOCK ADDRESS FOR GILPKY            AAC09500
ADC   0               YGIK   - SWITCH                FOR GIKBYD       AAC09600
ADC   0               ZGIK   - ID BLOCK ADDRESS FOR GIKBYD            AAC09700
ADC   0               YGIP   - SWITCH                FOR GIPBUT       AAC09800
ADC   0               ZGIP   - ID BLOCK ADDRESS FOR GIPBUT            AAC09900
ADC   0               YGIE   - SWITCH                FOR GIECM        AAC10000
ADC   0               ZGIE   - ID BLOCK ADDRESS FOR GIECM             AAC10100
EJT                                                                   AAC10200
```

Figure 1-3. Interactive GRAPHICS, Section AAC (Continued)

```
         I N T E R A C T I V E   G R A P H I C S   R E G I O N              AAC10300
SPC      2                                                                  AAC10400
ADC      0                GICL   - FLAG WORD FOR GICLR                       AAC10500
ADC      0                RELSTG - RELEASE LAST BLOCK RETURN ADDRESS         AAC10600
ADC      0                GHALFF - PICKED CHARACTER FETCH ROUTINE            AAC10700
ADC      0                GHSTK  - FLAG FOR BUTTON ON FETCH Q                AAC10800
ADC      0                GHIDBF - SINGLE PICK ID BLOCK FETCH ROUTINE        AAC10900
ADC      0                WAIT   - START OF WAIT  CONTROL BLOCKS             AAC11000
ADC      0                FETCH  - START OF FETCH CONTROL BLOCKS             AAC11100
ADC      0                XCOLBL - X-COORDINATE OF LAST BUTTON               AAC11200
ADC      0                YCOLBL - Y-COORDINATE OF LAST BUTTON               AAC11300
ADC      0                TRACD  - T. C. PROCESSOR ADDRESS                   AAC11400
ADC      0                REQSTK - REQUEST STACK                             AAC11500
ADC      0                       - RESERVED                                  AAC11600
ADC      0                       - RESERVED                                  AAC11700
ADC      0                       - LPRFLAG                                   AAC11800
ADC      0                       - X0-COORDINATE OF BEAM                     AAC11900
ADC      0                       - Y0-COORDINATE OF BEAM                     AAC12000
ADC      0                       - XBM0-COORDINATE OF DECODERS               AAC12100
ADC      0                       - YBM0-COORDINATE OF DECODERS               AAC12200
ADC      IING             IING   - INHIBIT GRAPHIC INTERRUPT ROUTINE         AAC12300
ADC      EING             EING   - ENABLE  GRAPHIC INTERRUPT ROUTINE         AAC12400
ADC      0                GLCON  - CONSOLE (NCON SAVED BY IGSPRO)            AAC12500
ADC      0                GLELE  -                                           AAC12600
```

Figure 1-3. Interactive GRAPHICS, Section AAC (Continued)

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1.4 Area for Applications Use, Section AAD

Section AAD, Figure 1-4, includes locations 70_{16} through $B2_{16}$. This area is available to the user to be used as desired.

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```
*         C O M M U N I C A T I O N   R E G I O N                                   AAD00100
*                                                                                   AAD00200
*                             THIS AREA IS AVAILABLE FOR APPLICATIONS USE           AAD00300
*                                                                                   AAD00400
*                                                                                   AAD00500
*                             THIS AREA IS AVAILABLE FOR APPLICATIONS USE           AAD00600
*                                                                                   AAD00700
      NUM   0                 $47                                                   AAD00800
      NUM   0                 $48                                                   AAD00900
      NUM   0                 $49                                                   AAD01000
      NUM   0                 $4A                                                   AAD01100
      NUM   0                 $4B                                                   AAD01200
      NUM   0                 $4C                                                   AAD01300
      NUM   0                 $4D                                                   AAD01400
      NUM   0                 $4E                                                   AAD01500
      NUM   0                 $4F                                                   AAD01600
      NUM   0                 $50                                                   AAD01700
      NUM   0                 $51                                                   AAD01800
      NUM   0                 $52                                                   AAD01900
      NUM   0                 $53                                                   AAD02000
      NUM   0                 $54                                                   AAD02100
      NUM   0                 $55                                                   AAD02200
      NUM   0                 $56                                                   AAD02300
      NUM   0                 $57                                                   AAD02400
      NUM   0                 $58                                                   AAD02500
      NUM   0                 $59                                                   AAD02600
      NUM   0                 $5A                                                   AAD02700
      NUM   0                 $5B                                                   AAD02800
      NUM   0                 $5D                                                   AAD02900
      NUM   0                 $5E                                                   AAD03000
      NUM   0                 $5F                                                   AAD03100
      NUM   0                 $60                                                   AAD03200
      NUM   0                 $61                                                   AAD03300
      NUM   0                 $63                                                   AAD03400
      NUM   0                 $64                                                   AAD03500
      NUM   0                 $65                                                   AAD03600
      NUM   0                 $66                                                   AAD03700
      NUM   0                 $67                                                   AAD03800
      NUM   0                 $68                                                   AAD03900
      NUM   0                 $69                                                   AAD04000
      NUM   0                 $6A                                                   AAD04100
      NUM   0                 $6B                                                   AAD04200
      NUM   0                 $6C                                                   AAD04300
      NUM   0                 $6D                                                   AAD04400
      NUM   0                 $6E                                                   AAD04500
      NUM   0                 $6F                                                   AAD04600
      EJT                                                                           AAD04700
      SPC   4                                                                       AAD04800
```

Figure 1-4. Area for Applications Use, Section AAD

```
*        C O M M U N I C A T I O N   R E G I O N                          AAD04900
*                                                                         AAD05000
*                                                                         AAD05100
         NUM  0             $70                                           AAD05200
         NUM  0             $71                                           AAD05300
         NUM  0             $72                                           AAD05400
         NUM  0             $73                                           AAD05500
         NUM  0             $74                                           AAD05600
         NUM  0             $75                                           AAD05700
         NUM  0             $76                                           AAD05800
         NUM  0             $77                                           AAD05900
         NUM  0             $78                                           AAD06000
         NUM  0             $79                                           AAD06100
         NUM  0             $7A                                           AAD06200
         NUM  0             $7B                                           AAD06300
         NUM  0             $7C                                           AAD06400
         NUM  0             $7D                                           AAD06500
         NUM  0             $7E                                           AAD06600
         NUM  0             $7F                                           AAD06700
         NUM  0             $80                                           AAD06800
         NUM  0             $82                                           AAD06900
         NUM  0             $83                                           AAD07000
         NUM  0             $84                                           AAD07100
         NUM  0             $85                                           AAD07200
         NUM  0             $86                                           AAD07300
         NUM  0             $87                                           AAD07400
         NUM  0             $88                                           AAD07500
         NUM  0             $89                                           AAD07600
         NUM  0             $8B                                           AAD07700
         NUM  0             $8C                                           AAD07800
         NUM  0             $8D                                           AAD07900
         NUM  0             $8E                                           AAD08000
         NUM  0             $8F                                           AAD08100
         EJT                                                              AAD08200
         SPC  2                                                           AAD08300
*        C O M M U N I C A T I O N   R E G I O N                          AAD08400
*                                                                         AAD08500
*                           THIS AREA IS AVAILABLE FOR APPLICATIONS USE   AAD08600
*                                                                         AAD08700
         NUM  0             $90                                           AAD08800
         NUM  0             $91                                           AAD08900
         NUM  0             $92                                           AAD09000
         NUM  0             $93                                           AAD09100
         NUM  0             $94                                           AAD09200
         NUM  0             $95                                           AAD09300
         NUM  0             $96                                           AAD09400
         NUM  0             $97                                           AAD09500
         NUM  0             $98                                           AAD09600
```

Figure 1-4. Area for Applications Use, Section AAD (Continued)

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```
NUM   0          $99                                AAD09700
NUM   0          $9A                                AAD09800
NUM   0          $9C                                AAD09900
NUM   0          $9D                                AAD10000
NUM   0          $9E                                AAD10100
NUM   0          $9F                                AAD10200
NUM   0          $A0                                AAD10300
NUM   0          $A2                                AAD10400
NUM   0          $A3                                AAD10500
NUM   0          $A4                                AAD10600
NUM   0          $A5                                AAD10700
NUM   0          $A6                                AAD10800
NUM   0          $A7                                AAD10900
NUM   0          $A8                                AAD11000
NUM   0          $A9                                AAD11100
NUM   0          $AA                                AAD11200
NUM   0          $AB                                AAD11300
NUM   0          $AC                                AAD11400
NUM   0          $AD                                AAD11500
NUM   0          $AE                                AAD11600
NUM   0          $AF                                AAD11700
NUM   0          $B0                                AAD11800
NUM   0          $B1                                AAD11900
NUM   0          $B2                                AAD12000
EJT                                                 AAD12100
```

Figure 1-4. Area for Applications Use, Section AAD (Continued)

1.5 Communication Region, Section AAE

The first part of Section AAE, Figure 1-5, lists the externals which are referenced in the communications region. Each external corresponds to a frequently used module. By placing the entry point address of each of these externals in the communications region one-word indirect addressing may be used to enter these modules. The rest of Section AAE is the communications region itself. It consists of locations $B3_{16}$ through FF_{16}. This area includes entry point addresses, temporary storage locations, logical unit numbers, the real time clock counter, and index register I. This section must not be modified by the user.

```
*           C O M M U N I C A T I O N S   E X T E R N A L S                   AAE00100
*                                                                             AAE00200
*                                                                             AAE00300
       EXT  FNR            FIND NEXT REQUEST                                  AAE00400
       EXT  COMPRG         COMPLETE REQUEST                                   AAE00500
       EXT  REQXT          REQUEST EXIT                                       AAE00600
       EXT  VOLR           VOLATILE RELEASE                                   AAE00700
       EXT  VOLA           VOLATILE ASSIGNMENT                                AAE00800
       EXT  LUABS          LOGICAL UNIT ABSOLUTIZING                          AAE00900
       EXT  SABS           STARTING ADDRESS ABSOLUTIZING                      AAE01000
       EXT  CABS           COMPLETION ADDRESS ABSOLUTIZING                    AAE01100
       EXT  NABS           NUMBER OF WORDS ABSOLUTIZING                       AAE01200
       EXT  DISPXX         DISPATCHER                                         AAE01300
       EXT  MONI           MONITOR                                            AAE01400
       EXT  MSIZV4         HIGHEST CORE LOCATION USED BY SYSTEM               AAE01500
       EXT  IPROC          INTERNAL INTERRUPT PROCESSOR                       AAE01600
       EXT  ALLIN          COMMON INTERRUPT HANDLER                           AAE01700
       EJT                                                                    AAE01800
*           C O M M U N I C A T I O N   R E G I O N                           AAE01900
*                                                                             AAE02000
       ORG  $B3                                                               AAE02100
       ADC  SCRTCH         LOGICAL UNIT OF STANDARD SCRATCH DEVICE            AAE02200
       ADC  SCHSTK         ADR OF TOP OF SCHEDULER STACK                      AAE02300
AFNR   ADC  FNR            ADR OF FIND NEXT REQUEST                           AAE02400
ACOMPR ADC  COMPRG         ADR OF COMPLETE REQUEST                            AAE02500
       ADC  MASKT          ADR OF MASK TABLE                                  AAE02600
       ADC  INTSTK         ADR OF TOP OF INTERRUPT STACK                      AAE02700
       ADC  REQXT          ADR OF EXIT FOR MONITOR REQUESTS                   AAE02800
AVOLR  ADC  VOLR           ADR OF RELEASE VOLATILE ROUTINE                    AAE02900
AVOLA  ADC  VOLA           ADR OF ASSIGN VOLATILE ROUTINE                     AAE03000
       ADC  LUABS          ADR OF ABSOLUTIZING ROUTINE FOR LOGICAL UNIT       AAE03100
       ADC  SABS           ADR OF ABSOLUTIZING ROUTINE FOR STARTING ADR       AAE03200
       ADC  CABS           ADR OF ABSOLUTIZING ROUTINE FOR COMPLETION ADRAAE03300
       ADC  NABS           ADR OF ABSOLUTIZING ROUTINE FOR NUMBER OF WRDSAAE03400
       NUM  0              MSB OF STARTING SCRATCH SECTOR      (ALWAYS ZERO)AAE03500
       NUM  0              LSB OF STARTING SCRATCH SECTOR         (SET BY SI)AAE03600
       ADC  LBUNIT         LOGICAL UNIT OF STANDARD LIBRARY DEVICE            AAE03700
       NUM  0              MSB OF PGM LIB DIRECTORY SECTOR    (ALWAYS ZERO)AAE03800
       NUM  0              LSB OF PGM LIB DIRECTORY SECTOR       (SET BY SI)AAE03900
*                                                                             AAE04000
       BZS  ($E3-$C5+1)    RESERVED FOR FTN                   (UNPROTECTED)AAE04100
       NUM  0              RESERVED FOR FTN + LOAD/GO SECTOR(UNPROTECTED)AAE04200
       NUM  0              RESERVED FOR FTN                   (UNPROTECTED)AAE04300
*                                                                             AAE04400
```

Figure 1-5. Communications Region, Section AAE

```
         BSS   (1)          LENGTH OF MASS RESIDENT SYSTEM DIR.(SET BY SI)AAE04500
         BSS   (1)          LENGTH OF CORE RESIDENT SYSTEM DIR.(SET BY SI)AAE04600
         NUM   0            REAL TIME CLOCK COUNTER                       AAE04700
         ADC   EXTBV4       ADDR OF EXTENDED CORE TABLE                   AAE04800
ADISP    ADC   DISPXX       ADR OF DISPATCHER                             AAE04900
         ADC   SLDIRY       ADR OF SYSTEM DIRECTORY                       AAE05000
         NUM   0            TEMPORARY TOP+1 OF UNPROTECTED     (SET BY SI)AAE05100
         NUM   0            TEMPORARY BOTTOM-1 OF UNPROTECTED  (SET BY SI)AAE05200
         NUM   0            USED BY JOB PROCESSOR FOR LOADER RETURNS      AAE05300
         NUM   -1           CURRENT PRIORITY LEVEL                        AAE05400
         ADC   VOLBLK       STARTING LOCATION OF VOLATILE STORAGE         AAE05500
         ADC   LPRSET       LENGTH OF PRESETS TABLE                       AAE05600
         ADC   APRSET       STARTING LOCATION OF PRESETS TABLE            AAE05700
         ADC   0            ADR OF BREAKPOINT PROGRAM IN CORE(UNPROTECTED)AAE05800
AMONI    ADC   MONI         ADR OF MONITOR ENTRY FOR REQUESTS             AAE05900
         ADC   MSIZV4       HIGHEST CORE LOCATION USED BY SYSTEM          AAE06000
         NUM   0            TOP+1 OF UNPROTECTED               (SET BY SI)AAE06100
         NUM   0            BOTTOM-1 OF UNPROTECTED            (SET BY SI)AAE06200
         ADC   IPROC        ADR OF INTERNAL INTERRUPT PROCESSOR           AAE06300
         ADC   STDINP       LOGICAL UNIT OF STANDARD INPUT DEVICE   (FTN 1)AAE06400
         ADC   BINOUT       LOGICAL UNIT OF STANDARD BINARY DEVICE  (FTN 2)AAE06500
         ADC   LSTOUT       LOGICAL UNIT OF STANDARD PRINT DEVICE   (FTN 3)AAE06600
         ADC   OUTCOM       LOGICAL UNIT OF OUTPUT COMMENT DEVICE   (FTN 4)AAE06700
         ADC   INPCOM       LOGICAL UNIT OF INPUT  COMMENT DEVICE   (FTN 4)AAE06800
         ADC   ALLIN        ADR OF COMMON INTERRUPT HANDLER               AAE06900
         BSS   (1)          I (MEMORY INDEX) REGISTER        (UNPROTECTED)AAE07000
         EJT                                                              AAE07100
```

Figure 1-5. Communications Region, Section AAE (Continued)

1.6 Interrupt Trap Region, Section AAF

Section AAF, Figure 1-6, the interrupt trap region, must reside in locations 100_{16} - $13F_{16}$, since the interrupt locations used by the hardware are located in this region. This section consists of sixteen four-word entries, one entry for each interrupt line.

Each four-word entry is as follows:

Word 0 The value of the Program Address Register, P, is stored by the hardware in word 0 at the time an interrupt occurs. This enables return to the next unexecuted instruction after interrupt processing. The overflow status is saved in bit 15 of word 0 in a 32K system. (See the description of word 2 for overflow handling in a 65K system.)

Word 1 Word 1 is the first instruction to be executed after an interrupt occurs. This instruction is a $54F8_{16}$ to transfer control to the internal interrupt processor. It is a $54FE_{16}$ to transfer control to the common interrupt handler. The internal interrupt processor is used for interrupt line 0. The common interrupt handler is normally used for interrupt lines 1-15. It is possible that the user may wish to bypass the common interrupt handler. This would be the case for an interrupt which must be processed before the common interrupt handler could transfer control to the primary interrupt response routine. In this case, word 1 should contain an instruction to transfer control directly to the interrupt response routine.

Word 2 Word 2 contains the priority level associated with this interrupt line. For a 65K system, the overflow status at the time of an interrupt is saved in bit 15 of word 2.

Word 3 Word 3 contains the address of the interrupt response routine. This word is used by the common interrupt handler to determine where control is to be passed after resetting the overflow indicator, saving the interrupted program in the interrupt stack and altering the system priority level.

```
*             I N T E R R U P T   R E G I O N                                AAF00100
*                                                                            AAF00200
*                                                                            AAF00300
LINE00  NUM   0             INTERRUPT LINE ENTRY                             AAF00400
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF00500
        NUM   15            PRIORITY LEVEL OF INTERRUPT                      AAF00600
        ADC   IPROC         INTERRUPT RESPONSE FOR THE PROTECT/PARITY ERR.AAF00700
LINE01  NUM   0             INTERRUPT LINE ENTRY                             AAF00800
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF00900
        NUM   14            PRIORITY LEVEL OF INTERRUPT                      AAF01000
        ADC   LIN1V4        INTERRUPT RESPONSE FOR THE LOW SPEED I/O         AAF01100
LINE02  NUM   0             INTERRUPT LINE ENTRY                             AAF01200
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF01300
        NUM   09            PRIORITY LEVEL OF INTERRUPT                      AAF01400
        ADC   P1752         INTERRUPT RESPONSE FOR THE 1752 DRUM             AAF01500
LINE02  NUM   0             INTERRUPT LINE ENTRY                             AAF01600
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF01700
        NUM   09            PRIORITY LEVEL OF INTERRUPT                      AAF01800
        ADC   P1751         INTERRUPT RESPONSE FOR THE 1751 DRUM             AAF01900
*                                                                            AAF02000
LINE03  NUM   0             INTERRUPT LINE ENTRY                             AAF02100
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF02200
        NUM   09            PRIORITY LEVEL OF INTERRUPT                      AAF02300
        ADC   P17332        INTERRUPT RESPONSE FOR THE 1733-2/856-2/4 DISKAAF02400
*                                                                            AAF02500
LINE03  NUM   0             INTERRUPT LINE ENTRY                             AAF02600
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF02700
        NUM   09            PRIORITY LEVEL OF INTERRUPT                      AAF02800
        ADC   P1738         INTERRUPT RESPONSE FOR THE 1738/853-4 DISK       AAF02900
*                                                                            AAF03000
LINE03  NUM   0             INTERRUPT LINE ENTRY                             AAF03100
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER                          AAF03200
        NUM   09            PRIORITY LEVEL OF INTERRUPT                      AAF03300
        ADC   P17331        INTERRUPT RESPONSE FOR THE 1733-1/853-4 DISK     AAF03400
*                                                                            AAF03500
LINE03  NUM   0             INTERRUPT LINE ENTRY                             AAF03600
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF03700
        NUM   09            PRIORITY LEVEL OF INTERRUPT                      AAF03800
        ADC   P17391        INTERRUPT RESPONSE FOR THE 1739-1 CART. DISK     AAF03900
*                                                                            AAF04000
LINE04  NUM   0             INTERRUPT LINE ENTRY                             AAF04100
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF04200
        NUM   10            PRIORITY LEVEL OF INTERRUPT                      AAF04300
        ADC   P42312        INTERRUPT RESPONSE FOR THE 1742-30/120 PRINTERAAF04400
*                                                                            AAF04500
LINE04  NUM   0             INTERRUPT LINE ENTRY                             AAF04600
        RTJ-  ($FE)         GO TO INTERRUPT HANDLER ROUTINE                  AAF04700
        NUM   10            PRIORITY LEVEL OF INTERRUPT                      AAF04800
        ADC   P40421        INTERRUPT RESPONSE FOR THE 1740/1742-1 PRINTERAAF04900
*                                                                            AAF05000
```

Figure 1-6. Interrupt Trap Region, Section AAF

```
LINE05 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  12         PRIORITY LEVEL OF INTERRUPT
       ADC  R3644      INTERRUPT RESPONSE FOR THE 364-4 COMM. MUX.
*
LINE07 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  10         PRIORITY LEVEL OF INTERRUPT
       ADC  R17322     INTERRUPT RESPONSE FOR THE 1732-2/615 MAG TAPE
*
LINE07 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  14         PRIORITY LEVEL OF INTERRUPT
       ADC  R1732U     INTERRUPT RESPONSE FOR THE 1732/608/9 MAG TAPE
*
LINE07 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  10         PRIORITY LEVEL OF INTERRUPT
       ADC  R1732B     INTERRUPT RESPONSE FOR THE 1732/608/9 MAG TAPE
*
LINE07 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  14         PRIORITY LEVEL OF INTERRUPT
       ADC  R1731U     INTERRUPT RESPONSE FOR THE 1731/601 MAG TAPE
*
LINE07 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  10         PRIORITY LEVEL OF INTERRUPT
       ADC  R1731B     INTERRUPT RESPONSE FOR THE 1731/601 MAG TAPE
LINE08 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  13         PRIORITY LEVEL OF INTERRUPT
       ADC  TIMINT     INTERRUPT RESPONSE FOR THE SYSTEM TIME BASE
*
LINE09 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  09         PRIORITY LEVEL OF INTERRUPT
       ADC  R1536      INTERRUPT RESPONSE FOR THE 1536-2 A/D MUX.
*
LINE10 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  10         PRIORITY LEVEL OF INTERRUPT
       ADC  R1747      INTERRUPT RESPONSE FOR THE 1747 DATA SET CONT.
*
LINE11 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  14         PRIORITY LEVEL OF INTERRUPT
       ADC  R17293     INTERRUPT RESPONSE FOR THE 1729-3 CARD READER
*
LINE11 NUM  0          INTERRUPT LINE ENTRY
       RTJ- ($FE)      GO TO INTERRUPT HANDLER ROUTINE
       NUM  14         PRIORITY LEVEL OF INTERRUPT
       ADC  R1728      INTERRUPT RESPONSE FOR THE 1728-430 READ/PNCH
*
```

Figure 1-6. Interrupt Trap Region, Section AAF (Continued)

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```
LINE11 NUM   0         INTERRUPT LINE ENTRY                              AAF10500
       RTJ-  ($FE)     GO TO INTERRUPT HANDLER ROUTINE                   AAF10600
       NUM   14        PRIORITY LEVEL OF INTERRUPT                       AAF10700
       ADC   R17292    INTERRUPT RESPONSE FOR THE 1729-2 CARD READER     AAF10800
*                                                                        AAF10900
LINE11 NUM   0         INTERRUPT LINE ENTRY                              AAF11000
       RTJ-  ($FE)     GO TO INTERRUPT HANDLER ROUTINE                   AAF11100
       NUM   10        PRIORITY LEVEL OF INTERRUPT                       AAF11200
       ADC   R1726L    INTERRUPT RESPONSE FOR THE 1726-405 CARD RDR.     AAF11300
*                                                                        AAF11400
LINE11 NUM   0         INTERRUPT LINE ENTRY                              AAF11500
       RTJ-  ($FE)     GO TO INTERRUPT HANDLER ROUTINE                   AAF11600
       NUM   10        PRIORITY LEVEL OF INTERRUPT                       AAF11700
       ADC   R1726B    INTERRUPT RESPONSE FOR THE 1726-405 CARD RDR.     AAF11800
*                                                                        AAF11900
LINE12 NUM   0         INTERRUPT LINE ENTRY                              AAF12000
       RTJ-  ($FE)     GO TO INTERRUPT HANDLER ROUTINE                   AAF12100
       NUM   11        PRIORITY LEVEL OF INTERRUPT                       AAF12200
       ADC   R17441    INTERRUPT RESPONSE FOR THE 1744 D-GRAPH. CONT.    AAF12300
*                                                                        AAF12400
LINE13 NUM   0         INTERRUPT LINE ENTRY                              AAF12500
       RTJ-  ($FE)     GO TO INTERRUPT HANDLER ROUTINE                   AAF12600
       NUM   11        PRIORITY LEVEL OF INTERRUPT                       AAF12700
       ADC   R17442    INTERRUPT RESPONSE FOR THE 1744 D-GRAPH. CONT.    AAF12800
*                                                                        AAF12900
LINEXX NUM   0         INTERRUPT LINE ENTRY                              AAF13000
       RTJ-  ($FE)     GO TO INTERRUPT HANDLER ROUTINE                   AAF13100
       NUM   0         PRIORITY LEVEL OF INTERRUPT                       AAF13200
       ADC   INVINT    INTERRUPT RESPONSE FOR THE INVALID INTERRUPTS     AAF13300
       SPC   1                                                           AAF13400
       EJT                                                               AAF13500
```

Figure 1-6. Interrupt Trap Region, Section AAF (Continued)

1.7 Core Resident Debugging Aids Entries, Section AAG

Section AAG, Figure 1-7, always starts at core location 140_{16}. At 140_{16} is a two-word jump to COUTV4, the off-line core dump routine, assuming COUTV4 is a part of the system. If COUTV4 is not in the system a jump to location zero is located at 140_{16}. At 142_{16} is a two-word jump to COBOP, the SYSCOP bootstrap which transfers the failed core image to mass memory. If COBOP is not included in the system, location 142_{16} contains a jump to location zero.

These two-word jumps are intended for use by the programmer as on-line debugging aids. (Refer to 1700 MSOS Version 4 Instant, Publication Number 39520500.)

```
*       C O R E   R E S I D E N T   D E B U G   E N T R I E S          AAG00100
        SPC   2                                                         AAG00200
        ORG   $140                                                      AAG00300
        SPC   1                                                         AAG00400
        JMP*  0                DEBUG / CHECKOUT NOT SELECTED            AAG00500
        JMP*  0                                                         AAG00600
        EXT   COUTV4                                                    AAG00700
        EXT   COBOP                                                     AAG00800
        SPC   2                                                         AAG00900
                                                                        AAG01000
        JMP*  COUTV4           OFF-LINE CORE DUMP                       AAG01100
        SPC   4                                                         AAG01200
        JMP*  COBOP            SYSTEM CHECKOUT BOOTSTRAP                AAG01300
        EJT
```

Figure 1-7. Core Resident Debugging Aids Entries, Section AAG

1.8 Interrupt Mask Table, Section AAH

The interrupt mask table is a set of masks, one for each of the 17 priority levels allowed by the operating system. For a given priority level, p, each bit of the corresponding interrupt mask is defined as follows:

interrupt mask p, bit m = 1 if an interrupt from interrupt line m is to be recognized when the system is operating at level p, that is, if line m has a priority level greater than p.
= 0 if an interrupt from interrupt line m is to be saved by the hardware but is not to be recognized when the system is operating at level p, i.e., bit m is zero if line m has an interrupt trap priority less than or equal to p. Note that bit m is zero if an interrupt from line m causes the system to run at priority level p. Bit m is zero for all values of p if line m is not used.

for m=0, 1, 2, ... 15.

When an interrupt occurs at level p one of the functions of the common interrupt handler is to alter the system priority level. This is done by selecting interrupt mask p from the interrupt mask table and storing it into the 1700 interrupt mask register (M register). The interrupt masks are defined so that drivers within the system do not need to be reentrant.

Suppose a driver responds to interrupts at priority level seven from line 15. The driver runs at level seven. The system interrupt trap priorities are as follows:

Interrupt Line	Priority Level
15	7
12	6
4	5
1	14
0	15

For simplicity we will assume the other interrupt lines are unused.

According to the definition of the interrupt masks, interrupt mask 7 would allow interrupt recognition for priority levels 14 and 15 only. Thus, bits 0 and 1 would be one and all other bits of interrupt mask 7 would be zero. {Interrupt mask 7 = 0003_{16}.}

When an interrupt is recognized at level 7, the common interrupt handler stores 0003_{16} in the M register before transferring control to the driver. As long as this value is in the M register the driver cannot be interrupted by a line 15 interrupt. Furthermore, the only interrupts recognized at level 7 are from lines 0 and 1. The interrupt masks for lines zero and one would be: interrupt mask 15 = 0000_{16} {for line 0} and interrupt mask 14 = 0001_{16} {for line 1}. Neither of these interrupt masks allows a line 15 interrupt to be recognized. By defining interrupt masks in this way the need for driver reentrancy is eliminated. Refer to Figure 1-8 for another Interrupt Mask Table example.

If the user modifies the interrupt trap region to add a buffered device, the priority level for the device must be less than 14, since the 1706 Buffered Data Channel Handler runs at level 14. For any device the priority level should be greater than 3 since the Job Processor and the Protect Processor run at levels 1-3.

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```
*        I N T E R R U P T   M A S K   T A B L E
*
*
         ENT   MASKT            INTERRUPT MASKS INDEXED BY PRIORITY LEVEL
*
*
*             <------------------------------------ INTERRUPT LINE NUMBER
*               15 14 13 12 11 10  9  8  7  6  5  4  3  2  1  0
*             ***************************************************
*        P -1 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        R  0 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        I  1 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        O  2 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        R  3 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        I  4 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        T  5 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        Y  6 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*           7 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        L  8 *  1  0  0  1  0  0  0  1  0  0  1  1  1  0  1  1  *
*        E  9 *  1  0  0  1  0  0  0  1  0  0  1  0  1  0  1  1  *
*        V 10 *  1  0  0  0  0  0  0  1  0  0  1  0  1  0  1  1  *
*        E 11 *  1  0  0  0  0  0  0  1  0  0  1  0  1  0  1  1  *
*        L 12 *  1  0  0  0  0  0  0  1  0  0  0  0  1  0  1  1  *
*        . 13 *  1  0  0  0  0  0  0  0  0  0  0  0  1  0  1  1  *
*        . 14 *  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  1  *
*        V 15 *  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  *
*             ***************************************************
*
*
        NUM   $913B            PRIORITY LEVEL -1
MASKT   NUM   $913B            PRIORITY LEVEL 00
        NUM   $913B            PRIORITY LEVEL 01
        NUM   $913B            PRIORITY LEVEL 02
        NUM   $913B            PRIORITY LEVEL 03
        NUM   $913B            PRIORITY LEVEL 04
        NUM   $913B            PRIORITY LEVEL 05
        NUM   $913B            PRIORITY LEVEL 06
        NUM   $913B            PRIORITY LEVEL 07
        NUM   $913B            PRIORITY LEVEL 08
        NUM   $912B            PRIORITY LEVEL 09
        NUM   $812B            PRIORITY LEVEL 10
        NUM   $812B            PRIORITY LEVEL 11
        NUM   $810B            PRIORITY LEVEL 12
        NUM   $800B            PRIORITY LEVEL 13
        NUM   $0001            PRIORITY LEVEL 14
        NUM   $0000            PRIORITY LEVEL 15
```

Figure 1-8. Interrupt Mask Table, Section AAH

1.9 Extended Communication Region, Section AAI

Section AAI, Figure 1-9, is called the extended communication region. It contains parameters and logical units required by the operating system. The logical unit numbers are supplied by the user when he completes the 1700 MSOS Ordering Form. The various mass memroy sector addresses are supplied by the system initializer during system installation. The mode switch (indicating 32K or 65K) is set by the restart portion of the SPACE program.

The only words of the extended communication region which a user might wish to change are words 10 and 11,(the unprotected core flag and the no swapping allowed flag.) Word 10 is always set to zero in a standard system indicating that unprotected core is in Part 0. The user may wish to move unprotected core to Part 1. When unprotected core is in Part 0, it is located adjacent to allocatable core so that when necessary the unprotected area can be swapped out to mass memory to extend the allocatable area. However, when both allocatable core and the background are used extensively by a system, and unprotected core is in Part 0, the number of core swaps required may create undesirable time lags in the system. Each core swap requires not only the time to write the unprotected area to mass memory, but also the time required to change the protect status of each word in the unprotected area. (The latter requires the execution of an 8-instruction loop for each word in the unprotected area.) For these reasons, it may in some systems be desirable to have unprotected core in Part 1. In order to change the system so that unprotected core is in Part 1, word 10, the unprotected core flag must be changed to one. In addition, if the partitioned core driver is not present in the system, word 11, the no swapping allowed flag, must also be one.

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```
*            E X T E N D E D   C O M M U N I C A T I O N S   R E G I O N   AAI00100
*                                                                         AAI00200
*                              REFFERENCED THRU LOCATION $E9              AAI00300
        SPC   3                                                           AAI00400
        ENT   MAXSEC                                                      AAI00500
        EXT   JFILV4                                                      AAI00600
        EXT   RCTV                                                        AAI00700
        EXT   ENDOV4                                                      AAI00800
        EXT   DATBAS                                                      AAI00900
        EXT   SECTOR                                                      AAI01000
        EQU   CSYLST(9)                                                   AAI01100
        EQU   CSYINP(10)                                                  AAI01200
        EQU   CSYPUN(11)                                                  AAI01300
        EQU   SECT1()                                                     AAI01400
        EQU   SECT3()                                                     AAI01500
        EQU   SECT4()                                                     AAI01600
        SPC   3                                                           AAI01700
EXTRV4  ADC   0            00   MODE SWITCH   32K=0   65K=1               AAI01800
        ADC   CSYINP       01   STANDARD CCSY INPUT  LU NUMBER            AAI01900
        ADC   CSYPUN       02   STANDARD CCSY OUTPUT LU NUMBER            AAI02000
        ADC   CSYLST       03   STANDARD CCSY LIST   LU NUMBER            AAI02100
        ADC   0            04   FIRST SECTOR LSB OF SYSTEM CORE IMAGE     AAI02200
        ADC   0            05   FIRST SECTOR LSB OF  S.  A.  T.           AAI02300
        ADC   0            06   FIRST SECTOR LSB OF CREP  TABLE           AAI02400
        ADC   0            07   FIRST SECTOR LSB OF CREP1 TABLE           AAI02500
        ADC   JFILV4       08   FIRST SECTOR LSB OF JOB FILE DIRECTORY    AAI02600
        ADC   RCTV         09   ADDRESS OF RCTV TABLE IN THE MONITOR      AAI02700
        ADC   0            10   UNPROTECTED CORE FLAG 0=PART0 / 1=PART1   AAI02800
        ADC   1            10   UNPROTECTED CORE FLAG 0=PART0 / 1=PART1   AAI02900
        ADC   0            11   UNPROTECTED SWAP ALLOWED 0=YES / 1=NO     AAI03000
        ADC   AYERTC       12   ADDRESS LOCATION CONTAINING THE YEAR      AAI03100
        ADC   AMONTC       13   ADDRESS LOCATION CONTAINING THE MONTH     AAI03200
        ADC   ADAYTC       14   ADDRESS LOCATION CONTAINING THE DAY       AAI03300
        ADC   ENDOV4       15   LAST ADDRESS OF PART 0 CORE               AAI03400
        ADC   0            16   FIRST ADDRESS OF BLANK (SYSTEM) COMMON    AAI03500
        ADC   DATBAS       17   FIRST ADDRESS OF LABELED COMMON           AAI03600
        ADC   0            18   COSY DRIVER CURRENT PHYSTAB ADDRESS       AAI03700
        ADC   0            19   JOB TABLE INITIALIZATION FLAG             AAI03800
        ADC   0            20   MASS MEMORY LOCATION OF ENGINEERING FILE  AAI03900
        ADC   SECT1        21   MSB OF MAXIMUM SCRATCH SECTOR             AAI04000
MAXSEC  ADC   SECTOR       22   LSB OF MAXIMUM SCRATCH SECTOR             AAI04100
        ADC   SECT3        23   MSB OF MAXIMUM LIBRARY SECTOR             AAI04200
        ADC   SECT4        24   LSB OF MAXIMUM LIBRARY SECTOR             AAI04300
        EJT                                                               AAI04400
```

Figure 1-9. Extended Communication Region, Section AAI

1.10 System Identification, Section AAJ

This section contains the system name provided by the user in the 1700 MSOS Ordering Form.
It also contains ASCII characters representing the date the system was built. These characters are supplied by the system initializer. The system name and date of build are printed with each autoload and at the beginning of each job on the job name identification sheet. Section AAJ is shown in Figure 1-10.

```
*              S Y S T E M   I D E N T I F I C A T I O N
*
        SPC   1
        ENT   SYSID
        EXT   SYSMON         MONTH SYSTEM WAS BUILT
        EXT   SYSDAY         DAY   SYSTEM WAS BUILT
        EXT   SYSYER         YEAR  SYSTEM WAS BUILT
        SPC   4
SYSID   ALF  16,
        ADC  SYSMON
        ADC  SYSDAY
        ADC  SYSYER
        EJT
```

Figure 1-10. System Identification, Section AAJ

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1-11 Interrupt Stack and Volatile Block Stack, Section AAK

The interrupt stack contains room for one entry for each priority level used by the system. Each entry consists of the values of the Q, A, I, and P registers, the overflow status, and the priority level at the time of an interrupt. The standard interrupt stack contains room for 16 priority levels. The size of the interrupt stack can be decreased by the user if it is certain that some priority levels will not be used by the system. However, care must be taken in doing so. The user must be sure there is room in the interrupt stack for each distinct priority level found in the interrupt trap region, Section AAF.

The volatile block stack, or volatile storage area, is an area that is used by MSOS to preserve reentrancy. It is used by the reentrant FORTRAN run-time package if reentrant FORTRAN is included in the system. It is used by the reentrant ENCODE/DECODE packages if these packages are in the system. If a reentrant user applications program is written, the volatile block stack may be used by such a program. For each priority level in the system the number of words of volatile storage is the sum of the following:

Use	Number Words
Basic Volatile	18
Reentrant FORTRAN	98, if this is a FORTRAN level 0, otherwise
Reentrant ENCODE/DECODE	57, if ENCODE/DECODE can run on this level 0, otherwise
Reentrant user applications	Number of words of volatile needed by any reentrant user applications programs which can run at this level
One extra word needed to store Q in volatile before the check is made to see if there is room in volatile for this entry.	1

The error message, OV, on the output comment device indicates volatile storage has overflowed. No recovery from this error is possible. Before the system is restarted the number of words of volatile should be increased as necessary. It is possible that the message OV may appear if the system deteriorates for some reason other than volatile overflow. Thus, the user should ascertain that some other feature of the system did not cause the system to fail, before assuming volatile overflow caused the problem.

```
*             S T O R A G E   S T A C K S
*
*
NUMPRI EQU  NUMPRI(16)       NUMBER OF SYSTEM PRIORITY LEVELS
EXTVOL EQU  EXTVOL(00)       AMOUNT OF EXTRA VOLATILE STORAGE
*
NFTNLV EQU  NFTNLV(0)        NUMBER OF REENTRANT FORTRAN LEVELS
NEDLVL EQU  NEDLVL(0)        NUMBER OF REENTRANT ENCODE/DECODE LEVELS
NFTNLV EQU  NFTNLV()         NUMBER OF REENTRANT FORTRAN LEVELS
NEDLVL EQU  NEDLVL()         NUMBER OF REENTRANT ENCODE/DECODE LEVELS
       SPC  3
*
*                  I N T E R R U P T   S T A C K
*
       ENT  INTSTK           CONTENTS,  1 = G-REGISTER
*                                       2 = A-REGISTER
*                                       3 = I-REGISTER
*                                       4 = P-REGISTER
*                                       5 = PRIORITY LEVEL AND OVERFLOW
*                                           INDICATOR (BIT 15)
*
INTSTK BZS  INTSTK(5*NUMPRI)
       SPC  3
*                  V O L A T I L E   B L O C K   S T A C K
*
       ENT  VOLBLK           CONTENTS,  1 = G-REGISTER
*                                       3 = I-REGISTER
*                                       4 = USER ASSIGNMENTS
*                                       .
*                                       N = USER ASSIGNMENTS
*
VOLBLK BZS  VOLBLK(18*NUMPRI+98*NFTNLV+57*NEDLVL+EXTVOL+1)
VOLEND EQU  VOLEND(*)        END OF VOLATILE
       SPC  3
*
```

Figure 1-11. Interrupt Stack and Volatile Block Stack, Section AAK

1.12 Scheduler/Timer Stack, Section AAL

This section (Figure 1-12) is used by both the scheduler and the timer programs. The waiting list of programs that have been requested by a scheduler request are threaded by priority. Within each priority they are threaded in a first-in first-out basis. The waiting list of timer requests are threaded according to the amount of time remaining before the program is to be scheduled. An entry in either stack is four words long as indicated in Figure 1-12. The number of entries in this stack is 24 in a standard system without IMPORT. If IMPORT is in the system, an additional 28 entries are included in the standard stack.

Since the stack must be large enough to contain the maximum number of expected simultaneous requests, it is sometimes necessary to increase the size of the scheduler/timer stack. However, the maximum number of expected simultaneous requests is generally difficult to compute. Therefore, the usual procedure is to use the standard stack size until a stack overflow is detected. Such an overflow is indicated by a non-zero value for the variable ERRCNT located in the scheduler/dispatcher program (NDISP or RDISP). If this overflow occurs, one or more scheduler or timer calls will be lost. The user should then increase the stack size and again monitor ERRCNT.

```
*                     S C H E D U L E R / T I M E R   S T A C K
*
         ENT   SCHSTK         CONTENTS,  1 = SCHEDULER CALL
         ENT   SCHLNG                    2 = STARTING ADDRESS
*                                        3 = THREAD TO NEXT CALL
SCHSTK   EQU   SCHSTK(*)                 4 = G-REGISTER CONTENTS
         SPC   1
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  001
         EJT
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  002
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  003
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  004
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  005
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  006
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  007
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  008
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  009
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  010
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  012
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  013
         EJT
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  014
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  015
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  016
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  017
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  018
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  019
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  020
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  021
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  023
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  024
         ADC   0,0,(-0),0     SCHEDULER STACK ENTRY  025
         EJT
*              S C H E D U L E R / T I M E R   S T A C K
*
*              28 ENTRIES REQUIRED FOR HIGH SPEED IMPORT
         SPC   4
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  025
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  026
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  027
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  028
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  029
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  030
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  031
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  032
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  033
         EJT
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  034
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  035
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  036
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  037
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  038
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  039
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  040
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  041
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  042
         ADC   0,0,*+2,0      SCHEDULER STACK ENTRY  043
         EJT
```

Figure 1-12. Scheduler/Timer Stack, Section AAL

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```
       ADC    0,0,*+2,0       SCHEDULER STACK ENTRY  045                          AAL05900
       ADC    0,0,*+2,0       SCHEDULER STACK ENTRY  046                          AAL06000
       ADC    0,0,*+2,0       SCHEDULER STACK ENTRY  047                          AAL06100
       ADC    0,0,*+2,0       SCHEDULER STACK ENTRY  048                          AAL06200
       ADC    0,0,*+2,0       SCHEDULER STACK ENTRY  049                          AAL06300
       ADC    0,0,*+2,0       SCHEDULER STACK ENTRY  050                          AAL06400
       ADC    0,0,*+2,0       SCHEDULER STACK ENTRY  051                          AAL06500
       ADC    0,0,*+2,0       SCHEDULER STACK ENTRY  052                          AAL06600
       ADC    0,0,(-0),0      SCHEDULER STACK ENTRY  053                          AAL06700
SCHLNG EQU    SCHLNG(*-SCHSTK)  SCHEDULER STACK LENGTH                            AAL06800
       EJT                                                                        AAL06900
```

Figure 1-12. Scheduler/Timer Stack, Section AAL (Continued)

1.13 LOG1A Logical Unit Table, Section AAM

The first word of Section AAM must contain the number of logical units in the system. This must be followed by one entry for each logical unit in the system. An entry for a given logical unit is the address of the physical device table for that logical unit.

Logical units are of two types, diagnostic and non-diagnostic. A diagnostic logical unit differs from a non-diagnostic logical unit for the same device in that a device error is handled differently. For a non-diagnostic logical unit, a device error causes the alternate device handler to be called. One of the functions of the alternate device handler is to print an error message indicating the logical unit and an error code. For a diagnostic logical unit the alternate device handler is not called. An error message is printed by SCMM. Such an error message contains more information than the corresponding message printed by the alternate device handler since SCMM performs additional error analysis on the device.

There are twelve standard logical units. These are always non-diagnostic logical units. The twelve are as follows:

Logical Unit	Function
1	Core allocator
2	Dummy
3	Dummy
4	Comment input/output
5	COSY driver - Unit 0 *
6	Mag tape - Unit 0 *
7	Pseudo tape - Unit 0 *
8	Library unit
9	Standard list unit
10	Standard input unit
11	Standard output unit
12	FORTRAN list unit

* If not present in a system, dummy is substituted.

Logical units 2 and 3 are always dummy logical units. This is due to the following reasons. FORTRAN allows its users to specify logical units 1-4 for input/output. There is no problem in distinguishing FORTRAN logical unit one from the system logical unit one, since the latter is the core allocator and does not correspond to an input/output device. Also, there is no confusion with regard to FORTRAN logical unit four, since logical unit four is the comment input/output device for both FORTRAN and the operating system. However, ambiguities would arise in regard to FORTRAN logical units two and three if the corresponding operating system logical units were non-dummy logical units. Therefore, these two logical units are always specified as dummies.

The set of all possible entries which may appear in a given LOG1A table is shown in Figure 1-13. The characters, XXX, in the comment field of each line are changed to a numerical value when a line is selected for a given SYSDAT. This value is an actual logical unit number. Refer to Figure 1-14 for a sample SYSDAT LOG1A Table. Logical units are selected according to the user's specifications in the 1700 MSOS Ordering Form.

The lines in the first part of this section have been grouped as indicated by brackets in Figure 1-13. One line is selected from each group as the corresponding standard logical unit. The reason the dummy logical unit is indicated as the first line of some groups is so that the Configurator can substitute the dummy logical unit for one or more of the twelve standard logical units if necessary. This preserves the standard logical unit numbers following an unused logical unit, so that the system may refer to the first twelve logical units by number, independent of system configuration.

In most systems, the remaining non-diagnostic logical units are listed after the first twelve logical units. Then the diagnostic logical units and finally, any non-diagnostic logical units used only as alternate devices, would appear. The order of the logical units after the first twelve is dependent on user specification in the MSOS Ordering Form.

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```
         L O G I C A L   U N I T   T A B L E S   ( L O G 1 A )                   AAM00100
                                                                                 AAM00200
         ENT   LOG1A      PHYSICAL DEVICES ADDRESSES BY LOGICAL UNIT             AAM00300
         ENT   NUMLU                                                             AAM00400
         SPC   1                                                                 AAM00500
LOG1A    ADC   NUMLU            NUMBER OF LOGICAL UNITS                          AAM00600
         ADC   PCORE        1   XXX CORE ALLOCATOR                               AAM00700
         ADC   PDUMMY       2   XXX DUMMY LOGICAL UNIT                           AAM00800
         ADC   P1711            XXX 1711 TELETYPE, 713-10 CRT                    AAM00900
         ADC   P1713K       4   XXX 1713 TELETYPE KEYBOARD/PRINTER               AAM01000
         ADC   PDUMMY           XXX DUMMY LOGICAL UNIT                           AAM01100
         ADC   PCOSY1       5   XXX COSY DRIVER, FIRST UNIT                      AAM01200
         ADC   PCOSY2           XXX COSY DRIVER, SECOND UNIT                     AAM01300
         ADC   PDUMMY           XXX DUMMY LOGICAL UNIT                           AAM01400
         ADC   P73220           XXX 1732-2 615-73/93 MAG TAPE UNIT 0             AAM01500
         ADC   P73221           XXX 1732-2 615-73/93 MAG TAPE UNIT 1             AAM01600
         ADC   P73222           XXX 1732-2 615-73/93 MAG TAPE UNIT 2             AAM01700
         ADC   P73223           XXX 1732-2 615-73/93 MAG TAPE UNIT 3             AAM01800
         ADC   P732U0           XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 0     AAM01900
         ADC   P732U1           XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 1     AAM02000
         ADC   P732U2           XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 2     AAM02100
         ADC   P732U3           XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 3     AAM02200
         ADC   P732U4           XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 4     AAM02300
         ADC   P732U5           XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 5     AAM02400
         ADC   P732U6           XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 6     AAM02500
         ADC   P732U7           XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 7     AAM02600
         ADC   P732B0           XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 0       AAM02700
         ADC   P732B1           XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 1       AAM02800
         ADC   P732B2           XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 2       AAM02900
         ADC   P732B3           XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 3       AAM03000
         ADC   P732B4           XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 4       AAM03100
         ADC   P732B5       6   XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 5       AAM03200
         ADC   P732B6           XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 6       AAM03300
         ADC   P732B7           XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 7       AAM03400
         ADC   P731U0           XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 0         AAM03500
         ADC   P731U1           XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 1         AAM03600
         ADC   P731U2           XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 2         AAM03700
         ADC   P731U3           XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 3         AAM03800
         ADC   P731U4           XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 4         AAM03900
         ADC   P731U5           XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 5         AAM04000
         ADC   P731U6           XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 6         AAM04100
         ADC   P731U7           XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 7         AAM04200
         ADC   P731B0           XXX BUFFERED 1731-601 MAG TAPE, UNIT 0           AAM04300
         ADC   P731B1           XXX BUFFERED 1731-601 MAG TAPE, UNIT 1           AAM04400
         ADC   P731B2           XXX BUFFERED 1731-601 MAG TAPE, UNIT 2           AAM04500
         ADC   P731B3           XXX BUFFERED 1731-601 MAG TAPE, UNIT 3           AAM04600
         ADC   P731B4           XXX BUFFERED 1731-601 MAG TAPE, UNIT 4           AAM04700
         ADC   P731B5           XXX BUFFERED 1731-601 MAG TAPE, UNIT 5           AAM04800
         ADC   P731B6           XXX BUFFERED 1731-601 MAG TAPE, UNIT 6           AAM04900
         ADC   P731B7           XXX BUFFERED 1731-601 MAG TAPE, UNIT 7           AAM05000
         ADC   PDUMMY           XXX DUMMY LOGICAL UNIT                           AAM05100
         ADC   PSUD00           XXX PSEUDO TAPE, UNIT 0                          AAM05200
         ADC   PSUD01           XXX PSEUDO TAPE, UNIT 1                          AAM05300
         ADC   PSUD02       7   XXX PSEUDO TAPE, UNIT 2                          AAM05400
```

Figure 1-13. LOG1A Logical Unit Table, Section AAM

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```
        ADC  PSUD03          XXX PSEUDO TAPE, UNIT 3                              AAM05500
        ADC  PSUD04       1  XXX PSEUDO TAPE, UNIT 4                              AAM05600
        ADC  PSUD06          XXX PSEUDO TAPE, UNIT 6                              AAM05700
        ADC  PSUD07          XXX PSEUDO TAPE, UNIT 7                              AAM05800
        ADC  P73320          XXX 1733-2 856-2/4 DISK, UNIT 0                      AAM05900
        ADC  P73321          XXX 1733-2 856-2/4 DISK, UNIT 1                      AAM06000
        ADC  P73322          XXX 1733-2 856-2/4 DISK, UNIT 2                      AAM06100
        ADC  P73323          XXX 1733-2 856-2/4 DISK, UNIT 3                      AAM06200
        ADC  P17380          XXX 1738 853/4 DISK, UNIT 0                          AAM06300
        ADC  P17381          XXX 1738 853/4 DISK, UNIT 1                          AAM06400
        ADC  P73310          XXX 1733-1 853/4 DISK, UNIT 0                        AAM06500
        ADC  P73311          XXX 1733-1 853/4 DISK, UNIT 1                        AAM06600
        ADC  P73312       8  XXX 1733-1 853/4 DISK, UNIT 2                        AAM06700
        ADC  P73313          XXX 1733-1 853/4 DISK, UNIT 3                        AAM06800
        ADC  P73314          XXX 1733-1 853/4 DISK, UNIT 4                        AAM06900
        ADC  P73315          XXX 1733-1 853/4 DISK, UNIT 5                        AAM07000
        ADC  P73316          XXX 1733-1 853/4 DISK, UNIT 6                        AAM07100
        ADC  P73317          XXX 1733-1 853/4 DISK, UNIT 7                        AAM07200
        ADC  P17391          XXX 1739-1 CARTRIDGE DISK                            AAM07300
        ADC  P1752           XXX 1752 DRUM                                        AAM07400
        ADC  P1751           XXX 1751 DRUM                                        AAM07500
        ADC  P42312          XXX 1742-30/120 LINE PRINTER                         AAM07600
        ADC  P40421          XXX 1740-501/1742 LINE PRINTER                       AAM07700
        ADC  P1711        9  XXX 1711 TELETYPE, 713-10 CRT                        AAM07800
        ADC  P1713K          XXX 1713 TELETYPE KEYBOARD/PRINTER                   AAM07900
        ADC  P17293          XXX 1729-3 CARD READER                               AAM08000
        ADC  P1728           XXX 1728-430 CARD READER                             AAM08100
        ADC  P17292          XXX 1729-2 CARD READER                               AAM08200
        ADC  P1726U          XXX UNBUFFERED 1726-405 CARD READER                  AAM08300
        ADC  P1726B          XXX BUFFERED 1726-405 CARD READER                    AAM08400
        ADC  P73220          XXX 1732-2 615-73/93 MAG TAPE UNIT 0                 AAM08500
        ADC  P732U0      10  XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 0         AAM08600
        ADC  P732B0          XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 0           AAM08700
        ADC  P731U0          XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 0             AAM08800
        ADC  P731B0          XXX BUFFERED 1731-601 MAG TAPE, UNIT 0               AAM08900
        ADC  P1713R          XXX 1713 TELETYPE PAPER TAPE READER                  AAM09000
        ADC  P1777R          XXX 1777/1721 PAPER TAPE READER                      AAM09100
        ADC  P1728           XXX 1728-430 CARD PUNCH                              AAM09200
        ADC  P1728S          XXX 1728/430 CARD PUNCH - S/W BUFFERED               AAM09300
        ADC  P73220          XXX 1732-2 615-73/93 MAG TAPE UNIT 0                 AAM09400
        ADC  P732U0          XXX UNBUFFERED 1732-1-608/9 MAG TAPE, UNIT 0         AAM09500
        ADC  P732B0          XXX BUFFERED 1732-1-608/9 MAG TAPE, UNIT 0           AAM09600
        ADC  P731U0      11  XXX UNBUFFERED 1731-601 MAG TAPE, UNIT 0             AAM09700
        ADC  P731B0          XXX BUFFERED 1731-601 MAG TAPE, UNIT 0               AAM09800
        ADC  P1713P          XXX 1713 TELETYPE PAPER TAPE PUNCH                   AAM09900
        ADC  P171PS          XXX 1713 PAPER TAPE PUNCH - S/W BUFFERED             AAM10000
        ADC  P1777P          XXX 1777/1723 PAPER TAPE PUNCH                       AAM10100
        ADC  P777PS          XXX 1777/23 PAPER TAPE PUNCH - S/W BUFFERED          AAM10200
FTN742  ADC  P42312      12  XXX 1742-30/120 FORTRAN LINE PRINTER                 AAM10300
FTN740  ADC  P40421          XXX 1740-501/1742 FORTRAN LINE PRINTER               AAM10400
        ADC  P1711           XXX 1711 TELETYPE, 713-10 CRT                        AAM10500
        ADC  P1713K          XXX 1713 TELETYPE KEYBOARD/PRINTER                   AAM10600
        ADC  P1728S          XXX 1728/430 CARD PUNCH - S/W BUFFERED               AAM10700
        ADC  P1713R          XXX 1713 TELETYPE PAPER TAPE READER                  AAM10800
        ADC  P1777R          XXX 1777/1721 PAPER TAPE READER                      AAM10900
PTRDNP  ADC  P1777R          XXX 1777/1721 PAPER TAPE READER - NO PARITY          AAM11000
        ADC  P1713P          XXX 1713 TELETYPE PAPER TAPE PUNCH                   AAM11100
        ADC  P171PS          XXX 1713 PAPER TAPE PUNCH - S/W BUFFERED             AAM11200
        ADC  P1777P          XXX 1777/1723 PAPER TAPE PUNCH                       AAM11300
        ADC  P777PS          XXX 1777/23 PAPER TAPE PUNCH - S/W BUFFERED          AAM11400
```

Figure 1-13. LOG1A Logical Unit Table, Section AAM (Continued)

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```
        ADC   PCOM00        XXX 364-4 COMMUNICATIONS MUX, UNIT 0                  AAM11500
        ADC   PCOM01        XXX 364-4 COMMUNICATIONS MUX, UNIT 1                  AAM11600
        ADC   PCOM02        XXX 364-4 COMMUNICATIONS MUX, UNIT 2                  AAM11700
        ADC   PCOM03        XXX 364-4 COMMUNICATIONS MUX, UNIT 3                  AAM11800
        ADC   PCOM04        XXX 364-4 COMMUNICATIONS MUX, UNIT 4                  AAM11900
        ADC   PCOM05        XXX 364-4 COMMUNICATIONS MUX, UNIT 5                  AAM12000
        ADC   PCOM06        XXX 364-4 COMMUNICATIONS MUX, UNIT 6                  AAM12100
        ADC   PCOM07        XXX 364-4 COMMUNICATIONS MUX, UNIT 7                  AAM12200
        ADC   PCOM08        XXX 364-4 COMMUNICATIONS MUX, UNIT 8                  AAM12300
        ADC   PCOM09        XXX 364-4 COMMUNICATIONS MUX, UNIT 9                  AAM12400
        ADC   PCOM10        XXX 364-4 COMMUNICATIONS MUX, UNIT 10                 AAM12500
        ADC   PCOM11        XXX 364-4 COMMUNICATIONS MUX, UNIT 11                 AAM12600
        ADC   PCOM12        XXX 364-4 COMMUNICATIONS MUX, UNIT 12                 AAM12700
        ADC   PCOM13        XXX 364-4 COMMUNICATIONS MUX, UNIT 13                 AAM12800
        ADC   PCOM14        XXX 364-4 COMMUNICATIONS MUX, UNIT 14                 AAM12900
        ADC   PCOM15        XXX 364-4 COMMUNICATIONS MUX, UNIT 15                 AAM13000
        ADC   PCMS00        XXX 364-4 COMM. MUX, UNIT  0 - S/W BUFFERED           AAM13100
        ADC   PCMS01        XXX 364-4 COMM. MUX, UNIT  1 - S/W BUFFERED           AAM13200
        ADC   PCMS02        XXX 364-4 COMM. MUX, UNIT  2 - S/W BUFFERED           AAM13300
        ADC   PCMS03        XXX 364-4 COMM. MUX, UNIT  3 - S/W BUFFERED           AAM13400
        ADC   PCMS04        XXX 364-4 COMM. MUX, UNIT  4 - S/W BUFFERED           AAM13500
        ADC   PCMS05        XXX 364-4 COMM. MUX, UNIT  5 - S/W BUFFERED           AAM13600
        ADC   PCMS06        XXX 364-4 COMM. MUX, UNIT  6 - S/W BUFFERED           AAM13700
        ADC   PCMS07        XXX 364-4 COMM. MUX, UNIT  7 - S/W BUFFERED           AAM13800
        ADC   PCMS08        XXX 364-4 COMM. MUX, UNIT  8 - S/W BUFFERED           AAM13900
        ADC   PCMS09        XXX 364-4 COMM. MUX, UNIT  9 - S/W BUFFERED           AAM14000
        ADC   PCMS10        XXX 364-4 COMM. MUX, UNIT 10 - S/W BUFFERED           AAM14100
        ADC   PCMS11        XXX 364-4 COMM. MUX, UNIT 11 - S/W BUFFERED           AAM14200
        ADC   PCMS12        XXX 364-4 COMM. MUX, UNIT 12 - S/W BUFFERED           AAM14300
        ADC   PCMS13        XXX 364-4 COMM. MUX, UNIT 13 - S/W BUFFERED           AAM14400
        ADC   PCMS14        XXX 364-4 COMM. MUX, UNIT 14 - S/W BUFFERED           AAM14500
        ADC   PCMS15        XXX 364-4 COMM. MUX, UNIT 15 - S/W BUFFERED           AAM14600
LU1747  ADC   P1747         XXX 1747 DATA SET CONTROLLER                          AAM14700
LU2740  ADC   P17440        XXX DIGIGRAPHICS CONSOLE 0                            AAM14800
LU2741  ADC   P17441        XXX DIGIGRAPHICS CONSOLE 1                            AAM14900
        ADC   P1501         XXX 1501 HIGH SPEED ANALOG MUX CONTROLLER             AAM15000
        ADC   P1536         XXX 1536-2 RELAY ANALOG MUX CONTROLLER                AAM15100
IMPSPD  ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 0                          AAM15200
IMPTC   ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 1                          AAM15300
IMPCT   ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 2                          AAM15400
IMSTR1  ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 3                          AAM15500
        ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 4                          AAM15600
        ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 5                          AAM15700
        ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 6                          AAM15800
        ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 7                          AAM15900
IMLAST  ADC   PDUMMY        XXX HIGH SPEED IMPORT UNIT 8                          AAM16000
X1711   ADC   P1711         XXX DIAGNOSTIC 1711 TELETYPE, 713-10 CRT              AAM16100
X1713K  ADC   P1713K        XXX DIAGNOSTIC 1713 TTY KEYBOARD / PRINTER            AAM16200
X73220  ADC   P73220        XXX DIAGNOSTIC 1732-2 615 MAG TAPE, UNIT 0            AAM16300
X73221  ADC   P73221        XXX DIAGNOSTIC 1732-2 615 MAG TAPE, UNIT 1            AAM16400
X73222  ADC   P73222        XXX DIAGNOSTIC 1732-2 615 MAG TAPE, UNIT 2            AAM16500
X73223  ADC   P73223        XXX DIAGNOSTIC 1732-2 615 MAG TAPE, UNIT 3            AAM16600
X732U0  ADC   P732U0        XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 0 AAM16700
X732U1  ADC   P732U1        XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 1 AAM16800
X732U2  ADC   P732U2        XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 2 AAM16900
X732U3  ADC   P732U3        XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 3 AAM17000
X732U4  ADC   P732U4        XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 4 AAM17100
X732U5  ADC   P732U5        XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 5 AAM17200
X732U6  ADC   P732U6        XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 6 AAM17300
X732U7  ADC   P732U7        XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 7 AAM17400
```

Figure 1-13. LOG1A Logical Unit Table, Section AAM (Continued)

```
X732B0  ADC  P732B0             XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 0 AAM17500
X732B1  ADC  P732B1             XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 1 AAM17600
X732B2  ADC  P732B2             XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 2 AAM17700
X732B3  ADC  P732B3             XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 3 AAM17800
X732B4  ADC  P732B4             XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 4 AAM17900
X732B5  ADC  P732B5             XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 5 AAM18000
X732B6  ADC  P732B6             XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 6 AAM18100
X732B7  ADC  P732B7             XXX DIAGNOSTIC 1732-1 608/9 MAG TAPE, UNIT 7 AAM18200
X731U1  ADC  P731U1             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1     AAM18300
X731U2  ADC  P731U2             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 2     AAM18400
X731U3  ADC  P731U3             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 3     AAM18500
X731U4  ADC  P731U4             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 4     AAM18600
X731U5  ADC  P731U5             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 5     AAM18700
X731U6  ADC  P731U6             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 6     AAM18800
X731U7  ADC  P731U7             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 7     AAM18900
X731B0  ADC  P731B0             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0     AAM19000
X731B1  ADC  P731B1             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1     AAM19100
X731B2  ADC  P731B2             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 2     AAM19200
X731B3  ADC  P731B3             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 3     AAM19300
X731B4  ADC  P731B4             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 4     AAM19400
X731B5  ADC  P731B5             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 5     AAM19500
X731B6  ADC  P731B6             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 6     AAM19600
X731B7  ADC  P731B7             XXX DIAGNOSTIC 1731-601 MAG TAPE, UNIT 7     AAM19700
X17380  ADC  P17380             XXX DIAGNOSTIC 1738 853/4 DISK, UNIT 0       AAM19800
X17381  ADC  P17381             XXX DIAGNOSTIC 1738 853/4 DISK, UNIT 1       AAM19900
X42312  ADC  P42312             XXX DIAGNOSTIC 1742-30/120 LINE PRINTER      AAM20000
X40421  ADC  P40421             XXX DIAGNOSTIC 1740-501/1742 LINE PRINTER    AAM20100
X17293  ADC  P17293             XXX DIAGNOSTIC 1729-3 CARD READER            AAM20200
X1728   ADC  P1728              XXX DIAGNOSTIC 1728-430 READER / PUNCH       AAM20300
X17292  ADC  P17292             XXX DIAGNOSTIC 1729-2 CARD READER            AAM20400
X1726U  ADC  P1726U             XXX DIAGNOSTIC UNBUFFERED 1726 CARD READER   AAM20500
X1726B  ADC  P1726B             XXX DIAGNOSTIC BUFFERED 1726 CARD READER     AAM20600
X1713R  ADC  P1713R             XXX DIAGNOSTIC 1713 TTY READER               AAM20700
X1777R  ADC  P1777R             XXX DIAGNOSTIC 1777/1721 PAPER TAPE READER   AAM20800
X1713P  ADC  P1713P             XXX DIAGNOSTIC 1713 TTY PUNCH                AAM20900
X1777P  ADC  P1777P             XXX DIAGNOSTIC 1777/1723 PAPER TAPE PUNCH    AAM21000
        ADC  PDUMMY      3     {XXX DUMMY LOGICAL UNIT                       AAM21100
NUMLU   EQU  NUMLU(*-LOG1A-1)                                                AAM21200
        EJT                                                                  AAM21300
```

Figure 1-13. LOG1A Logical Unit Table, Section AAM (Continued)

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```
*         L O G I C A L   U N I T   T A B L E S   ( L O G 1 A )
*
*
       ENT   LOG1A      PHYSICAL DEVICES ADDRESSES BY LOGICAL UNIT
       ENT   NUMLU
       SPC   1
LOG1A  ADC   NUMLU            NUMBER OF LOGICAL UNITS
       ADC   PCORE            1     CORE ALLOCATOR
       ADC   PDUMMY           2     DUMMY LOGICAL UNIT
       ADC   PDUMMY           3     DUMMY LOGICAL UNIT
       ADC   P1711            4     1711 TELETYPE, 713-10 CRT
       ADC   PDUMMY           5     DUMMY LOGICAL UNIT
       ADC   P731U0           6     UNBUFFERED 1731-601 MAG TAPE, UNIT 0
       ADC   PSUD00           7     PSEUDO TAPE, UNIT 0
       ADC   P17380           8     1738 853/4 DISK, UNIT 0
       ADC   P40421           9     1740-501/1742 LINE PRINTER
       ADC   P1728            10    1728-430 CARD READER
       ADC   P1728            11    1728-430 CARD PUNCH
FTN740 ADC   P40421           12    1740-501/1742 FORTRAN LINE PRINTER
       ADC   P731U1           13    UNBUFFERED 1731-601 MAG TAPE, UNIT 1
       ADC   P1777R           14    1777/1721 PAPER TAPE READER
       ADC   P1777P           15    1777/1723 PAPER TAPE PUNCH
PTRDNP ADC   P1777R           16    1777/1721 PAPER TAPE READER - NO PARITY
       ADC   PCOM00           17    364-4 COMMUNICATIONS MUX, UNIT 0
       ADC   PCOM01           18    364-4 COMMUNICATIONS MUX, UNIT 1
X731U0 ADC   P731U0           33    DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0
X731U1 ADC   P731U1           34    DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
X17380 ADC   P17380           35    DIAGNOSTIC 1738 853/4 DISK, UNIT 0
X40421 ADC   P40421           36    DIAGNOSTIC 1740-501/1742 LINE PRINTER
X1728  ADC   P1728            37    DIAGNOSTIC 1728-430 READER / PUNCH
X1777R ADC   P1777R           38    DIAGNOSTIC 1777/1721 PAPER TAPE READER
X1777P ADC   P1777P           39    DIAGNOSTIC 1777/1723 PAPER TAPE PUNCH
X1711  ADC   P1711            40    DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
NUMLU  EQU   NUMLU(*-LOG1A-1)
       EJT
```

Figure 1-14. Sample SYSDAT LOG1A Table, Section AAM

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1.14 LOG1 Logical Unit Table, Section AAN

The first word of the LOG1 table contains the number of logical units in the system. Following this there must be one entry for each logical unit in the system. These entries must correspond in order to the entries in the LOG1A table.

Bit 14 of a given entry indicates whether or not this logical unit shares a physical device table with another logical unit. If bit 14 is one, the logical unit does share a physical device table. An example of a SYSDAT LOG1 table, is shown in Figure 1-15. This example corresponds to the LOG1A table shown in Figure 1-14. In this figure all logical units share physical device tables except logical units 1, 5, 7, 8, 13, 14, 15, and 17. The particular physical device table shared by a set of logical units may be identified by referring to Figure 1-14. For example, logical units 2 and 3 share the physical device table located at PDUMMY; logical units 9, 12 and 21 share the physical device table located at P42312.

Bit 13 of a LOG1 entry is always zero in an original SYSDAT. If, during system operation, the corresponding hardware device driver detects an irrecoverable error, bit 13 will be set to one. At that time, if an alternate device exists, it will be used to process all requests for this logical unit until MSOS is advised that the primary unit has been restored. Bit 13 is not to be modified by the user.

Bits 0-11 of a LOG1 entry give the logical unit number of the alternate device if one exists for this logical unit. If bits 0-11 are zero, there is no alternate device. In the example in Figure 1-15, there is only one logical unit which has an alternate device. That is logical unit 4, the standard comment input/output device which has logical unit 2, the dummy logical unit, as an alternate. This is a standard system procedure so that a failure on the system comment device will not hang the system in an endless sequence of attempts to print an error message on the comment device.

```
*            L O G I C A L    U N I T    T A B L E S    ( L O G 1 )
*
*
          ENT   LOG1          LOGICAL UNIT INFORMATION BY LOGICAL UNIT
*                                   BIT 14 = 1, IMPLIES LU SHARES DEVICE
*                                   BIT 13 = 1, IMPLIES LU IS MARKED DOWN
*                                   BITS 0 - 11 IS ALTERNATE LOGICAL UNIT
*                                             ALTERNATE = 0, IMPLIES NONE
S         EQU   S($4000)            SHARED BIT
          SPC   1
LOG1      ADC   NUMLU               NUMBER OF LOGICAL UNITS
          ADC   0                   1     CORE ALLOCATOR
          ADC   0+S                 2     DUMMY LOGICAL UNIT
          ADC   0+S                 3     DUMMY LOGICAL UNIT
          ADC   2+S                 4     1711 TELETYPE, 713-10 CRT
          ADC   0+S                 5     DUMMY LOGICAL UNIT
          ADC   0+S                 6     UNBUFFERED 1731-601 MAG TAPE, UNIT 0
          ADC   0                   7     PSEUDO TAPE, UNIT 0
          ADC   0+S                 8     1738 853/4 DISK, UNIT 0
          ADC   0+S                 9     1740-501/1742 LINE PRINTER
          ADC   0+S                 10    1728-430 CARD READER
          ADC   0+S                 11    1728-430 CARD PUNCH
          ADC   0+S                 12    1740-501/1742 FORTRAN LINE PRINTER
          ADC   0+S                 13    UNBUFFERED 1731-601 MAG TAPE, UNIT 1
          ADC   0+S                 14    1777/1721 PAPER TAPE READER
          ADC   0+S                 15    1777/1723 PAPER TAPE PUNCH
          ADC   0+S                 16    1777/1721 PAPER TAPE READER - NO PARITY
          ADC   0                   17    364-4 COMMUNICATIONS MUX, UNIT 0
          ADC   0                   18    364-4 COMMUNICATIONS MUX, UNIT 1
          ADC   0+S                 33    DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0
          ADC   0+S                 34    DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
          ADC   0+S                 35    DIAGNOSTIC 1738 853/4 DISK, UNIT 0
          ADC   0+S                 36    DIAGNOSTIC 1740-501/1742 LINE PRINTER
          ADC   0+S                 37    DIAGNOSTIC 1728-430 READER / PUNCH
          ADC   0+S                 38    DIAGNOSTIC 1777/1721 PAPER TAPE READER
          ADC   0+S                 39    DIAGNOSTIC 1777/1723 PAPER TAPE PUNCH
          ADC   0+S                 40    DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
```

Figure 1-15. Sample SYSDAT LOG1 Table, Section AAN

1.15 LOG2 Logical Unit Table, Section AA0

The first word of the LOG2 table contains the number of logical units in the system. Following the first word there must be one entry for each logical unit in the system. These entries are in the same order as in the LOG1A table and the LOG1 table. Each entry is a pointer to the thread word of the next request to be processed for this logical unit. Initially, each entry is $FFFF_{16}$ signifying there are no requests threaded for this logical unit. An example of a SYSDAT LOG2 table is shown in Figure 1-16. The logical units correspond to those in the LOG1A Table in Figure 1-14.

```
*                L O G I C A L   U N I T   T A B L E S   ( L O G 2 )
*
*
         ENT     LOG2          TOP OF I/O THREAD ADDRESSES BY LOGICAL UNIT
         SPC     1
LOG2     ADC     NUMLU            NUMBER OF LOGICAL UNITS
         NUM     $FFFF            1     CORE ALLOCATOR
         NUM     $FFFF            2     DUMMY LOGICAL UNIT
         NUM     $FFFF            3     DUMMY LOGICAL UNIT
         NUM     $FFFF            4     1711 TELETYPE, 713-10 CRT
         NUM     $FFFF            5     DUMMY LOGICAL UNIT
         NUM     $FFFF            6     UNBUFFERED 1731-601 MAG TAPE, UNIT 0
         NUM     $FFFF            7     PSEUDO TAPE, UNIT 0
         NUM     $FFFF            8     1738 853/4 DISK, UNIT 0
         NUM     $FFFF            9     1740-501/1742 LINE PRINTER
         NUM     $FFFF            10    1728-430 CARD READER
         NUM     $FFFF            11    1728-430 CARD PUNCH
         NUM     $FFFF            12    1740-501/1742 FORTRAN LINE PRINTER
         NUM     $FFFF            13    UNBUFFERED 1731-601 MAG TAPE, UNIT 1
         NUM     $FFFF            14    1777/1721 PAPER TAPE READER
         NUM     $FFFF            15    1777/1723 PAPER TAPE PUNCH
         NUM     $FFFF            16    1777/1721 PAPER TAPE READER - NO PARITY
         NUM     $FFFF            17    364-4 COMMUNICATIONS MUX, UNIT 0
         NUM     $FFFF            18    364-4 COMMUNICATIONS MUX, UNIT 1
         NUM     $FFFF            33    DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0
         NUM     $FFFF            34    DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
         NUM     $FFFF            35    DIAGNOSTIC 1738 853/4 DISK, UNIT 0
         NUM     $FFFF            36    DIAGNOSTIC 1740-501/1742 LINE PRINTER
         NUM     $FFFF            37    DIAGNOSTIC 1728-430 READER / PUNCH
         NUM     $FFFF            38    DIAGNOSTIC 1777/1721 PAPER TAPE READER
         NUM     $FFFF            39    DIAGNOSTIC 1777/1723 PAPER TAPE PUNCH
         NUM     $FFFF            40    DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
```

Figure 1-16. Sample SYSDAT LOG2 Table, Section AA0.

1.16 Diagnostic Tables, Section AAP

The first part of the diagnostic tables is the alternate device error table. This table is used by the system as a temporary storage area in which a driver of a failed device passes information to the alternate device handler. The number of entries in the table is contained in the first word of the table. In a standard system the number of entries is the number of logical units in the system. The number of entries must be at least as large as the maximum number of logical units which could fail simultaneously. If the user can ascertain that this maximum is smaller than the number of logical units in the system, the number of entries in the table may be reduced. For example, in a standard system the number of entries may be reduced by one for logical unit one, the core allocator, and reduced by two more for logical units two and three, dummy logical units. Neither the core allocator nor a dummy logical unit will call the alternate device handler. Care must be taken in reducing the size of the table in that if the table is insufficient, the alternate device handler halts in a $18FF_{16}$ instruction, thus terminating system operation.

The second part of the diagnostic tables is the diagnostic timer table. This table must contain one entry for each logical unit for which the diagnostic timer is to test for a timeout condition. An entry in the diagnostic timer table is the address of the physical device tablefor the logical unit. The diagnostic timer program will examine each physical device table whose address is contained in the diagnostic timer table. If the diagnostic clock word of the physical device table is counted down to zero, then the diagnostic timer causes the driver to be scheduled through its error entry. For a hardware device, this is an indication of

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a lost interrupt. For the core allocator, a count down to zero indicates a swap of unprotected core to mass memory may be performed at this time if additional allocatable core is needed. The frequency of swaps allowed in a system is determined by the user in the MSOS Ordering Form.

An example of SYSDAT diagnostic tables appears in Figure 1-17.

```
*           D I A G N O S T I C   T A B L E S
*
*
        ENT   ALTERR     ALTERNATE DEVICE ERROR TABLE
        SPC   1
ALTERR  ADC   NUMLU           ERROR TABLE SIZE
        BZS   (NUMLU)         SPACE FOR MAXIMUM SIMULTANEOUS FAILURES
        SPC   3
        ENT   DGNTAB     DIAGNOSTIC TIMER TABLE
        SPC   1
DGNTAB  EQU   DGNTAB(*)       START OF TABLE
        ADC   PCORE           1     CORE ALLOCATOR
        ADC   P1711           4     1711 TELETYPE, 713-10 CRT
        ADC   P731U0          6     UNBUFFERED 1731-601 MAG TAPE, UNIT 0
        ADC   P17380          8     1738 853/4 DISK, UNIT 0
        ADC   P40421          9     1740-501/1742 LINE PRINTER
        ADC   P1728           10    1728-430 CARD READER
        ADC   P731U1          13    UNBUFFERED 1731-601 MAG TAPE, UNIT 1
        ADC   P1777R          14    1777/1721 PAPER TAPE READER
        ADC   P1777P          15    1777/1723 PAPER TAPE PUNCH
        ADC   PCOM00          17    364-4 COMMUNICATIONS MUX, UNIT 0
        ADC   PCOM01          18    364-4 COMMUNICATIONS MUX, UNIT 1
        NUM   $FFFF           END OF TABLE
```

Figure 1-17. Sample SYSDAT Diagnostic Tables, Section AAP

1.17 Standard Logical Units, Section AAQ

This section defines the standard logical units for the system. Equivalences in this section are referenced in the communication region, Section AAE. The standard equivalences in the data base are shown in Figure 1-18. These equivalences may be changed if the user desires. Note that the scratch unit is equivalenced to zero in the data base. The user specifies the scratch unit prior to system installation so that in a SYSDAT listing the scratch unit is equivalenced to an actual logical unit instead of to zero.

```
*           S T A N D A R D   L O G I C A L   U N I T S                        AAQ00100
*                                                                              AAQ00200
       ENT DUMALT                                                              AAQ00300
*                                                                              AAQ00400
DUMALT EQU DUMALT(2)         STANDARD DUMMY ALTERNATE                          AAQ00500
INPCOM EQU INPCOM(4)         STANDARD INPUT COMMENT                            AAQ00600
OUTCOM EQU OUTCOM(4)         STANDARD OUTPUT COMMENT                           AAQ00700
LBUNIT EQU LBUNIT(8)         STANDARD LIBRARY UNIT                             AAQ00800
SCRTCH EQU SCRTCH()          STANDARD SCRATCH UNIT                             AAQ00900
LSTOUT EQU LSTOUT(9)         STANDARD LIST OUTPUT                              AAQ01000
STDINP EQU STDINP(10)        STANDARD INPUT                                    AAQ01100
BINOUT EQU BINOUT(11)        STANDARD BINARY OUTPUT                            AAQ01200
       EJT                                                                     AAQ01300
```

Figure 1-18. Standard Logical Units, Section AAQ

1.18 Line One Table, Section AAR

The line one data base cards are shown in Figure 1-19. A given configuration may require only one hardware device to be connected to the line one (low speed input/output) interrupt, or it may require several hardware devices to use line one. If only one hardware device uses line one, the first part of the line one table from the data base, cards *AAR0050 through *AAR0100 will be included in SYSDAT together with the physical device table address of the line one device. These cards will then comprise all of the line one interrupt handler. If more than one device uses line one, cards *AAR0050 through *AAR0100 are omitted from SYSDAT, but a list of the system line one devices is included beginning at LNITV4. In this case, the program with entry point LIN1V4 must be included in the system outside the SYSDAT area. This is a standard MSOS routine which utilizes the list of physical device table addresses beginning at LNITV4.

```
*           L I N E   O N E   T A B L E                                                  AAR00100
*                                                                                        AAR00200
       SPC  1                                                                            AAR00300
*                                                                                        AAR00400
       ENT  LIN1V4          LINE 1 INTERRUPT ENTRY                                       AAR00500
       SPC  1                                                                            AAR00600
LIN1V4 LDQ* LN1TV4          PLACE THE PDT ADDRESS IN Q                                   AAR00700
       LDA- 2,Q                                                                          AAR00800
       STA- I                                                                            AAR00900
       JMP- (I)             TRANSFER CONTROL TO THE DRIVER CONTINUATOR                   AAR01000
       SPC  3                                                                            AAR01100
       ENT  INVINT                                                                       AAR01200
       SPC  1                                                                            AAR01300
INVINT JMP- (ADISP)                                                                      AAR01400
       ENT  LN1TV4                                                                       AAR01500
       EXT  LIN1V4                                                                       AAR01600
       EXT  INVINT                                                                       AAR01700
*                                                                                        AAR01800
       SPC  4                                                                            AAR01900
       EQU  LN1TV4(*)       START OF TABLE                                               AAR02000
       ADC  P1711               1711 TELETYPE, 713-10 CRT                                AAR02100
       ADC  P1713K              1713 TELETYPE                                            AAR02200
       ADC  P1777R              1777 PAPER TAPE READER                                   AAR02300
       ADC  P1777P              1777 PAPER TAPE PUNCH                                    AAR02400
       NUM  $FFFF           END OF TABLE                                                 AAR02500
       EJT                                                                               AAR02600
```

Figure 1-19. Line One Table, Section AAR

1.19 Physical Device Tables, Mandatory Entries, Section AAS

Section AAS defines the basic structure of a physical device table. Words 0-15 of a physical device table must conform to the definitions in this section. Care must be taken in altering any of the first 16 words of a physical device table. Even if one of these words is not used by the driver, it may be used by the operating system in determining the logical flow of a program. The mandatory entries are shown in Figure 1-20. In a given physical device table additional words may be added for use by the output message buffering package and for special use by drivers.

Word 5 of the mandatory entries is the logical unit currently assigned to this device. Word 6 is the current request parameter list location. Word 7 tells the driver which device to use. This word contains the following information:

Bits	Code
0-6	Station
7-10	Equipment
11-15	Converter

By loading Q with word 7, and performing an input, the equipment status is obtained. The bits of word 8, request status are defined as follows:

Bits		
15	1 if operation is in progress	
	0 if operation is complete	
14	1 if driver detects I/O hardware failure	
11-13	Equipment class	
	Code	Device
	0	Class undefined
	1	Magnetic tape
	2	Mass storage
	3	Card

Bits	Code	Device
	4	Paper tape
	5	Printer
	6	Teletypewriter
	7	Reserved for future use
4-10	Equipment type code	

Type Code	Device
0	1711
1	1721/1722
2	1723/1724
3	1752
4	713-10/711-100/713-120
5	1738/853
6	1751
7	1739-1
8	1738/854
9	1731/601
10	Software Buffer
11	COSY Driver
12	1728/430
13	Core Allocator
14	1733-1/854
15	1733-2/856-2
16	1733-2/856-4
17	1742-30
18	1742-120
19	1740/501
20	1732-2/615-73

Code	Device
21	1732-2/615-93
22	1732-1/1706/608
23	1726/405
24	1732-1/608
25	1732-1/609
26	1713 Keyboard
27	1713 Punch
28	1713 Reader
29	1729-2
30	1732-1/1706/609
31	Software Dummy
32	364-4/361-1
33	364-4/361-4
34	1742-1
35	1777 Reader
36	Pseudo Tape
37	1777 Punch
38	1729-3
39	1733-1/853
40	1731/1706/601
41	1726/1706/405
42	1747
43	1744/274
44	1536
45	1501
46-99	For later use
100-127	For user assignment

Bits	
3	Not used {Reserved}
2	=1 if device may be written by unprotected programs
1	=1 if device may be read by unprotected programs
0	=1 if device not available to unprotected programs

The bits of word 9, driver status, are used as follows:

Bits		
15	=1 if error condition and/or end-of-file detected	Driver
14	=1 if fewer words read than requested	
13	=1 if device remains ready after detecting an error or end-of-file or both	
6-12	Reserved for special use by individual drivers	
5	0 if this is a control character	Driver
4	0 if this is first character	
3	1 if ASCII; 0 if binary mode	
2	1 if lower case character, 0 if upper case	
1	1 if format READ or WRITE; 0 if unformatted	FNR
0	1 if WRITE request; 0 if READ request	

Word 10 is the location where the driver will next store or obtain data. Word 11 is one more than the location where the driver is to store or obtain data to satisfy a request. Equipment status is stored in word 12. Word 13 contains the driver length in words if the driver is mass memory resident. Word 13 is zero for an optionally core or mass resident driver which is core resident in a given system. In an actual SYSDAT, word 14 will contain an address constant obtained from an external value. This value is the sector number of the start of the driver. For a core resident driver, the external will be unpatched, and thus word 14 will contain $7FFF_{16}$. Values for words 13 and 14 are inserted by the system initializer by means of *S statements. Word 15 is used for storing a return address by the programs NFNR, MAKQ, and NCMPRG.

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```
*         P H Y S I C A L   D E V I C E   T A B L E S
*
*
*         THE FOLLOWING SECTION CONTAINS THE PHYSICAL DEVICE TABLES
*         AND INTERRUPT RESPONSE ROUTINES  FOR EACH LOGICAL UNIT IN
*         THE SYSTEM.
*
*         LISTED BELOW ARE THE MANDATORY ENTRIES FOR ALL PHYSICAL
*         DEVICE TABLES.     ADDITIONAL ENTRIES REQUIRED BY EACH
*         DRIVER MAY BE ADDED AFTER THE LAST ENTRY INDICATED.
       SPC   3
PHYSTB EQU   PHYSTB(*)
       EQU   ELVL(0)          00   SCHEDULER CALL WITH DRIVER LEVEL
       EQU   EDIN(1)          01   DRIVER INITIATOR ENTRY
       EQU   EDCN(2)          02   DRIVER CONTINUATOR ENTRY
       EQU   EDPGM(3)         03   DRIVER DIAGNOSTIC ENTRY
       EQU   EDCLK(4)         04   DIAGNOSTIC CLOCK
       EQU   ELU(5)           05   LOGICAL UNIT
       EQU   EPTR(6)          06   PARAMETER LOCATION
       EQU   EWES(7)          07   CONVERTOR, EQUIPMENT, STATION
       EQU   EREQST(8)        08   REQUEST STATUS
       EQU   ESTAT1(9)        09   DRIVER STATUS
       EQU   ECCOR(10)        10   CURRENT LOCATION
       EQU   ELSTWD(11)       11   LAST LOCATION PLUS ONE
       EQU   ESTAT2(12)       12   DEVICE STATUS
       EQU   MASLGN(13)       13   DRIVER LENGTH (IF MASS MEMORY)
       EQU   MASSEC(14)       14   NAME ASSOCIATED WITH SECTOR NUMBER
       EQU   RETURN(15)       15   RESERVED FOR ENR AND CMR
       EJT
```

Figure 1-20. Physical Device Tables, Mandatory Entries, Section AAS

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1.20 Core Allocator Physical Device Table, Section AAT

The entries in the core allocator physical device table Figure 1-21, are all fixed except word 13. Word 13 is the minimum number of seconds allowed between swaps. If word 13 is negative, swaps are allowed as often as needed by the system.

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```
*          C O R E   A L L O C A T O R                                         AAT00100
*                                                                              AAT00200
       SPC   1                                                                 AAT00300
       ENT   PCORE                                                             AAT00400
       EXT   ICORE,ECORE                                                       AAT00500
       EQU   SWAPT()          SWAP TIME                                        AAT00600
       SPC   1                                                                 AAT00700
PCORE  ADC   $5207            00  SCHEDULER CALL                               AAT00800
       ADC   ICORE            01  INITIATOR ADDRESS                            AAT00900
       ADC   0                02  CONTINUATOR ADDRESS    - NOT USED            AAT01000
       ADC   ECORE            03  TIMEOUT ERROR ADDRESS                        AAT01100
       NUM   -1               04  DIAGNOSTIC CLOCK                             AAT01200
       NUM   0                05  LOGICAL UNIT                                 AAT01300
       NUM   0                06  PARAMETER LOCATION                           AAT01400
       NUM   0                07  CONVERTER, EQUIPMENT, STATION - NONE         AAT01500
       NUM   $00D6            08  REQUEST STATUS                               AAT01600
       NUM   0                09  DRIVER STATUS                                AAT01700
       NUM   0                10  CURRENT LOCATION                             AAT01800
       NUM   0                11  LAST LOCATION PLUS ONE                       AAT01900
       NUM   0                12  DEVICE STATUS                                AAT02000
       VFD   X16/SWAPT-1      13  TIME BETWEEN SWAPS (NONE IF NEGATIVE)        AAT02100
       NUM   $7FFF            14  RESERVED                                     AAT02200
       NUM   0                15  RESERVED FOR ENR AND CMR                     AAT02300
       EJT                                                                     AAT02400
```

Figure 1-21. Core Allocator Physical Device Table, Section AAT

1.21 Dummy Physical Device Table, Section AAU

Section AAU, the physical device table for the dummy logical unit, has a fixed structure with no options. This section appears in Figure 1-22.

```
*        D U M M Y   L O G I C A L   U N I T                                      AAU00100
*                                                                                 AAU00200
       SPC  1                                                                     AAU00300
       EXT  IDUMMY,CDUMMY,EDUMMY                                                  AAU00400
       SPC  1                                                                     AAU00500
PDUMMY ADC  $520A         00  SCHEDULER CALL                                      AAU00600
       ADC  IDUMMY        01  INITIATOR ADDRESS                                   AAU00700
       ADC  CDUMMY        02  CONTINUATOR ADDRESS                                 AAU00800
       ADC  EDUMMY        03  TIMEOUT ERROR ADDRESS                               AAU00900
       NUM  -1            04  DIAGNOSTIC CLOCK        - NOT USED                  AAU01000
       NUM  0             05  LOGICAL UNIT                                        AAU01100
       NUM  0             06  PARAMETER LOCATION                                  AAU01200
       NUM  0             07  CONVERTER, EQUIPMENT, STATION - NONE                AAU01300
       NUM  $01F6         08  REQUEST STATUS                                      AAU01400
       NUM  $8000         09  DRIVER STATUS                                       AAU01500
       NUM  0             10  CURRENT LOCATION                                    AAU01600
       NUM  0             11  LAST LOCATION PLUS ONE                              AAU01700
       NUM  0             12  DEVICE STATUS                                       AAU01800
       NUM  0             13  RESERVED                                            AAU01900
       NUM  $7FFF         14  RESERVED                                            AAU02000
       NUM  0             15  RESERVED FOR FNR AND CMR                            AAU02100
       EJT                                                                        AAU02200
```

Figure 1-22. Dummy Physical Device Table, Section AAU

1.22 1711 Teletype/713-10 CRT Physical Device Table, Section AAV

The entries of this section, Figure 1-23, are fixed except for the type code of the device, bits 4-10 of word 8. The type code specifies whether a 1711 teletype or a 713-10 CRT is to be used. (A given system cannot contain both a 1711 and a 713-10 due to hardware requirements.) Word 18 contains an index into the LOG1A table if there is a corresponding diagnostic logical unit. This index is defined in card *AAV0080.

```
*       1711  TELETYPE,  713-10  CRT                                  AAV00100
*                                                                     AAV00200
       SPC   1                                                        AAV00300
       EXT   I1711,C1711,E1711                                        AAV00400
       EQU   T713(04*$10)   TYPE CODE - 713-10 CRT                    AAV00500
       EQU   T1711(00*$10)  TYPE CODE - 1711 TELETYPE                 AAV00600
       EQU   U1711(0)                                                 AAV00700
       EQU   U1711(X1711-LOG1A)                                       AAV00800
       SPC   1                                                        AAV00900
P1711  ADC   $520E          00  SCHEDULER CALL                        AAV01000
       ADC   I1711          01  INITIATOR ADDRESS                     AAV01100
       ADC   C1711          02  CONTINUATOR ADDRESS                   AAV01200
       ADC   E1711          03  TIMEOUT ERROR ADDRESS                 AAV01300
       NUM   -1             04  DIAGNOSTIC CLOCK                      AAV01400
       NUM   0              05  LOGICAL UNIT                          AAV01500
       NUM   0              06  PARAMETER LOCATION                    AAV01600
       NUM   $0091          07  CONVERTER, EQUIPMENT, STATION         AAV01700
       ADC   $3006+T1711    08  REQUEST STATUS                        AAV01800
       ADC   $3006+T713     08  REQUEST STATUS                        AAV01900
       NUM   0              09  DRIVER STATUS                         AAV02000
       NUM   0              10  CURRENT LOCATION                      AAV02100
       NUM   0              11  LAST LOCATION PLUS ONE                AAV02200
       NUM   0              12  DEVICE STATUS                         AAV02300
       NUM   0              13  ERROR CODE AND STARTING LOCATION      AAV02400
       NUM   $7FFF          14  RESERVED                              AAV02500
       NUM   0              15  RESERVED FOR FNR AND CMR              AAV02600
       NUM   0              16  DRIVER FLAGS                          AAV02700
       NUM   1              17  HARDWARE PARITY CHECK FLAG            AAV02800
       ADC   U1711          18  DIAGNOSTIC LU                         AAV02900
       EJT                                                            AAV03000
```

Figure 1-23. 1711 Teletype, 713-10 CRT Physical Device Table, Section AAV

1.23 Interrupt Response Routine for the 1713 Teletype with Paper Tape Reader/Punch, Section AAW

This interrupt response routine determines whether an interrupt from the 1713 Teletype is due to an operation on the keyboard, the paper tape reader, or the paper tape punch. Control is then transferred to the proper driver continuator entry. {Refer to Figure 1-24.}

```
*           1 7 1 3   T E L E T Y P E   W I T H   R E A D E R / P U N C HAAW00100
*                                                                        AAW00200
*            C O M M O N   I N T E R R U P T   R E S P O N S E           AAW00300
*                                                                        AAW00400
       ENT  S13BZY,S13MOD                                                AAW00500
       SPC  2                                                            AAW00600
S13BZY NUM  0                 CURRENTLY ACTIVE  P D T  ADDRESS           AAW00700
S13MOD NUM  0                 COMMON E O P INDICATOR                     AAW00800
       SPC  2                                                            AAW00900
CN1713 LDQ* S13BZY            IS ANY UNIT CURRENTLY ACTIVE               AAW01000
       SQN  BSY13             YES                                        AAW01100
K1713C LDQ  =XP1713K          NO, GO TO THE KEYBOARD CONTINUATOR         AAW01200
       JMP+ C1713K                                                       AAW01300
BSY13  TRQ  A                                                            AAW01400
       EOR  =XP1713K          IS THIS AN INTERRUPT FOR THE KEYBOARD      AAW01500
       SAN  BSY13A            NO                                         AAW01600
       JMP* K1713C            YES, GO TO THE KEYBOARD CONTINUATOR        AAW01700
       SPC  1                                                            AAW01800
BSY13A LDA- 2,Q                                                          AAW01900
       STA- I                                                            AAW02000
       JMP- (I)               GO TO THE SELECTED UNIT≠S CONTINUATOR      AAW02100
       EJT                                                               AAW02200
```

Figure 1-24. Interrupt Response Routine for 1713 Teletype with Paper Tape Reader/Punch, Section AAW

1.24 1713 Teletype Keyboard Physical Device Table, Section AAX

In this physical device table, word 19 contains an index into the LOG1A table if there is a corresponding diagnostic logical unit. The remaining entries are fixed. This section is shown in Figure 1-25.

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```
*               1 7 1 3   T E L E T Y P E   K E Y B O A R D                         AAX00100
*                                                                                   AAX00200
         EXT    I1713K,C1713K,E1713K                                                AAX00300
         EQU    U1713K(0)                                                           AAX00400
         EQU    U1713K(X1713K-LOG1A)                                                AAX00500
         SPC    1                                                                   AAX00600
P1713K   ADC    $520E            00   SCHEDULER CALL                                AAX00700
         ADC    I1713K           01   INITIATOR ADDRESS                             AAX00800
         ADC    CN1713           02   CONTINUATOR ADDRESS                           AAX00900
         ADC    E1713K           03   TIMEOUT ERROR ADDRESS                         AAX01000
         NUM    -1               04   DIAGNOSTIC CLOCK                              AAX01100
         NUM    0                05   LOGICAL UNIT                                  AAX01200
         NUM    0                06   PARAMETER LOCATION                            AAX01300
         NUM    $0091            07   CONVERTER, EQUIPMENT, STATION                 AAX01400
         NUM    $31A6            08   REQUEST STATUS                                AAX01500
         NUM    0                09   DRIVER STATUS                                 AAX01600
         NUM    0                10   CURRENT LOCATION                              AAX01700
         NUM    0                11   LAST LOCATION PLUS ONE                        AAX01800
         NUM    0                12   DEVICE STATUS                                 AAX01900
         NUM    0                13   ERROR CODE                                    AAX02000
         NUM    $7FFF            14   RESERVED                                      AAX02100
         NUM    0                15   RESERVED FOR FNR AND CMR                      AAX02200
         NUM    0                16   RETURN ADDRESS                                AAX02300
         NUM    0                17   SPARE                                         AAX02400
         NUM    0                18   SPARE                                         AAX02500
         ADC    U1713K           19   DIAGNOSTIC LU                                 AAX02600
         EJT                                                                        AAX02700
```

Figure 1-25. 1713 Teletype Keyboard Physical Device Table, Section AAX

1.25 1713 Teletype Paper Tape Reader Physical Device Table, Section AAY

The driver for the 1713 teletype paper tape reader may be either core resident or mass memory resident. This physical device table, Figure 1-26, has the same general form as all physical device tables for which the driver may be either core resident or mass memory resident. The residency option is indicated by the parameter M1713R. This parameter is zero for a core resident driver, one for a mass resident driver. If the driver is core resident, the driver initiator, continuator, and error entries in the physical device table are linked directly to the driver entries. If the driver is mass memory resident the entry points in the physical device table will transfer control to the locations MASDRV, MASCON, and MASERR. These are entries in the mass memory driver executive program, MMEXEC. The cards *AAY0160 - *AAY0210 are therefore assembled into a SYSDAT with a mass resident driver for the 1713 teletype reader.

Word 19 contains an index into the LOG1A table if there is a corresponding diagnostic logical unit. This index is defined in card *AAY0300.

```
*                 1 7 1 3   T E L E T Y P E   R E A D E R              AAY00100
*                                                                      AAY00200
         SPC   1                                                       AAY00300
         EQU   M1713R(0)                                               AAY00400
         EQU   M1713R(1)                                               AAY00500
*                                                                      AAY00600
         IFA   M1713R,EQ,0      CORE RESIDENT DRIVER                   AAY00700
         EXT   I1713R                                                  AAY00800
         EXT   C1713R                                                  AAY00900
         EXT   E1713R                                                  AAY01000
         EQU   L1713R(0)                                               AAY01100
         EQU   S1713R($7FFF)                                           AAY01200
         EIF                                                           AAY01300
*                                                                      AAY01400
         IFA   M1713R,EQ,1    MASS RESIDENT DRIVER                     AAY01500
         EXT   MASDRV                                                  AAY01600
         EXT   MASCON                                                  AAY01700
         EXT   MASERR                                                  AAY01800
I1713R   JMP*  MASDRV          INITIATE DRIVER                         AAY01900
C1713R   JMP*  MASCON          INTERRUPT RESPONSE                      AAY02000
E1713R   JMP*  MASERR          TIMEOUT ERROR                           AAY02100
         EXT   L1713R                                                  AAY02200
         EXT   S1713R                                                  AAY02300
         EIF                                                           AAY02400
*                                                                      AAY02500
         EJT                                                           AAY02600
*                 1 7 1 3   T E L E T Y P E   R E A D E R              AAY02700
*                                                                      AAY02800
         EQU   U1713R(0)                                               AAY02900
         EQU   U1713R(X1713R-LOG1A)                                    AAY03000
         SPC   1                                                       AAY03100
P1713R   ADC   $520E           00  SCHEDULER CALL                      AAY03200
         ADC   I1713R          01  INITIATOR ADDRESS                   AAY03300
         ADC   C1713R          02  CONTINUATOR ADDRESS                 AAY03400
         ADC   E1713R          03  TIMEOUT ERROR ADDRESS               AAY03500
         NUM   -1              04  DIAGNOSTIC CLOCK                    AAY03600
         NUM   0               05  LOGICAL UNIT                        AAY03700
         NUM   0               06  PARAMETER LOCATION                  AAY03800
         NUM   $0091           07  CONVERTER, EQUIPMENT, STATION       AAY03900
         NUM   $21C2           08  REQUEST STATUS                      AAY04000
         NUM   0               09  DRIVER STATUS                       AAY04100
         NUM   0               10  CURRENT LOCATION                    AAY04200
         NUM   0               11  LAST LOCATION PLUS ONE              AAY04300
         NUM   0               12  DEVICE STATUS                       AAY04400
         ADC   L1713R          13  DRIVER LENGTH IF MASS MEMORY        AAY04500
         ADC   S1713R          14  NAME ASSOCIATED WITH SECTOR NUMBER  AAY04600
         NUM   0               15  CHECKSUM AND ERROR CODE             AAY04700
         NUM   0               16  TEMPORARY                           AAY04800
         NUM   0               17  RETURN ADDRESS                      AAY04900
         NUM   0               18  TEMPORARY ADDRESS                   AAY05000
         ADC   U1713R          19  DIAGNOSTIC LU                       AAY05100
         EJT                                                           AAY05200
```

Figure 1-26. 1713 Teletype Reader Physical Device Table, Section AAY

1.26 1713 Teletype Paper Tape Punch Physical Device Table, Section AAZ

The driver for the 1713 teletype paper tape punch may be either core resident or mass resident. If core resident, M1713R is zero, and words 1, 2, and 3 of the table are driver entries. If mass resident, M1713R is one, and words 1, 2, and 3 are locations which jump to entries within MMEXEC.

Word 19 contains an index into the LOG1A Table if there is a corresponding diagnostic logical unit. This section is shown in Figure 1-27.

```
*        1 7 1 3   T E L E T Y P E   P U N C H
*
       SPC   1
       EQU   M1713P(0)
       EQU   M1713P(1)
*
       IFA   M1713P,EQ,0       CORE RESIDENT DRIVER
       EXT   I1713P
       EXT   C1713P
       EXT   E1713P
       EQU   L1713P(0)
       EQU   S1713P($7FFF)
       EIF
*
       IFA   M1713P,EQ,1     MASS RESIDENT DRIVER
       EXT   MASDRV
       EXT   MASCON
       EXT   MASERR
I1713P JMP*  MASDRV          INITIATE DRIVER
C1713P JMP*  MASCON          INTERRUPT RESPONSE
E1713P JMP*  MASERR          TIMEOUT ERROR
       EXT   L1713P
       EXT   S1713P
       EIF
*
       EJT
*        1 7 1 3   T E L E T Y P E   P U N C H
*
       EQU   U1713P(0)
       EQU   U1713P(X1713P-LOG1A)
       SPC   1
P1713P ADC   $520E           00  SCHEDULER CALL
       ADC   I1713P          01  INITIATOR ADDRESS
       ADC   C1713P          02  CONTINUATOR ADDRESS
       ADC   E1713P          03  TIMEOUT ERROR ADDRESS
       NUM   -1              04  DIAGNOSTIC CLOCK
       NUM   0               05  LOGICAL UNIT
       NUM   0               06  PARAMETER LOCATION
       NUM   $0091           07  CONVERTER, EQUIPMENT, STATION
       NUM   $21B4           08  REQUEST STATUS
       NUM   0               09  DRIVER STATUS
       NUM   0               10  CURRENT LOCATION
       NUM   0               11  LAST LOCATION PLUS ONE
       NUM   0               12  DEVICE STATUS
       ADC   L1713P          13  DRIVER LENGTH IF MASS MEMORY
       ADC   S1713P          14  NAME ASSOCIATED WITH SECTOR NUMBER
       NUM   0               15  CHECKSUM AND ERROR CODE
       NUM   0               16  TEMPORARY
       NUM   0               17  RETURN ADDRESS
       NUM   0               18  SPARE
       ADC   U1713P          19  DIAGNOSTIC LU
       EJT
```

Figure 1-27. 1713 Teletype Punch Physical Device Table, Section AAZ

1.27 1713 Paper Tape Punch Software Buffered Section, Section ABA

This section of the data base contains the macro instruction, BUFFER, and a set of parameters for the macro expansion as used by the 1713 paper tape punch (refer to Figure 1-28). The BUFFER macro when expanded, is a physical device table. The general form of this physical device table is shown in Figure 1-29. This form of physical device table supplies the parameters for the message buffering routine. The function of this routine is to transfer a user's output message from core to mass memory and then to initiate the driver. After the message has been written to mass memory, the user may consider the request to be completed. Subsequent output of the message is independent of the user.

A mass memory resident program can make a buffered output request and release its core area when buffering is completed but prior to actual message output. Thus, software message buffering is useful for slow input/output devices. After the message has been buffered to mass memory, portions of the message are transferred to a core resident character buffer prior to transmission to the output device. The macro parameters are as follows:

1) FLSB - Least significant bits of start of mass memory buffer.
2) LLSB - Least significant bits of end of buffer.
3) FMSB - Most significant bits of start of buffer.
4) BLU - Logical unit for eventual output.
5) MMLU - Mass memory logical unit.
6) CBSIZE - Character buffer size. The size of this buffer is the number of words in a formatted write request that will be made to logical unit, BLU.

For purposes of specifying the mass memory buffer area, mass memory is defined in 32K - word pages. The maximum size of the buffer on

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mass storage is one page or 8000_{16} words. The buffer must reside totally within one page. The most significant bits of the starting address of the buffer, FMSB, are the same as the most significant bits of the last address of the buffer. Therefore, the least significant bits of the starting address, FLSB, must be less than the least significant bits of the last address, LLSB. The following set of parameter values would be valid:

FMSB = 30_{16}

FLSB = 0

LLSB = $7FFF_{16}$

The following set of parameter values are invalid:

FMSB = 30_{16}

FLSB = 6000_{16}

LLSB = 4000_{16}

The page, p, and word within the page, w_p, corresponding to a given system sector, s, and word within the sector, w_s, may be computed as follows:

$$p = \left\lfloor \left(96 \cdot \{s-1\} + w_s\right) / 32{,}768 \right\rfloor$$

where $\lfloor x \rfloor$ is the greatest integer less than or equal to x

$w_p = 96 \cdot \{s-1\} + w_s - 32{,}768 \cdot p.$

For example, if s = 633 and w_s = 88, then p = 1, and w_p = $6D58_{16}$.

The form of a physical device table for a device using the message buffering routine differs from a physical device table for a device not using software buffering. Refer to Figure 1-29. The initiator address is an entry to DSBUFR, the message buffering routine. The continuator address and diagnostic error addresses are not used. Beginning at word 20 is a monitor request to transfer the message to mass memory. Beginning at word 29 is a monitor request to transfer a portion of the message from the mass memory buffer to the character buffer in core. Beginning at word 38 is a monitor request to transfer a formatted record from the character buffer to the output device. Beginning at word 45 is the character buffer.

In a standard system the software buffers are always aftertthe end of the scratch area. If the scratch device and the library device are the same, this positioning of the software buffers causes a relatively long seek time between an access of the allocatable core area within the system core image and an access of the software buffer area. (Refer tothe standard system mass storage diagram in Figure 1-30.) Thus, placing the software buffers at the end of the scratch area may cause excessive disk seek time due to frequent swapping and simultaneous message buffering. In this case, the user may wish to move the software buffers. If another disk drive is available which is not being accessed so frequently, this may be the best place for the software buffers. To move a buffer to another logical unit it is necessary to change all references to FLSB, LLSB, FMSB, and MMLU in the physical device table. If there is no other drive available, the user may wish to move the buffer from the end of the disk to the area beginning after the end of the core image and before the system library. This area is shown in Figure 1-30. This requires rebuilding the system. To make room for a software buffer area after the core image, the following initializer control statement must be changed:

```
    *M              LIBEDT       1
```

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This must be changed to force the system library to start far enough after the end of the core image to leave room for the software buffers. The system library should start at system sector $s = n_1 + n_2$ where:

n_1 = former starting address of system library
n_2 = length of software buffer area in sectors

Thus, the control statement

```
*M                LIBEDT      1
```

must be changed to:

```
*M,,s             LIBEDT      1
```

where s is the constant computed as $n_1 + n_2$.

In addition, the value of MAXSEC, maximum scratch sector, must be changed. This value appears in words 21-22 of the Extended Communication Region, Section AAI.

```
*          1 7 1 3   T A P E   P U N C H   S / W   B U F F E R R E D   ABA00100
*                                                                      ABA00200
P171PS BUFFER $0000,$0000,$0000.00,$000.0096                           ABA00300
       EJT                                                             ABA00400
```

Figure 1-28. 1713 Teletype Paper Tape Punch Software Buffered Section, Section ABA

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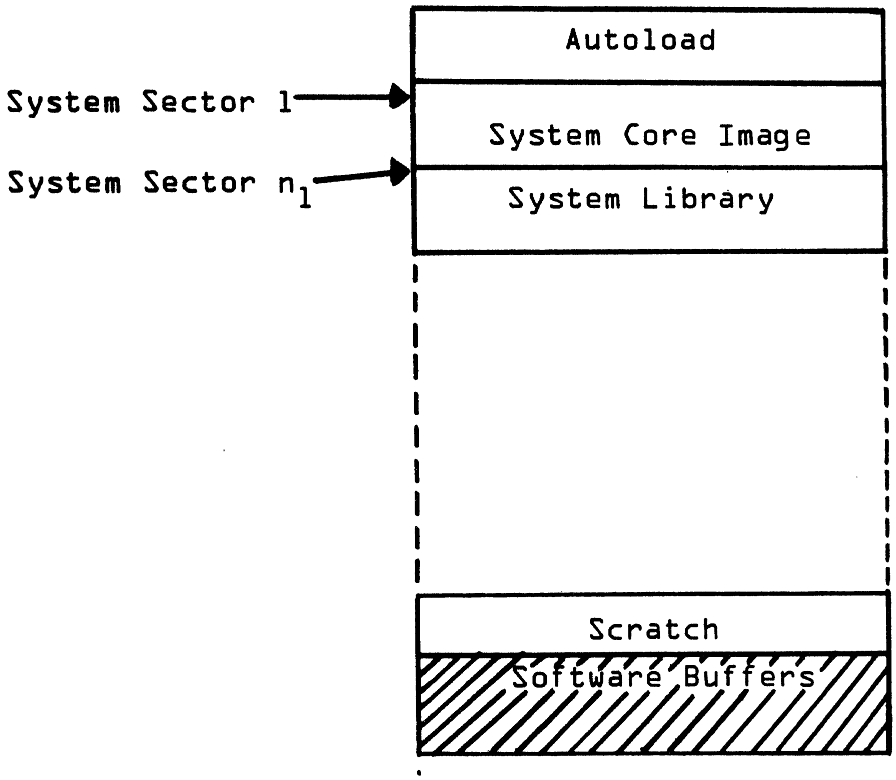
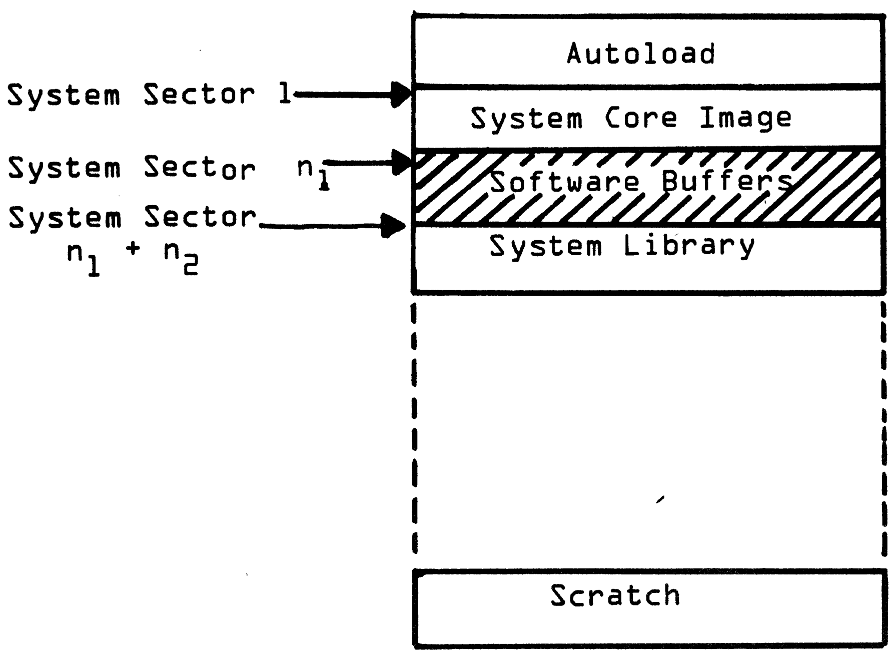
```
*BUFFER MAC  FLSB,LLSB,FMSB,BLU,MMLU,CBSIZE
*       LOC  A
*       EXT  ISBUFR       BUFFER DRIVER INITIATOR
*       EXT  CBWRIT       MASS MEMORY WRITE COMPLETION
*       EXT  CBREAD       MASS MEMORY READ COMPLETION
*       EXT  BOUTC        BUFFER OUTPUT COMPLETION
*       NUM  $520A        00  SCHEDULER CALL
*       ADC  ISBUFR       01  INITIATOR ADDRESS
*       ADC  0            02  CONTINUATOR ADDRESS (NOT USED)
*       ADC  0            03  DIAGNOSTIC ERROR ADDRESS (NOT USED)
*       NUM  -1           04  DIAGNOSTIC CLOCK (NOT USED)
*       NUM  0            05  LOGICAL UNIT
*       ADC  0            06  PARAMETER LOCATION
*       NUM  0            07  CONVERTER, EQUIPMENT, STATION (NOT USED)
*       NUM  $A4          08  REQUEST STATUS
*       NUM  0            09  DRIVER STATUS
*       NUM  0            10  CURRENT LOCATION
*       NUM  0            11  LAST LOCATION PLUS ONE
*       NUM  0            12  DEVICE STATUS (NOT USED)
*       NUM  0            13  MASS MEMORY LENGTH (NOT USED)
*       NUM  $7FFF        14  MASS MEMORY LOCATION (NOT USED)
*       NUM  0            15  MONITOR RETURN
*       ADC  ≠FLSB≠       16  LSB START OF BUFFER
*       ADC  ≠LLSB≠       17  LSB END OF BUFFER
*       ADC  ≠FLSB≠       18  CURRENT LSB START OF BUFFER
*       ADC  ≠LLSB≠       19  CURRENT LSB END OF BUFFER
*       NUM  $44AA        20  MASS MEMORY WRITE REQUEST (UNFORMATTED)
*       ADC  CBWRIT       21  COMPLETION
*       NUM  0            22  THREAD
*       ADC  ≠MMLU≠       23  MASS MEMORY LOGICAL UNIT
*       NUM  0            24  NUMBER OF WORDS
*       NUM  0            25  STARTING DATA LOCATION
*       ADC  ≠FMSB≠       26  MSB ADDRESS
*       ADC  ≠FLSB≠       27  LSB ADDRESS
*       NUM  0            28  CONTROL WORD
*       NUM  $42AA        29  MASS MEMORY READ REQUEST (UNFORMATTED)
*       ADC  CBREAD       30  COMPLETION
*       NUM  0            31  THREAD
*       ADC  ≠MMLU≠       32  MASS MEMORY LOGICAL UNIT
*       NUM  0            33  NUMBER OF WORDS
*       ADC  ≠A≠          34  STARTING LOCATION (CHARACTER BUFFER)
*       ADC  ≠FMSB≠       35  MSB ADDRESS
*       ADC  ≠FLSB≠       36  LSB ADDRESS
*       NUM  0            37  PARTIAL WORD OUTPUT FLAG
*       NUM  $4CAA        38  BUFFER WRITE REQUEST (FORMATTED)
*       ADC  BOUTC        39  COMPLETION
*       NUM  0            40  THREAD
*       ADC  ≠BLU≠        41  OUTPUT LOGICAL UNIT
*       NUM  0            42  NUMBER OF WORDS
*       ADC  ≠A≠          43  STARTING LOCATION (CHARACTER BUFFER)
*       ADC  ≠CBSIZE≠     44  CHARACTER BUFFER SIZE
*       BZS  ≠A≠(≠CBSIZE≠) 45- CHARACTER BUFFER
*       EMC
        END
```

Figure 1-29. Form of BUFFER Macro Expansion



Standard System



System after software buffer area has been moved.

n_2 = length of software buffer area in sectors.

Figure 1-30. Mass Storage Before and After Moving Software Buffers

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1.28 COSY Driver Physical Device Table, Section ABB

The COSY driver may be core resident or mass resident depending on the value of MCOSY1. The initiator address will link directly to the driver if core resident. Otherwise, the initiator address is a jump to MASDRV in the program MMEXEC. There may be two COSY logical units, each with a distinct physical device table. The number of COSY logical units is specified by the user in the MSOS Ordering Form. To use COSY, only one COSY logical unit is necessary, but having two logical units will allow simultaneous input and output, thus increasing throughput.

Section ABB is shown in Figure 1-31.

```
*          C O S Y    D R I V E R
*
      SPC   1
      EQU   MCOSY1(0)
      EQU   MCOSY1(1)
*
      IFA   MCOSY1.EQ.0       CORE RESIDENT DRIVER
      EXT   TCOSY
      EQU   LCOSY(0)
      EQU   SCOSY($7FFF)
      EIF
*
      IFA   MCOSY1.EQ.1       MASS RESIDENT DRIVER
      EXT   MASDRV
ICOSY JMP*  MASDRV            INITIATE DRIVER
      EXT   LCOSY
      EXT   SCOSY
      EIF
*
      EJT
*          C O S Y    D R I V E R ,    F I R S T    U N I T
*
      SPC   1
PCOSY1 ADC  $5208        00   SCHEDULER CALL
      ADC   ICOSY        01   INITIATOR ADDRESS
      ADC   0            02   CONTINUATOR ADDRESS    - NOT USED
      ADC   0            03   TIMEOUT ERROR ADDRESS  - NOT USED
      NUM   -1           04   DIAGNOSTIC CLOCK
      NUM   0            05   LOGICAL UNIT
      NUM   0            06   PARAMETER LOCATION
      NUM   0            07   CONVERTER, EQUIPMENT, STATION - NONE
      NUM   $0886        08   REQUEST STATUS
      NUM   0            09   DRIVER STATUS
      NUM   0            10   CURRENT LOCATION
      NUM   0            11   LAST LOCATION PLUS ONE
      NUM   0            12   DEVICE STATUS
      ADC   LCOSY        13   DRIVER LENGTH IF MASS MEMORY
      ADC   SCOSY        14   NAME ASSOCIATED WITH SECTOR NUMBER
      NUM   0            15   RESERVED FOR FNR AND CMR
      ADC   PCOSY2       16   PHYSTB THREAD
      NUM   0            17   SEQUENCE NUMBER
      NUM   0            18   ID
      NUM   0            19   ID-1
      NUM   0            20   ID-2
      NUM   0            21   NUMBER OF WORDS REQUESTED
      NUM   $5555        22   HCL-CHARACTER POINTER
      NUM   $5555        23   COSY-CHARACTER POINTER
      NUM   0            24   R/W FLAG
```

Figure 1-31. COSY Driver Physical Device Table, Section ABB

```
        NUM    1               25  PON5F                                      ABB04900
        NUM    0               26  FSTCHR                                     ABB05000
        NUM    0               27  ENDDCK                                     ABB05100
        ADC    INPBFA          28  COSY BUFFER LOCATION                       ABB05200
        ADC    INPBFA          29  NEXT COSY WORD                             ABB05300
        NUM    0               30  HOL-BUFFER POINTER                         ABB05400
        NUM    1               31  INITIAL CALL FLAG                          ABB05500
        NUM    0               32  SEQUENCE FLAG  NONZERO=NO SEQUENCE NUMBER  ABB05600
*                                                                             ABB05700
        BZS    INPBFA(192)     33  COSY BUFFER                                ABB05800
*                             224  COSY BUFFER                                ABB05900
        EJT                                                                   ABB06000
*              C O S Y   D R I V E R ,   S E C O N D   U N I T                ABB06100
*                                                                             ABB06200
        SPC    1                                                              ABB06300
PCOSY2  ADC    $5208           00  SCHEDULER CALL                             ABB06400
        ADC    ICOSY           01  INITIATOR ADDRESS                          ABB06500
        ADC    0               02  CONTINUATOR ADDRESS   - NOT USED           ABB06600
        ADC    0               03  TIMEOUT ERROR ADDRESS - NOT USED           ABB06700
        NUM    -1              04  DIAGNOSTIC CLOCK                           ABB06800
        NUM    0               05  LOGICAL UNIT                               ABB06900
        NUM    0               06  PARAMETER LOCATION                         ABB07000
        NUM    0               07  CONVERTER, EQUIPMENT, STATION - NONE       ABB07100
        NUM    $08B6           08  REQUEST STATUS                             ABB07200
        NUM    0               09  DRIVER STATUS                              ABB07300
        NUM    0               10  CURRENT LOCATION                           ABB07400
        NUM    0               11  LAST LOCATION PLUS ONE                     ABB07500
        NUM    0               12  DEVICE STATUS                              ABB07600
        ADC    LCOSY           13  DRIVER LENGTH IF MASS MEMORY               ABB07700
        ADC    SCOSY           14  NAME ASSOCIATED WITH SECTOR NUMBER         ABB07800
        NUM    0               15  RESERVED FOR ENR AND CMR                   ABB07900
        ADC    PCOSY1          16  PHYSTB THREAD                              ABB08000
        NUM    0               17  SEQUENCE NUMBER                            ABB08100
        NUM    0               18  ID                                         ABB08200
        NUM    0               19  ID-1                                       ABB08300
        NUM    0               20  ID-2                                       ABB08400
        NUM    0               21  NUMBER OF WORDS REQUESTED                  ABB08500
        NUM    $5555           22  HOL-CHARACTER POINTER                      ABB08600
        NUM    $5555           23  COSY-CHARACTER POINTER                     ABB08700
        NUM    0               24  R/W FLAG                                   ABB08800
        NUM    1               25  PON5F                                      ABB08900
        NUM    0               26  FSTCHR                                     ABB09000
        NUM    0               27  ENDDCK                                     ABB09100
        ADC    INPBFB          28  COSY BUFFER LOCATION                       ABB09200
        ADC    INPBFB          29  NEXT COSY WORD                             ABB09300
        NUM    0               30  HOL-BUFFER POINTER                         ABB09400
        NUM    1               31  INITIAL CALL FLAG                          ABB09500
        NUM    0               32  SEQUENCE FLAG  NONZERO=NO SEQUENCE NUMBER  ABB09600
*                                                                             ABB09700
        BZS    INPBFB(192)     33  COSY BUFFER                                ABB09800
*                             224  COSY BUFFER                                ABB09900
        EJT                                                                   ABB10000
```

Figure 1-31. COSY Driver Physical Device Table, Section ABB

(Continued)

1.29 1732-2/615-73/93 Magnetic Tape Physical Device Table, Section ABC

This set of physical device tables can include data for up to four tape drives. Each of these drives may be either 7-track (615-73) or 9-track (615-93). The number of tracks determines the equipment type in word 8 of each physical device table. (Refer to Figure 1-32.) According to the specifications by the user in the MSOS Ordering Form, word 8 will contain the correct request status. In any given SYSDAT, only one of the word 8 definitions ($0806+T6157 or $0806+T6159) will be assembled into each 615-73/93 physical device table.

The driver is the same for all 615-73/93 magnetic tape units. This driver is core resident if M17322 is zero in which case words 1, 2, and 3 of each table are driver entries. If M17322 is one, the driver is mass resident, and words 1, 2, and 3 of each table point to jumps to the mass memory driver executive program, MMEXEC.

For each 615-73/93 magnetic tape physical device table, word 17 is an index into the LOG1A table of logical unit numbers if there is a corresponding diagnostic logical unit. Otherwise this word is zero.

Word 23 of each table contains the thread word for the driver. Each table is linked to the table for the next unit, with the thread for the last unit pointing to the table for the first unit. If there is only one unit, the thread points to itself.

In a physical device table for a 7-track drive words 24 and 25 have special meanings. The maximum physical record size, as specified in word 24, is the number of words written to tape at one time. The number of words specified in a READ/WRITE request to the driver defines logical record length. If a logical record is longer than the maximum physical record size, it is segmented and written as a series of physical records. A maximum physical record size of 192 words is standard, since the COSY driver uses 192-word records. The record size may be larger if other aspects of the system require it, but this will require a larger pack/unpack buffer as will be defined. If the COSY driver is not included in the system, a maximum smaller than 192 words may be specified by the user.

Word 25 is a pointer to BF1F32, the buffer used to pack and unpack data for 615-73 requests. A hardware assembly/disassembly feature is available on the 615-73. With this feature, 12 bits may be output into two frames of tape with one output instead of two. Similarly, two frames may be input with one input instead of two.

To use this hardware feature a buffer must be made available to the driver for packing and unpacking data. This is the buffer BF1F32 within the physical device tables. The size of this buffer is defined as follows: If the maximum physical record size is n words, then the length of the pack/unpack buffer is $\left\lfloor \frac{4}{3} \cdot n \right\rfloor + 2$ words, where $\lfloor x \rfloor$ is the greatest integer less than or equal to x.

If a foreground user wishes to temporarily use a larger maximum physical record size, he may include in his program, code to do the following:

1) Temporarily change the value of word 24 of the physical device table he will use in making the request. The new value is the larger physical record size.

2) Temporarily change word 25 of the physical device table to point to a pack/unpack buffer in the user's own program.

If a foreground user uses this technique, he must take care that no other user makes a request for this physical device table before the table has been restored to its original form.

If all 615-73/93 units in the system are 615-93, i.e., 9-track drives, the driver optional modules for 7-track repacking of binary information will not be included in the system. When these modules are not in the system, lines *ABC0130 and *ABC0140 are included in SYSDAT.

These lines equate the entry points PACK, UNPK, BCDASC, ASCBCD, and PRUCMP with $7FFF_{16}$. The purpose of these equivalences is to avoid listing these entry points as unpatched externals at the time of system installation.

The 615-73/93 interrupt response routine is located at lines *ABC0390 and *ABC0400 The routine stores the address of the physical device table in the Q-register, then jumps to the driver continuator entry.

```
*              6 1 5 - 7 3 / 9 3     M A G     T A P E
*
        SPC    1
        EQU    T6157(20*$10)  TYPE CODE - 615-73 MAG TAPE
        EQU    T6159(21*$10)  TYPE CODE - 615-93 MAG TAPE
        EQU    PHSREC(192)    MAX. PHYSICAL RECORD SIZE FOR  7  TRACK
        SPC    2
BF1F32  BZS    BF1F32(PHSREC*4/3+2)      PACK/UNPACK BUFFER (7 TRACK)
        SPC    1
*                             LINK UNSELECTED 7 TRACK PROCESSORS
        SPC    1
        ENT    PACK,UNPK,BCDASC,ASCBCD,PRUCMP
        EQU    PACK($7FFF),UNPK($7FFF)
        EQU    BCDASC($7FFF),ASCBCD($7FFF),PRUCMP($7FFF)
        SPC    1
        EQU    M17322(0)
        EQU    M17322(1)
*
        IFA    M17322,EQ,0     CORE RESIDENT DRIVER
        EXT    I17322
        EXT    C17322
        EXT    E17322
        EQU    L17322(0)
        EQU    S17322($7FFF)
        EIF
*
        IFA    M17322,EQ,1    MASS RESIDENT DRIVER
        EXT    MASDRV
        EXT    MASCON
        EXT    MASERR
I17322  JMP+   MASDRV         INITIATE DRIVER
C17322  JMP+   MASCON         INTERRUPT RESPONSE
E17322  JMP+   MASERR         TIMEOUT ERROR
        EXT    L17322
        EXT    S17322
        EIF
*
        SPC    2
R17322  LDQ    =XP73220       INTERRUPT RESPONSE FOR 615-73/93 MAG TAPE
        JMP*   (P73220+2)
        EJT
*              6 1 5 - 7 3 / 9 3     M A G     T A P E ,     U N I T    0
*
        EQU    U73220(0)
        EQU    U73220(X73220-LCG1A)
        SPC    1
P73220  ADC    $520A          00   SCHEDULER CALL
        ADC    I17322         01   INITIATOR ADDRESS
        ADC    C17322         02   CONTINUATOR ADDRESS
        ADC    E17322         03   TIMEOUT ERROR ADDRESS
        NUM    -1             04   DIAGNOSTIC CLOCK
        NUM    0              05   LOGICAL UNIT
        NUM    0              06   PARAMETER LOCATION
        NUM    $0381          07   CONVERTER, EQUIPMENT, STATION
```

Figure 1-32. 1732-2/615-73/93 Magnetic Tape Physical Device Table

Section ABC

```
         ADC   $0806+T6157     08  REQUEST STATUS                                     ABC05500
         ADC   $0806+T6159     08  REQUEST STATUS                                     ABC05600
         NUM   0               09  DRIVER STATUS                                      ABC05700
         NUM   0               10  CURRENT LOCATION                                   ABC05800
         NUM   0               11  LAST LOCATION PLUS ONE                             ABC05900
         NUM   0               12  DEVICE STATUS                                      ABC06000
         ADC   L17322          13  DRIVER LENGTH IF MASS MEMORY                       ABC06100
         ADC   S17322          14  NAME ASSOCIATED WITH SECTOR NUMBER                 ABC06200
         NUM   0               15  RESERVED FOR FNR AND CMR                           ABC06300
         NUM   $0448           16  UNIT, FUNCTION AND DENSITY CONTROL                 ABC06400
         ADC   U73220          17  DIAGNOSTIC LU                                      ABC06500
         ADC   0               18  ERROR CODE                                         ABC06600
         NUM   0               19  RECOVERY RETURN ADDRESS                            ABC06700
         NUM   0               20  RECORD CHECKSUM                                    ABC06800
         NUM   $DCDC           21  FUNCTION DIRECTORY BITWORD                         ABC06900
         NUM   0               22  TEMPORARY CHECKSUM                                 ABC07000
         ADC   P73221          23  PHYSTB THREAD                                      ABC07100
         NUM   0               24  RESERVED                                           ABC07200
         NUM   0               25  RESERVED                                           ABC07300
         ADC   PHSREC          24  MAX PHY RECORD SIZE          (7 TRACK)             ABC07400
         ADC   BF1F32          25  PACK/UNPACK BUFFER           (7 TRACK)             ABC07500
         EJT                                                                          ABC07600
*              6 1 5 - 7 3 / 9 3    M A G   T A P E ,   U N I T   1                   ABC07700
*                                                                                     ABC07800
         EQL   U73221(0)                                                              ABC07900
         EQL   U73221(X73221-LOG1A)                                                   ABC08000
         SPC   1                                                                      ABC08100
P73221   ADC   $520A           00  SCHEDULER CALL                                     ABC08200
         ADC   I17322          01  INITIATOR ADDRESS                                  ABC08300
         ADC   C17322          02  CONTINUATOR ADDRESS                                ABC08400
         ADC   E17322          03  TIMEOUT ERROR ADDRESS                              ABC08500
         NUM   -1              04  DIAGNOSTIC CLOCK                                   ABC08600
         NUM   0               05  LOGICAL UNIT                                       ABC08700
         NUM   0               06  PARAMETER LOCATION                                 ABC08800
         NUM   $0381           07  CONVERTER, EQUIPMENT, STATION                      ABC08900
         ADC   $0806+T6157     08  REQUEST STATUS                                     ABC09000
         ADC   $0806+T6159     08  REQUEST STATUS                                     ABC09100
         NUM   0               09  DRIVER STATUS                                      ABC09200
         NUM   0               10  CURRENT LOCATION                                   ABC09300
         NUM   0               11  LAST LOCATION PLUS ONE                             ABC09400
         NUM   0               12  DEVICE STATUS                                      ABC09500
         ADC   L17322          13  DRIVER LENGTH IF MASS MEMORY                       ABC09600
         ADC   S17322          14  NAME ASSOCIATED WITH SECTOR NUMBER                 ABC09700
         NUM   0               15  RESERVED FOR FNR AND CMR                           ABC09800
         NUM   $04C8           16  UNIT, FUNCTION AND DENSITY CONTROL                 ABC09900
         ADC   U73221          17  DIAGNOSTIC LU                                      ABC10000
         ADC   0               18  ERROR CODE                                         ABC10100
         NUM   0               19  RECOVERY RETURN ADDRESS                            ABC10200
         NUM   0               20  RECORD CHECKSUM                                    ABC10300
         NUM   $DCDC           21  FUNCTION DIRECTORY BITWORD                         ABC10400
         NUM   0               22  TEMPORARY CHECKSUM                                 ABC10500
```

Figure 1-32. 1732-2/615-73/93 Magnetic Tape Physical Device Table

Section ABC {Continued}

```
         ADC  P73222           23  PHYSTB THREAD                               ARC10600
         NUM  0                24  RESERVED                                    ARC10700
         NUM  0                25  RESERVED                                    ARC10800
         ADC  PHSREC           24  MAX PHY RECORD SIZE          (7 TRACK)      ARC10900
         ADC  BF1F32           25  PACK/UNPACK BUFFER           (7 TRACK)      ARC11000
         EJT                                                                   ARC11100
*             6 1 5 - 7 3 / 9 3   M A G   T A P E ,   U N I T   2              ARC11200
*                                                                              ARC11300
         EQL  U73222(0)                                                        ARC11400
         EQL  U73222(X73222-LOGIA)                                             ARC11500
         SPC  1                                                                ARC11600
P73222   ADC  $520A            00  SCHEDULER CALL                              ARC11700
         ADC  I17322           01  INITIATOR ADDRESS                           ARC11800
         ADC  C17322           02  CONTINUATOR ADDRESS                         ARC11900
         ADC  E17322           03  TIMEOUT ERROR ADDRESS                       ARC12000
         NUM  -1               04  DIAGNOSTIC CLOCK                            ARC12100
         NUM  0                05  LOGICAL UNIT                                ARC12200
         NUM  0                06  PARAMETER LOCATION                          ARC12300
         NUM  $0381            07  CONVERTER, EQUIPMENT, STATION               ARC12400
         ADC  $0806+T6157      08  REQUEST STATUS                              ARC12500
         ADC  $0806+T6159      08  REQUEST STATUS                              ARC12600
         NUM  0                09  DRIVER STATUS                               ARC12700
         NUM  0                10  CURRENT LOCATION                            ARC12800
         NUM  0                11  LAST LOCATION PLUS ONE                      ARC12900
         NUM  0                12  DEVICE STATUS                               ARC13000
         ADC  L17322           13  DRIVER LENGTH IF MASS MEMORY                ARC13100
         ADC  S17322           14  NAME ASSOCIATED WITH SECTOR NUMBER          ARC13200
         NUM  0                15  RESERVED FOR ENR AND CMR                    ARC13300
         NUM  $0548            16  UNIT, FUNCTION AND DENSITY CONTROL          ARC13400
         ADC  U73222           17  DIAGNOSTIC LU                               ARC13500
         ADC  0                18  ERROR CODE                                  ARC13600
         NUM  0                19  RECOVERY RETURN ADDRESS                     ARC13700
         NUM  0                20  RECORD CHECKSUM                             ARC13800
         NUM  $DCDC            21  FUNCTION DIRECTORY BITWORD                  ARC13900
         NUM  0                22  TEMPORARY CHECKSUM                          ARC14000
         ADC  P73223           23  PHYSTB THREAD                               ARC14100
         NUM  0                24  RESERVED                                    ARC14200
         NUM  0                25  RESERVED                                    ARC14300
         ADC  PHSREC           24  MAX PHY RECORD SIZE          (7 TRACK)      ARC14400
         ADC  BF1F32           25  PACK/UNPACK BUFFER           (7 TRACK)      ARC14500
         EJT                                                                   ARC14600
```

Figure 1-32. 1732-2/615-73/93 Magnetic Tape Physical Device Table, Section ABC {Continued}

```
*         615-73/93 MAG TAPE, UNIT 3                                          ARC14700
*                                                                             ARC14800
        EQU  U73223(0)                                                        ARC14900
        EQU  U73223(X73423-LOG1A)                                             ARC15000
        SPC  1                                                                ARC15100
P73223  ADC  $520A          00   SCHEDULER CALL                              ARC15200
        ADC  I17322         01   INITIATOR ADDRESS                           ARC15300
        ADC  C17322         02   CONTINUATOR ADDRESS                         ARC15400
        ADC  E17322         03   TIMEOUT ERROR ADDRESS                       ARC15500
        NUM  -1             04   DIAGNOSTIC CLOCK                            ARC15600
        NUM  0              05   LOGICAL UNIT                                ARC15700
        NUM  0              06   PARAMETER LOCATION                          ARC15800
        NUM  $0381          07   CONVERTER, EQUIPMENT, STATION               ARC15900
        ADC  $0806+T6157    08   REQUEST STATUS                              ARC16000
        ADC  $0806+T6159    08   REQUEST STATUS                              ARC16100
        NUM  0              09   DRIVER STATUS                               ARC16200
        NUM  0              10   CURRENT LOCATION                            ARC16300
        NUM  0              11   LAST LOCATION PLUS ONE                      ARC16400
        NUM  0              12   DEVICE STATUS                               ARC16500
        ADC  L17322         13   DRIVER LENGTH IF MASS MEMORY                ARC16600
        ADC  S17322         14   NAME ASSOCIATED WITH SECTOR NUMBER          ARC16700
        NUM  0              15   RESERVED FOR ENR AND CMR                    ARC16800
        NUM  $05C9          16   UNIT, FUNCTION AND DENSITY CONTROL          ARC16900
        ADC  U73223         17   DIAGNOSTIC LU                               ARC17000
        ADC  0              18   ERROR CODE                                  ARC17100
        NUM  0              19   RECOVERY RETURN ADDRESS                     ARC17200
        NUM  0              20   RECORD CHECKSUM                             ARC17300
        NUM  $DCDC          21   FUNCTION DIRECTORY BITWORD                  ARC17400
        NUM  0              22   TEMPORARY CHECKSUM                          ARC17500
        ADC  P73220         23   PHYSTB THREAD                               ARC17600
        NUM  0              24   RESERVED                                    ARC17700
        NUM  0              25   RESERVED                                    ARC17800
        ADC  PHSREC         24   MAX PHY RECORD SIZE        (7 TRACK)        ARC17900
        ADC  BF1F32         25   PACK/UNPACK BUFFER         (7 TRACK)        ARC18000
        EJT                                                                   ARC18100
```

Figure 1-32. 1732-2/615-73/93 Magnetic Tape Physical Device Table, Section ABC (Continued)

1.30 1732-1/608/609 Unbuffered Magnetic Tape Physical Device Table, Section ABD

Up to eight unbuffered 1732-1/608/609 magnetic tape drives may be included in a system. Each has its own physical device table, as shown in Figure 1-33. In each table, the type code in word 8 specifies whether the unit is a 608 or a 609. Word 17 of each table is an index into the LOG1A table if there is a diagnostic logical unit associated with this drive. Word 17 is zero if there is no corresponding diagnostic logical unit.

There is one driver for all 608/609 magnetic tape drives in a system. The driver includes the packing/unpacking logic needed for a 608 unit, even if all units in the system are 609's.

The driver can be core resident or mass resident. If M1732U is zero, the driver is core resident, and words 1, 2, and 3 of each table are driver entries. If M1732U is one, the driver is mass resident, and words 1, 2, and 3 of each table point to jumps to MMEXEC.

The interrupt response routine is contained in lines *ABD0330 and *ABD0340 of Figure 1-33. It is in the form of a standard interrupt processor for MSOS. The common interrupt handler transfers control to the interrupt response routine which in turn puts the address of the first physical device table in Q and jumps to the driver continuator entry. The driver then determines which of the tape drives caused the interrupt.

The physical device tables are threaded, the thread appearing in word 23 of each table. The thread word in the first table points to the second, the second to the third, etc. The thread word for the last unit points to the first. If there are n units in the system, where n is less than eight, the physical device tables in the system will correspond to units 0, 1, 2, ... n-2, 7. For example, if there are five units, the units are numbered 0, 1, 2, 3, 7. If there is only one unit in a system it is unit 0 and the thread word points to the physical device table for unit 0.

```
*            6 0 8 / 9   M A G   T A P E
*
         SPC   1
         EQU   T608U(24*$10)  TYPE CODE - 608 MAG TAPE
         EQU   T609U(25*$10)  TYPE CODE - 609 MAG TAPE
         EQU   PHSREC(192)      MAX. PHYSICAL RECORD SIZE FOR  7  TRACK
         SPC   2
BF1F32   BZS   BF1F32(PHSREC*4/3+2)       PACK/UNPACK BUFFER (7 TRACK)
         SPC   1
         EQU   M1732U(0)
         EQU   M1732U(1)
*
         IFA   M1732U.EQ.0      CORE RESIDENT DRIVER
         EXT   I1732U
         EXT   C1732U
         EXT   E1732U
         EQU   L1732U(0)
         EQU   S1732U($7FFF)
         EIF
*
         IFA   M1732U.EQ.1     MASS RESIDENT DRIVER
         EXT   MASDRV
         EXT   MASCON
         EXT   MASERR
I1732U   JMP+  MASDRV          INITIATE DRIVER
C1732U   JMP+  MASCON          INTERRUPT RESPONSE
E1732U   JMP+  MASERR          TIMEOUT ERROR
         EXT   L1732U
         EXT   S1732U
         EIF
*
         SPC   2
R1732U   LDQ   =XP732U0        INTERRUPT RESPONSE FOR 608/9 MAG TAPE
         JMP*  (P732U0+2)
         EJT
*            6 0 8 / 9   M A G   T A P E ,   U N I T   0
*
         EQU   U732U0(0)
         EQU   U732U0(X732U0-LOG1A)
         SPC   1
P732U0   ADC   $520E           00   SCHEDULER CALL
         ADC   I1732U          01   INITIATOR ADDRESS
         ADC   C1732U          02   CONTINUATOR ADDRESS
         ADC   E1732U          03   TIMEOUT ERROR ADDRESS
         NUM   -1              04   DIAGNOSTIC CLOCK
         NUM   0               05   LOGICAL UNIT
         NUM   0               06   PARAMETER LOCATION
         NUM   $0381           07   CONVERTER, EQUIPMENT, STATION
         ADC   $0806+T608U     08   REQUEST STATUS
         ADC   $0806+T609U     08   REQUEST STATUS
         NUM   0               09   DRIVER STATUS
```

Figure 1-33. 1732-1/608/609 Unbuffered Magnetic Tape Physical Device Table, Section ABD

```
         NUM  0                 10  CURRENT LOCATION                                  ABD05200
         NUM  0                 11  LAST LOCATION PLUS ONE                            ABD05300
         NUM  0                 12  DEVICE STATUS                                     ABD05400
         ADC  L1732U            13  DRIVER LENGTH IF MASS MEMORY                      ABD05500
         ADC  S1732U            14  NAME ASSOCIATED WITH SECTOR NUMBER                ABD05600
         NUM  0                 15  RESERVED FOR FNR AND CMR                          ABD05700
         NUM  $0440             16  FUNCTION AND UNIT CONTROL                         ABD05800
         ADC  U732U0            17  DIAGNOSTIC LU                                     ABD05900
         ADC  0                 18  ERROR CODE                                        ABD06000
         NUM  0                 19  RECOVERY RETURN ADDRESS                           ABD06100
         NUM  0                 20  RECORD CHECKSUM                                   ABD06200
         NUM  $DCDC             21  FUNCTION DIRECTORY BITWORD                        ABD06300
         NUM  0                 22  TEMPORARY CHECKSUM                                ABD06400
         ADC  P732U1            23  PHYSTB THREAD                                     ABD06500
         ADC  PHSREC            24  MAX PHY RECORD SIZE          (7 TRACK)            ABD06600
         ADC  BF1F32            25  PACK/UNPACK BUFFER           (7 TRACK)            ABD06700
         NUM  0                 26  END-OF-TAPE FLAG                                  ABD06800
         EJT                                                                          ABD06900
*             6 0 8 / 9   M A G   T A P E ,   U N I T   1                             ABD07000
*                                                                                     ABD07100
         EQU  U732U1(0)                                                               ABD07200
         EQU  U732U1(X732U1-LOG1A)                                                    ABD07300
         SPC  1                                                                       ABD07400
P732U1   ADC  $520E             00  SCHEDULER CALL                                    ABD07500
         ADC  I1732U            01  INITIATOR ADDRESS                                 ABD07600
         ADC  C1732U            02  CONTINUATOR ADDRESS                               ABD07700
         ADC  E1732U            03  TIMEOUT ERROR ADDRESS                             ABD07800
         NUM  -1                04  DIAGNOSTIC CLOCK                                  ABD07900
         NUM  0                 05  LOGICAL UNIT                                      ABD08000
         NUM  0                 06  PARAMETER LOCATION                                ABD08100
         NUM  $0381             07  CONVERTER, EQUIPMENT, STATION                     ABD08200
         ADC  $0806+T608U       08  REQUEST STATUS                                    ABD08300
         ADC  $0806+T609U       08  REQUEST STATUS                                    ABD08400
         NUM  0                 09  DRIVER STATUS                                     ABD08500
         NUM  0                 10  CURRENT LOCATION                                  ABD08600
         NUM  0                 11  LAST LOCATION PLUS ONE                            ABD08700
         NUM  0                 12  DEVICE STATUS                                     ABD08800
         ADC  L1732U            13  DRIVER LENGTH IF MASS MEMORY                      ABD08900
         ADC  S1732U            14  NAME ASSOCIATED WITH SECTOR NUMBER                ABD09000
         NUM  0                 15  RESERVED FOR FNR AND CMR                          ABD09100
         NUM  $04C0             16  FUNCTION AND UNIT CONTROL                         ABD09200
         ADC  U732U1            17  DIAGNOSTIC LU                                     ABD09300
         ADC  0                 18  ERROR CODE                                        ABD09400
         NUM  0                 19  RECOVERY RETURN ADDRESS                           ABD09500
         NUM  0                 20  RECORD CHECKSUM                                   ABD09600
         NUM  $DCDC             21  FUNCTION DIRECTORY BITWORD                        ABD09700
         NUM  0                 22  TEMPORARY CHECKSUM                                ABD09800
         ADC  P732U2            23  PHYSTB THREAD                                     ABD09900
         ADC  PHSREC            24  MAX PHY RECORD SIZE          (7 TRACK)            ABD10000
         ADC  BF1F32            25  PACK/UNPACK BUFFER           (7 TRACK)            ABD10100
         NUM  0                 26  END-OF-TAPE FLAG                                  ABD10200
         EJT                                                                          ABD10300
```

Figure 1-33. 1732-1/608/609 Unbuffered Magnetic Tape Physical Device Table, Section ABD (Continued)

```
*           6 0 8 / 9   M A G   T A P E ,   U N I T   2                           ABD10400
*                                                                                 ABD10500
         EQU   U732U2(0)                                                          ABD10600
         EQU   U732U2(X732U2-LCG1A)                                               ABD10700
         SPC   1                                                                  ABD10800
P732U2   ADC   $520E            00  SCHEDULER CALL                                ABD10900
         ADC   I1732U           01  INITIATOR ADDRESS                             ABD11000
         ADC   C1732U           02  CONTINUATOR ADDRESS                           ABD11100
         ADC   E1732U           03  TIMEOUT ERROR ADDRESS                         ABD11200
         NUM   -1               04  DIAGNOSTIC CLOCK                              ABD11300
         NUM   0                05  LOGICAL UNIT                                  ABD11400
         NUM   0                06  PARAMETER LOCATION                            ABD11500
         NUM   $0381            07  CONVERTER, EQUIPMENT, STATION                 ABD11600
         ADC   $0806+T608U      08  REQUEST STATUS                                ABD11700
         ADC   $0806+T609U      08  REQUEST STATUS                                ABD11800
         NUM   0                09  DRIVER STATUS                                 ABD11900
         NUM   0                10  CURRENT LOCATION                              ABD12000
         NUM   0                11  LAST LOCATION PLUS ONE                        ABD12100
         NUM   0                12  DEVICE STATUS                                 ABD12200
         ADC   L1732U           13  DRIVER LENGTH IF MASS MEMORY                  ABD12300
         ADC   S1732U           14  NAME ASSOCIATED WITH SECTOR NUMBER            ABD12400
         NUM   0                15  RESERVED FOR FNR AND CMR                      ABD12500
         NUM   $0540            16  FUNCTION AND UNIT CONTROL                     ABD12600
         ADC   U732U2           17  DIAGNOSTIC LU                                 ABD12700
         ADC   0                18  ERROR CODE                                    ABD12800
         NUM   0                19  RECOVERY RETURN ADDRESS                       ABD12900
         NUM   0                20  RECORD CHECKSUM                               ABD13000
         NUM   $DCDC            21  FUNCTION DIRECTORY BITWORD                    ABD13100
         NUM   0                22  TEMPORARY CHECKSUM                            ABD13200
         ADC   P732U3           23  PHYSTB THREAD                                 ABD13300
         ADC   PHSREC           24  MAX PHY RECORD SIZE         (7 TRACK)         ABD13400
         ADC   BF1F32           25  PACK/UNPACK BUFFER          (7 TRACK)         ABD13500
         NUM   0                26  END-OF-TAPE FLAG                              ABD13600
         EJT                                                                      ABD13700
*           6 0 8 / 9   M A G   T A P E ,   U N I T   3                           ABD13800
*                                                                                 ABD13900
         EQU   U732U3(0)                                                          ABD14000
         EQU   U732U3(X732U3-LCG1A)                                               ABD14100
         SPC   1                                                                  ABD14200
P732U3   ADC   $520E            00  SCHEDULER CALL                                ABD14300
         ADC   I1732U           01  INITIATOR ADDRESS                             ABD14400
         ADC   C1732U           02  CONTINUATOR ADDRESS                           ABD14500
         ADC   E1732U           03  TIMEOUT ERROR ADDRESS                         ABD14600
         NUM   -1               04  DIAGNOSTIC CLOCK                              ABD14700
         NUM   0                05  LOGICAL UNIT                                  ABD14800
         NUM   0                06  PARAMETER LOCATION                            ABD14900
         NUM   $0381            07  CONVERTER, EQUIPMENT, STATION                 ABD15000
         ADC   $0806+T608U      08  REQUEST STATUS                                ABD15100
         ADC   $0806+T609U      08  REQUEST STATUS                                ABD15200
         NUM   0                09  DRIVER STATUS                                 ABD15300
         NUM   0                10  CURRENT LOCATION                              ABD15400
         NUM   0                11  LAST LOCATION PLUS ONE                        ABD15500
         NUM   0                12  DEVICE STATUS                                 ABD15600
         ADC   L1732U           13  DRIVER LENGTH IF MASS MEMORY                  ABD15700
```

Figure 1-33. 1732-1/608/609 Unbuffered Magnetic Tape Physical Device Table, Section ABD (Continued)

```
       ADC   S1732U            14  NAME ASSOCIATED WITH SECTOR NUMBER           ABD15800
       NUM   0                 15  RESERVED FOR FNR AND CMR                     ABD15900
       NUM   $05C0             16  FUNCTION AND UNIT CONTROL                    ABD16000
       ADC   U732U3            17  DIAGNOSTIC LU                                ABD16100
       ADC   0                 18  ERROR CODE                                   ABD16200
       NUM   0                 19  RECOVERY RETURN ADDRESS                      ABD16300
       NUM   0                 20  RECORD CHECKSUM                              ABD16400
       NUM   $DCDC             21  FUNCTION DIRECTORY BITWORD                   ABD16500
       NUM   0                 22  TEMPORARY CHECKSUM                           ABD16600
       ADC   P732U4            23  PHYSTB THREAD                                ABD16700
       ADC   PHSREC            24  MAX PHY RECORD SIZE        (7 TRACK)         ABD16800
       ADC   BF1F32            25  PACK/UNPACK BUFFER         (7 TRACK)         ABD16900
       NUM   0                 26  END-OF-TAPE FLAG                             ABD17000
       EJT                                                                      ABD17100
*            6 0 8 / 9   M A G   T A P E ,   U N I T   4                        ABD17200
*                                                                               ABD17300
       EQU   U732U4(0)                                                          ABD17400
       EQU   U732U4(X732U4-LCGIA)                                               ABD17500
       SPC   1                                                                  ABD17600
P732U4 ADC   $520E             00  SCHEDULER CALL                               ABD17700
       ADC   I1732U            01  INITIATOR ADDRESS                            ABD17800
       ADC   C1732U            02  CONTINUATOR ADDRESS                          ABD17900
       ADC   E1732U            03  TIMEOUT ERROR ADDRESS                        ABD18000
       NUM   -1                04  DIAGNOSTIC CLOCK                             ABD18100
       NUM   0                 05  LOGICAL UNIT                                 ABD18200
       NUM   0                 06  PARAMETER LOCATION                           ABD18300
       NUM   $0381             07  CONVERTER, EQUIPMENT, STATION                ABD18400
       ADC   $0806+T608U       08  REQUEST STATUS                               ABD18500
       ADC   $0806+T609U       08  REQUEST STATUS                               ABD18600
       NUM   0                 09  DRIVER STATUS                                ABD18700
       NUM   0                 10  CURRENT LOCATION                             ABD18800
       NUM   0                 11  LAST LOCATION PLUS ONE                       ABD18900
       NUM   0                 12  DEVICE STATUS                                ABD19000
       ADC   L1732U            13  DRIVER LENGTH IF MASS MEMORY                 ABD19100
       ADC   S1732U            14  NAME ASSOCIATED WITH SECTOR NUMBER           ABD19200
       NUM   0                 15  RESERVED FOR FNR AND CMR                     ABD19300
       NUM   $0640             16  FUNCTION AND UNIT CONTROL                    ABD19400
       ADC   U732U4            17  DIAGNOSTIC LU                                ABD19500
       ADC   0                 18  ERROR CODE                                   ABD19600
       NUM   0                 19  RECOVERY RETURN ADDRESS                      ABD19700
       NUM   0                 20  RECORD CHECKSUM                              ABD19800
       NUM   $DCDC             21  FUNCTION DIRECTORY BITWORD                   ABD19900
       NUM   0                 22  TEMPORARY CHECKSUM                           ABD20000
       ADC   P732U5            23  PHYSTB THREAD                                ABD20100
       ADC   PHSREC            24  MAX PHY RECORD SIZE        (7 TRACK)         ABD20200
       ADC   BF1F32            25  PACK/UNPACK BUFFER         (7 TRACK)         ABD20300
       NUM   0                 26  END-OF-TAPE FLAG                             ABD20400
       EJT                                                                      ABD20500
```

Figure 1-33. 1732-1/608/609 Unbuffered Magnetic Tape Physical Device Table, Section ABD (Continued)

```
*            6 0 8 / 9   M A G   T A P E ,   U N I T   5                   ABD20600
*                                                                           ABD20700
         EQU  U732U5(0)                                                     ABD20800
         EQU  U732U5(X732U5-LOG1A)                                          ABD20900
         SPC  1                                                             ABD21000
P732U5   ADC  $520E          00  SCHEDULER CALL                             ABD21100
         ADC  I1732U         01  INITIATOR ADDRESS                          ABD21200
         ADC  C1732U         02  CONTINUATOR ADDRESS                        ABD21300
         ADC  E1732U         03  TIMEOUT ERROR ADDRESS                      ABD21400
         NUM  -1             04  DIAGNOSTIC CLOCK                           ABD21500
         NUM  0              05  LOGICAL UNIT                               ABD21600
         NUM  0              06  PARAMETER LOCATION                         ABD21700
         NUM  $0381          07  CONVERTER, EQUIPMENT, STATION              ABD21800
         ADC  $0806+T608U    08  REQUEST STATUS                             ABD21900
         ADC  $0806+T609U    08  REQUEST STATUS                             ABD22000
         NUM  0              09  DRIVER STATUS                              ABD22100
         NUM  0              10  CURRENT LOCATION                           ABD22200
         NUM  0              11  LAST LOCATION PLUS ONE                     ABD22300
         NUM  0              12  DEVICE STATUS                              ABD22400
         ADC  L1732U         13  DRIVER LENGTH IF MASS MEMORY               ABD22500
         ADC  S1732U         14  NAME ASSOCIATED WITH SECTOR NUMBER         ABD22600
         NUM  0              15  RESERVED FOR FNR AND CMR                   ABD22700
         NUM  $06C0          16  FUNCTION AND UNIT CONTROL                  ABD22800
         ADC  U732U5         17  DIAGNOSTIC LU                              ABD22900
         ADC  0              18  ERROR CODE                                 ABD23000
         NUM  0              19  RECOVERY RETURN ADDRESS                    ABD23100
         NUM  0              20  RECORD CHECKSUM                            ABD23200
         NUM  $DCDC          21  FUNCTION DIRECTORY BITWORD                 ABD23300
         NUM  0              22  TEMPORARY CHECKSUM                         ABD23400
         ADC  P732U6         23  PHYSTB THREAD                              ABD23500
         ADC  PHSREC         24  MAX PHY RECORD SIZE        (7 TRACK)       ABD23600
         ADC  BF1F32         25  PACK/UNPACK BUFFER         (7 TRACK)       ABD23700
         NUM  0              26  END-OF-TAPE FLAG                           ABD23800
         EJT                                                                ABD23900
*            6 0 8 / 9   M A G   T A P E ,   U N I T   6                   ABD24000
*                                                                           ABD24100
         EQU  U732U6(0)                                                     ABD24200
         EQU  U732U6(X732U6-LOG1A)                                          ABD24300
         SPC  1                                                             ABD24400
P732U6   ADC  $520E          00  SCHEDULER CALL                             ABD24500
         ADC  I1732U         01  INITIATOR ADDRESS                          ABD24600
         ADC  C1732U         02  CONTINUATOR ADDRESS                        ABD24700
         ADC  E1732U         03  TIMEOUT ERROR ADDRESS                      ABD24800
         NUM  -1             04  DIAGNOSTIC CLOCK                           ABD24900
         NUM  0              05  LOGICAL UNIT                               ABD25000
         NUM  0              06  PARAMETER LOCATION                         ABD25100
         NUM  $0381          07  CONVERTER, EQUIPMENT, STATION              ABD25200
         ADC  $0806+T608U    08  REQUEST STATUS                             ABD25300
         ADC  $0806+T609U    08  REQUEST STATUS                             ABD25400
         NUM  0              09  DRIVER STATUS                              ABD25500
         NUM  0              10  CURRENT LOCATION                           ABD25600
         NUM  0              11  LAST LOCATION PLUS ONE                     ABD25700
         NUM  0              12  DEVICE STATUS                              ABD25800
         ADC  L1732U         13  DRIVER LENGTH IF MASS MEMORY               ABD25900
         ADC  S1732U         14  NAME ASSOCIATED WITH SECTOR NUMBER         ABD26000
         NUM  0              15  RESERVED FOR FNR AND CMR                   ABD26100
         NUM  $0740          16  FUNCTION AND UNIT CONTROL                  ABD26200
```

Figure 1-33. 1732-1/608/609 Unbuffered Magnetic Tape Physical Device Table, Section ABD (Continued)

```
        ADC  U732U6          17  DIAGNOSTIC LU                                    ABD26300
        ADC  0               18  ERROR CODE                                       ABD26400
        NUM  0               19  RECOVERY RETURN ADDRESS                          ABD26500
        NUM  0               20  RECORD CHECKSUM                                  ABD26600
        NUM  $DCDC           21  FUNCTION DIRECTORY BITWORD                       ABD26700
        NUM  0               22  TEMPORARY CHECKSUM                               ABD26800
        ADC  P732U7          23  PHYSTB THREAD                                    ABD26900
        ADC  PHSREC          24  MAX PHY RECORD SIZE         (7 TRACK)            ABD27000
        ADC  BF1F32          25  PACK/UNPACK BUFFER          (7 TRACK)            ABD27100
        NUM  0               26  END-OF-TAPE FLAG                                 ABD27200
        EJT                                                                       ABD27300
*            6 0 8 / 9   M A G   T A P E ,   U N I T   7                          ABD27400
*                                                                                 ABD27500
        EQU  U732U7(0)                                                            ABD27600
        EQU  U732U7(X732U7-LOG1A)                                                 ABD27700
        SPC  1                                                                    ABD27800
P732U7  ADC  $520E           00  SCHEDULER CALL                                   ABD27900
        ADC  I1732U          01  INITIATOR ADDRESS                                ABD28000
        ADC  C1732U          02  CONTINUATOR ADDRESS                              ABD28100
        ADC  E1732U          03  TIMEOUT ERROR ADDRESS                            ABD28200
        NUM  -1              04  DIAGNOSTIC CLOCK                                 ABD28300
        NUM  0               05  LOGICAL UNIT                                     ABD28400
        NUM  0               06  PARAMETER LOCATION                               ABD28500
        NUM  $0381           07  CONVERTER, EQUIPMENT, STATION                    ABD28600
        ADC  $0806+T608U     08  REQUEST STATUS                                   ABD28700
        ADC  $0806+T609U     08  REQUEST STATUS                                   ABD28800
        NUM  0               09  DRIVER STATUS                                    ABD28900
        NUM  0               10  CURRENT LOCATION                                 ABD29000
        NUM  0               11  LAST LOCATION PLUS ONE                           ABD29100
        NUM  0               12  DEVICE STATUS                                    ABD29200
        ADC  L1732U          13  DRIVER LENGTH IF MASS MEMORY                     ABD29300
        ADC  S1732U          14  NAME ASSOCIATED WITH SECTOR NUMBER               ABD29400
        NUM  0               15  RESERVED FOR ENR AND CMR                         ABD29500
        NUM  $07C0           16  FUNCTION AND UNIT CONTROL                        ABD29600
        ADC  U732U7          17  DIAGNOSTIC LU                                    ABD29700
        ADC  0               18  ERROR CODE                                       ABD29800
        NUM  0               19  RECOVERY RETURN ADDRESS                          ABD29900
        NUM  0               20  RECORD CHECKSUM                                  ABD30000
        NUM  $DCDC           21  FUNCTION DIRECTORY BITWORD                       ABD30100
        NUM  0               22  TEMPORARY CHECKSUM                               ABD30200
        ADC  P732U0          23  PHYSTB THREAD                                    ABD30300
        ADC  PHSREC          24  MAX PHY RECORD SIZE         (7 TRACK)            ABD30400
        ADC  BF1F32          25  PACK/UNPACK BUFFER          (7 TRACK)            ABD30500
        NUM  0               26  END-OF-TAPE FLAG                                 ABD30600
        EJT                                                                       ABD30700
```

Figure 1-33. 1732-1/608/609 Unbuffered Magnetic Tape Physical Device Table, Section ABD (Continued)

1.31 <u>1732-1/608/609 Buffered Magnetic Tapes, Section ABE</u>

Section ABE, Figure 1-34, contains the Data Base for the 1732-1/608/609 buffered magnetic tapes. One physical device table for each drive in the system will appear in a SYSDAT for a given system. The words in these tables have meanings analogous to the tables for 608/609 unbuffered units except that word 7 includes the converter code for the 1706 Buffered Data Channel. As for the unbuffered case, there can be up to eight 608/609 buffered magnetic tapes in a system.

Words 24 and 25 are the same for a 608 physical device as for a 615-73 physical device table. Both can use the same pack/unpack buffer since any given system can contain either 615-73 units or 608 units, but not both. This is true due to hardware requirements.

```
*         6 0 8 / 9   B U F F E R E D   M A G   T A P E                 ABE00100
*                                                                       ABE00200
        SPC   1                                                         ABE00300
        EQU   T608B(22*$10)  TYPE CODE - 608 MAG TAPE                   ABE00400
        EQU   T609B(30*$10)  TYPE CODE - 609 MAG TAPE                   ABE00500
        EQU   N7061()                                                   ABE00600
        EQU   N17068(N7061*$100)                                        ABE00700
        EQU   PHSREC(192)    MAX. PHYSICAL RECORD SIZE FOR  7  TRACK    ABE00800
        SPC   2                                                         ABE00900
BF1F32  BZS   BF1F32(PHSREC*4/3+2)      PACK/UNPACK BUFFER (7 TRACK)    ABE01000
        SPC   1                                                         ABE01100
        EQU   M1732B(0)                                                 ABE01200
        EQU   M1732B(1)                                                 ABE01300
*                                                                       ABE01400
        IFA   M1732B,EQ,0     CORE RESIDENT DRIVER                      ABE01500
        EXT   I1732B                                                    ABE01600
        EXT   C1732B                                                    ABE01700
        EXT   E1732B                                                    ABE01800
        EQU   L1732B(0)                                                 ABE01900
        EQU   S1732B($7FFF)                                             ABE02000
        EIF                                                             ABE02100
*                                                                       ABE02200
        IFA   M1732B,EQ,1    MASS RESIDENT DRIVER                       ABE02300
        EXT   MASDRV                                                    ABE02400
        EXT   MASCON                                                    ABE02500
        EXT   MASERR                                                    ABE02600
I1732B  JMP+  MASDRV         INITIATE DRIVER                            ABE02700
C1732B  JMP+  MASCON         INTERRUPT RESPONSE                         ABE02800
E1732B  JMP+  MASERR         TIMEOUT ERROR                              ABE02900
        EXT   L1732B                                                    ABE03000
        EXT   S1732B                                                    ABE03100
        EIF                                                             ABE03200
*                                                                       ABE03300
        SPC   2                                                         ABE03400
R1732B  LDQ   =XP732B0       INTERRUPT RESPONSE FOR 608/9 BUFFERED TAPE ABE03500
        JMP*  (P732B0+2)                                                ABE03600
        EJT                                                             ABE03700
*         6 0 8 / 9   B U F F E R E D   T A P E ,   U N I T   0         ABE03800
*                                                                       ABE03900
        EQU   U732B0(0)                                                 ABE04000
        EQU   U732B0(X732B0-LOG1A)                                      ABE04100
        SPC   1                                                         ABE04200
P732B0  ADC   $5204          00  SCHEDULER CALL                         ABE04300
        ADC   I1732B         01  INITIATOR ADDRESS                      ABE04400
        ADC   C1732B         02  CONTINUATOR ADDRESS                    ABE04500
        ADC   E1732B         03  TIMEOUT ERROR ADDRESS                  ABE04600
        NUM   -1             04  DIAGNOSTIC CLOCK                       ABE04700
        NUM   0              05  LOGICAL UNIT                           ABE04800
        NUM   0              06  PARAMETER LOCATION                     ABE04900
        ADC   $0381+N17068   07  CONVERTER, EQUIPMENT, STATION          ABE05000
        ADC   $0806+T608B    08  REQUEST STATUS                         ABE05100
        ADC   $0806+T609B    08  REQUEST STATUS                         ABE05200
        NUM   0              09  DRIVER STATUS                          ABE05300
```

Figure 1-34. 1732-1/608/609 Buffered Magnetic Tape Physical Device Table, Section ABE

```
        NUM  0                10  CURRENT LOCATION                         ABE05400
        NUM  0                11  LAST LOCATION PLUS ONE                   ABE05500
        NUM  0                12  DEVICE STATUS                            ABE05600
        ADC  L1732B           13  DRIVER LENGTH IF MASS MEMORY             ABE05700
        ADC  S1732B           14  NAME ASSOCIATED WITH SECTOR NUMBER       ABE05800
        NUM  0                15  RESERVED FOR FNR AND CMR                 ABE05900
        NUM  $0440            16  FUNCTION AND UNIT CONTROL                ABE06000
        ADC  U732B0           17  DIAGNOSTIC LU                            ABE06100
        ADC  0                18  ERROR CODE                               ABE06200
        NUM  0                19  RECOVERY RETURN ADDRESS                  ABE06300
        NUM  0                20  RECORD CHECKSUM                          ABE06400
        NUM  $DCDC            21  FUNCTION DIRECTORY BITWORD               ABE06500
        NUM  0                22  TEMPORARY CHECKSUM                       ABE06600
        ADC  P732B1           23  PHYSTB THREAD                            ABE06700
        ADC  PHSREC           24  MAX PHY RECORD SIZE        (7 TRACK)     ABE06800
        ADC  BF1F32           25  PACK/UNPACK BUFFER         (7 TRACK)     ABE06900
        NUM  0                26  END-OF-TAPE FLAG                         ABE07000
        EJT                                                                ABE07100
*            6 0 8 / 9   B U F F E R E D   T A P E ,   U N I T   1         ABE07200
*                                                                          ABE07300
        EQU  U732B1(0)                                                     ABE07400
        EQU  U732B1(X732B1-LOG1A)                                          ABE07500
        SPC  1                                                             ABE07600
P732B1  ADC  $520A            00  SCHEDULER CALL                           ABE07700
        ADC  T1732B           01  INITIATOR ADDRESS                        ABE07800
        ADC  C1732B           02  CONTINUATOR ADDRESS                      ABE07900
        ADC  E1732B           03  TIMEOUT ERROR ADDRESS                    ABE08000
        NUM  -1               04  DIAGNOSTIC CLOCK                         ABE08100
        NUM  0                05  LOGICAL UNIT                             ABE08200
        NUM  0                06  PARAMETER LOCATION                       ABE08300
        ADC  $0381+N1706B     07  CONVERTER, EQUIPMENT, STATION            ABE08400
        ADC  $0806+T608B      08  REQUEST STATUS                           ABE08500
        ADC  $0806+T609B      08  REQUEST STATUS                           ABE08600
        NUM  0                09  DRIVER STATUS                            ABE08700
        NUM  0                10  CURRENT LOCATION                         ABE08800
        NUM  0                11  LAST LOCATION PLUS ONE                   ABE08900
        NUM  0                12  DEVICE STATUS                            ABE09000
        ADC  L1732B           13  DRIVER LENGTH IF MASS MEMORY             ABE09100
        ADC  S1732B           14  NAME ASSOCIATED WITH SECTOR NUMBER       ABE09200
        NUM  0                15  RESERVED FOR FNR AND CMR                 ABE09300
        NUM  $04C0            16  FUNCTION AND UNIT CONTROL                ABE09400
        ADC  U732B1           17  DIAGNOSTIC LU                            ABE09500
        ADC  0                18  ERROR CODE                               ABE09600
        NUM  0                19  RECOVERY RETURN ADDRESS                  ABE09700
        NUM  0                20  RECORD CHECKSUM                          ABE09800
        NUM  $DCDC            21  FUNCTION DIRECTORY BITWORD               ABE09900
        NUM  0                22  TEMPORARY CHECKSUM                       ABE10000
        ADC  P732B2           23  PHYSTB THREAD                            ABE10100
        ADC  PHSREC           24  MAX PHY RECORD SIZE        (7 TRACK)     ABE10200
        ADC  BF1F32           25  PACK/UNPACK BUFFER         (7 TRACK)     ABE10300
        NUM  0                26  END-OF-TAPE FLAG                         ABE10400
        EJT                                                                ABE10500
```

Figure 1-34. 1732-1/608/609 Buffered Magnetic Tape Physical Device Table, Section ABE (Continued)

```
*            6 0 8 / 9   B U F F E R E D   T A P E ,   U N I T   2
*
       EQU  U732B2(0)
       EQU  U732B2(X732B2-LOG1A)
       SPC  1
P732B2 ADC  $520A           00  SCHEDULER CALL
       ADC  I1732B          01  INITIATOR ADDRESS
       ADC  C1732B          02  CONTINUATOR ADDRESS
       ADC  E1732B          03  TIMEOUT ERROR ADDRESS
       NUM  -1              04  DIAGNOSTIC CLOCK
       NUM  0               05  LOGICAL UNIT
       NUM  0               06  PARAMETER LOCATION
       ADC  $0381+N17068    07  CONVERTER, EQUIPMENT, STATION
       ADC  $0806+T608B     08  REQUEST STATUS
       ADC  $0806+T609B     08  REQUEST STATUS
       NUM  0               09  DRIVER STATUS
       NUM  0               10  CURRENT LOCATION
       NUM  0               11  LAST LOCATION PLUS ONE
       NUM  0               12  DEVICE STATUS
       ADC  L1732B          13  DRIVER LENGTH IF MASS MEMORY
       ADC  S1732B          14  NAME ASSOCIATED WITH SECTOR NUMBER
       NUM  0               15  RESERVED FOR ENR AND CMR
       NUM  $0540           16  FUNCTION AND UNIT CONTROL
       ADC  U732B2          17  DIAGNOSTIC LU
       ADC  0               18  ERROR CODE
       NUM  0               19  RECOVERY RETURN ADDRESS
       NUM  0               20  RECORD CHECKSUM
       NUM  $DCDC           21  FUNCTION DIRECTORY BITWORD
       NUM  0               22  TEMPORARY CHECKSUM
       ADC  P732B3          23  PHYSTB THREAD
       ADC  PHSREC          24  MAX PHY RECORD SIZE       (7 TRACK)
       ADC  BF1F32          25  PACK/UNPACK BUFFER        (7 TRACK)
       NUM  0               26  END-OF-TAPE FLAG
       EJT
*            6 0 8 / 9   B U F F E R E D   T A P E ,   U N I T   3
*
       EQU  U732B3(0)
       EQU  U732B3(X732B3-LOG1A)
       SPC  1
P732B3 ADC  $520A           00  SCHEDULER CALL
       ADC  I1732B          01  INITIATOR ADDRESS
       ADC  C1732B          02  CONTINUATOR ADDRESS
       ADC  E1732B          03  TIMEOUT ERROR ADDRESS
       NUM  -1              04  DIAGNOSTIC CLOCK
       NUM  0               05  LOGICAL UNIT
       NUM  0               06  PARAMETER LOCATION
       ADC  $0381+N17068    07  CONVERTER, EQUIPMENT, STATION
       ADC  $0806+T608B     08  REQUEST STATUS
       ADC  $0806+T609B     08  REQUEST STATUS
       NUM  0               09  DRIVER STATUS
       NUM  0               10  CURRENT LOCATION
       NUM  0               11  LAST LOCATION PLUS ONE
       NUM  0               12  DEVICE STATUS
       ADC  L1732B          13  DRIVER LENGTH IF MASS MEMORY
```

Figure 1-34. 1732-1/608/609 Buffered Magnetic Tape Physical Device Table, Section ABE (Continued)

```
      ADC  S1732B          14  NAME ASSOCIATED WITH SECTOR NUMBER      ABE16000
      NUM  0               15  RESERVED FOR FNR AND CMR                ABE16100
      NUM  $05C0           16  FUNCTION AND UNIT CONTROL               ABE16200
      ADC  U732B3          17  DIAGNOSTIC LU                           ABE16300
      ADC  0               18  ERROR CODE                              ABE16400
      NUM  0               19  RECOVERY RETURN ADDRESS                 ABE16500
      NUM  0               20  RECORD CHECKSUM                         ABE16600
      NUM  $DCDC           21  FUNCTION DIRECTORY BITWORD              ABE16700
      NUM  0               22  TEMPORARY CHECKSUM                      ABE16800
      ADC  P732B4          23  PHYSTB THREAD                           ABE16900
      ADC  PHSREC          24  MAX PHY RECORD SIZE       (7 TRACK)     ABE17000
      ADC  BF1F32          25  PACK/UNPACK BUFFER        (7 TRACK)     ABE17100
      NUM  0               26  END-OF-TAPE FLAG                        ABE17200
      EJT                                                              ABE17300
*          6 0 8 / 9   B U F F E R E D   T A P E ,   U N I T   4       ABE17400
*                                                                      ABE17500
      EQU  U732B4(0)                                                   ABE17600
      EQU  U732B4(X732B4-LOG1A)                                        ABE17700
      SPC  1                                                           ABE17800
P732B4 ADC $520A           00  SCHEDULER CALL                          ABE17900
      ADC  I1732B          01  INITIATOR ADDRESS                       ABE18000
      ADC  C1732B          02  CONTINUATOR ADDRESS                     ABE18100
      ADC  E1732B          03  TIMEOUT ERROR ADDRESS                   ABE18200
      NUM  -1              04  DIAGNOSTIC CLOCK                        ABE18300
      NUM  0               05  LOGICAL UNIT                            ABE18400
      NUM  0               06  PARAMETER LOCATION                      ABE18500
      ADC  $0381+N17068    07  CONVERTER, EQUIPMENT, STATION           ABE18600
      ADC  $0806+T608B     08  REQUEST STATUS                          ABE18700
      ADC  $0806+T609B     08  REQUEST STATUS                          ABE18800
      NUM  0               09  DRIVER STATUS                           ABE18900
      NUM  0               10  CURRENT LOCATION                        ABE19000
      NUM  0               11  LAST LOCATION PLUS ONE                  ABE19100
      NUM  0               12  DEVICE STATUS                           ABE19200
      ADC  L1732B          13  DRIVER LENGTH IF MASS MEMORY            ABE19300
      ADC  S1732B          14  NAME ASSOCIATED WITH SECTOR NUMBER      ABE19400
      NUM  0               15  RESERVED FOR FNR AND CMR                ABE19500
      NUM  $0640           16  FUNCTION AND UNIT CONTROL               ABE19600
      ADC  U732B4          17  DIAGNOSTIC LU                           ABE19700
      ADC  0               18  ERROR CODE                              ABE19800
      NUM  0               19  RECOVERY RETURN ADDRESS                 ABE19900
      NUM  0               20  RECORD CHECKSUM                         ABE20000
      NUM  $DCDC           21  FUNCTION DIRECTORY BITWORD              ABE20100
      NUM  0               22  TEMPORARY CHECKSUM                      ABE20200
      ADC  P732B5          23  PHYSTB THREAD                           ABE20300
      ADC  PHSREC          24  MAX PHY RECORD SIZE       (7 TRACK)     ABE20400
      ADC  BF1F32          25  PACK/UNPACK BUFFER        (7 TRACK)     ABE20500
      NUM  0               26  END-OF-TAPE FLAG                        ABE20600
      EJT                                                              ABE20700
```

Figure 1-34. 1732-1/608/609 Buffered Magnetic Tape Physical Device Table, Section ABE (Continued)

(128)

```
*           6 0 8 / 9   B U F F E R E D   T A P E ,   U N I T   5       ABE20800
*                                                                         ABE20900
        EQU  U73285(0)                                                    ABE21000
        EQU  U73285(X73285-LOG1A)                                         ABE21100
        SPC  1                                                            ABE21200
P73285  ADC  $520A         00  SCHEDULER CALL                             ABE21300
        ADC  I1732B        01  INITIATOR ADDRESS                          ABE21400
        ADC  C1732B        02  CONTINUATOR ADDRESS                        ABE21500
        ADC  F1732B        03  TIMEOUT ERROR ADDRESS                      ABE21600
        NUM  -1            04  DIAGNOSTIC CLOCK                           ABE21700
        NUM  0             05  LOGICAL UNIT                               ABE21800
        NUM  0             06  PARAMETER LOCATION                         ABE21900
        ADC  $0381+N17098  07  CONVERTER, EQUIPMENT, STATION              ABE22000
        ADC  $0806+T608B   08  REQUEST STATUS                             ABE22100
        ADC  $0806+T609B   08  REQUEST STATUS                             ABE22200
        NUM  0             09  DRIVER STATUS                              ABE22300
        NUM  0             10  CURRENT LOCATION                           ABE22400
        NUM  0             11  LAST LOCATION PLUS ONE                     ABE22500
        NUM  0             12  DEVICE STATUS                              ABE22600
        ADC  L1732B        13  DRIVER LENGTH IF MASS MEMORY               ABE22700
        ADC  S1732B        14  NAME ASSOCIATED WITH SECTOR NUMBER         ABE22800
        NUM  0             15  RESERVED FOR FNR AND CMR                   ABE22900
        NUM  $06C0         16  FUNCTION AND UNIT CONTROL                  ABE23000
        ADC  U73285        17  DIAGNOSTIC LU                              ABE23100
        ADC  0             18  ERROR CODE                                 ABE23200
        NUM  0             19  RECOVERY RETURN ADDRESS                    ABE23300
        NUM  0             20  RECORD CHECKSUM                            ABE23400
        NUM  $DCDC         21  FUNCTION DIRECTORY BITWORD                 ABE23500
        NUM  0             22  TEMPORARY CHECKSUM                         ABE23600
        ADC  P73286        23  PHYSTB THREAD                              ABE23700
        ADC  PHSREC        24  MAX PHY RECORD SIZE        (7 TRACK)       ABE23800
        ADC  BF1F32        25  PACK/UNPACK BUFFER         (7 TRACK)       ABE23900
        NUM  0             26  END-OF-TAPE FLAG                           ABE24000
        EJT                                                               ABE24100
*           6 0 8 / 9   B U F F E R E D   T A P E ,   U N I T   6       ABE24200
*                                                                         ABE24300
        EQU  U73286(0)                                                    ABE24400
        EQU  U73286(X73286-LOG1A)                                         ABE24500
        SPC  1                                                            ABE24600
P73286  ADC  $520A         00  SCHEDULER CALL                             ABE24700
        ADC  I1732B        01  INITIATOR ADDRESS                          ABE24800
        ADC  C1732B        02  CONTINUATOR ADDRESS                        ABE24900
        ADC  F1732B        03  TIMEOUT ERROR ADDRESS                      ABE25000
        NUM  -1            04  DIAGNOSTIC CLOCK                           ABE25100
        NUM  0             05  LOGICAL UNIT                               ABE25200
        NUM  0             06  PARAMETER LOCATION                         ABE25300
        ADC  $0381+N17098  07  CONVERTER, EQUIPMENT, STATION              ABE25400
        ADC  $0806+T608B   08  REQUEST STATUS                             ABE25500
        ADC  $0806+T609B   08  REQUEST STATUS                             ABE25600
        NUM  0             09  DRIVER STATUS                              ABE25700
```

Figure 1-34. 1732-1/608/609 Buffered Magnetic Tape Physical Device Table, Section ABE (CONTINUED)

```
      NUM  0                  10  CURRENT LOCATION                          ABE25800
      NUM  0                  11  LAST LOCATION PLUS ONE                    ABE25900
      NUM  0                  12  DEVICE STATUS                             ABE26000
      ADC  L1732B             13  DRIVER LENGTH IF MASS MEMORY              ABE26100
      ADC  S1732B             14  NAME ASSOCIATED WITH SECTOR NUMBER        ABE26200
      NUM  0                  15  RESERVED FOR FNR AND CMR                  ABE26300
      NUM  $0740              16  FUNCTION AND UNIT CONTROL                 ABE26400
      ADC  U732B6             17  DIAGNOSTIC LU                             ABE26500
      ADC  0                  18  ERROR CODE                                ABE26600
      NUM  0                  19  RECOVERY RETURN ADDRESS                   ABE26700
      NUM  0                  20  RECORD CHECKSUM                           ABE26800
      NUM  $DCDC              21  FUNCTION DIRECTORY BITWORD                ABE26900
      NUM  0                  22  TEMPORARY CHECKSUM                        ABE27000
      ADC  P732B7             23  PHYSTB THREAD                             ABE27100
      ADC  PHSREC             24  MAX PHY RECORD SIZE        (7 TRACK)      ABE27200
      ADC  BF1F32             25  PACK/UNPACK BUFFER         (7 TRACK)      ABE27300
      NUM  0                  26  END-OF-TAPE FLAG                          ABE27400
      EJT                                                                   ABE27500
*          6 0 8 / 9   B U F F E R E D   T A P E ,   U N I T   7            ABE27600
*                                                                           ABE27700
      EQU  U732B7(0)                                                        ABE27800
      EQU  U732B7(X732B7-LOG1A)                                             ABE27900
      SPC  1                                                                ABE28000
P732B7 ADC $520A              00  SCHEDULER CALL                            ABE28100
      ADC  I1732B             01  INITIATOR ADDRESS                         ABE28200
      ADC  C1732B             02  CONTINUATOR ADDRESS                       ABE28300
      ADC  E1732B             03  TIMEOUT ERROR ADDRESS                     ABE28400
      NUM  -1                 04  DIAGNOSTIC CLOCK                          ABE28500
      NUM  0                  05  LOGICAL UNIT                              ABE28600
      NUM  0                  06  PARAMETER LOCATION                        ABE28700
      ADC  $0381+N17098       07  CONVERTER, EQUIPMENT, STATION             ABE28800
      ADC  $0806+T6080        08  REQUEST STATUS                            ABE28900
      ADC  $0806+T6090        08  REQUEST STATUS                            ABE29000
      NUM  0                  09  DRIVER STATUS                             ABE29100
      NUM  0                  10  CURRENT LOCATION                          ABE29200
      NUM  0                  11  LAST LOCATION PLUS ONE                    ABE29300
      NUM  0                  12  DEVICE STATUS                             ABE29400
      ADC  L1732B             13  DRIVER LENGTH IF MASS MEMORY              ABE29500
      ADC  S1732B             14  NAME ASSOCIATED WITH SECTOR NUMBER        ABE29600
      NUM  0                  15  RESERVED FOR FNR AND CMR                  ABE29700
      NUM  $07C0              16  FUNCTION AND UNIT CONTROL                 ABE29800
      ADC  U732B7             17  DIAGNOSTIC LU                             ABE29900
      ADC  0                  18  ERROR CODE                                ABE30000
      NUM  0                  19  RECOVERY RETURN ADDRESS                   ABE30100
      NUM  0                  20  RECORD CHECKSUM                           ABE30200
      NUM  $DCDC              21  FUNCTION DIRECTORY BITWORD                ABE30300
      NUM  0                  22  TEMPORARY CHECKSUM                        ABE30400
      ADC  P732B0             23  PHYSTB THREAD                             ABE30500
      ADC  PHSREC             24  MAX PHY RECORD SIZE        (7 TRACK)      ABE30600
      ADC  BF1F32             25  PACK/UNPACK BUFFER         (7 TRACK)      ABE30700
      NUM  0                  26  END-OF-TAPE FLAG                          ABE30800
      EJT                                                                   ABE30900
```

Figure 1-34. 1732-1/608/609 Buffered Magnetic Tape Physical Device Table, Section ABE (CONTINUED)

1.32 1731-601 Unbuffered Magnetic Tape Physical Device Tables, Section ABF

Up to eight 1731-601 unbuffered units may be included in a system. Each unit must have its own physical device table. A 1731-601 unbuffered magnetic tape physical device table is similar to a table for a 608/609 unbuffered magnetic tape unit, as discussed in Section 1.30. The following differences exist:

(1) The maximum physical record size and the pack/unpack buffer word are not specified in a physical device table for a 1731-601 magnetic tape unit, since these parameters are contained in the driver.

(2) Words 23 and 26 of a physical device table for a 608/609 unbuffered unit correspond to words 24 and 25, respectively, of a table for a 601 unbuffered unit. (Compare Figure 1-33 with Figure 1-35.)

(3) Word 7 is the same for all 601 units since the number of tracks is seven for all 601 units.

```
*            1 7 3 1 - 6 0 1   M A G   T A P E
*
        SPC   1
        EQU   M1731U(0)
        EQU   M1731U(1)
*
        IFA   M1731U.EQ.0    CORE RESIDENT DRIVER
        EXT   I1731U
        EXT   C1731U
        EXT   E1731U
        EQU   L1731U(0)
        EQU   S1731U($7FFF)
        EIF
*
        IFA   M1731U.EQ.1    MASS RESIDENT DRIVER
        EXT   MASDRV
        EXT   MASCON
        EXT   MASERR
I1731U  JMP+  MASDRV         INITIATE DRIVER
C1731U  JMP+  MASCON         INTERRUPT RESPONSE
E1731U  JMP+  MASERR         TIMEOUT ERROR
        EXT   L1731U
        EXT   S1731U
        EIF
*
        SPC   2
R1731U  LDQ   =XP731U0       INTERRUPT RESPONSE FOR THE 601 MAG TAPE
        JMP*  (P731U0+2)
        EJT
*            1 7 3 1 - 6 0 1   M A G   T A P E ,   U N I T   0
*
        EQU   U731U0(0)
        EQU   U731U0(X731U0-LOG1A)
        SPC   1
P731U0  ADC   $520F          00  SCHEDULER CALL
        ADC   I1731U         01  INITIATOR ADDRESS
        ADC   C1731U         02  CONTINUATOR ADDRESS
        ADC   E1731U         03  TIMEOUT ERROR ADDRESS
        NUM   -1             04  DIAGNOSTIC CLOCK
        NUM   0              05  LOGICAL UNIT
        NUM   0              06  PARAMETER LOCATION
        NUM   $0381          07  CONVERTER, EQUIPMENT, STATION
        NUM   $0896          08  REQUEST STATUS
        NUM   0              09  DRIVER STATUS
        NUM   0              10  CURRENT LOCATION
        NUM   0              11  LAST LOCATION PLUS ONE
        NUM   0              12  DEVICE STATUS
        ADC   L1731U         13  DRIVER LENGTH IF MASS MEMORY
        ADC   S1731U         14  NAME ASSOCIATED WITH SECTOR NUMBER
        NUM   0              15  RESERVED FOR ENR AND CMR
        NUM   $0414          16  FUNCTION AND UNIT CONTROL
        ADC   U731U0         17  DIAGNOSTIC LU
        NUM   0              18  ERROR CODE
        NUM   0              19  RECOVERY RETURN ADDRESS
        NUM   0              20  RECORD CHECKSUM
```

Figure 1-35. 1731-601 Unbuffered Magnetic Tape Physical Device Table, Section ABF

```
        NUM   $DCDC          21   FUNCTION DIRECTORY BITWORD                    ABF05600
        NUM   0              22   TEMPORARY CHECKSUM                            ABF05700
        NUM   0              23   READ/WRITE PROCESSOR RETURN ADDRESS           ABF05800
        ADC   P73101         24   PHYSTB THREAD                                 ABF05900
        NUM   0              25   END-OF-TAPE FLAG                              ABF06000
        EJT                                                                     ABF06100
*             1 7 3 1 - 6 0 1   M A G   T A P E ,   U N I T   1                 ABF06200
*                                                                               ABF06300
        EQU   U73101(0)                                                         ABF06400
        EQU   U73101(X73101-LOG1A)                                              ABF06500
        SPC   1                                                                 ABF06600
P73101  ADC   $520E          00   SCHEDULER CALL                                ABF06700
        ADC   I1731U         01   INITIATOR ADDRESS                             ABF06800
        ADC   C1731U         02   CONTINUATOR ADDRESS                           ABF06900
        ADC   E1731U         03   TIMEOUT ERROR ADDRESS                         ABF07000
        NUM   -1             04   DIAGNOSTIC CLOCK                              ABF07100
        NUM   0              05   LOGICAL UNIT                                  ABF07200
        NUM   0              06   PARAMETER LOCATION                            ABF07300
        NUM   $0381          07   CONVERTER, EQUIPMENT, STATION                 ABF07400
        NUM   $0896          08   REQUEST STATUS                                ABF07500
        NUM   0              09   DRIVER STATUS                                 ABF07600
        NUM   0              10   CURRENT LOCATION                              ABF07700
        NUM   0              11   LAST LOCATION PLUS ONE                        ABF07800
        NUM   0              12   DEVICE STATUS                                 ABF07900
        ADC   L1731U         13   DRIVER LENGTH IF MASS MEMORY                  ABF08000
        ADC   S1731U         14   NAME ASSOCIATED WITH SECTOR NUMBER            ABF08100
        NUM   0              15   RESERVED FOR FNR AND CMR                      ABF08200
        NUM   $0494          16   FUNCTION AND UNIT CONTROL                     ABF08300
        ADC   U73101         17   DIAGNOSTIC LU                                 ABF08400
        NUM   0              18   ERROR CODE                                    ABF08500
        NUM   0              19   RECOVERY RETURN ADDRESS                       ABF08600
        NUM   0              20   RECORD CHECKSUM                               ABF08700
        NUM   $DCDC          21   FUNCTION DIRECTORY BITWORD                    ABF08800
        NUM   0              22   TEMPORARY CHECKSUM                            ABF08900
        NUM   0              23   READ/WRITE PROCESSOR RETURN ADDRESS           ABF09000
        ADC   P73102         24   PHYSTB THREAD                                 ABF09100
        NUM   0              25   END-OF-TAPE FLAG                              ABF09200
        EJT                                                                     ABF09300
*             1 7 3 1 - 6 0 1   M A G   T A P E ,   U N I T   2                 ABF09400
*                                                                               ABF09500
        EQU   U73102(0)                                                         ABF09600
        EQU   U73102(X73102-LOG1A)                                              ABF09700
        SPC   1                                                                 ABF09800
P73102  ADC   $520E          00   SCHEDULER CALL                                ABF09900
        ADC   I1731U         01   INITIATOR ADDRESS                             ABF10000
        ADC   C1731U         02   CONTINUATOR ADDRESS                           ABF10100
        ADC   E1731U         03   TIMEOUT ERROR ADDRESS                         ABF10200
        NUM   -1             04   DIAGNOSTIC CLOCK                              ABF10300
        NUM   0              05   LOGICAL UNIT                                  ABF10400
        NUM   0              06   PARAMETER LOCATION                            ABF10500
        NUM   $0381          07   CONVERTER, EQUIPMENT, STATION                 ABF10600
        NUM   $0896          08   REQUEST STATUS                                ABF10700
        NUM   0              09   DRIVER STATUS                                 ABF10800
        NUM   0              10   CURRENT LOCATION                              ABF10900
        NUM   0              11   LAST LOCATION PLUS ONE                        ABF11000
        NUM   0              12   DEVICE STATUS                                 ABF11100
        ADC   L1731U         13   DRIVER LENGTH IF MASS MEMORY                  ABF11200
```

Figure 1-35. 1731-601 Unbuffered Magnetic Tape Physical Device Table Section ABF (Continued)

```
        ADC   S1731L         14  NAME ASSOCIATED WITH SECTOR NUMBER         ABF11300
        NUM   0              15  RETURN AND TEMP STORAGE                    ABF11400
        NUM   $0514          16  FUNCTION AND UNIT CONTROL                  ABF11500
        ADC   U73102         17  DIAGNOSTIC LU                              ABF11600
        NUM   0              18  ERROR CODE                                 ABF11700
        NUM   0              19  RECOVERY RETURN ADDRESS                    ABF11800
        NUM   0              20  RECORD CHECKSUM                            ABF11900
        NUM   $DCDC          21  FUNCTION DIRECTORY BITWORD                 ABF12000
        NUM   0              22  TEMPORARY CHECKSUM                         ABF12100
        NUM   0              23  READ/WRITE PROCESSOR RETURN ADDRESS        ABF12200
        ADC   P73103         24  PHYSTB THREAD                              ABF12300
        NUM   0              25  END-OF-TAPE FLAG                           ABF12400
        EJT                                                                 ABF12500
*             1 7 3 1 - 6 0 1    M A G   T A P E ,   U N I T   3            ABF12600
*                                                                           ABF12700
        EQU   U73103(0)                                                     ABF12800
        EQU   U73103(X73103-LOG1A)                                          ABF12900
        SPC   1                                                             ABF13000
P73103  ADC   $520F          00  SCHEDULER CALL                             ABF13100
        ADC   I1731L         01  INITIATOR ADDRESS                          ABF13200
        ADC   C1731L         02  CONTINUATOR ADDRESS                        ABF13300
        ADC   E1731L         03  TIMEOUT ERROR ADDRESS                      ABF13400
        NUM   -1             04  DIAGNOSTIC CLOCK                           ABF13500
        NUM   0              05  LOGICAL UNIT                               ABF13600
        NUM   0              06  PARAMETER LOCATION                         ABF13700
        NUM   $0381          07  CONVERTER, EQUIPMENT, STATION              ABF13800
        NUM   $0896          08  REQUEST STATUS                             ABF13900
        NUM   0              09  DRIVER STATUS                              ABF14000
        NUM   0              10  CURRENT LOCATION                           ABF14100
        NUM   0              11  LAST LOCATION PLUS ONE                     ABF14200
        NUM   0              12  DEVICE STATUS                              ABF14300
        ADC   L1731L         13  DRIVER LENGTH IF MASS MEMORY               ABF14400
        ADC   S1731L         14  NAME ASSOCIATED WITH SECTOR NUMBER         ABF14500
        NUM   0              15  RESERVED FOR FNR AND CMR                   ABF14600
        NUM   $0594          16  FUNCTION AND UNIT CONTROL                  ABF14700
        ADC   U73103         17  DIAGNOSTIC LU                              ABF14800
        NUM   0              18  ERROR CODE                                 ABF14900
        NUM   0              19  RECOVERY RETURN ADDRESS                    ABF15000
        NUM   0              20  RECORD CHECKSUM                            ABF15100
        NUM   $DCDC          21  FUNCTION DIRECTORY BITWORD                 ABF15200
        NUM   0              22  TEMPORARY CHECKSUM                         ABF15300
        NUM   0              23  READ/WRITE PROCESSOR RETURN ADDRESS        ABF15400
        ADC   P73104         24  PHYSTB THREAD                              ABF15500
        NUM   0              25  END-OF-TAPE FLAG                           ABF15600
        EJT                                                                 ABF15700
*             1 7 3 1 - 6 0 1    M A G   T A P E ,   U N I T   4            ABF15800
*                                                                           ABF15900
        EQU   U73104(0)                                                     ABF16000
        EQU   U73104(X73104-LOG1A)                                          ABF16100
        SPC   1                                                             ABF16200
P73104  ADC   $520F          00  SCHEDULER CALL                             ABF16300
        ADC   I1731L         01  INITIATOR ADDRESS                          ABF16400
        ADC   C1731L         02  CONTINUATOR ADDRESS                        ABF16500
        ADC   E1731L         03  TIMEOUT ERROR ADDRESS                      ABF16600
        NUM   -1             04  DIAGNOSTIC CLOCK                           ABF16700
        NUM   0              05  LOGICAL UNIT                               ABF16800
        NUM   0              06  PARAMETER LOCATION                         ABF16900
```

Figure 1-35. 1731-601 Unbuffered Magnetic Tape Physical Device Table, Section ABF (Continued)

```
      NUM   $0381          07  CONVERTER, EQUIPMENT, STATION                          ABF17000
      NUM   $0896          08  REQUEST STATUS                                         ABF17100
      NUM   0              09  DRIVER STATUS                                          ABF17200
      NUM   0              10  CURRENT LOCATION                                       ABF17300
      NUM   0              11  LAST LOCATION PLUS ONE                                 ABF17400
      NUM   0              12  DEVICE STATUS                                          ABF17500
      ADC   L1731U         13  DRIVER LENGTH IF MASS MEMORY                           ABF17600
      ADC   S1731U         14  NAME ASSOCIATED WITH SECTOR NUMBER                     ABF17700
      NUM   0              15  RESERVED FOR FNR AND CMR                               ABF17800
      NUM   $0614          16  FUNCTION AND UNIT CONTROL                              ABF17900
      ADC   U73104         17  DIAGNOSTIC LU                                          ABF18000
      NUM   0              18  ERROR CODE                                             ABF18100
      NUM   0              19  RECOVERY RETURN ADDRESS                                ABF18200
      NUM   0              20  RECORD CHECKSUM                                        ABF18300
      NUM   $DCDC          21  FUNCTION DIRECTORY BITWORD                             ABF18400
      NUM   0              22  TEMPORARY CHECKSUM                                     ABF18500
      NUM   0              23  READ/WRITE PROCESSOR RETURN ADDRESS                    ABF18600
      ADC   P73105         24  PHYSTB THREAD                                          ABF18700
      NUM   0              25  END-OF-TAPE FLAG                                       ABF18800
      EJT                                                                             ABF18900
*           1 7 3 1 - 6 0 1   M A G   T A P E ,   U N I T   5                         ABF19000
*                                                                                     ABF19100
      EQU   U73105(0)                                                                 ABF19200
      EQU   U73105(X73105-LOG1A)                                                      ABF19300
      SPC   1                                                                         ABF19400
P73105 ADC  $520F          00  SCHEDULER CALL                                         ABF19500
      ADC   I1731U         01  INITIATOR ADDRESS                                      ABF19600
      ADC   C1731U         02  CONTINUATOR ADDRESS                                    ABF19700
      ADC   E1731U         03  TIMEOUT ERROR ADDRESS                                  ABF19800
      NUM   -1             04  DIAGNOSTIC CLOCK                                       ABF19900
      NUM   0              05  LOGICAL UNIT                                           ABF20000
      NUM   0              06  PARAMETER LOCATION                                     ABF20100
      NUM   $0381          07  CONVERTER, EQUIPMENT, STATION                          ABF20200
      NUM   $0896          08  REQUEST STATUS                                         ABF20300
      NUM   0              09  DRIVER STATUS                                          ABF20400
      NUM   0              10  CURRENT LOCATION                                       ABF20500
      NUM   0              11  LAST LOCATION PLUS ONE                                 ABF20600
      NUM   0              12  DEVICE STATUS                                          ABF20700
      ADC   L1731U         13  DRIVER LENGTH IF MASS MEMORY                           ABF20800
      ADC   S1731U         14  NAME ASSOCIATED WITH SECTOR NUMBER                     ABF20900
      NUM   0              15  RESERVED FOR FNR AND CMR                               ABF21000
      NUM   $0694          16  FUNCTION AND UNIT CONTROL                              ABF21100
      ADC   U73105         17  DIAGNOSTIC LU                                          ABF21200
      NUM   0              18  ERROR CODE                                             ABF21300
      NUM   0              19  RECOVERY RETURN ADDRESS                                ABF21400
      NUM   0              20  RECORD CHECKSUM                                        ABF21500
      NUM   $DCDC          21  FUNCTION DIRECTORY BITWORD                             ABF21600
      NUM   0              22  TEMPORARY CHECKSUM                                     ABF21700
      NUM   0              23  READ/WRITE PROCESSOR RETURN ADDRESS                    ABF21800
      ADC   P73106         24  PHYSTB THREAD                                          ABF21900
      NUM   0              25  END-OF-TAPE FLAG                                       ABF22000
      EJT                                                                             ABF22100
*           1 7 3 1 - 6 0 1   M A G   T A P E ,   U N I T   6                         ABF22200
*                                                                                     ABF22300
      EQU   U73106(0)                                                                 ABF22400
      EQU   U73106(X73106-LOG1A)                                                      ABF22500
      SPC   1                                                                         ABF22600
```

Figure 1-35. 1731-601 Unbuffered Magnetic Tape Physical Device Tabl
Section ABF (Continued)

```
P731U6 ADC    $520E             00   SCHEDULER CALL                                 ABF22700
       ADC    I1731U            01   INITIATOR ADDRESS                              ABF22800
       ADC    C1731U            02   CONTINUATOR ADDRESS                            ABF22900
       ADC    E1731U            03   TIMEOUT ERROR ADDRESS                          ABF23000
       NUM    -1                04   DIAGNOSTIC CLOCK                               ABF23100
       NUM    0                 05   LOGICAL UNIT                                   ABF23200
       NUM    0                 06   PARAMETER LOCATION                             ABF23300
       NUM    $0381             07   CONVERTER, EQUIPMENT, STATION                  ABF23400
       NUM    $0896             08   REQUEST STATUS                                 ABF23500
       NUM    0                 09   DRIVER STATUS                                  ABF23600
       NUM    0                 10   CURRENT LOCATION                               ABF23700
       NUM    0                 11   LAST LOCATION PLUS ONE                         ABF23800
       NUM    0                 12   DEVICE STATUS                                  ABF23900
       ADC    L1731U            13   DRIVER LENGTH IF MASS MEMORY                   ABF24000
       ADC    S1731U            14   NAME ASSOCIATED WITH SECTOR NUMBER             ABF24100
       NUM    0                 15   RESERVED FOR FNR AND CMR                       ABF24200
       NUM    $0714             16   FUNCTION AND UNIT CONTROL                      ABF24300
       ADC    U731U6            17   DIAGNOSTIC LU                                  ABF24400
       NUM    0                 18   ERROR CODE                                     ABF24500
       NUM    0                 19   RECOVERY RETURN ADDRESS                        ABF24600
       NUM    0                 20   RECORD CHECKSUM                                ABF24700
       NUM    $DCDC             21   FUNCTION DIRECTORY BITWORD                     ABF24800
       NUM    0                 22   TEMPORARY CHECKSUM                             ABF24900
       NUM    0                 23   READ/WRITE PROCESSOR RETURN ADDRESS            ABF25000
       ADC    P731U7            24   PHYSTB THREAD                                  ABF25100
       NUM    0                 25   END-OF-TAPE FLAG                               ABF25200
       EJT                                                                          ABF25300
*             1 7 3 1 - 6 0 1        M A G   T A P E ,   U N I T   7                ABF25400
*                                                                                   ABF25500
       EQU    U731U7(0)                                                             ABF25600
       EQU    U731U7(X731U7-LOG1A)                                                  ABF25700
       SPC    1                                                                     ABF25800
P731U7 ADC    $520E             00   SCHEDULER CALL                                 ABF25900
       ADC    I1731U            01   INITIATOR ADDRESS                              ABF26000
       ADC    C1731U            02   CONTINUATOR ADDRESS                            ABF26100
       ADC    E1731U            03   TIMEOUT ERROR ADDRESS                          ABF26200
       NUM    -1                04   DIAGNOSTIC CLOCK                               ABF26300
       NUM    0                 05   LOGICAL UNIT                                   ABF26400
       NUM    0                 06   PARAMETER LOCATION                             ABF26500
       NUM    $0381             07   CONVERTER, EQUIPMENT, STATION                  ABF26600
       NUM    $0896             08   REQUEST STATUS                                 ABF26700
       NUM    0                 09   DRIVER STATUS                                  ABF26800
       NUM    0                 10   CURRENT LOCATION                               ABF26900
       NUM    0                 11   LAST LOCATION PLUS ONE                         ABF27000
       NUM    0                 12   DEVICE STATUS                                  ABF27100
       ADC    L1731U            13   DRIVER LENGTH IF MASS MEMORY                   ABF27200
       ADC    S1731U            14   NAME ASSOCIATED WITH SECTOR NUMBER             ABF27300
       NUM    0                 15   RESERVED FOR FNR AND CMR                       ABF27400
       NUM    $0794             16   FUNCTION AND UNIT CONTROL                      ABF27500
       ADC    U731U7            17   DIAGNOSTIC LU                                  ABF27600
       NUM    0                 18   ERROR CODE                                     ABF27700
       NUM    0                 19   RECOVERY RETURN ADDRESS                        ABF27800
       NUM    0                 20   RECORD CHECKSUM                                ABF27900
       NUM    $DCDC             21   FUNCTION DIRECTORY BITWORD                     ABF28000
       NUM    0                 22   TEMPORARY CHECKSUM                             ABF28100
       NUM    0                 23   READ/WRITE PROCESSOR RETURN ADDRESS            ABF28200
       ADC    P731U0            24   PHYSTB THREAD                                  ABF28300
       NUM    0                 25   END-OF-TAPE FLAG                               ABF28400
       EJT                                                                          ABF28500
```

Figure 1-35. 1731-601 Unbuffered Magnetic Tape Physical Device Table, Section ABF (Continued)

1.33 1731-601 Buffered Magnetic Tape Physical Device Table, Section ABG

A maximum of eight 1731-601 buffered magnetic tape units may be included in a system. Each must have its own physical device table. The words of this table are defined in the same way as in a physical device table for a 1731-601 unbuffered unit except that word 7 also contains the converter code for the 1706 Buffered Data Channel (Figure 1-36).

```
*           1 7 3 1 - 6 0 1   B U F F E R E D   T A P E
*
       SPC   1
       EQU   N7062()
       EQU   N17061(N7062**100)
       EQU   M1731B(0)
       EQU   M1731B(1)
*
       IFA   M1731B,EQ,0     CORE RESIDENT DRIVER
       EXT   I1731B
       EXT   C1731B
       EXT   E1731B
       EQU   S1731B($7FFF)
       EIF
*
       IFA   M1731B,EQ,1     MASS RESIDENT DRIVER
       EXT   MASDRV
       EXT   MASCON
       EXT   MASERR
I1731B JMP+  MASDRV          INITIATE DRIVER
C1731B JMP+  MASCON          INTERRUPT RESPONSE
E1731B JMP+  MASERR          TIMEOUT ERROR
       EXT   L1731B
       EXT   S1731B
       EIF
*
       SPC   2
R1731B LDQ   =XP731B0        INTERRUPT RESPONSE FOR 601 BUFFERED TAPE
       JMP*  (P731B0+2)
       EJT
*           1 7 3 1 - 6 0 1   B U F F E R E D   T A P E ,   U N I T   0
*
       EQU   U731B0(0)
       EQU   U731B0(X731B0-LOG1A)
       SPC   1
P731B0 ADC   $520A           00  SCHEDULER CALL
       ADC   C1731B          02  CONTINUATOR ADDRESS
       ADC   E1731B          03  TIMEOUT ERROR ADDRESS
       NUM   -1              04  DIAGNOSTIC CLOCK
       NUM   0               05  LOGICAL UNIT
       NUM   0               06  PARAMETER LOCATION
       ADC   $0381+N17061    07  CONVERTER, EQUIPMENT, STATION
       NUM   $0A86           08  REQUEST STATUS
       NUM   0               09  DRIVER STATUS
       NUM   0               10  CURRENT LOCATION
       NUM   0               11  LAST LOCATION PLUS ONE
       NUM   0               12  DEVICE STATUS
       ADC   L1731B          13  DRIVER LENGTH IF MASS MEMORY
       ADC   S1731B          14  NAME ASSOCIATED WITH SECTOR NUMBER
       NUM   0               15  RESERVED FOR FNR AND CMR
       NUM   $0414           16  FUNCTION AND UNIT CONTROL
       ADC   U731B0          17  DIAGNOSTIC LU
       NUM   0               18  ERROR CODE
       NUM   0               19  RECOVERY RETURN ADDRESS
       NUM   0               20  RECORD CHECKSUM
       NUM   $DCDC           21  FUNCTION DIRECTORY BITWORD
```

Figure 1-36. 1731-601 Buffered Magnetic Tape Physical Device Table, Section ABG

```
         NUM    0                 22  TEMPORARY CHECKSUM                                  ABG05700
         NUM    0                 23  READ/WRITE PROCESSOR RETURN ADDRESS                 ABG05800
         ADC    P731B1            24  PHYSTB THREAD                                       ABG05900
         NUM    0                 25  END-OF-TAPE FLAG                                    ABG06000
         EJT                                                                              ABG06100
*               1 7 3 1 - 0 0 1   B U F F E R E D   T A P E ,   U N I T   1               ABG06200
*                                                                                         ABG06300
         EQU    U731B1(0)                                                                 ABG06400
         EQU    U731B1(X731B1-LOG1A)                                                      ABG06500
         SPC    1                                                                         ABG06600
P731B1   ADC    $520A             00  SCHEDULER CALL                                      ABG06700
         ADC    I1731B            01  INITIATOR ADDRESS                                   ABG06800
         ADC    C1731B            02  CONTINUATOR ADDRESS                                 ABG06900
         ADC    E1731B            03  TIMEOUT ERROR ADDRESS                               ABG07000
         NUM    -1                04  DIAGNOSTIC CLOCK                                    ABG07100
         NUM    0                 05  LOGICAL UNIT                                        ABG07200
         NUM    0                 06  PARAMETER LOCATION                                  ABG07300
         ADC    $0381+N17001      07  CONVERTER, EQUIPMENT, STATION                       ABG07400
         NUM    $0A86             08  REQUEST STATUS                                      ABG07500
         NUM    0                 09  DRIVER STATUS                                       ABG07600
         NUM    0                 10  CURRENT LOCATION                                    ABG07700
         NUM    0                 11  LAST LOCATION PLUS ONE                              ABG07800
         NUM    0                 12  DEVICE STATUS                                       ABG07900
         ADC    L1731B            13  DRIVER LENGTH IF MASS MEMORY                        ABG08000
         ADC    S1731B            14  NAME ASSOCIATED WITH SECTOR NUMBER                  ABG08100
         NUM    0                 15  RESERVED FOR ENR AND CMR                            ABG08200
         NUM    $0494             16  FUNCTION AND UNIT CONTROL                           ABG08300
         ADC    U731B1            17  DIAGNOSTIC LU                                       ABG08400
         NUM    0                 18  ERROR CODE                                          ABG08500
         NUM    0                 19  RECOVERY RETURN ADDRESS                             ABG08600
         NUM    0                 20  RECORD CHECKSUM                                     ABG08700
         NUM    $DCDC             21  FUNCTION DIRECTORY BITWORD                          ABG08800
         NUM    0                 22  TEMPORARY CHECKSUM                                  ABG08900
         NUM    0                 23  READ/WRITE PROCESSOR RETURN ADDRESS                 ABG09000
         ADC    P731B2            24  PHYSTB THREAD                                       ABG09100
         NUM    0                 25  END-OF-TAPE FLAG                                    ABG09200
         EJT                                                                              ABG09300
*               1 7 3 1 - 0 0 1   B U F F E R E D   T A P E ,   U N I T   2               ABG09400
*                                                                                         ABG09500
         EQU    U731B2(0)                                                                 ABG09600
         EQU    U731B2(X731B2-LOG1A)                                                      ABG09700
         SPC    1                                                                         ABG09800
P731B2   ADC    $520A             00  SCHEDULER CALL                                      ABG09900
         ADC    I1731B            01  INITIATOR ADDRESS                                   ABG10000
         ADC    C1731B            02  CONTINUATOR ADDRESS                                 ABG10100
         ADC    E1731B            03  TIMEOUT ERROR ADDRESS                               ABG10200
         NUM    -1                04  DIAGNOSTIC CLOCK                                    ABG10300
         NUM    0                 05  LOGICAL UNIT                                        ABG10400
         NUM    0                 06  PARAMETER LOCATION                                  ABG10500
         ADC    $0381+N17001      07  CONVERTER, EQUIPMENT, STATION                       ABG10600
         NUM    $0A86             08  REQUEST STATUS                                      ABG10700
         NUM    0                 09  DRIVER STATUS                                       ABG10800
         NUM    0                 10  CURRENT LOCATION                                    ABG10900
         NUM    0                 11  LAST LOCATION PLUS ONE                              ABG11000
         NUM    0                 12  DEVICE STATUS                                       ABG11100
         ADC    L1731B            13  DRIVER LENGTH IF MASS MEMORY                        ABG11200
         ADC    S1731B            14  NAME ASSOCIATED WITH SECTOR NUMBER                  ABG11300
         NUM    0                 15  RESERVED FOR ENR AND CMR                            ABG11400
         NUM    $0514             16  FUNCTION AND UNIT CONTROL                           ABG11500
         ADC    U731B2            17  DIAGNOSTIC LU                                       ABG11600
```

Figure 1-36. 1731-601 Buffered Magnetic Tape Physical Device Table Section ABG (Continued)

```
         NUM  0                18  ERROR CODE                                  ABG11700
         NUM  0                19  RECOVERY RETURN ADDRESS                     ABG11800
         NUM  0                20  RECORD CHECKSUM                             ABG11900
         NUM  $DCDC            21  FUNCTION DIRECTORY BITWORD                  ABG12000
         NUM  0                22  TEMPORARY CHECKSUM                          ABG12100
         NUM  0                23  READ/WRITE PROCESSOR RETURN ADDRESS         ABG12200
         ADC  P731B3           24  PHYSTB THREAD                               ABG12300
         NUM  0                25  END-OF-TAPE FLAG                            ABG12400
         EJT                                                                   ABG12500
*             1 7 3 1 - 6 0 1    B U F F E R E D   T A P E ,   U N I T     3 ABG12600
*                                                                              ABG12700
         EQU  U731B3(0)                                                        ABG12800
         EQU  U731B3(X731B3-LOG1A)                                             ABG12900
         SPC  1                                                                ABG13000
P731B3   ADC  $520A            00  SCHEDULER CALL                              ABG13100
         ADC  I1731B           01  INITIATOR ADDRESS                           ABG13200
         ADC  C1731B           02  CONTINUATOR ADDRESS                         ABG13300
         ADC  E1731B           03  TIMEOUT ERROR ADDRESS                       ABG13400
         NUM  -1               04  DIAGNOSTIC CLOCK                            ABG13500
         NUM  0                05  LOGICAL UNIT                                ABG13600
         NUM  0                06  PARAMETER LOCATION                          ABG13700
         ADC  $0381+N17061     07  CONVERTER, EQUIPMENT, STATION               ABG13800
         NUM  $0A86            08  REQUEST STATUS                              ABG13900
         NUM  0                09  DRIVER STATUS                               ABG14000
         NUM  0                10  CURRENT LOCATION                            ABG14100
         NUM  0                11  LAST LOCATION PLUS ONE                      ABG14200
         NUM  0                12  DEVICE STATUS                               ABG14300
         ADC  L1731B           13  DRIVER LENGTH IF MASS MEMORY                ABG14400
         ADC  S1731B           14  NAME ASSOCIATED WITH SECTOR NUMBER          ABG14500
         NUM  0                15  RESERVED FOR ENR AND CMR                    ABG14600
         NUM  $0594            16  FUNCTION AND UNIT CONTROL                   ABG14700
         ADC  U731B3           17  DIAGNOSTIC LU                               ABG14800
         NUM  0                18  ERROR CODE                                  ABG14900
         NUM  0                19  RECOVERY RETURN ADDRESS                     ABG15000
         NUM  0                20  RECORD CHECKSUM                             ABG15100
         NUM  $DCDC            21  FUNCTION DIRECTORY BITWORD                  ABG15200
         NUM  0                22  TEMPORARY CHECKSUM                          ABG15300
         NUM  0                23  READ/WRITE PROCESSOR RETURN ADDRESS         ABG15400
         ADC  P731B4           24  PHYSTB THREAD                               ABG15500
         NUM  0                25  END-OF-TAPE FLAG                            ABG15600
         EJT                                                                   ABG15700
*             1 7 3 1 - 6 0 1    B U F F E R E D   T A P E ,   U N I T     4 ABG15800
*                                                                              ABG15900
         EQU  U731B4(0)                                                        ABG16000
         EQU  U731B4(X731B4-LOG1A)                                             ABG16100
         SPC  1                                                                ABG16200
P731B4   ADC  $520A            00  SCHEDULER CALL                              ABG16300
         ADC  I1731B           01  INITIATOR ADDRESS                           ABG16400
         ADC  C1731B           02  CONTINUATOR ADDRESS                         ABG16500
         ADC  E1731B           03  TIMEOUT ERROR ADDRESS                       ABG16600
         NUM  -1               04  DIAGNOSTIC CLOCK                            ABG16700
         NUM  0                05  LOGICAL UNIT                                ABG16800
         NUM  0                06  PARAMETER LOCATION                          ABG16900
         ADC  $0381+N17061     07  CONVERTER, EQUIPMENT, STATION               ABG17000
         NUM  $0A86            08  REQUEST STATUS                              ABG17100
         NUM  0                09  DRIVER STATUS                               ABG17200
         NUM  0                10  CURRENT LOCATION                            ABG17300
```

Figure 1-36. 1731-601 Buffered Magnetic Tape Physical Device Table, Section ABG (Continued)

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```
         NUM    0                 11   LAST LOCATION PLUS ONE                    ABG17400
         NUM    0                 12   DEVICE STATUS                             ABG17500
         ADC    L1731B            13   DRIVER LENGTH IF MASS MEMORY              ABG17600
         ADC    S1731B            14   NAME ASSOCIATED WITH SECTOR NUMBER        ABG17700
         NUM    0                 15   RESERVED FOR FNR AND CMR                  ABG17800
         NUM    $0614             16   FUNCTION AND UNIT CONTROL                 ABG17900
         ADC    U731B4            17   DIAGNOSTIC LU                             ABG18000
         NUM    0                 18   ERROR CODE                                ABG18100
         NUM    0                 19   RECOVERY RETURN ADDRESS                   ABG18200
         NUM    0                 20   RECORD CHECKSUM                           ABG18300
         NUM    $DCDC             21   FUNCTION DIRECTORY BITWORD                ABG18400
         NUM    0                 22   TEMPORARY CHECKSUM                        ABG18500
         NUM    0                 23   READ/WRITE PROCESSOR RETURN ADDRESS       ABG18600
         ADC    P731B5            24   PHYSTB THREAD                             ABG18700
         NUM    0                 25   END-OF-TAPE FLAG                          ABG18800
         EJT                                                                     ABG18900
*               1 7 3 1 - 6 0 1   B U F F E R E D   T A P E ,   U N I T   5      ABG19000
*                                                                                ABG19100
         EQU    U731B5(0)                                                        ABG19200
         EQU    U731B5(X731B5-LOG1A)                                             ABG19300
         SPC    1                                                                ABG19400
P731B5   ADC    $520A             00   SCHEDULER CALL                            ABG19500
         ADC    I1731B            01   INITIATOR ADDRESS                         ABG19600
         ADC    C1731B            02   CONTINUATOR ADDRESS                       ABG19700
         ADC    E1731B            03   TIMEOUT ERROR ADDRESS                     ABG19800
         NUM    -1                04   DIAGNOSTIC CLOCK                          ABG19900
         NUM    0                 05   LOGICAL UNIT                              ABG20000
         NUM    0                 06   PARAMETER LOCATION                        ABG20100
         ADC    $0381+N1701       07   CONVERTER, EQUIPMENT, STATION             ABG20200
         NUM    $0A86             08   REQUEST STATUS                            ABG20300
         NUM    0                 09   DRIVER STATUS                             ABG20400
         NUM    0                 10   CURRENT LOCATION                          ABG20500
         NUM    0                 11   LAST LOCATION PLUS ONE                    ABG20600
         NUM    0                 12   DEVICE STATUS                             ABG20700
         ADC    L1731B            13   DRIVER LENGTH IF MASS MEMORY              ABG20800
         ADC    S1731B            14   NAME ASSOCIATED WITH SECTOR NUMBER        ABG20900
         NUM    0                 15   RESERVED FOR FNR AND CMR                  ABG21000
         NUM    $0694             16   FUNCTION AND UNIT CONTROL                 ABG21100
         ADC    U731B5            17   DIAGNOSTIC LU                             ABG21200
         NUM    0                 18   ERROR CODE                                ABG21300
         NUM    0                 19   RECOVERY RETURN ADDRESS                   ABG21400
         NUM    0                 20   RECORD CHECKSUM                           ABG21500
         NUM    $DCDC             21   FUNCTION DIRECTORY BITWORD                ABG21600
         NUM    0                 22   TEMPORARY CHECKSUM                        ABG21700
         NUM    0                 23   READ/WRITE PROCESSOR RETURN ADDRESS       ABG21800
         ADC    P731B6            24   PHYSTB THREAD                             ABG21900
         NUM    0                 25   END-OF-TAPE FLAG                          ABG22000
         EJT                                                                     ABG22100
*               1 7 3 1 - 6 0 1   B U F F E R E D   T A P E ,   U N I T   6      ABG22200
*                                                                                ABG22300
         EQU    U731B6(0)                                                        ABG22400
         EQU    U731B6(X731B6-LOG1A)                                             ABG22500
         SPC    1                                                                ABG22600
P731B6   ADC    $520A             00   SCHEDULER CALL                            ABG22700
         ADC    I1731B            01   INITIATOR ADDRESS                         ABG22800
         ADC    C1731B            02   CONTINUATOR ADDRESS                       ABG22900
         ADC    E1731B            03   TIMEOUT ERROR ADDRESS                     ABG23000
         NUM    -1                04   DIAGNOSTIC CLOCK                          ABG23100
         NUM    0                 05   LOGICAL UNIT                              ABG23200
         NUM    0                 06   PARAMETER LOCATION                        ABG23300
```

Figure 1-36. 1731-601 Buffered Magnetic Tape Physical Device Table Section ABG (Continued)

```
        ADC   $0381+N17061    07   CONVERTER, EQUIPMENT, STATION                ABG23400
        NUM   $0A86           08   REQUEST STATUS                               ABG23500
        NUM   0               09   DRIVER STATUS                                ABG23600
        NUM   0               10   CURRENT LOCATION                             ABG23700
        NUM   0               11   LAST LOCATION PLUS ONE                       ABG23800
        NUM   0               12   DEVICE STATUS                                ABG23900
        ADC   L1731B          13   DRIVER LENGTH IF MASS MEMORY                 ABG24000
        ADC   S1731B          14   NAME ASSOCIATED WITH SECTOR NUMBER           ABG24100
        NUM   0               15   RESERVED FOR FNR AND CMR                     ABG24200
        NUM   $0714           16   FUNCTION AND UNIT CONTROL                    ABG24300
        ADC   U731B6          17   DIAGNOSTIC LU                                ABG24400
        NUM   0               18   ERROR CODE                                   ABG24500
        NUM   0               19   RECOVERY RETURN ADDRESS                      ABG24600
        NUM   0               20   RECORD CHECKSUM                              ABG24700
        NUM   $DCDC           21   FUNCTION DIRECTORY BITWORD                   ABG24800
        NUM   0               22   TEMPORARY CHECKSUM                           ABG24900
        NUM   0               23   READ/WRITE PROCESSOR RETURN ADDRESS          ABG25000
        ADC   P731B7          24   PHYSTB THREAD                                ABG25100
        NUM   0               25   END-OF-TAPE FLAG                             ABG25200
        EJT                                                                     ABG25300
*             1 7 3 1 - 6 0 1   B U F F E R E D   T A P E ,   U N I T   7       ABG25400
*                                                                               ABG25500
        EQU   U731B7(0)                                                         ABG25600
        EQU   U731B7(X731B7-LOG1A)                                              ABG25700
        SPC   1                                                                 ABG25800
P731B7  ADC   $520A           00   SCHEDULER CALL                               ABG25900
        ADC   I1731B          01   INITIATOR ADDRESS                            ABG26000
        ADC   C1731B          02   CONTINUATOR ADDRESS                          ABG26100
        ADC   E1731B          03   TIMEOUT ERROR ADDRESS                        ABG26200
        NUM   -1              04   DIAGNOSTIC CLOCK                             ABG26300
        NUM   0               05   LOGICAL UNIT                                 ABG26400
        NUM   0               06   PARAMETER LOCATION                           ABG26500
        ADC   $0381+N17061    07   CONVERTER, EQUIPMENT, STATION                ABG26600
        NUM   $0A86           08   REQUEST STATUS                               ABG26700
        NUM   0               09   DRIVER STATUS                                ABG26800
        NUM   0               10   CURRENT LOCATION                             ABG26900
        NUM   0               11   LAST LOCATION PLUS ONE                       ABG27000
        NUM   0               12   DEVICE STATUS                                ABG27100
        ADC   L1731B          13   DRIVER LENGTH IF MASS MEMORY                 ABG27200
        ADC   S1731B          14   NAME ASSOCIATED WITH SECTOR NUMBER           ABG27300
        NUM   0               15   RESERVED FOR FNR AND CMR                     ABG27400
        NUM   $0794           16   FUNCTION AND UNIT CONTROL                    ABG27500
        ADC   U731B7          17   DIAGNOSTIC LU                                ABG27600
        NUM   0               18   ERROR CODE                                   ABG27700
        NUM   0               19   RECOVERY RETURN ADDRESS                      ABG27800
        NUM   0               20   RECORD CHECKSUM                              ABG27900
        NUM   $DCDC           21   FUNCTION DIRECTORY BITWORD                   ABG28000
        NUM   0               22   TEMPORARY CHECKSUM                           ABG28100
        NUM   0               23   READ/WRITE PROCESSOR RETURN ADDRESS          ABG28200
        ADC   P731B8          24   PHYSTB THREAD                                ABG28300
        NUM   0               25   END-OF-TAPE FLAG                             ABG28400
        EJT                                                                     ABG28500
```

Figure 1-36. 1731-601 Buffered Magnetic Tape Physical Device Table, Section ABG (Continued)

1.34 Pseudo Tape Physical Device Tables, Section ABH

The pseudo tape driver may be core resident or mass resident. The residency of the driver is indicated by the parameter PSTPDO (refer to Figure 1-37). If PSTPDO is zero, the driver is core resident, and word 1 of each table is a driver entry. If PSTPDO is one, the driver is mass resident, and word 1 of each table is linked to a jump to an MMEXEC entry.

Since the pseudo tape driver is a software driver, physical device table words 2, 3, and 4, associated with hardware operation, are not used. For the same reason, diagnostic logical unit capability is not available.

The initial value of word 12, device status, is dependent on whether the pseudo device is to be used by the background or whether it is to be accessed by the foreground. For a pseudo tape device used by the background, only bit 0 of word 12 is set initially. Bit 0 indicates the device is ready. No other bits are set since a background user is required to use certain Job Processor control statements before accessing a pseudo tape. These control statements will initialize other bits of the device status word as necessary. For a pseudo tape device to be accessed by the foreground, no Job Processor control statements will be used to initialize the device status. The initial value of word 12 for such a device is $C401_{16}$. The initially-set bits are as follows:

Bit	Meaning
0	Ready
10	Load point
14	Mode (0 for read, 1 for write)
15	Write enabled

Word 16 contains the file number. This is zero for a physical device table for a background pseudo tape; non-zero for a foreground pseudo tape. Each foreground pseudo tape corresponds to one Job Processor file. Pseudo tape unit 0 is Job Processor file number $7FF8_{16}$, unit 1 is file number $7FF9_{16}$, etc. Up to eight pseudo tapes may be included in a system. If eight are included, the last pseudo tape is Job Processor file number $7FFF_{16}$.

Beginning at word 19 is a request buffer of 12 words. This buffer is used for making monitor requests when pseudo tapes are read or written.

Beginning at word 32 is a pointer block of 30 words. This block consists of the following:

1) a two-word pointer to the last block of records stored in the file.

2) twenty-eight two-word pointers, each pointing to a record stored within this last block.

Each two-word pointer consists of a sector and a word within that sector. Pseudo tape records are written using File Manager store sequential requests. After twenty-eight sequential records have been written, the pointer block is also transferred to mass memory. By using these pointer blocks, pseudo tape file records may be read by using a Monitor read request instead of a File Manager retrieve request, thus saving time.

Although any number of pseudo tapes, up to a maximum of eight, are permissible in a system, care should be exercised in determining the number, in that each pseudo tape physical device table requires 76 words of core.

```
*            P S E U D O    T A P E
*
         SPC   1
         EQU   PSTPD0(0)
         EQU   PSTPD0(1)
*
         IFA   PSTPD0,EQ,0    CORE RESIDENT DRIVER
         EXT   IPSUDC
         EQU   LPSUDC(0)
         EQU   SPSUDC($7FFF)
         EIF
*
         IFA   PSTPD0,EQ,1    MASS RESIDENT DRIVER
         EXT   MASDRV
IPSUDO   JMP+  MASDRV         INITIATE DRIVER
         EXT   LPSUDC
         EXT   SPSUDC
         EIF
*
         EJT
*            P S E U D O    T A P E ,    U N I T    0
*
         SPC   1
PSUD00   ADC   $5208          00   SCHEDULER CALL
         ADC   IPSUDC         01   INITIATOR ADDRESS
         ADC   0              02   CONTINUATOR ADDRESS    - NOT USED
         ADC   0              03   TIMEOUT ERROR ADDRESS  - NOT USED
         NUM   -1             04   DIAGNOSTIC CLOCK       - NOT USED
         NUM   0              05   LOGICAL UNIT
         NUM   0              06   PARAMETER LOCATION
PWES0    NUM   0              07   CONVERTER, EQUIPMENT, STATION - NONE
         NUM   $0A46          08   REQUEST STATUS
         NUM   0              09   DRIVER STATUS
         NUM   0              10   CURRENT LOCATION
         NUM   0              11   LAST LOCATION PLUS ONE
         NUM   1              12   DEVICE STATUS
         NUM   $C401          12   DEVICE STATUS
         ADC   LPSUDC         13   DRIVER LENGTH IF MASS MEMORY
         ADC   SPSUDC         14   NAME ASSOCIATED WITH SECTOR NUMBER
         NUM   0              15   RESERVED FOR FNR AND CMR
         NUM   0              16   FILE NUMBER
         NUM   $7FF8          16   FILE NUMBER
         NUM   0              17   TEMP FOR MOTION REQ PROCESSOR
         NUM   0              18   TEMP FOR MOTION REQ PROCESSOR
         BZS   (12)           19   REQUEST BUFFER - REQBUF
         NUM   0              31   BLOCK POINTER - BLKPTR
         BZS   (30)           32   POINTER BLOCK - PTRBLK
PSDR00   NUM   0              62   *
         NUM   $5400          63   *
         NUM   0              64   * AREA TO BE STUFFED WITH
         ADC   PWES0          65   * FILE MANAGER AND DISK REQUESTS
         BZS   (6)            66   *
         NUM   $1400          72   *
         RTJ*  (PSDR00)       73   *
         ADC   0              74   INPUT BUFFER ADDRESS
         ADC   PSUD01         75   PHYSTB THREAD
```

Figure 1-37. Pseudo Tape Physical Device Table, Section ABH

```
*              P S E U D O    T A P E ,    U N I T   1                      ABH05700
*                                                                           ABH05800
        SPC    1                                                            ABH05900
PSUD01  ADC    $5208          00   SCHEDULER CALL                           ABH06000
        ADC    ↑PSUDC         01   INITIATOR ADDRESS                        ABH06100
        ADC    0              02   CONTINUATOR ADDRESS    - NOT USED        ABH06200
        ADC    0              03   TIMEOUT ERROR ADDRESS - NOT USED         ABH06300
        NUM    -1             04   DIAGNOSTIC CLOCK       - NOT USED        ABH06400
        NUM    0              05   LOGICAL UNIT                             ABH06500
        NUM    0              06   PARAMETER LOCATION                       ABH06600
PWES1   NUM    0              07   CONVERTER, EQUIPMENT, STATION - NONE     ABH06700
        NUM    $0A46          08   REQUEST STATUS                           ABH06800
        NUM    0              09   DRIVER STATUS                            ABH06900
        NUM    0              10   CURRENT LOCATION                         ABH07000
        NUM    *              11   LAST LOCATION PLUS ONE                   ABH07100
        NUM    1              12   DEVICE STATUS                            ABH07200
        NUM    $C401          12   DEVICE STATUS                            ABH07300
        ADC    LPSUDC         13   DRIVER LENGTH IF MASS MEMORY             ABH07400
        ADC    SPSUDC         14   NAME ASSOCIATED WITH SECTOR NUMBER       ABH07500
        NUM    0              15   RESERVED FOR FNR AND CMR                 ABH07600
        NUM    0              16   FILE NUMBER                              ABH07700
        NUM    $7FF9          16   FILE NUMBER                              ABH07800
        NUM    0              17   TEMP FOR MOTION REQ PROCESSOR            ABH07900
        NUM    0              18   TEMP FOR MOTION REQ PROCESSOR            ABH08000
        BZS    (12)           19   REQUEST BUFFER - REQBUF                  ABH08100
        NUM    0              31   BLOCK POINTER - BLKPTR                   ABH08200
        BZS    (30)           32   POINTER BLOCK - PTRBLK                   ABH08300
PSDR01  NUM    0              62   *                                        ABH08400
        NUM    $5400          63   *                                        ABH08500
        NUM    0              64   * AREA TO BE STUFFED WITH                ABH08600
        ADC    PWES1          65   * FILE MANAGER AND DISK REQUESTS         ABH08700
        BZS    (6)            66   *                                        ABH08800
        NUM    $1400          72   *                                        ABH08900
        RTJ-   (PSDR01)       73   *                                        ABH09000
        ADC    0              74   INPUT BUFFER ADDRESS                     ABH09100
        ADC    PSUD02         75   PHYSTB THREAD                            ABH09200
        EJT                                                                 ABH09300
*              P S E U D O    T A P E ,    U N I T   2                      ABH09400
*                                                                           ABH09500
        SPC    1                                                            ABH09600
PSUD02  ADC    $5208          00   SCHEDULER CALL                           ABH09700
        ADC    ↑PSUDC         01   INITIATOR ADDRESS                        ABH09800
        ADC    0              02   CONTINUATOR ADDRESS    - NOT USED        ABH09900
        ADC    0              03   TIMEOUT ERROR ADDRESS - NOT USED         ABH10000
        NUM    -1             04   DIAGNOSTIC CLOCK       - NOT USED        ABH10100
        NUM    0              05   LOGICAL UNIT                             ABH10200
        NUM    0              06   PARAMETER LOCATION                       ABH10300
PWES2   NUM    0              07   CONVERTER, EQUIPMENT, STATION - NONE     ABH10400
        NUM    $0A46          08   REQUEST STATUS                           ABH10500
        NUM    0              09   DRIVER STATUS                            ABH10600
        NUM    0              10   CURRENT LOCATION                         ABH10700
        NUM    0              11   LAST LOCATION PLUS ONE                   ABH10800
        NUM    1              12   DEVICE STATUS                            ABH10900
        NUM    $C401          12   DEVICE STATUS                            ABH11000
        ADC    LPSUDC         13   DRIVER LENGTH IF MASS MEMORY             ABH11100
        ADC    SPSUDC         14   NAME ASSOCIATED WITH SECTOR NUMBER       ABH11200
        NUM    0              15   RESERVED FOR FNR AND CMR                 ABH11300
        NUM    0              16   FILE NUMBER                              ABH11400
        NUM    $7FFA          16   FILE NUMBER                              ABH11500
```

Figure 1-37. Pseudo Tape Physical Device Table, Section ABH (Conti

```
         NUM    0              17   TEMP FOR MOTION REQ PROCESSOR                 ABH11600
         NUM    0              18   TEMP FOR MOTION REQ PROCESSOR                 ABH11700
         BZS    (12)           19   REQUEST BUFFER - REQBUF                       ABH11800
         NUM    0              31   BLOCK POINTER - BLKPTR                        ABH11900
         BZS    (30)           32   POINTER BLOCK - PTRBLK                        ABH12000
PSDRG2   NUM    0              62   *                                             ABH12100
         NUM    $5400          63   *                                             ABH12200
         NUM    0              64   * AREA TO BE STUFFED WITH                     ABH12300
         ADC    PWES2          65   * FILE MANAGER AND DISK REQUESTS              ABH12400
         BZS    (6)            66   *                                             ABH12500
         NUM    $1400          72   *                                             ABH12600
         RTC#   (PSDRG2)       73   *                                             ABH12700
         ADC    0              74   INPUT BUFFER ADDRESS                          ABH12800
         ADC    PSUD03         75   PHYSTB THREAD                                 ABH12900
         EJT                                                                      ABH13000
*               P S E U D O   T A P E ,   U N I T   3                             ABH13100
*                                                                                 ABH13200
         SPC    1                                                                 ABH13300
PSUD03   ADC    $5208          00   SCHEDULER CALL                                ABH13400
         ADC    IPSUDC         01   INITIATOR ADDRESS                             ABH13500
         ADC    0              02   CONTINUATOR ADDRESS    - NOT USED             ABH13600
         ADC    0              03   TIMEOUT ERROR ADDRESS - NOT USED              ABH13700
         NUM    -1             04   DIAGNOSTIC CLOCK       - NOT USED             ABH13800
         NUM    0              05   LOGICAL UNIT                                  ABH13900
         NUM    0              06   PARAMETER LOCATION                            ABH14000
PWES3    NUM    0              07   CONVERTER, EQUIPMENT, STATION - NONE          ABH14100
         NUM    $0A46          08   REQUEST STATUS                                ABH14200
         NUM    0              09   DRIVER STATUS                                 ABH14300
         NUM    0              10   CURRENT LOCATION                              ABH14400
         NUM    0              11   LAST LOCATION PLUS ONE                        ABH14500
         NUM    1              12   DEVICE STATUS                                 ABH14600
         NUM    $C401          12   DEVICE STATUS                                 ABH14700
         ADC    LPSUDC         13   DRIVER LENGTH IF MASS MEMORY                  ABH14800
         ADC    SPSUDC         14   NAME ASSOCIATED WITH SECTOR NUMBER            ABH14900
         NUM    0              15   RESERVED FOR FNR AND CMR                      ABH15000
         NUM    0              16   FILE NUMBER                                   ABH15100
         NUM    $7FFB          16   FILE NUMBER                                   ABH15200
         NUM    0              17   TEMP FOR MOTION REQ PROCESSOR                 ABH15300
         NUM    0              18   TEMP FOR MOTION REQ PROCESSOR                 ABH15400
         BZS    (12)           19   REQUEST BUFFER - REQBUF                       ABH15500
         NUM    0              31   BLOCK POINTER - BLKPTR                        ABH15600
         BZS    (30)           32   POINTER BLOCK - PTRBLK                        ABH15700
PSDRG3   NUM    0              62   *                                             ABH15800
         NUM    $5400          63   *                                             ABH15900
         NUM    0              64   * AREA TO BE STUFFED WITH                     ABH16000
         ADC    PWES3          65   * FILE MANAGER AND DISK REQUESTS              ABH16100
         BZS    (6)            66   *                                             ABH16200
         NUM    $1400          72   *                                             ABH16300
         RTC#   (PSDRG3)       73   *                                             ABH16400
         ADC    0              74   INPUT BUFFER ADDRESS                          ABH16500
         ADC    PSUD04         75   PHYSTB THREAD                                 ABH16600
         EJT                                                                      ABH16700
```

Figure 1-37. Pseudo Tape Physical Device Table, Section ABH {Continued}

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```
*         P S E U D O   T A P E ,   U N I T   4                              ABH16800
*                                                                            ABH16900
          SPC   1                                                            ABH17000
PSUD04    ADC   $5208      00  SCHEDULER CALL                                ABH17100
          ADC   TPSUDC     01  INITIATOR ADDRESS                             ABH17200
          ADC   0          02  CONTINUATOR ADDRESS    - NOT USED             ABH17300
          ADC   0          03  TIMEOUT ERROR ADDRESS - NOT USED              ABH17400
          NUM   -1         04  DIAGNOSTIC CLOCK       - NOT USED             ABH17500
          NUM   0          05  LOGICAL UNIT                                  ABH17600
          NUM   0          06  PARAMETER LOCATION                            ABH17700
PWES4     NUM   0          07  CONVERTER, EQUIPMENT, STATION - NONE          ABH17800
          NUM   $0A46      08  REQUEST STATUS                                ABH17900
          NUM   0          09  DRIVER STATUS                                 ABH18000
          NUM   0          10  CURRENT LOCATION                              ABH18100
          NUM   0          11  LAST LOCATION PLUS ONE                        ABH18200
          NUM   1          12  DEVICE STATUS                                 ABH18300
          NUM   $C401      12  DEVICE STATUS                                 ABH18400
          ADC   LPSUDC     13  DRIVER LENGTH IF MASS MEMORY                  ABH18500
          ADC   SPSUDC     14  NAME ASSOCIATED WITH SECTOR NUMBER            ABH18600
          NUM   0          15  RESERVED FOR FNR AND CMR                      ABH18700
          NUM   0          16  FILE NUMBER                                   ABH18800
          NUM   $7FFC      16  FILE NUMBER                                   ABH18900
          NUM   0          17  TEMP FOR MOTION REQ PROCESSOR                 ABH19000
          NUM   0          18  TEMP FOR MOTION REQ PROCESSOR                 ABH19100
          BZS   (12)       19  REQUEST BUFFER - REQBUF                       ABH19200
          NUM   0          31  BLOCK POINTER - BLKPTR                        ABH19300
          BZS   (30)       32  POINTER BLOCK - PTRBLK                        ABH19400
PSDR04    NUM   0          62  *                                             ABH19500
          NUM   $5400      63  *                                             ABH19600
          NUM   0          64  * AREA TO BE STUFFED WITH                     ABH19700
          ADC   PWES4      65  * FILE MANAGER AND DISK REQUESTS              ABH19800
          BZS   (6)        66  *                                             ABH19900
          NUM   $1400      72  *                                             ABH20000
          RTJ-* (PSDR04)   73  *                                             ABH20100
          ADC   0          74  INPUT BUFFER ADDRESS                          ABH20200
          ADC   PSUD05     75  PHYSTB THREAD                                 ABH20300
          EJT                                                                ABH20400
*         P S E U D O   T A P E ,   U N I T   5                              ABH20500
*                                                                            ABH20600
          SPC   1                                                            ABH20700
PSUD05    ADC   $5208      00  SCHEDULER CALL                                ABH20800
          ADC   TPSUDC     01  INITIATOR ADDRESS                             ABH20900
          ADC   0          02  CONTINUATOR ADDRESS    - NOT USED             ABH21000
          ADC   0          03  TIMEOUT ERROR ADDRESS - NOT USED              ABH21100
          NUM   -1         04  DIAGNOSTIC CLOCK       - NOT USED             ABH21200
          NUM   0          05  LOGICAL UNIT                                  ABH21300
          NUM   0          06  PARAMETER LOCATION                            ABH21400
PWES5     NUM   0          07  CONVERTER, EQUIPMENT, STATION - NONE          ABH21500
          NUM   $0A46      08  REQUEST STATUS                                ABH21600
          NUM   0          09  DRIVER STATUS                                 ABH21700
          NUM   0          10  CURRENT LOCATION                              ABH21800
          NUM   0          11  LAST LOCATION PLUS ONE                        ABH21900
          NUM   1          12  DEVICE STATUS                                 ABH22000
          NUM   $C401      12  DEVICE STATUS                                 ABH22100
          ADC   LPSUDC     13  DRIVER LENGTH IF MASS MEMORY                  ABH22200
          ADC   SPSUDC     14  NAME ASSOCIATED WITH SECTOR NUMBER            ABH22300
          NUM   0          15  RESERVED FOR FNR AND CMR                      ABH22400
          NUM   0          16  FILE NUMBER                                   ABH22500
          NUM   $7FFD      16  FILE NUMBER                                   ABH22600
          NUM   0          17  TEMP FOR MOTION REQ PROCESSOR                 ABH22700
```

Figure 1-37. Pseudo Tape Physical Device Table, Section ABH (Contir

```
         NUM   0               18   TEMP FOR MOTION REQ PROCESSOR               ABH22800
         BZS   (12)            19   REQUEST BUFFER - REQBUF                     ABH22900
         NUM   0               31   BLOCK POINTER - BLKPTR                      ABH23000
         BZS   (30)            32   POINTER BLOCK - PTRBLK                      ABH23100
PSDRQ5   NUM   0               62   *                                           ABH23200
         NUM   $5400           63   *                                           ABH23300
         NUM   0               64   * AREA TO BE STUFFED WITH                   ABH23400
         ADC   PWES5           65   * FILE MANAGER AND DISK REQUESTS            ABH23500
         BZS   (6)             66   *                                           ABH23600
         NUM   $1400           72   *                                           ABH23700
         RTJ*  (PSDRQ5)        73   *                                           ABH23800
         ADC   0               74   INPUT BUFFER ADDRESS                        ABH23900
         ADC   PSUD06          75   PHYSTB THREAD                               ABH24000
         EJT                                                                    ABH24100
*              P S E U D O     T A P E ,     U N I T     6                      ABH24200
*                                                                               ABH24300
         SPC   1                                                                ABH24400
PSUD06   ADC   $5208           00   SCHEDULER CALL                              ABH24500
         ADC   IPSUDC          01   INITIATOR ADDRESS                           ABH24600
         ADC   0               02   CONTINUATOR ADDRESS    - NOT USED           ABH24700
         ADC   0               03   TIMEOUT ERROR ADDRESS - NOT USED            ABH24800
         NUM   -1              04   DIAGNOSTIC CLOCK       - NOT USED           ABH24900
         NUM   6               05   LOGICAL UNIT                                ABH25000
         NUM   0               06   PARAMETER LOCATION                          ABH25100
PWES6    NUM   0               07   CONVERTER, EQUIPMENT, STATION - NONE        ABH25200
         NUM   $0A46           08   REQUEST STATUS                              ABH25300
         NUM   0               09   DRIVER STATUS                               ABH25400
         NUM   0               10   CURRENT LOCATION                            ABH25500
         NUM   0               11   LAST LOCATION PLUS ONE                      ABH25600
         NUM   1               12   DEVICE STATUS                               ABH25700
         NUM   $C401           12   DEVICE STATUS                               ABH25800
         ADC   LPSUDC          13   DRIVER LENGTH IF MASS MEMORY                ABH25900
         ADC   SPSUDC          14   NAME ASSOCIATED WITH SECTOR NUMBER          ABH26000
         NUM   0               15   RESERVED FOR FNR AND CMR                    ABH26100
         NUM   0               16   FILE NUMBER                                 ABH26200
         NUM   $7FFF           16   FILE NUMBER                                 ABH26300
         NUM   0               17   TEMP FOR MOTION REQ PROCESSOR               ABH26400
         NUM   0               18   TEMP FOR MOTION REQ PROCESSOR               ABH26500
         BZS   (12)            19   REQUEST BUFFER - REQBUF                     ABH26600
         NUM   0               31   BLOCK POINTER - BLKPTR                      ABH26700
         BZS   (30)            32   POINTER BLOCK - PTRBLK                      ABH26800
PSDRQ6   NUM   0               62   *                                           ABH26900
         NUM   $5400           63   *                                           ABH27000
         NUM   0               64   * AREA TO BE STUFFED WITH                   ABH27100
         ADC   PWES6           65   * FILE MANAGER AND DISK REQUESTS            ABH27200
         BZS   (6)             66   *                                           ABH27300
         NUM   $1400           72   *                                           ABH27400
         RTJ*  (PSDRQ6)        73   *                                           ABH27500
         ADC   0               74   INPUT BUFFER ADDRESS                        ABH27600
         ADC   PSUD07          75   PHYSTB THREAD                               ABH27700
         EJT                                                                    ABH27800
```

Figure 1-37. Pseudo Tape Physical Device Table, Section ABH (Continued)

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```
*          P S E U D O   T A P E ,   U N I T   7                                     ABH27900
*                                                                                    ABH28000
        SPC  1                                                                       ABH28100
PSUD07  ADC  $5208        00   SCHEDULER CALL                                        ABH28200
        ADC  IPSUDC       01   INITIATOR ADDRESS                                     ABH28300
        ADC  0            02   CONTINUATOR ADDRESS      - NOT USED                   ABH28400
        ADC  0            03   TIMEOUT ERROR ADDRESS - NOT USED                      ABH28500
        NUM  -1           04   DIAGNOSTIC CLOCK         - NOT USED                   ABH28600
        NUM  0            05   LOGICAL UNIT                                          ABH28700
        NUM  0            06   PARAMETER LOCATION                                    ABH28800
PWES7   NUM  0            07   CONVERTER, EQUIPMENT, STATION - NONE                  ABH28900
        NUM  $0A46        08   REQUEST STATUS                                        ABH29000
        NUM  0            09   DRIVER STATUS                                         ABH29100
        NUM  0            10   CURRENT LOCATION                                      ABH29200
        NUM  0            11   LAST LOCATION PLUS ONE                                ABH29300
        NUM  1            12   DEVICE STATUS                                         ABH29400
        NUM  $C401        12   DEVICE STATUS                                         ABH29500
        ADC  LPSUDC       13   DRIVER LENGTH IF MASS MEMORY                          ABH29600
        ADC  SPSUDC       14   NAME ASSOCIATED WITH SECTOR NUMBER                    ABH29700
        NUM  0            15   RESERVED FOR ENR AND CMR                              ABH29800
        NUM  0            16   FILE NUMBER                                           ABH29900
        NUM  $7FFF        16   FILE NUMBER                                           ABH30000
        NUM  0            17   TEMP FOR MOTION REQ PROCESSOR                         ABH30100
        NUM  0            18   TEMP FOR MOTION REQ PROCESSOR                         ABH30200
        EZS  (12)         19   REQUEST BUFFER - REQBUF                               ABH30300
        NUM  0            31   BLOCK POINTER - BLKPTR                                ABH30400
        EZS  (30)         32   POINTER BLOCK - PTRBLK                                ABH30500
PSDR07  NUM  0            62   *                                                     ABH30600
        NUM  $5400        63   *                                                     ABH30700
        NUM  0            64   * AREA TO BE STUFFED WITH                             ABH30800
        ADC  PWES7        65   * FILE MANAGER AND DISK REQUESTS                      ABH30900
        EZS  (6)          66   *                                                     ABH31000
        NUM  $1400        72   *                                                     ABH31100
        RTL* (PSDR07)     73   *                                                     ABH31200
        ADC  0            74   INPUT BUFFER ADDRESS                                  ABH31300
        ADC  PSUD00       75   PHYSTB THREAD                                         ABH31400
        EJT                                                                          ABH31500
```

Figure 1-37. Pseudo Tape Physical Device Table, Section ABH (Continued)

1.35 1733-2/856 Disk Physical Device Tables, Section ABI

Section ABI, Figure 1-38, contains the physical device tables for any 1733-2/856 disks in a system. In a given SYSDAT word 8 will contain the type code, T8562 for an 856-2; or T8564, for an 856-4. Up to 4 856 drives may be included in a system. There is one physical device table for each drive. These are threaded with word 22 of each table as the thread word.

This set of physical device tables has a standard interrupt response routine located at R17332. The address of the first physical device table is loaded into Q, and control is transferred to the driver continuator entry.

In each table, bit 15 of word 16 indicates whether the hardware is to be operated in the compare or no compare mode. If bit 15 is one, no compare will be performed. If bit 15 is zero, the compare feature will be used. Use of the compare feature slows down mass memory operation, but it will detect any data compare problems during a mass memory operation.

Note that the 1733-2/856 disk does not have diagnostic logical unit capability.

(152)

```
*       1 7 3 3 - 2 / 8 5 6   D I S K                                    ABI00100
*                                                                        ABI00200
        SPC  1                                                           ABI00300
        ENT  P332D0                                                      ABI00400
        EXT  I17332,C17332,E17332                                        ABI00500
        EQU  T8562(15*$10)  TYPE CODE - 1733-2 856-2                     ABI00600
        EQU  T8564(16*$10)  TYPE CODE - 1733-2 856-4                     ABI00700
        SPC  2                                                           ABI00800
R17332  LDQ  =XP73320       INTERRUPT RESPONSE FOR 1733-2 DISK           ABI00900
        JMP* (P73320+2)                                                  ABI01000
        EJT                                                              ABI01100
*       1 7 3 3 - 2 / 8 5 6   D I S K - U N I T   0                      ABI01200
*                                                                        ABI01300
        SPC  1                                                           ABI01400
        EQU  P332D0(*)                                                   ABI01500
P73320  ADC  $5209          00  SCHEDULER CALL                           ABI01600
        ADC  I17332         01  INITIATOR ADDRESS                        ABI01700
        ADC  C17332         02  CONTINUATOR ADDRESS                      ABI01800
        ADC  E17332         03  TIMEOUT ERROR ADDRESS                    ABI01900
        NUM  -1             04  DIAGNOSTIC CLOCK                         ABI02000
        NUM  0              05  LOGICAL UNIT                             ABI02100
        NUM  0              06  PARAMETER LOCATION                       ABI02200
        NUM  $0181          07  CONVERTER, EQUIPMENT, STATION            ABI02300
        ADC  $1006+T8562    08  REQUEST STATUS                           ABI02400
        ADC  $1006+T8564    08  REQUEST STATUS                           ABI02500
        NUM  $0200          09  DRIVER STATUS                            ABI02600
        NUM  0              10  CURRENT LOCATION                         ABI02700
        NUM  0              11  LAST LOCATION PLUS ONE                   ABI02800
        NUM  0              12  DEVICE STATUS                            ABI02900
        NUM  0              13  ERROR COUNTER                            ABI03000
        NUM  0              14  DATA TRANSFER FUNCTION                   ABI03100
        NUM  0              15  SECTOR NUMBER OR FNR RETURN              ABI03200
        NUM  $8100          16  NO COMPARE FLAG / DIRECTOR FUNCTION      ABI03300
        NUM  0              17  TEMSEC - USED BY WORD ADDRESSING         ABI03400
        NUM  0              18  OVERLAY AREA (SCHEDULER CALL)            ABI03500
        NUM  0              19  OVERLAY AREA (COMPLETION ADDRESS)        ABI03600
        NUM  0              20  OVERLAY AREA (THREAD)                    ABI03700
        NUM  0              21  OVERLAY AREA (LOGICAL UNIT)              ABI03800
        ADC  P73321         22  PHYSTB THREAD                            ABI03900
        NUM  0              23  RETURN ADDRESS FOR DATA TRANSFER         ABI04000
        NUM  0              24  FIRST SECTOR ADDRESS ON DISK 1           ABI04100
        NUM  0              25  LAST DATA TRANSFER FUNCTION              ABI04200
        NUM  0              26  BUFFER SIZE FOR SPLIT TRANSFERS .        ABI04300
        NUM  0              27  CYLINDER ADDRESS FOR TRANSFER            ABI04400
        NUM  0              28  MASK FOR THIS UNITS SEEK COMPLETE BIT    ABI04500
        ADC  BF332A         29  ADDRESS OF 96 WORD BUFFER                ABI04600
        NUM  0              30  TEMPORARY FOR WORD ADDRESSING            ABI04700
        NUM  0              31  TEMPORARY FOR WORD ADDRESSING            ABI04800
        NUM  0              32  TEMPORARY FOR WORD ADDRESSING            ABI04900
        NUM  0              33  REQUEST CODE                             ABI05000
        NUM  0              34  REQUEST PRIORITY                         ABI05100
        NUM  0              35  STARTING SECTOR FOR COMPARE OR RETRY     ABI05200
        NUM  0              36  FWA OF TRANSFER FOR COMPARE OR RETRY     ABI05300
        NUM  0              37  ERROR COUNTER                            ABI05400
        NUM  0              38  DATA TRANSFER FUNCTION CODE              ABI05500
        NUM  0              39  SECTOR NUMBER CURRENTLY IN BUFFER        ABI05600
        NUM  0              40  LAST VALUE OF CYLINDER ADDRESS STATUS    ABI05700
        NUM  0              41  LAST VALUE OF  C W A  STATUS             ABI05800
        NUM  0              42  LAST VALUE OF CHECKWORD STATUS           ABI05900
        NUM  0              43  LAST VALUE OF DRIVE CYLINDER STATUS      ABI06000
```

Figure 1-38. 1733-2/856 Disk Physical Device Table, Section ABI

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```
*                                                                        ABI06100
       EZS   BF332A(96)        44  BUFFER FOR WORD ADDRESSING            ABI06200
*                             139  BUFFER FOR WORD ADDRESSING            ABI06300
       EJT                                                               ABI06400
*      1 7 3 3 - 2 / 8 5 6   D I S K - U N I T   1                      ABI06500
*                                                                        ABI06600
       SPC   1                                                           ABI06700
P73321 ADC   *5209             00  SCHEDULER CALL                        ABI06800
       ADC   I17332            01  INITIATOR ADDRESS                     ABI06900
       ADC   C17332            02  CONTINUATOR ADDRESS                   ABI07000
       ADC   E17332            03  TIMEOUT ERROR ADDRESS                 ABI07100
       NUM   -1                04  DIAGNOSTIC CLOCK                      ABI07200
       NUM   0                 05  LOGICAL UNIT                          ABI07300
       NUM   0                 06  PARAMETER LOCATION                    ABI07400
       NUM   $0181             07  CONVERTER, EQUIPMENT, STATION         ABI07500
       ADC   $1006+T8562       08  REQUEST STATUS                        ABI07600
       ADC   $1006+T8564       08  REQUEST STATUS                        ABI07700
       NUM   $0200             09  DRIVER STATUS                         ABI07800
       NUM   0                 10  CURRENT LOCATION                      ABI07900
       NUM   0                 11  LAST LOCATION PLUS ONE                ABI08000
       NUM   0                 12  DEVICE STATUS                         ABI08100
       NUM   0                 13  ERROR COUNTER                         ABI08200
       NUM   0                 14  DATA TRANSFER FUNCTION                ABI08300
       NUM   0                 15  SECTOR NUMBER OR FNR RETURN           ABI08400
       NUM   $8300             16  NO COMPARE FLAG / DIRECTOR FUNCTION   ABI08500
       NUM   0                 17  TEMSEC - USED BY WORD ADDRESSING      ABI08600
       NUM   0                 18  OVERLAY AREA (SCHEDULER CALL)         ABI08700
       NUM   0                 19  OVERLAY AREA (COMPLETION ADDRESS)     ABI08800
       NUM   0                 20  OVERLAY AREA (THREAD)                 ABI08900
       NUM   0                 21  OVERLAY AREA (LOGICAL UNIT)           ABI09000
       ADC   P73322            22  PHYSTB THREAD                         ABI09100
       NUM   0                 23  RETURN ADDRESS FOR DATA TRANSFER      ABI09200
       NUM   0                 24  FIRST SECTOR ADDRESS ON DISK 1        ABI09300
       NUM   0                 25  LAST DATA TRANSFER FUNCTION           ABI09400
       NUM   0                 26  BUFFER SIZE FOR SPLIT TRANSFERS       ABI09500
       NUM   0                 27  CYLINDER ADDRESS FOR TRANSFER         ABI09600
       NUM   0                 28  MASK FOR THIS UNITS SEEK COMPLETE BIT ABI09700
       ADC   BF332B            29  ADDRESS OF 96 WORD BUFFER             ABI09800
       NUM   0                 30  TEMPORARY FOR WORD ADDRESSING         ABI09900
       NUM   0                 31  TEMPORARY FOR WORD ADDRESSING         ABI10000
       NUM   0                 32  TEMPORARY FOR WORD ADDRESSING         ABI10100
       NUM   0                 33  REQUEST CODE                          ABI10200
       NUM   0                 34  REQUEST PRIORITY                      ABI10300
       NUM   0                 35  STARTING SECTOR FOR COMPARE OR RETRY  ABI10400
       NUM   0                 36  FWA OF TRANSFER FOR COMPARE OR RETRY  ABI10500
       NUM   0                 37  ERROR COUNTER                         ABI10600
       NUM   0                 38  DATA TRANSFER FUNCTION CODE           ABI10700
       NUM   0                 39  SECTOR NUMBER CURRENTLY IN BUFFER     ABI10800
       NUM   0                 40  LAST VALUE OF CYLINDER ADDRESS STATUS ABI10900
       NUM   0                 41  LAST VALUE OF  C W A  STATUS          ABI11000
       NUM   0                 42  LAST VALUE OF CHECKWORD STATUS        ABI11100
       NUM   0                 43  LAST VALUE OF DRIVE CYLINDER STATUS   ABI11200
*                                                                        ABI11300
       EZS   BF332B(96)        44  BUFFER FOR WORD ADDRESSING            ABI11400
*                             139  BUFFER FOR WORD ADDRESSING            ABI11500
       EJT                                                               ABI11600
```

Figure 1-38. 1733-2/856 Disk Physical Device Table, Section ABI (Co

```
*       1 7 3 3 - 2 / 8 5 6   D I S K - U N I T   2
*
        SPC   1
P73322  ADC   $5209             00   SCHEDULER CALL
        ADC   I17332            01   INITIATOR ADDRESS
        ADC   C17332            02   CONTINUATOR ADDRESS
        ADC   E17332            03   TIMEOUT ERROR ADDRESS
        NUM   -1                04   DIAGNOSTIC CLOCK
        NUM   0                 05   LOGICAL UNIT
        NUM   0                 06   PARAMETER LOCATION
        NUM   $0181             07   CONVERTER, EQUIPMENT, STATION
        ADC   $1006+T8562       08   REQUEST STATUS
        ADC   $1006+T8564       08   REQUEST STATUS
        NUM   $0200             09   DRIVER STATUS
        NUM   0                 10   CURRENT LOCATION
        NUM   0                 11   LAST LOCATION PLUS ONE
        NUM   0                 12   DEVICE STATUS
        NUM   0                 13   ERROR COUNTER
        NUM   0                 14   DATA TRANSFER FUNCTION
        NUM   0                 15   SECTOR NUMBER OR FNR RETURN
        NUM   $8500             16   NO COMPARE FLAG / DIRECTOR FUNCTION
        NUM   0                 17   TEMSEC - USED BY WORD ADDRESSING
        NUM   0                 18   OVERLAY AREA (SCHEDULER CALL)
        NUM   0                 19   OVERLAY AREA (COMPLETION ADDRESS)
        NUM   0                 20   OVERLAY AREA (THREAD)
        NUM   0                 21   OVERLAY AREA (LOGICAL UNIT)
        ADC   P73323            22   PHYSTB THREAD
        NUM   0                 23   RETURN ADDRESS FOR DATA TRANSFER
        NUM   0                 24   FIRST SECTOR ADDRESS ON DISK 1
        NUM   0                 25   LAST DATA TRANSFER FUNCTION
        NUM   0                 26   BUFFER SIZE FOR SPLIT TRANSFERS
        NUM   0                 27   CYLINDER ADDRESS FOR TRANSFER
        NUM   0                 28   MASK FOR THIS UNITS SEEK COMPLETE BIT
        ADC   BF332C            29   ADDRESS OF 96 WORD BUFFER
        NUM   0                 30   TEMPORARY FOR WORD ADDRESSING
        NUM   0                 31   TEMPORARY FOR WORD ADDRESSING
        NUM   0                 32   TEMPORARY FOR WORD ADDRESSING
        NUM   0                 33   REQUEST CODE
        NUM   0                 34   REQUEST PRIORITY
        NUM   0                 35   STARTING SECTOR FOR COMPARE OR RETRY
        NUM   0                 36   FWA OF TRANSFER FOR COMPARE OR RETRY
        NUM   0                 37   ERROR COUNTER
        NUM   0                 38   DATA TRANSFER FUNCTION CODE
        NUM   0                 39   SECTOR NUMBER CURRENTLY IN BUFFER
        NUM   0                 40   LAST VALUE OF CYLINDER ADDRESS STATUS
        NUM   0                 41   LAST VALUE OF  C W A  STATUS
        NUM   0                 42   LAST VALUE OF CHECKWORD STATUS
        NUM   0                 43   LAST VALUE OF DRIVE CYLINDER STATUS
*
        BZS   BF332C(96)        44   BUFFER FOR WORD ADDRESSING
*                              139   BUFFER FOR WORD ADDRESSING
        EJT
```

Figure 1-38. 1733-2/856 Disk Physical Device Table, Section ABI
{Continued}

```
*       1 7 3 3 - 2 / 8 5 6   D I S K - U N I T   3                         ABI16900
*                                                                           ABI17000
        SPC   1                                                             ABI17100
P73323  ADC   $5209              00  SCHEDULER CALL                         ABI17200
        ADC   I17332             01  INITIATOR ADDRESS                      ABI17300
        ADC   C17332             02  CONTINUATOR ADDRESS                    ABI17400
        ADC   E17332             03  TIMEOUT ERROR ADDRESS                  ABI17500
        NUM   -1                 04  DIAGNOSTIC CLOCK                       ABI17600
        NUM   0                  05  LOGICAL UNIT                           ABI17700
        NUM   0                  06  PARAMETER LOCATION                     ABI17800
        NUM   $0181              07  CONVERTER, EQUIPMENT, STATION          ABI17900
        ADC   $1006+T8562        08  REQUEST STATUS                         ABI18000
        ADC   $1006+T8564        08  REQUEST STATUS                         ABI18100
        NUM   $0200              09  DRIVER STATUS                          ABI18200
        NUM   0                  10  CURRENT LOCATION                       ABI18300
        NUM   0                  11  LAST LOCATION PLUS ONE                 ABI18400
        NUM   0                  12  DEVICE STATUS                          ABI18500
        NUM   0                  13  ERROR COUNTER                          ABI18600
        NUM   0                  14  DATA TRANSFER FUNCTION                 ABI18700
        NUM   0                  15  SECTOR NUMBER OR FNR RETURN            ABI18800
        NUM   $8700              16  NO COMPARE FLAG / DIRECTOR FUNCTION    ABI18900
        NUM   0                  17  TEMSEC - USED BY WORD ADDRESSING       ABI19000
        NUM   0                  18  OVERLAY AREA (SCHEDULER CALL)          ABI19100
        NUM   0                  19  OVERLAY AREA (COMPLETION ADDRESS)      ABI19200
        NUM   0                  20  OVERLAY AREA (THREAD)                  ABI19300
        NUM   0                  21  OVERLAY AREA (LOGICAL UNIT)            ABI19400
        ADC   P73320             22  PHYSTB THREAD                          ABI19500
        NUM   0                  23  RETURN ADDRESS FOR DATA TRANSFER       ABI19600
        NUM   0                  24  FIRST SECTOR ADDRESS ON DISK 1         ABI19700
        NUM   0                  25  LAST DATA TRANSFER FUNCTION            ABI19800
        NUM   0                  26  BUFFER SIZE FOR SPLIT TRANSFERS        ABI19900
        NUM   0                  27  CYLINDER ADDRESS FOR TRANSFER          ABI20000
        NUM   0                  28  MASK FOR THIS UNITS SEEK COMPLETE BIT  ABI20100
        ADC   BF332C             29  ADDRESS OF 96 WORD BUFFER              ABI20200
        NUM   0                  30  TEMPORARY FOR WORD ADDRESSING          ABI20300
        NUM   0                  31  TEMPORARY FOR WORD ADDRESSING          ABI20400
        NUM   0                  32  TEMPORARY FOR WORD ADDRESSING          ABI20500
        NUM   0                  33  REQUEST CODE                           ABI20600
        NUM   0                  34  REQUEST PRIORITY                       ABI20700
        NUM   0                  35  STARTING SECTOR FOR COMPARE OR RETRY   ABI20800
        NUM   0                  36  FWA OF TRANSFER FOR COMPARE OR RETRY   ABI20900
        NUM   0                  37  ERROR COUNTER                          ABI21000
        NUM   0                  38  DATA TRANSFER FUNCTION CODE            ABI21100
        NUM   0                  39  SECTOR NUMBER CURRENTLY IN BUFFER      ABI21200
        NUM   0                  40  LAST VALUE OF CYLINDER ADDRESS STATUS  ABI21300
        NUM   0                  41  LAST VALUE OF  C W A  STATUS           ABI21400
        NUM   0                  42  LAST VALUE OF CHECKWORD STATUS         ABI21500
        NUM   0                  43  LAST VALUE OF DRIVE CYLINDER STATUS    ABI21600
*                                                                           ABI21700
        BZS   BF332C(96)         44  BUFFER FOR WORD ADDRESSING             ABI21800
*                               139  BUFFER FOR WORD ADDRESSING             ABI21900
        EJT                                                                 ABI22000
```

Figure 1-38. 1733-2/856 Disk Physical Device Table, Section ABI (Continued)

1.36 1738-853/854 Disk Physical Device Tables, Section ABJ

Section ABJ, Figure 1-39, contains physical device tables for up to two disk drives. The type code in word 8 of each table specifies whether the corresponding drive is an 853 or an 854. If a drive has a corresponding diagnostic logical unit word 22 contains an index into the logical unit numbers in the LOG1A table. Word 23 is the thread word used to thread the physical device tables in this section.

The interrupt response routine for this section is located at R1738. The interrupt response is the MSOS standard interrupt response routine.

Word 16 of each table determines whether or not the hardware compare feature is to be used. If bit 15 of word 16 is one, no compare will be performed. If bit 15 is zero, the compare feature will be used. Use of the compare feature slows down mass memory operation, but it will detect any data compare problems during a mass memory operation.

```
*              1 7 3 8   8 5 3 / 4   D I S K ,   U N I T   0
        SPC    1
        EXT    I1738,C1738,E1738
        EQU    T853(05**$10)   TYPE CODE - 853 DISK
        EQU    T854(08**$10)   TYPE CODE - 854 DISK
        EQU    U17380(0)
        EQU    U17380(X17380-LOG1A)
        SPC    2
R1738   LDQ    =XP17380        INTERRUPT RESPONSE FOR 853/4 DISK
        JMP*   (P17380+2)
        SPC    2
P17380  ADC    $5209           00   SCHEDULER CALL
        ADC    I1738           01   INITIATOR ADDRESS
        ADC    C1738           02   CONTINUATOR ADDRESS
        ADC    E1738           03   TIMEOUT ERROR ADDRESS
        NUM    -1              04   DIAGNOSTIC CLOCK
        NUM    0               05   LOGICAL UNIT
        NUM    0               06   PARAMETER LOCATION
        NUM    $0181           07   CONVERTER, EQUIPMENT, STATION
        ADC    $1006+T853      08   REQUEST STATUS
        ADC    $1006+T854      08   REQUEST STATUS
        NUM    $0200           09   DRIVER STATUS
        NUM    0               10   CURRENT LOCATION
        NUM    0               11   LAST LOCATION PLUS ONE
        NUM    0               12   DEVICE STATUS
        NUM    0               13   ERROR COUNTER
        NUM    0               14   DATA TRANSFER FUNCTION
        NUM    0               15   SECTOR NUMBER
        NUM    $811A           16   NO COMPARE FLAG / DIRECTOR FUNCTION
        NUM    0               17   SPARE
        NUM    0               18   OVERLAY AREA (SCHEDULER CALL)
        NUM    0               19   OVERLAY AREA (COMPLETION ADDRESS)
        NUM    0               20   OVERLAY AREA (THREAD)
        NUM    0               21   OVERLAY AREA (LOGICAL UNIT)
        ADC    U17380          22   DIAGNOSTIC LU
        ADC    P17381          23   PHYSTB THREAD
        EJT
*              1 7 3 8   8 5 3 / 4   D I S K ,   U N I T   1
*
        SPC    1
        EQU    U17381(0)
        EQU    U17381(X17381-LOG1A)
        SPC    1
P17381  ADC    $5209           00   SCHEDULER CALL
        ADC    I1738           01   INITIATOR ADDRESS
        ADC    C1738           02   CONTINUATOR ADDRESS
        ADC    E1738           03   TIMEOUT ERROR ADDRESS
        NUM    -1              04   DIAGNOSTIC CLOCK
        NUM    0               05   LOGICAL UNIT
        NUM    0               06   PARAMETER LOCATION
        NUM    $0181           07   CONVERTER, EQUIPMENT, STATION
        ADC    $1006+T853      08   REQUEST STATUS
        ADC    $1006+T854      08   REQUEST STATUS
        NUM    $0200           09   DRIVER STATUS
        NUM    0               10   CURRENT LOCATION
        NUM    0               11   LAST LOCATION PLUS ONE
        NUM    0               12   DEVICE STATUS
        NUM    0               13   ERROR COUNTER
        NUM    0               14   DATA TRANSFER FUNCTION
        NUM    0               15   SECTOR NUMBER
        NUM    $831A           16   NO COMPARE FLAG / DIRECTOR FUNCTION
```

Figure 1-39. 1738-853/854 Disk Physical Device Table, Section ABJ

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```
NUM   0            17  SPARE                                         ABJ06200
NUM   0            18  OVERLAY AREA (SCHEDULER CALL)                 ABJ06300
NUM   0            19  OVERLAY AREA (COMPLETION ADDRESS)             ABJ06400
NUM   0            20  OVERLAY AREA (THREAD)                         ABJ06500
NUM   0            21  OVERLAY AREA (LOGICAL UNIT)                   ABJ06600
ADC   U17381       22  DIAGNOSTIC LU                                 ABJ06700
ADC   P17380       23  PHYSTB THREAD                                 ABJ06800
EJT                                                                  ABJ06900
```

Figure 1-39. 1738-853/854 Disk Physical Device Table, Section ABJ (Con't)

1.37 1733-1/853/854 Disk Physical Device Tables, Section ABK

This section is similar to Section ABJ, except that up to eight 853/854 Disk drives may be used with a 1733-1 Controller. Each drive controlled by a 1733-1 must have a physical device table in this section. The data base for Section ABK is shown in Figure 1-40. A standard interrupt response routine is located at R17331.

In each table word 8 contains a type code depending on whether the drive is an 853 or an 854. Word 22 is the thread word, connecting all the tables in this section. Bit 15 of word 16 is set if the hardware compare feature is not to be used. Diagnostic logical unit capability is not available for 1733-1/853/854 Disk drives.

Words 17 - 21 and words 23-127 are used by the driver to handle word addressing requests, to provide an overlay area for requests which would read over request parameters, and to accomplish overlap seek capability. All of these words must be initially zero and may not be modified by the user.

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```
*         1 7 3 3 - 1   8 5 3 / 4   D I S K ,   U N I T   0
*
       SPC   1
       EXT   I17331,C17331,E17331
       EQU   T33853(39*$10)    TYPE CODE - 1733-853
       EQU   T33854(14*$10)    TYPE CODE - 1733-854
       SPC   2
R17331 LDQ   =XP73310          INTERRUPT RESPONSE FOR 1733-1 DISK
       JMP*  (P73310+2)
       SPC   2
P73310 ADC   $5209             00  SCHEDULER CALL
       ADC   I17331            01  INITIATOR ADDRESS
       ADC   C17331            02  CONTINUATOR ADDRESS
       ADC   E17331            03  TIMEOUT ERROR ADDRESS
       NUM   -1                04  DIAGNOSTIC CLOCK
       NUM   0                 05  LOGICAL UNIT
       NUM   0                 06  PARAMETER LOCATION
       NUM   $0181             07  CONVERTER, EQUIPMENT, STATION
       ADC   $1006+T33853      08  REQUEST STATUS
       ADC   $1006+T33854      08  REQUEST STATUS
       NUM   $0200             09  DRIVER STATUS
       NUM   0                 10  CURRENT LOCATION
       NUM   0                 11  LAST LOCATION PLUS ONE
       NUM   0                 12  DEVICE STATUS
       NUM   0                 13  ERROR COUNTER
       NUM   0                 14  DATA TRANSFER FUNCTION
       NUM   0                 15  FILE ADDRESS / SECTOR NUMBER
       NUM   $8100             16  NO COMPARE FLAG / DIRECTOR FUNCTION
       NUM   0                 17  LAST SECTOR READ INTO BUFFER
       NUM   0                 18  OVERLAY AREA (SCHEDULER CALL)
       NUM   0                 19  OVERLAY AREA (COMPLETION ADDRESS)
       NUM   0                 20  OVERLAY AREA (THREAD)
       NUM   0                 21  OVERLAY AREA (LOGICAL UNIT)
       ADC   P73311            22  PHYSTB THREAD
       NUM   0                 23  COMPARE FLAG
       NUM   0                 24  WORD NUMBER WITHIN SECTOR
       NUM   0                 25  TEMPORARY FWA
       NUM   0                 26  TEMPORARY LWA + 1
       NUM   0                 27  TEMPORARY SECTOR
       NUM   0                 28  TEMPORARY REQUEST PRIORITY
       NUM   0                 29  TEMPORARY REQUEST
       NUM   0                 30  TEMPORARY STORAGE
       NUM   0                 31  RETURN ADDRESS WITHIN DRIVER
*
       BZS   (96)              32  BUFFER FOR WORD ADDRESSING
*                             127  BUFFER FOR WORD ADDRESSING
       EJT
*         1 7 3 3 - 1   8 5 3 / 4   D I S K ,   U N I T   1
*
       SPC   1
P73311 ADC   $5209             00  SCHEDULER CALL
       ADC   I17331            01  INITIATOR ADDRESS
       ADC   C17331            02  CONTINUATOR ADDRESS
       ADC   E17331            03  TIMEOUT ERROR ADDRESS
       NUM   -1                04  DIAGNOSTIC CLOCK
       NUM   0                 05  LOGICAL UNIT
       NUM   0                 06  PARAMETER LOCATION
       NUM   $0181             07  CONVERTER, EQUIPMENT, STATION
       ADC   $1006+T33853      08  REQUEST STATUS
```

Figure 1-40. 1733-1/853/854 Disk Physical Device Tables, Section ABK

```
         ADC  $1006+T33854   08   REQUEST STATUS                                ARK06000
         NUM  $0200          09   DRIVER STATUS                                 ARK06100
         NUM  0              10   CURRENT LOCATION                              ARK06200
         NUM  0              11   LAST LOCATION PLUS ONE                        ARK06300
         NUM  0              12   DEVICE STATUS                                 ARK06400
         NUM  0              13   ERROR COUNTER                                 ARK06500
         NUM  0              14   DATA TRANSFER FUNCTION                        ARK06600
         NUM  0              15   FILE ADDRESS / SECTOR NUMBER                  ARK06700
         NUM  $8300          16   NO COMPARE FLAG / DIRECTOR FUNCTION           ARK06800
         NUM  0              17   LAST SECTOR READ INTO BUFFER                  ARK06900
         NUM  0              18   OVERLAY AREA (SCHEDULER CALL)                 ARK07000
         NUM  0              19   OVERLAY AREA (COMPLETION ADDRESS)             ARK07100
         NUM  0              20   OVERLAY AREA (THREAD)                         ARK07200
         NUM  0              21   OVERLAY AREA (LOGICAL UNIT)                   ARK07300
         ADC  P73312         22   PHYSTB THREAD                                 ARK07400
         NUM  0              23   COMPARE FLAG                                  ARK07500
         NUM  0              24   WORD NUMBER WITHIN SECTOR                     ARK07600
         NUM  0              25   TEMPORARY FWA                                 ARK07700
         NUM  0              26   TEMPORARY LWA + 1                             ARK07800
         NUM  0              27   TEMPORARY SECTOR                              ARK07900
         NUM  0              28   TEMPORARY REQUEST PRIORITY                    ARK08000
         NUM  0              29   TEMPORARY REQUEST                             ARK08100
         NUM  0              30   TEMPORARY STORAGE                             ARK08200
         NUM  0              31   RETURN ADDRESS WITHIN DRIVER                  ARK08300
*                                                                           ARK08400
         BZS  (96)           32   BUFFER FOR WORD ADDRESSING                    ARK08500
*                           127   BUFFER FOR WORD ADDRESSING                    ARK08600
         EJT                                                                ARK08700
*             1 7 3 3 - 1   8 5 3 / 4   D I S K ,   U N I T   2             ARK08800
*                                                                           ARK08900
         SPC  1                                                             ARK09000
P73312   ADC  $5209          00   SCHEDULER CALL                                ARK09100
         ADC  I17331         01   INITIATOR ADDRESS                             ARK09200
         ADC  C17331         02   CONTINUATOR ADDRESS                           ARK09300
         ADC  E17331         03   TIMEOUT ERROR ADDRESS                         ARK09400
         NUM  -1             04   DIAGNOSTIC CLOCK                              ARK09500
         NUM  0              05   LOGICAL UNIT                                  ARK09600
         NUM  0              06   PARAMETER LOCATION                            ARK09700
         NUM  $0181          07   CONVERTER, EQUIPMENT, STATION                 ARK09800
         ADC  $1006+T33853   08   REQUEST STATUS                                ARK09900
         ADC  $1006+T33854   08   REQUEST STATUS                                ARK10000
         NUM  $0200          09   DRIVER STATUS                                 ARK10100
         NUM  0              10   CURRENT LOCATION                              ARK10200
         NUM  0              11   LAST LOCATION PLUS ONE                        ARK10300
         NUM  0              12   DEVICE STATUS                                 ARK10400
         NUM  0              13   ERROR COUNTER                                 ARK10500
         NUM  0              14   DATA TRANSFER FUNCTION                        ARK10600
         NUM  0              15   FILE ADDRESS / SECTOR NUMBER                  ARK10700
         NUM  $8500          16   NO COMPARE FLAG / DIRECTOR FUNCTION           ARK10800
         NUM  0              17   LAST SECTOR READ INTO BUFFER                  ARK10900
         NUM  0              18   OVERLAY AREA (SCHEDULER CALL)                 ARK11000
         NUM  0              19   OVERLAY AREA (COMPLETION ADDRESS)             ARK11100
         NUM  0              20   OVERLAY AREA (THREAD)                         ARK11200
         NUM  0              21   OVERLAY AREA (LOGICAL UNIT)                   ARK11300
         ADC  P73313         22   PHYSTB THREAD                                 ARK11400
         NUM  0              23   COMPARE FLAG                                  ARK11500
         NUM  0              24   WORD NUMBER WITHIN SECTOR                     ARK11600
         NUM  0              25   TEMPORARY FWA                                 ARK11700
         NUM  0              26   TEMPORARY LWA + 1                             ARK11800
```

Figure 1-40. 1733-1/853/854 Disk Physical Device Tables, Section AI
(Continued)

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```
         NUM   0                 27   TEMPORARY SECTOR
         NUM   0                 28   TEMPORARY REQUEST PRIORITY
         NUM   0                 29   TEMPORARY REQUEST
         NUM   0                 30   TEMPORARY STORAGE
         NUM   0                 31   RETURN ADDRESS WITHIN DRIVER
*
         BZS   (96)              32   BUFFER FOR WORD ADDRESSING
*                               127   BUFFER FOR WORD ADDRESSING
         EJT
*              1 7 3 3 - 1    8 5 3 / 4    D I S K ,    U N I T   3
*
         SPC   1
P73313   ADC   $5209             00   SCHEDULER CALL
         ADC   I17331            01   INITIATOR ADDRESS
         ADC   C17331            02   CONTINUATOR ADDRESS
         ADC   E17331            03   TIMEOUT ERROR ADDRESS
         NUM   -1                04   DIAGNOSTIC CLOCK
         NUM   0                 05   LOGICAL UNIT
         NUM   0                 06   PARAMETER LOCATION
         NUM   $0181             07   CONVERTER, EQUIPMENT, STATION
         ADC   $1006+T33853      08   REQUEST STATUS
         ADC   $1006+T33854      08   REQUEST STATUS
         NUM   $0200             09   DRIVER STATUS
         NUM   0                 10   CURRENT LOCATION
         NUM   0                 11   LAST LOCATION PLUS ONE
         NUM   0                 12   DEVICE STATUS
         NUM   0                 13   ERROR COUNTER
         NUM   0                 14   DATA TRANSFER FUNCTION
         NUM   0                 15   FILE ADDRESS / SECTOR NUMBER
         NUM   $E700             16   NO COMPARE FLAG / DIRECTOR FUNCTION
         NUM   0                 17   LAST SECTOR READ INTO BUFFER
         NUM   0                 18   OVERLAY AREA (SCHEDULER CALL)
         NUM   0                 19   OVERLAY AREA (COMPLETION ADDRESS)
         NUM   0                 20   OVERLAY AREA (THREAD)
         NUM   0                 21   OVERLAY AREA (LOGICAL UNIT)
         ADC   P73314            22   PHYSTB THREAD
         NUM   0                 23   COMPARE FLAG
         NUM   0                 24   WORD NUMBER WITHIN SECTOR
         NUM   0                 25   TEMPORARY FWA
         NUM   0                 26   TEMPORARY LWA + 1
         NUM   0                 27   TEMPORARY SECTOR
         NUM   0                 28   TEMPORARY REQUEST PRIORITY
         NUM   0                 29   TEMPORARY REQUEST
         NUM   0                 30   TEMPORARY STORAGE
         NUM   0                 31   RETURN ADDRESS WITHIN DRIVER
*
         BZS   (96)              32   BUFFER FOR WORD ADDRESSING
*                               127   BUFFER FOR WORD ADDRESSING
         EJT
*              1 7 3 3 - 1    8 5 3 / 4    D I S K ,    U N I T   4
*
         SPC   1
P73314   ADC   $5209             00   SCHEDULER CALL
         ADC   I17331            01   INITIATOR ADDRESS
         ADC   C17331            02   CONTINUATOR ADDRESS
         ADC   E17331            03   TIMEOUT ERROR ADDRESS
         NUM   -1                04   DIAGNOSTIC CLOCK
         NUM   0                 05   LOGICAL UNIT
         NUM   0                 06   PARAMETER LOCATION
         NUM   $0181             07   CONVERTER, EQUIPMENT, STATION
         ADC   $1006+T33853      08   REQUEST STATUS
         ADC   $1006+T33854      08   REQUEST STATUS
```

Figure 1-40. 1733-1/853/854 Disk Physical Device Tables, Section ABK (Continued)

```
         NUM  $0200           09  DRIVER STATUS                              ABK18100
         NUM  0               10  CURRENT LOCATION                           ABK18200
         NUM  0               11  LAST LOCATION PLUS ONE                     ABK18300
         NUM  0               12  DEVICE STATUS                              ABK18400
         NUM  0               13  ERROR COUNTER                              ABK18500
         NUM  0               14  DATA TRANSFER FUNCTION                     ABK18600
         NUM  0               15  FILE ADDRESS / SECTOR NUMBER               ABK18700
         NUM  $8900           16  NO COMPARE FLAG / DIRECTOR FUNCTION        ABK18800
         NUM  0               17  LAST SECTOR READ INTO BUFFER               ABK18900
         NUM  0               18  OVERLAY AREA (SCHEDULER CALL)              ABK19000
         NUM  0               19  OVERLAY AREA (COMPLETION ADDRESS)          ABK19100
         NUM  0               20  OVERLAY AREA (THREAD)                      ABK19200
         NUM  0               21  OVERLAY AREA (LOGICAL UNIT)                ABK19300
         ADC  P73315          22  PHYSTB THREAD                              ABK19400
         NUM  0               23  COMPARE FLAG                               ABK19500
         NUM  0               24  WORD NUMBER WITHIN SECTOR                  ABK19600
         NUM  0               25  TEMPORARY FWA                              ABK19700
         NUM  0               26  TEMPORARY LWA + 1                          ABK19800
         NUM  0               27  TEMPORARY SECTOR                           ABK19900
         NUM  0               28  TEMPORARY REQUEST PRIORITY                 ABK20000
         NUM  0               29  TEMPORARY REQUEST                          ABK20100
         NUM  0               30  TEMPORARY STORAGE                          ABK20200
         NUM  0               31  RETURN ADDRESS WITHIN DRIVER               ABK20300
*                                                                            ABK20400
         BZS  (96)            32  BUFFER FOR WORD ADDRESSING                 ABK20500
*                            127  BUFFER FOR WORD ADDRESSING                 ABK20600
         EJT                                                                 ABK20700
*             1 7 3 3 - 1   8 5 3 / 4   D I S K .   U N I T   5              ABK20800
*                                                                            ABK20900
         SPC  1                                                              ABK21000
P73315   ADC  $5209           00  SCHEDULER CALL                             ABK21100
         ADC  I17331          01  INITIATOR ADDRESS                          ABK21200
         ADC  C17331          02  CONTINUATOR ADDRESS                        ABK21300
         ADC  E17331          03  TIMEOUT ERROR ADDRESS                      ABK21400
         NUM  -1              04  DIAGNOSTIC CLOCK                           ABK21500
         NUM  0               05  LOGICAL UNIT                               ABK21600
         NUM  0               06  PARAMETER LOCATION                         ABK21700
         NUM  $0181           07  CONVERTER, EQUIPMENT, STATION              ABK21800
         ADC  $1006+T33853    08  REQUEST STATUS                             ABK21900
         ADC  $1006+T33854    08  REQUEST STATUS                             ABK22000
         NUM  $0200           09  DRIVER STATUS                              ABK22100
         NUM  0               10  CURRENT LOCATION                           ABK22200
         NUM  0               11  LAST LOCATION PLUS ONE                     ABK22300
         NUM  0               12  DEVICE STATUS                              ABK22400
         NUM  0               13  ERROR COUNTER                              ABK22500
         NUM  0               14  DATA TRANSFER FUNCTION                     ABK22600
         NUM  0               15  FILE ADDRESS / SECTOR NUMBER               ABK22700
         NUM  $8800           16  NO COMPARE FLAG / DIRECTOR FUNCTION        ABK22800
         NUM  0               17  LAST SECTOR READ INTO BUFFER               ABK22900
         NUM  0               18  OVERLAY AREA (SCHEDULER CALL)              ABK23000
         NUM  0               19  OVERLAY AREA (COMPLETION ADDRESS)          ABK23100
         NUM  0               20  OVERLAY AREA (THREAD)                      ABK23200
         NUM  0               21  OVERLAY AREA (LOGICAL UNIT)                ABK23300
         ADC  P73316          22  PHYSTB THREAD                              ABK23400
         NUM  0               23  COMPARE FLAG                               ABK23500
         NUM  0               24  WORD NUMBER WITHIN SECTOR                  ABK23600
         NUM  0               25  TEMPORARY FWA                              ABK23700
         NUM  0               26  TEMPORARY LWA + 1                          ABK23800
```

...e 1-40. 1733-1/853/854 Disk Physical Device Tables, Section ABK (Con

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```
      NUM   0                 27   TEMPORARY SECTOR                        ABK23900
      NUM   0                 28   TEMPORARY REQUEST PRIORITY              ABK24000
      NUM   0                 29   TEMPORARY REQUEST                       ABK24100
      NUM   0                 30   TEMPORARY STORAGE                       ABK24200
      NUM   0                 31   RETURN ADDRESS WITHIN DRIVER            ABK24300
*                                                                          ABK24400
      BZS   (96)              32   BUFFER FOR WORD ADDRESSING              ABK24500
*                            127   BUFFER FOR WORD ADDRESSING              ABK24600
      EJT                                                                  ABK24700
*           1 7 3 3 - 1   8 5 3 / 4   D I S K ,   U N I T   6            ABK24800
*                                                                          ABK24900
      SPC   1                                                              ABK25000
P73316 ADC  $5209             00   SCHEDULER CALL                          ABK25100
      ADC   I17331            01   INITIATOR ADDRESS                       ABK25200
      ADC   C17331            02   CONTINUATOR ADDRESS                     ABK25300
      ADC   E17331            03   TIMEOUT ERROR ADDRESS                   ABK25400
      NUM   -1                04   DIAGNOSTIC CLOCK                        ABK25500
      NUM   0                 05   LOGICAL UNIT                            ABK25600
      NUM   0                 06   PARAMETER LOCATION                      ABK25700
      NUM   $0181             07   CONVERTER, EQUIPMENT, STATION           ABK25800
      ADC   $1006+T33853      08   REQUEST STATUS                          ABK25900
      ADC   $1006+T33854      08   REQUEST STATUS                          ABK26000
      NUM   $0200             09   DRIVER STATUS                           ABK26100
      NUM   0                 10   CURRENT LOCATION                        ABK26200
      NUM   0                 11   LAST LOCATION PLUS ONE                  ABK26300
      NUM   0                 12   DEVICE STATUS                           ABK26400
      NUM   0                 13   ERROR COUNTER                           ABK26500
      NUM   0                 14   DATA TRANSFER FUNCTION                  ABK26600
      NUM   0                 15   FILE ADDRESS / SECTOR NUMBER            ABK26700
      NUM   $8D00             16   NO COMPARE FLAG / DIRECTOR FUNCTION     ABK26800
      NUM   0                 17   LAST SECTOR READ INTO BUFFER            ABK26900
      NUM   0                 18   OVERLAY AREA (SCHEDULER CALL)           ABK27000
      NUM   0                 19   OVERLAY AREA (COMPLETION ADDRESS)       ABK27100
      NUM   0                 20   OVERLAY AREA (THREAD)                   ABK27200
      NUM   0                 21   OVERLAY AREA (LOGICAL UNIT)             ABK27300
      ADC   P73317            22   PHYSTB THREAD                           ABK27400
      NUM   0                 23   COMPARE FLAG                            ABK27500
      NUM   0                 24   WORD NUMBER WITHIN SECTOR               ABK27600
      NUM   0                 25   TEMPORARY FWA                           ABK27700
      NUM   0                 26   TEMPORARY LWA + 1                       ABK27800
      NUM   0                 27   TEMPORARY SECTOR                        ABK27900
      NUM   0                 28   TEMPORARY REQUEST PRIORITY              ABK28000
      NUM   0                 29   TEMPORARY REQUEST                       ABK28100
      NUM   0                 30   TEMPORARY STORAGE                       ABK28200
      NUM   0                 31   RETURN ADDRESS WITHIN DRIVER            ABK28300
*                                                                          ABK28400
      BZS   (96)              32   BUFFER FOR WORD ADDRESSING              ABK28500
*                            127   BUFFER FOR WORD ADDRESSING              ABK28600
      EJT                                                                  ABK28700
*           1 7 3 3 - 1   8 5 3 / 4   D I S K ,   U N I T   7            ABK28800
*                                                                          ABK28900
      SPC   1                                                              ABK29000
P73317 ADC  $5209             00   SCHEDULER CALL                          ABK29100
      ADC   I17331            01   INITIATOR ADDRESS                       ABK29200
      ADC   C17331            02   CONTINUATOR ADDRESS                     ABK29300
      ADC   E17331            03   TIMEOUT ERROR ADDRESS                   ABK29400
      NUM   -1                04   DIAGNOSTIC CLOCK                        ABK29500
      NUM   0                 05   LOGICAL UNIT                            ABK29600
      NUM   0                 06   PARAMETER LOCATION                      ABK29700
      NUM   $0181             07   CONVERTER, EQUIPMENT, STATION           ABK29800
```

Figure 1-40. 1733-1/853/854 Disk Physical Device Tables, Section ABK (Continued)

```
        ADC   $1006+T33853   08   REQUEST STATUS                          ABK29900
        ADC   $1006+T33854   08   REQUEST STATUS                          ABK30000
        NUM   $0200          09   DRIVER STATUS                           ABK30100
        NUM   0              10   CURRENT LOCATION                        ABK30200
        NUM   0              11   LAST LOCATION PLUS ONE                  ABK30300
        NUM   0              12   DEVICE STATUS                           ABK30400
        NUM   0              13   ERROR COUNTER                           ABK30500
        NUM   0              14   DATA TRANSFER FUNCTION                  ABK30600
        NUM   0              15   FILE ADDRESS / SECTOR NUMBER            ABK30700
        NUM   $8F00          16   NO COMPARE FLAG / DIRECTOR FUNCTION     ABK30800
        NUM   0              17   LAST SECTOR READ INTO BUFFER            ABK30900
        NUM   0              18   OVERLAY AREA (SCHEDULER CALL)           ABK31000
        NUM   0              19   OVERLAY AREA (COMPLETION ADDRESS)       ABK31100
        NUM   0              20   OVERLAY AREA (THREAD)                   ABK31200
        NUM   0              21   OVERLAY AREA (LOGICAL UNIT)             ABK31300
        ADC   P73310         22   PHYSTB THREAD                           ABK31400
        NUM   0              23   COMPARE FLAG                            ABK31500
        NUM   0              24   WORD NUMBER WITHIN SECTOR               ABK31600
        NUM   0              25   TEMPORARY FWA                           ABK31700
        NUM   0              26   TEMPORARY LWA + 1                       ABK31800
        NUM   0              27   TEMPORARY SECTOR                        ABK31900
        NUM   0              28   TEMPORARY REQUEST PRIORITY              ABK32000
        NUM   0              29   TEMPORARY REQUEST                       ABK32100
        NUM   0              30   TEMPORARY STORAGE                       ABK32200
        NUM   0              31   RETURN ADDRESS WITHIN DRIVER            ABK32300
*                                                                         ABK32400
        BZS   (96)           32   BUFFER FOR WORD ADDRESSING              ABK32500
*                           127   BUFFER FOR WORD ADDRESSING              ABK32600
        EJT                                                               ABK32700
*             1 7 3 9 - 1    C A R T R I D G E   D I S K                  ABK32800
*                                                                         ABK32900
        SPC   1                                                           ABK33000
        EXT   I17391,C17391,E17391                                        ABK33100
        SPC   2                                                           ABK33200
R17391  LDQ   =XP17391       INTERRUPT RESPONSE FOR 1739-1 DISK           ABK33300
        JMP*  (P17391+2)                                                  ABK33400
        EJT                                                               ABK33500
```

Figure 1-40. 1733-1/853/854 Disk Physical Device Tables, Section ABK (Continued)

1.38 1739-1 Cartridge Disk Physical Device Tables, Section ABL

Section ABL, Figure 1-41, contains a standard interrupt response routine, located at R17391. Bit 15 of word 16 is the no compare flag. If set, the hardware compare feature will not be used. Diagnostic logical unit capability is not available for this device.

Words 17-136 are used by the driver for error analysis for an overlay area, and for word addressing. Word 29 is a pointer to the 96-word buffer. Words 17-28 and words 30-136 are all zero initially. Words 17-136 may not be modified by the user.

```
*        1 7 3 9 - 1   C A R T R I D G E   D I S K                       ABL00100
*                                                                        ABL00200
        SPC   1                                                          ABL00300
P17391  ADC   $5209         00  SCHEDULER CALL                           ABL00400
        ADC   I17391        01  INITIATOR ADDRESS                        ABL00500
        ADC   C17391        02  CONTINUATOR ADDRESS                      ABL00600
        ADC   F17391        03  TIMEOUT ERROR ADDRESS                    ABL00700
        NUM   -1            04  DIAGNOSTIC CLOCK                         ABL00800
        NUM   0             05  LOGICAL UNIT                             ABL00900
        NUM   0             06  PARAMETER LOCATION                       ABL01000
        NUM   $0181         07  CONVERTER, EQUIPMENT, STATION            ABL01100
        NUM   $1076         08  REQUEST STATUS                           ABL01200
        NUM   $0200         09  DRIVER STATUS                            ABL01300
        NUM   0             10  CURRENT LOCATION                         ABL01400
        NUM   0             11  LAST LOCATION PLUS ONE                   ABL01500
        NUM   0             12  DEVICE STATUS                            ABL01600
        NUM   0             13  DRIVER LENGTH IF MASS MEMORY             ABL01700
        NUM   $7FFF         14  NAME ASSOCIATED WITH SECTOR NUMBER       ABL01800
        NUM   0             15  SECTOR NUMBER OR FNR RETURN              ABL01900
        NUM   $8100         16  NO COMPARE FLAG / DIRECTOR FUNCTION      ABL02000
        NUM   0             17  TEMSEC - USED BY WORD ADDRESSING         ABL02100
        NUM   0             18  OVERLAY AREA (SCHEDULER CALL)            ABL02200
        NUM   0             19  OVERLAY AREA (COMPLETION ADDRESS)        ABL02300
        NUM   0             20  OVERLAY AREA (THREAD)                    ABL02400
        NUM   0             21  OVERLAY AREA (LOGICAL UNIT)              ABL02500
        NUM   0             22  SECTOR NUMBER CURRENTLY IN BUFFER        ABL02600
        NUM   0             23  RETURN ADDRESS FOR DATA TRANSFER         ABL02700
        NUM   0             24  ERROR COUNTER                            ABL02800
        NUM   0             25  LAST DATA TRANSFER FUNCTION              ABL02900
        NUM   0             26  BUFFER SIZE FOR SPLIT TRANSFERS          ABL03000
        NUM   0             27  CYLINDER ADDRESS FOR TRANSFER            ABL03100
        NUM   0             28  DATA TRANSFER FUNCTION CODE              ABL03200
        ADC   BF7931        29  ADDRESS OF 96 WORD BUFFER                ABL03300
        NUM   0             30  TEMPORARY FOR WORD ADDRESSING            ABL03400
        NUM   0             31  TEMPORARY FOR WORD ADDRESSING            ABL03500
        NUM   0             32  TEMPORARY FOR WORD ADDRESSING            ABL03600
        NUM   0             33  REQUEST CODE                             ABL03700
        NUM   0             34  REQUEST PRIORITY                         ABL03800
        NUM   0             35  STARTING SECTOR FOR COMPARE OR RETRY     ABL03900
        NUM   0             36  FWA OF TRANSFER FOR COMPARE OR RETRY     ABL04000
        NUM   0             37  LAST VALUE OF CYLINDER ADDRESS STATUS    ABL04100
        NUM   0             38  LAST VALUE OF  C W A  STATUS             ABL04200
        NUM   0             39  LAST VALUE OF CHECKWORD STATUS           ABL04300
        NUM   0             40  LAST VALUE OF DRIVE CYLINDER STATUS      ABL04400
*                                                                        ABL04500
        BZS   BF7931(96)    41  BUFFER FOR WORD ADDRESSING               ABL04600
*                          136  BUFFER FOR WORD ADDRESSING               ABL04700
        EJT                                                              ABL04800
```

Figure 1-41. 1739-1 Cartridge Disk Physical Device Tables,

Section ABL

1.39 1752 Drum Physical Device Tables, Section ABM

The standard interrupt response routine for the 1752 drum is located at R1752, Figure 1-42. Diagnostic logical unit capability is not available. Words 16-30 are used by the driver for an overlay area for requests that would read over request parameters, and for error analysis. These words are initially zero. They must not be modified by the user.

```
*               1 7 5 2   D R U M                                                                 ABM00100
*                                                                                                 ABM00200
          EXT   I1752,C1752,E1752                                                                 ABM00300
          SPC   2                                                                                 ABM00400
R1752     LDQ   =XP1752          INTERRUPT RESPONSE FOR 1752 DRUM                                 ABM00500
          JMP*  (P1752+2)                                                                         ABM00600
          EJT                                                                                     ABM00700
*               1 7 5 2   D R U M                                                                 ABM00800
*                                                                                                 ABM00900
          SPC   1                                                                                 ABM01000
P1752     ADC   $5209            00   SCHEDULER CALL                                              ABM01100
          ADC   I1752            01   INITIATOR ADDRESS                                           ABM01200
          ADC   C1752            02   CONTINUATOR ADDRESS                                         ABM01300
          ADC   E1752            03   TIMEOUT ERROR ADDRESS                                       ABM01400
          NUM   -1               04   DIAGNOSTIC CLOCK                                            ABM01500
          NUM   0                05   LOGICAL UNIT                                                ABM01600
          NUM   0                06   PARAMETER LOCATION                                          ABM01700
          NUM   $0101            07   CONVERTER, EQUIPMENT, STATION                               ABM01800
          NUM   $1036            08   REQUEST STATUS                                              ABM01900
          NUM   0                09   DRIVER STATUS                                               ABM02000
          NUM   0                10   CURRENT LOCATION                                            ABM02100
          NUM   0                11   LAST LOCATION PLUS ONE                                      ABM02200
          NUM   0                12   DEVICE STATUS                                               ABM02300
          NUM   0                13   RESERVED                                                    ABM02400
          NUM   $7FFF            14   RESERVED                                                    ABM02500
          NUM   0                15   RESERVED FOR FNR AND CMR                                    ABM02600
          NUM   0                16   SECTOR NUMBER                                               ABM02700
          NUM   0                17   DATA TRANSFER FUNCTION                                      ABM02800
          NUM   0                18   COUNTER                                                     ABM02900
          NUM   0                19   FULL SECTOR COUNTER                                         ABM03000
          NUM   0                20   SAVE ECCOR                                                  ABM03100
          NUM   0                21   SAVE ELSTWD                                                 ABM03200
          NUM   0                22   OVERLAY AREA (SCHEDULER CALL)                               ABM03300
          NUM   0                23   OVERLAY AREA (COMPLETION ADDRESS)                           ABM03400
          NUM   0                24   OVERLAY AREA (THREAD)                                       ABM03500
          NUM   0                25   OVERLAY AREA (LOGICAL UNIT)                                 ABM03600
          NUM   0                26   UNSUCCESSFUL I/O ATTEMPT COUNTER                            ABM03700
          NUM   0                27   EQUIPMENT STATUS (ON LAST ERROR)                            ABM03800
          NUM   0                28   CORE STATUS      (ON LAST ERROR)                            ABM03900
          NUM   0                29   SECTOR STATUS    (ON LAST ERROR)                            ABM04000
          NUM   0                30   DATA STATUS      (ON LAST ERROR)                            ABM04100
          EJT                                                                                     ABM04200
```

Figure 1-42. 1752 Drum Physical Device Tables, Section ABM

1.40 1751 Drum Physical Device Tables, Section ABN

The standard interrupt response routine for the 1751 Drum is located at R1751, Figure 1-43. The 1751 Drum does not have diagnostic logical unit capability.

Words 13-18 are used by the driver as an overlay area for requests that would read over request parameters in the user's program. These words are initially zero and are not to be modified by the user.

Words 19-30 comprise 6 pairs of words used to send commands to the 1751 Drum to initiate I/O transfer. The first word of each pair is the data word which is placed in the A-register. The second word of each pair is the director function which is placed in Q. In word 19, bits 0-7 are the eight most significant bits of the track number. In word 21, bits 11-14 are the four least significant bits of the track number, and bits 0-10 are the drum sector number. A drum sector is one word only and should not be confused with a disk sector of 96 words. A drum sector number has a value between 0 and 2047. Word 23 contains the initial core address for the transfer. Word 25 contains the final core address. Word 27 contains a one in bit position 3 to request an end-of-operation interrupt from the hardware.

Word 29 will contain either the contents of physical device table word 36, for a drum write, or physical device table word 37, for a drum read. Word 32 contains a negative value to indicate to the driver that the preceding pair is the end of the string of pairs to output to the drum.

Bits 7-10 of words 20, 22, 24, 26, 28, 36, and 37 contain the equipment code for the 1751 drum. If the equipment code in bits 7-10 of word 7 is changed, the equipment code in bits 7-10 of words 20, 22, 24, 26, 28, 36, and 37 must be changed to match the revised code.

For system directory calls, a monitor FREAD request will be performed by the 1751 driver. The request code, 4, corresponding to an FREAD request is therefore stored in word 33 of the physical device table for use by the driver.

Word 34 is used by the driver for temporary storage of the current request code. Word 35 is used by the driver to store one less than the number of words to be transferred.

```
*        1 7 5 1   D R U M                                                ABN00100
*                                                                         ABN00200
         EXT   I1751,C1751,F1751                                          ABN00300
         SPC   1                                                          ABN00400
R1751    LDQ   =XP1751         INTERRUPT RESPONSE FOR 1751 DRUM           ABN00500
         JMP*  (P1751+2)                                                  ABN00600
         SPC   2                                                          ABN00700
P1751    ADC   $5209           00  SCHEDULER CALL                         ABN00800
         ADC   I1751           01  INITIATOR ADDRESS                      ABN00900
         ADC   C1751           02  CONTINUATOR ADDRESS                    ABN01000
         ADC   F1751           03  TIMEOUT ERROR ADDRESS                  ABN01100
         NUM   -1              04  DIAGNOSTIC CLOCK                       ABN01200
         NUM   0               05  LOGICAL UNIT                           ABN01300
         NUM   0               06  PARAMETER LOCATION                     ABN01400
         NUM   $0101           07  CONVERTER, EQUIPMENT, STATION          ABN01500
         NUM   $1066           08  REQUEST STATUS                         ABN01600
         NUM   0               09  DRIVER STATUS                          ABN01700
         NUM   0               10  CURRENT LOCATION                       ABN01800
         NUM   0               11  LAST LOCATION PLUS ONE                 ABN01900
         NUM   0               12  DEVICE STATUS                          ABN02000
         NUM   0               13  OVERLAY AREA (SCHEDULER CALL)          ABN02100
         NUM   0               14  OVERLAY AREA (COMPLETION ADDRESS)      ABN02200
         NUM   0               15  OVERLAY AREA (THREAD)                  ABN02300
         NUM   0               16  OVERLAY AREA (LOGICAL UNIT)            ABN02400
         NUM   0               17  OVERLAY AREA (SPARE)                   ABN02500
         NUM   0               18  OVERLAY AREA (SPARE)                   ABN02600
         NUM   0               19  TRACK ADDRESS FUNCTION                 ABN02700
         NUM   $0108           20  TRACK ADDRESS FUNCTION                 ABN02800
         NUM   0               21  SECTOR ADDRESS FUNCTION                ABN02900
         NUM   $010A           22  SECTOR ADDRESS FUNCTION                ABN03000
         NUM   0               23  S REGISTER FUNCTION                    ABN03100
         NUM   $010C           24  S REGISTER FUNCTION                    ABN03200
         NUM   0               25  CORE ADDRESS FUNCTION                  ABN03300
         NUM   $010E           26  CORE ADDRESS FUNCTION                  ABN03400
         NUM   $0008           27                                         ABN03500
         NUM   $0101           28  REQUEST STATUS                         ABN03600
         NUM   0               29  READ / WRITE CONTROL                   ABN03700
         NUM   0               30  READ / WRITE CONTROL                   ABN03800
         NUM   0               31  READ / WRITE CONTROL                   ABN03900
         NUM   -1              32  READ / WRITE CONTROL                   ABN04000
         NUM   4               33  READSD                                 ABN04100
         NUM   0               34  READSD                                 ABN04200
         NUM   0               35  DN                                     ABN04300
         NUM   $0100           36  WRITE CONTROL FUNCTION                 ABN04400
         NUM   $0104           37  READ  CONTROL FUNCTION                 ABN04500
         EJT                                                              ABN04600
```

Figure 1-43. 1751 Drum Physical Device Tables, Section ABN

1.41 1742-30/120 Line Printer Physical Device Table, Section AB0

Section AB0, Figure 1-44, defines the physical device table for either a 1742-30 line printer or a 1742-120 line printer. The type code in word 8 is dependent on the type of printer. The standard interrupt response routine is located at R42312. The driver may be either core resident or mass memory resident. If core resident, words 1, 2, and 3 are linked to the driver. If mass resident, words 1, 2, and 3 are linked to jumps to entries in MMEXEC.

If there is a corresponding FORTRAN logical unit for this device, word 19 will contain an index into the LOG1A table of logical unit numbers. The FORTRAN logical unit is the one that is used when it is desired to have the first character of the output buffer interpreted as a FORTRAN carriage control character.

Word 21, maximum number of lines per page, is 60 in a standard system. This may be changed if desired. If word 21 is negative, lines are printed consecutively with no spaces skipped between pages. Word 22, number of characters per line, is 136 in a standard system. This may be changed if the user desires.

Word 23 is an index into the LOG1A table if there is a corresponding diagnostic logical unit. If there is no corresponding diagnostic logical unit, word 23 is zero.

The train image module with entry, TRAIN, is necessary for a 1742-120 printer, since the driver must have a set of codes corresponding, in order, to the characters on the hardware train within the printer. The train image module is not necessary for the 1742-30 printer, and thus cards *AB00680 and *AB00690 are included in a physical device table for a 1742-30 printer. In such a system the train image module is not present. By equating the entry TRAIN with $7FFF_{16}$, TRAIN does not appear as an unpatched external at the time of system installation.

```
*        1 7 4 2 - 3 0 / 1 2 0   L I N E   P R I N T E R
*
         SPC   1
         EQU   T4230(17*$10)  TYPE CODE - 1742-30
         EQU   T4212(18*$10)  TYPE CODE - 1742-120
         EQU   U42312(0)
         EQU   U42312(X42312-LOG1A)
         EQU   F42312(FTN742-LOG1A)
         SPC   1
         EQU   M42312(0)
         EQU   M42312(1)
*
         IFA   M42312.EQ.0     CORE RESIDENT DRIVER
         EXT   I42312
         EXT   C42312
         EXT   E42312
         EQU   L42312(0)
         EQU   S42312($7FFF)
         EIF
*
         IFA   M42312.EQ.1     MASS RESIDENT DRIVER
         EXT   MASDRV
         EXT   MASCON
         EXT   MASERR
I42312   JMP+  MASDRV          INITIATE DRIVER
C42312   JMP+  MASCON          INTERRUPT RESPONSE
E42312   JMP+  MASERR          TIMEOUT ERROR
         EXT   L42312
         EXT   S42312
         EIF
*
         SPC   2
R42312   LDQ   =XP42312        INTERRUPT RESPONSE FOR 1742-30/120 PRINTER
         JMP*  (P42312+2)
         EJT
*        1 7 4 2 - 3 0 / 1 2 0   L I N E   P R I N T E R
*
         SPC   1
P42312   ADC   $520A           00  SCHEDULER CALL
         ADC   I42312          01  INITIATOR ADDRESS
         ADC   C42312          02  CONTINUATOR ADDRESS
         ADC   E42312          03  TIMEOUT ERROR ADDRESS
         NUM   -1              04  DIAGNOSTIC CLOCK
         NUM   0               05  LOGICAL UNIT
         NUM   0               06  PARAMETER LOCATION
         NUM   $0201           07  CONVERTER, EQUIPMENT, STATION
         ADC   $2804+T4230     08  REQUEST STATUS
         ADC   $2804+T4212     08  REQUEST STATUS
         NUM   0               09  DRIVER STATUS
         NUM   0               10  CURRENT LOCATION
         NUM   0               11  LAST LOCATION PLUS ONE
         NUM   0               12  DEVICE STATUS
         ADC   L42312          13  DRIVER LENGTH IF MASS MEMORY
         ADC   S42312          14  NAME ASSOCIATED WITH SECTOR NUMBER
         NUM   0               15  BLANK DETECTION INDICATOR
         NUM   *               16  LINE COUNT
         NUM   0               17  TEMPORARY STORAGE FOR CONTROL FUNC.
         NUM   0               18  CHARACTER COUNT
```

Figure 1-44. 1742-30/120 Line Printer Physical Device Table, Section AB0

```
ADC  F42312          19  FORTRAN LOGICAL UNIT                        AB005900
NUM  0               20  NUMBER OF BLANKS TO BE SENT                 AB006000
NUM  60              21  MAXIMUM NUMBER OF LINES PER PAGE            AB006100
NUM  136             22  NUMBER OF CHARACTERS PER LINE               AB006200
ADC  042312          23  DIAGNOSTIC LU                               AB006300
SPC  2                                                               AB006400
ENT  TRAIN           LINK UNSELECTED 1742-120 TRAIN IMAGE            AB006500
EQU  TRAIN($7FFF)                                                    AB006600
EJT                                                                  AB006700
*                                                                    AB006800
*    F O R T R A N   L I N E   P R I N T E R                         AB006900
SPC  2                                                               AB007000
*    PHYSTB SHARED WITH 1742-30/120 LINE PRINTER                     AB007100
EJT                                                                  AB007200
```

Figure 1-44. 1742-30/120 Line Printer Physical Device Table, Section AB0 (Continued)

1.42 1740-501/1742-1 Line Printer Physical Device Table, Section ABP

Section ABP, Figure 1-45, is the set of data for a 1740-501 line printer or a 1742-1 line printer physical device table. The type code in bits 4-10 of word 8 is dependent on which of these printers is in the system. The standard interrupt response routine is located at R40421. The driver is core resident if M40421 is zero, mass resident if M40421 is one. The remainder of the lines in this section have the same meanings as the lines of Section AB0 as described in Article 1.41, except that no train image module is needed for either the 1740-501 or the 1742-1 printer.

```
*            1 7 4 0 - 5 0 1 / 1 7 4 2   L I N E   P R I N T E R
*
        SPC   1
        EQL   T501(19*$10)   TYPE CODE - 1740-501
        EQL   T742(34*$10)   TYPE CODE - 1742-1
        EQL   U40421(0)
        EQL   U40421(X40421-LCG1A)
        EQL   F40421(FTN740-LCG1A)
        SPC   1
        EQL   M40421(0)
        EQL   M40421(1)
*
        IFA   M40421,EQ,0    CORE RESIDENT DRIVER
        EXT   I40421
        EXT   C40421
        EXT   E40421
        EQL   L40421(0)
        EQL   S40421($7FFF)
        EIF
*
        IFA   M40421,EQ,1    MASS RESIDENT DRIVER
        EXT   MASDRV
        EXT   MASCON
        EXT   MASERR
I40421  JMP+  MASDRV         INITIATE DRIVER
C40421  JMP+  MASCON         INTERRUPT RESPONSE
E40421  JMP+  MASERR         TIMEOUT ERROR
        EXT   L40421
        EXT   S40421
        EIF
*
        SPC   2
R40421  LDQ   =XP40421       INTERRUPT RESPONSE FOR 501/1742 LINE PRINTER
        JMP*  (P40421+2)
        EJT
*            1 7 4 0 - 5 0 1 / 1 7 4 2   L I N E   P R I N T E R
*
        SPC   1
P40421  ADC   $520A          00  SCHEDULER CALL
        ADC   I40421         01  INITIATOR ADDRESS
        ADC   C40421         02  CONTINUATOR ADDRESS
        ADC   E40421         03  TIMEOUT ERROR ADDRESS
        NUM   -1             04  DIAGNOSTIC CLOCK
        NUM   0              05  LOGICAL UNIT
        NUM   0              06  PARAMETER LOCATION
        NUM   $0201          07  CONVERTER, EQUIPMENT, STATION
        ADC   $2804+T742     08  REQUEST STATUS
        ADC   $2804+T501     08  REQUEST STATUS
        NUM   0              09  DRIVER STATUS
        NUM   0              10  CURRENT LOCATION
        NUM   0              11  LAST LOCATION PLUS ONE
        NUM   0              12  DEVICE STATUS
        ADC   L40421         13  DRIVER LENGTH IF MASS MEMORY
        ADC   S40421         14  NAME ASSOCIATED WITH SECTOR NUMBER
        NUM   0              15  ODD CHARACTER AND ERROR CODE
```

Figure 1-45. 1740-501/1742-1 Line Printer Physical Device Table, Section ABP

```
      NUM  0          16  SPARE                                      ABP05600
      NUM  0          17  TEMPORARY                                  ABP05700
      NUM  0          18  LINE COUNT                                 ABP05800
      ADC  F4Q421     19  FORTRAN LINE PRINTER LOGICAL UNIT          ABP05900
      NUM  0          20  NUMBER OF BLANKS TO BE SENT                ABP06000
      NUM  60         21  MAXIMUM NUMBER OF LINES PER PAGE           ABP06100
      NUM  136        22  NUMBER OF CHARACTERS PER LINE              ABP06200
      ADC  U4Q421     23  DIAGNOSTIC LU                              ABP06300
      EJT                                                            ABP06400
*          F O R T R A N   L I N E   P R I N T E R                   ABP06500
      SPC  2                                                         ABP06600
*          PHYSTB SHARED WITH 1740-501/1742 LINE PRINTER             ABP06700
      EJT                                                            ABP06800
```

Figure 1-45. 1740-501/1742-1 Line Printer Physical Device Table, Section ABP (Continued)

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1.43 1729-3 Card Reader Physical Device Table, Section ABQ

The driver for the 1729-3 card reader is optionally core resident or mass resident, depending on the value of M17293. (Refer to Figure 1-46.) The standard interrupt response routine is located at R17293.

Word 16 contains the end-of-file code. The hexadecimal value, F, in bits 0-3 corresponds to a 6, 7, 8, and 9 punched in column one of a card.

Word 27 is an index into the LOG1A table if there is a corresponding diagnostic logical unit. Otherwise word 27 is zero.

Words 28-107 are used by the driver as a temporary storage area for input from the card reader.

```
*        1 7 2 9 - 3   C A R D   R E A D E R                                   ABQ00100
*                                                                              ABQ00200
        SPC   1                                                                ABQ00300
        EQU   U17293(0)                                                        ABQ00400
        EQU   U17293(X17293-LOG1A)                                             ABQ00500
        SPC   1                                                                ABQ00600
        EQU   M17293(0)                                                        ABQ00700
        EQU   M17293(1)                                                        ABQ00800
*                                                                              ABQ00900
        IFA   M17293,EQ,0      CORE RESIDENT DRIVER                            ABQ01000
        EXT   I17293                                                           ABQ01100
        EXT   C17293                                                           ABQ01200
        EXT   E17293                                                           ABQ01300
        EQU   L17293(0)                                                        ABQ01400
        EQU   S17293($7FFF)                                                    ABQ01500
        EIF                                                                    ABQ01600
*                                                                              ABQ01700
        IFA   M17293,EQ,1      MASS RESIDENT DRIVER                            ABQ01800
        EXT   MASDRV                                                           ABQ01900
        EXT   MASCON                                                           ABQ02000
        EXT   MASERR                                                           ABQ02100
I17293  JMP+  MASDRV           INITIATE DRIVER                                 ABQ02200
C17293  JMP+  MASCON           INTERRUPT RESPONSE                              ABQ02300
E17293  JMP+  MASERR           TIMEOUT ERROR                                   ABQ02400
        EXT   L17293                                                           ABQ02500
        EXT   S17293                                                           ABQ02600
        EIF                                                                    ABQ02700
*                                                                              ABQ02800
        SPC   2                                                                ABQ02900
R17293  LDQ   =XP17293         INTERRUPT RESPONSE FOR 1729-3 CARD READER       ABQ03000
        JMP*  (P17293+2)                                                       ABQ03100
        EJT                                                                    ABQ03200
*        1 7 2 9 - 3   C A R D   R E A D E R                                   ABQ03300
*                                                                              ABQ03400
        SPC   1                                                                ABQ03500
P17293  ADC   $520E            00   SCHEDULER CALL                             ABQ03600
        ADC   I17293           01   INITIATOR ADDRESS                          ABQ03700
        ADC   C17293           02   CONTINUATOR ADDRESS                        ABQ03800
        ADC   E17293           03   TIMEOUT ERROR ADDRESS                      ABQ03900
        NUM   -1               04   DIAGNOSTIC CLOCK                           ABQ04000
        NUM   0                05   LOGICAL UNIT                               ABQ04100
        NUM   0                06   PARAMETER LOCATION                         ABQ04200
        NUM   $05A1            07   CONVERTER, EQUIPMENT, STATION              ABQ04300
        NUM   $1A62            08   REQUEST STATUS                             ABQ04400
        NUM   0                09   DRIVER STATUS                              ABQ04500
        NUM   0                10   CURRENT LOCATION                           ABQ04600
        NUM   0                11   LAST LOCATION PLUS ONE                     ABQ04700
        NUM   0                12   DEVICE STATUS                              ABQ04800
        ADC   L17293           13   DRIVER LENGTH IF MASS MEMORY               ABQ04900
        ADC   S17293           14   NAME ASSOCIATED WITH SECTOR NUMBER         ABQ05000
        NUM   0                15   PACKING CYCLE ADDRESS STORAGE              ABQ05100
        NUM   $000F            16   E O F  FORMAT (6789)                       ABQ05200
        ADC   BFR293           17   FIRST LOCATION OF 80 WORD INPUT BUFFER     ABQ05300
        NUM   0                18   CURRENT CARD BUFFER LOCATION               ABQ05400
        NUM   0                19   SUBROUTINE RETURN ADDRESS                  ABQ05500
        NUM   0                20   CARD SEQUENCE NUMBER                       ABQ05600
```

Figure 1-46. 1729-3 Card Reader Physical Device Table, Section ABQ

```
      NUM   0                 21   RECORD LENGTH                              ABQ05700
      NUM   0                 22   CHECKSUM ACCUMULATOR                       ABQ05800
      NUM   0                 23   TEMPORARY STORAGE                          ABQ05900
      NUM   0                 24   OUTPUT OFFSET SWITCH                       ABQ06000
      NUM   0                 25   TEMPORARY STORAGE                          ABQ06100
      NUM   0                 26   HOLLERITH ERROR FLAG                       ABQ06200
      ADC   U17293            27   DIAGNOSTIC LOGICAL UNIT                    ABQ06300
                                                                              ABQ06400
      EZS   BFR293(80)        28   INPUT BUFFER                               ABQ06500
                             107   INPUT BUFFER                               ABQ06600
      EJT                                                                     ABQ06700
```

Figure 1-46. 1729-3 Card Reader Physical Device Table, Section ABQ
(Continued)

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1.44 1728/430 Card Reader/Punch Physical Device Table, Section ABR

Data for the 1728/430 Card Reader/Punch physical device table is contained in Section ABR, Figure 1-47. The driver is optionally core resident or mass resident depending on the value of M1728. The standard interrupt response routine is located at R1728. Word 16 contains the end-of-file code, F_{16}, in bits 0-3. This corresponds to a 6, 7, 8, and 9 punched in column one of a card. Bit 15 of word 16 is used to designate whether the mode change from read to punch and vice versa is to cause the message "Error 11" to be printed by the Alternate Device Handler. If Bit 15 is one, a mode change causes an Error 11 message. If bit 15 is zero, a mode change does not cause an error message to be printed.

Word 27 is an index into the LOG1A table if there is a corresponding diagnostic logical unit. Otherwise, word 27 is zero.

```
*        1 7 2 8 / 4 3 0   C A R D   R E A D E R / P U N C H
*
         SPC   1
         EQU   U1728(0)
         EQU   U1728(X1728-LOG1A)
         SPC   1
         EQU   M1728(0)
         EQU   M1728(1)
*
         IFA   M1728.EQ.0      CORE RESIDENT DRIVER
         EXT   I1728
         EXT   C1728
         EXT   E1728
         EQU   L1728(0)
         EQU   S1728($7FFF)
         EIF
*
         IFA   M1728.EQ.1      MASS RESIDENT DRIVER
         EXT   MASDRV
         EXT   MASCON
         EXT   MASERR
I1728    JMP+  MASDRV          INITIATE DRIVER
C1728    JMP+  MASCON          INTERRUPT RESPONSE
E1728    JMP+  MASERR          TIMEOUT ERROR
         EXT   L1728
         EXT   S1728
         EIF
*
         SPC   2
R1728    LDQ   =XP1728         INTERRUPT RESPONSE FOR 1728-430 READ/PUNCH
         JMP*  (F1728+2)
         EJT
*        1 7 2 8 / 4 3 0   C A R D   R E A D E R / P U N C H
*
         SPC   1
P1728    ADC   $520F           00  SCHEDULER CALL
         ADC   I1728           01  INITIATOR ADDRESS
         ADC   C1728           02  CONTINUATOR ADDRESS
         ADC   E1728           03  TIMEOUT ERROR ADDRESS
         NUM   -1              04  DIAGNOSTIC CLOCK
         NUM   0               05  LOGICAL UNIT
         NUM   0               06  PARAMETER LOCATION
         NUM   $05A1           07  CONVERTER, EQUIPMENT, STATION
         NUM   $18C6           08  REQUEST STATUS
         NUM   0               09  DRIVER STATUS
         NUM   0               10  CURRENT LOCATION
         NUM   0               11  LAST LOCATION PLUS ONE
         NUM   0               12  DEVICE STATUS
         ADC   L1728           13  DRIVER LENGTH IF MASS MEMORY
         ADC   S1728           14  NAME ASSOCIATED WITH SECTOR NUMBER
         NUM   0               15  PACKING CYCLE ADDRESS STORAGE
         NUM   $600F           16  READ/PUNCH SWITCH, EOF FORMAT (6789)
         ADC   BUF28           17  FIRST LOCATION OF 80 WORD I / O BUFFER
         NUM   0               18  CURRENT CARD BUFFER LOCATION
         NUM   0               19  SUBROUTINE RETURN ADDRESS
         NUM   0               20  CARD SEQUENCE NUMBER
         NUM   0               21  RECORD LENGTH
         NUM   0               22  CHECKSUM ACCUMULATOR
```

Figure 1-47. 1728/430 Card Reader/Punch Physical Device Table, Section ABR

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```
      NUM  0                   23  TEMPORARY STORAGE                                ABR05900
      NUM  0                   24  OUTPUT OFFSET SWITCH                             ABR06000
      NUM  0                   25  ERROR RETURN                                     ABR06100
      NUM  0                   26  HOLLERITH ERROR FLAG                             ABR06200
      ADC  U1728               27  DIAGNOSTIC LU                                    ABR06300
*                                                                                   ABR06400
      BZS  BUF28(80)           28  INPUT / OUTPUT BUFFER                            ABR06500
*                             107  INPUT / OUTPUT BUFFER                            ABR06600
      EJT                                                                           ABR06700
```

Figure 1-47. 1728/430 Card Reader/Punch Physical Device Table, Section ABR (Continued)

1.45 1729-2 Card Reader Physical Device Table, Section ABS

The driver for the 1729-2 card reader is optionally core resident or mass resident depending on the value of M17292. If core resident, words 1, 2, and 3 of the table are linked to driver entries. If mass resident, words 1, 2, and 3 of the table refer to jumps to the MMEXEC module. (Refer to Figure 1-48.) The standard interrupt response routine is located at R17292. Word 16 contains the end-of-file code, F_{16}, corresponding to a 6, 7, 8, and 9 punch in column one of a card. Word 27 contains an index into the LOG1A table if there is a corresponding diagnostic logical unit. Otherwise, word 27 is zero.

```
*           1 7 2 9 - 2   C A R D   R E A D E R
*
        SPC  1
        EQU  U17292(0)
        EQU  U17292(X17292-LOG1A)
        SPC  1
        EQU  M17292(0)
        EQU  M17292(1)
*
        IFA  M17292.EQ.0     CORE RESIDENT DRIVER
        EXT  I17292
        EXT  C17292
        EXT  E17292
        EQU  L17292(0)
        EQU  S17292($7FFF)
        EIF
*
        IFA  M17292.EQ.1     MASS RESIDENT DRIVER
        EXT  MASDRV
        EXT  MASCON
        EXT  MASERR
I17292  JMP+ MASDRV          INITIATE DRIVER
C17292  JMP+ MASCON          INTERRUPT RESPONSE
E17292  JMP+ MASERR          TIMEOUT ERROR
        EXT  L17292
        EXT  S17292
        EIF
*
        SPC  2
R17292  LDQ  =XP17292        INTERRUPT RESPONSE FOR 1729-2 CARD READER
        JMP* (P17292+2)
        EJT
*           1 7 2 9 - 2   C A R D   R E A D E R
*
        SPC  1
P17292  ADC  $520E           00  SCHEDULER CALL
        ADC  I17292          01  INITIATOR ADDRESS
        ADC  C17292          02  CONTINUATOR ADDRESS
        ADC  E17292          03  TIMEOUT ERROR ADDRESS
        NUM  -1              04  DIAGNOSTIC CLOCK
        NUM  0               05  LOGICAL UNIT
        NUM  0               06  PARAMETER LOCATION
        NUM  $05A1           07  CONVERTER, EQUIPMENT, STATION
        NUM  $19D2           08  REQUEST STATUS
        NUM  0               09  DRIVER STATUS
        NUM  0               10  CURRENT LOCATION
        NUM  0               11  LAST LOCATION PLUS ONE
        NUM  0               12  DEVICE STATUS
        ADC  L17292          13  DRIVER LENGTH IF MASS MEMORY
        ADC  S17292          14  NAME ASSOCIATED WITH SECTOR NUMBER
        NUM  0               15  PACKING CYCLE ADDRESS STORAGE
        NUM  $000F           16  E O F  FORMAT (6789)
        ADC  BFR292          17  FIRST LOCATION OF 80 WORD INPUT BUFFER
        NUM  0               18  CURRENT CARD BUFFER LOCATION
        NUM  0               19  SUBROUTINE RETURN ADDRESS
        NUM  0               20  CARD SEQUENCE NUMBER
        NUM  0               21  RECORD LENGTH
        NUM  0               22  CHECKSUM ACCUMULATOR
        NUM  0               23  TEMPORARY STORAGE
        NUM  0               24  OUTPUT OFFSET SWITCH
```

Figure 1-48. 1729-2 Card Reader Physical Device Table, Section ABS

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```
      NUM   0              25   TEMPORARY STORAGE                   ABS06100
      NUM   0              26   HOLLERITH ERROR FLAG                ABS06200
      ADC   U17292         27   DIAGNOSTIC LOGICAL UNIT             ABS06300
                                                                    ABS06400
      BZS   BFR292(80)     28   INPUT BUFFER                        ABS06500
                          107   INPUT BUFFER                        ABS06600
      EJT                                                           ABS06700
```

Figure 1-48. 1729-2 Card Reader Physical Device Table, Section ABS
(Continued)

1.46 1726-405 Card Reader Physical Device Table, Section ABT

The 1726-405 Card Reader driver is optionally core resident or mass resident depending on the value of M1726U. The standard interrupt response routine is located at R1726U. (Refer to Figure 1-49.)

Word 16 contains the hardware conversion indicator in bit 15. If bit 15 is one, the 1726 controller will perform conversion from Hollerith punched codes to ASCII. (EBCDIC to ASCII hardware conversion is not available.) If bit 15 is zero, software conversion will be used. Software conversion may be performed either to convert Hollerith punched codes to ASCII or to convert EBCDIC punched codes to ASCII. If bit 15 is zero, the particular software conversion table to use is indicated in the MSOS skeleton. (Refer to Chapter 2.)

If a corresponding diagnostic logical unit exists, word 26 will be an index into the LOG1A table of logical unit numbers. Otherwise, word 26 will be zero.

```
*               1 7 2 6 - 4 0 5   C A R D   R E A D E R
*
        SPC     1
        EQU     U1726U(0)
        EQU     U1726U(X1726U-LOG1A)
        SPC     1
        EQU     M1726U(0)
        EQU     M1726U(1)
*
        IFA     M1726U,EQ,0      CORE RESIDENT DRIVER
        EXT     I1726U
        EXT     C1726U
        EXT     E1726U
        EQU     L1726U(0)
        EQU     S1726U($7FFF)
        EIF
*
        IFA     M1726U,EQ,1      MASS RESIDENT DRIVER
        EXT     MASDRV
        EXT     MASCON
        EXT     MASERR
I1726U  JMP+    MASDRV           INITIATE DRIVER
C1726U  JMP+    MASCON           INTERRUPT RESPONSE
E1726U  JMP+    MASERR           TIMEOUT ERROR
        EXT     L1726U
        EXT     S1726U
        EIF
*
        SPC     2
R1726U  LDQ     =XP1726U         INTERUPT RESPONSE FOR 1726-405 CARD READER
        JMP*    (P1726U+2)
        EJT
*               1 7 2 6 - 4 0 5   C A R D   R E A D E R
*
        SPC     1
P1726U  ADC     $520A            00  SCHEDULER CALL
        ADC     I1726U           01  INITIATOR ADDRESS
        ADC     C1726U           02  CONTINUATOR ADDRESS
        ADC     E1726U           03  TIMEOUT ERROR ADDRESS
        NUM     -1               04  DIAGNOSTIC CLOCK
        NUM     0                05  LOGICAL UNIT
        NUM     0                06  PARAMETER LOCATION
        NUM     $0581            07  CONVERTER, EQUIPMENT, STATION
        NUM     $1972            08  REQUEST STATUS
        NUM     0                09  DRIVER STATUS
        NUM     0                10  CURRENT LOCATION
        NUM     0                11  LAST LOCATION PLUS ONE
        NUM     0                12  DEVICE STATUS
        ADC     L1726U           13  DRIVER LENGTH IF MASS MEMORY
        ADC     S1726U           14  NAME ASSOCIATED WITH SECTOR NUMBER
        NUM     0                15  PACKING CYCLE ADDRESS STORAGE
        NUM     0                16  S/W CONVERSION INDICATOR
        NUM     $8000            16  H/W CONVERSION INDICATOR
```

Figure 1-49. 1726-405 Card Reader Physical Device Table, Section ABT

```
      ADC   BF726L          17   FIRST ADDRESS OF 80 WORD INPUT BUFFER        ABT05400
      NUM   0               18   CURRENT CARD BUFFER LOCATION                 ABT05500
      NUM   0               19   SUBROUTINE RETURN ADDRESS                    ABT05600
      NUM   0               20   CARD SEQUENCE NUMBER                         ABT05700
      NUM   0               21   RECORD LENGTH                                ABT05800
      NUM   0               22   CHECKSUM ACCUMULATOR                         ABT05900
      NUM   0               23   TEMPORARY STORAGE                            ABT06000
      NUM   0               24   OUTPUT OFFSET SWITCH                         ABT06100
      NUM   0               25   SPARE                                        ABT06200
      ADC   U1726L          26   DIAGNOSTIC LU                                ABT06300
*                                                                             ABT06400
      BZS   BF726L(80)      27   INPUT BUFFER                                 ABT06500
*                          106   INPUT BUFFER                                 ABT06600
      EJT                                                                     ABT06700
```

Figure 1-49. 1726-405 Card Reader Physical Device Table, Section ABT (Continued)

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1.47 1726-405 Buffered Card Reader Physical Device Table, Section ABU

The 1726-405 buffered card reader driver is optionally core resident or mass resident depending on the value of M1726B. The standard interrupt response routine is located at R1726B. (Refer to Figure 1-50.) The converter code for the 1706 Buffered Data Channel is contained in word 7. Words 16 and 26 have the same definitions as in Section ABT, as described in Article 1.46.

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```
*               1 7 2 6 - 4 0 5   B U F F E R E D   C A R D   R E A D E R
*
        SPC     1
        EQU     U1726B(0)
        EQU     U1726B(X1726B-LOG1A)
        EQU     N7063()
        EQU     N1706C(N7063**100)
        SPC     1
        EQU     M1726B(0)
        EQU     M1726B(1)
*
        IFA     M1726B,EQ,0    CORE RESIDENT DRIVER
        EXT     I1726B
        EXT     C1726B
        EXT     E1726B
        EQU     L1726B(0)
        EQU     S1726B($7FFF)
        EIF
*
        IFA     M1726B,EQ,1    MASS RESIDENT DRIVER
        EXT     MASDRV
        EXT     MASCON
        EXT     MASERR
I1726B  JMP+    MASDRV         INITIATE DRIVER
C1726B  JMP+    MASCON         INTERRUPT RESPONSE
E1726B  JMP+    MASERR         TIMEOUT ERROR
        EXT     L1726B
        EXT     S1726B
        EIF
*
        SPC     2
R1726B  LDQ     =XP1726B       INTERRUPT RESPONSE FOR 1726-405 CARD READER
        JMP*    (P1726B+2)
        EJT
*               1 7 2 6 - 4 0 5   B U F F E R E D   C A R D   R E A D E R
*
        SPC     1
P1726B  ADC     $520A          00  SCHEDULER CALL
        ADC     I1726B         01  INITIATOR ADDRESS
        ADC     C1726B         02  CONTINUATOR ADDRESS
        ADC     E1726B         03  TIMEOUT ERROR ADDRESS
        NUM     -1             04  DIAGNOSTIC CLOCK
        NUM     0              05  LOGICAL UNIT
        NUM     0              06  PARAMETER LOCATION
        ADC     $0581+N1706C   07  CONVERTER, EQUIPMENT, STATION
        NUM     $1A92          08  REQUEST STATUS
```

Figure 1-50. 1726-405 Buffered Card Reader Physical Device Table, Section ABU

```
      NUM   0                09  DRIVER STATUS                                  ABU04700
      NUM   0                10  CURRENT LOCATION                               ABU04800
      NUM   0                11  LAST LOCATION PLUS ONE                         ABU04900
      NUM   0                12  DEVICE STATUS                                  ABU05000
      ADC   L1726B           13  DRIVER LENGTH IF MASS MEMORY                   ABU05100
      ADC   S1726B           14  NAME ASSOCIATED WITH SECTOR NUMBER             ABU05200
      NUM   0                15  PACKING CYCLE ADDRESS STORAGE                  ABU05300
      NUM   0                16  S/W CONVERSION INDICATOR                       ABU05400
      NUM   $8000            16  H/W CONVERSION INDICATOR                       ABU05500
      ADC   BF726B           17  FIRST ADDRESS OF 80 WORD INPUT BUFFER          ABU05600
      NUM   0                18  CURRENT CARD BUFFER LOCATION                   ABU05700
      NUM   0                19  SUBROUTINE RETURN ADDRESS                      ABU05800
      NUM   0                20  CARD SEQUENCE NUMBER                           ABU05900
      NUM   0                21  RECORD LENGTH                                  ABU06000
      NUM   0                22  CHECKSUM ACCUMULATOR                           ABU06100
      NUM   0                23  TEMPORARY STORAGE                              ABU06200
      NUM   0                24  OUTPUT OFFSET SWITCH                           ABU06300
      NUM   0                25  SPARE                                          ABU06400
      ADC   U1726B           26  DIAGNOSTIC LU                                  ABU06500
*                                                                               ABU06600
      BZS   BF726B(80)       27  INPUT BUFFER                                   ABU06700
*                           106  INPUT BUFFER                                   ABU06800
      EJT                                                                       ABU06900
```

Figure 1-50. 1726-405 Buffered Card Reader Physical Device Table, Section ABU (Continued)

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1.48 1728/430 Punch Software Buffered Physical Device Table, Section ABV

Section ABV, Figure 1-51, contains the macro instruction BUFFER and a list of parameters for the macro expansion. For an explanation of each parameter, refer to Article 1.27.

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```
*         1 7 2 8 - 4 3 0   P U N C H   S / W   B U F F E R E D          ABV00100
*                                                                       ABV00200
P1728S BUFFER $0000,$0000,$0000,00,$000,0097                            ABV00300
       EJT                                                              ABV00400
```

Figure 1-51. 1728-430 Punch Software Buffered Physical Device Table, Section ABV

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1.49 1777/1721 Paper Tape Reader Physical Device Table, Section ABW

This section defines the physical device table for either the 1777 Paper Tape Reader or the 1721 Paper Tape Reader. The type code in word 8 is dependent on which device is in the system. (Refer to Figure 1-52.) The driver is optionally core resident or mass resident depending on the value of M1777R. The interrupt is processed by the Line 1 Interrupt Handler.

Word 22 is an index into the LOG1A table if there is a no-parity paper tape reader logical unit in the system. If there is a no-parity paper tape reader logical unit, it uses the physical device table defined in this section and when it is used there is no parity check when data is read.

Word 23 is an index into the LOG1A table of logical unit numbers if there is a corresponding diagnostic logical unit. Otherwise word 23 is zero.

```
*         1 7 7 7 / 1 7 2 1   P A P E R   T A P E   R E A D E R
*
        SPC   1
        EQU   T1777R(35*$10) TYPE CODE - 1777 PAPER TAPE READER
        EQU   T1721(01*$10) TYPE CODE - 1721 PAPER TAPE READER
        EQU   SKPAR(PTRDNP-LOG1A)
        EQU   U1777R(0)
        EQU   U1777R(X1777R-LOG1A)
        SPC   1
        EQU   M1777R(0)
        EQU   M1777R(1)
*
        IFA   M1777R.EQ.0    CORE RESIDENT DRIVER
        EXT   I1777R
        EXT   C1777R
        EXT   E1777R
        EQU   L1777R(0)
        EQU   S1777R($7FFF)
        EIF
*
        IFA   M1777R.EQ.1    MASS RESIDENT DRIVER
        EXT   MASDRV
        EXT   MASCON
        EXT   MASERR
I1777R  JMP*  MASDRV         INITIATE DRIVER
C1777R  JMP*  MASCON         INTERRUPT RESPONSE
E1777R  JMP*  MASERR         TIMEOUT ERROR
        EXT   L1777R
        EXT   S1777R
        EIF
*
        EJT
*         1 7 7 7 / 1 7 2 1   P A P E R   T A P E   R E A D E R
*
        SPC   1
P1777R  ADC   $520E          00  SCHEDULER CALL
        ADC   I1777R         01  INITIATOR ADDRESS
        ADC   C1777R         02  CONTINUATOR ADDRESS
        ADC   E1777R         03  TIMEOUT ERROR ADDRESS
        NUM   -1             04  DIAGNOSTIC CLOCK
        NUM   0              05  LOGICAL UNIT
        NUM   0              06  PARAMETER LOCATION
        NUM   $00A1          07  CONVERTER, EQUIPMENT, STATION
        ADC   $2002+T1721    08  REQUEST STATUS
        ADC   $2002+T1777R   08  REQUEST STATUS
        NUM   0              09  DRIVER STATUS
        NUM   0              10  CURRENT LOCATION
        NUM   0              11  LAST LOCATION PLUS ONE
        NUM   0              12  DEVICE STATUS
        ADC   L1777R         13  DRIVER LENGTH IF MASS MEMORY
        ADC   S1777R         14  NAME ASSOCIATED WITH SECTOR NUMBER
        NUM   0              15  CHECKSUM AND ERROR CODE
        NUM   0              16  LENGTH
        NUM   0              17  RETURN ADDRESS
        NUM   0              18  TEMPORARY ADDRESS
        NUM   0              19  ERROR CODE
        NUM   0              20  TEMPORARY
        NUM   0              21  LOST DATA
        ADC   SKPAR          22  LU OF NON-PARITY PAPER TAPE READER
        ADC   U1777R         23  DIAGNOSTIC LOGICAL UNIT
        EJT
```

Figure 1-52. 1777/1721 Paper Tape Reader Physical Device Table, Section ABW

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```
*       1 7 7 7 / 1 7 2 1   P A P E R   T A P E   R E A D E R          ARW06200
     SPC  2                                                            ARW06300
*       NO PARITY CHECKS ON ASCII READS                                ARW06400
*                                                                      ARW06500
*       PHYSTR SHARED WITH 1777/1721 READER                            ARW06600
     EJT                                                               ARW06700
```

Figure 1-52. 1777/1721 Paper Tape Reader Physical Device Table, Section ABU {Continued}

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1.50 1777/1723 Paper Tape Punch Physical Device Table, Section ABX

Section ABX defines the physical device table for a 1777 paper tape punch or a 1723 paper tape punch. The type code in word 8 is dependent on which device is in the system. (Refer to Figure 1-53.) The driver is optionally core or mass resident depending on the value of M1777P. The interrupt is processed by the Line 1 Interrupt Handler. Word 22 contains an index into the LOG1A table if there is a corresponding diagnostic logical unit. Otherwise word 22 is zero.

```
*         1 7 7 7 / 1 7 2 3   P A P E R   T A P E   P U N C H
*
       SPC   1
       EQU   T1723(02*$10)  TYPE CODE - 1723 PAPER TAPE PUNCH
       EQU   T177P(37*$10)  TYPE CODE - 1777 PAPER TAPE PUNCH
       EQU   U1777P(0)
       EQU   U1777P(X1777P-LOG1A)
       SPC   1
       EQU   M1777P(0)
       EQU   M1777P(1)
*
       IFA   M1777P,EQ,0    CORE RESIDENT DRIVER
       EXT   I1777P
       EXT   C1777P
       EXT   E1777P
       EQU   L1777P(0)
       EQU   S1777P($7FFF)
       EIF
*
       IFA   M1777P,EQ,1    MASS RESIDENT DRIVER
       EXT   MASDRV
       EXT   MASCON
       EXT   MASERR
I1777P JMP*  MASDRV         INITIATE DRIVER
C1777P JMP*  MASCON         INTERRUPT RESPONSE
E1777P JMP*  MASERR         TIMEOUT ERROR
       EXT   L1777P
       EXT   S1777P
       EIF
*
       EJT
*         1 7 7 7 / 1 7 2 3   P A P E R   T A P E   P U N C H
*
       SPC   1
P1777P ADC   $520E          00  SCHEDULER CALL
       ADC   I1777P         01  INITIATOR ADDRESS
       ADC   C1777P         02  CONTINUATOR ADDRESS
       ADC   E1777P         03  TIMEOUT ERROR ADDRESS
       NUM   -1             04  DIAGNOSTIC CLOCK
       NUM   0              05  LOGICAL UNIT
       NUM   0              06  PARAMETER LOCATION
       NUM   $00C1          07  CONVERTER, EQUIPMENT, STATION
       ADC   $2004+T1723    08  REQUEST STATUS
       ADC   $2004+T177P    08  REQUEST STATUS
       NUM   0              09  DRIVER STATUS
       NUM   0              10  CURRENT LOCATION
       NUM   0              11  LAST LOCATION PLUS ONE
       NUM   0              12  DEVICE STATUS
       ADC   L1777P         13  DRIVER LENGTH IF MASS MEMORY
       ADC   S1777P         14  NAME ASSOCIATED WITH SECTOR NUMBER
       NUM   0              15  CHECKSUM AND ERROR CODE
       NUM   0              16  TEMPORARY
       NUM   0              17  RETURN ADDRESS
       NUM   0              18  TEMPORARY ADDRESS
       NUM   0              19  ERROR CODE
       NUM   0              20  TEMPORARY
       NUM   0              21  LOST DATA
       ADC   U1777P         22  DIAGNOSTIC LOGICAL UNIT
       EJT
```

Figure 1-53. 1777/1723 Paper Tape Punch Physical Device Table, Section ABX

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1.51 1777/1723 Paper Tape Punch Software Buffered Physical Device Table, Section ABY

Section ABY, Figure 1-54, consists of the macro instruction BUFFER and a list of parameters for the macro expansion. Refer to Article 1.27 for an explanation of the macro expansion.

```
*          1 7 7 7   T A P E   P U N C H   S / W   B U F F E R R E D   ABY00100
*                                                                        ABY00200
P777PS BUFFER $0000,$0000,$0000,00,$000,0097                             ABY00300
       EJT                                                               ABY00400
```

Figure 1-54. 1777/1723 Paper Tape Punch Software Buffered Physical Device Table, Section ABY

1.52 364-4 Communications Multiplexor Physical Device Table, Section ABZ

Up to 16 364-4 Communications Multiplexor units may be included in a system. Each unit has its own physical device table defined in Section ABZ, Figure 1-55. The interrupt response routine at R3644 is standard. In each table, the type code in word 8 specifies whether a 361-1 or a 361-4 communications adaptor is used.

Word 16 of each table contains the codes for the two characters which will precede every FWRITE request. In a standard system word 16 contains $0A0D_{16}$ corresponding to a line feed and carriage return. It is unlikely that the user would wish to use different characters to precede each FWRITE, but he may do so if he wishes. Word 17 contains any special input termination character codes. If TIMESHARE is in the system, these codes are $1B_{16}$ which represents the ESCAPE character and 21_{16} which represents an exclamation point (!). Input of either of these characters is a signal to TIMESHARE that the current operation is to be terminated. If TIMESHARE is not in the system, word 17 is zero in a released system. The user may store data in word 17 if he supplies his own input data handler. (Refer to the description of word 21 below.)

Word 20 contains the following parameters:

Bits	Meaning
15	Echoplex mode flag
4-14	Lapsed time allowed before timeout, specified in seconds.
0-3	Priority level of input handler

If bit 15 is set to one each terminal connected to the communications adapter is operated in echoplex mode, that is, the driver automatically outputs all input characters as they are received. If bit 15 is zero echoing will not be performed. The echoplex mode flag is set to one in a standard released system. Bits 4-15 of word 20 contain the amount of time which may elapse before a timeout error condition is indicated. Lapsed time before timeout is 300 seconds in a standard system. This may be changed if desired. If bits 4-14 of word 20 are all zero, the timeout error feature will not be used. If timeout error detection is desired, a lapsed time value of from 1 second to 2047 seconds may be specified. The priority level in bits 0-3 refers to the entry point address in word 21. Bits 0-3 contain the value 4 in a standard system without TIMESHARE. In a system including TIMESHARE bits 0-3 contain the value 8, since the TIMESHARE executive program must run at level 8.

Word 21 is the address of the entry to the program which will process input from the terminals connected to the communications adapter. In a system which includes TIMESHARE, this is the address of EXECRD, entry to the TIMESHARE executive program. In a system without TIMESHARE, the user may provide his own input handler, specifying the entry point in word 21 and the corresponding priority level in bits 0-3 of word 20. The actual handler may be mass resident, but a core location must still be specified in word 21. This may be the location of a program

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to schedule the mass resident input handler.

Word 65 of each table is the thread word. The thread words link all the communications adapters in the system so that the driver can examine the status of each adapter when an interrupt occurs, performing input and output as required.

```
*         3 6 4 - 4   C O M M .   M U X ,   U N I T   0                ABZ00100
*                                                                      ABZ00200
      SPC   1                                                          ABZ00300
      EXT   I3644,C3644,E3644                                          ABZ00400
      ENT   CABF00                                                     ABZ00500
      EQU   T3611(32*$10)  TYPE CODE - 361-1 COMM. ADAPTER             ABZ00600
      EQU   T3614(33*$10)  TYPE CODE - 361-4 COMM. ADAPTER             ABZ00700
      SPC   2                                                          ABZ00800
R3644 LDQ   =XPCOM00       INTERRUPT RESPONSE FOR 364-4 COMM. MUX.     ABZ00900
      JMP*  (PCOM00+2)                                                 ABZ01000
      SPC   2                                                          ABZ01100
PCOM00 ADC  $520C          00  SCHEDULER CALL                          ABZ01200
      ADC   I3644          01  INITIATOR ADDRESS                       ABZ01300
      ADC   C3644          02  CONTINUATOR ADDRESS                     ABZ01400
      ADC   E3644          03  TIMEOUT ERROR ADDRESS                   ABZ01500
      NUM   -1             04  DIAGNOSTIC CLOCK                        ABZ01600
      NUM   0              05  LOGICAL UNIT                            ABZ01700
      NUM   0              06  PARAMETER LOCATION                      ABZ01800
      NUM   0              07  CONVERTER, EQUIPMENT, STATION           ABZ01900
      ADC   $3004+T3614    08  REQUEST STATUS                          ABZ02000
      ADC   $3004+T3611    08  REQUEST STATUS                          ABZ02100
      NUM   0              09  DRIVER STATUS                           ABZ02200
      NUM   0              10  CURRENT LOCATION                        ABZ02300
      NUM   0              11  LAST LOCATION PLUS ONE                  ABZ02400
      NUM   0              12  DEVICE STATUS                           ABZ02500
      NUM   0              13  RESERVED                                ABZ02600
      NUM   $7FFF          14  RESERVED                                ABZ02700
      NUM   0              15  RESERVED FOR FNR AND CMR                ABZ02800
      NUM   $0A0D          16  CONTROL WORD TO PRECEED FWRITE          ABZ02900
      NUM   $0000          17  SPECIAL INPUT TERMINATION CHARACTERS    ABZ03000
      NUM   $1B21          17  SPECIAL INPUT TERMINATION CHARACTERS    ABZ03100
      NUM   0              18  CURRENT DATA CHARACTER                  ABZ03200
      NUM   0              19  FLAGWORD FOR DRIVER                     ABZ03300
      ADC   (60*16+04)     20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER  ABZ03400
      ADC   0              21  ENTRY POINT OF INPUT HANDLER            ABZ03500
      NUM   -1             22  INPUT DIAGNOSTIC CLOCK                  ABZ03600
      NUM   0              23  INDEX TO INPUT BUFFER                   ABZ03700
      BZS   CABF00(40)     24  INPUT BUFFER                            ABZ03800
*                          63  INPUT BUFFER                            ABZ03900
      NUM   0              64  WORD COUNT OF INPUT DATA                ABZ04000
      ADC   PCOM01         65  PHYSTB THREAD                           ABZ04100
      EJT                                                              ABZ04200
*         3 6 4 - 4   C O M M .   M U X ,   U N I T   1                ABZ04300
*                                                                      ABZ04400
      ENT   CABF01                                                     ABZ04500
      SPC   1                                                          ABZ04600
PCOM01 ADC  $520C          00  SCHEDULER CALL                          ABZ04700
      ADC   I3644          01  INITIATOR ADDRESS                       ABZ04800
      ADC   C3644          02  CONTINUATOR ADDRESS                     ABZ04900
      ADC   E3644          03  TIMEOUT ERROR ADDRESS                   ABZ05000
      NUM   -1             04  DIAGNOSTIC CLOCK                        ABZ05100
      NUM   0              05  LOGICAL UNIT                            ABZ05200
      NUM   0              06  PARAMETER LOCATION                      ABZ05300
      NUM   0              07  CONVERTER, EQUIPMENT, STATION           ABZ05400
      ADC   $3004+T3614    08  REQUEST STATUS                          ABZ05500
      ADC   $3004+T3611    08  REQUEST STATUS                          ABZ05600
      NUM   0              09  DRIVER STATUS                           ABZ05700
      NUM   0              10  CURRENT LOCATION                        ABZ05800
      NUM   0              11  LAST LOCATION PLUS ONE                  ABZ05900
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Section ABZ

```
        NUM   0               12   DEVICE STATUS
        NUM   0               13   RESERVED
        NUM   $7FFF           14   RESERVED
        NUM   0               15   RESERVED FOR FNR AND CMR
        NUM   $0A0D           16   CONTROL WORD TO PRECEED FWRITE
        NUM   $0000           17   SPECIAL INPUT TERMINATION CHARACTERS
        NUM   $1B21           17   SPECIAL INPUT TERMINATION CHARACTERS
        NUM   0               18   CURRENT DATA CHARACTER
        NUM   0               19   FLAGWORD FOR DRIVER
        ADC   (60*16+04)      20   INPUT TIMEOUT + LEVEL OF INPUT HANDLER
        ADC   0               21   ENTRY POINT OF INPUT HANDLER
        NUM   -1              22   INPUT DIAGNOSTIC CLOCK
        NUM   0               23   INDEX TO INPUT BUFFER
        BZS   CABF01(40)      24   INPUT BUFFER
*                             63   INPUT BUFFER
        NUM   0               64   WORD COUNT OF INPUT DATA
        ADC   PCOM02          65   PHYSTB THREAD
        EJT
*             3 6 4 - 4   C O M M .   M U X ,   U N I T   2
*
        ENT   CABF02
        SPC   1
PCOM02  ADC   $520C           00   SCHEDULER CALL
        ADC   I3644           01   INITIATOR ADDRESS
        ADC   C3644           02   CONTINUATOR ADDRESS
        ADC   E3644           03   TIMEOUT ERROR ADDRESS
        NUM   -1              04   DIAGNOSTIC CLOCK
        NUM   0               05   LOGICAL UNIT
        NUM   0               06   PARAMETER LOCATION
        NUM   0               07   CONVERTER, EQUIPMENT, STATION
        ADC   $3004+T3614     08   REQUEST STATUS
        ADC   $3004+T3611     08   REQUEST STATUS
        NUM   0               09   DRIVER STATUS
        NUM   0               10   CURRENT LOCATION
        NUM   0               11   LAST LOCATION PLUS ONE
        NUM   0               12   DEVICE STATUS
        NUM   0               13   RESERVED
        NUM   $7FFF           14   RESERVED
        NUM   0               15   RESERVED FOR FNR AND CMR
        NUM   $0A0D           16   CONTROL WORD TO PRECEED FWRITE
        NUM   $0000           17   SPECIAL INPUT TERMINATION CHARACTERS
        NUM   $1B21           17   SPECIAL INPUT TERMINATION CHARACTERS
        NUM   0               18   CURRENT DATA CHARACTER
        NUM   0               19   FLAGWORD FOR DRIVER
        ADC   (60*16+04)      20   INPUT TIMEOUT + LEVEL OF INPUT HANDLER
        ADC   0               21   ENTRY POINT OF INPUT HANDLER
        NUM   -1              22   INPUT DIAGNOSTIC CLOCK
        NUM   0               23   INDEX TO INPUT BUFFER
        BZS   CABF02(40)      24   INPUT BUFFER
*                             63   INPUT BUFFER
        NUM   0               64   WORD COUNT OF INPUT DATA
        ADC   PCOM03          65   PHYSTB THREAD
        EJT
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Section ABZ (Continued)

```
*              3 6 4 - 4   C O M M .   M U X ,   U N I T   3                       ABZ11300
*                                                                                  ABZ11400
         ENT   CABF03                                                              ABZ11500
         SPC   1                                                                   ABZ11600
PCOM03   ADC   $520C           00  SCHEDULER CALL                                  ABZ11700
         ADC   I3644           01  INITIATOR ADDRESS                               ABZ11800
         ADC   C3644           02  CONTINUATOR ADDRESS                             ABZ11900
         ADC   E3644           03  TIMEOUT ERROR ADDRESS                           ABZ12000
         NUM   -1              04  DIAGNOSTIC CLOCK                                ABZ12100
         NUM   0               05  LOGICAL UNIT                                    ABZ12200
         NUM   0               06  PARAMETER LOCATION                              ABZ12300
         NUM   0               07  CONVERTER, EQUIPMENT, STATION                   ABZ12400
         ADC   $3004+T3614     08  REQUEST STATUS                                  ABZ12500
         ADC   $3004+T3611     08  REQUEST STATUS                                  ABZ12600
         NUM   0               09  DRIVER STATUS                                   ABZ12700
         NUM   0               10  CURRENT LOCATION                                ABZ12800
         NUM   0               11  LAST LOCATION PLUS ONE                          ABZ12900
         NUM   0               12  DEVICE STATUS                                   ABZ13000
         NUM   0               13  RESERVED                                        ABZ13100
         NUM   $7FFF           14  RESERVED                                        ABZ13200
         NUM   0               15  RESERVED FOR ENR AND CMR                        ABZ13300
         NUM   $0A0D           16  CONTROL WORD TO PRECEED FWRITE                  ABZ13400
         NUM   $0000           17  SPECIAL INPUT TERMINATION CHARACTERS            ABZ13500
         NUM   $1B21           17  SPECIAL INPUT TERMINATION CHARACTERS            ABZ13600
         NUM   0               18  CURRENT DATA CHARACTER                          ABZ13700
         NUM   0               19  FLAGWORD FOR DRIVER                             ABZ13800
         ADC   (60*16+04)      20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER          ABZ13900
         ADC   0               21  ENTRY POINT OF INPUT HANDLER                    ABZ14000
         NUM   -1              22  INPUT DIAGNOSTIC CLOCK                          ABZ14100
         NUM   0               23  INDEX TO INPUT BUFFER                           ABZ14200
         BZS   CABF03(40)      24  INPUT BUFFER                                    ABZ14300
*                              63  INPUT BUFFER                                    ABZ14400
         NUM   0               64  WORD COUNT OF INPUT DATA                        ABZ14500
         ADC   PCOM04          65  PHYSTB THREAD                                   ABZ14600
         EJT                                                                       ABZ14700
*              3 6 4 - 4   C O M M .   M U X ,   U N I T   4                       ABZ14800
*                                                                                  ABZ14900
         ENT   CABF04                                                              ABZ15000
         SPC   1                                                                   ABZ15100
PCOM04   ADC   $520C           00  SCHEDULER CALL                                  ABZ15200
         ADC   I3644           01  INITIATOR ADDRESS                               ABZ15300
         ADC   C3644           02  CONTINUATOR ADDRESS                             ABZ15400
         ADC   E3644           03  TIMEOUT ERROR ADDRESS                           ABZ15500
         NUM   -1              04  DIAGNOSTIC CLOCK                                ABZ15600
         NUM   0               05  LOGICAL UNIT                                    ABZ15700
         NUM   0               06  PARAMETER LOCATION                              ABZ15800
         NUM   0               07  CONVERTER, EQUIPMENT, STATION                   ABZ15900
         ADC   $3004+T3614     08  REQUEST STATUS                                  ABZ16000
         ADC   $3004+T3611     08  REQUEST STATUS                                  ABZ16100
         NUM   0               09  DRIVER STATUS                                   ABZ16200
         NUM   0               10  CURRENT LOCATION                                ABZ16300
         NUM   0               11  LAST LOCATION PLUS ONE                          ABZ16400
         NUM   0               12  DEVICE STATUS                                   ABZ16500
         NUM   0               13  RESERVED                                        ABZ16600
         NUM   $7FFF           14  RESERVED                                        ABZ16700
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Section ABZ (Continued)

```
         NUM   0                  15   RESERVED FOR FNR AND CMR                     ABZ16800
         NUM   $0A0D              16   CONTROL WORD TO PRECEED FWRITE               ABZ16900
         NUM   $0000              17   SPECIAL INPUT TERMINATION CHARACTERS         ABZ17000
         NUM   $1B21              17   SPECIAL INPUT TERMINATION CHARACTERS         ABZ17100
         NUM   0                  18   CURRENT DATA CHARACTER                       ABZ17200
         NUM   0                  19   FLAGWORD FOR DRIVER                          ABZ17300
         ADC   (60*16+04)         20   INPUT TIMEOUT + LEVEL OF INPUT HANDLER       ABZ17400
         ADC   0                  21   ENTRY POINT OF INPUT HANDLER                 ABZ17500
         NUM   -1                 22   INPUT DIAGNOSTIC CLOCK                       ABZ17600
         NUM   0                  23   INDEX TO INPUT BUFFER                        ABZ17700
         BZS   CABF04(40)         24   INPUT BUFFER                                 ABZ17800
*                                 63   INPUT BUFFER                                 ABZ17900
         NUM   0                  64   WORD COUNT OF INPUT DATA                     ABZ18000
         ADC   PCOM05             65   PHYSTB THREAD                                ABZ18100
         EJT                                                                        ABZ18200
*              3 6 4 - 4   C O M M .   M U X ,   U N I T   5                        ABZ18300
*                                                                                   ABZ18400
         ENT   CABF05                                                               ABZ18500
         SPC   1                                                                    ABZ18600
PCOM05   ADC   $520C              00   SCHEDULER CALL                               ABZ18700
         ADC   T3644              01   INITIATOR ADDRESS                            ABZ18800
         ADC   C3644              02   CONTINUATOR ADDRESS                          ABZ18900
         ADC   E3644              03   TIMEOUT ERROR ADDRESS                        ABZ19000
         NUM   -1                 04   DIAGNOSTIC CLOCK                             ABZ19100
         NUM   0                  05   LOGICAL UNIT                                 ABZ19200
         NUM   0                  06   PARAMETER LOCATION                           ABZ19300
         NUM   0                  07   CONVERTER, EQUIPMENT, STATION                ABZ19400
         ADC   $3004+T3614        08   REQUEST STATUS                               ABZ19500
         ADC   $3004+T3611        08   REQUEST STATUS                               ABZ19600
         NUM   0                  09   DRIVER STATUS                                ABZ19700
         NUM   0                  10   CURRENT LOCATION                             ABZ19800
         NUM   0                  11   LAST LOCATION PLUS ONE                       ABZ19900
         NUM   0                  12   DEVICE STATUS                                ABZ20000
         NUM   0                  13   RESERVED                                     ABZ20100
         NUM   $7FFF              14   RESERVED                                     ABZ20200
         NUM   0                  15   RESERVED FOR FNR AND CMR                     ABZ20300
         NUM   $0A0D              16   CONTROL WORD TO PRECEED FWRITE               ABZ20400
         NUM   $0000              17   SPECIAL INPUT TERMINATION CHARACTERS         ABZ20500
         NUM   $1B21              17   SPECIAL INPUT TERMINATION CHARACTERS         ABZ20600
         NUM   0                  18   CURRENT DATA CHARACTER                       ABZ20700
         NUM   0                  19   FLAGWORD FOR DRIVER                          ABZ20800
         ADC   (60*16+04)         20   INPUT TIMEOUT + LEVEL OF INPUT HANDLER       ABZ20900
         ADC   0                  21   ENTRY POINT OF INPUT HANDLER                 ABZ21000
         NUM   -1                 22   INPUT DIAGNOSTIC CLOCK                       ABZ21100
         NUM   0                  23   INDEX TO INPUT BUFFER                        ABZ21200
         BZS   CABF05(40)         24   INPUT BUFFER                                 ABZ21300
*                                 63   INPUT BUFFER                                 ABZ21400
         NUM   0                  64   WORD COUNT OF INPUT DATA                     ABZ21500
         ADC   PCOM06             65   PHYSTB THREAD                                ABZ21600
         EJT                                                                        ABZ21700
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Section ABZ (Continued)

```
*             3 6 4 - 4   C O M M .   M U X ,   U N I T   6             ABZ21800
*                                                                       ABZ21900
        ENT   CABF06                                                    ABZ22000
        SPC   1                                                         ABZ22100
PCOM06  ADC   $520C             00   SCHEDULER CALL                     ABZ22200
        ADC   I3644             01   INITIATOR ADDRESS                  ABZ22300
        ADC   C3644             02   CONTINUATOR ADDRESS                ABZ22400
        ADC   E3644             03   TIMEOUT ERROR ADDRESS              ABZ22500
        NUM   -1                04   DIAGNOSTIC CLOCK                   ABZ22600
        NUM   0                 05   LOGICAL UNIT                       ABZ22700
        NUM   0                 06   PARAMETER LOCATION                 ABZ22800
        NUM   0                 07   CONVERTER, EQUIPMENT, STATION      ABZ22900
        ADC   $3004+T3614       08   REQUEST STATUS                     ABZ23000
        ADC   $3004+T3611       08   REQUEST STATUS                     ABZ23100
        NUM   0                 09   DRIVER STATUS                      ABZ23200
        NUM   0                 10   CURRENT LOCATION                   ABZ23300
        NUM   0                 11   LAST LOCATION PLUS ONE             ABZ23400
        NUM   0                 12   DEVICE STATUS                      ABZ23500
        NUM   0                 13   RESERVED                           ABZ23600
        NUM   $7FFF             14   RESERVED                           ABZ23700
        NUM   0                 15   RESERVED FOR FNR AND CMR           ABZ23800
        NUM   $0A0D             16   CONTROL WORD TO PRECEED FWRITE     ABZ23900
        NUM   $0000             17   SPECIAL INPUT TERMINATION CHARACTERS ABZ24000
        NUM   $1B21             17   SPECIAL INPUT TERMINATION CHARACTERS ABZ24100
        NUM   0                 18   CURRENT DATA CHARACTER             ABZ24200
        NUM   0                 19   FLAGWORD FOR DRIVER                ABZ24300
        ADC   (60*16+04)        20   INPUT TIMEOUT + LEVEL OF INPUT HANDLER ABZ24400
        ADC   0                 21   ENTRY POINT OF INPUT HANDLER       ABZ24500
        NUM   -1                22   INPUT DIAGNOSTIC CLOCK             ABZ24600
        NUM   0                 23   INDEX TO INPUT BUFFER              ABZ24700
        BZS   CABF06(40)        24   INPUT BUFFER                       ABZ24800
*                               63   INPUT BUFFER                       ABZ24900
        NUM   0                 64   WORD COUNT OF INPUT DATA           ABZ25000
        ADC   PCOM07            65   PHYSTB THREAD                      ABZ25100
        EJT                                                             ABZ25200
*             3 6 4 - 4   C O M M .   M U X ,   U N I T   7             ABZ25300
*                                                                       ABZ25400
        ENT   CABF07                                                    ABZ25500
        SPC   1                                                         ABZ25600
PCOM07  ADC   $520C             00   SCHEDULER CALL                     ABZ25700
        ADC   I3644             01   INITIATOR ADDRESS                  ABZ25800
        ADC   C3644             02   CONTINUATOR ADDRESS                ABZ25900
        ADC   E3644             03   TIMEOUT ERROR ADDRESS              ABZ26000
        NUM   -1                04   DIAGNOSTIC CLOCK                   ABZ26100
        NUM   0                 05   LOGICAL UNIT                       ABZ26200
        NUM   0                 06   PARAMETER LOCATION                 ABZ26300
        NUM   0                 07   CONVERTER, EQUIPMENT, STATION      ABZ26400
        ADC   $3004+T3614       08   REQUEST STATUS                     ABZ26500
        ADC   $3004+T3611       08   REQUEST STATUS                     ABZ26600
        NUM   0                 09   DRIVER STATUS                      ABZ26700
        NUM   0                 10   CURRENT LOCATION                   ABZ26800
        NUM   0                 11   LAST LOCATION PLUS ONE             ABZ26900
        NUM   0                 12   DEVICE STATUS                      ABZ27000
        NUM   0                 13   RESERVED                           ABZ27100
        NUM   $7FFF             14   RESERVED                           ABZ27200
        NUM   0                 15   RESERVED FOR FNR AND CMR           ABZ27300
        NUM   $0A0D             16   CONTROL WORD TO PRECEED FWRITE     ABZ27400
        NUM   $0000             17   SPECIAL INPUT TERMINATION CHARACTERS ABZ27500
        NUM   $1B21             17   SPECIAL INPUT TERMINATION CHARACTERS ABZ27600
        NUM   0                 18   CURRENT DATA CHARACTER             ABZ27700
        NUM   0                 19   FLAGWORD FOR DRIVER                ABZ27800
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Section ABZ (Continued)

```
         ADC  (60*16+04)       20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER     ABZ27900
         ADC  0                21  ENTRY POINT OF INPUT HANDLER               ABZ28000
         NUM  -1               22  INPUT DIAGNOSTIC CLOCK                     ABZ28100
         NUM  0                23  INDEX TO INPUT BUFFER                      ABZ28200
         BZS  CABF07(40)       24  INPUT BUFFER                               ABZ28300
*                              63  INPUT BUFFER                               ABZ28400
         NUM  0                64  WORD COUNT OF INPUT DATA                   ABZ28500
         ADC  PCOM08           65  PHYSTB THREAD                              ABZ28600
         EJT                                                                  ABZ28700
*             3 6 4 - 4   C O M M .   M U X ,   U N I T   8                   ABZ28800
*                                                                             ABZ28900
         ENT  CABF08                                                          ABZ29000
         SPC  1                                                               ABZ29100
PCOM08   ADC  $520C            00  SCHEDULER CALL                             ABZ29200
         ADC  I3644            01  INITIATOR ADDRESS                          ABZ29300
         ADC  C3644            02  CONTINUATOR ADDRESS                        ABZ29400
         ADC  E3644            03  TIMEOUT ERROR ADDRESS                      ABZ29500
         NUM  -1               04  DIAGNOSTIC CLOCK                           ABZ29600
         NUM  0                05  LOGICAL UNIT                               ABZ29700
         NUM  0                06  PARAMETER LOCATION                         ABZ29800
         NUM  0                07  CONVERTER, EQUIPMENT, STATION              ABZ29900
         ADC  $3004+T3614      08  REQUEST STATUS                             ABZ30000
         ADC  $3004+T3611      08  REQUEST STATUS                             ABZ30100
         NUM  0                09  DRIVER STATUS                              ABZ30200
         NUM  0                10  CURRENT LOCATION                           ABZ30300
         NUM  0                11  LAST LOCATION PLUS ONE                     ABZ30400
         NUM  0                12  DEVICE STATUS                              ABZ30500
         NUM  0                13  RESERVED                                   ABZ30600
         NUM  $7FFF            14  RESERVED                                   ABZ30700
         NUM  0                15  RESERVED FOR ENR AND CMR                   ABZ30800
         NUM  $0A0D            16  CONTROL WORD TO PRECEED FWRITE             ABZ30900
         NUM  $0000            17  SPECIAL INPUT TERMINATION CHARACTERS       ABZ31000
         NUM  $1B21            17  SPECIAL INPUT TERMINATION CHARACTERS       ABZ31100
         NUM  0                18  CURRENT DATA CHARACTER                     ABZ31200
         NUM  0                19  FLAGWORD FOR DRIVER                        ABZ31300
         ADC  (60*16+04)       20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER     ABZ31400
         ADC  0                21  ENTRY POINT OF INPUT HANDLER               ABZ31500
         NUM  -1               22  INPUT DIAGNOSTIC CLOCK                     ABZ31600
         NUM  0                23  INDEX TO INPUT BUFFER                      ABZ31700
         BZS  CABF08(40)       24  INPUT BUFFER                               ABZ31800
                               63  INPUT BUFFER                               ABZ31900
         NUM  0                64  WORD COUNT OF INPUT DATA                   ABZ32000
         ADC  PCOM09           65  PHYSTB THREAD                              ABZ32100
         EJT                                                                  ABZ32200
*             3 6 4 - 4   C O M M .   M U X ,   U N I T   9                   ABZ32300
*                                                                             ABZ32400
         ENT  CABF09                                                          ABZ32500
         SPC  1                                                               ABZ32600
PCOM09   ADC  $520C            00  SCHEDULER CALL                             ABZ32700
         ADC  I3644            01  INITIATOR ADDRESS                          ABZ32800
         ADC  C3644            02  CONTINUATOR ADDRESS                        ABZ32900
         ADC  E3644            03  TIMEOUT ERROR ADDRESS                      ABZ33000
         NUM  -1               04  DIAGNOSTIC CLOCK                           ABZ33100
         NUM  0                05  LOGICAL UNIT                               ABZ33200
         NUM  0                06  PARAMETER LOCATION                         ABZ33300
         NUM  0                07  CONVERTER, EQUIPMENT, STATION              ABZ33400
         ADC  $3004+T3614      08  REQUEST STATUS                             ABZ33500
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Section ABZ (Continued)

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```
         ADC    $3004+T3611     08   REQUEST STATUS                                 ABZ33600
         NUM    0               09   DRIVER STATUS                                  ABZ33700
         NUM    0               10   CURRENT LOCATION                               ABZ33800
         NUM    0               11   LAST LOCATION PLUS ONE                         ABZ33900
         NUM    0               12   DEVICE STATUS                                  ABZ34000
         NUM    0               13   RESERVED                                       ABZ34100
         NUM    $7FFF           14   RESERVED                                       ABZ34200
         NUM    0               15   RESERVED FOR ENR AND CMR                       ABZ34300
         NUM    $0A0D           16   CONTROL WORD TO PRECEED FWRITE                 ABZ34400
         NUM    $0000           17   SPECIAL INPUT TERMINATION CHARACTERS           ABZ34500
         NUM    $1821           17   SPECIAL INPUT TERMINATION CHARACTERS           ABZ34600
         NUM    0               18   CURRENT DATA CHARACTER                         ABZ34700
         NUM    0               19   FLAGWORD FOR DRIVER                            ABZ34800
         ADC    (60*16+04)      20   INPUT TIMEOUT + LEVEL OF INPUT HANDLER         ABZ34900
         ADC    0               21   ENTRY POINT OF INPUT HANDLER                   ABZ35000
         NUM    -1              22   INPUT DIAGNOSTIC CLOCK                         ABZ35100
         NUM    0               23   INDEX TO INPUT BUFFER                          ABZ35200
         BZS    CABF09(40)      24   INPUT BUFFER                                   ABZ35300
*                               63   INPUT BUFFER                                   ABZ35400
         NUM    0               64   WORD COUNT OF INPUT DATA                       ABZ35500
         ADC    PCOM10          65   PHYSTB THREAD                                  ABZ35600
         EJT                                                                        ABZ35700
*               3 6 4 - 4    C O M M .    M U X .    U N I T   1 0                  ABZ35800
*                                                                                   ABZ35900
         ENT    CABF10                                                              ABZ36000
         SPC    1                                                                   ABZ36100
PCOM10   ADC    $520C           00   SCHEDULER CALL                                 ABZ36200
         ADC    T3644           01   INITIATOR ADDRESS                              ABZ36300
         ADC    C3644           02   CONTINUATOR ADDRESS                            ABZ36400
         ADC    E3644           03   TIMEOUT ERROR ADDRESS                          ABZ36500
         NUM    -1              04   DIAGNOSTIC CLOCK                               ABZ36600
         NUM    0               05   LOGICAL UNIT                                   ABZ36700
         NUM    0               06   PARAMETER LOCATION                             ABZ36800
         NUM    0               07   CONVERTER, EQUIPMENT, STATION                  ABZ36900
         ADC    $3004+T3614     08   REQUEST STATUS                                 ABZ37000
         ADC    $3004+T3611     08   REQUEST STATUS                                 ABZ37100
         NUM    0               09   DRIVER STATUS                                  ABZ37200
         NUM    0               10   CURRENT LOCATION                               ABZ37300
         NUM    0               11   LAST LOCATION PLUS ONE                         ABZ37400
         NUM    0               12   DEVICE STATUS                                  ABZ37500
         NUM    0               13   RESERVED                                       ABZ37600
         NUM    $7FFF           14   RESERVED                                       ABZ37700
         NUM    0               15   RESERVED FOR ENR AND CMR                       ABZ37800
         NUM    $0A0D           16   CONTROL WORD TO PRECEED FWRITE                 ABZ37900
         NUM    $0000           17   SPECIAL INPUT TERMINATION CHARACTERS           ABZ38000
         NUM    $1821           17   SPECIAL INPUT TERMINATION CHARACTERS           ABZ38100
         NUM    0               18   CURRENT DATA CHARACTER                         ABZ38200
         NUM    0               19   FLAGWORD FOR DRIVER                            ABZ38300
         ADC    (60*16+04)      20   INPUT TIMEOUT + LEVEL OF INPUT HANDLER         ABZ38400
         ADC    0               21   ENTRY POINT OF INPUT HANDLER                   ABZ38500
         NUM    -1              22   INPUT DIAGNOSTIC CLOCK                         ABZ38600
         NUM    0               23   INDEX TO INPUT BUFFER                          ABZ38700
         BZS    CABF10(40)      24   INPUT BUFFER                                   ABZ38800
*                               63   INPUT BUFFER                                   ABZ38900
         NUM    0               64   WORD COUNT OF INPUT DATA                       ABZ39000
         ADC    PCOM11          65   PHYSTB THREAD                                  ABZ39100
         EJT                                                                        ABZ39200
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Section ABZ (Continued)

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```
*           3 6 4 - 4    C O M M .    M U X .    U N I T    1 1                  ABZ39300
*                                                                                ABZ39400
        ENT  CABF11                                                              ABZ39500
        SPC  1                                                                   ABZ39600
PCOM11  ADC  $520C             00  SCHEDULER CALL                                ABZ39700
        ADC  T3644             01  INITIATOR ADDRESS                             ABZ39800
        ADC  C3644             02  CONTINUATOR ADDRESS                           ABZ39900
        ADC  E3644             03  TIMEOUT ERROR ADDRESS                         ABZ40000
        NUM  -1                04  DIAGNOSTIC CLOCK                              ABZ40100
        NUM  0                 05  LOGICAL UNIT                                  ABZ40200
        NUM  0                 06  PARAMETER LOCATION                            ABZ40300
        NUM  0                 07  CONVERTER, EQUIPMENT, STATION                 ABZ40400
        ADC  $3004+T3614       08  REQUEST STATUS                                ABZ40500
        ADC  $3004+T3611       08  REQUEST STATUS                                ABZ40600
        NUM  0                 09  DRIVER STATUS                                 ABZ40700
        NUM  0                 10  CURRENT LOCATION                              ABZ40800
        NUM  0                 11  LAST LOCATION PLUS ONE                        ABZ40900
        NUM  0                 12  DEVICE STATUS                                 ABZ41000
        NUM  0                 13  RESERVED                                      ABZ41100
        NUM  $7FFF             14  RESERVED                                      ABZ41200
        NUM  0                 15  RESERVED FOR FNR AND CMR                      ABZ41300
        NUM  $0A0D             16  CONTROL WORD TO PRECEED FWRITE                ABZ41400
        NUM  $0000             17  SPECIAL INPUT TERMINATION CHARACTERS          ABZ41500
        NUM  $1B21             17  SPECIAL INPUT TERMINATION CHARACTERS          ABZ41600
        NUM  0                 18  CURRENT DATA CHARACTER                        ABZ41700
        NUM  0                 19  FLAGWORD FOR DRIVER                           ABZ41800
        ADC  (60*16+04)        20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER        ABZ41900
        ADC  0                 21  ENTRY POINT OF INPUT HANDLER                  ABZ42000
        NUM  -1                22  INPUT DIAGNOSTIC CLOCK                        ABZ42100
        NUM  0                 23  INDEX TO INPUT BUFFER                         ABZ42200
        BZS  CABF11(40)        24  INPUT BUFFER                                  ABZ42300
*                              63  INPUT BUFFER                                  ABZ42400
        NUM  0                 64  WORD COUNT OF INPUT DATA                      ABZ42500
        ADC  PCOM12            65  PHYSTB THREAD                                 ABZ42600
        EJT                                                                      ABZ42700
*           3 6 4 - 4    C O M M .    M U X .    U N I T    1 2                  ABZ42800
*                                                                                ABZ42900
        ENT  CABF12                                                              ABZ43000
        SPC  1                                                                   ABZ43100
PCOM12  ADC  $520C             00  SCHEDULER CALL                                ABZ43200
        ADC  T3644             01  INITIATOR ADDRESS                             ABZ43300
        ADC  C3644             02  CONTINUATOR ADDRESS                           ABZ43400
        ADC  E3644             03  TIMEOUT ERROR ADDRESS                         ABZ43500
        NUM  -1                04  DIAGNOSTIC CLOCK                              ABZ43600
        NUM  0                 05  LOGICAL UNIT                                  ABZ43700
        NUM  0                 06  PARAMETER LOCATION                            ABZ43800
        NUM  0                 07  CONVERTER, EQUIPMENT, STATION                 ABZ43900
        ADC  $3004+T3614       08  REQUEST STATUS                                ABZ44000
        ADC  $3004+T3611       08  REQUEST STATUS                                ABZ44100
        NUM  0                 09  DRIVER STATUS                                 ABZ44200
        NUM  0                 10  CURRENT LOCATION                              ABZ44300
        NUM  0                 11  LAST LOCATION PLUS ONE                        ABZ44400
        NUM  0                 12  DEVICE STATUS                                 ABZ44500
        NUM  0                 13  RESERVED                                      ABZ44600
        NUM  $7FFF             14  RESERVED                                      ABZ44700
        NUM  0                 15  RESERVED FOR FNR AND CMR                      ABZ44800
        NUM  $0A0D             16  CONTROL WORD TO PRECEED FWRITE                ABZ44900
        NUM  $0000             17  SPECIAL INPUT TERMINATION CHARACTERS          ABZ45000
        NUM  $1B21             17  SPECIAL INPUT TERMINATION CHARACTERS          ABZ45100
        NUM  0                 18  CURRENT DATA CHARACTER                        ABZ45200
```

ure 1-55. 364-4 Communications Multiplexor Physical Device Table, Section ABZ (Continued)

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```
         NUM    0                19  FLAGWORD FOR DRIVER                          ABZ45300
         ADC    (60*16+04)       20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER       ABZ45400
         ADC    0                21  ENTRY POINT OF INPUT HANDLER                 ABZ45500
         NUM    -1               22  INPUT DIAGNOSTIC CLOCK                       ABZ45600
         NUM    0                23  INDEX TO INPUT BUFFER                        ABZ45700
         BZS    CABF12(40)       24  INPUT BUFFER                                 ABZ45800
*                                63  INPUT BUFFER                                 ABZ45900
         NUM    0                64  WORD COUNT OF INPUT DATA                     ABZ46000
         ADC    PCOM13           65  PHYSTB THREAD                                ABZ46100
         EJT                                                                      ABZ46200
*               3 6 4 - 4   C O M M .   M U X ,   U N I T   1 3                   ABZ46300
*                                                                                 ABZ46400
         ENT    CABF13                                                            ABZ46500
         SPC    1                                                                 ABZ46600
PCOM13   ADC    $520C            00  SCHEDULER CALL                               ABZ46700
         ADC    I3644            01  INITIATOR ADDRESS                            ABZ46800
         ADC    C3644            02  CONTINUATOR ADDRESS                          ABZ46900
         ADC    E3644            03  TIMEOUT ERROR ADDRESS                        ABZ47000
         NUM    -1               04  DIAGNOSTIC CLOCK                             ABZ47100
         NUM    0                05  LOGICAL UNIT                                 ABZ47200
         NUM    0                06  PARAMETER LOCATION                           ABZ47300
         NUM    0                07  CONVERTER, EQUIPMENT, STATION                ABZ47400
         ADC    $3004+T3614      08  REQUEST STATUS                               ABZ47500
         ADC    $3004+T3611      08  REQUEST STATUS                               ABZ47600
         NUM    0                09  DRIVER STATUS                                ABZ47700
         NUM    0                10  CURRENT LOCATION                             ABZ47800
         NUM    0                11  LAST LOCATION PLUS ONE                       ABZ47900
         NUM    0                12  DEVICE STATUS                                ABZ48000
         NUM    0                13  RESERVED                                     ABZ48100
         NUM    $7FFF            14  RESERVED                                     ABZ48200
         NUM    0                15  RESERVED FOR ENP AND CMR                     ABZ48300
         NUM    $0A0D            16  CONTROL WORD TO PRECEED FWRITE               ABZ48400
         NUM    $0000            17  SPECIAL INPUT TERMINATION CHARACTERS         ABZ48500
         NUM    $1B21            17  SPECIAL INPUT TERMINATION CHARACTERS         ABZ48600
         NUM    0                18  CURRENT DATA CHARACTER                       ABZ48700
         NUM    0                19  FLAGWORD FOR DRIVER                          ABZ48800
         ADC    (60*16+04)       20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER       ABZ48900
         ADC    0                21  ENTRY POINT OF INPUT HANDLER                 ABZ49000
         NUM    -1               22  INPUT DIAGNOSTIC CLOCK                       ABZ49100
         NUM    0                23  INDEX TO INPUT BUFFER                        ABZ49200
         BZS    CABF13(40)       24  INPUT BUFFER                                 ABZ49300
*                                63  INPUT BUFFER                                 ABZ49400
         NUM    0                64  WORD COUNT OF INPUT DATA                     ABZ49500
         ADC    PCOM14           65  PHYSTB THREAD                                ABZ49600
         EJT                                                                      ABZ49700
*               3 6 4 - 4   C O M M .   M U X ,   U N I T   1 4                   ABZ49800
*                                                                                 ABZ49900
         ENT    CABF14                                                            ABZ50000
         SPC    1                                                                 ABZ50100
PCOM14   ADC    $520C            00  SCHEDULER CALL                               ABZ50200
         ADC    I3644            01  INITIATOR ADDRESS                            ABZ50300
         ADC    C3644            02  CONTINUATOR ADDRESS                          ABZ50400
         ADC    E3644            03  TIMEOUT ERROR ADDRESS                        ABZ50500
         NUM    -1               04  DIAGNOSTIC CLOCK                             ABZ50600
         NUM    0                05  LOGICAL UNIT                                 ABZ50700
         NUM    0                06  PARAMETER LOCATION                           ABZ50800
         NUM    0                07  CONVERTER, EQUIPMENT, STATION                ABZ50900
         ADC    $3004+T3614      08  REQUEST STATUS                               ABZ51000
         ADC    $3004+T3611      08  REQUEST STATUS                               ABZ51100
         NUM    0                09  DRIVER STATUS                                ABZ51200
         NUM    0                10  CURRENT LOCATION                             ABZ51300
         NUM    0                11  LAST LOCATION PLUS ONE                       ABZ51400
         NUM    0                12  DEVICE STATUS                                ABZ51500
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Sect. ABZ (Ct

```
       NUM  0              13  RESERVED                                  ABZ51600
       NUM  $7FFF          14  RESERVED                                  ABZ51700
       NUM  0              15  RESERVED FOR FNR AND CMR                  ABZ51800
       NUM  $0A0D          16  CONTROL WORD TO PRECEED FWRITE            ABZ51900
       NUM  $0000          17  SPECIAL INPUT TERMINATION CHARACTERS      ABZ52000
       NUM  $1B21          17  SPECIAL INPUT TERMINATION CHARACTERS      ABZ52100
       NUM  0              18  CURRENT DATA CHARACTER                    ABZ52200
       NUM  0              19  FLAGWORD FOR DRIVER                       ABZ52300
       ADC  (60*16+04)     20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER    ABZ52400
       ADC  0              21  ENTRY POINT OF INPUT HANDLER              ABZ52500
       NUM  -1             22  INPUT DIAGNOSTIC CLOCK                    ABZ52600
       NUM  0              23  INDEX TO INPUT BUFFER                     ABZ52700
       BZS  CABF14(40)     24  INPUT BUFFER                              ABZ52800
*                          63  INPUT BUFFER                              ABZ52900
       NUM  0              64  WORD COUNT OF INPUT DATA                  ABZ53000
       ADC  PCOM15         65  PHYSTB THREAD                             ABZ53100
       EJT                                                               ABZ53200
*           3 6 4 - 4   C O M M .   M U X ,   U N I T   1 5             ABZ53300
*                                                                        ABZ53400
       ENT  CABF15                                                       ABZ53500
       SPC  1                                                            ABZ53600
PCOM15 ADC  $520C          00  SCHEDULER CALL                            ABZ53700
       ADC  E3644          03  TIMEOUT ERROR ADDRESS                     ABZ53800
       ADC  I3644          01  INITIATOR ADDRESS                         ABZ53900
       ADC  C3644          02  CONTINUATOR ADDRESS                       ABZ54000
       NUM  -1             04  DIAGNOSTIC CLOCK                          ABZ54100
       NUM  0              05  LOGICAL UNIT                              ABZ54200
       NUM  0              06  PARAMETER LOCATION                        ABZ54300
       NUM  0              07  CONVERTER, EQUIPMENT, STATION             ABZ54400
       ADC  $3004+T3614    08  REQUEST STATUS                            ABZ54500
       ADC  $3004+T3611    08  REQUEST STATUS                            ABZ54600
       NUM  0              09  DRIVER STATUS                             ABZ54700
       NUM  0              10  CURRENT LOCATION                          ABZ54800
       NUM  0              11  LAST LOCATION PLUS ONE                    ABZ54900
       NUM  0              12  DEVICE STATUS                             ABZ55000
       NUM  0              13  RESERVED                                  ABZ55100
       NUM  $7FFF          14  RESERVED                                  ABZ55200
       NUM  0              15  RESERVED FOR FNR AND CMR                  ABZ55300
       NUM  $0A0D          16  CONTROL WORD TO PRECEED FWRITE            ABZ55400
       NUM  $0000          17  SPECIAL INPUT TERMINATION CHARACTERS      ABZ55500
       NUM  $1B21          17  SPECIAL INPUT TERMINATION CHARACTERS      ABZ55600
       NUM  0              18  CURRENT DATA CHARACTER                    ABZ55700
       NUM  0              19  FLAGWORD FOR DRIVER                       ABZ55800
       ADC  (60*16+04)     20  INPUT TIMEOUT + LEVEL OF INPUT HANDLER    ABZ55900
       ADC  0              21  ENTRY POINT OF INPUT HANDLER              ABZ56000
       NUM  -1             22  INPUT DIAGNOSTIC CLOCK                    ABZ56100
       NUM  0              23  INDEX TO INPUT BUFFER                     ABZ56200
       BZS  CABF15(40)     24  INPUT BUFFER                              ABZ56300
                           63  INPUT BUFFER                              ABZ56400
       NUM  0              64  WORD COUNT OF INPUT DATA                  ABZ56500
       NUM  $FFFF          65  PHYSTB THREAD                             ABZ56600
       EJT                                                               ABZ56700
```

Figure 1-55. 364-4 Communications Multiplexor Physical Device Table, Sect.

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1.53 364-4 Communications Multiplexor Software Buffered Physical Device Table, Section ACA

Section ACA, Figure 1-56, contains the buffer macro instruction together with a set of parameters to be expanded into a physical device table. The general form of the buffer macro expansion is described in Article 1.27.

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```
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   0          ACA00100
*                                                                         ACA00200
PCMS00 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA00300
       EJT                                                                ACA00400
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   1          ACA00500
*                                                                         ACA00600
PCMS01 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA00700
       EJT                                                                ACA00800
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   2          ACA00900
*                                                                         ACA01000
PCMS02 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA01100
       EJT                                                                ACA01200
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   3          ACA01300
*                                                                         ACA01400
PCMS03 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA01500
       EJT                                                                ACA01600
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   4          ACA01700
*                                                                         ACA01800
PCMS04 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA01900
       EJT                                                                ACA02000
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   5          ACA02100
*                                                                         ACA02200
PCMS05 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA02300
       EJT                                                                ACA02400
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   6          ACA02500
*                                                                         ACA02600
PCMS06 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA02700
       EJT                                                                ACA02800
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   7          ACA02900
*                                                                         ACA03000
PCMS07 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA03100
       EJT                                                                ACA03200
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   8          ACA03300
*                                                                         ACA03400
PCMS08 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA03500
       EJT                                                                ACA03600
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   9          ACA03700
*                                                                         ACA03800
PCMS09 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA03900
       EJT                                                                ACA04000
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   1 0        ACA04100
*                                                                         ACA04200
PCMS10 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA04300
       EJT                                                                ACA04400
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   1 1        ACA04500
*                                                                         ACA04600
PCMS11 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA04700
       EJT                                                                ACA04800
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   1 2        ACA04900
*                                                                         ACA05000
PCMS12 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA05100
       EJT                                                                ACA05200
*          3 6 4 - 4    S / W    B U F F E R E D ,    U N I T   1 3        ACA05300
*                                                                         ACA05400
PCMS13 BUFFER $0000,$0000,$0000,00,$000,0041                             ACA05500
       EJT                                                                ACA05600
```

Figure 1-56. 364-4 Communications Multiplexor Software Buffered Physical Device Table, Section ACA

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```
*          3 6 4 - 4   S / W   B U F F E R E D ,   U N I T   1 4        ACA05700
*                                                                      ACA05800
PCMS14 BUFFER $0000,$0000,$0000,00,$000,0041                           ACA05900
       EJT                                                             ACA06000
*          3 6 4 - 4   S / W   B U F F E R E D ,   U N I T   1 5        ACA06100
*                                                                      ACA06200
PCMS15 BUFFER $0000,$0000,$0000,00,$000,0041                           ACA06300
       EJT                                                             ACA06400
```

Figure 1-56. 364-4 Communications Multiplexor Software Buffered Physical Device Table, Section ACA (Continued)

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1.54 1747 Data Set Controller Physical Device Table, Section ACB

This section is shown in Figure 1-57. A standard interrupt response routine is located at R1747. Bits 7-10 of word 7 contain the converter code for the 1706 Buffered Data Channel, since the 1706 is required for this device. Words 18-29 contain a monitor request to print a hardware failure message. Section ACB does not contain any options.

```
*             1 7 4 7   D A T A   S E T   C O N T R O L L E R
*
         SPC   1
         EXT   I1747,C1747,E1747
         EQU   N7065()
         EQU   N17067(N7065*$100)
         SPC   2
R1747    LDQ   =XP1747         INTERRUPT RESPONSE FOR THE 1747
         JMP*  (P1747+2)
         SPC   2
P1747    ADC   $520A           00   SCHEDULER CALL
         ADC   I1747           01   INITIATOR ADDRESS
         ADC   C1747           02   CONTINUATOR ADDRESS
         ADC   E1747           03   TIMEOUT ERROR ADDRESS
         NUM   -1              04   DIAGNOSTIC CLOCK
         NUM   0               05   LOGICAL UNIT
         NUM   0               06   PARAMETER LOCATION
         ADC   $0501+N17067    07   CONVERTER, EQUIPMENT, STATION
         NUM   $02A1           08   REQUEST STATUS
         NUM   0               09   DRIVER STATUS
         NUM   0               10   CURRENT LOCATION
         NUM   0               11   LAST LOCATION PLUS ONE
         NUM   0               12   DEVICE STATUS
         NUM   0               13   RESERVED
         NUM   $7FFF           14   RESERVED
         NUM   0               15   RESERVED FOR FNR AND CMR
         NUM   0               16   TEMPORARY STORAGE
ISAVE    NUM   0               17   TEMPORARY STORAGE OF I
         RTJ-  (AMONI)         18   TELETYPE MONITOR REQUEST
         ADC   $4C88           19   FORMATTED WRITE
         ADC   TTYCMP          20   COMPLETION
         ADC   0               21   THREAD
         ADC   4               22   LOGICAL UNIT
         ADC   0               23   MESSAGE LENGTH
         ADC   0               24   MESSAGE ADDRESS
         JMP-  (ADISP)         25   EXIT
TTYCMP   LDA*  ISAVE           26   REQUEST COMPLETION
         STA-  I               27
         JMP*  0               28   RETURN
*                              29   RETURN
         EJT
```

Figure 1-57. 1747 Data Set Controller Physical Device Table, Section ACB

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1.55 1744/274 Digigraphics Console Physical Device Tables, Section ACC

The standard interrupt response routine for the 1744/274 Digigraphic Consoles is located at R17441. (Refer to Figure 1-58.) In a standard system there are two consoles, however the driver will support more consoles. If more than two consoles are to be used in a system the user must supply a physical device table for each additional console.

Word 7 of each table contains the converter code for the 1706 Buffered Data Channel. Word 17 is the thread word used to connect the physical device tables for all consoles in the system. Word 23 is the console number as shown in the table heading, i.e., the console number if the consoles are numbered starting at zero. If the consoles are numbered beginning with one, then word 23 is the console number minus one. There are no options in this section.

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```
*               1 7 4 4   D I G I G R A P H I C S   C O N S O L E   0              ACC00100
*                                                                                  ACC00200
        EXT     I1744,C1744,E1744                                                  ACC00300
        EQU     N7064()                                                            ACC00400
        EQU     N17064(N7064*$100)                                                 ACC00500
        SPC     2                                                                  ACC00600
R17441  LDQ     =XP17440            INTERRUPT RESPONSE FOR 1744 DIGIGRAPHICS       ACC00700
        JMP*    (P17440+2)                                                         ACC00800
        SPC     2                                                                  ACC00900
P17440  ADC     $520B               00  SCHEDULER CALL                             ACC01000
        ADC     I1744               01  INITIATOR ADDRESS                          ACC01100
        ADC     C1744               02  CONTINUATOR ADDRESS                        ACC01200
        ADC     E1744               03  TIMEOUT ERROR ADDRESS                      ACC01300
        NUM     -1                  04  DIAGNOSTIC CLOCK                           ACC01400
        NUM     0                   05  LOGICAL UNIT                               ACC01500
        NUM     0                   06  PARAMETER LOCATION                         ACC01600
        ADC     $0600+N17064        07  CONVERTER, EQUIPMENT, STATION              ACC01700
        NUM     $0286               08  REQUEST STATUS                             ACC01800
        NUM     0                   09  DRIVER STATUS                              ACC01900
        NUM     0                   10  CURRENT LOCATION                           ACC02000
        NUM     0                   11  LAST LOCATION PLUS ONE                     ACC02100
        NUM     0                   12  DEVICE STATUS                              ACC02200
        NUM     0                   13  RESERVED                                   ACC02300
        NUM     $7FFF               14  RESERVED                                   ACC02400
        NUM     0                   15  RESERVED FOR FNR AND CMR                   ACC02500
        ADC     0                   16                                             ACC02600
        ADC     P17441              17  PHYSTB THREAD                              ACC02700
        ADC     0                   18                                             ACC02800
        ADC     *                   19                                             ACC02900
        NUM     0                   20                                             ACC03000
        NUM     0                   21                                             ACC03100
        NUM     0                   22                                             ACC03200
        NUM     0                   23  CONSOLE NUMBER MINUS 1                     ACC03300
        EJT                                                                        ACC03400
*               1 7 4 4   D I G I G R A P H I C S   C O N S O L E   1              ACC03500
*                                                                                  ACC03600
        SPC     2                                                                  ACC03700
R17442  LDQ     =XP17441            INTERRUPT RESPONSE FOR 1744 DIGIGRAPHICS       ACC03800
        JMP*    (P17441+2)                                                         ACC03900
        SPC     2                                                                  ACC04000
P17441  ADC     $520B               00  SCHEDULER CALL                             ACC04100
        ADC     I1744               01  INITIATOR ADDRESS                          ACC04200
        ADC     C1744               02  CONTINUATOR ADDRESS                        ACC04300
        ADC     E1744               03  TIMEOUT ERROR ADDRESS                      ACC04400
        NUM     -1                  04  DIAGNOSTIC CLOCK                           ACC04500
        NUM     0                   05  LOGICAL UNIT                               ACC04600
        NUM     0                   06  PARAMETER LOCATION                         ACC04700
        ADC     $0680+N17064        07  CONVERTER, EQUIPMENT, STATION              ACC04800
        NUM     $0286               08  REQUEST STATUS                             ACC04900
        NUM     0                   09  DRIVER STATUS                              ACC05000
        NUM     0                   10  CURRENT LOCATION                           ACC05100
        NUM     0                   11  LAST LOCATION PLUS ONE                     ACC05200
        NUM     0                   12  DEVICE STATUS                              ACC05300
        NUM     0                   13  RESERVED                                   ACC05400
        NUM     $7FFF               14  RESERVED                                   ACC05500
        NUM     0                   15  RESERVED FOR FNR AND CMR                   ACC05600
        ADC     0                   16                                             ACC05700
        ADC     P17440              17  PHYSTB THREAD                              ACC05800
        ADC     0                   18                                             ACC05900
```

Figure 1-58. 1744/274 Digigraphics Consoles Physical Device Tables Section ACC

```
ADC   0          19                                   ACC06000
NUM   0          20                                   ACC06100
NUM   0          21                                   ACC06200
NUM   0          22                                   ACC06300
NUM   1          23  CONSOLE NUMBER MINUS 1           ACC06400
EJT                                                   ACC06500
```

Figure 1-58. 1744/274 Digigraphics Consoles Physical Device Tables Section ACC (Continued)

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1.56 1525-3/1501-10/1501-11 High Speed Analog Input Multiplexor Controller Physical Device Table, Section ACD

This section defines a physical device table used without interrupts. Thus, words 2 and 3 of the table are not used. (Refer to Figure 1-59.) No options are available for this section.

```
*         H I G H - S P E E D   A / D   M U L T I P L E X O R                  ACD00100
*                                                                              ACD00200
          SPC  1                                                               ACD00300
          EXT  I1501                                                           ACD00400
          SPC  1                                                               ACD00500
P1501     ADC  $5209        00  SCHEDULER CALL                                 ACD00600
          ADC  I1501        01  INITIATOR ADDRESS                              ACD00700
          ADC  0            02  CONTINUATOR ADDRESS   - NOT USED               ACD00800
          ADC  0            03  TIMEOUT ERROR ADDRESS - NOT USED               ACD00900
          NUM  -1           04  DIAGNOSTIC CLOCK                               ACD01000
          NUM  0            05  LOGICAL UNIT                                   ACD01100
          NUM  0            06  PARAMETER LOCATION                             ACD01200
          NUM  0            07  CONVERTER, EQUIPMENT, STATION - NONE           ACD01300
          NUM  $02D1        08  REQUEST STATUS                                 ACD01400
          NUM  0            09  DRIVER STATUS                                  ACD01500
          NUM  0            10  CURRENT LOCATION                               ACD01600
          NUM  0            11  LAST LOCATION PLUS ONE                         ACD01700
          NUM  0            12  DEVICE STATUS                                  ACD01800
          NUM  0            13  RESERVED                                       ACD01900
          NUM  $7FFF        14  RESERVED                                       ACD02000
          NUM  0            15  RESERVED FOR FNR AND CMR                       ACD02100
          EJT                                                                  ACD02200
```

Figure 1-59. 1501-10 High Speed Analog Input Multiplexor Controller Physical Device Table, Section ACD

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1.57 1525-3/1536-2/1502-80 Relay Multiplexor Controller Physical Device Table, Section ACE

The interrupt response routine at R1536, Figure 1-60, is standard. {This section to be completed pending driver design by Chuck Wollaston.}

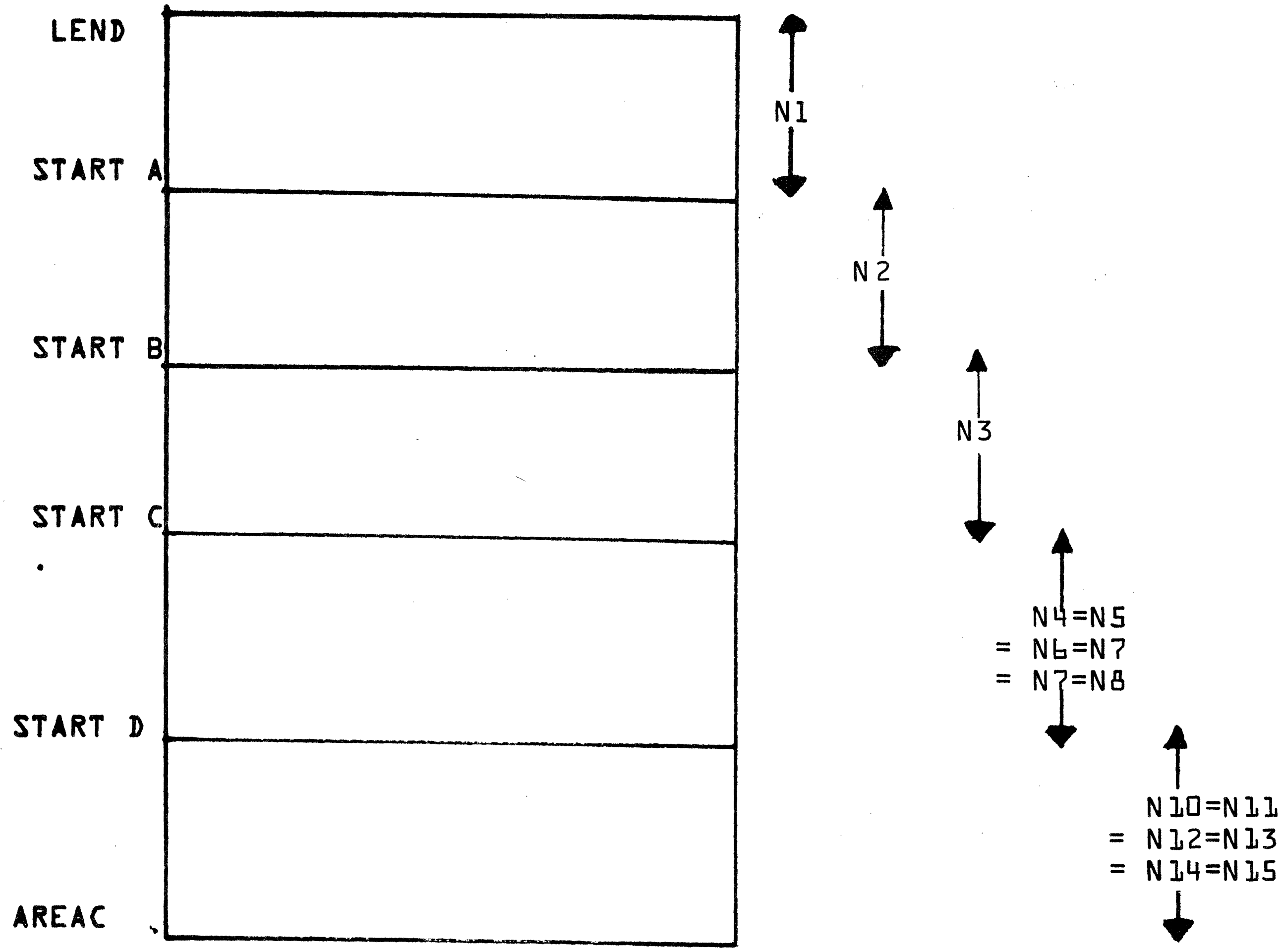
```
*               1 5 3 6   R E L A Y   M U L T I P L E X O R
*
        SPC     1
        EXT     I1536,C1536,E1536
        ENT     ARSAIV
        EQU     ARSAIV($0F44) RIGHT JUSTIFY DATA SHIFT (11-BIT ADC)
        SPC     2
R1536   LDG     =XP1536             INTERRUPT RESPONSE FOR 1536 RELAY MUX
        JMP*    (P1536+2)
        SPC     2
P1536   NUM     $5209               00  SCHEDULER CALL
        ADC     I1536               01  INITIATOR ADDRESS
        ADC     C1536               02  CONTINUATOR ADDRESS
        ADC     E1536               03  TIMEOUT ERROR ADDRESS
        NUM     -1                  04  DIAGNOSTIC CLOCK
        NUM     0                   05  LOGICAL UNIT
        NUM     0                   06  PARAMETER LOCATION
        ADC     EQ5362              07  CONVERTER, EQUIPMENT, STATION
        NUM     $02C1               08  REQUEST STATUS
        NUM     0                   09  DRIVER STATUS
        NUM     0                   10  CURRENT LOCATION
        NUM     0                   11  LAST LOCATION PLUS ONE
        NUM     0                   12  DEVICE STATUS
        NUM     0                   13  RESERVED
        NUM     $7FFF               14  RESERVED
        NUM     0                   15  RESERVED FOR FNR AND CMR
        NUM     0                   16  STATUS OF ADC
        ADC     EQ5253              17  CONVERTER, EQUIPMENT, STATION (A D C)
        NUM     -1                  18  CURRENT INPUT ADDRESS
        NUM     0                   19  CONVERT TO MV. FLAG
        NUM     0                   20  ERROR FLAG
        NUM     10240               21  GAIN   1     = X1
        NUM     10240               22  GAIN   2     = X10
        NUM     10240               23  GAIN   3     = X100
        NUM     10240               24  GAIN   4     = X1000
        NUM     0                   25  GAIN   5       NOT USED
        NUM     0                   26  GAIN   6       NOT USED
        NUM     0                   27  GAIN   7       NOT USED
        NUM     0                   28  GAIN   8       NOT USED
        NUM     0                   29  OFFSET 1
        NUM     0                   30  OFFSET 2
        NUM     0                   31  OFFSET 3
        NUM     0                   32  OFFSET 4
        NUM     0                   33  OFFSET 5       NOT USED
        NUM     0                   34  OFFSET 6       NOT USED
        NUM     0                   35  OFFSET 7       NOT USED
        NUM     0                   36  OFFSET 8       NOT USED
        EJT
```

Figure 1-60. 1536-2 Relay Multiplexor Controller Physical Device Table, Section ACE

1.58 Core Allocation Data, Section ACF

Section ACF, Figure 1-61, contains the parameters which define the areas within allocatable core. The location CALTHD is used dynamically by the operating system to contain the current number of words available in allocatable core.

Beginning at location LVLSTR is a table of addresses. Each address is the starting location of the allocatable core area available for a particular priority level. In a SYSDAT listing, the LVLSTR table contains only dummy entries. A core dump of the LVLSTR table from an installed system will show the actual starting addresses of the areas within allocatable core. These starting addresses are inserted by the restart portion of the SPACE program. The starting addresses are dependent on the area lengths. Each area ends at the end of allocatable core. The lengths are given by the parameters N1, N2, ... , N15. Length of the area available to priority level 1 is the value N1, length of the area available to level 2 is N2, etc. In a standard system N1, N2, N3 and N4 are dependent on MSOS requirements, and N5 ... N15 are dependent on information supplied by the user in the 1700 MSOS Ordering Form. The following diagram illustrates a typical layout of allocatable core in a standard released system.



The preceding diagram corresponds to the following table of addresses beginning at location LVLSTR:

Location	Address	Definition
LVLSTR	AREAC	START OF ALLOCATABLE CORE FOR LEVEL 0
	STARTA	START OF ALLOCATABLE CORE FOR LEVEL 1
	STARTB	START OF ALLOCATABLE CORE FOR LEVEL 2
	STARTC	START OF ALLOCATABLE CORE FOR LEVEL 3
	STARTD	START OF ALLOCATABLE CORE FOR LEVEL 4
	STARTD	START OF ALLOCATABLE CORE FOR LEVEL 5
	STARTD	START OF ALLOCATABLE CORE FOR LEVEL 6
	STARTD	START OF ALLOCATABLE CORE FOR LEVEL 7

Location	Address	Definition
	STARTD	START OF ALLOCATABLE CORE FOR LEVEL 8
	LEND	START OF ALLOCATABLE CORE FOR LEVEL 9
	AREAC	START OF ALLOCATABLE CORE FOR LEVEL 10
	AREAC	START OF ALLOCATABLE CORE FOR LEVEL 11
	AREAC	START OF ALLOCATABLE CORE FOR LEVEL 12
	AREAC	START OF ALLOCATABLE CORE FOR LEVEL 13
	AREAC	START OF ALLOCATABLE CORE FOR LEVEL 14
	AREAC	START OF ALLOCATABLE CORE FOR LEVEL 15

In the above example a program with core request priority 9 could not run within the allocatable area. If would require a core swap to run.

The user may change the starting locations of the areas within allocatable core, thus changing the lengths of the areas. He must observe the following restrictions when revising the lengths and starting addresses:

1. The start of allocatable core for level 0 must be the first location of allocatable core. This is true because level 0 is used in initializing the system and at that time the entire allocatable area must be available. The system library programs LIBEDT and the Job Processor are used during initialization before their core request priorities have been set to non-zero values.

2. The end of allocatable core, LEND, must not be changed unless the system is rebuilt.

3. If no space is allowed within allocatable core for a given priority level, then this level must exceed 2 so that a program at that level can force a core swap.

4. The area available to level 1 must be large enough to accommodate the following Job Processor modules:

JOBENT

T11

T7

T5

T3

At the time of system installation the number of words available to level 1 is set by executing the following system initializer control statement after loading these modules:

*S,N1,P

(The above modules have core request priority 1 in the system directory.)

5. The area available to level 2 must be large enough to accommodate the following Job Processor modules:

JOBPRO

ONE

TWO

THREE

The value of N2 is set during system installation by executing a *S system initializer control statement. After loading the modules JOBPRO, ONE, TWO and THREE, the control statement

*S,N2,P

is executed to set the value of N2. (The above modules have core request priority 2 in the system directory.)

6. The value of N3 is determined by the overlay size of the Protect Processor, since the Protect Processor has core request priority 3 in the System Directory.

7. The value of N4 must be large enough so that the largest of the following programs can run in the area available at level 4:

a) Any System Library Programs which have a core request priority level of four. In a typical system this includes

ODEBUG

System Checkout Package

MIPRO

File Manager

TDFUNC

Engineering File Modules

SCMM

Verification Programs

b) Any user programs which are to use this area.

If the File Manager is to be used by the background, N4 must be large enough so that even if the Job Processor and the Protect Processor occupy all of the areas available to levels 1-3, there will be enough area left for the File Manager to run. If the unbuffered protect processor, UPROTP, is in the system and a File Manager request is made from the background, a core swap cannot be made since background input/output would be in progress. Even if the buffered protect processor, BPROTP, is in the system only a maximum of 96 words could be swapped. The minimum allocatable core area needed by the File Manager

is $P + I \cdot 96 + 118$

where P = the size of the largest File Manager request processor (store sequential, store direct, etc.)

I = 0, if there are no indexed files in the system

= 1, if there are indexed files in the system and the expected number of key values declared when a file is defined is less than 8465, for all files in the system.

= 2, if there is at least one indexed file in the system for which the expected number of key values is declared at the time of file definition to be greater than or equal to 8465.

(The constant value 118 is the sum of 96 words for the file information segment (FIS) directory, 16 words for one file information segment (FIS) and 6 words for the header appended to a FIS when a FIS is in core. The value I·96 is the size of the largest key information segment (KIS) directory for any file in the system.) Thus, for background File Manager requests to be possible we must have

$$N4 \geq P + I \cdot 96 + 118$$

Note that this is a minimum. If more core is available in area 4, the File Manager may be able to have more than one processor as well as more than one KIS directory and/or FIS in core at once, thus increasing throughput. If the value of N4 is small, it may be wise to adjust the File Manager timeout parameter so that core areas allocated for the File Manager are released soon after they have been used. Refer to Article 1.79, File Manager Data. In a standard released system N4 is made as large as possible. In a system which allows File Manager requests by background programs, a

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released system allows at least 1500 words as the value of N4.

After modifying this section of SYSDAT, the system can be rebuilt or the references to the lengths and starting addresses can be changed in the restart portion of the SPACE program and the system can be autoloaded.

```
*            R E S I D E N T   C O R E   D A T A                              ACF00100
*                                                                             ACF00200
         ENT  LSTLOC                                                          ACF00300
         EXT  BGNMON                                                          ACF00400
         SPC  1                                                               ACF00500
LSTLOC   ADC  BGNMON           BEGINNING LOCATION OF CORE RESIDENT SYSTEM     ACF00600
         SPC  2                                                               ACF00700
*            C O R E   A L L O C A T I O N   D A T A                          ACF00800
*                                                                             ACF00900
         ENT  CALTHD           CORE ALLOCATOR THREAD                          ACF01000
         ENT  LVLSTR           LEVEL START ALLOCATION TABLE                   ACF01100
         EXT  AREAC            START OF ALLOCATABLE AREA                      ACF01200
         EXT  LEND             END OF ALLOCATABLE AREA                        ACF01300
*                                                                             ACF01400
CALTHD   ADC  C                TOTAL AVAILABLE ALLOCATABLE CORE               ACF01500
         ADC  AREAC            START OF ALLOCATABLE AREA                      ACF01600
*                                                                             ACF01700
LVLSTR   ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  0         ACF01800
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  1         ACF01900
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  2         ACF02000
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  3         ACF02100
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  4         ACF02200
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  5         ACF02300
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  6         ACF02400
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  7         ACF02500
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  8         ACF02600
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL  9         ACF02700
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL 10         ACF02800
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL 11         ACF02900
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL 12         ACF03000
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL 13         ACF03100
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL 14         ACF03200
         ADC  AREAC            START OF ALLOCATABLE CORE FOR LEVEL 15         ACF03300
         ADC  LEND             END OF ALLOCATABLE CORE                        ACF03400
*                                                                             ACF03500
         ENT  N5,N6,N7,N8,N9,N10,N11,N12,N13,N14,N15                          ACF03600
         SPC  1                                                               ACF03700
*        NOTE -  THE SIZE OF AREAS 1, 2, 3, AND 4 ARE SPECIFIED               ACF03800
*                DURING SYSTEM INITIALIZATION                                 ACF03900
*                                                                             ACF04000
N5       EQU     N5()          NUMBER OF CORE LOCATIONS FOR AREA 5            ACF04100
N6       EQU     N6()          NUMBER OF CORE LOCATIONS FOR AREA 6            ACF04200
N7       EQU     N7()          NUMBER OF CORE LOCATIONS FOR AREA 7            ACF04300
N8       EQU     N8()          NUMBER OF CORE LOCATIONS FOR AREA 8            ACF04400
N9       EQU     N9()          NUMBER OF CORE LOCATIONS FOR AREA 9            ACF04500
N10      EQU     N10()         NUMBER OF CORE LOCATIONS FOR AREA 10           ACF04600
N11      EQU     N11()         NUMBER OF CORE LOCATIONS FOR AREA 11           ACF04700
N12      EQU     N12()         NUMBER OF CORE LOCATIONS FOR AREA 12           ACF04800
N13      EQU     N13()         NUMBER OF CORE LOCATIONS FOR AREA 13           ACF04900
N14      EQU     N14()         NUMBER OF CORE LOCATIONS FOR AREA 14           ACF05000
N15      EQU     N15()         NUMBER OF CORE LOCATIONS FOR AREA 15           ACF05100
         EJT                                                                  ACF05200
```

Figure 1-61. Core Allocation Data, Section ACF

1.59 Partitioned Core Data, Section ACG

Section ACG, Figure 1-62, contains the parameters defining partitioned core. The first part of this section is a set of equivalences which are included in SYSDAT only if partitioned core is not in the system. These equivalences do two things. They set those indicators checked by the monitor to indicate there is no partitioned core in the system. Also, they patch the unused partitioned core driver entries with $7FFF_{16}$ so that these entries will not be listed as unpatched externals at the time of system installation. That part of Section ACG following the equivalences is included in SYSDAT only if the system includes partitioned core.

In a released system the starting addresses of the partitions are determined by the information supplied by the user in the 1700 MSOS Ordering Form. An unused partition is indicated by an entry of $FFFF_{16}$ as the starting address. The number of the last partition in the system is equivalenced to LSTPRT.

Following the starting addresses is a table of top-of-threads, one for each partition. When the system is operating, the top of thread for partition n points to the first of a set of programs waiting to be executed with a starting location at the start of partition n if there is a waiting list for the partition. If there is no waiting list, the thread is zero unless the partition is not in the system in which case it is $FFFE_{16}$. Initially the thread for a partition is zero if the partition is in the system. Otherwise, it is $FFFE_{16}$.

At line *ACG0550 is a table starting with location USE. This table contains 16 entries, one for each protected partition, i.e., partitions 0 through 15. For a given partition, the corresponding word of the USE table is zero unless there is currently a program which has its starting location at the beginning of this partition. In this case the corresponding word in the USE table has a bit set for each partition occupied by that program. For example, if a system contains protected partitions 0-7, and currently there is a program in partitions 0-2, a program in partition 4, and a program in partitions 6-7, the USE table would contain the following values:

Location	Contents in hexadecimal
USE +0	0007
+1	0000
+2	0000
+3	0000
+4	0010
+5	0000

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Location	Contents in hexadecimal
USE +6	00C0
+7	0000
+8	0000
+9	0000
+10	0000
+11	0000
+12	0000
+13	0000
+14	0000
+15	0000

This table must contain all zeroes initially.

The partition busy indicator word is labeled BUSY. Within this word bit n indicates the status of partition n. If the bit is a one, the corresponding partition is currently being used by a program or the partition is not included in the system. If the bit is zero the partition is available. In the above example, the value of BUSY corresponding to the USE table values would be $FFD7_{16}$. Initially the word BUSY must have those bits set which correspond to partitions not included in the system. All other bits must be zero initially.

The partition core driver active indicator, DIP, is initially $FFFF_{16}$.

The words in Section ACG may be modified by the user to re-define partitioned core. In doing this, the following requirements must be met:

1. The number of partitions in a system may be from 1 to 17. These must be numbered starting with partition 0. Partition 16 must be included to contain unprotected core, if unprotected core is in Part 1.
2. Any partitions with numbers 0 through 15 must be contiguous. (Partition 16 need not be contiguous to the other partitions.)
3. Partitioned core must start at the beginning of Part 1. It must begin at a location $\leq 8000_{16}$.

```
*          P A R T I T I O N   C O R E   D A T A
*
*          THESE ENTRIES ALLOW PROPER SYSTEM LINKAGE IF PARTITIONED
*          CORE IS NOT SELECTED.
      SPC  2
      ENT  PARTBL,LSTPRT,PRTCDR,BUSY
      ENT  OUTPV4,RDPTV4,SPCEV4,PTNALC
      ENT  PTNREL,K65T10,K65T12,K65COR
      SPC  2
      EQU  PARTBL($7FFF),LSTPRT($0000),PRTCDR($7FFF),BUSY($7FFF)
      EQU  OUTPV4($7FFF),RDPTV4($7FFF),SPCEV4($7FFF),PTNALC($7FFF)
      EQU  PTNREL($7FFF),K65T10($7FFF),K65T12($7FFF),K65COR($7FFF)
      ENT PARTBL,BUSY,DIP,LSTPRT
      SPC  1
      EQU LSTPRT()           LAST PARTITION IN SYSTEM
*
PARTBL NUM  0                STARTING ADDRESS OF PARTITION 0
       NUM  0                STARTING ADDRESS OF PARTITION 1
       NUM  0                STARTING ADDRESS OF PARTITION 2
       NUM  0                STARTING ADDRESS OF PARTITION 3
       NUM  *                STARTING ADDRESS OF PARTITION 4
       NUM  0                STARTING ADDRESS OF PARTITION 5
       NUM  0                STARTING ADDRESS OF PARTITION 6
       NUM  0                STARTING ADDRESS OF PARTITION 7
       NUM  0                STARTING ADDRESS OF PARTITION 8
       NUM  0                STARTING ADDRESS OF PARTITION 9
       NUM  0                STARTING ADDRESS OF PARTITION 10
       NUM  0                STARTING ADDRESS OF PARTITION 11
       NUM  0                STARTING ADDRESS OF PARTITION 12
       NUM  0                STARTING ADDRESS OF PARTITION 13
       NUM  0                STARTING ADDRESS OF PARTITION 14
       NUM  0                STARTING ADDRESS OF PARTITION 15
*
       NUM  0                STARTING ADDRESS OF PARTITION 16 - SWAP AREA
       SPC  2
THDS   NUM  0                TOP OF REQUEST THREAD FOR PARTITION 0
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 1
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 2
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 3
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 4
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 5
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 6
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 7
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 8
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 9
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 10
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 11
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 12
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 13
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 14
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 15
*
       NUM  0                TOP OF REQUEST THREAD FOR PARTITION 16 - SWAP
       SPC  2
USE    BZS  USE(16)          PARTITION-IN-USE INDICATORS
       SPC  2
BUSY   NUM  0                BUSY INDICATOR  -  BIT 0 = PARTITION 0
DIP    NUM  -0               PARTITION CORE DRIVER ACTIVE INDICATOR
       EJT
```

Figure 1-62. Partitioned Core Data, Section ACG

1.60 System Common Declaration, Section ACH

Section ACH, Figure 1-63, is contained in SYSDAT only if blank common is to be available in the system. If it is available, blank common resides in Part 0 following allocatable core. Blank common may include up to 2710_{16} words. The size of blank common is declared in SYSDAT since SYSDAT is always the first program in the system to be loaded. The size is specified by the user in the MSOS 4 Ordering Form. Blank common may not be preset with data during system initialization.

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```
*          S Y S T E M   C O M M O N   D E C L A R A T I O N               ACH00100
*                                                                         ACH00200
*       THIS ENTRY SPECIFIES THE AMOUNT OF SYSTEM (BLANK) COMMON           ACH00300
        SPC   4                                                           ACH00400
        EQU    NCOM()                                                     ACH00500
        SPC   1                                                           ACH00600
COMMON  COM   COMMON(NCOM)                                                ACH00700
        EJT                                                               ACH00800
```

Figure 1-63. System Common Declaration, Section ACH

1.61 System Idle Loop, Section ACI

Location IDLE, Figure 1-64, is entered after an autoload and whenever there is no activity in the system. Immediately after an autoload, location STRTUP contains zero. Thus, at this time an entry at IDLE causes the code at STRTUP to be executed. If the system library request priorities have not yet been set, the standard input logical unit is set to the logical unit of the installation device. This idle loop is then executed until the operator enters a manual interrupt to start the procedure of building the system library and program library. (Refer to the 1700 MSOS 4 Installation Handbook, Publication Number 39520900.) If, on entry to STRTUP, the libraries have already been built, control is transferred to STRTP1 where a core swap is forced. This is the path taken after all autoloads except the autoload which occurs during system installation just prior to the building of the libraries. If other functions are to be performed for such autoloads they should be inserted at STRTP1 prior to the core swap. The reason for a core swap after an autoload is that the unprotected area as well as allocatable core are needed by the Restart routine to perform initialization tasks.

The loop beginning at IDLER is included in this section only if there is a hardware timing device in the system. The counter in this loop is used by the system in determining the percentage of system operation time that is idle time. If there is no hardware device in the system, the IDLER loop contained in SYSDAT will be the one found in Section ACO, Figure 1-70.

The IDLER loop (either the one from this section or the one from Section ACO) is entered in two situations:

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1) There is no system activity and the current priority level is -1.

2) A program in allocatable core requires more core and none is available except by a core swap. In this case, the protect processor checks to see that the following requirements are satisfied:

a) If the unbuffered protect processor, UPROTK, is in the system, any background input/output in progress must be completed.

b) If the buffered protect processor, BPROTK, is in the system, background input/output must be completed except for input/output involving less than 96 words per record. In this case BPROTK retains the input/output operation and the record buffer within itself.

c) Any incompleted background timer requests must be completed.

When the above requirements are satisfied, the unprotected area is written to mass memory and the core locations in the unprotected area are protected. The idle loop is scheduled at level 2. Control is returned to the program in allocatable core which made the space request. The idle loop is entered at level 2 during input/output operations performed by this program. When the program releases the space the unprotected area is read back in from mass memory and the area is again unprotected.

```
*          M I S C E L L A N E O U S   P R O G R A M S
*
*          S Y S T E M   I D L E   L O O P
        SPC   2
        ENT   IDLE           BASIC SYSTEM IDLE LOOP
        ENT   IDLER          SYSTEM IDLE SUBROUTINE
        ENT   IDLCTR         IDLE LOOP COUNTER
        SPC   2
IDLE    LDA*  STRTUP         IS THIS THE INITIAL IDLE ENTRY
        SAN   IDLE1          NO
        RTJ*  STRTUP         YES. PERFORM STARTUP FUNCTIONS
IDLE1   RTJ*  IDLER
        JMP*  IDLE
IDLER   NUM   0
        IIN   0              USED AT LEVEL -1 OR LEVEL 2
        RAO*  IDLCTR
        EIN   0
        JMP*  (IDLER)
        SPC   1
IDLCTR  NUM   0              IDLE LOOP COUNTER
        SPC   2
        EXT   LIBEDT         LIBRARY EDIT
        EXT   RELFLE         SYSTEM CORE SWAP ROUTINE
        EXT   INPTV4         JOB PROCESSOR STANDARD INPUT DEVICE
        SPC   1
STRTUP  NUM   0
        LDQ-  $FF
        ADQ   =XLIBEDT       OBTAIN THE DIRECTORY ADDRESS OF LIBEDT
        LDA-  (ZERO),Q       HAVE THE REQUEST PRIORITIES BEEN SET UP
        SAN   STRTP1         YES
        ENA   0
        STA*  INPTV4         SET THE STD. INPUT TO THE INSTALLATION L.U.
        JMP*  (STRTUP)          AND EXIT
        SPC   1
STRTP1  RTJ-  (AMONI)        SCHEDULE RELFLE TO FORCE A SWAP
        ADC   $5203
        ADC   RELFLE
*
*       NOTE - ANY ADDITIONAL SYSTEM STARTUP FUNCTIONS MAY BE
*              ADDED HERE
*
        JMP*  (STRTUP)
        END
```

Figure 1-64. System Idle Loop, Section ACI

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1.62 Interrupt Response for the 1750/1572 Sample Rate Timer, Section ACJ

This section is included in SYSDAT only if a 1750/1572 Sample Rate Timer is to be used as the system timer. (Refer to Figure 1-65). The location 01572 contains the quotient:

$$\frac{n}{\text{60 cycles per second}}$$

where n is the basic clock rate of the system timer. In a released system, n is 200 kilocycles and the quotient is 3333. The user must change this value if the basic clock rate is other than 200 kilocycles. The other entries in this section are fixed.

At the end of Section ACJ the entry points to the other timer interrupt response routines are equated to $7FFF_{16}$. This is done so that these entries will not appear as unpatched externals at the time of system installation.

```
*              M I S C E L L A N E O U S   P R O G R A M S
*
*              I N T E R R U P T   R E S P O N S E   F O R   T I M E R
*
         ENT   TMRTYP,TMCODE    TYPE OF SYSTEM TIME BASE
         EXT   TIMEUP           TMINT INTERRUPT ENTRY
         EQU   X($7FFF)         VALUE FOR UNSELECTED ENTRY POINTS
         SPC   1
         EQU   TMCODE(1)        1572 PROGRAMMABLE SAMPLE RATE UNIT
TMRTYP   ADC   TMCODE           TIME BASE CODE
         SPC   2
         ENT   E1572F           FUNCTION CODE TO ENABLE 1572
         ENT   E1572            1572 BASIC W,E,S WORD
         ENT   O1572            1572 OSCILLATOR FREQ./CLOCK FREQ.
         SPC   1
E1572F   NUM   $8900
*                               $8000 = ENABLE INTERRUPT
*                               $800 = SET SAMPLE RATE GEN MODE
*                               $100 = ENABLE INPUT SOURCE 2
E1572    NUM   $0403
O1572    NUM   1667             100 KC/60 CPS
         SPC   1
TIMINT   LDQ*  E1572            FUNCTION OUTPUT
         ENA   1                ACKNOWLEDGE INTERRUPT
         OUT   TIMREJ-*
         LDA*  E1572F           RE-ENABLE TIMER
         OUT   TIMREJ-*
         INQ   -1               DATA OUTPUT
         LDA*  O1572            COUNTDOWN VALUE
         OUT   TIMREJ-*
         JMP+  TIMEUP           EXIT TO TMINT
TIMREJ   NOP   0                TIMER REJECT
         JMP-  (ADISP)          EXIT
         SPC   4
*
*              LINK ALL UNSELECTED ENTRY POINTS
*
         ENT   E1573,H15721,E15721,D15721,O15721,EQ3644
         EQU   E1573(X),H15721(X),E15721(X),D15721(X),O15721(X),EQ3644(X)
```

Figure 1-65. Interrupt Response for the 1750/1572 Sample Rate Timer, Section ACJ

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1.63 Interrupt Response for the 1750/1573 Line Synchronized Timer, Section ACK

This section is included in SYSDAT only if a 1750/1573 Line Synchronized Timer is the system timing device. All entries are fixed. At the end of the section entries to interrupt response routines for other timing devices are equated to $7FFF_{16}$ so that they will not appear as unpatched externals during system installation. Section ACK is shown in Figure 1-66.

```
       EQU    TMCODE(2)        1573 LINE SYNC TIMING GENERATOR              ACK00100
TMRTYP ADC    TMCODE           TIME BASE CODE                               ACK00200
       SPC    2                                                             ACK00300
       ENT    E1573            1573 BASIC W,E,S WORD                        ACK00400
       SPC    1                                                             ACK00500
E1573  NUM    $0401                                                         ACK00600
       SPC    1                                                             ACK00700
TIMINT LDQ*   E1573            FUNCTION OUTPUT                              ACK00800
       ENA    0                                                             ACK00900
       OUT    TIMREJ-*                                                      ACK01000
       JMP+   TIMEUP           EXIT TO TMINT                                ACK01100
TIMREJ NOP    0                TIMER REJECT                                 ACK01200
       JMP-   (ADISP)          EXIT                                         ACK01300
       SPC    4                                                             ACK01400
*                                                                           ACK01500
*             LINK ALL UNSELECTED ENTRY POINTS                              ACK01600
*                                                                           ACK01700
       ENT    E1572F,E1572,O1572,H15721,E15721,D15721,O15721,EQ3644         ACK01800
       EQU    E1572F(X),E1572(X),O1572(X),H15721(X)                         ACK01900
       EQU    E15721(X),D15721(X),O15721(X),EQ3644(X)                       ACK02000
```

Figure 1-66. Interrupt Response for the 1750/1573 Line Synchronized Timer, Section ACK

1.64 Interrupt Response Routine for the Line Synchronized Timing Portion of the 1750-1/1572-1 Sample Timing Unit, Section ACL

This section, Figure 1-67, is included in SYSDAT if the Line Synchronized Timing Portion of a 1750-1/1572-1 Sample Timing Unit is the system timer. If the sample rate generator portion of the 1572-1 is used by a user program, an exit is made to the user-supplied interrupt response routine SRG721 when it is determined that the sample rate generator portion of the 1572-1 caused the interrupt.

Entry points for other timer interrupt response routines are equated to $7FFF_{16}$ to avoid having these names printed as unpatched externals at the time of system installation.

```
       EQU  TMCODE(3)       1572-1 SAMPLE TIMING UNIT (LST PART)
TMRTYP ADC  TMCODE          TIME BASE CODE
       SPC  2
       ENT  H15721          1572-1 FUNCTION OUTPUT HISTORY WORD
       ENT  E15721          1572-1 BASIC W,E,S WORD - FUNCTION
       EXT  SRG721          SRG SECTION USER PROGRAM
       SPC  1
H15721 NUM  0
E15721 NUM  $048F
E15721 ADC  EG5721
       SPC  1
TIMINT LDQ* E15721          STATUS INPUT
       INP  TIMREJ-*
       SAP  LST             BIT 15 = SRG, BIT 14 = LST
SRG    LDA* H15721
       INA  8
       OUT  TIMREJ-*        ACKNOWLEDGE SRG INTERRUPT
       LDA* GOSRG+1         VERIFY USER ROUTINE PATCHED
       EOR- LPMSK+15
       SAZ  NOSRG           SKIP IF NOT PATCHED
GOSRG  JMP+ SRG721          EXIT TO USER PROGRAM
NOSRG  ENA  7               AND MASK FOR LST FUNCTION BITS
       IIN  0
       AND* H15721
       OUT  TIMREJ-*        TURN OFF THE SRG
       STA* H15721          RESTORE 1572-1 HISTORY
       EIN  0
       JMP- (ADISP)         EXIT
LST    ENA  $38             AND MASK FOR SRG FUNCTION BITS
       IIN  0
       AND* H15721
       INA  3               ADD LST INTERRUPT ENABLE + ACKNOWLEDGE
       OUT  TIMREJ-*        FUNCTION OUTPUT
       INA  -1              REMOVE ACKNOWLEDGE BIT
       STA* H15721          RESTORE 1572-1 HISTORY
       EIN  0
       JMP+ TIMEUP          EXIT TO TMINT
TIMREJ NOP  0               TIMER REJECT
       JMP- (ADISP)         EXIT
       EJT
*           I N T E R R U P T   R E S P O N S E   F O R   T I M E R
*
       SPC  2
*
*           LINK ALL UNSELECTED ENTRY POINTS
*
       ENT  E1572F,E1572,O1572,E1573,D15721,O15721,EQ3644
       EQU  E1572F(X),E1572(X),O1572(X),E1573(X)
       EQU  D15721(X),O15721(X),EQ3644(X)
```

Figure 1-67. Interrupt Response Routine for the Line Synchronized Timing Portion of the 1750-1/1572-1 Sample Timing Unit Section ACL

1.65 Interrupt Response Routine for the Sample Rate Generator Portion of the 1750-1/1572-1 Sample Timing Unit, Section ACM

This section, Figure 1-68, is included in SYSDAT only if the sample rate generator portion of a 1750-1/1572-1 Sample Timing Unit is the system timer. The parameter O1572 has the value

$$\frac{k}{\text{60 cycles per second}}$$

where k is the clock rate of the sample rate generator. In a standard released system k is 100 kilocycles and O1572 has the value 1667. The user must change this value if the clock rate of the sample rate generator is other than 100 kilocycles. If the user supplies an interrupt response routine, LST721, for the line synchronized timing portion of the 1572-1, an exit is made to this routine whenever it is determined that the interrupt was caused by the line synchronized timing portion of the device.

Entry points for other timer interrupt response routines are equated to $7FFF_{16}$ to avoid having these names appear as unpatched externals at the time of system installation.

```
         EQU   TMCODE(4)       1572-1 SAMPLE TIMING UNIT (SRG PART)
TMRTYP   ADC   TMCODE          TIME BASE CODE
         ENT   H15721          1572-1 FUNCTION OUTPUT HISTORY WORD
         ENT   E15721          1572-1 BASIC W.E.S WORD - FUNCTION
         ENT   D15721          1572-1 BASIC W.E.S WORD - DATA
         ENT   O15721          SRG TIME BASE/CLOCK FREQ.
         EXT   LST721          LST SECTION USER PROGRAM
         SPC   1
H15721   NUM   0
O15721   NUM   1667            100 KC/ 60 CPS
E15721   NUM   $048F
D15721   NUM   $040F
E15721   ADC   EG5721
D15721   ADC   EG5721-$80
         SPC   1
TIMINT   LDG*  E15721          STATUS INPUT
         INP   TIMREJ-*
         SAM   SRG             BIT 15 = SRG, BIT 14 = LST
         LDA*  H15721
         INA   1
         OUT   TIMREJ-*        ACKNOWLEDGE LST INTERRUPT
         LDA*  GOLST+1         VERIFY USER ROUTINE PATCHED
         EOR-  LPMSK+15
         SAZ   NOLST           SKIP IF NOT PATCHED
GOLST    JMP+  LST721          EXIT TO USER PROGRAM
NOLST    ENA   $38             AND MASK FOR SRG FUNCTION BITS
         IIN   0
         AND*  H15721
         OUT   TIMREJ-*        TURN OFF THE LST
         STA*  H15721          RESTORE 1572-1 HISTORY
         EIN   0
         JMP-  (ADISP)         EXIT
SRG      ENA   7               AND MASK FOR LST FUNCTION BITS
         IIN   0
         AND*  H15721
         INA   $18             ADD SRG INTERRUPT ENABLE + ACKNOWLEDGE
         OUT   TIMREJ-*
         INA   -8              REMOVE ACKNOWLEDGE
         STA*  H15721          RESTORE 1572-1 HISTORY WORD
         EIN   0
         LDG*  D15721          DATA OUTPUT
         LDA*  O15721
         OUT   TIMREJ-*
         JMP+  TIMEUP          EXIT TO TMINT
TIMREJ   NOP   0               TIMER REJECT
         JMP-  (ADISP)         EXIT
         EJT
*              I N T E R R U P T   R E S P O N S E   F O R   T I M E R
*
         SPC   2
*
*              LINK ALL UNSELECTED ENTRY POINTS
*
         ENT   E1572F,E1572,O1572,E1573,EQ3644
         EQU   E1572F(X),E1572(X),O1572(X),E1573(X),EQ3644(X)
```

Figure 1-68. Interrupt Response Routine for the Sample Rate Generator Portion of the 1750-1/1572-1 Sample Timing Unit, Section ACM

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1.66 Interrupt Response Routine for the 364-4 Communications Multiplexor Timebase, Section ACN

This section is included in SYSDAT only if a 364-4 Communications Multiplexor is the system timer. Entry points for other timer interrupt response routines are equated to $7FFF_{16}$ to avoid having these names appear as unpatched externals at the time of system installation. {Figure 1-69.}

```
         EQU    TMCODE(5)          364-4 COMMUNICATIONS MULTIPLEXOR
TMRTYP   ADC    TMCODE             TIME BASE CODE
         SPC    2
         EQU    BASCTR(2)          TIMER INTERRUPTS / DRIVER ENTRY
*
*        NOTE   -        THIS VALUE IS USED TO ESTABLISH BOTH THE BAUD RATE
*                        RESPONSE OF THE COMMUNICATIONS EQUIPMENT, AND ALSO
*                        THE SYSTEM TIMER ACCURACY.   THE 364-4 SHOULD NOT
*                        BE ADJUSTED SUCH THAT THE SYSTEM TIMER FREQUENCY
*                        IS LESS THAN 60 HZ.   IF IT IS ADJUSTED TO ALLOW A
*                        FREQUENCY GREATER THAN 60 HZ. THE VALUE OF ≠TIMCPS≠
*                        MUST BE CHANGED ACCORDINGLY.   ≠TIMCPS≠ IS LOCATED
*                        IN THE TIMER PARAMETER REGION OF SYSDAT.
*
         ENT    EQ3644             364-4 BASIC W.E.S WORD - FUNCTION
         SPC    1
EQ3644   NUM    $0281
CTR      NUM    0
         SPC    1
TIMINT   LDA*   CTR                IS THE COUNT EXHAUSTED
         SAN    DOWN               NO, DECREMENT IT
         LDA    =XBASCTR           YES. RE-INITIALIZE
DOWN     INA    -1
         STA*   CTR                IS IT TIME TO ENTER THE DRIVER
         SAZ    DRIVER             YES
         LDQ*   EQ3644             NO. JUST ACKNOWLEDGE THE INTERRUPT
         ENA    6
         OUT    TIMREJ-*
TIME     JMP+   TIMEUP             EXIT TO TMINT
TIMREJ   NOP    0
         JMP-   (ADISP)
         SPC    1
DRIVER   LDQ    =XPCOM00           SET UP TO SCHEDULE THE DRIVER
         LDA-   (ZERO),Q
         STA*   CALL
         LDA-   2,Q
         STA*   CALL+1
         RTJ-   (AMONI)            SCHEDULE THE CONTINUATION ENTRY
CALL     ADC    0
         ADC    0
         JMP*   TIME               EXIT
         EJT
*               I N T E R R U P T   R E S P O N S E   F O R   T I M E R
*
         SPC    2
*
*               LINK ALL UNSELECTED ENTRY POINTS
*
         ENT    E1572F,E1572,O1572,E1573,H15721,E15721,D15721,O15721
         EQU    E1572F(X),E1572(X),O1572(X),E1573(X)
         EQU    H15721(X),E15721(X),D15721(X),O15721(X)
```

Figure 1-69. Interrupt Response Routine for the 364-4 Communications Multiplexor Timebase, Section ACN

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1.67 Software Pseudo Timer Routine, Section AC0

This routine, Figure 1-70, is included in SYSDAT for a system with no hardware timing device. It contains the IDLER loop for such a system. The pseudo timer is used to approximate elapsed time by counting the number of passes through the IDLER loop. When the count overflows the TMINT program is scheduled. This program will check the status of the hardware devices in the system to determine if an interrupt expected from any device is late. Thus the pseudo timer is used for hardware failure detection.

The value of BASCTR, line *AC00050, is set to approximate 60 cycles per second. The fastest cycle time for a 1700-series central processing unit was used in deriving the value of BASCTR. Since system overhead is the critical factor in pseudo timer elapsed time, there is no reason to make the BASCTR value dependent on the system cycle time. The pseudo timer may be used for system timer calls if the only requirement is that a minimum time period must have elapsed.

Entry points for hardware timer interrupt response routines are equated to $7FFF_{16}$ to avoid having these entries printed as unpatched externals at the time of system installation.

```
        EQU   TMCODE(0)      SOFTWARE PSEUDO TIMER
TMRTYP  ADC   6              TIME BASE CODE
        SPC   2
CTR     NUM   30967
BASCTR  NUM   30967          APPROXIMATION TO 60 CPS
        SPC   1
IDLER   NUM   0
        IIN   0              USED AT LEVEL -1 OR LEVEL 2
        SOV   0
        RAO*  CTR            PSEUDO SYSTEM TIMER
        SOV   COUNT          SKIP IF 1800 LOOPS EXECUTED
        EIN   0
        JMP*  (IDLER)        BACK TO BASIC IDLE LOOP
COUNT   LDA*  BASCTR         INITIALIZE LOOP COUNTER
        STA*  CTR
        LDQ*  IDLER          SAVE RETURN FOR RE-ENTRANCY IN VOLATILE
        RTJ-  (AVOLA)        GET 3 WORDS VOLATILE STORAGE
        NUM   3
        RTJ-  (AMONI)
        ADC   $520D          SCHEDULE TMINT AT LEVEL 13
        ADC   TIMEUP
        IIN   0
        RTJ-  (AVOLR)        RETURN VOLATILE
        JMP-  (ZERO),Q       RETURN TO IDLE LOOP
        SPC   4
*
*             LINK ALL UNSELECTED ENTRY POINTS
*
        ENT   E1572F,E1572,01572,E1573,H15721,E15721,D15721,015721,EQ3644
        EQU   E1572F(X),E1572(X),01572(X),E1573(X),H15721(X)
        EQU   E15721(X),D15721(X),015721(X),EQ3644(X)
        EJT
```

Figure 1-70. Software Pseudo Timer Routine, Section AC0

1.68 1706 Buffered Data Channel Handler, Section ACP

A 1706 Buffered Data Channel accumulates a buffer of data from the A/Q channel. When the data has been collected in the 1706 buffer, it is transmitted by the 1706 to a connected output device. This is more efficient than transmitting each word directly from the A/Q channel to the device since in the latter case the driver must process an interrupt for each word transmitted. There may be from one to three 1706 Buffered Data Channels in a system. If there is at least one 1706 in the system, Section ACP will be included in SYSDAT. The number of 1706's is equated to the parameter NUM06. Refer to Figure 1-71. Each 1706 channel may be connected to up to eight devices. The number of devices connected to the first 1706 is NON1, the number connected to the second 1706 is NON2, and the number connected to the third is NON3. A 1706 can transfer data to only one device at a time. For this reason, if any one of the 1706 channels is to be used by more than one device, the buffered data channel allocator program, AL1706, must be included in the system to queue the drivers which share usage of a 1706. If there are no shared 1706's in the system the access entry, RQ1706,and the release entry, RL1706, are equated, thus creating a dummy routine in place of AL1706.

The program, AL1706, uses the wait stacks STACKA, STACKB, and STACKC. When a driver requests 1706 allocation, and the 1706 to which the corresponding device is connected is currently in use, AL1706 places the driver return address, I-register (physical device table address), and priority level in the appropriate stack in this section. The entries to any unused stacks are equated to $7FFF_{16}$ to avoid having these entries appear as unpatched externals at the time of system installation. Following the stacks are parameter arrays used by AL1706 to queue the 1706's in the system.

```
*         M I S C E L L A N E O U S   P R O G R A M S          ACP00100
*                                                               ACP00200
*         1 7 0 6   B U F F E R E D   D A T A   C H A N N E L   ACP00300
*                                                               ACP00400
*         H A N D L E R                                         ACP00500
*                                                               ACP00600
      SPC  2                                                    ACP00700
      ENT  RQ1706          ACCESS  ENTRY FOR 1706               ACP00800
      ENT  RL1706          RELEASE ENTRY FOR 1706               ACP00900
      SPC  1                                                    ACP01000
RL1706 NUM 0               ENTRY USED IF NO 1706 UNITS SHARED   ACP01100
      IIN  0                                                    ACP01200
      LDQ- I               TRANSFER PDT ADDRESS TO Q            ACP01300
      EIN  0                                                    ACP01400
      JMP* (RL1706)        RETURN                               ACP01500
      SPC  1                                                    ACP01600
      EQU  RQ1706(RL1706) EQUATE BOTH ENTRIES                   ACP01700
*                                                               ACP01800
      EQU  NUM06()         NUMBER OF 1706 UNITS IN SYSTEM       ACP01900
*                                                               ACP02000
*     1706 DATA STACKS                                          ACP02100
*                                                               ACP02200
      ENT  STACKA          DATA STACK FOR 1706 NO. 1            ACP02300
      ENT  STACKB          DATA STACK FOR 1706 NO. 2            ACP02400
      ENT  STACKC          DATA STACK FOR 1706 NO. 3            ACP02500
      EQU   NON1()         NUMBER OF DEVICES ON 1706 NO. 1      ACP02600
STACKA BZS STACKA(3*NON1-3)                                     ACP02700
      EQU   NON2()         NUMBER OF DEVICES ON 1706 NO. 2      ACP02800
STACKB BZS STACKB(3*NON2-3)                                     ACP02900
      EQU   NON3()         NUMBER OF DEVICES ON 1706 NO. 3      ACP03000
STACKC BZS STACKC(3*NON3-3)                                     ACP03100
      EQU  STACKA($7FFF)                                        ACP03200
      EQU  STACKB($7FFF)                                        ACP03300
      EQU  STACKC($7FFF)                                        ACP03400
*                                                               ACP03500
*     1706 DATA STACK SIZES                                     ACP03600
*                                                               ACP03700
      ENT  STKSIZ                                               ACP03800
STKSIZ EQU STKSIZ(*)                                            ACP03900
      ADC  NON1*3-3                                             ACP04000
      ADC  NON2*3-3                                             ACP04100
      ADC  NON3*3-3                                             ACP04200
*                                                               ACP04300
*     1706 BUSY FLAGS                                           ACP04400
*                                                               ACP04500
      ENT  BUSY1                                                ACP04600
BUSY1 BZS  BUSY1(NUM06)                                         ACP04700
      EJT                                                       ACP04800
*         1 7 0 6   B U F F E R E D   D A T A   C H A N N E L   ACP04900
*                                                               ACP05000
*         H A N D L E R                                         ACP05100
*                                                               ACP05200
```

Figure 1-71. 1706 Buffered Data Channel Handler, Section ACP

```
        SPC   2
*
        ENT   TEMPI
        ENT   ITEMP
TEMPI   BZS   TEMPI(NUM06)
ITEMP   BZS   ITEMP(NUM05)
*
*       STACK NEXT IN POINTERS
*
        ENT   NXTIN
NXTIN   BZS   NXTIN(NUM06)
*
*       STACK NEXT OUT POINTERS
*
        ENT   NXTOUT
NXTOUT  BZS   NXTOUT(NUM06)
*
*       PHYSICAL DEVICE TABLE POINTERS
*
        ENT   ONPDT
ONPDT   BZS   ONPDT(NUM06)
        EJT
```

Figure 1-71. 1706 Buffered Data Channel Handler, Section ACP (Continued)

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1.69 A/Q Channel Allocator Routine, Section ACQ

Devices which do not use a hardware buffered data channel receive data one word at a time from the A/Q channel. Certain of these devices require that a data interrupt be serviced within a specified amount of time to avoid lost data. These are devices in which the data must be transmitted during the time interval that the data medium is being transported through the reading or writing mechanism. Examples of data media for which this is true are cards, paper tape, and magnetic tape. Specific examples of devices which require A/Q channel allocation are listed in Figure 1-72, beginning at line *ACQ0180. The area at AQSTCK is used by the A/Q channel allocator as a wait stack for devices requesting A/Q channel allocation. This stack requires 3 words for each device which is queued. If fewer than two devices in the system require A/Q channel allocation lines *ACQ0060 through *ACQ0150 constitute this section. These lines equate the request entry and the release entry of the A/Q channel allocator and replace the A/Q channel allocator with a dummy routine.

```
*            M I S C E L L A N E O U S   P R O G R A M S                      ACQ00100
*                                                                              ACQ00200
*            A / Q   C H A N N E L   A L L O C A T I O N                      ACQ00300
*                                                                              ACQ00400
        SPC  2                                                                 ACQ00500
        ENT  RQAQ           REQUEST ENTRY FOR A/Q                              ACQ00600
        ENT  RLAQ           RELEASE ENTRY FOR A/Q                              ACQ00700
        SPC  1                                                                 ACQ00800
RQAQ    NUM  0              ENTRY USED IF NO A/Q ALLOCATION                    ACQ00900
        IIN  0                                                                 ACQ01000
        LDQ- I              TRANSFER PDT ADDRESS TO Q                          ACQ01100
        EIN  0                                                                 ACQ01200
        JMP* (RQAQ)         RETURN                                             ACQ01300
        SPC  1                                                                 ACQ01400
        EQU  RLAQ(RQAQ)     EQUATE BOTH ENTRIES                                ACQ01500
*       DEVICES REQUIRING ALLOCATION                                           ACQ01600
*                                                                              ACQ01700
*            1711/713   TELETYPE / CRT                                         ACQ01800
*            1713       KEYBOARD                                               ACQ01900
*            1713       PAPER TAPE READER                                      ACQ02000
*            1713       PAPER TAPE PUNCH                                       ACQ02100
*            1721       PAPER TAPE READER                                      ACQ02200
*            1723       PAPER TAPE PUNCH                                       ACQ02300
*            1777       PAPER TAPE READER                                      ACQ02400
*            1777       PAPER TAPE PUNCH                                       ACQ02500
*            1728/430   CARD READER/PUNCH                                      ACQ02600
*            1729-2     CARD READER                                            ACQ02700
*            1729-3     CARD READER                                            ACQ02800
*            1731/601       UNBUFFERED MAG TAPE                                ACQ02900
*            1732-1/608/609 UNBUFFERED MAG TAPE                                ACQ03000
        SPC  2                                                                 ACQ03100
        ENT  AQSTCK         STACK FOR REQUESTS                                 ACQ03200
        ENT  AQSSIZ         STACK SIZE                                         ACQ03300
        SPC  2                                                                 ACQ03400
        EQU  NUMAQ()        QUANTITY OF ALLOCATION DEVICES                     ACQ03500
        SPC  2                                                                 ACQ03600
AQSTCK  BZS  AQSTCK(3*NUMAQ-3)                                                 ACQ03700
AQSSIZ  ADC  NUMAQ*3-3                                                         ACQ03800
        EJT                                                                    ACQ03900
```

Figure 1-72. A/Q Channel Allocator Routine, Section ACQ

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1.70 Interface to Mass Memory Driver; Common Exit for Drivers in System Without Mass Resident Drivers, Section ACR

If no mass resident driver is required by the system, only lines *ACR0010 through *ACR0100 will be included in this section of SYSDAT. (Refer to Figure 1-73.) These lines supply a common exit for those drivers which are optionally core resident or mass resident. In a system with at least one mass resident driver MMEXEC is in the system. This program then processes driver exits for optionally mass resident drivers. It checks the physical device table for a device to see if the driver is core resident or mass resident. It then releases core if necessary and jumps to the dispatcher. For a system with no mass memory driver, MMEXEC is not in the system and the entry MAS300 in this section provides the common driver exit.

The buffer located at BUFF is included in SYSDAT if there is at least one mass resident driver in the system. This buffer is used to contain mass resident drivers while they are in core. It must be sized to at least contain the largest mass resident driver in the system. For dual operation of any two drivers, it must be sized to contain the largest two mass resident drivers in the system. A system which includes a mass resident COSY driver should have a buffer large enough to contain the COSY driver together with the largest mass resident driver used by the COSY driver. This is because the COSY driver, DCOSY, makes requests of other input/output drivers. A driver being used by DCOSY must be in core simultaneously with DCOSY until the driver completes the request for the COSY driver.

```
*               M I S C E L L A N E O U S   I N F O R M A T I O N
*
*               C O M M O N   E X I T   F O R   A L L   D R I V E R S
         SPC    2
         ENT    MAS300
         SPC    2
MAS300   JMP-   (ADISP)
         SPC    2
         ENT    RELBYG         LINK ENTRY POINT IN MMEXEC
         EQU    RELBYG($7FFF)
*               M A S S   R E S I D E N T   D R I V E R S   B U F F E R
*
*               THIS BUFFER WILL CONTAIN THE MASS RESIDENT DRIVER(S)
*               WHEN THEY ARE IN CORE.   THE SMALLEST ALLOWABLE SIZE IS
*               EQUAL TO THE LARGEST MASS RESIDENT DRIVER IN THE SYSTEM.
*               OPTIMUM THROUGHPUT REQUIRES SIZING EQUAL TO THE TWO
*               LARGEST MASS RESIDENT DRIVERS IN THE SYSTEM.
         SPC    2
         ENT    BUFF,BUFFE
         EQU    MBFSZ()
         SPC    2
BUFF     BZS    BUFF(MBFSZ)
         EQU    BUFFE(*)
         EJT
```

Figure 1-73. Interface to Mass Memory Drivers; Common Exit for Drivers in System Without Mass Memory Drivers, Section ACR

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1.71 Reentrant FORTRAN Information, Section ACS

Section ACS, Figure 1-74, provides information regarding reentrant FORTRAN. This section is included in SYSDAT only if the reentrant FORTRAN library is needed in the system. The bits of FMASK specify which priority levels are available to programs using the foreground FORTRAN library. If bit n is 1, priority level n is a foreground FORTRAN level. If only one FORTRAN level is available in the foreground, FORTRAN reentrancy is not needed in the system and Section ACS is omitted from SYSDAT.

The list of entry point addresses beginning at FLIST lists those entry points of the reentrant FORTRAN library which are included in the system. For a system with a single precision reentrant FORTRAN library lines *ACS0220 through *ACS0450 are included in the entry point list. Lines *ACS0530 through *ACS0670 are included in the list only if the double precision routines are to be included in the reentrant FORTRAN library.

The entry Q8STP is provided for compatibility with the compiler. A jump to Q8STP is added to the end of a FORTRAN program by the compiler if the last statement in the program is not a branching statement. Usually a reentrant FORTRAN program is terminated with a CALL RELESE statement. A jump to Q8STP is added by the compiler even though it is unnecessary. A FORTRAN reentrant program links to the Q8STP entry in this section in terminating the program. FORTRAN STOP and PAUSE statements also use Q8STP. These statements are illegal in the foreground. If they are used they will also link to the Q8STP entry in this section.

Lines *ACS0800 through *ACS0840 are included if double precision routines are not to be a part of the FORTRAN reentrant library.

```
*        M I S C E L L A N E O U S   I N F O R M A T I O N                ACS00100
*                                                                         ACS00200
*        F O R T R A N   R E E N T R A N T   I N F O R M A T I O N        ACS00300
*                                                                         ACS00400
      ENT  FMASK,FLIST                                                    ACS00500
      EXT  Q8QF2I,Q8QI2F,Q8QF2F,GSAVE,E4SAVE                              ACS00600
      EXT  RETAD,KG47V4,KG48V4,KG49V4                                     ACS00700
      EXT  ABS,SQRT,SIGN,IFIX,FLOAT                                       ACS00800
      EXT  EXP,ALOG,TANH,SIN,COS,ATAN,IFALT                               ACS00900
      EXT  FLOT,ARGUO                                                     ACS01000
      EXT  Q8DFLT,Q8QD2I,Q8QD2F,Q8QD2D                                    ACS01100
      EXT  DABS,DSQRT,DSIGN,SNGL,DFLT                                     ACS01200
      EXT  DEXP,DLOG,DSIN,DCOS,DATAN,DFLCT                                ACS01300
      SPC  1                                                              ACS01400
FMASK NUM  $XXXX          FORTRAN REENTRANT LEVELS (BIT 0 = LEVEL 0)      ACS01500
      SPC  1                                                              ACS01600
*     TABLE OF FORTRAN ENTRY POINTS SAVED TO MAINTAIN REENTRANCY          ACS01700
      SPC  1                                                              ACS01800
*     ENTRY POINT         PROGRAM       DESCRIPTION                       ACS01900
*     -----------         -------       -----------                       ACS02000
      SPC  1                                                              ACS02100
FLIST ADC  FEND                                                           ACS02200
      ADC  Q8QF2I         Q8EXPR   FLOAT-TO-INTEGER FUNCTION              ACS02300
      ADC  Q8QI2F         Q8EXPR   INTEGER-TO-FLOAT FUNCTION              ACS02400
      ADC  Q8QF2F         Q8EXPR   FLOAT-TO-FLOAT   FUNCTION              ACS02500
      ADC  QSAVE          Q8EXPR   G-REGISTER       STORAGE               ACS02600
      ADC  E4SAVE         Q8EXPR   LOCATION $E4     STORAGE               ACS02700
      ADC  RETAD          Q8EXPR   RETURN ADDRESS   STORAGE               ACS02800
      ADC  KG47V4         Q8EXPR   TEMPORARY        STORAGE               ACS02900
      ADC  KG48V4         Q8EXPR   TEMPORARY        STORAGE               ACS03000
      ADC  KG49V4         Q8EXPR   TEMPORARY        STORAGE               ACS03100
      ADC  ABS            Q8ABR    ABSOLUTE VALUE FUNCTION                ACS03200
      ADC  SQRT           SQRTFR   SQUARE ROOT FUNCTION                   ACS03300
      ADC  SIGN           SIGNR    INTRINSIC FUNCTION SIGN                ACS03400
      ADC  IFIX           FXFLR    INTRINSIC FUNCTION IFIX                ACS03500
      ADC  FLOAT          FXFLR    INTRINSIC FUNCTION FLOAT               ACS03600
      ADC  EXP            EXPRGR   EXTERNAL FUNCTION EXP                  ACS03700
      ADC  ALOG           LNPRGR   EXTERNAL FUNCTION ALOG                 ACS03800
      ADC  TANH           TANHR    EXTERNAL FUNCTION TANH                 ACS03900
      ADC  SIN            SNCSR    EXTERNAL FUNCTION SIN                  ACS04000
      ADC  COS            SNCSR    EXTERNAL FUNCTION COS                  ACS04100
      ADC  ATAN           ARCPGR   EXTERNAL FUNCTION ATAN                 ACS04200
      ADC  IFALT          IFALTR   EXTERNAL FUNCTION IFALT                ACS04300
      ADC  FLOT           FLOATR   FLOATING POINT PROCESSOR               ACS04400
      ADC  ARGUO          Q8QIO    TEMPORARY STORAGE                      ACS04500
      EJT                                                                 ACS04600
```

Figure 1-74. Reentrant FORTRAN Information, Section ACS

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```
*             F O R T R A N   R E E N T R A N T   I N F O R M A T I O N   ACS04700
*                                                                         ACS04800
        SPC   1                                                           ACS04900
*       ENTRY POINT          PROGRAM       DESCRIPTION                    ACS05000
*       -----------          -------       -----------                    ACS05100
        SPC   1                                                           ACS05200
        ADC   Q8DFLT         Q8DBLR     INTEGER-TO-DOUBLE FUNCTION        ACS05300
        ADC   Q8QD2I         DEXPR      DOUBLE-TO-INTEGER FUNCTION        ACS05400
        ADC   Q8QD2F         DEXPR      DOUBLE-TO-SINGLE  FUNCTION        ACS05500
        ADC   Q8QD2D         DEXPR      DOUBLE-TO-DOUBLE  FUNCTION        ACS05600
        ADC   DABS           Q8DABR     DBL. PREC. ABSOLUTE VALUE FUNCTION ACS05700
        ADC   DSQRT          DSQRTR     DBL. PREC. SQUARE ROOT FUNCTION   ACS05800
        ADC   DSIGN          DSIGNR     INTRINSIC FUNCTION DSIGN          ACS05900
        ADC   SNGL           SNGLR      INTRINSIC FUNCTION SNGL           ACS06000
        ADC   DFLT           Q8DFLR     INTRINSIC FUNCTION DFLT           ACS06100
        ADC   DEXP           DEXPFR     DBL. PREC. EXTERNAL FUNCTION EXP  ACS06200
        ADC   DLOG           DLOGR      DBL. PREC. EXTERNAL FUNCTION ALOG ACS06300
        ADC   DSIN           DSNCSR     DBL. PREC. EXTERNAL FUNCTION SIN  ACS06400
        ADC   DCOS           DSNCSR     DBL. PREC. EXTERNAL FUNCTION COS  ACS06500
        ADC   DATAN          DATANR     DBL. PREC. EXTERNAL FUNCTION ATAN ACS06600
        ADC   DFLOT          DFLOTR     DBL. PREC. FLOATING POINT PROCESSOR ACS06700
FEND    EQU   FEND(*-FLIST-1)                                             ACS06800
        EJT                                                               ACS06900
*             F O R T R A N   R E E N T R A N T   I N F O R M A T I O N   ACS07000
*                                                                         ACS07100
        SPC   4                                                           ACS07200
*       THIS ENTRY IS PROVIDED TO ALLOW COMPATIBILITY BETWEEN THE         ACS07300
*       NON-REENTRANT (BACKGROUND) FORTRAN AND REENTRANT FORTRAN          ACS07400
        SPC   1                                                           ACS07500
        ENT   Q8STP                                                       ACS07600
        SPC   1                                                           ACS07700
Q8STP   NOP   0              FORTRAN    STOP                              ACS07800
        JMP-  (ADISP)                                                     ACS07900
        SPC   2                                                           ACS08000
*       LINK THE DOUBLE PRECISION ENTRY POINT REFERENCED BY ≠FORMTR≠      ACS08100
        SPC   1                                                           ACS08200
        ENT   DOUT                                                        ACS08300
        EQU   DOUT($7FFF)                                                 ACS08400
        EJT                                                               ACS08500
```

Figure 1-74. Reentrant FORTRAN Information, Section ACS (Continued)

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1.72 Time/Date Parameter Storage, Section ACT

This section is a table of current time and date parameter values. The parameters AYERTO, AMONTO, and ADAYTO are in ASCII. The other parameters are integer values.
{Refer to Figure 1-75.}

```
*         M I S C E L L A N E O U S   I N F O R M A T I O N            ACT00100
*                                                                      ACT00200
*         T I M E / D A T E   P A R A M E T E R   S T O R A G E        ACT00300
*                                                                      ACT00400
      SPC  3                                                           ACT00500
      ENT  AYERTO          CURRENT YEAR    (ASCII)                     ACT00600
      ENT  AMONTO          CURRENT MONTH   (ASCII)                     ACT00700
      ENT  ADAYTO          CURRENT DAY     (ASCII)                     ACT00800
      ENT  YERTO           CURRENT YEAR    (INTEGER)                   ACT00900
      ENT  MONTO           CURRENT MONTH   (INTEGER)                   ACT01000
      ENT  DAYTO           CURRENT DAY     (INTEGER)                   ACT01100
      ENT  HORTO           CURRENT HOUR    (INTEGER)                   ACT01200
      ENT  MINTO           CURRENT MINUTE  (INTEGER)                   ACT01300
      ENT  SECON           CURRENT SECOND  (INTEGER)                   ACT01400
      ENT  CONTA           CURRENT COUNT   (INTEGER)                   ACT01500
      ENT  HORMIN          CURRENT 24-HOUR TIME                        ACT01600
      ENT  TOTMIN          CURRENT DAY ELAPSED MINUTES                 ACT01700
      SPC  3                                                           ACT01800
AYERTO NUM  0              CURRENT YEAR    (ASCII)                     ACT01900
AMONTO NUM  0              CURRENT MONTH   (ASCII)                     ACT02000
ADAYTO NUM  0              CURRENT DAY     (ASCII)                     ACT02100
YERTO  NUM  0              CURRENT YEAR    (INTEGER)                   ACT02200
MONTO  NUM  0              CURRENT MONTH   (INTEGER)                   ACT02300
DAYTO  NUM  0              CURRENT DAY     (INTEGER)                   ACT02400
HORTO  NUM  0              CURRENT HOUR    (INTEGER)                   ACT02500
MINTO  NUM  0              CURRENT MINUTE  (INTEGER)                   ACT02600
SECON  NUM  0              CURRENT SECOND  (INTEGER)                   ACT02700
CONTA  NUM  0              CURRENT COUNT   (INTEGER)                   ACT02800
HORMIN NUM  0              CURRENT 24-HOUR TIME                        ACT02900
TOTMIN NUM  0              CURRENT DAY ELAPSED MINUTES                 ACT03000
      EJT                                                              ACT03100
```

Figure 1-75. Time/Date Parameter Storage, Section ACT

1.73 System Timer Parameters, Section ACU

This section (Figure 1-76) contains system timer parameter values. TIMCPS is the line frequency of the system. TIMEC is defined as

$$\left\lfloor \frac{n}{10} - 1 \right\rfloor$$

where n is the number of timer cycles per second, and $\lfloor x \rfloor$ is the greatest integer less than or equal to x. TODLVL is the first word in the parameter list for a monitor request to schedule the time-of-day program, TOD. The request code is 8, meaning that scheduling is to be done after a time delay. The priority level is 6, the d-bit is 1, and the x-bit is 0. Bits 4 through 7 are zero indicating the time delay is to be expressed in counts of the timing device. NSCHED specifies the maximum number of timer request completions which will be processed at the time of a timer interrupt. When a timer interrupt occurs the timer request processor determines the number of timer requests for which the time delay has elapsed since the last timer interrupt. If this number exceeds NSCHED, the first NSCHED requests are scheduled and the remaining requests are placed on the counts thread for expiration at the next timer interrupt. The value of NSCHED may be used to limit the number of scheduler requests made at one time if a large number of timer requests are used in the system.

```
*            M I S C E L L A N E O U S   I N F O R M A T I O N
*
*            S Y S T E M   T I M E R   P A R A M E T E R S
        SPC  4
        ENT  TIMCPS           BASIC SYSTEM CLOCK FREQUENCY
        SPC  1
TIMCPS  EQU  TIMCPS(60)       TIMER CYCLES PER SECOND
        SPC  4
        ENT  TIMEC            TIMER CYCLES PER 1/10 SECOND MINUS 1
        SPC  1
TIMEC   EQU  TIMEC(TIMCPS/10-1)
        SPC  4
        ENT  TODLVL           TIME OF DAY(TOD) PROGRAM REQ. CODE + PRIORITY
        SPC  1
TODLVL  EQU  TODLVL($5006) D-BIT = 1, REQUEST CODE 8, PRIORITY 6
        SPC  4
        ENT  NSCHED           MAX. NO. OF COMPLETIONS PER TIMER INTERVAL
        SPC  1
NSCHED  NUM  5                MAXIMUM 5 COMPLETIONS PER INTERVAL
        SPC  4
        ENT  TMRLVL           DIAGNOSTIC TIMER PRIORITY LEVEL
        SPC  1
TMRLVL  EQU  TMRLVL(13)       LEVEL 13
        EJT
```

Figure 1-76. System Timer Parameters, Section ACU

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1.74 System Program Overlay Sizes, Section ACV

This section, Figure 1-77, contains the overlay size for the library edit program, LIBEDT, for the protect processor, BPROTK or UPROTK, and for the on-line debug package, ODEBUG. If there is enough core space in the system, the buffered protect processor, BPROTK, is used with the larger overlay size {line *ACV0100}. Otherwise, the unbuffered protect processor, UPROTK is used {line *ACV0110}.

```
*     M I S C E L L A N E O U S   I N F O R M A T I O N         ACV00100
*                                                               ACV00200
*     S Y S T E M   P R O G R A M   O V E R L A Y   S I Z E S   ACV00300
      SPC  2                                                    ACV00400
      ENT  LSIZV4          INITIAL OVERLAY SIZE OF LIBEDT       ACV00500
      ENT  PSIZV4          INITIAL OVERLAY SIZE OF PROTEC       ACV00600
      ENT  ODBSIZ          INITIAL OVERLAY SIZE OF ODEBUG       ACV00700
      SPC  4                                                    ACV00800
      EQU  LSIZV4($44D)    INITIAL OVERLAY SIZE OF LIBEDT       ACV00900
      EQU  PSIZV4($3C8)    INITIAL OVERLAY SIZE OF PROTEC       ACV01000
      EQU  PSIZV4($488)    INITIAL OVERLAY SIZE OF PROTEC       ACV01100
      EQU  ODBSIZ($210)    INITIAL OVERLAY SIZE OF ODEBUG       ACV01200
      EJT                                                       ACV01300
```

Figure 1-77. System Program Overlay Sizes, Section ACV

1.75 IOM Station Assignments, Section ACW

This section to be written later, pending definition by C. Wollaston.

```
        M I S C E L L A N E O U S   I N F O R M A T I O N

        I O M   S T A T I O N   A S S I G N M E N T S

SPC  4
ENT  EQ5761          STATUS ADDRESS CODE FOR 1576-1 STALL ALARM
EQU  ED($0400)       BASIC DATA   EQUIPMENT CODE FOR THE I O M
EQU  ES($0480)       BASIC STATUS EQUIPMENT CODE FOR THE I O M
SPC  4
MODULE 0 (CIU) ASSIGNMENTS

EQU S01572()         NO. OF STATIONS ASSIGNED TO THE 1572-1 TIMER
EQU S01576()         NO. OF STATIONS ASSIGNED TO THE 1576-1 STALL
EQU S01525()         NO. OF STATIONS ASSIGNED TO THE 1525 ADC
EQU S01536()         NO. OF STATIONS ASSIGNED TO THE 1536 MUX
EQU S05011()         NO. OF STATIONS ASSIGNED TO THE 1501-10 MUX
EQU S01595()         NO. OF STATIONS ASSIGNED TO THE 1595 RS232
EQU S01544()         NO. OF STATIONS ASSIGNED TO THE 1544 DIG-IN
EQU S01553()         NO. OF STATIONS ASSIGNED TO THE 1553 DIG-OUT
EQU S01555()         NO. OF STATIONS ASSIGNED TO THE 1555 RLY-OUT

MODULE 1 (CIE 1) ASSIGNMENTS

EQU S11595()         NO. OF STATIONS ASSIGNED TO THE 1595 RS232
EQU S11544()         NO. OF STATIONS ASSIGNED TO THE 1544 DIG-IN
EQU S11553()         NO. OF STATIONS ASSIGNED TO THE 1553 DIG-OUT
EQU S11555()         NO. OF STATIONS ASSIGNED TO THE 1555 RLY-OUT

MODULE 2 (CIE 2) ASSIGNMENTS

EQU S21595()         NO. OF STATIONS ASSIGNED TO THE 1595 RS232
EQU S21544()         NO. OF STATIONS ASSIGNED TO THE 1544 DIG-IN
EQU S21553()         NO. OF STATIONS ASSIGNED TO THE 1553 DIG-OUT
EQU S21555()         NO. OF STATIONS ASSIGNED TO THE 1555 RLY-OUT
EJT
        I O M   S T A T I O N   A S S I G N M E N T S

SPC  4

MODULE 3 (CIE 3) ASSIGNMENTS

EQU S31595()         NO. OF STATIONS ASSIGNED TO THE 1595 RS232
EQU S31544()         NO. OF STATIONS ASSIGNED TO THE 1544 DIG-IN
EQU S31553()         NO. OF STATIONS ASSIGNED TO THE 1553 DIG-OUT
EQU S31555()         NO. OF STATIONS ASSIGNED TO THE 1555 RLY-OUT

MODULE 4 (CIE 4) ASSIGNMENTS

EQU S41595()         NO. OF STATIONS ASSIGNED TO THE 1595 RS232
EQU S41544()         NO. OF STATIONS ASSIGNED TO THE 1544 DIG-IN
EQU S41553()         NO. OF STATIONS ASSIGNED TO THE 1553 DIG-OUT
EQU S41555()         NO. OF STATIONS ASSIGNED TO THE 1555 RLY-OUT
```

Figure 1-78. IOM Station Assignments, Section ACW

```
*       MODULE 5 (CIF 5) ASSIGNMENTS
*
        EQU  S51595()        NO. OF STATIONS ASSIGNED TO THE 1595 RS232
        EQU  S51544()        NO. OF STATIONS ASSIGNED TO THE 1544 DIG-IN
        EQU  S51553()        NO. OF STATIONS ASSIGNED TO THE 1553 DIG-OUT
        EQU  S51555()        NO. OF STATIONS ASSIGNED TO THE 1555 RLY-OUT
*
*       MODULE 6 (CIF 6) ASSIGNMENTS
*
        EQU  S61595()        NO. OF STATIONS ASSIGNED TO THE 1595 RS232
        EQU  S61544()        NO. OF STATIONS ASSIGNED TO THE 1544 DIG-IN
        EQU  S61553()        NO. OF STATIONS ASSIGNED TO THE 1553 DIG-OUT
        EQU  S61555()        NO. OF STATIONS ASSIGNED TO THE 1555 RLY-OUT
*
*       MODULE 7 (CIF 7) ASSIGNMENTS
*
        EQU  S71595()        NO. OF STATIONS ASSIGNED TO THE 1595 RS232
        EQU  S71544()        NO. OF STATIONS ASSIGNED TO THE 1544 DIG-IN
        EQU  S71553()        NO. OF STATIONS ASSIGNED TO THE 1553 DIG-OUT
        EQU  S71555()        NO. OF STATIONS ASSIGNED TO THE 1555 RLY-OUT
*
        EJT
*            I O M   S T A T I O N   A S S I G N M E N T S
*
        SPC  4
        EQU  M0S0(0016-S01572)
        EQU  M0S1(M0S0-S01576)
        EQU  M0S2(M0S1-S01525)
        EQU  M0S3(M0S2-S01536)
        EQU  M0S4(M0S3-S05011)
        EQU  M0S5(M0S4-S01595)
        EQU  M0S6(M0S5-S01544)
        EQU  M0S7(M0S6-S01553)
        EQU  M0S8(M0S7-S01555)
        EQU  M1S0(0016-S11595)
        EQU  M1S1(M1S0-S11544)
        EQU  M1S2(M1S1-S11553)
        EQU  M1S3(M1S2-S11555)
        EQU  M2S0(0016-S21595)
        EQU  M2S1(M2S0-S21544)
        EQU  M2S2(M2S1-S21553)
        EQU  M2S3(M2S2-S21555)
        EQU  M3S0(0016-S31595)
        EQU  M3S1(M3S0-S31544)
        EQU  M3S2(M3S1-S31553)
        EQU  M3S3(M3S2-S31555)
        EQU  M4S0(0016-S41595)
        EQU  M4S1(M4S0-S41544)
        EQU  M4S2(M4S1-S41553)
        EQU  M4S3(M4S2-S41555)
        EQU  M5S0(0016-S51595)
        EQU  M5S1(M5S0-S51544)
```

Figure 1-78. IOM Station Assignments, Section ACW (Continued)

```
        EQU   M5S2(M5S1-S51553)
        EQU   M5S3(M5S2-S51555)
        EQU   M6S0(0016-S61595)
        EQU   M6S1(M6S0-S61544)
        EQU   M6S2(M6S1-S61553)
        EQU   M6S3(M6S2-S61555)
        EQU   M7S0(0016-S71595)
        EQU   M7S1(M7S0-S71544)
        EQU   M7S2(M7S1-S71553)
        EQU   M7S3(M7S2-S71555)
        EJT
*             I O M   A D D R E S S I N G   C O D E S
*
        SPC   4
*       STATUS ADDRESSING CODES FOR PERTINENT  IOM  MODULES
        SPC   4
        EQU   EQ5721(M0S0+ES)    1572-1 LST/SRG TIMER
        EQU   EQ5761(M0S1+ES)    1576-1 STALL ALARM
        EQU   EQ5253(M0S2+ES)    1525-3 ANALOG/DIGITAL CONVERTER
        EQU   EQ5362(M0S3+ES)    1536-2 RELAY MULTIPLEXOR
        EQU   EQ5011(M0S4+ES)    1501-10 HIGH SPEED MULTIPLEXOR
        SPC   4
*       BASE STATUS ADDRESS CODES FOR EACH RS232 MODULE
        SPC   4
        EQU   EQ5950(ES+$00+M0S5)
        EQU   EQ5951(ES+$10+M1S0)
        EQU   EQ5952(ES+$20+M2S0)
        EQU   EQ5953(ES+$30+M3S0)
        EQU   EQ5954(ES+$40+M4S0)
        EQU   EQ5955(ES+$50+M5S0)
        EQU   EQ5956(ES+$60+M6S0)
        EQU   EQ5957(ES+$70+M7S0)
        EJT
*             I O M   D A T A   T A B L E S
*
        SPC   2
*       DIGITAL INPUT BLOCK ASSIGNMENT TABLE
        SPC   1
        ENT   BLKT44,LBKT44
        SPC   2
BLKT44  EQU   BLKT44(*)
        IFA   S01544,NE,0
        ADC   ED+$00+M0S5-1
        ADC   S01544
        EIF
        IFA   S11544,NE,0
        ADC   ED+$10+M1S0-1
        ADC   S11544
        EIF
        IFA   S21544,NE,0
        ADC   ED+$20+M2S0-1
        ADC   S21544
        EIF
        IFA   S31544,NE,0
```

Figure 1-78. IOM Station Assignments, Section ACW {Continued}

```
         ADC   ED+$30+M3S0-1
         ADC   S31544
         EIF
         IFA   S41544,NE,0
         ADC   ED+$40+M4S0-1
         ADC   S41544
         EIF
         IFA   S51544,NE,0
         ADC   ED+$50+M5S0-1
         ADC   S51544
         EIF
         IFA   S61544,NE,0
         ADC   ED+$60+M6S0-1
         ADC   S61544
         EIF
         IFA   S71544,NE,0
         ADC   ED+$70+M7S0-1
         ADC   S71544
         EIF
         SPC   2
         EQU   L1544A(S01544+S11544+S21544+S31544)
         EQU   L1544B(S41544+S51544+S61544+S71544)
         EQU   LBKT44(L1544A+L1544B)
         EJT
*              I O M   D A T A   T A B L E S
*
         SPC   4
*        DIGITAL OUTPUT BLOCK ASSIGNMENT TABLE
         SPC   4
         ENT   BLKT35,LBKT35
         SPC   2
BLKT35   EQU   BLKT35(*)
         IFA   S01553,NE,0
         ADC   ED+$00+M0S6-1
         ADC   S01553
         EIF
         IFA   S01555,NE,0
         ADC   ED+$00+M0S7-1
         ADC   S01555
         EIF
         IFA   S11553,NE,0
         ADC   ED+$10+M1S1-1
         ADC   S11553
         EIF
         IFA   S11555,NE,0
         ADC   ED+$10+M1S2-1
         ADC   S11555
         EIF
         IFA   S21553,NE,0
         ADC   ED+$20+M2S1-1
         ADC   S21553
         EIF
         IFA   S21555,NE,0
         ADC   ED+$20+M2S2-1
```

Figure 1-78. IOM Station Assignments, Section ACW (Continued)

```
         ADC    S21555
         EIF
         IFA    S31553.NE.0
         ADC    ED+$30+M3S1-1
         ADC    S31553
         EIF
         IFA    S31555.NE.0
         ADC    ED+$30+M3S2-1
         ADC    S31555
         EIF
         EJT
*               I O M   D A T A   T A B L E S
*
         SPC    2
         IFA    S41553.NE.0
         ADC    ED+$40+M4S1-1
         ADC    S41553
         EIF
         IFA    S41555.NE.0
         ADC    ED+$40+M4S2-1
         ADC    S41555
         EIF
         IFA    S51553.NE.0
         ADC    ED+$50+M5S1-1
         ADC    S51553
         EIF
         IFA    S51555.NE.0
         ADC    ED+$50+M5S2-1
         ADC    S51555
         EIF
         IFA    S61553.NE.0
         ADC    ED+$60+M6S1-1
         ADC    S61553
         EIF
         IFA    S61555.NE.0
         ADC    ED+$60+M6S2-1
         ADC    S61555
         EIF
         IFA    S71553.NE.0
         ADC    ED+$70+M7S1-1
         ADC    S71553
         EIF
         IFA    S71555.NE.0
         ADC    ED+$70+M7S2-1
         ADC    S71555
         EIF
         SPC    1
*        DIGITAL OUTPUT HISTORY TABLE
         SPC    1
         ENT    HIST
         SPC    2
HIST     EQU    HIST(*)
         EZS    H1(S01553+S11553+S21553+S31553+S41553+S51553+S61553+S71553)
         EZS    H2(S01555+S11555+S21555+S31555+S41555+S51555+S61555+S71555)
         SPC    1
         EQU    LBKT35(*-HIST)
         EJT
```

Figure 1-78. IOM Station Assignments, Section ACW

1.76 In Core Flags Used by SCMM and ODEBUG, Section ACX

Lines *ACX0010 through *ACX0080, defining the SCMM in-core flag, are included only if SCMM is included in the system. Lines *ACX0090 through *ACX0160, defining the ODEBUG in-core flag, are included only if the on-line debug package is included in the system. (Refer to Figure 1-79.)

```
*          M I S C E L L A N E O U S   I N F O R M A T I O N              ACX00100
*                                                                         ACX00200
*          S   C   M   M    I N C O R E   F L A G                         ACX00300
*                                                                         ACX00400
      ENT  SCMMLC                                                         ACX00500
      SPC  2                                                              ACX00600
SCMMLC NUM 0             NON-ZERO IF  S C M M  RUNNING                    ACX00700
      EJT                                                                 ACX00800
*          M I S C E L L A N E O U S   I N F O R M A T I O N              ACX00900
*                                                                         ACX01000
*          O N   L I N E   D E B U G   I N C O R E   F L A G              ACX01100
*                                                                         ACX01200
      ENT  CHRSFG                                                         ACX01300
      SPC  2                                                              ACX01400
CHRSFG NUM 0             NON-ZERO IF ODEBUG RUNNING                       ACX01500
      EJT                                                                 ACX01600
```

Figure 1-79. In Core Flags Used by SCMM and ODEBUG, Section ACX

1.77 COBOPS Starting Sector, Patches for Unneeded FORTRAN Entries, Section ACY

This section, Figure 1-80, will contain the starting sector for the failed core image as used by the system checkout package, SYSCOP, if SYSCOP is in the system. In addition, lines *ACY0150 through *ACY0210 will be included in this section if reentrant FORTRAN is not in the system. These lines equate the entry points FMASK and FLIST with $7FFF_{16}$ so that they will not be listed as unpatched externals at the time of system installation. If reentrant FORTRAN is in the system, the entry points FLIST and FMASK will be defined in Section ACS, Reentrant FORTRAN information. In this case lines *ACY0210 through *ACY0280 are included in this section. In a system with reentrant FORTRAN, the scheduler and dispatcher module, NDISP, is not needed. The entry NDISP is equated to $7FFF_{16}$ so that it will not appear as an unpatched external at the time of system installation.

```
*           M I S C E L L A N E O U S     I N F O R M A T I O N
*
*           S Y S T E M    C H E C K O U T    P A R A M E T E R S
        SPC   4
*       THE STARTING SECTOR OF THE FAILED CORE IMAGE IS SPECIFIED BY
*       THE NAME COBOPS.  THIS AREA MUST BE SIZED TO ACCOMODATE A
*       FAILED IMAGE OF THE SIZE SPECIFIED BY NAME MSIZV4.  THE FAILED
*       IMAGE MUST RESIDE ON THE LIBRARY MASS MEMORY UNIT.  IF THE
*       MASS MEMORY LIBRARY UNIT IS A CARTRIDGE DISK, THE IMAGE AREA
*       CANNOT OVERLAP FROM ONE PLATTER TO THE OTHER.
        SPC   2
        ENT   COBOPS
COBOPS  EQU  COBOPS()         START SECTOR OF FAILED IMAGE
        SPC   4
*       THIS ENTRY IS PROVIDED TO LINK THE FORTRAN REENTRANCY DATA
*       ENTRY POINTS
        SPC   1
        ENT   FMASK,FLIST
        SPC   1
        EQU   FMASK($7FFF),FLIST($7FFF)
        SPC   4
*       THIS ENTRY IS PROVIDED TO LINK THE NO-FORTRAN DISPATCHER
*       ENTRY POINT
        SPC   1
        ENT   NDISP
        SPC   1
        EQU   NDISP($7FFF)
        EJT
```

Figure 1-80. SYSCOP Parameters, Section ACY

1.78 High Speed IMPORT Information, Section ACZ

Section ACZ is included only if High Speed IMPORT is in the system. In that case, the entries in this section are as shown in Figure 1-81. Word 1, UNDEF, is the address of the physical device table of the dummy logical unit. This address is used by IMPORT as the address inserted in the LOG1A table for each device that will be used for an IMPORT data stream. The dummy logical unit is so referenced in the LOG1A table until the corresponding physical device table has been set up for IMPORT.

Word 2 of this section, the priority level of IMPORT, is fixed at level 6. Word 3 must be the priority level at which D1747 will run. Word 4, transmission buffer size, is 325 in a released system. It may be reduced to 165 to save core if desired. One of the two values, 165 or 325, must be used as this entry. Words 5 and 6 should be zero for Hollerith/ASCII (026) card conversion, non-zero for EBCDIC/ASCII (029) card conversion. Words 7, 8, and 9 are fixed. The values of words ten and eleven must be negative. The magnitude of each of these entries is in counts of the system timing device. The magnitude of each may be increased if transmission is to occur over a longer than standard distance. The number of counts allows time for the 1700/6000 connecting lines to perform the transmission and to change from receive mode to send mode or vice versa. The last word of this section, JOBMAX, is the maximum number of jobs allowed to be transmitted from this 1700 to the 6000 at one time. This number may be adjusted depending on the number of 1700's connected to

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the 6000 and on the desires of the user.

For further information, refer to the 1700 MSOS IMPORT High Speed Reference Manual, 1700 Version 1, Publication No. 60305700.

```
*             M I S C E L L A N E O U S    I N F O R M A T I O N                    ACZ00100
*                                                                                   ACZ00200
*             H I G H    S P E E D    I M P O R T    I N F O R M A T I O N          ACZ00300
        SPC   4                                                                     ACZ00400
        ENT   IMPSPD,IMPTC,IMFCT,IMSTR1,IMLAST                                      ACZ00500
        ENT   IPRI,DSCPRI,DSCLU,IMCOM,IMBFSZ                                        ACZ00600
        ENT   IMTID,UNDEF,P2629,R2629                                               ACZ00700
        ENT   SYNCLI,RETLIM,JOBMAX                                                  ACZ00800
        SPC   4                                                                     ACZ00900
UNDEF   ADC   PDUMMY              01  UNDEFINED UNIT                                ACZ01000
IPRI    ADC   6                   02  PRIORITY LEVEL OF IMPORT                      ACZ01100
DSCPRI  ADC   10                  03  PRIORITY LEVEL OF DATA SET DRIVER (D1747)     ACZ01200
IMBFSZ  ADC   325                 04  SIZE OF TRANSMISSION BUFFER                   ACZ01300
P2629   ADC   0                   05  026/029 CARD OUTPUT FORMAT (0 = 026)          ACZ01400
R2629   ADC   0                   06  026/029 CARD INPUT  FORMAT (0 = 026)          ACZ01500
IMCOM   ADC   4                   07  IMPORT COMMENT DEVICE LOGICAL UNIT            ACZ01600
DSCLU   ADC   LU1747-LOG1A        08  DATA SET CONTROLLER  LOGICAL UNIT             ACZ01700
IMTID   ALF   1,ME                09  DEFAULT IMPORT TERMINAL I.D.                  ACZ01800
SYNCLI  NUM   -10                 10  MAXIMUM ALLOWABLE SYNCHRONIZATION ERROR       ACZ01900
RETLIM  NUM   -10                 11  MAXIMUM ALLOWABLE RE-TRANSMISSION ERROR       ACZ02000
JOBMAX  NUM   25                  12  MAXIMUM ALLOWABLE STACKED JOBS                ACZ02100
        EJT                                                                         ACZ02200
```

Figure 1-81. High Speed IMPORT Information, Section ACZ

1.79 File Manager Data, Section ADA

Lines *ADA0050 through *ADA0110 are included in this section only if there is no File Manager in the system. (Refer to Figure 1-82.) These lines equate certain entries used by the File Manager with $7FFF_{16}$ so that these entries will not be listed as unpatched externals at the time of system installation.

If there is a File Manager in the system, the first line in Section ADA after the heading is line *ADA0120. Beginning at this line are the system parameter values needed by the File Manager. FISLU is the library unit in a standard system. It may be changed to a different unit but in that case the system must be rebuilt so that all references to FISLU will be correctly linked. MAXMMA, the number of mass memory read/write attempts made when a mass memory error is detected, is one in a standard released system. A value of one means that once a mass memory error is detected the mass memory read or write request will be repeated once by the File Manager. The user should leave this value at one.

The parameter RPTPER is the time in hundredths of a second that a given request processor will remain in core after completion of a request. If there is enough space in allocatable core for several File Manager request processors to be in core simultaneously, then RPTPER may be increased to a value greater than the standard value of 10 which corresponds to a tenth of a second. Before a request processor releases its core it may be requested again. In that case, it would not have to be re-read from mass memory, thus saving system overhead time. If a minimum amount of allocatable core is available for File Manager request processors, then RPTPER should be set to the minimum value of one so that if one File Manager request processor is in core and a different request processor is requested, the second request will not have to wait unnecessarily during the timeout before release of core by the first processor. The value of RPTPER cannot be set to zero since the timeout value for a request processor is initialized to RPTPER and the time-out value is decremented by one before being tested for zero. (Refer to Article 1.58 for a discussion of allocatable core area available for File Manager request processors.)

The parameter FDTPER is defined similarly to RPTPER except that it refers to the timeout period before core is released for a file information segment (FIS). It is also the timeout period before core is released for the FIS Directory. Criteria similar to those discussed in conjunction with the parameter RPTPER should be used if the user wishes to change the value of FDTPER.

The parameters FIDSEC, FIBLSA, and FIBNIX are used dynamically by the File Manager. They must be zero initially. When the first define file request is encountered by the File Manager, non-zero values are defined for each of these parameters.

The parameter ADRFMS is the starting sector of the File Manager space on the FISLU logical unit. Its value is dependent on the particular device which is used as the library unit. The external BEGFMS, which is linked by a *S statement at the time of system installation, defines ADRFMS if one of the following is used as the library unit:

1738-853/854 Disk
1733-853/854 Disk
1751 Drum
1752 Drum

ADRFMS is defined as $5BF7_{16}$ if the library unit is one of the

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following devices:

1733-856 Cartridge Disk with 4.4 million words.

1739-1 Cartridge Disk

ADRFMS is defined to be $2DF9_{16}$ if the library unit is a 7133-856 Disk with 2.2 million words. The definition of ADRFMS for the latter three services places the file space on the fixed platter disk for each of these devices. This has the advantage of minimizing seek time during system operation, but this positioning of file space is not required.

FSLIST is the location of the start of the file space parameters for each File Manager mass memory unit in the system. Up to nine File Manager units may be included in a system. These are numbered beginning with File Manager unit zero which is generally the system library unit. For each File Manager unit in the system a subsection of Section ADA is included to define the necessary parameters. For File Manager unit n, $0 \leq n \leq 8$, the following parameter values are given:

1. NUMFSn - Total number of sectors available for file space go on this unit. This is the value given on the MSOS ordering form. If the user wishes to add a File Manager to an existing system, the method of determining NUMFSn is described in Article 5.1.

2. LUEn - Bits 7 - 15 of LUEn give the number of words in the subsection for this File Manager unit. (This is a variable since the length of the file space list can vary as described under item 4.) Bits 0 - 6 of LUEn contain the system logical unit number corresponding to this File Manager unit.

3. The starting os sector of space available on this logical unit for File Manager use. For File Manager unit zero, this value is given by the parameter ADRFMS. For n ≠ 0, the starting sector is the value of the parameter BEGLUn.

4. Definition of the file space list for this File Manager unit. At any time after system operation has begun all available file space for this File Manager unit is contained either in the file space list or the file space pool. The file space list is composed of one or more blocks of available space. Each block is a threaded sequence of available segments of mass memory such that each segment has the same length in sectors as every other segment in the block. The segment lengths to be included in the file space list for this File Manager unit are given by the subsection entries following:

```
         ADC  NUMFSn
```

In a standard released system there are three segment lengths included in the file space list for each File Manager unit. These lengths are one sector, two sectors, and three sectors. The lengths are defined by the following thread definitions:

```
         NUM  0,1                     THREAD OF ONE SECTOR LONG
         NUM  0,2                     THREAD OF TWO SECTORS LONG
         NUM  0,3                     THREAD OF THREE SECTORS LONG
```

The first word of each thread is the sector of the first segment in this block. The first word of each thread must be zero initially. All available file space on this File Manager unit which lies in a segment of a length <u>other</u> than those included in the file space list is included in the file space pool for this File Manager unit. The user may redefine the segment lengths in the file space list depending on the different file record lengths he intends to use in the system. The advantage of keeping as much of the available file space as possible in the file space list is that available space there can be allocated much more quickly than can space in the file space pool. The disadvantage in having too many blocks in a file space list is that two words of core are used for each block. Consider the following example. The user determines that the file space list for File Manager unit 0 is to be composed of:

1) a block of segments one sector long
2) a block of segments two sectors long
3) a block of segments four sectors long
4) a block of segments six sectors long

In this case, the initial file space list threads for File Manager unit 0 would be as follows:

```
        NUM  0,1                THREAD OF ONE SECTOR LONG
        NUM  0,2                THREAD OF TWO SECTORS LONG
        NUM  0,4                THREAD OF FOUR SECTORS LONG
        NUM  0,6                THREAD OF SIX SECTORS LONG
```

5. The number of available file sectors. Initially this must be zero for each File Manager unit.

Following the set of subsections for all File Manager units in the system is a set of equivalences for entry points corresponding to unused File Manager units. These equivalences avoid having these entry points listed as unpatched externals at the time of system installation.

```
*           M I S C E L L A N E O U S   I N F O R M A T I O N
*
*           F I L E   M A N A G E R   D A T A
*
*           THESE ENTRIES ALLOW PROPER SYSTEM LINKAGE FOR IF THE FILE
*           MANAGER IS NOT SELECTED.
       SPC  2
       ENT  FSLIST
       ENT  ADRFMS,NUMFS0
       EQU  FSLIST($7FFF)
       EQU  ADRFMS($7FFF),NUMFS0($7FFF)
       SPC  2
       ENT  FISLU           LOGICAL UNIT OF FIS DIRECTORY AND BLOCKS
       ENT  MAXMMA          MAXIMUM NO. OF MASS MEMORY ATTEMPTS ON ERROR
       ENT  RPTPER          REQUEST PROCESSOR TIMFOUT PERIOD
       ENT  FDTPER          FILE/DIRECTORY TIMEOUT PERIOD
       ENT  FIDSEC          FIS DIRECTORY, S SECTOR ADDRESS
       ENT  FIBLSA          SECTOR ADDRESS OF LAST FIS BLOCK
       ENT  FIBNIX          INDEX TO THE NEXT AVAILABLE LOCATION IN FIBLSA
       ENT  FSLIST          START OF FILE SPACE LIST
       ENT  FSLLTH          FILE SPACE LIST LENGTH
       ENT  FSLEND          END OF FILE SPACE LIST
       ENT  ADRFMS          BEGINNING OF FILE MANAGER SPACE ON LIB UNIT
       SPC  2
       EQU  FISLU(LBUNIT)   LOGICAL UNIT OF FIS DIRECTORY AND BLOCKS
       EQU  MAXMMA(1)       MAXIMUM NO. OF MASS MEMORY ATTEMPTS ON ERROR
       EQU  FDTPER(10)      FILE/DIRECTORY TIMEOUT PERIOD     (1/10 SEC.)
       EQU  RPTPER(10)      REQUEST PROCESSOR TIMEOUT PERIOD (1/10 SEC.)
       SPC  2
      ↑14,6,
      ↑15,18,
      ↑17,3,
      ↑18,3,
       EXT  BEGFMS
ADRFMS ADC  BEGFMS          BEGINNING OF FILE MANAGER SPACE ON LIB UNIT
     ↑13,10,
      ↑16,3,
ADRFMS ADC  $5BF7           BEGINNING OF FILE MANAGER SPACE ON LIB UNIT
ADRFMS ADC  $2DF9           BEGINNING OF FILE MANAGER SPACE ON LIB UNIT
       SPC  1
********         THE FOLLOWING MUST BE IN ORDER                ********
FIDSEC ADC  0               1. FIS DIRECTORY, S SECTOR ADDRESS
FIBLSA ADC  0               2. SECTOR ADDRESS OF THE LAST FIS BLOCK
FIBNIX ADC  0               3. INDEX TO NEXT AVAILABLE LOCATION IN FIBLSA
FSLIST EQU  FSLIST(*)       4. START OF FILE SPACE LIST
       SPC  1
********         START OF LOGICAL UNIT ENTRIES                 ********
       SPC  2
```

Figure 1-82. File Manager Data, Section ADA

```
*           L O G I C A L   U N I T   D A T A ,   U N I T   0           ADA04900
*                                                                        ADA05000
      ENT  NUMFS0                                                        ADA05100
      EQU  NUMFS0()         NUMBER OF FILE SECTORS - UNIT 0              ADA05200
      SPC  1                                                             ADA05300
LUE0  VFD  X9/LUEL0,X7/LBUNIT  LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)ADA05400
      ADC  0                   ADDRESS OF FILE SPACE POOL                ADA05500
      ADC  0                   NUMBER OF AVAILABLE SECTORS               ADA05600
      ADC  NUMFS0              NUMBER OF SECTORS IN THIS FILE SPACE      ADA05700
      NUM  0,1                 THREAD OF ONE SECTOR LONG                 ADA05800
      NUM  0,2                 THREAD OF TWO SECTORS LONG                ADA05900
      NUM  0,3                 THREAD OF THREE SECTORS LONG              ADA06000
LUEL0 EQU  LUEL0(*-LUE0)                                                 ADA06100
      EJT                                                                ADA06200
*           L O G I C A L   U N I T   D A T A ,   U N I T   1           ADA06300
*                                                                        ADA06400
      ENT  BEGLU1                                                        ADA06500
      ENT  NUMFS1                                                        ADA06600
      EQU  LUNIT1()         LOGICAL UNIT OF FILE MANAGER UNIT 1          ADA06700
      EQU  BEGLU1()         BEGINNING FILE SECTOR  - UNIT 1              ADA06800
      EQU  NUMFS1()         NUMBER OF FILE SECTORS - UNIT 1              ADA06900
      SPC  1                                                             ADA07000
LUE1  VFD  X9/LUEL1,X7/LUNIT1  LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)ADA07100
      ADC  BEGLU1              ADDRESS OF FILE SPACE POOL                ADA07200
      ADC  0                   NUMBER OF AVAILABLE SECTORS               ADA07300
      ADC  NUMFS1              NUMBER OF SECTORS IN THIS FILE SPACE      ADA07400
      NUM  0,1                 THREAD OF ONE SECTOR LONG                 ADA07500
      NUM  0,2                 THREAD OF TWO SECTORS LONG                ADA07600
      NUM  0,3                 THREAD OF THREE SECTORS LONG              ADA07700
LUEL1 EQU  LUEL1(*-LUE1)                                                 ADA07800
      EJT                                                                ADA07900
*           L O G I C A L   U N I T   D A T A ,   U N I T   2           ADA08000
*                                                                        ADA08100
      ENT  BEGLU2                                                        ADA08200
      ENT  NUMFS2                                                        ADA08300
      EQU  LUNIT2()         LOGICAL UNIT OF FILE MANAGER UNIT 2          ADA08400
      EQU  BEGLU2()         BEGINNING FILE SECTOR  - UNIT 2              ADA08500
      EQU  NUMFS2()         NUMBER OF FILE SECTORS - UNIT 2              ADA08600
      SPC  1                                                             ADA08700
LUE2  VFD  X9/LUEL2,X7/LUNIT2  LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)ADA08800
      ADC  BEGLU2              ADDRESS OF FILE SPACE POOL                ADA08900
      ADC  0                   NUMBER OF AVAILABLE SECTORS               ADA09000
      ADC  NUMFS2              NUMBER OF SECTORS IN THIS FILE SPACE      ADA09100
      NUM  0,1                 THREAD OF ONE SECTOR LONG                 ADA09200
      NUM  0,2                 THREAD OF TWO SECTORS LONG                ADA09300
      NUM  0,3                 THREAD OF THREE SECTORS LONG              ADA09400
LUEL2 EQU  LUEL2(*-LUE2)                                                 ADA09500
      EJT                                                                ADA09600
```

Figure 1-82. File Manager Data, Section ADA (Continued)

```
*                 L O G I C A L   U N I T   D A T A ,   U N I T   3
*
        ENT  BEGLU3
        ENT  NUMFS3
        EQU  LUNIT3()          LOGICAL UNIT OF FILE MANAGER UNIT 3
        EQU  BEGLU3()          BEGINNING FILE SECTOR  - UNIT 3
        EQU  NUMFS3()          NUMBER OF FILE SECTORS - UNIT 3
        SPC  1
LUE3    VFD  X9/LUEL3,X7/LUNIT3     LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)
        ADC  BEGLU3                 ADDRESS OF FILE SPACE POOL
        ADC  0                      NUMBER OF AVAILABLE SECTORS
        ADC  NUMFS3                 NUMBER OF SECTORS IN THIS FILE SPACE
        NUM  0,1                    THREAD OF ONE SECTOR LONG
        NUM  0,2                    THREAD OF TWO SECTORS LONG
        NUM  0,3                    THREAD OF THREE SECTORS LONG
LUEL3   EQU  LUEL3(*-LUE3)
        EJT
*                 L O G I C A L   U N I T   D A T A ,   U N I T   4
*
        ENT  BEGLU4
        ENT  NUMFS4
        EQU  LUNIT4()          LOGICAL UNIT OF FILE MANAGER UNIT 4
        EQU  BEGLU4()          BEGINNING FILE SECTOR  - UNIT 4
        EQU  NUMFS4()          NUMBER OF FILE SECTORS - UNIT 4
        SPC  1
LUE4    VFD  X9/LUEL4,X7/LUNIT4     LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)
        ADC  BEGLU4                 ADDRESS OF FILE SPACE POOL
        ADC  0                      NUMBER OF AVAILABLE SECTORS
        ADC  NUMFS4                 NUMBER OF SECTORS IN THIS FILE SPACE
        NUM  0,1                    THREAD OF ONE SECTOR LONG
        NUM  0,2                    THREAD OF TWO SECTORS LONG
        NUM  0,3                    THREAD OF THREE SECTORS LONG
LUEL4   EQU  LUEL4(*-LUE4)
        EJT
*                 L O G I C A L   U N I T   D A T A ,   U N I T   5
*
        ENT  BEGLU5
        ENT  NUMFS5
        EQU  LUNIT5()          LOGICAL UNIT OF FILE MANAGER UNIT 5
        EQU  BEGLU5()          BEGINNING FILE SECTOR  - UNIT 5
        EQU  NUMFS5()          NUMBER OF FILE SECTORS - UNIT 5
        SPC  1
LUE5    VFD  X9/LUEL5,X7/LUNIT5     LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)
        ADC  BEGLU5                 ADDRESS OF FILE SPACE POOL
        ADC  0                      NUMBER OF AVAILABLE SECTORS
        ADC  NUMFS5                 NUMBER OF SECTORS IN THIS FILE SPACE
        NUM  0,1                    THREAD OF ONE SECTOR LONG
        NUM  0,2                    THREAD OF TWO SECTORS LONG
        NUM  0,3                    THREAD OF THREE SECTORS LONG
LUEL5   EQU  LUEL5(*-LUE5)
        EJT
```

Figure 1-82. File Manager Data, Section ADA (Continued)

```
*       L O G I C A L   U N I T   D A T A ,   U N I T   6
*
        ENT BEGLU6
        ENT NUMFS6
        EQU LUNIT6()          LOGICAL UNIT OF FILE MANAGER UNIT 6
        EQU BEGLU6()          BEGINNING FILE SECTOR  - UNIT 6
        EQU NUMFS6()          NUMBER OF FILE SECTORS - UNIT 6
        SPC  1
LUE6    VFD  X9/LUEL6,X7/LUNIT6  LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)
        ADC  BEGLU6              ADDRESS OF FILE SPACE POOL
        ADC  0                   NUMBER OF AVAILABLE SECTORS
        ADC  NUMFS6              NUMBER OF SECTORS IN THIS FILE SPACE
        NUM  0,1                 THREAD OF ONE SECTOR LONG
        NUM  0,2                 THREAD OF TWO SECTORS LONG
        NUM  0,3                 THREAD OF THREE SECTORS LONG
LUEL6   EQU  LUEL6(*-LUE6)
        EJT
*       L O G I C A L   U N I T   D A T A ,   U N I T   7
*
        ENT BEGLU7
        ENT NUMFS7
        EQU LUNIT7()          LOGICAL UNIT OF FILE MANAGER UNIT 7
        EQU BEGLU7()          BEGINNING FILE SECTOR  - UNIT 7
        EQU NUMFS7()          NUMBER OF FILE SECTORS - UNIT 7
        SPC  1
LUE7    VFD  X9/LUEL7,X7/LUNIT7  LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)
        ADC  BEGLU7              ADDRESS OF FILE SPACE POOL
        ADC  0                   NUMBER OF AVAILABLE SECTORS
        ADC  NUMFS7              NUMBER OF SECTORS IN THIS FILE SPACE
        NUM  0,1                 THREAD OF ONE SECTOR LONG
        NUM  0,2                 THREAD ON TWO SECTORS LONG
        NUM  0,3                 THREAD OF THREE SECTORS LONG
LUEL7   EQU  LUEL7(*-LUE7)
        EJT
*       L O G I C A L   U N I T   D A T A ,   U N I T   8
*
        ENT BEGLU8
        ENT NUMFS8
        EQU LUNIT8()          LOGICAL UNIT OF FILE MANAGER UNIT 8
        EQU BEGLU8()          BEGINNING FILE SECTOR  - UNIT 8
        EQU NUMFS8()          NUMBER OF FILE SECTORS - UNIT 8
        SPC  1
LUE8    VFD  X9/LUEL8,X7/LUNIT8  LU ENTRY LENGTH(7/15), LOGICAL UNIT(0-6)
        ADC  BEGLU8              ADDRESS OF FILE SPACE POOL
        ADC  0                   NUMBER OF AVAILABLE SECTORS
        ADC  NUMFS8              NUMBER OF SECTORS IN THIS FILE SPACE
```

Figure 1-82. File Manager Data, Section ADA {Continued}

```
         NUM   0,1                    THREAD OF ONE SECTOR LONG            ADA19400
         NUM   0,2                    THREAD ON TWO SECTORS LONG           ADA19500
         NUM   0,3                    THREAD OF THREE SECTORS LONG         ADA19600
LUEL8    EQU   LUEL8(*-LUE8)                                               ADA19700
         SPC   2                                                           ADA19800
FSLLTH   EQU   FSLLTH(*-FSLIST)       FILE SPACE LIST LENGTH               ADA19900
         SPC   1                                                           ADA20000
FSLEND   NUM   -0                     END OF FILE SPACE LIST               ADA20100
         EJT                                                               ADA20200
*              F I L E   M A N A G E R   D A T A                           ADA20300
*                                                                          ADA20400
         SPC   2                                                           ADA20500
*              LINK UNSELECTED ENTRY POINTS                                ADA20600
         SPC   2                                                           ADA20700
         ENT   BEGLU1,NUMFS1                                               ADA20800
         EQU   BEGLU1($7FFF),NUMFS1($7FFF)                                 ADA20900
         ENT   BEGLU2,NUMFS2                                               ADA21000
         EQU   BEGLU2($7FFF),NUMFS2($7FFF)                                 ADA21100
         ENT   BEGLU3,NUMFS3                                               ADA21200
         EQU   BEGLU3($7FFF),NUMFS3($7FFF)                                 ADA21300
         ENT   BEGLU4,NUMFS4                                               ADA21400
         EQU   BEGLU4($7FFF),NUMFS4($7FFF)                                 ADA21500
         ENT   BEGLU5,NUMFS5                                               ADA21600
         EQU   BEGLU5($7FFF),NUMFS5($7FFF)                                 ADA21700
         ENT   BEGLU6,NUMFS6                                               ADA21800
         EQU   BEGLU6($7FFF),NUMFS6($7FFF)                                 ADA21900
         ENT   BEGLU7,NUMFS7                                               ADA22000
         EQU   BEGLU7($7FFF),NUMFS7($7FFF)                                 ADA22100
         ENT   BEGLU8,NUMFS8                                               ADA22200
         EQU   BEGLU8($7FFF),NUMFS8($7FFF)                                 ADA22300
         EJT                                                               ADA22400
```

Figure 1-82. File Manager Data, Section ADA (Continued)

1.80 Job Processor File Parameters, Section ADB

Section ADB, Figure 1-83, gives the file parameter values used by the Job Processor. The parameter JLLUV4 is the logical unit used for storing Job Processor files. In a standard released system this is the library unit, but this may be changed if the user desires.

In order to have any Job Processor files, the system must include the pseudo tape driver. The pseudo tape capability is in turn dependent on a File Manager being in the system. If there are no pseudo tapes in the system, lines *ADB0140 through *ADB0190 will appear in SYSDAT to avoid listing JBFLV4, FBASV4 and PKEYV4 as unpatched externals at the time of system installation. In addition, if there is no File Manager in the system, lines *ADB0100 and *ADB0200 will be included in SYSDAT so that RELFIL will not be listed as an unpatched external.

If pseudo tape capability is included in the system lines *ADB0200 through *ADB0290 will appear in SYSDAT. In these lines, the values of JBFLV4, FBASV4, and PKEYV4 are defined.

The number of Job Processor files, JBFLV4, is the number specified by the user in the 1700 MSOS Ordering Form. This may be changed. The value of JBFLV4 must be such that $0 \leq$ JBFLV4 ≤ 1000. File numbers $7FF8_{16}$ through $7FFF_{16}$ are reserved for foreground pseudo tapes.

The parameter RKEYV4 is the Job File purge key. PKEYV4 contains the ASCII code for the two characters used with the Job Processor *PURGE request. The value of PKEYV4 may be changed by the user.

```
*            M I S C E L L A N E O U S   I N F O R M A T I O N
*
*            J O B   P R O C E S S O R   F I L E   P A R A M E T E R S
*
         SPC   3
         ENT   JLLUV4          LOGICAL UNIT OF JOB PROCESSOR FILES
         ENT   JBFLV4          NUMBER OF JOB PROCESSOR FILES
         ENT   FBASV4          FIRST FILE NUMBER USED BY JOB PROCESSOR
         ENT   PKEYV4          JOB FILE PURGE KEY
         ENT   RELFIL          FILE RELEASE PROCESSOR (DUMMY)
         SPC   3
JLLUV4   ADC   LBUNIT          LOGICAL UNIT OF JOB PROCESSOR FILES
         SPC   2
         EQU JBFLV4(0)         NUMBER OF JOB PROCESSOR FILES
*
*        LINK ENTRY POINTS REFERENCED BY THE JOB FILE PROCESSORS
*
         EQU   FBASV4($7FFF)
         EQU   PKEYV4($7FFF)
         EQU   RELFIL($7FFF)
         EQU JBFLV4()          NUMBER OF JOB PROCESSOR FILES
         SPC   1
         EQU FBASV4($7FF8-JBFLV4)
*
*        NOTE - FILES $7FF8 THRU $7FFF ARE RESERVED FOR FOREGROUND
*               PSEUDO TAPES.
         SPC   2
         EQU   PKEYV4($3030) JOB FILE PURGE KEY
         EJT
```

Figure 1-83. Job Processor File Parameters, Section ADB

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1.81 Preset Protected Entry Points for Use by Unpatched Programs, Section ADC

This section, as shown in Figure 1-84, will contain the address of each protected entry point which may be accessed by an unprotected program. When an unprotected program attempts to execute a return jump to a protected location, an interrupt occurs on line 0. The protect processor determines that the interrupt was due to a program protect fault. It then searches the addresses listed in Section ADC to see if the protected address is in the table of protected entry points which may be used by unprotected programs. If not, the unprotected program is terminated and an error message is printed. If the address is one which may be accessed by an unprotected program, control is transferred to the dispatcher. In this case, when the interrupted unprotected program is again put into operation, the return jump to the protected location is executed.

For all systems the Job Processor entry, JPRETN, is accessible from unprotected programs. If the debugging checkout package is in the system lines *ADC0160 through *ADC0200 are included so that SNAPOL, the snap dump entry, will be accessible from the background. If the File Manager is in the system, lines *ADC0210 through *ADC0710 are included so that the File Manager may be accessed by unprotected programs.

Section ADC in a given SYSDAT contains the ASCII code for each entry point to be included. During system installation this list is used to determine corresponding entry point locations.

APRSET is the start of Section ADC and LPRSET is the length of this section. These values are referenced in the communications region, Section AAE, as discussed in Article 1.5.

Care must be used if the user wishes to add an entry point reference to this section. A protected program which may be entered from unprotected core should inhibit interrupts and save the return address and other necessary information in volatile storage before enabling interrupts to prevent erroneous entries. Before returning to an unprotected program, the protected program should check to see if the job has been cancelled. If the job has been terminated, exit should be made to the dispatcher. In addition, the protected program must check parameters passed from unprotected programs to prevent storing into protected core. Maximum system protection is provided when the list of entry points referenced in Section ADC is kept to a minimum.

```
*               P R E S E T   R E G I O N
*
*               PRESET PROTECTED ENTRY POINTS FOR USE BY UNPROTECTED PGMS
*
APRSET  EQU     APRSET(*)
        ENT     JPRET
        SPC     2
*               J O B   P R O C E S S O R   P R E S E T
        SPC     2
        EXT     JPRETN
        ALF     3,JPRETN
JPRET   ADC     JPRETN          JOB PROCESSOR RETURN
*
        SPC     2
*               S N A P   D U M P   P R E S E T
        SPC     2
        EXT     SNAPOL
        ALF     3,SNAPOL
        ADC     SNAPOL          REGISTER SNAPSHOT
*
        SPC     2
*               F I L E   M A N A G E R   P R E S E T S
        SPC     2
        EXT     DEFFIL
        ALF     3,DEFFIL
        ADC     DEFFIL          DEFINE FILE
*
        EXT     RELFIL
        ALF     3,RELFIL
        ADC     RELFIL          RELEASE FILE
*
        EXT     DEFIDX
        ALF     3,DEFIDX
        ADC     DEFIDX          DEFINE INDEXED FILE
*
        EXT     LOKFIL
```

Figure 1-84. Preset Protected Entry Points for Use by Unprotected Programs, Section ADC

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```
         ALF   3,LOKFIL
         ADC   LOKFIL          LOCK FILE
*
         EXT   UNLFIL
         ALF   3,UNLFIL
         ADC   UNLFIL          UNLOCK FILE
*
         EXT   STOSEQ
         ALF   3,STOSEQ
         ADC   STOSEQ          STORE SEQUENTIAL RECORD
*
         EXT   STODIR
         ALF   3,STODIR
         ADC   STODIR          STORE DIRECT
*
         EXT   STOIDX
         ALF   3,STOIDX
         ADC   STOIDX          STORE INDEXED RECORD
*
         EXT   RTVSEQ
         ALF   3,RTVSEQ
         ADC   RTVSEQ          RETRIEVE SEQUENTIAL RECORD
*
         EXT   RTVDIR
         ALF   3,RTVDIR
         ADC   RTVDIR          RETRIEVE DIRECT
*
         EXT   RTVIDX
         ALF   3,RTVIDX
         ADC   RTVIDX          RETRIEVE INDEXED RECORD
*
         EXT   RTVIDO
         ALF   3,RTVIDO
         ADC   RTVIDO          RETRIEVE INDEXED-ORDERED RECORD
         EJT
```

Figure 1-84. Preset Protected Entry Points for Use by Unprotected Programs, Section ADC (Continued)

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1.82 System Library Directory, Section ADD

This section defines the start of the system library directory. The directory will follow SYSDAT. It is set up by the System Initializer Program. {Refer to Figure 1-85.}

```
*            S Y S T E M   L I B R A R Y   D I R E C T O R Y              ADD00100
*                                                                         ADD00200
*                         COMPILED FROM #Y, #YM BY SYSTEM INITIALIZER     ADD00300
SLDIRY EQU   SLDIRY(*)                                                    ADD00400
       END                                                                ADD00500
 MON                                                                      ADD00600
1202  RECORDS TRANSFERRED
```

Figure 1-85. System Library Directory, Section ADD

2.1 Binaries Included in the Install File

Included in the installation materials sent to a user is a binary copy of every 1700 MSOS 4.1 module. A number of these modules may not be included in the user's installed operating system, but the binary copies will, nevertheless, be included in the set of system binaries. In addition, copies of certain 1700 FORTRAN 3.2 modules are included if the user has a FORTRAN compiler license. The install file itself contains only those modules to be included in the system. The system binaries media and the install file media may be magnetic tape, punched cards, or paper tape. The system skeleton as discussed in Article 2.2 is set up to select those modules from the set of system binaries which are to be part of a given system.

Some of the modules included in binary form must be included in every 1700 MSOS 4.1 system. Some of the modules are optional. They can be included for added system capabilities, but are not necessary. Other modules are part of a group such that at least one module from the group must be included, or part or all of the group is required under certain conditions. Following is a list of the MSOS 4.1 modules and the FORTRAN 3.2 modules which may be included in binary form in the install file. A module in the list is optional unless there is an X in the column headed "Required in All Systems". If the module is a part of a group, such that one or more modules in the group are required under certain conditions, a non-blank identifier appears in the left-hand column of the list. At the beginning of a group, the requirement for selection within the group is explained.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
	X	SYSDAT	The binary copy of SYSDAT as it has been customized for a particular installation. The binary form of SYSDAT corresponds to the source copy of SYSDAT also included in the installation materials for the system.
	X	SPACE	
	X	NMONI	

One of the modules in Group E is required.

E		RDISP	This is the scheduler/dispatcher module which must be used when reentrant FORTRAN is in the system.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
			It may be used if reentrant FORTRAN is not in the system, but in this case it causes core to be used unnecessarily.
E		NDISP	This is the scheduler/dispatcher module which is normally used when reentrant FORTRAN is not in the system.
	X	RW	
	X	T14	
	X	T16	
	X	PARAME	
	X	COMMON	
	X	NIPROC	
		LIN1V4	This program is used to analyze interrupts on line one. It is required only if more than one device in the system is connected to interrupt line one.
	X	ALVOL	
	X	OFVOL	
	X	ALCORE	
	X	DCORE	
		PRTCDR	This module is necessary only if partitioned core is in the system.
	X	NFNR	
	X	NCMPRQ	
	X	MAKQ	
	X	ADEV	
	X	TMINT	
	X	DTIMER	
	X	TOD	
	X	MINT	
	X	TRVEC	

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
		SNAPOL	Provides registers snap dump capability, useful in debugging programs.
		DMP42X	Provides core dump capability if the 1742-30 or 1742-120 line printer is in the system.
		DMP421	Provides core dump capability if the 1740/501 or 1742-1 line printer is in the system.

Group F consists of the set of SYSCOP bootstrap programs. One of the programs in this group must be included if SYSCOP is in the system. The module selected depends on the system hardware configuration.

F		B17332	SYSCOP bootstrap for the 1733-2/856-2/856-4 Cartridge Disk.
F		BDK85X	SYSCOP bootstrap for the 1733-1/853/854 Disk or the 1738/853/854 Disk.
F		B17391	SYSCOP bootstrap for the 1739-1 Cartridge Disk.
F		B1752	SYSCOP bootstrap for the 1752 Drum
F		B1751	SYSCOP bootstrap for the 1751 Drum

All the modules in Group G are required if the File Manager is in the system.

G		FILMGR	Core resident File Manager module.
G		RSPCV4	Core resident File Manager module.
G		SRHFIS	Core resident File Manager module.
	X	EFDATA	
	X	DUMMY	Driver for dummy device.
		ALAQ	This module is required if more than one device in the system requires A/Q allocation.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
		AL1706	This module is required if two or more devices in the system share a 1706 Buffered Data Channel.

One comment device driver from Group H must be included.

H		D1711	Core resident 1711/1712/1713/713 Keyboard driver
H		D1713K	Core resident 1713 Keyboard driver

One of the core resident mass storage drivers from Group I is required. A maximum of one disk driver and one drum driver may be present in a system.

I		D17332	1733-2/856-2/856-4 Cartridge Disk driver.
I		D1738	1738/853/854 Disk driver.
I		D17331	1733-1/853/854 Disk driver.
I		D17391	1739-1 Cartridge Disk driver.
I		D1751	1751 Drum driver.
I		D1752	1752 Drum driver.
		REWCK	Core resident rewind check module required if magnetic tape is present in the system.
		DSBUFR	Provides software buffering capability.
		MMEXEC	Handles mass memory resident drivers. Required if any driver in the system is mass memory resident.

Group J consists of those drivers which are optionally core resident or mass memory resident. The system requires an input device driver and an output device driver. These need not be two separate drivers if the input device and the output device are the same device and one

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GROUP IDENTIFICATION (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS

driver handles both input and output. The input device and output device may be the same as the comment device in which case the driver from Group H satisfies the input device/output device driver requirement. Otherwise this requirement must be satisfied from Group J.

J		D1713R	1713 Paper Tape Reader driver.
J		D1713P	1713 Paper Tape Punch driver.
J		DCOSY	COSY interface driver.
J		D17322	1732-2/615-73/615-93/10300 Buffered Magnetic Tape driver.
		D327TR	This module is the 7-track interface. It is required by D17322 only if 7-track tapes will be used.
J		D1732U	1732-1/608/609 Magnetic Tape driver (unbuffered).
J		D1732B	1732-1/608/609 Magnetic Tape driver
J		D1731U	These five modules comprise the 1731/601 Magnetic Tape driver (unbuffered).
J		FRWA	
J		FRWB	
J		RWBA	
J		MAXRVU	
J		D1731B	These five modules comprise the 1731/1706/601 Buffered Magnetic Tape driver.
J		FRWAB	
J		FRWBB	
J		RWBAB	
J		MAXRVB	
J		DPSUDO	Pseudo tape driver
J		D42312	Driver for the 1742-30 Line Printer or the 1742-120 Train Printer. The 1742-120 Printer requires T5954 to be appended to the driver.
		T5954	Train image table for the 1742-120 Printer.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
J		D40421	Driver for the 1740/501 Line Printer or the 1742-1 Line Printer.
J		D17293	1729-3 Card Reader driver. This module requires either CR026 or CR029.
		CR026	Table used for converting Hollerith {026} punched code to ASCII.
		CR029	Table used for converting EBCDIC {029} punched code to ASCII.
J		D1728	1728/430 Card Reader/Punch driver. This module requires either the pair of modules CP026 and CR026 or the pair CP029 and CR029.
		CP026	Table used for converting ASCII to Hollerith {026} punched code.
		CP029	Table used for converting ASCII to EBCDIC {029} punched code.
J		D17292	1729-2 Card Reader driver. Use of this module requires either CR026 or CR029.
J		D1726U	1726/405 Card Reader driver {unbuffered}. Use of this module requires the inclusion of either CR026 or CR029.
J		D1726B	1726/1706/405 Buffered Card Reader driver. Use of this module requires the inclusion of either CR026 or CR029.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
J		D1777R	1721/1722/1777 Paper Tape Reader driver.
J		D1777P	1723/1724/1777 Paper Tape Punch driver.
J		D3644	364-4 Communications Multi-plexor driver.
J		D1747	1747 Data Set Controller driver
J		D1744	1744/274 Digigraphic Unit driver
J		D1501	1525-3/1501-10/1501-11 High Level Solid State Analog Input driver.
J		D1536	1525-3/1536-2/1502-80 Low Level Relay Analog Input driver.
J		D1544	1544-1 to -4 Digital Input driver.
J		D5355	1553-1 to -4/1555-1 to -3 Digital Output driver.
		S15721	1572-1 Sample Rate Generator driver. This driver may be included only if the sample rate mode of the timer is not being used as the basic system time base. If included, S15721 must be core resident.
		L15721	1572-1 Line Synchronized Timer driver. This driver may be included only if the line synchronized timer aspects of the 1572-1 are not being used as the system time base. If included, L15721 must be core resident.

The modules in Group K are all required if reentrant FORTRAN is in the system. They are all core resident.

K		FORTR	
K		Q8PRMR	

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
K		PARABR	
K		Q8EXPR	
K		Q8ABR	
K		SQRTFR	
K		SIGNR	
K		FXFLR	
K		EXPRGR	
K		LNPRGR	
K		TANHR	
K		SNCSR	
K		ARCPGR	
K		IFALTR	
K		FLCATR	
K		Q8QIOR	
K		BINARR	
K		IOCODR	
K		INITLR	
K		RSTORR	
K		GETCHR	
K		IPACKR	
K		UPDATR	
K		DECPLR	
K		INTGRR	
K		SPACER	
K		HOLR	
K		DCHXR	
K		HXASCR	
K		AFMTOR	
K		RFMTOR	
K		AFMTIR	
K		RFMTIR	
K		ASCHXR	

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
K		HXDCR	
K		FLOTIR	
K		FOUTR	
K		EOUTR	
K		EWRITR	
K		INTIIR	
K		FORMTR	
K		Q8QFIR	
K		Q8QFLR	
K		Q8QFXR	

The modules in Group K1 are usually included with reentrant FORTRAN although any module in the group may be omitted if the reentrant FORTRAN programs in the system are restricted to not call the corresponding formatting routine. Each of these formatting routines is described in the 1700 MSOS 4 MS FORTRAN Version 3 A/B Reference Manual.

K1		HEXAR	Permits reentrant FORTRAN calls to HEXASC.
K1		HEXDR	Permits reentrant FORTRAN calls to HEXDEC.
K1		ASCIIR	Permits reentrant FORTRAN calls to ASCII.
K1		DECHXR	Permits reentrant FORTRAN calls to DECHEX.
K1		AFORMR	Permits reentrant FORTRAN to call AFORM.
K1		RFORMR	Permits reentrant FORTRAN to call RFORM.
K1		FLOTGR	Permits reentrant FORTRAN to call FLOATG.

GROUP IDENTIFICATION (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS

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The modules in Group L are all required if double precision reentrant FORTRAN is in the system. They are all core resident.

L		Q8DBLR	
L		DEXPR	
L		Q8DABR	
L		DSQRTR	
L		DSIGNR	
L		SNGLR	
L		Q8DFLR	
L		DEXPFR	
L		DLOGR	
L		DRSTRR	
L		DSNCSR	
L		DATANR	
L		DFLOTR	
L		Q8QDFR	
L		DOUTR	
	X	NXTLOC	This is a dummy program. The purpose of loading it is that the load location of NXTLOC marks the next available core location above the monitor and reentrant FORTRAN.
	X	LIBEDT	
	X	LOAD1	
	X	BRNCH1	
	X	LIDRV1	
	X	LCDRV1	
	X	LMDRV1	
	X	LLDRV1	
	X	ADJOF1	
	X	CNVRT1	
	X	LSTOT1	

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
	X	LINK11	
	X	LOADR1	
	X	NAMPR1	
	X	RBDBZ1	
	X	ENTEX1	
	X	XFRPR1	
	X	STBASE	Mass memory resident.
	X	LNKENT	
	X	LNKCR1	
	X	PATCH	
	X	TBSCH1	
	X	HASH	
	X	TBSTR1	
	X	PAGE	
	X	PROGLD	
	X	SCAN1	
	X	CHPU1	
	X	ADJOV2	
	X	ADRPR1	
	X	JOBENT	
	X	T11	
	X	T7	
	X	T5	
	X	T3	
	X	JOBPRO	
		ONE	A dummy program. The loading of ONE provides for the capability of the user to later replace ONE by a non-dummy program of the same name. The replacement program may be loaded by using LIBEDT.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
		TWO	Each of these are dummy programs with the same purpose as ONE.
		THREE	

One module from Group M is required as the protect processor for the system.

M		UPROTK	Unbuffered protect processor. Using UPROTK, unprotected core is not swapped out while unprotected input/output is in progress.
M		BPROTK	Buffered protect processor. Using BPROTK, unprotected core may be swapped out while unprotected input/output is in progress if certain conditions are met. {Refer to Article 1.58.}
	X	JBKILL	
	X	JPLOAD	
	X	JPCHGE	
	X	ASCHEX	
	X	T13	
	X	JCRDV4	
	X	JLGOV4	
	X	JPSTV4	
	X	NAMEV4	
	X	JPFLV4	
	X	JPF2V4	
	X	RESTOR	

GROUP IDENTIFICATION (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS

The modules in Group N are required only if the recovery package is in the system.

GROUP IDENTIFICATION (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
N		RCOVER	
N		OUTSEL	
N		RDMPV4	
N		MASDMP	

The modules in Group O are required only if the breakpoint package is in the system.

GROUP IDENTIFICATION (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
O		BRKPTD	
O		SIFT	
O		BIASCI	
O		RETJMP	
O		JMPTO	
O		ENTER	
O		ENTCOR	
O		PRTREG	
O		TERMIN	
O		RESUME	
O		DPCORB	
O		MSDMPB	
O		SETBRP	
		ODEBUG	Required only if the debugging package is in the system.

Modules in Group P are required only if the system checkout package is in the system.

GROUP IDENTIFICATION (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
P		SYSCOP	
P		CO1ST	
P		CO2ND	
P		CO3RD	
P		COLAST	

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
	X	MIPRO	
	X	TDFUNC	
	X	EFSTOR	
	X	EFLIST	
		SCMEXC	Required only if the SCMM package is in the system.
	X	VERFY1	Used for system verification tests that accompany the system install file.

Modules in Group Q are loaded as dummy ordinals. The purpose of these dummy programs is to allow the user to later insert programs into the system library. Any of these may be omitted if it is not intended to later enter a corresponding system library program.

Q		DUMMY1	
Q		DUMMY2	
Q		DUMMY3	
Q		DUMMY4	
Q		DUMMY5	
Q		DUMMY6	
Q		DUMMY7	
Q		DUMMY8	
Q		DUMMY9	
Q		DUMMY0	

Note that the drivers from Group J which are to be mass resident are loaded following the modules in Group Q.

Modules in Group R are the mass resident File Manager request processors. These are included only if the File Manager is in the system. The module FMDUMY is a dummy module of 96 words. Each time it is loaded it causes the sector pointer to point to a new sector. The module RPEND is also a dummy module. It contains zero words. It is used to record the end of a request

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS

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processor, and is therefore loaded after the set of modules for each request processor. The function of a given request processor in Group R is given in the remarks column.

R		DEFFIL	Define file
R		FILSPC	
R		RELFIL	Release file
R		RELSPC	
R		DEFIDX	Define file indexed
R		SQRTFM	
R		FILSPC	
R		LOKFIL	Lock file
R		UNLFIL	Unlock file
R		STOSEQ	Store sequential
R		FILSPC	
R		STODIR	Store direct
R		STOIDX	Store indexed
R		HASHCD	
R		GETKID	
R		FILSPC	
R		RTVSEQ	Retrieve sequential
R		RTNSPC	
R		RTVDIR	Retrieve direct
R		RTNSPC	
R		RTVIDX	Retrieve indexed
R		HASHCD	
R		GETKID	
R		RTNSPC	
R		RTVIDO	Retrieve indexed ordered
R		GETKID	
R		RTNSPC	

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS

Modules in Group S are Macro Assembler modules and thus are included only if the Macro Assembler is in the system.

S		LIBMAC	Allows generation of a new macro library.
S		ASSEM	Sequences the Macro Assembler passes.
S		PASS1	
S		PA1PR2	
S		PASS2	
S		PA2PR2	
S		PASS3	
S		PA3PR2	
S		PA3PR3	
S		MACSKL	Macro library
S		MACROS	

Either the FORTRAN 3.2 A compiler or the FORTRAN 3.2 B compiler may be included. The B compiler is faster, but requires larger overlays. {Refer to the 1700 MSOS 4 MS FORTRAN Version 3 A/B Reference Manual, Publication No. 60362000.} The COSY deck identifier for each module of the A compiler ends with "FORTRAN 3.2A". The COSY deck identifier for each module of the B compiler ends with "FORTRAN 3.2B".

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GROUP IDENTIFIER (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER

Following is the list of modules to be loaded for the FORTRAN 3.2 A compiler. Note that some redundancies occur. The modules must be loaded in this order including the redundancies so that each compiler overlay will be properly defined. The skeleton records for the FORTRAN 3.2A compiler are listed in Article 6.3.2.

		FTNA	
		FTNA	
		GOA	F02
		IOFREA	F08
		CNVT	A01
		CONV	F03
		DIAG	F04
		GETC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QRFRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAA	F17
		DUMYAA	F18
		PHASEA	A08
		ARAYSZ	A42
		DOLOOP	A43
		ENDDO	A29
		GNST	A06
		IGETCF	F14
		OPTION	F15
		PLABEL	A09
		QRGBDS	A10
		RDLABL	A11
		SAVEID	A04
		STCHAR	A12
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOA	F02
		IOPREA	F08
		CNVT	A01
		CONV	F03
		DTAG	F04
		GFTC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QRPRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAB	F19
		DUMYAB	F20
		BYEQFR	A19
		DFLOT	F06
		DUMVCL	F07
		DXF9	F05
		GETF	A05
		GOLT	A02
		SAVEID	A04
		STCHAR	A12
		SUBPFR	A23
		TYPE	A13
		ENDLOC	F16

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GROUP IDENTIFIER (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOA	F02
		IOPRBA	F08
		CNVT	A01
		CONV	F03
		DTAG	F04
		GETC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QBPRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAC	F21
		DUMYAC	F22
		ASGNPR	A32
		BDOPR	A33
		CFIVCC	A34
		CKIVC	A35
		CKNAME	A36
		COMNPR	A15
		DFLOT	F06
		DIMPR	A16
		DUMVCL	F07
		DXF9	F05
		EREPR	A38
		EXRLPR	A24
		GETF	A05
		GPUT	A02
		RDLABL	A11
		TYPEPR	A18
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOA	F02
		IOPREA	F08
		CNVT	A01
		CONV	F03
		DTAG	F04
		GETC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QBFRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAD	F23
		DUMYAD	F24
		ASEMFR	A40
		DFLOT	F06
		DUMVCL	F07
		DXP9	F05
		GETF	A05
		G-LT	A02
		IGETCF	F14
		PUNT	A27
		RDLABL	A11
		SUBSCR	A17
		FNDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOA	F02
		IOPRBA	F08
		CNVT	A01
		CONV	F03
		DIAG	F04
		GETC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QAPRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAE	F25
		DUMYAE	F26
		CONSUB	A30
		DATAPR	A31
		DFLOT	F06
		DUMVOL	F07
		DXP9	F05
		GETF	A05
		GPUT	A02
		STCHAR	A12
		ENDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOA	F02
		IOFREA	F08
		CNVT	A01
		CONV	F03
		DTAG	F04
		GETC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QAPRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAF	F27
		DUMYAF	F28
		CHECKF	A20
		FGETC	A21
		FORK	A22
		PFGVS	A25
		PRNTNM	A26
		STCHAR	A12
		SYMSCN	A28
		ENDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOA	F02
		IOPRBA	F08
		CNVT	A01
		CONV	F03
		DIAG	F04
		GETC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QBPRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAG	F29
		DUMYAG	F30
		ARITH	A14
		IGETCF	F14
		PUNT	A27
		TREE	A41
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOA	F02
		IOFRBA	F08
		CNVT	A01
		CONV	F03
		DIAG	F04
		GETC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QBPRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAH	F31
		DUMYAH	F32
		IGETCF	F14
		MODMXR	A39
		PUNT	A27
		ENDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOA	F02
		IOPRBA	F08
		CNVT	A01
		CONV	F03
		DIAG	F04
		GETC	F13
		GETSYM	F12
		OUTENT	A07
		PACK	F09
		QBPRMS	F10
		STORE	F11
		SYMBOL	A03
		LOCLAI	F33
		DUMYAI	F34
		IOSPR	A37
		ENDOC	A29
		RDLABL	A11
		STCHAR	A12
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOB	F35
		CNVT	A01
		DUMMY	B01
		FCNSTK	B02
		GETSYM	F12
		IOPREB	F36
		KCPART	B03
		KOLTFT	B04
		KSCSTK	B05
		KPC3FR	B06
		KSYMGN	B07
		LABKPC	B08
		LABLER	B09
		PUNT	B10
		QBPRMS	F10
		STOREB	F37
		SYMBOL	B11
		TSALOC	B12
		LOCLBA	F38
		DUMYBA	F39
		PHASER	B21
		INXRST	B19
		NOPROC	B20
		READIR	B22
		ENDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOB	F35
		CNVT	A01
		DUMMY	B01
		FCNSTK	B02
		GETSYM	F12
		IOPRBB	F36
		KCPART	B03
		KOLTFT	B04
		KPCSTK	B05
		KPC3PR	B06
		KSYMGN	B07
		LABKPC	B08
		LABLER	B09
		PUNT	B10
		QBFRMS	F10
		STOREB	F37
		SYMBOL	B11
		TSALCC	B12
		LOCLBB	F40
		DUMYBB	F41
		AFIDL	B25
		ASSEM	B13
		BANANA	B14
		END	B16
		ENTCCD	B17
		INXRST	B19
		SUBFUN	B23
		ENDLCC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOB	F35
		CNVT	A01
		DUMMY	B01
		FCMSTK	B02
		GETSYM	F12
		IOFRBB	F36
		KCPART	B03
		KOUTPT	B04
		KPCSTK	B05
		KPC3PR	B06
		KSYMGN	B07
		LABKPC	B08
		LABLER	B09
		PUNT	B10
		QBPRMS	F10
		STOREB	F37
		SYMBOL	B11
		TSALOC	B12
		LOCLBC	F42
		DUMYBC	F43
		ASLPER	B26
		ARAYSZ	A42
		BGINDO	B15
		CGOTO	B27
		HELEN	B18
		SYMSCN	A28
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOB	F35
		CNVT	A01
		DUMMY	B01
		FCNSTK	B02
		GETSYM	F12
		IOPREB	F36
		KCPART	B03
		KOUTPT	B04
		KPCSTK	B05
		KPC3PR	B06
		KSYMGN	B07
		LABKPC	B08
		LABLER	B09
		PUNT	B10
		QBPRMS	F10
		STOREB	F37
		SYMBCL	B11
		TSALOC	B12
		LOCLED	F44
		DUMYBD	F45
		ARITHR	B34
		FINK	B28
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOB	F35
		CNVT	A01
		DUMMY	B01
		FCNSTK	B02
		GETSYM	F12
		IOPRBB	F36
		KCFART	B03
		KOUTPT	B04
		KPCSTK	B05
		KPC3PR	B06
		KSYMGN	B07
		LABKPC	B08
		LABLER	B09
		PUNT	B10
		QBPRMS	F10
		STOREB	F37
		SYMBOL	B11
		TSALOC	B12
		LOCLBE	F46
		DUMYBE	F47
		ACP	B24
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOB	F35
		CNVT	A01
		DUMMY	B01
		FCMSTK	B02
		GETSYM	F12
		IOPRBB	F36
		KCPART	B03
		KOLTPT	B04
		KPCSTK	B05
		KPC3PR	B06
		KSYMGN	B07
		LABKPC	B08
		LABLER	B09
		PUNT	B10
		Q8PRMS	F10
		STOREB	F37
		SYMBOL	B11
		TSALOC	B12
		LOCLBF	F48
		DUMYBF	F49
		SUBPR3	B33
		INTRAM	B29
		PARTSB	B30
		SUBPR1	B31
		SUBPR2	B32
		ENDLOC	F16

GROUP IDENTIFIER (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOC	F50
		IOPRBC	F51
		BKDWN	C01
		BLDUP	C02
		BSS	C03
		CHKWD	C04
		CON	C07
		COUNT	C08
		DATAST	C09
		GETSYM	C10
		INCUT	C11
		LABEL	C14
		LABIN	C15
		QBFRMS	F10
		REED	C17
		SYMSCN	C19
		LOCLCA	F52
		DUMYCA	F53
		PHASEC	C13
		ENDLOC	F16

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GROUP IDENTIFIER (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOC	F50
		IOPRBC	F51
		BKDWN	C01
		BLDUP	C02
		BSS	C03
		CHKWD	C04
		CON	C07
		COUNT	C08
		DATAST	C09
		GETSYM	C10
		INOUT	C11
		LABEL	C14
		LABIN	C15
		Q8PRMS	F10
		REED	C17
		SYMSCN	C19
		LOCLCB	F54
		CHCP	C05
		CL12	C06
		SKIP	C18
		IXOPT	C12
		QXLD	C16
		ENDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOOD	F55
		INDEX	D01
		IOPRED	F56
		NPUNCH	D02
		QAPRMS	F10
		LOCLDA	F58
		DUMYDA	F59
		PHASE6	D03
		BEGINO	D21
		CONV	F57
		FINISH	D22
		GETSYM	D16
		IACON	D17
		IHCON	D18
		NWRITE	D19
		PACK	F09
		SYMSCN	D20
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOOD	F55
		INDEX	D01
		IOPRBD	F56
		NPUNCH	D02
		Q8PRMS	F10
		LOCLDB	F60
		DUMYDB	F61
		AMOUT	D04
		BKDWN	D06
		COUNT	D07
		GETSYM	D14
		LABOUT	D08
		NP2OUT	D09
		RBDX	D10
		RBPK	D11
		SYMSCN	D15
		TABDEC	D12
		UNPUNC	D13
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOCD	F55
		INDEX	D01
		IOPRBD	F56
		NPUNCH	D02
		QBPRMS	F10
		LOCLOC	F62
		ADMAX	D05
		GETSYM	D14
		TABDEC	D12
		SYMSCN	D15
		ENDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOE	F63
		INDEX	E01
		IOFRED	F56
		NPUNCH	E02
		QAPRMS	F10
		LOCLDA	F58
		DUMYDA	F59
		PHASE6	E03
		BEGINO	E19
		CONV	F57
		FINISH	E20
		GETSYM	E14
		IACON	E15
		IHCON	E16
		NWRITE	E17
		PACK	F09
		SETPNT	E18
		SYMSCN	D20
		ENDLOC	F16

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOE	F63
		INDEX	E01
		IOPRED	F56
		NPUNCH	E02
		QBFRMS	F10
		LOCLDB	F60
		DUMYDB	F61
		AMCUT	E04
		BKDWN	E06
		CONV	F57
		COUNT	E07
		GETSYM	E14
		IACON	E15
		IHCON	E16
		LABOUT	E08
		NP2OUT	E09
		NWRITE	E17
		PACK	F09
		RBCX	E10
		RBFK	E11
		SETPRT	E18
		SYMSCN	D20
		TABDEC	E12
		UNFUNC	E13
		ENDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNA	
		GOE	F63
		INDEX	E01
		IOPRBD	F56
		NPUNCH	E02
		QBPRMS	F10
		LOCLOC	F62
		ADMAX	E05
		GETSYM	E14
		SYMSCN	D20
		TABDEC	E12
		ENDLOC	F16

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER

Following is the list of modules to be loaded for the FORTRAN 3.2 B Compiler. As for the A compiler, there are some redundancies. The modules must be loaded in the order listed to properly define each compiler overlay. The skeleton records for the FORTRAN 3.2B compiler are listed in Appendix B.

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNB	
		FTNB	
		GOA	02F
		CFIVCC	34A
		CKNAME	36A
		CNVT	01A
		CONV	03F
		DIAG	04F
		DXF9	05F
		DFLOT	06F
		DUMVCL	35F
		GETC	14F
		GETF	04A
		GETSYM	07F
		GPUT	02A
		IGETCF	15F
		IOPREA	08F
		PACK	09F
		Q8PRMS	10F
		RDLABL	10A
		STORE	11F
		SYMBOL	03A
		ENDOC	29A
		GNST	05A
		OPTION	16F
		OUTENT	06A
		PHASEA	07A
		PLABEL	08A
		STCHAR	11A
		TYPE	12A
		SAVEID	13A
		LOCLA1	12F
		DUMYA1	13F
		Q8GBDS	09A
		ENDLCC	17F

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNB	
		GOA	02F
		CFIVOC	34A
		CKNAME	36A
		CNVT	01A
		CONV	03F
		DIAG	04F
		DXP9	05F
		DFLOT	06F
		DUMVOL	35F
		GETC	14F
		GETF	04A
		GETSYM	07F
		GPUT	02A
		IGETCF	15F
		IOPRBA	08F
		PACK	09F
		Q8PRMS	10F
		RDLABL	10A
		STORE	11F
		SYMBOL	03A
		ENDDO	29A
		GNST	05A
		OPTION	16F
		OUTENT	06A
		PHASEA	07A
		PLABEL	08A
		STCHAR	11A
		TYPE	12A
		SAVEID	13A
		LOCLA2	18F
		DUMYA2	19F
		BYEQPR	19A
		CHECKF	20A
		COMNPR	15A
		CONSUB	30A
		DATAPR	31A
		DIMPR	16A
		EXRLPR	24A
		FGETC	21A
		FORK	22A
		PEQVS	25A
		PRNTNM	26A
		SUBPPR	23A
		SYMSCN	28A
		TYPEPR	18A
		ENDLOC	17F

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNB	
		GOA	02F
		CFIVCC	34A
		CKNAME	36A
		CNVT	01A
		CONV	03F
		DIAG	04F
		DXP9	05F
		DPLOT	06F
		DUMVCL	35F
		GETC	14F
		GETF	04A
		GETSYM	07F
		GPUT	02A
		IGETCF	15F
		IOPREA	08F
		PACK	09F
		Q8PRMS	10F
		RDLABL	10A
		STORE	11F
		SYMBOL	03A
		ENDDC	29A
		GNST	05A
		OPTION	16F
		OUTENT	06A
		PHASEA	07A
		PLABEL	08A
		STCHAR	11A
		TYPE	12A
		SAVEID	13A
		LOCLA3	20F
		DUMYA3	21F
		ARAYSZ	42A
		ASEMPR	40A
		ASGNPR	32A
		BDCPR	33A
		CHECKF	20A
		CKIVC	35A
		CONSUB	30A
		CPLOCP	43A
		FGETC	21A
		FORK	22A
		ERBPR	38A
		MODMXR	39A
		PUNT	27A
		ENDLCC	17F

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GROUP IDENTIFIER (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNB	
		GOA	02F
		CFIVCC	34A
		CKNAME	36A
		CNVT	01A
		CONV	03F
		DIAG	04F
		DXF9	05F
		DFLOT	06F
		DUMVCL	35F
		GETC	14F
		GETF	04A
		GETSYM	07F
		GPLT	02A
		IGETCF	15F
		IOPREA	08F
		PACK	09F
		Q8FRMS	10F
		RDLABEL	10A
		STCRE	11F
		SYMBCL	03A
		ENDDC	29A
		GNST	05A
		OPTICN	16F
		OUTENT	06A
		PHASEA	07A
		PLABEL	08A
		STCHAR	11A
		TYPE	12A
		SAVEID	13A
		LOCLA4	22F
		DUMYA4	23F
		ARITH	14A
		SUBSCR	17A
		TREE	41A
		ENDLCC	17F

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNB	
		GOA	02F
		CFIVCC	34A
		CKNAME	36A
		CNVT	01A
		CONV	03F
		DIAG	04F
		DXF9	05F
		DFLOT	06F
		DUMVCL	35F
		GETC	14F
		GETF	04A
		GETSYM	07F
		GPUT	02A
		IGETCF	15F
		IOPRBA	08F
		PACK	09F
		Q8FRMS	10F
		RDLABL	10A
		STCRE	11F
		SYMBCL	03A
		ENDDC	29A
		GNST	05A
		OPTICN	16F
		OUTENT	06A
		PHASEA	07A
		PLABEL	08A
		STCHAR	11A
		TYPE	12A
		SAVEID	13A
		LOCLAS	24F
		DUMYAS	25F
		BDCPR	33A
		CKIVC	35A
		IOSPR	37A
		ENDLCC	17F

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNB	
		GOB	26F
		CNVT	01A
		DUMMY	01B
		FOMSTK	02B
		GETSYM	07F
		IOPRBB	27F
		KCPART	03B
		KOUTPT	04B
		KPCSTK	05B
		KPC3PR	06B
		KSYMGN	07B
		LABKPC	08B
		LABLER	09B
		PUNT	10B
		CONV	03F
		Q8PRMS	10F
		STOREB	34F
		SYMBOL	11B
		TSALOC	12B
		ARAYSZ	42A
		ASSEM	13B
		BANANA	14B
		BGINDO	15B
		END	16B
		ENTCOD	17B
		HELEN	18B
		INXRST	19B
		NOPROC	20B
		PHASEB	21B
		READIR	22B
		SUBFUN	23B
		SYMSCN	28A
		ACP	24B
		AFIDL	25B
		ASUPER	26B
		CGOTO	27B
		FINK	28B
		INTRAM	29B
		PARTSB	30B
		SUBPR1	31B
		SUBPR2	32B
		SUBPR3	33B
		ARITHR	34B
		ENDLOC	17F

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNB	
		GOC	28F
		BKDWN	01C
		BLDUP	02C
		BSS	03C
		CHKWD	04C
		CHOP	05C
		CL12	06C
		CON	07C
		COUNT	08C
		DATAST	09C
		GETSYM	10C
		INOUT	11C
		IOFRBC	29F
		IXCPT	12C
		LABEL	14C
		LABIN	15C
		PHASEC	13C
		QBFRMS	10F
		QXLD	16C
		REED	17C
		SKIP	18C
		SYMSCN	19C
		ENDLCC	17F

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTAB	
		GOOD	30F
		AMCUT	01D
		ADMAX	02D
		BEGINO	03D
		BKDWN	04D
		COUNT	05D
		FINISH	06D
		GETSYM	10C
		IACON	07D
		IHCON	08D
		INDEX	09D
		IOPRBD	31F
		LABOUT	10D
		NP2OUT	11D
		NPUNCH	12D
		NWRITE	13D
		PACK	09F
		PHASE6	14D
		QBPRMS	10F
		RBDX	15D
		RBFK	16D
		SYMSCN	17D
		TABDEC	18D
		UNFUNC	19D
		CONV	33F
		ENDLOC	17F

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
		FTNB	
		GOE	32F
		AMCUT	01E
		ADMAX	02E
		BEGINO	03E
		BKDWN	04E
		CONV	33F
		COUNT	05E
		FINISH	06E
		GETSYM	10C
		IACON	07E
		IHCON	08E
		INDEX	09E
		IOFRED	31F
		LABOUT	10E
		NP2OUT	11E
		NPUNCH	12E
		NWRITE	13E
		PACK	09F
		PHASE6	14E
		QBFRMS	10F
		RBDX	15E
		RBEK	16E
		SETPRT	17E
		SYMSCN	17D
		TABDEC	18E
		UNFUNC	19E
		ENDLOC	17F

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER	
		FORTN	F01	If background FORTRAN is in the system, this module is usually included. It provides the FORTRAN/monitor interface. It may be omitted if background FORTRAN programs are restricted so as not to use the functions LINK and ICLOCK and not to use the following statements:

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER	
				CALL READ
				CALL WRITE
				CALL FREAD
				CALL FWRITE
				CALL SCHEDL
				CALL TIMER
				CALL RELESE
				CALL DISP
				CALL OUTINS
				CALL INPINS
				CALL ICONCT
				CALL OCONCT

All the modules in Group T must be present if the system is to allow FORTRAN programs to run in the background. The modules in this group supply mathematical function capability.

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER
T		Q8PRMS	G01
T		Q8EXPN	G02
T		Q8AB	G03
T		SQRTF	G04
T		SIGN	G05
T		FXFL	G06
T		EXPPRG	G07
T		LNUPRG	G08
T		TANH	G09
T		SINCOS	G10
T		ARCTPG	G11
T		IFALT	G12
T		FLOAT	G13

Either Group U or Group V must be present together with Group T to form a background FORTRAN library. Group U provides more capabilities than Group V. Group V provides the same capabilities as those of the foreground FORTRAN library. If a FORTRAN program is to be checked out in the background for later use in the foreground it is recommended that it be tested with Group V, since this insures that the program will run properly without relying on the greater capabilities of Group U. Group U is called the FORTRAN Input/Output Library. Group V is called the FORTRAN Limited Input/Output Library. In a given system, the user may wish to allow the programmer to select either Group U or Group V at run time. The method for doing this is explained in the note entitled FORTRAN Background Library Run Time Options. This note follows the list of modules in Group V1. Some of the differences between Group U and Group V are as follows:

Group U, FORTRAN Input/ Output Library	Group V, FORTRAN Limited Input/Output Library
E and D formats may be used for input as well as output.	E and D formats are limited to output specifications only.
Using F format for output, the range of the internal number is not restricted.	Using F format for output, the range of the internal number represented must be from 10^{-5} to $10^{+5}-1$.
An integer-type variable may be a one-word variable or a two-word variable.	All integer-type variables must be one word integer-type variables, i.e., the K compile-time option is not available.

Group U, FORTRAN Input/ Output Library	Group V, FORTRAN Limited Input/Output Library
Input records may be of any length.	Each input record is limited to 80 characters. Thus the following is illegal: READ(10,20)(X(I,J),I=1,10),J=1,20) 20 FORMAT(10F8.4)
FORTRAN mass storage files input/output is available.	FORTRAN mass storage files are not accessible.
READ/WRITE statements may be used for mass memory input/output.	Mass memory input/output may not be performed using READ/WRITE statements. (Mass memory input/output is possible using CALL READ, CALL WRITE, CALL FREAD, CALL FWRITE if the FORTN module is included.)
Calls to SETBFR are not necessary.	Calls to SETBFR are required.

For a full explanation of the differences, refer to the 1700 MSOS 4 MS FORTRAN Version 3 A/B Reference Manual, Publication No. 60362000.

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER

The modules in Group U, the FORTRAN Input/Output Library are as follows:

U		Q8IFRM	H01
U		Q8FS	H02
U		Q8TRAN	H03
U		Q8QINI	H04
U		Q8QEND	H05
U		Q8CMP	H06
U		Q8RWBU	H07
U		Q8ERRM	H08
U		Q8DFIO	H09
U		Q8QX	H10
U		Q8QUNI	H11
U		Q8FGET	H12
U		Q8MAGT	H13
U		TAPCON	H14
U		IOCK	H15
U		PSSTOP	H16
U		Q8PAND	H17
U		Q8EXP1	H18
U		Q8EXP9	H19
U		Q8QGTX	H20

The modules in Group V, the FORTRAN Limited Input/Output Library are as follows. Note the remarks with the module Q8QIO.

V		IOCODE	J01
V		PSUEDO	J02
V		IGETCH	J03
V		IPACK	J04
V		UPDATN	J05
V		DECPL	J06
V		INTGR	J07

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER	
V		SPACEN	J08	
V		HOLRTH	J09	
V		DCHX	J10	
V		HXASC	J11	
V		AFRMOT	J12	
V		RFRMOT	J13	
V		AFRMIN	J14	
V		RFRMIN	J15	
V		ASCHX	J16	
V		HXDC	J17	
V		FLOTIN	J18	
V		FOUT	J19	
V		EOUT	J20	
V		EWRITE	J21	
V		INITL1	J22	
V		FORMIN	J23	
V		Q8QFI	J24	
V		Q8QFL	J25	
V		Q8QFX	J26	
V		Q8QIO	H21	Although Q8QIO is necessary for the FORTRAN Limited Input/Output Library, the module Q8QIO is not present in a standard released system A Q8QIO binary may be extracted from a binaries file. {Refer to Article 6.5.1.}

GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER

This binary may then be loaded so that the FORTRAN background library will be the FORTRAN Limited Input/Output Library. When loading Q8QIO, the modules Q8QX, Q8QINI, Q8QEND, and Q8QGTX must not be present in the system.

Any or all of the modules in Group V1 may be included if desired with Group V, the FORTRAN Limited Input/Output/Output Library. Each module in Group V1 is a formatting routine with the same function as one of the reentrant formatting routines in Group K1.

V1		HEXASC	J27
V1		HEXDEC	J28
V1		ASCII	J29
V1		DECHEX	J30
V1		AFORM	J31
V1		RFORM	J32
V1		FLOATG	J33

FORTRAN Background Library Run-time Options

There are four different combinations of FORTRAN background library modules which may be included in the system. These combinations are as follows:

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COSY DECK IDENTIFIERS FOR MODULES INCLUDED	GROUP U FORTRAN INPUT/ OUTPUT LIBRARY, PRESENT	GROUP V FORTRAN LIMITED INPUT/OUTPUT LIBRARY, PRESENT	RUN-TIME OPTIONS
H01-H20 (with or without J27-J33)	Yes	No	No option available. All background FORTRAN programs will run under Group U, FORTRAN Input/Output Library.
J01-J26, H21 (with or without J27-J33)	No	Yes	No option available. All background FORTRAN programs will run under Group V, FORTRAN Limited Input/Output Library.
H01-H03, H06-H09, H11-H19, J01-J26, H21 (with or without J27-J33)	In Part	Yes	A background FORTRAN program will run under Group V unless the programmer inserts binaries for modules H04, H05, H10 and H20 after his binary deck at run-time. If he inserts these modules his program will run under Group U. By inserting H04, H05, H10 and H20, linkage is performed so that Group V is not used. This combination is useful if most background FORTRAN programs are to run with the FORTRAN Limited Input/Output Library, but it is desired to leave the option open for running with the FORTRAN Input/Output Library.

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COSY DECK IDENTIFIERS FOR MODULES INCLUDED	GROUP U FORTRAN INPUT/ OUTPUT LIBRARY, PRESENT	GROUP V FORTRAN LIMITED INPUT/OUTPUT LIBRARY, PRESENT	RUN-TIME OPTIONS
			When using this combination, the background program has access to the pause command to tape motion requests, and to mass storage files. None of these are, however available to a foreground FORTRAN program.

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COSY DECK IDENTIFIERS FOR MODULES INCLUDED	GROUP U FORTRAN INPUT/ OUTPUT LIBRARY, PRESENT	GROUP V FORTRAN LIMITED INPUT/OUTPUT LIBRARY, PRESENT	RUN-TIME OPTIONS
H01-H20, J01-J26 {with or without J27-J33}	Yes	In Part	A background FORTRAN program will run under Group U unless the programmer, at runtime, inserts module H21, Q8QIO, in binary form following his binary deck. {See note regarding Q8QIO in the list of modules for Group V.} If a Q8QIO binary is inserted, linkage wil will be performed so that only the modules in Group V will be used. This combination is useful if most background FORTRAN programs are to use the FORTRAN Input/Output Library, but it is desired that the FORTRAN Limited Input/Output Library be available as an option. This is what the user gets in a released system.

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Group W is required for FORTRAN background double precision independent of whether Group U or Group V is selected. {If Group W is not present, the module DBLDMY must be included.}

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GROUP IDENTIFIER {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	COSY DECK IDENTIFIER	
W		DEXPN	K01	
W		Q8DBLE	K02	
W		SNGL	K03	
W		Q8DABN	K04	
W		DSQRTN	K05	
W		Q8DSIG	K06	
W		Q8DFLT	K07	
W		DEXPFN	K08	
W		DLOGN	K09	
W		DSNCSN	K10	
W		DATANN	K11	
W		DFLOTN	K12	
W		DUMVOL	K13	
W		DRSTOR	K14	
W		Q8DXP1	K15	
W		Q8DXP9	K16	
W		Q8QDFN	K17	
W		DOUTN	K18	
		DBLDMY	K19	If Group W, FORTRAN background double precision is not selected, the module DBLDMY is required to link unpatched externals.
		TRACE		Provides background trace of user's program.
		LULIST		Provides capability of listing logical units.
		LISTR		Lists name and record length of each program on binary tape, cards, or paper tape.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
		OPSORT	Provides cross references of 1700 assembly language operands. This module is not required by the macro assembler since the assembler performs its own cross references sort.
		EESORT	Provides a list of entry points and externals; lengths of program, common, and data; program name and name card comments for assembly language programs. {Not used by the Macro Assembler.}
		COSY	Compression of source deck information utility.
		LCOSY	Lists names of programs in a COSY library.
		CYFT	COSY format program; inserts COSY control cards into source decks.
		IOUP IOUPV4	IOUP Background utility. Performs data transfer, data verification, and motion control.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS

The modules in Group Y are required if the DSKTAP save/recovery package is to be included in the system. The modules in this group may be used to save a copy of the system by transferring the system from mass memory to magnetic tape. They may subsequently be used to transfer the information saved on tape back to mass memory, thus restoring the system. In addition to the modules in Group Y the DSKTAP package requires one module from Group Y1 to be used as the mass memory driver. Note that there is no DSKTAP driver for the 1751 Drum since DSKTAP has no provision for use of that device.

Y		DTLP	
Y		DSKTAP	
Y		DSKEQC	
Y		DSKDHX	
Y		DSKCDR	
Y		DSKMTI	
Y		DSKMTO	
Y1		MDRV56	DSKTAP driver for the 1733-2/856-2/856-4 Cartridge Disk.
Y1		DSKMMD	DSKTAP driver for the 1733-1/853/854 Disk or the 1738/853/854 Disk.
Y1		MDRIV4	DSKTAP driver for the 1739-1 Cartridge Disk.
Y1		MDR52	DSKTAP driver for the 1752 Drum.

The modules in Group Z are required for the binary tape editing and update program, SETUP. Some of the modules are listed twice since they must be loaded twice for use by SETUP.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
Z		SPCALL	
Z		SPOLY1	
Z		STPV4	
Z		IERROR	
Z		MCTDK	
Z		GETPAG	
Z		CONPRT	
Z		REDCON	
Z		CONDEC	
Z		ORDERM	
Z		IREAD	
Z		ASCOUT	
Z		PARAMS	
Z		DISKIO	
Z		SPOLY2	
Z		SUP	
Z		IERROR	
Z		GETPAG	
Z		BTOA	
Z		ISTAT	
Z		SCIO	
Z		SCRD	
Z		REDCON	
Z		ICAT	
Z		BUFIN	
Z		MOVE	
Z		IREAD	
Z		ASCOUT	
Z		PARAMS	
Z		DISKIO	

The modules in Group AB are used by the small computer maintenance monitor, SCMM. Each module provides an SCMM test for one or more hardware devices.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
AB		SCMTTY	SCMTTY is included if SCMM is in the system. SCMTTY contains the SCMM test for the comment device.
AB		SCMCRD	SCMM test for the 1729-3 card reader, the 1728/430 card reader, or the 1729-2 card reader.
AB		SCM405	SCMM test for the 1726/405 card reader or the 1726/1706/405 buffered card reader.
AB		SCMCD1	SCMM test for the 1733-2/856-2/856-4 cartridge disk or the 1739-1 cartridge disk.
AB		SCMCD2	Included with SCMCD1 if there is more than one 1733-2/856-2/856-4 cartridge disk unit in the system. Using both SCMCD1 and SCMCD2 overlap seek can be used.
AB		SCMDK1	SCMM test for the 1733-1/853/854 disk or the 1738/853/854 disk.
AB		SCMDVP	Contains variable positioning seek test and two position seek test for the 1733-1/853/854 disk or the 1738/853/854 disk.
AB		SCMDK2	Included if more than one 1733-1/853/854 disk unit or more than one 1738/853/854 disk unit is in the system. With SCMDK1 and SCMDK2 overlap seek can be used in the tests.
AB		SCMPRT	SCMM test for any of the following: 1742-30 Line Printer 1742-120 Train Printer

GROUP IDENTIFICATION (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
			1740/501 Line Printer
			1742-1 Line Printer
AB		SCMMTT	SCMM tests for magnetic tape.
AB		SCMDRM	SCMM test for the 1752 drum.
AB		SCMDM1	SCMM test for the 1751 drum.
AB		SCMPTR	SCMM test for the 1713 paper tape reader or for the 1721/1722/1777 paper tape reader driver.
AB		SCMPTP	SCMM test for the 1713 paper tape punch or the 1723/1724/1777 paper tape punch.
	X	LIBILD	
	X	LIBIDO	
	X	CONVRS	
	X	MESSY	
	X	LJA2B	
	X	MOVECH	
	X	PICKUP	
	X	IOSUB	
	X	HELPER	
	X	MOVECH	
	X	HELP0	Library Builder modules.
	X	HELP1	
	X	HELP2	
	X	HELP3	
	X	HELP4	
	X	HELP5	
	X	HELP8	
	X	HELP9	
	X	HELP10	
	X	HELP11	
	X	HELP12	
	X	HELP13	
	X	HELP14	

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
	X	SKED	Skeleton editor modules
	X	SKFILE	
	X	SILP	System initializer loader program.
	X	CONTRL	System initializer modules.
	X	ILOAD	
	X	LDRTBL	
	X	I1	
	X	I2	
	X	Q1711	

Groups AC, AD, AE and AF pertain to system initializer modules. The set of modules selected from these groups are the same ones which are included in the bootstrap version of the system initializer which is the first file of the installation materials. The particular modules selected depend on the information specified by the user in the 1700 MSOS Ordering Form.

If a line printer is to be used by the system initializer as the list device, one of the modules in Group AC must be included. {If a line printer is not to be used, Q1711 supplies the teletypewriter driver used by the system initializer as the list device.}

AC		Q42312	Provides the system initializer driver for a 1742-30 or 1742-120 Line Printer. If the 1742-120 Line Printer is used, the module T5954 must be included to load the train image.
		T5954	See remarks for Q42312.
AC		Q40421	Provides the system initializer driver for a 1740/501 or 1742-1 Line Printer.
	X	IDRIV	System initializer required module

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
One of the modules in Group AD is required as an input driver for the System Initializer.			
AD		QMT7TK	Provides the system initializer driver for 7-track magnetic tape. This module is required if 7-track magnetic tape is to be used by the system initializer.
AD		QMT9TK	Provides the system initializer driver for 9-track magnetic tape. This module is required if 9-track magnetic tape is to be used by the system initializer.
AD		QCARD	Provides the system initializer card reader driver. This module together with either CR026 or CR029 must be included if cards are to be used for system installation.
		CR026	Table used for converting Hollerith {026} punched code to ASCII. {See QCARD remarks.}
		CR029	Table used for converting EBCDIC {029} punched code to ASCII. {See QCARD remarks.}
AD		QPTAPE	Provides the system initializer driver for paper tape. This module is required if paper tape is to be used for system installation.
	X	MDRIV	Required system initializer module.
One of the modules in Group AE is required to provide a mass memory driver for the system initializer.			
AE		Q17332	System initializer driver for the 1733-2/856-2/856-4 Cartridge Disk.

GROUP IDENTIFICATION {IF ANY}	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
AE		QDK85X	System initializer driver for the 1733-1/853/854 Disk or the 1738/853/854 Disk.
AE		Q17391	System initializer driver for the 1739-1 Cartridge Disk.
AE		Q1752	System initializer driver for the 1752 Drum.
AE		Q1751	System initializer driver for the 1751 Drum.

The modules in Group AF are dummy programs. A module in Group AF should be included only if the system initializer driver for the corresponding device is not included. The purpose of including a dummy module is to avoid having unpatched externals for unused devices printed at the time of system installation.

AF		QPRDMY	Dummy module for line printer.
AF		QMTDMY	Dummy module for magnetic tape.
AF		QCDDMY	Dummy module for cards.
AF		QPTDMY	Dummy module for paper tape.
		SMM1	System Maintenance Monitor {SMM} bootstrap to read an absolutized binary program from a 7-track magnetic tape.
		SMM2	SMM bootstrap to read an absolutized binary program from a 9-track magnetic tape.
		SMM3	SMM bootstrap toread an absolutized binary program from a paper tape.

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GROUP IDENTIFICATION (IF ANY)	REQ'D IN ALL SYSTEMS	PROGRAM NAME	REMARKS
		SMM4	SMM bootstrap to read an absolutized binary program from a 1728-430 card reader. It may read from a 1726-405 card reader if the function code is changed.

2.2 MSOS SKELETON

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The system skeleton is a file which consists of requests to the install file builder program, LIBILD. These requests specify the order and identification of the binary programs that are to be retrieved from a set of binary programs and included in an install file that is being built. The skeleton contains no binary programs itself, merely commands which specify which binaries are to be retrieved. Given an install file, the skeleton can be extracted from the install file and modified by using the skeleton editor program, SKED. By using SKED, the skeleton may then be output on cards, magnetic tape, or paper tape, to be used by LIBILD to create a new install file.

Each module to be included in the system has a corresponding *B statement in the skeleton, for example:

```
*B  'SYSDAT'
```

In addition to the *B statements, a given skeleton may include LIBILD control statements, LIBEDT control statements, system initializer control statements, and other MSOS control statements.

System parameter values may be modified by the use of *S system initializer control statements. These statements may be included in the system skeleton, or they may be typed in from the comment device at the beginning of system installation before the

*V control statement. A *S statement which is typed in from the comment device defining the value of a parameter overrides any *S statement defining that parameter in the skeleton. For instance if the statement *S,SYSMON,$3039 appeared in the skeleton and the operator entered *S,SYSMON,$3130 at the beginning of installations, the parameter SYSMON would have the value $3130. It is important to note that system parameters which are entries in SYSDAT may not be modified in this way. This is because a *S statement and a SYSDAT entry point defining the same parameter would cause duplicate definitions of an entry point and thus cause SYSDAT not to be loaded. The following is a list of comments about certain of the control statements included within a skeleton.

*S,SYSMON,m	The hexadecimal value, m, is the ASCII code for the month of system construction.
*S,SYSDAY,d	The hexadecimal value, d, is the ASCII code for the day of system construction.

*S,SYSYER,y — The hexadecimal value, y, is the ASCII code for the last two digits of the year of system construction.

*S,SYSLVL,ℓ — The hexadecimal value, ℓ, is the ASCII code for the PSR level of the system.

*S,ENDOV4,n — The hexadecimal value, n, is the last core location in Part 0. The value of n must be such that $n \leq 7FFF_{16}$. This is because blank common is in Part 0 and FORTRAN requires common locations to be specified by only 15 bits.

In a system with partitioned core the value of ENDOV4 is one less than the starting address of partitioned core. In a system without partitioned core the value of ENDOV4 is equal to BGNMON-1.

Referring to Figure 2-1, there are two types of system changes which effect the value of ENDOV4. First, ENDOV4 must be modified if the size of partitioned core is to be changed. Second, the addition or deletion of any core resident modules which effect BGNMON effect ENDOV4. For example, if BGNMON is decreased by 400_{16} words, and the size of partitioned core is to remain the same, then ENDOV4 must also be decreased by 400_{16} words. The conditions for changing BGNMON follow.

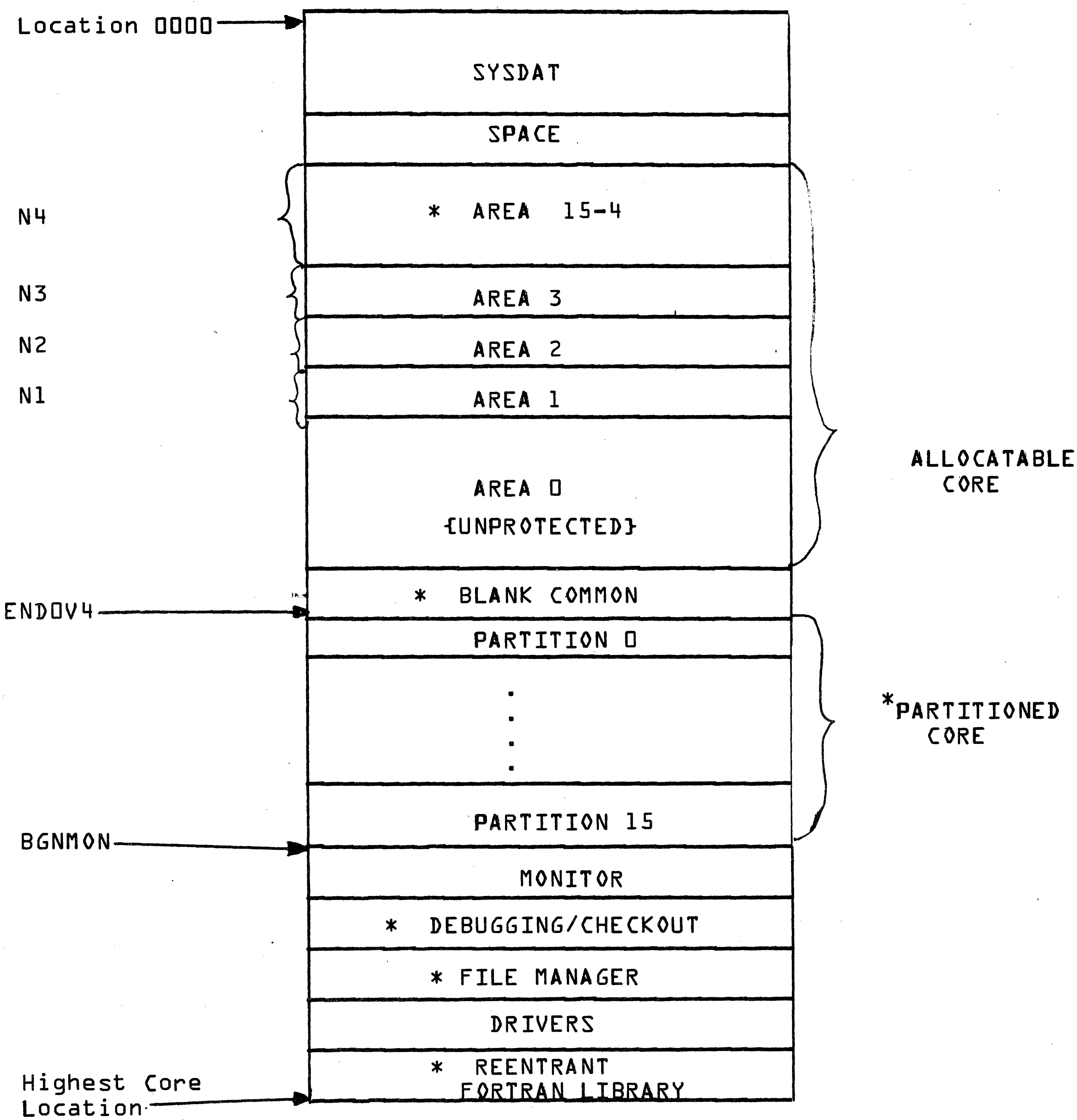

FIGURE 2-1 Core Memory Arrangement

* Optional Items

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*S,BGNMON,b

The hexadecimal value, b, is the location of the first word of the monitor.

The value of BGNMON must be changed if any of the following are added, deleted, or changed in size:

- Monitor modules
- Debugging/checkout modules
- File Manager core resident routines
- Core resident drivers
- Reentrant FORTRAN library modules

  (Refer to Figure 2-1)

If a routine of unknown length is to be added, the necessary decrease in the value of BGNMON may be determined by using LIBILD to extract the routine from the MSOS binary library and then using EESORT to list its length. For example, suppose the File Manager is to be added. Further suppose that the user does not have listings of the File Manager core resident modules. To determine the lengths of these modules he first prepares the following LIBILD control records (on tape or cards):

```
*B          'FILMGR'
*B          'RSPCV4'
*B          'SRHFIS'
*T
*END
```

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The MSOS binary library is then loaded into an input device. Typing on the teletype would be as follows if the MSOS library is to be read from logical unit 6, the LIBILD control records are to be read from the standard input device, logical unit 10, and the LIBILD output is to be written on logical unit 13.

```
MI
*BATCH
L,10 FAILED 06
ACTION
CU
J
*JOB
J
*LIBILD
CONTROL LU  =
DEFS LU     =
INSTALL LU  = 13
NEWLIB LU   =
LIB 01 LU   = 6
LIB 02 LU   =
SKELETON LU = 10

LOAD SKEL/INSTAL, CR WHEN READY

LIBRARY BUILD COMPLETE
TYPE *Z TO TERMINATE OR
TYPE *C TO CONTINUE WITH CURRENT SKELETON AND/OR
OUTPUT LIBRARY LU'S *Z
```

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At this point a short install file has been generated. It includes a binary copy of FILMGR, RSPCV4, and SRHFIS. Following the SRHFIS binary is a *T record. This record is needed to terminate input to EESORT. Typing on the teletype continues as follows:

```
J
*REW,13
J
*K,I13
J
*EESORT
ENTER LIST FOR LIST ONLY, SORT FOR LIST AND SORTLIST
J
```

The output from EESORT is shown in Figure 2-2.

LISTING OF PROGRAM NAMES, ENTRY POINTS AND EXTERNALS

PROGRAM NAME	PROGRAM LENGTH	COMMON SIZE	DATA SIZE	NAME CARD COMMENTS
FILMGR	0225	0000	0000	DECK-ID F01 MSOS 4.1

PROGRAM ENTRY POINTS

DEFFIL	RELFIL	DEFIDX	LOKFIL	UNLFIL	STOSEQ	STODIR
STOIDX	RTVSEG	RTVDIR	RTVIDX	RTVIDC	FMPFLG	FMRERR
ABSPAR	CKCFIS	CKPRCT	CKUADR	GETSPC	MMREAD	MMWRIT
FILREQ	ACTREG	ARGPRO	RPTABL	FILNBR	FSTLOC	FIDLOC
RPTINT	FDTINT	NWFISD	NWFISP			

PROGRAM EXTERNALS

ENDOV4	RSAFLG	FIBSIZ	TMRTYP	FIDSEC	FDTPER	RPTPER
MAXMMA	FISLU	SWAPCK	UNFIO	LPTRS	LCCF	RACSPC
FMREND	FMRP12	FMRP11	FMRP10	FMRP09	FMRP08	FMRP07
FMRP06	FMRP05	FMRP04	FMRP03	FMRP02	FMRP01	

PROGRAM NAME	PROGRAM LENGTH	COMMON SIZE	DATA SIZE	NAME CARD COMMENTS
RSPCV4	00F0	0000	0000	DECK-ID F02 MSOS 4.1

PROGRAM ENTRY POINTS

FSLMMA RACSPC RSAFLG

PROGRAM EXTERNALS

FISLU	FSLEND	FSLLTH	FSLIST	FDTINT	FIDLOC	TMRTYP
FSTLOC	FILNBR	RPTABL	ARGPRO	ACTREG	FILREQ	

FIGURE 2-2. EESORT Output Listing Module Length

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PROGRAM NAME	PROGRAM LENGTH	COMMON SIZE	DATA SIZE	NAME CARD COMMENTS
SRHFIS	01B9	0000	0000	DECK-ID F03 MSOS 4.1

PROGRAM ENTRY POINTS

SRHFIS FILBLK NWFBLK FIBSIZ

PROGRAM EXTERNALS

MMREAD GETSPC FMPERR NWFISB NWFISD FDTINT FIDLOC
FSTLOC FIDSEC FISLU
*T

FIGURE 2-2 Continued

As seen from the EESORT output, the lengths of the modules FILMGR, RSPCV4, and SRHFIS are 225_{17}, $F0_{16}$, and $1B9_{16}$, respectively. Thus the total space needed for the File Manager core resident modules is the sum of these three lengths, $4CE_{16}$. When adding these modules it is necessary to decrease both BGNMON and ENDOV4 by $4CE_{16}$. When adding these modules it is necessary to decrease both BGNMON and ENDOV4 by $4CE_{16}$.

An alternate method of obtaining the total length of a number of modules is to use the *L job processor command, as shown in Article 6.3.2.

S,MSIZV4,s

The hexadecimal value, s, is the number of words of core available in the system hardware.

*S,SECTOR,c

The hexadecimal value, c, is the maximum sector number which may be used in addressing mass memory. SECTOR is equated to MAXSEC in SYSDAT.

*S,N1,P
*S,N2,P
*S,N3,n_3
*S,N4,n_4

These statements set the values of core allocation parameters. Refer to Article 1.58. In addition to the considerations in Article 1.58, it may be necessary to decrease the value of N4 when customizing the system. If a program library program or file is added to the system which is larger than the previous unprotected area then N4 must be decreased. This decreases the size of allocatable area 4 and increases the size of unprotected core.

*S,FMRP01,S
*S,FMRP02,S
.
.
.
*S,FMRP11,S
*S,FMRP12,S

FMRP01 is set to the number of the last sector used by the first file manager request processor, FMRP02 is set to the number of the last sector used by the second file manager request processor, etc.

*S,BEGFMS,S

The starting sector of File Manager space is defined by this statement under certain conditions. Refer to Article 1.79.

GENERAL PROCEDURE FOR SYSTEM MODIFICATION

The system modifications that will be discussed involve the addition or deletion of one or more modules from the system. An individual module could be changed internally by a user who has a good understanding of the module's function. It is not, however, the purpose of this manual to discuss all possible changes which might be made to individual program modules. In order to add or delete program modules, three of the items which may be used are the system install file, the set of system binaries and the MSOS COSY. These three items are defined as follows:

1. The system install file consists of one binary copy of each module in a particular MSOS installation, together with system initializer control statements and LIBEDT control statements. The system install file provides the information needed to build a particular 1700 MSOS system. This information consists of two parts, that used by the system initializer and that used by LIBEDT. An install file is a part of the installation materials for every installation. It is provided on cards, magnetic tape or paper tape depending on the particular installation.

2. The set of MSOS binaries is a complete set of the currently available 1700 MSOS program modules, each in binary form. This set differs from the install file in two ways:
   a) A module is included, even though it may not be present in the particular MSOS system.
   b) No control cards are present.

   The set of MSOS binaries is supplied with every installation. Binaries of FORTRAN modules are included if the user has a FORTRAN compiler license. The binaries are provided on cards, magnetic tape, or paper tape, depending on the particular installation.

3. The MSOS COSY is a complete set of the available 1700 MSOS program modules, each in compressed source {COSY} format. An MSOS COSY is not supplied with the installation materials unless specified by the user. In general, COSY is not used in system modification. The two instances in which the MSOS COSY is used are as follows:
   a. when adding the background FORTRAN Limited Input/Output Library to the system
   b. when performing PSR updates prior to the quarterly release of binary updates.

   In an MSOS COSY, each module is preceded by a COSY identifier. The MSOS COSY may be on cards, magnetic tape or paper tape.

The general procedure for system modification includes the following steps. More details, dependent on the type of modification being made, are included in chapters 4 through 8.

	MATERIALS USED	METHODS INCLUDING MSOS PACKAGES WHICH MAY BE USED	RESULT
1	SYSDAT Source	Use of keypunch to modify source cards if cards can be used in system. {LIBEDT may have to be used first to transfer SYSDAT source from tape to cards.} If cards cannot be used, COSY can be used to modify SYSDAT source.	Modified SYSDAT Source.

	MATERIALS USED	METHODS INCLUDING MSOS PACKAGES WHICH MAY BE USED	RESULT
2	Modified SYSDAT Source	Macro Assembler	Binary copy of modified SYSDAT
3	Install File	SKED	Modified system skeleton
4	a. Modified system skeleton b. MSOS binaries (including FORTRAN binaries in some cases) c. Binary copy of modified SYSDAT d. Update binaries (if system is being updated)	LIBILD	Modified install file
5	Modified install file	System Initializer	Modified MSOS on mass memory

If a number of major modifications are to be made to a system the user may wish to consider re-ordering the system. This may be done by completing a 1700 MSOS 4 Ordering Form.

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Chapter 4 - Procedure for Adding a Driver

4.1 SYSDAT Changes

The SYSDAT source must be modified in the following ways when adding a driver. In each case, the user is referred to the discussion of the corresponding SYSDAT section in Chapter 1.

1. The interrupt trap region, Section AAF, must be modified to include an entry for the device being added.
2. The interrupt mask table, Section AAH, must be modified.
3. The size of the interrupt stack, Section AAK, must be increased if necessary. If the size has been left as the standard size of 16 entries, it will be unnecessary to modify Section AAK.
4. An entry for the logical unit of the added device must be added to the LOG1A Table, Section AAM. If there is to be a diagnostic logical unit for the added device, an entry for the diagnostic logical unit must be added to the LOG1A Table also.
5. The LOG1 Table, Section AAN, must be modified.
6. The LOG2 Table, Section AAO, must be modified.
7. An entry must be added to the diagnostic timer table in Section AAP if the diagnostic timer is to be used with the added device.
8. The line one table, Section AAR, must be modified only if the added device is connected to interrupt line one.
9. A physical device table must be added for the new device.
10. It may be necessary to modify the 1706 buffered data channel handler entries, Section ACP, if the device added is a buffered device.
11. It will be necessary to modify Section ACQ, A/Q Channel Allocation, if the new device is one of those which requires A/Q channel allocation.
12. Section ACR must be modified only if a mass resident driver is being added to a system which previously contained no mass resident driver.

4.2 Skeleton Changes

The skeleton must be modified to add a *M statement. In addition, a *B statement for each driver module must be added. If the driver requires one or more auxiliary modules for conversion code tables or a train image table, a *B statement for each of these must also be added. If the driver being added is to be mass resident, two control statements must follow the *B statement for the last module required by the driver. These *B statements are as follows. The name of each MSOS driver has the form

$$Dx_1x_2x_3x_4x_5$$

where x_1,x_2,x_3,x_4,x_5 are alphanumeric characters which will include one or more trailing blanks if the name of the driver contains fewer than six characters. The two control statements added for a mass resident driver have the following forms:

$$*S,Sx_1x_2x_3x_4x_5,S$$

$$*S,Lx_1x_2x_3x_4x_5,P$$

These statements are interpreted by the system initializer so that $Sx_1x_2x_3x_4x_5$ is the sector number of the last sector containing a module required by the driver, $Dx_1x_2x_3x_4x_5$, and $Lx_1x_2x_3x_4x_5$ is the word length of the driver including all necessary modules. For example, if the driver D1777P is to be added as a mass resident driver, the following control statements must be added:

```
*S, S1777P,S
*S, L1777P,P
```

When adding a driver, the corresponding SCMM test module should be added if it is not already in the system. The SCMM test modules are listed in Group AB of Chapter 2. Each test module has a name in the form, $SCMa_1a_2a_3$, for example, SCMCRD. To add an SCMM test module, seven records must be added to the SCMM program library entries in the skeleton. These records are as follows:

*K¬I

*K¬P8

*P¬F

*B 'SCM$a_1a_2a_3$'

*T

*K¬I8

*N¬SCM$a_1a_2a_3$¬¬¬B

These records instruct LIBEDT to accept the binary for SCM$a_1a_2a_3$ from the standard input device¬ absolutize it¬ and output on the library unit¬ logical unit 8· The *T record indicates the end of the binary programs to be absolutized· The *K¬I8 control statement indicates input is the absolutized information output to the library unit· The *N statement instructs LIBEDT to store this information in a file named SCM$a_1a_2a_3$·

The System Maintenance Monitor bootstrap corresponding to the added hardware device may be added by inserting a *L statement and a *B statement into the SMM bootstraps program library entries in the skeleton· These entries are of the form

*L¬SMM$a_1a_2a_3$
*B 'SMMn'

Where $a_1a_2a_3$ is the mnemonic for the added test and n indicates which SMM bootstrap is to be added· {Refer to Chapter 2·}

4.3 Example cf Driver Addition Using Magnetic Tape

To illustrate the addition of a driver, an example will be considered in detail. In this example, the user has a system including magnetic tape, but no cards. The logical units in the system are as follows:

```
1    CORE ALLOCATOR
2    DUMMY LOGICAL UNIT
3    DUMMY LOGICAL UNIT
4    1711 TELETYPE, 713-10 CRT
5    COSY DRIVER, FIRST UNIT
6    UNBUFFERED 1731-601 MAG TAPE, UNIT 0
7    DUMMY LOGICAL UNIT
8    1738 853/4 DISK, UNIT 0
9    1740-501/1742 LINE PRINTER
10   UNBUFFERED 1731-601 MAG TAPE, UNIT 0
11   UNBUFFERED 1731-601 MAG TAPE, UNIT 0
12   1740-501/1742 FORTRAN LINE PRINTER
13   UNBUFFERED 1731-601 MAG TAPE, UNIT 1
14   DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
15   DIAGNOSTIC 1738 853/4 DISK, UNIT 0
16   DIAGNOSTIC 1740-501/1742 LINE PRINTER
17   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
18   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0
```

The user wishes to add the capability of using cards by connecting a 1728/430 Card Reader/Punch to his system hardware configuration. To use this device he must add the driver D1728. In the example, this driver will be added as a mass resident driver.

4.3.1 Changing SYSDAT by Using COSY

According to the procedure outlined in Chapter 3, the first step is to modify SYSDAT. This will be done by converting the SYSDAT source on magnetic tape to COSY form and then using COSY to make the modifications. A source copy of SYSDAT is the fourth file of the installation tape. To position the tape to the beginning of SYSDAT, it is necessary to advance past the first three files on the tape. This may be done by using ODEBUG. The user mounts the installation tape on tape unit 0, logical unit 10. After an autoload, the printing on the comment device appears as follows:

```
MI
DB
DEBUG IN
ADF,10,3
NEXT
OFF
DEBUG OUT
```

The following procedures are simplified by changing the standard input device from logical unit 10 to logical unit 4.

This may be done by changing the contents of the word $F9_{16}$ in core and in the mass memory core image from A_{16} to 4. {Refer to Article 1.5}. The following discussion assumes this change has been made. If the change is not made, logical unit 10 must be unready each time *BATCH is entered as a control statement.

A COSY tape of SYSDAT is needed. It is also necessary to have an ASCII listing of SYSDAT which includes the COSY sequence numbers. The COSY sequence numbers will be used when revising SYSDAT. These sequence numbers will be different from the sequence numbers in the original SYSDAT and will not include the section identifier in columns 74-76. To convert SYSDAT to an acceptable COSY input format it is necessary to write a DCK/identifier and a Hollerith identifier preceding the SYSDAT source information. It is also necessary to write an END/record after the end of the SYSDAT source information. To do this the CYFT program may be used. CYFT will be used to transfer the source of SYSDAT to magnetic tape unit one, adding the necessary COSY control records.

The user mounts a scratch tape on magnetic tape unit 1 {logical unit 13}. The tape on logical unit 10 is positioned at the beginning of SYSDAT.

The printing on the comment device is as follows:

```
MI
*BATCH
J
*JOB
J
*K, I10, P13
J
*CYFT
J
```

To convert the SYSDAT with COSY control cards on logical unit 13 to COSY, the installation tape is removed from logical unit 10 and a scratch tape is mounted in its place. The printing on the comment device is then as follows:

```
*REW, 13
J
*K, I13
J
*CSY, I13, P10
J
*COSY
J
```

To obtain a SYSDAT listing with COSY sequence numbers the typing on the comment device is as follows:

```
*K, I5, P2
J
*CSY, I10
J
*ASSEM
J
```

The above assigns the COSY driver, logical unit 5, to be the standard input device. Thus, the assembler receives its input from the COSY driver. The COSY driver, in turn, receives its input from logical unit 10.

The actual SYSDAT corrections may now be made. {These corrections are discussed in Section 4.3.2.} The COSY of SYSDAT is on tape unit 0. A scratch tape is mounted on tape unit 1. Typing on the teletype continues as follows:

```
*K,I4
J
*CSY,I10,P13
J
*COSY
SYSDAT DCK/ I.C
       DEL/ 399,400
       NUM  14
       ADC  R1728
       DEL/ 444,481
       NUM  $089B
MASKT  NUM  $089B
       NUM  $089B
       NUM  $089B
       NUM  $089B
       NUM  $089B
       NUM  $089B
       NUM  $089B
       NUM  $089B
       NUM  $089B
       NUM  $0893
       NUM  $0883
       NUM  $0883
       NUM  $0883
       NUM  $0883
       DEL/ 628,629
       ADC  P1728          10    1728/430 CARD READER
       ADC  P1728          11    1728/430 CARD PUNCH
       INS/ 636
X1728  ADC  P1728          19    DIAGNOSTIC 1728/430 CARD READER/PUNCH
       DEL/ 659,660
       ADC  0+S            10    1728/430 CARD READER
       ADC  0+S            11    1728/430 CARD PUNCH
       INS/ 667
       ADC  0+S            19    DIAGNOSTIC 1728/430 READER/PUNCH
       DEL/ 684,685
       NUM  $FFFF          10    1728/430 CARD READER
       NUM  $FFFF          11    1728/430 CARD PUNCH
       INS/ 692
       NUM  $FFFF          19    DIAGNOSTIC 1728/430 READER/PUNCH
       INS/ 709
       ADC  P1728          10    1728/430 CARD READER
       INS/ 1098
```

```
*          1728/430 CARD READER/PUNCH
          EQU   U1728(X1728-LOGIA)
          EQU   M1728(1)
          EXT   MASDRV
          EXT   MASCON
          EXT   MASERR
I1728     JMP+  MASDRV
C1728     JMP+  MASCON
E1728     JMP+  MASERR
          EXT   L1728
          EXT   S1728
R1728     LDQ   =XP1728
          JMP*  (P1728+2)
          EJT
*            1728/430 CARD READER/PUNCH
P1728     ADC   $520E
          ADC   I1728
          ADC   C1728
          ADC   E1728
          NUM   -1
          NUM   0
          NUM   0
          NUM   $05A1
          NUM   $18C6
          NUM   0
          NUM   0
          NUM   0
          NUM   0
          ADC   L1728
          ADC   S1728
          NUM   0
          NUM   $800F
          ADC   BUF28
          NUM   0
          NUM   0
          NUM   0
          NUM   0
          NUM   0
          NUM   0
          NUM   0
          NUM   0
          NUM   0
          ADC   U1728
          BZS   BUF28(80)
          EJT
          DEL/  1263
          EQU   NUMAQ(3)
          END/
```

J

Each of the preceding COSY corrections was preceded by a line feed so that the typing would be readable. Line feeds are ignored by the COSY driver.

A binary copy of the corrected SYSDAT is obtained by requesting the Macro Assembler to process the corrected COSY copy of SYSDAT. A scratch tape is mounted on tape unit 0. The SYSDAT binary will be written on this tape. Typing on the comment device continues as follows:

```
*K,I5,P13
J
*CSY,I13,P2
*J
*ASSEM
J
```

An assembly listing is obtained on the line printer.

If there are further corrections to be made to SYSDAT, these may be made by repeating the above procedure, substituting the COSY of the revised SYSDAT for the COSY of the original SYSDAT.

4.3.2 Specific SYSDAT Changes

The following sections of SYSDAT were changed or added in order to add the 1728/430 Card Reader driver:

Interrupt Trap Region, Section AAF
Interrupt Mask Table, Section AAH
LOG1A Table, Section AAM
LOG1 Table, Section AAN
LOG2 Table, Section AAO

Diagnostic Tables, Section AAP
1728/430 Card Reader/Punch Physical
Device Table, Section ABR
A/Q Channel Allocation, Section ACQ

The changes in each of these sections are shown in the following printouts.

- <u>Interrupt Trap Region, Section AAF</u>

  As shown in Article 1.6, Figure 1-6, the standard interrupt line for the 1728/430 Card Reader is line 11. Following is the line 11 entry in Section AAF before modification. (The sequence numbers are COSY sequence numbers)

```
*                                                                          00396
LINE11 NUM  0           INTERRUPT LINE ENTRY                               00397
       RTJ- ($FE)       GO TO INTERRUPT HANDLER ROUTINE                    00398
       NUM  0           PRIORITY LEVEL OF INTERRUPT                        00399
       ADC  INVINT      INTERRUPT RESPONSE FOR THE INVALID INTERRUPTS      00400
```

The line 11 entry in Section AAF after modifications is as follows:

```
*                                                                          00396
LINE11 NUM  0           INTERRUPT LINE ENTRY                               00397
       RTJ- ($FE)       GO TO INTERRUPT HANDLER ROUTINE                    00398
       NUM  14                                                             00399
       ADC  R1728                                                          00400
```

- Interrupt Mask Table, Section AAH

Information regarding standard priority levels is contained in Figure 1-6, Article 1.6. The standard priority level for the 1728/430 Card Reader driver is level 14. The 1728/430 interrupt should be permitted at priority levels -1, 0, 1, 2, 3, 4, 5, 6, 7, 8 , 9, 10, 11, 12, 13. As explained in Article 1.8, the interrupt is not permitted at level 14, since the driver runs at level 14 and the driver is not re-entrant. The interrupt mask table prior to modification is as follows:

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```
*          I N T E R R U P T   M A S K   T A B L E
*
*
       ENT   MASKT             INTERRUPT MASKS INDEXED BY PRIORITY LEVEL
*
*
*             <---------------------------- INTERRUPT LINE NUMBER
*                15 14 13 12 11 10  9  8  7  6  5  4  3  2  1  0
*             **********************************************************
*      P  -1  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      R   0  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      I   1  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      O   2  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      R   3  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      I   4  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      T   5  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      Y   6  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*          7  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      L   8  *   0  0  0  0  0  0  0  0  1  0  0  1  1  0  1  1  *
*      E   9  *   0  0  0  0  0  0  0  0  1  0  0  1  0  0  1  1  *
*      V  10  *   0  0  0  0  0  0  0  0  1  0  0  0  0  0  1  1  *
*      E  11  *   0  0  0  0  0  0  0  0  1  0  0  0  0  0  1  1  *
*      L  12  *   0  0  0  0  0  0  0  0  1  0  0  0  0  0  1  1  *
*      .  13  *   0  0  0  0  0  0  0  0  1  0  0  0  0  0  1  1  *
*      .  14  *   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  1  *
*      V  15  *   0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  *
*             **********************************************************
*
*
       NUM   $009B             PRIORITY LEVEL -1
MASKT  NUM   $009B             PRIORITY LEVEL 00
       NUM   $009B             PRIORITY LEVEL 01
       NUM   $009B             PRIORITY LEVEL 02
       NUM   $009B             PRIORITY LEVEL 03
       NUM   $009B             PRIORITY LEVEL 04
       NUM   $009B             PRIORITY LEVEL 05
       NUM   $009B             PRIORITY LEVEL 06
       NUM   $009B             PRIORITY LEVEL 07
       NUM   $009B             PRIORITY LEVEL 08
       NUM   $0093             PRIORITY LEVEL 09
       NUM   $0083             PRIORITY LEVEL 10
       NUM   $0083             PRIORITY LEVEL 11
       NUM   $0083             PRIORITY LEVEL 12
       NUM   $0083             PRIORITY LEVEL 13
       NUM   $0001             PRIORITY LEVEL 14
       NUM   $0000             PRIORITY LEVEL 15
```

After modification, the bits set in the masks for priority levels -1, 0, 1, 2, ... 12, 13 include the bits previously set as well as bit 11 corresponding to interrupt line 11 for the 1728/430 Card Reader. The mask table after modification is as follows. Note that lines 444-466 of the original table were deleted so as to avoid misleading comments in the listing. The new sequence numbers are those assigned by COSY.

```
*          I N T E R R U P T   M A S K   T A B L E                          00438
*                                                                           00439
*                                                                           00440
        ENT   MASKT          INTERRUPT MASKS INDEXED BY PRIORITY LEVEL      00441
*                                                                           00442
*                                                                           00443
        NUM   $089B                                                         00444
MASKT   NUM   $089B                                                         00445
        NUM   $089B                                                         00446
        NUM   $089B                                                         00447
        NUM   $089B                                                         00448
        NUM   $089B                                                         00449
        NUM   $089B                                                         00450
        NUM   $089B                                                         00451
        NUM   $089B                                                         00452
        NUM   $089B                                                         00453
        NUM   $0893                                                         00454
        NUM   $0883                                                         00455
        NUM   $0883                                                         00456
        NUM   $0883                                                         00457
        NUM   $0883                                                         00458
        NUM   $0001          PRIORITY LEVEL 14                              00459
        NUM   $0000          PRIORITY LEVEL 15                              00460
```

- LOG1A Table, Section AAM

Before modification the LOG1A table is as follows:

```
*        L O G I C A L   U N I T   T A B L E S   ( L O G 1 A )
*
*
         ENT    LOG1A       PHYSICAL DEVICES ADDRESSES BY LOGICAL UNIT
         ENT    NUMLU

LOG1A    ADC    NUMLU           NUMBER OF LOGICAL UNITS
         ADC    PCORE           1    CORE ALLOCATOR
         ADC    PDUMMY          2    DUMMY LOGICAL UNIT
         ADC    PDUMMY          3    DUMMY LOGICAL UNIT
         ADC    P1711           4    1711 TELETYPE, 713-10 CRT
         ADC    PCOSY1          5    COSY DRIVER, FIRST UNIT
         ADC    P731U0          6    UNBUFFERED 1731-601 MAG TAPE, UNIT 0
         ADC    PDUMMY          7    DUMMY LOGICAL UNIT
         ADC    P17380          8    1738 853/4 DISK, UNIT 0
         ADC    P40421          9    1740-501/1742 LINE PRINTER
         ADC    P731U0          10   UNBUFFERED 1731-601 MAG TAPE, UNIT 0
         ADC    P731U0          11   UNBUFFERED 1731-601 MAG TAPE, UNIT 0
FTN740   ADC    P40421          12   1740-501/1742 FORTRAN LINE PRINTER
         ADC    P731U1          13   UNBUFFERED 1731-601 MAG TAPE, UNIT 1
X1711    ADC    P1711           14   DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
X17380   ADC    P17380          15   DIAGNOSTIC 1738 853/4 DISK, UNIT 0
X40421   ADC    P40421          16   DIAGNOSTIC 1740-501/1742 LINE PRINTER
X731U1   ADC    P731U1          17   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
X731U0   ADC    P731U0          18   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0
NUMLU    EQU    NUMLU(*-LOG1A-1)
```

Three entries are to be added to the LOG1A table, one for the 1728/430 Card Reader, one for the 1728/430 Card Punch, and one for the Diagnostic 1728/430 Reader/Punch. The assignment of a logical unit number to each of these entries is dependent on the wishes of the user.

The grouped entries in Figure 1-15 are sometimes helpful in making logical unit number assignments. In this example,

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the card reader is to become the standard input device, logical unit 10, and the card punch, the standard output device, logical unit 11. The unbuffered 1732-601 Magnetic Tape, Unit 0, previously assigned to both logical units 10 and 11 is also assigned to logical unit 6. Therefore, there is no need to give magnetic tape unit 0 another logical unit number. Nineteen was chosen as the logical unit number for the diagnostic logical unit corresponding to the 1728/430 Card Reader/Punch. The modified LOG1A Table is as follows:

```
*           L O G I C A L   U N I T   T A B L E S   ( L O G 1 A )
*
*
        ENT     LOG1A       PHYSICAL DEVICES ADDRESSES BY LOGICAL UNIT
        ENT     NUMLU

LOG1A   ADC     NUMLU           NUMBER OF LOGICAL UNITS
        ADC     PCORE           1     CORE ALLCCATOR
        ADC     PDUMMY          2     DUMMY LOGICAL UNIT
        ADC     PDUMMY          3     DUMMY LOGICAL UNIT
        ADC     P1711           4     1711 TELETYPE, 713-10 CRT
        ADC     PCOSY1          5     COSY DRIVER, FIRST UNIT
        ADC     P731U0          6     UNBUFFERED 1731-601 MAG TAPE, UNIT 0
        ADC     PDUMMY          7     DUMMY LOGICAL UNIT
        ADC     P17380          8     1738 853/4 DISK, UNIT 0
        ADC     P40421          9     1740-501/1742 LINE PRINTER
        ADC     P1728           10    1728/430 CARD READER
        ADC     P1728           11    1728/430 CARD PUNCH  ********************
FTN740  ADC     P40421          12    1740-501/1742 FORTRAN LINE PRINTER
        ADC     P731U1          13    UNBUFFERED 1731-601 MAG TAPE, UNIT 1
X1711   ADC     P1711           14    DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
X17380  ADC     P17380          15    DIAGNOSTIC 1738 853/4 DISK, UNIT 0
X40421  ADC     P40421          16    DIAGNOSTIC 1740-501/1742 LINE PRINTER
X731U1  ADC     P731U1          17    DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
X731U0  ADC     P731U0          18    DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0
X1728   ADC     P1728           19    DIAGNOSTIC 1728/430 CARD READER/PUNCH
NUMLU   EQU     NUMLU(*-LOG1A-1)
```

LOG1 Table, Section AAN

The LOG1 Table entreis must be made to correspond to the LOG1A Table entries. Before modification the LOG1 Table is as follows:

```
*             L O G I C A L   U N I T   T A B L E S   ( L O G 1 )
*
*
      ENT   LOG1       LOGICAL UNIT INFORMATION BY LOGICAL UNIT
*                           BIT 14 = 1, IMPLIES LU SHARES DEVICE
*                           BIT 13 = 1, IMPLIES LU IS MARKED DOWN
*                           BITS 0 - 11 IS ALTERNATE LOGICAL UNIT
*                                  ALTERNATE = 0, IMPLIES NONE
S     EQU   S($4000)        SHARED BIT

LOG1  ADC   NUMLU           NUMBER OF LOGICAL UNITS
      ADC   0               1    CORE ALLOCATOR
      ADC   0+S             2    DUMMY LOGICAL UNIT
      ADC   0+S             3    DUMMY LOGICAL UNIT
      ADC   2+S             4    1711 TELETYPE, 713-10 CRT
      ADC   0               5    COSY DRIVER, FIRST UNIT
      ADC   0+S             6    UNBUFFERED 1731-601 MAG TAPE, UNIT 0
      ADC   0+S             7    DUMMY LOGICAL UNIT
      ADC   0+S             8    1738 853/4 DISK, UNIT 0
      ADC   0+S             9    1740-501/1742 LINE PRINTER
      ADC   0+S             10   UNBUFFERED 1731-601 MAG TAPE, UNIT 0
      ADC   0+S             11   UNBUFFERED 1731-601 MAG TAPE, UNIT 0
      ADC   0+S             12   1740-501/1742 FORTRAN LINE PRINTER
      ADC   0+S             13   UNBUFFERED 1731-601 MAG TAPE, UNIT 1
      ADC   0+S             14   DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
      ADC   0+S             15   DIAGNOSTIC 1738 853/4 DISK, UNIT 0
      ADC   0+S             16   DIAGNOSTIC 1740-501/1742 LINE PRINTER
      ADC   0+S             17   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
      ADC   0+S             18   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0
```

The entries for logical units 10 and 11 need not be changed, except for the comments field. An entry for logical unit 19 must be added. After the changes have been made, the LOG1 table is as follows:

```
*          L O G I C A L   U N I T   T A B L E S   ( L O G 1 )
*
*
      ENT  LOG1       LOGICAL UNIT INFORMATION BY LOGICAL UNIT
*                          BIT 14 = 1, IMPLIES LU SHARES DEVICE
*                          BIT 13 = 1, IMPLIES LU IS MARKED DOWN
*                          BITS 0 - 11 IS ALTERNATE LOGICAL UNIT
*                                   ALTERNATE = 0, IMPLIES NONE
S     EQU  S($4000)        SHARED BIT

LOG1  ADC  NUMLU           NUMBER OF LOGICAL UNITS
      ADC  0               1    CORE ALLOCATOR
      ADC  0+S             2    DUMMY LOGICAL UNIT
      ADC  0+S             3    DUMMY LOGICAL UNIT
      ADC  2+S             4    1711 TELETYPE, 713-10 CRT
      ADC  0               5    COSY DRIVER, FIRST UNIT
      ADC  0+S             6    UNBUFFERED 1731-601 MAG TAPE, UNIT 0
      ADC  0+S             7    DUMMY LOGICAL UNIT
      ADC  0+S             8    1738 853/4 DISK, UNIT 0
      ADC  0+S             9    1740-501/1742 LINE PRINTER
      ADC  0+S             10   1728/430 CARD READER
      ADC  0+S             11   1728/430 CARD PUNCH
      ADC  0+S             12   1740-501/1742 FORTRAN LINE PRINTER
      ADC  0+S             13   UNBUFFERED 1731-601 MAG TAPE, UNIT 1
      ADC  0+S             14   DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
      ADC  0+S             15   DIAGNOSTIC 1738 853/4 DISK, UNIT 0
      ADC  0+S             16   DIAGNOSTIC 1740-501/1742 LINE PRINTER
      ADC  0+S             17   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
      ADC  0+S             18   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0
      ADC  0+S             19   DIAGNOSTIC 1728/430 READER/PUNCH
```

• LOG2 Table, Section AA0

The LOG2 Table, before modification, is as follows:

```
*          L O G I C A L   U N I T   T A B L E S   ( L O G 2 )
*
*
       ENT   LOG2        TOP OF I/O THREAD ADDRESSES BY LOGICAL UNIT

LOG2   ADC   NUMLU           NUMBER OF LOGICAL UNITS
       NUM   $FFFF           1    CORE ALLOCATOR
       NUM   $FFFF           2    DUMMY LOGICAL UNIT
       NUM   $FFFF           3    DUMMY LOGICAL UNIT
       NUM   $FFFF           4    1711 TELETYPE. 713-10 CRT
       NUM   $FFFF           5    COSY DRIVER, FIRST UNIT
       NUM   $FFFF           6    UNBUFFERED 1731-601 MAG TAPE. UNIT 0
       NUM   $FFFF           7    DUMMY LOGICAL UNIT
       NUM   $FFFF           8    1738 853/4 DISK, UNIT 0
       NUM   $FFFF           9    1740-501/1742 LINE PRINTER
       NUM   $FFFF           10   UNBUFFERED 1731-601 MAG TAPE. UNIT 0
       NUM   $FFFF           11   UNBUFFERED 1731-601 MAG TAPE. UNIT 0
       NUM   $FFFF           12   1740-501/1742 FORTRAN LINE PRINTER
       NUM   $FFFF           13   UNBUFFERED 1731-601 MAG TAPE. UNIT 1
       NUM   $FFFF           14   DIAGNOSTIC 1711 TELETYPE, 713-10 CRT
       NUM   $FFFF           15   DIAGNOSTIC 1738 853/4 DISK, UNIT 0
       NUM   $FFFF           16   DIAGNOSTIC 1740-501/1742 LINE PRINTER
       NUM   $FFFF           17   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1
       NUM   $FFFF           18   DIAGNOSTIC 1731-601 MAG TAPE. UNIT 0
```

The entries of the LOG2 Table must be made to correspond to those in the LOG1A Table. After modification the LOG2 Table is as follows:

```
*        L O G I C A L   U N I T   T A B L E S   ( L O G 2 )            00648
*                                                                       00649
*                                                                       00650
      ENT   LOG2       TOP OF I/O THREAD ADDRESSES BY LOGICAL UNIT      00651
LOG2  ADC   NUMLU          NUMBER OF LOGICAL UNITS                      00653
      NUM   $FFFF          1    CORE ALLOCATOR                          00654
      NUM   $FFFF          2    DUMMY LOGICAL UNIT                      00655
      NUM   $FFFF          3    DUMMY LOGICAL UNIT                      00656
      NUM   $FFFF          4    1711 TELETYPE, 713-10 CRT               00657
      NUM   $FFFF          5    COSY DRIVER, FIRST UNIT                 00658
      NUM   $FFFF          6    UNBUFFERED 1731-601 MAG TAPE, UNIT 0    00659
      NUM   $FFFF          7    DUMMY LOGICAL UNIT                      00660
      NUM   $FFFF          8    1738 853/4 DISK, UNIT 0                 00661
      NUM   $FFFF          9    1740-501/1742 LINE PRINTER              00662
      NUM   $FFFF          10   1728/430 CARD READER                    00663
      NUM   $FFFF          11   1728/430 CARD PUNCH                     00664
      NUM   $FFFF          12   1740-501/1742 FORTRAN LINE PRINTER      00665
      NUM   $FFFF          13   UNBUFFERED 1731-601 MAG TAPE, UNIT 1    00666
      NUM   $FFFF          14   DIAGNOSTIC 1711 TELETYPE, 713-10 CRT    00667
      NUM   $FFFF          15   DIAGNOSTIC 1738 853/4 DISK, UNIT 0      00668
      NUM   $FFFF          16   DIAGNOSTIC 1740-501/1742 LINE PRINTER   00669
      NUM   $FFFF          17   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1    00670
      NUM   $FFFF          18   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0    00671
      NUM   $FFFF          19   DIAGNOSTIC 1728/430 READER/PUNCH        00672
```

• **Diagnostic Tables, Section AAP**

Before modification Section AAP is as follows:

```
*          D I A G N O S T I C   T A B L E S
*
*
        ENT    ALTERR     ALTERNATE DEVICE ERROR TABLE

ALTERR  ADC    NUMLU           ERROR TABLE SIZE
        BZS    (NUMLU)         SPACE FOR MAXIMUM SIMULTANEOUS FAILURES


        ENT    DGNTAB     DIAGNOSTIC TIMER TABLE

DGNTAB  EQU    DGNTAB(*)       START OF TABLE
        ADC    PCORE           1     CORE ALLOCATOR
        ADC    P1711           4     1711 TELETYPE. 713-10 CRT
        ADC    P731U0          6     UNBUFFERED 1731-601 MAG TAPE. UNIT 0
        ADC    P17380          8     1738 853/4 DISK. UNIT 0
        ADC    P40421          9     1740-501/1742 LINE PRINTER
        ADC    P731U1          13    UNBUFFERED 1731-601 MAG TAPE. UNIT 1
        NUM    $FFFF           END OF TABLE
```

An entry must be added for logical unit 10, the 1728/430 Card Reader. After this additon, Section AAP appears as follows:

```
*         D I A G N O S T I C   T A B L E S
*
*
       ENT   ALTERR    ALTERNATE DEVICE ERROR TABLE

ALTERR ADC   NUMLU          ERROR TABLE SIZE
       BZS   (NUMLU)        SPACE FOR MAXIMUM SIMULTANEOUS FAILURES


       ENT   DGNTAB    DIAGNOSTIC TIMER TABLE

DGNTAB EQU   DGNTAB(*)      START OF TABLE
       ADC   PCORE          1     CORE ALLOCATOR
       ADC   P1711          4     1711 TELETYPE, 713-10 CRT
       ADC   P731U0         6     UNBUFFERED 1731-601 MAG TAPE, UNIT 0
       ADC   P17380         8     1738 853/4 DISK, UNIT 0
       ADC   P40421         9     1740-501/1742 LINE PRINTER
       ADC   P1728          10    1728/430 CARD READER
       ADC   P731U1         13    UNBUFFERED 1731-601 MAG TAPE, UNIT 1
       NUM   $FFFF          END OF TABLE
```

- <u>1728/430 Card Reader/Punch Physical Device Table, Section ABR</u>

A physical device table must be added for the 1728/430 Card Reader/Punch. This is obtained by extracting the appropriate lines from Figure 1-47, Article 1.44. There will be a diagnostic logical unit corresponding to this device.

Thus, the symbol U1728 is equated to an index into the LOG1A Table. The lines corresponding to a mass resident driver are selected. Word 16 of the table contains the standard entry. The physical device table appears as follows after it has been added to SYSDAT:

```
*       1728/430 CARD READER/PUNCH    **************************************
        EQU  U1728(X1728-LOG1A)
        EQU  M1728(1)
        EXT  MASDRV
        EXT  MASCON
        EXT  MASERR
I1728   JMP+ MASDRV

C1728   JMP+ MASCON

E1728   JMP+ MASERR

        EXT  L1728
        EXT  S1728
R1728   LDQ  =XP1728

        JMP* (P1728+2)
```

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```
*       1728/430 CARD READER/PUNCH
P1728   ADC   $520E
        ADC   I1728
        ADC   C1728
        ADC   E1728
        NUM   -1
        NUM   0
        NUM   0
        NUM   $05A1
        NUM   $18C6
        NUM   0
        NUM   0
        NUM   0
        NUM   0
        ADC   L1728
        ADC   S1728
        NUM   0
        NUM   $880F
        ADC   BUF28
        NUM   0
        NUM   0
        NUM   0
        NUM   0
        NUM   0
        NUM   0
        NUM   0
        NUM   0
        NUM   0
        ADC   U1728
        BZS   BUF28(80)
```

- **A/Q Channel Allocation, Section ACQ**

Prior to modification Section ACQ is as follows:

```
*          M I S C E L L A N E O U S   P R O G R A M S
*
*          A / Q   C H A N N E L   A L L O C A T I O N
*

*      DEVICES REQUIRING ALLOCATION
*
*          1711/713   TELETYPE / CRT
*          1713       KEYBOARD
*          1713       PAPER TAPE READER
*          1713       PAPER TAPE PUNCH
*          1721       PAPER TAPE READER
*          1723       PAPER TAPE PUNCH
*          1777       PAPER TAPE READER
*          1777       PAPER TAPE PUNCH
*          1728/430   CARD READER/PUNCH
*          1729-2     CARD READER
*          1729-3     CARD READER
*          1731/601        UNBUFFERED MAG TAPE
*          1732-1/608/609 UNBUFFERED MAG TAPE

       ENT   AQSTCK         STACK FOR REQUESTS
       ENT   AQSSIZ         STACK SIZE

       EQU   NUMAQ(2)       QUANTITY OF ALLOCATION DEVICES

AQSTCK BZS   AQSTCK(3*NUMAQ-3)
AQSSIZ ADC   NUMAQ*3-3
```

The 1728/430 Card Reader/Punch requires A/Q channel allocation. Therefore the value of NUMAQ must be increased by one. After making this change, Section ACQ appears as follows:

```
*         M I S C E L L A N E O U S   P R O G R A M S
*
*         A / Q   C H A N N E L   A L L O C A T I O N
*


*      DEVICES REQUIRING ALLOCATION
*
*         1711/713   TELETYPE / CRT
*         1713       KEYBOARD
*         1713       PAPER TAPE READER
*         1713       PAPER TAPE PUNCH
*         1721       PAPER TAPE READER
*         1723       PAPER TAPE PUNCH
*         1777       PAPER TAPE READER
*         1777       PAPER TAPE PUNCH
*         1728/430   CARD READER/PUNCH
*         1729-2     CARD READER
*         1729-3     CARD READER
*         1731/601        UNBUFFERED MAG TAPE
*         1732-1/608/609 UNBUFFERED MAG TAPE

       ENT    AQSTCK        STACK FOR REQUESTS
       ENT    AQSSIZ        STACK SIZE

       EQU    NUMAQ(3)

AQSTCK BZS    AQSTCK(3*NUMAQ-3)
AQSSIZ ADC    NUMAQ*3-3
```

4.3.3 Modifying the Skeleton

The first step in modifying the skeleton is to obtain a listing of the skeleton. The install file is the second file on the install tape. The program SKED may be used to extract the skeleton from the install file and to obtain a sequenced listing of it. The install tape is mounted on tape unit 0. After entering the job processor, typing on the teletype appears as follows:

```
J
*SKED
SKED IN

NEXT
ADF,10,1
NEXT
BUILD,10

ANY MORE INPUT.  ENTER LU

NEXT
CATLOG
```

The BUILD command extracts the skeleton from the install file. The CATLOG command results in a resequencing and listing of the skeleton as follows:

```
*S.SYSMON.$3039
*S.SYSDAY.$3035
*S.SYSYER.$3734
*S.SYSLVL.$3836
*V
*V          1700 MASS STORAGE OPERATING SYSTEM - VER. 4.1
*V
*V          ANN'S TEST SYSTEM
*V
*YM.LIBEDT.1
*YM.LOADSD.2
*YM.JOBENT.3
*YM.JOBPRO.4
*YM.PROTEC.5
*YM.JPLOAD.6
*YM.JPCHGE.7
*YM.JPT13.8
*YM.JCRDV4.9
*YM.JLGOV4.10
*YM.JPSTV4.11
*YM.NAMEV4.12
*YM.JPFLV4.13
*YM.AFILV4.14
*YM.RESTOR.15
*YM.RCOVER.16
*YM.BRKPT.17
*YM.ODEBUG.18
*YM.SYSCOP.19
*YM.SYSSEG.20
*YM.MIPRO.21
*YM.TDFUNC.22
*YM.EFSTOR.23
*YM.EFLIST.24
*YM.SCMM17.25
*YM.VERIFY.26
*YM.DUMMY1.27
*YM.DUMMY2.28
*YM.DUMMY3.29
*YM.DUMMY4.30
*YM.DUMMY5.31
*YM.DUMMY6.32
*YM.DUMMY7.33
*YM.DUMMY8.34
*YM.DUMMY9.35
*YM.DUMMY0.36
*S.N4.$3C40
*S.ENDOV4.$6BFF
*S.BGNMON.$6C00
*S.MSIZV4.$7FFF
*S.SECTOR.$7EDA
*
*L          SYSTEM DATA PROGRAM
*B   'SYSDAT'  '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*L          SPACE REQUEST PROCESSOR
*B   'SPACE'   '   DECK-ID A02  MSOS 4.1'
*
*           SYSTEM CORE RESIDENT PROGRAMS
*
*LP         MONITOR
```

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```
*B   'NMONI'   '  DECK-ID A03  MSOS 4.1'
*B   'NDISP'   '  DECK-ID A04  MSOS 4.1'
*B   'RW'      '  DECK-ID A06  MSOS 4.1'
*B   'T14'     '  DECK-ID A07  MSOS 4.1'
*B   'T16'     '  DECK-ID A08  MSOS 4.1'
*B   'PARAME'  '  DECK-ID A09  MSOS 4.1'
*B   'COMMON'  '  DECK-ID A10  MSOS 4.1'
*B   'NIPROC'  '  DECK-ID A11  MSOS 4.1'
*B   'ALVOL'   '  DECK-ID A13  MSOS 4.1'
*B   'OFVOL'   '  DECK-ID A14  MSOS 4.1'
*B   'ALCORE'  '  DECK-ID A15  MSOS 4.1'
*B   'DCORE'   '  DECK-ID A16  MSOS 4.1'
*B   'NFNR'    '  DECK-ID A18  MSOS 4.1'
*B   'NCMPRO'  '  DECK-ID A19  MSOS 4.1'
*B   'MAKQ'    '  DECK-ID A20  MSOS 4.1'
*B   'ADEV'    '  DECK-ID A21  MSOS 4.1'
*B   'TMINT'   '  DECK-ID A22  MSOS 4.1'
*B   'DTIMER'  '  DECK-ID A23  MSOS 4.1'
*B   'TOD'     '  DECK-ID A24  MSOS 4.1'
*B   'MINT'    '  DECK-ID A25  MSOS 4.1'
*B   'TRVEC'   '  DECK-ID D01  MSOS 4.1'
*LP        DEBUGGING / CHECKOUT
*B   'SNAPOL'  '  DECK-ID H01  MSOS 4.1'
*B   'DMP421'  '  DECK-ID H03  MSOS 4.1'
*B   'BDK85X'  '  DECK-ID H05  MSOS 4.1'
*LP        CORE RESIDENT DRIVERS
*B   'FFDATA'  '  DECK-ID C01  MSOS 4.1'
*B   'DUMMY'   '  DECK-ID C02  MSOS 4.1'
*B   'ALAQ'    '  DECK-ID C03  MSOS 4.1'
*B   'D1711'   '  DECK-ID C05  MSOS 4.1'
*B   'D1738'   '  DECK-ID C08  MSOS 4.1'
*B   'REWCK'   '  DECK-ID C13  MSOS 4.1'
*B   'MMEXEC'  '  DECK-ID C15  MSOS 4.1'
*B   'NXTLOC'  '  NEXT AVAILABLE LOCATION'
*
*          SYSTEM MASS RESIDENT PROGRAMS
*
*M                   LIBEDT         1
*B   'LIBEDT'  '  DECK-ID D02  MSOS 4.1'
*M                   LOADSD         2
*B   'LOAD1'   '  DECK-ID D03  MSOS 4.1'
*B   'BPNCH1'  '  DECK-ID D04  MSOS 4.1'
*B   'LIDRV1'  '  DECK-ID D05  MSOS 4.1'
*B   'LCDRV1'  '  DECK-ID D06  MSOS 4.1'
*B   'LMDRV1'  '  DECK-ID D07  MSOS 4.1'
*B   'LLDRV1'  '  DECK-ID D08  MSOS 4.1'
*B   'ADJOF1'  '  DECK-ID D09  MSOS 4.1'
*B   'CNVRT1'  '  DECK-ID D10  MSOS 4.1'
*B   'LSTOT1'  '  DECK-ID D11  MSOS 4.1'
*B   'LINK11'  '  DECK-ID D12  MSOS 4.1'
*B   'LOADR1'  '  DECK-ID D13  MSOS 4.1'
*B   'NAMPR1'  '  DECK-ID D14  MSOS 4.1'
*B   'RBDBZ1'  '  DECK-ID D15  MSOS 4.1'
*B   'ENTEX1'  '  DECK-ID D16  MSOS 4.1'
*B   'XFRPR1'  '  DECK-ID D17  MSOS 4.1'
*B   'STBASE'  '  DECK-ID D18  MSOS 4.1'
*B   'LNKENT'  '  DECK-ID D19  MSOS 4.1'
*B   'LNKCR1'  '  DECK-ID D20  MSOS 4.1'
*B   'PATCH'   '  DECK-ID D21  MSOS 4.1'
*B   'TBSCH1'  '  DECK-ID D22  MSOS 4.1'
```

```
*B   'HASH'     '  DECK-ID D23  MSOS 4.1'
*B   'TBSTR1'   '  DECK-ID D24  MSOS 4.1'
*B   'PAGE'     '  DECK-ID D25  MSOS 4.1'
*B   'PROGLD'   '  DECK-ID D26  MSOS 4.1'
*B   'SCAN1'    '  DECK-ID D27  MSOS 4.1'
*B   'CHPU1'    '  DECK-ID D28  MSOS 4.1'
*B   'ADJOV2'   '  DECK-ID D29  MSOS 4.1'
*B   'ADRPR1'   '  DECK-ID D30  MSOS 4.1'
*M             JOBENT        3
*B   'JOBENT'   '  DECK-ID D31  MSOS 4.1'
*B   'T11'      '  DECK-ID D32  MSOS 4.1'
*B   'T7'       '  DECK-ID D33  MSOS 4.1'
*B   'T5'       '  DECK-ID D34  MSOS 4.1'
*B   'T3'       '  DECK-ID D35  MSOS 4.1'
*S,N1,P
*M             JOBPRO        4
*B   'JOBPRO'   '  DECK-ID D36  MSOS 4.1'
*B   'ONE'      '  DECK-ID D37  MSOS 4.1'
*B   'TWO'      '  DECK-ID D38  MSOS 4.1'
*B   'THREE'    '  DECK-ID D39  MSOS 4.1'
*S,N2,P
*M             PROTEC        5
*B   'BPROTK'   '  DECK-ID D41  MSOS 4.1'
*B   'JBKILL'   '  DECK-ID D42  MSOS 4.1'
*M             JPLOAD        6
*B   'JPLOAD'   '  DECK-ID D43  MSOS 4.1'
*M             JPCHGE        7
*B   'JPCHGE'   '  DECK-ID D44  MSOS 4.1'
*B   'ASCHEX'   '  DECK-ID D45  MSOS 4.1'
*M             JPT13         8
*B   'T13'      '  DECK-ID D46  MSOS 4.1'
*M             JCRDV4        9
*B   'JCRDV4'   '  DECK-ID D47  MSOS 4.1'
*M             JLGOV4       10
*B   'JLGOV4'   '  DECK-ID D48  MSOS 4.1'
*M             JPSTV4       11
*B   'JPSTV4'   '  DECK-ID D49  MSOS 4.1'
*M             NAMEV4       12
*B   'NAMEV4'   '  DECK-ID D50  MSOS 4.1'
*M             JPFLV4       13
*B   'JPFLV4'   '  DECK-ID D51  MSOS 4.1'
*M             AFILV4       14
*B   'JPF2V4'   '  DECK-ID D52  MSOS 4.1'
*M             RESTOR       15
*B   'RESTOR'   '  DECK-ID D53  MSOS 4.1'
*M             RCOVER       16
*B   'RCOVER'   '  DECK-ID H09  MSOS 4.1'
*B   'OUTSEL'   '  DECK-ID H10  MSOS 4.1'
*B   'RDMPV4'   '  DECK-ID H11  MSOS 4.1'
*B   'MASDMP'   '  DECK-ID H12  MSOS 4.1'
*M             BRKPT        17
*B   'BRKPTD'   '  DECK-ID H13  MSOS 4.1'
*B   'SIFT'     '  DECK-ID H14  MSOS 4.1'
*B   'BIASCI'   '  DECK-ID H15  MSOS 4.1'
*B   'RETJMP'   '  DECK-ID H16  MSOS 4.1'
*B   'JUMPTO'   '  DECK-ID H17  MSOS 4.1'
*B   'ENTER'    '  DECK-ID H18  MSOS 4.1'
*B   'ENTCOR'   '  DECK-ID H19  MSOS 4.1'
*B   'PRTREG'   '  DECK-ID H20  MSOS 4.1'
*B   'TERMIN'   '  DECK-ID H21  MSOS 4.1'
```

```
*B   'RESUME'   '  DECK-ID H22  MSOS 4.1'
*B   'DPCORR'   '  DECK-ID H23  MSOS 4.1'
*B   'MSDMPB'   '  DECK-ID H24  MSOS 4.1'
*B   'SETBRP'   '  DECK-ID H25  MSOS 4.1'
*M                ODEBUG       18
*B   'ODEBUG'   '  DECK-ID H26  MSOS 4.1'
*M                SYSCOP       19
*B   'SYSCOP'   '  DECK-ID H27  MSOS 4.1'
*M                SYSSEG       20
*B   'C01ST'    '  DECK-ID H28  MSOS 4.1'
*B   'C02ND'    '  DECK-ID H29  MSOS 4.1'
*B   'C03RD'    '  DECK-ID H30  MSOS 4.1'
*B   'COLAST'   '  DECK-ID H31  MSOS 4.1'
*M                MIPRO        21
*B   'MIPRO'    '  DECK-ID A26  MSOS 4.1'
*M                TDFUNC       22
*B   'TDFUNC'   '  DECK-ID A27  MSOS 4.1'
*M                EFSTOR       23
*B   'EFSTOR'   '  DECK-ID A28  MSOS 4.1'
*M                EFLIST       24
*B   'EFLIST'   '  DECK-ID A29  MSOS 4.1'
*M                SCMM17       25
*B   'SCMEXC'   '  DECK-ID E01  MSOS 4.1'
*M                VERIFY       26
*B   'VERFY1'   '  DECK-ID A30  MSOS 4.1'
*M                DUMMY1       27
*M                DUMMY2       28
*M                DUMMY3       29
*M                DUMMY4       30
*M                DUMMY5       31
*M                DUMMY6       32
*M                DUMMY7       33
*M                DUMMY8       34
*M                DUMMY9       35
*M                DUMMY0       36
*
*          MASS RESIDENT DRIVERS
*
*M                COSY DRIVER
*B   'DCOSY'    '  DECK-ID C28  MSOS 4.1'
*S.SCOSY.S
*S.LCOSY.P
*M                1731 601 MAG TAPE
*B   'D1731U'   '  DECK-ID C33  MSOS 4.1'
*B   'FRWA'     '  DECK-ID C34  MSOS 4.1'
*B   'FRWB'     '  DECK-ID C35  MSOS 4.1'
*B   'RWBA'     '  DECK-ID C36  MSOS 4.1'
*B   'MAXRVU'   '  DECK-ID C37  MSOS 4.1'
*S.S1731U.S
*S.L1731U.P
*M                1740-501/1742 LINE PRINTER
*B   'D40421'   '  DECK-ID C46  MSOS 4.1'
*S.S40421.S
*S.L40421.P
*T         END OF SYSTEM
*JOB,INSTAL,SYSTEM
*K.I6
*LIBEDT
*K.I6
*V  DEFINE REQUEST PRIORITIES
```

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```
*S,001.03,M
*S,002,00,M
*S.003,01.M
*S.004,02.M
*S.005.03.M
*S,006,02.M
*S.007,02.M
*S,008.02.M
*S,009,02.M
*S,010.02.M
*S.011.02.M
*S.012,03.M
*S.013.03.M
*S.014.03.M
*S.015.02.M
*S.016,03,M
*S,017,03.M
*S,018.04.M
*S,019,04.M
*S.020.04.M
*S,021.04.M
*S.022.04.M
*S.023.04.M
*S.024.04.M
*S.025.04.M
*S,026.04.M
*S,027,04.M
*S.028.04.M
*S,029,04.M
*S,030.04,M
*S.031.04.M
*S.032.04.M
*S.033.04.M
*S.034.04.M
*S.035,04.M
*S.036.04.M
*V  1700 MACRO ASSEMBLER 3.
*K.I6
*L.LIBMAC
*B  'LIBMAC'   '  DECK-ID G01  MSOS 4.1'
*L.ASSEM
*B  'ASSEM'    '  DECK-ID G02  MSOS 4.1'
*K.P8
*P.F
*B  'PASS1'    '  DECK-ID G03  MSOS 4.1'
*B  'PA1PR2'   '  DECK-ID G04  MSOS 4.1'
*T
*K.I8
*N.PASS1...B
*K.I6
*K.P8
*P.F
*B  'PASS2'    '  DECK-ID G05  MSOS 4.1'
*B  'PA2PR2'   '  DECK-ID G06  MSOS 4.1'
*T
*K.I8
*N.PASS2...B
*K.I6
*K.P8
*P.F
```

```
*B  'PASS3'    '  DECK-ID G07  MSOS 4.1'
*B  'PA3PR2'   '  DECK-ID G08  MSOS 4.1'
*B  'PA3PR3'   '  DECK-ID G09  MSOS 4.1'
*T
*K,I8
*N,PASS3,,,B
*K,I6
*K,P8
*P,F
*B  'TABLST'   '  DECK-ID G10  MSOS 4.1'
*T
*K,I8
*N,TABLST,,,B
*K,I6
*K,P8
*P,F
*B  'XREF'     '  DECK-ID G11  MSOS 4.1'
*K,I8
*N,XREF,,,B
*K,I6
*N,MACSKL,,,B
*B     'MACSKL'
*N,MACROS,,,B
*B     'MACROS'
*V  DEBUGGING AND CHECKOUT
*K,I6
*L,TRACE
*B  'TRACE'    '  DECK-ID H32  MSOS 4.1'
*V  SYSTEM UTILITY PROGRAMS
*K,I6
*L,LULIST
*B  'LULIST'   '  DECK-ID J01  MSOS 4.1'
*L,LISTR
*B  'LISTR'    '  DECK-ID J02  MSOS 4.1'
*L,OPSORT
*B  'OPSORT'   '  DECK-ID J03  MSOS 4.1'
*L,EESORT
*B  'EESORT'   '  DECK-ID J04  MSOS 4.1'
*L,COSY
*B  'COSY'     '  DECK-ID J05  MSOS 4.1'
*L,LCOSY
*B  'LCOSY'    '  DECK-ID J06  MSOS 4.1'
*L,CYFT
*B  'CYFT'     '  DECK-ID J07  MSOS 4.1'
*L,IOUP
*B  'IOUP'     '  DECK-ID J08  MSOS 4.1'
*K,P8
*P,F
*B  'IOUP'     '  DECK-ID J08  MSOS 4.1'
*B  'IOUPV4'   '  DECK-ID J09  MSOS 4.1'
*T
*K,I8
*N,IOUPV4,,,B
*K,I6
*L,DTLP
*B  'DTLP'     '  DECK-ID J10  MSOS 4.1'
*K,P8
*P,F
*B  'DSKTAP'   '  DECK-ID J11  MSOS 4.1'
*B  'DSKEQC'   '  DECK-ID J12  MSOS 4.1'
```

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```
*B   'DSKDHX'   '   DECK-ID J13   MSOS 4.1'
*B   'DSKCOP'   '   DECK-ID J14   MSOS 4.1'
*B   'DSKMTI'   '   DECK-ID J15   MSOS 4.1'
*B   'DSKMTO'   '   DECK-ID J16   MSOS 4.1'
*B   'DSKMMD'   '   DECK-ID J18   MSOS 4.1'
*T
*K.I8
*N.DSKTAP...B
*K.I6
*L.SETPV4
*B   'SPCALL'   '   DECK-ID J21   MSOS 4.1'
*K.P8
*P.F
*B   'SPOLY1'   '   DECK-ID J22   MSOS 4.1'
*B   'STPV4'    '   DECK-ID J23   MSOS 4.1'
*B   'IERROR'   '   DECK-ID J24   MSOS 4.1'
*B   'MCTDK'    '   DECK-ID J25   MSOS 4.1'
*B   'GETPAG'   '   DECK-ID J26   MSOS 4.1'
*B   'CONPRT'   '   DECK-ID J27   MSOS 4.1'
*B   'REDCON'   '   DECK-ID J28   MSOS 4.1'
*B   'CONDEC'   '   DECK-ID J29   MSOS 4.1'
*B   'ORDERM'   '   DECK-ID J30   MSOS 4.1'
*B   'IREAD'    '   DECK-ID J31   MSOS 4.1'
*B   'ASCOUT'   '   DECK-ID J32   MSOS 4.1'
*B   'PARAMS'   '   DECK-ID J33   MSOS 4.1'
*B   'DISKIO'   '   DECK-ID J34   MSOS 4.1'
*T
*K.I8
*N.STP1V4...B
*K.I6
*K.P8
*P.F
*B   'SPOLY2'   '   DECK-ID J35   MSOS 4.1'
*B   'SUP'      '   DECK-ID J36   MSOS 4.1'
*B   'IERROR'   '   DECK-ID J24   MSOS 4.1'
*B   'GETPAG'   '   DECK-ID J26   MSOS 4.1'
*B   'BTOA'     '   DECK-ID J37   MSOS 4.1'
*B   'ISTAT'    '   DECK-ID J38   MSOS 4.1'
*B   'SCIO'     '   DECK-ID J39   MSOS 4.1'
*B   'SCRD'     '   DECK-ID J40   MSOS 4.1'
*B   'REDCON'   '   DECK-ID J28   MSOS 4.1'
*B   'ICAT'     '   DECK-ID J41   MSOS 4.1'
*B   'BUFIN'    '   DECK-ID J42   MSOS 4.1'
*B   'MOVE'     '   DECK-ID J43   MSOS 4.1'
*B   'IREAD'    '   DECK-ID J31   MSOS 4.1'
*B   'ASCOUT'   '   DECK-ID J32   MSOS 4.1'
*B   'PARAMS'   '   DECK-ID J33   MSOS 4.1'
*B   'DISKIO'   '   DECK-ID J34   MSOS 4.1'
*T
*K.I8
*N.STP2V4...B
*V   SCMM TEST ROUTINES
*K.I6
*K.P8
*P.F
*B   'SCMTTY'   '   DECK-ID E02   MSOS 4.1'
*T
*K.I8
*N.SCMTTY...B
*K.I6
```

```
*K.P8
*P.F
*B   'SCMDK1'   '   DECK-ID E08  MSOS 4.1'
*T
*K.I8
*N.SCMDK1...B
*K.I6
*K.P8
*P.F
*B   'SCMDVP'   '   DECK-ID E09  MSOS 4.1'
*T
*K.I8
*N.SCMDVP...B
*K.I6
*K.P8
*P.F
*B   'SCMPRT'   '   DECK-ID E11  MSOS 4.1'
*T
*K.I8
*N.SCMPRT...B
*K.I6
*K.P8
*P.F
*B   'SCMMTI'   '   DECK-ID E12  MSOS 4.1'
*T
*K.I8
*N.SCMMTI...B
*V   INSTALL LIBRARY BUILDER
*K.I6
*L.LIBILD
*B   'LIBILD'   '   DECK-ID B01  MSOS 4.1'
*K.P8
*P.F
*B   'LIBIDO'   '   DECK-ID B02  MSOS 4.1'
*B   'CONVRS'   '   DECK-ID B03  MSOS 4.1'
*B   'MESSY'    '   DECK-ID B04  MSOS 4.1'
*B   'LJA2R'    '   DECK-ID B05  MSOS 4.1'
*B   'MOVECH'   '   DECK-ID B06  MSOS 4.1'
*B   'PICKUP'   '   DECK-ID B07  MSOS 4.1'
*B   'IOSUB'    '   DECK-ID B08  MSOS 4.1'
*T
*K.I8
*N.LIBIDO...B
*K.I6
*K.P8
*P.F
*B   'HELPER'   '   DECK-ID B09  MSOS 4.1'
*B   'MOVECH'   '   DECK-ID B06  MSOS 4.1'
*B   'HELP0'    '   DECK-ID B10  MSOS 4.1'
*B   'HELP1'    '   DECK-ID B11  MSOS 4.1'
*B   'HELP2'    '   DECK-ID B12  MSOS 4.1'
*B   'HELP3'    '   DECK-ID B13  MSOS 4.1'
*B   'HELP4'    '   DECK-ID B14  MSOS 4.1'
*B   'HELP5'    '   DECK-ID B15  MSOS 4.1'
*B   'HELP8'    '   DECK-ID B16  MSOS 4.1'
*B   'HELP9'    '   DECK-ID B17  MSOS 4.1'
*B   'HELP10'   '   DECK-ID B18  MSOS 4.1'
*B   'HELP11'   '   DECK-ID B19  MSOS 4.1'
*B   'HELP12'   '   DECK-ID B20  MSOS 4.1'
*B   'HELP13'   '   DECK-ID B21  MSOS 4.1'
```

```
*B   'HELP14'    '   DECK-ID B22   MSOS 4.1'
*T
*K.I8
*N.HELPER...B
*V   INSTALL  SKELETON EDITOR
*K.I6
*L.SKED
*B   'SKED'      '   DECK-ID B23   MSOS 4.1'
*K.P8
*P.F
*B   'SKFILE'    '   DECK-ID B24   MSOS 4.1'
*T
*K.I8
*N.SKFILE...B
*V   SYSTEM  INITIALIZER
*K,I6
*L.SILP
*B   'SILP'      '   DECK-ID B25   MSOS 4.1'
*K.P8
*P.F
*B   'CONTRL'    '   DECK-ID B26   MSOS 4.1'
*B   'ILOAD'     '   DECK-ID B27   MSOS 4.1'
*B   'LDRTRL'    '   DECK-ID B28   MSOS 4.1'
*B   'I1'        '   DECK-ID B29   MSOS 4.1'
*B   'I2'        '   DECK-ID B30   MSOS 4.1'
*B   '01711'     '   DECK-ID B31   MSOS 4.1'
*B   '040421'    '   DECK-ID B34   MSOS 4.1'
*B   'IDRIV'     '   DECK-ID B35   MSOS 4.1'
*B   'QMT7TK'    '   DECK-ID B36   MSOS 4.1'
*B   'MDRIV'     '   DECK-ID B42   MSOS 4.1'
*B   'ODK85X'    '   DECK-ID B44   MSOS 4.1'
*B   'QCDDMY'    '   DECK-ID B50   MSOS 4.1'
*B   'OPTDMY'    '   DECK-ID B51   MSOS 4.1'
*T
*K.I8
*N.SI...B
*V   SMM   BOOTSTRAPS
*K.I6
*L.SMM7T
*B   'SMM1'      '   DECK-ID B54   MSOS 4.1'
*Z
*K.I10.P11,L9
*CTO.    MSOS 4.1 INSTALLATION COMPLETED - YOU MAY AUTOLOAD
*Z
```

The date of the system build is to be changed. The value of N4 will be changed as an example of the modification of one of the parameters discussed in Article 2.2. {In this instance the value of N4 had been previously customized to a value such that unprotected core could not accommodate the largest program library file.} To change the build date and the value of N4 the commands to SKED are as follows:

```
NEXT
DELETE,1,3

NEXT DELETE,46,46

NEXT
INSERT,4,4
*S,N4,$3000
*S,SYSMON,$3130
*S,SYSDAY,$3130
*S,SYSYER,$3734
```

The *M record for the 1728/430 driver, driver modules, and the associated *S cards defining driver length and last sector load address must be added to the mass resident drivers portion of the skeleton.

The skeleton statements to be added will follow record 233. To insert these statements the requests to SKED continue, with typing on the teletype as follows:

4-37

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```
NEXT
INSERT,233,4
*M                    1728/430 CARD READER/PUNCH
*B  'D1728'
*B  'CP026'
*B  'CR026'
*S,S1728,S
*S,L1728,P
```

The skeleton statements to add the SCMM test module, SCMCRD will follow record 446. The typing on the teletype continues as follows:

```
NEXT
INSERT,446,4
*K,I6
*K,P8
*P,F
*B  'SCMCRD'
*T
*K,I8
*N,SCMCRD,,,B
```

The skeleton statements to add the SMM bootstrap for the 1728/430 Card Reader are as follows:

```
NEXT
INSERT,519,4

*L,SMM430
*B  'SMM4'
```

A scratch tape is mounted on tape unit one prior to the following dump request.

```
NEXT
DUMP,13

NEXT
EXIT

J
```

The DUMP,13 request results in the revised skeleton being written on tape unit one and a listing of the revised skeleton being listed on the line printer. The revised skeleton is as follows:

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```
*S.SYSLVL.$3836
*S.N4.$3006
*S.SYSMON.$3130
*S.SYSDAY.$3130
*S.SYSYER.$3734
*V
*V        1700 MASS STORAGE OPERATING SYSTEM - VER. 4.1
*V
*V        ANN'S TEST SYSTEM
*V
*YM.LIBEDT.1
*YM.LOADSD.2
```

```
*YM.JOBENT.3
*YM.JOBPRO.4
*YM.PROTEC.5
*YM,JPLOAD.6
*YM.JPCHGE.7
*YM.JPT13.8
*YM.JCRDV4.9
*YM.JLGOV4.10
*YM.JPSTV4.11
*YM,NAMEV4.12
*YM.JPFLV4.13
*YM.AFILV4.14
*YM.RESTOR.15
*YM.RCOVER.16
*YM,BRKPT.17
*YM.ODEBUG.18
*YM.SYSCOP.19
*YM.SYSSEG.20
*YM.MIPRO.21
*YM.TDFUNC.22
*YM.EFSTOR.23
*YM,EFLIST,24
*YM.SCMM17.25
*YM,VERIFY.26
*YM.DUMMY1.27
*YM.DUMMY2,28
*YM.DUMMY3.29
*YM,DUMMY4.30
*YM.DUMMY5.31
*YM.DUMMY6.32
*YM.DUMMY7.33
*YM.DUMMY8.34
*YM.DUMMY9.35
*YM.DUMMY0.36
*S.END0V4.$6BFF
*S.BGNMON.$6C00
*S.MSIZV4,$7FFF
*S.SECTOR.$7FDA
*
*L          SYSTEM DATA PROGRAM
*B    'SYSDAT'   '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*L          SPACE REQUEST PROCESSOR
*B    'SPACE'    '   DECK-ID A02  MSOS 4.1'
*
*           SYSTEM CORE RESIDENT PROGRAMS
*
*LP         MONITOR
*B    'NMONI'    '   DECK-ID A03  MSOS 4.1'
*B    'NDISP'    '   DECK-ID A04  MSOS 4.1'
*B    'RW'       '   DECK-ID A06  MSOS 4.1'
*B    'T14'      '   DECK-ID A07  MSOS 4.1'
*B    'T16'      '   DECK-ID A08  MSOS 4.1'
*B    'PARAME'   '   DECK-ID A09  MSOS 4.1'
*B    'COMMON'   '   DECK-ID A10  MSOS 4.1'
*B    'NIPROC'   '   DECK-ID A11  MSOS 4.1'
*B    'ALVOL'    '   DECK-ID A13  MSOS 4.1'
*B    'OFVOL'    '   DECK-ID A14  MSOS 4.1'
*B    'ALCORE'   '   DECK-ID A15  MSOS 4.1'
*B    'DCORE'    '   DECK-ID A16  MSOS 4.1'
*B    'NENR'     '   DECK-ID A18  MSOS 4.1'
```

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```
*B  'NCMPRQ'  '  DECK-ID A19  MSOS 4.1'
*B  'MAKQ'    '  DECK-ID A20  MSOS 4.1'
*B  'ADEV'    '  DECK-ID A21  MSOS 4.1'
*B  'TMINT'   '  DECK-ID A22  MSOS 4.1'
*B  'DTIMER'  '  DECK-ID A23  MSOS 4.1'
*B  'TOD'     '  DECK-ID A24  MSOS 4.1'
*B  'MINT'    '  DECK-ID A25  MSOS 4.1'
*B  'TRVEC'   '  DECK-ID D01  MSOS 4.1'
*LP       DEBUGGING / CHECKOUT
*B  'SNAPOL'  '  DECK-ID H01  MSOS 4.1'
*B  'DMP421'  '  DECK-ID H03  MSOS 4.1'
*B  'BDK85X'  '  DECK-ID H05  MSOS 4.1'
*LP       CORE RESIDENT DRIVERS
*B  'FFDATA'  '  DECK-ID C01  MSOS 4.1'
*B  'DUMMY'   '  DECK-ID C02  MSOS 4.1'
*B  'ALAQ'    '  DECK-ID C03  MSOS 4.1'
*B  'D1711'   '  DECK-ID C05  MSOS 4.1'
*B  'D1738'   '  DECK-ID C08  MSOS 4.1'
*B  'REWCK'   '  DECK-ID C13  MSOS 4.1'
*B  'MMEXEC'  '  DECK-ID C15  MSOS 4.1'
*B  'NXTLOC'  '  NEXT AVAILABLE LOCATION'
*
*         SYSTEM MASS RESIDENT PROGRAMS
*
*M                     LIBEDT        1
*B  'LIBEDT'  '  DECK-ID D02  MSOS 4.1'
*M                     LOADSD        2
*B  'LOAD1'   '  DECK-ID D03  MSOS 4.1'
*B  'BRNCH1'  '  DECK-ID D04  MSOS 4.1'
*B  'LIDRV1'  '  DECK-ID D05  MSOS 4.1'
*B  'LCDRV1'  '  DECK-ID D06  MSOS 4.1'
*B  'LMDRV1'  '  DECK-ID D07  MSOS 4.1'
*B  'LLDRV1'  '  DECK-ID D08  MSOS 4.1'
*B  'ADJOF1'  '  DECK-ID D09  MSOS 4.1'
*B  'CNVRT1'  '  DECK-ID D10  MSOS 4.1'
*B  'LSTOT1'  '  DECK-ID D11  MSOS 4.1'
*B  'LINK11'  '  DECK-ID D12  MSOS 4.1'
*B  'LOADR1'  '  DECK-ID D13  MSOS 4.1'
*B  'NAMPR1'  '  DECK-ID D14  MSOS 4.1'
*B  'RBDBZ1'  '  DECK-ID D15  MSOS 4.1'
*B  'ENTEX1'  '  DECK-ID D16  MSOS 4.1'
*B  'XFRPR1'  '  DECK-ID D17  MSOS 4.1'
*B  'STBASE'  '  DECK-ID D18  MSOS 4.1'
*B  'LNKENT'  '  DECK-ID D19  MSOS 4.1'
*B  'LNKCR1'  '  DECK-ID D20  MSOS 4.1'
*B  'PATCH'   '  DECK-ID D21  MSOS 4.1'
*B  'TRSCH1'  '  DECK-ID D22  MSOS 4.1'
*B  'HASH'    '  DECK-ID D23  MSOS 4.1'
*B  'TRSTR1'  '  DECK-ID D24  MSOS 4.1'
*B  'PAGE'    '  DECK-ID D25  MSOS 4.1'
*B  'PROGLD'  '  DECK-ID D26  MSOS 4.1'
*B  'SCAN1'   '  DECK-ID D27  MSOS 4.1'
*B  'CHPU1'   '  DECK-ID D28  MSOS 4.1'
*B  'ADJOV2'  '  DECK-ID D29  MSOS 4.1'
*B  'ADRPR1'  '  DECK-ID D30  MSOS 4.1'
*M                     JOBENT        3
*B  'JOBENT'  '  DECK-ID D31  MSOS 4.1'
*B  'T11'     '  DECK-ID D32  MSOS 4.1'
*B  'T7'      '  DECK-ID D33  MSOS 4.1'
*B  'T5'      '  DECK-ID D34  MSOS 4.1'
```

```
*B   'T3'       '  DECK-ID D35  MSOS 4.1'
*S,N1,P
*M              JOBPRO        4
*B   'JOBPRO'   '  DECK-ID D36  MSOS 4.1'
*B   'ONE'      '  DECK-ID D37  MSOS 4.1'
*B   'TWO'      '  DECK-ID D38  MSOS 4.1'
*B   'THREE'    '  DECK-ID D39  MSOS 4.1'
*S,N2,P
*M              PROTEC        5
*B   'BPROTK'   '  DECK-ID D41  MSOS 4.1'
*B   'JBKILL'   '  DECK-ID D42  MSOS 4.1'
*M              JPLOAD        6
*B   'JPLOAD'   '  DECK-ID D43  MSOS 4.1'
*M              JPCHGE        7
*B   'JPCHGE'   '  DECK-ID D44  MSOS 4.1'
*B   'ASCHEX'   '  DECK-ID D45  MSOS 4.1'
*M              JPT13         8
*B   'T13'      '  DECK-ID D46  MSOS 4.1'
*M              JCRDV4        9
*B   'JCRDV4'   '  DECK-ID D47  MSOS 4.1'
*M              JLGOV4       10
*B   'JLGOV4'   '  DECK-ID D48  MSOS 4.1'
*M              JPSTV4       11
*B   'JPSTV4'   '  DECK-ID D49  MSOS 4.1'
*M              NAMEV4       12
*B   'NAMEV4'   '  DECK-ID D50  MSOS 4.1'
*M              JPFLV4       13
*B   'JPFLV4'   '  DECK-ID D51  MSOS 4.1'
*M              AFILV4       14
*B   'JPF2V4'   '  DECK-ID D52  MSOS 4.1'
*M              RESTOR       15
*B   'RESTOR'   '  DECK-ID D53  MSOS 4.1'
*M              RCOVER       16
*B   'RCOVER'   '  DECK-ID H09  MSOS 4.1'
*B   'OUTSEL'   '  DECK-ID H10  MSOS 4.1'
*B   'RDMPV4'   '  DECK-ID H11  MSOS 4.1'
*B   'MASDMP'   '  DECK-ID H12  MSOS 4.1'
*M              BRKPT        17
*B   'BRKPTD'   '  DECK-ID H13  MSOS 4.1'
*B   'SIFT'     '  DECK-ID H14  MSOS 4.1'
*B   'BIASCI'   '  DECK-ID H15  MSOS 4.1'
*B   'RETJMP'   '  DECK-ID H16  MSOS 4.1'
*B   'JUMPTO'   '  DECK-ID H17  MSOS 4.1'
*B   'ENTER'    '  DECK-ID H18  MSOS 4.1'
*B   'ENTCOR'   '  DECK-ID H19  MSOS 4.1'
*B   'PRTREG'   '  DECK-ID H20  MSOS 4.1'
*B   'TERMIN'   '  DECK-ID H21  MSOS 4.1'
*B   'RESUME'   '  DECK-ID H22  MSOS 4.1'
*B   'DPCORR'   '  DECK-ID H23  MSOS 4.1'
*B   'MSDMPR'   '  DECK-ID H24  MSOS 4.1'
*B   'SETBRP'   '  DECK-ID H25  MSOS 4.1'
*M              ODEBUG       18
*B   'ODEBUG'   '  DECK-ID H26  MSOS 4.1'
*M              SYSCOP       19
*B   'SYSCOP'   '  DECK-ID H27  MSOS 4.1'
*M              SYSSEG       20
*B   'CO1ST'    '  DECK-ID H28  MSOS 4.1'
*B   'CO2ND'    '  DECK-ID H29  MSOS 4.1'
*B   'CO3RD'    '  DECK-ID H30  MSOS 4.1'
*B   'COLAST'   '  DECK-ID H31  MSOS 4.1'
```

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```
*M                    MIPRO        21
*B   'MIPRO'      '   DECK-ID A26  MSOS 4.1'
*M                    TDFUNC       22
*B   'TDFUNC'     '   DECK-ID A27  MSOS 4.1'
*M                    EFSTOR       23
*B   'EFSTOR'     '   DECK-ID A28  MSOS 4.1'
*M                    EFLIST       24
*B   'EFLIST'     '   DECK-ID A29  MSOS 4.1'
*M                    SCMM17       25
*B   'SCMEXC'     '   DECK-ID E01  MSOS 4.1'
*M                    VERIFY       26
*B   'VERFY1'     '   DECK-ID A30  MSOS 4.1'
*M                    DUMMY1       27
*M                    DUMMY2       28
*M                    DUMMY3       29
*M                    DUMMY4       30
*M                    DUMMY5       31
*M                    DUMMY6       32
*M                    DUMMY7       33
*M                    DUMMY8       34
*M                    DUMMY9       35
*M                    DUMMY0       36
*
*            MASS RESIDENT DRIVERS
*
*M                    COSY DRIVER
*B   'DCOSY'      '   DECK-ID C28  MSOS 4.1'
*S,SCOSY,S
*S,LCOSY,P
*M                    1731 601 MAG TAPE
*B   'D1731U'     '   DECK-ID C33  MSOS 4.1'
*B   'FRWA'       '   DECK-ID C34  MSOS 4.1'
*B   'FRWB'       '   DECK-ID C35  MSOS 4.1'
*B   'RWBA'       '   DECK-ID C36  MSOS 4.1'
*B   'MAXRVU'     '   DECK-ID C37  MSOS 4.1'
*S,S1731U,S
*S,L1731U,P
*M                    1740-501/1742 LINE PRINTER
*B   'D40421'     '   DECK-ID C46  MSOS 4.1'
*S,S40421,S
*S,L40421,P
*M
*B   'D1728'
*B   'CP026'
*B   'CR026'
*S,S1728,S
*S,L1728,P
*T           END OF SYSTEM
*JOB,INSTAL,SYSTEM
*K,I6
*LIBEDT
*K,I6
*V  DEFINE REQUEST PRIORITIES
*S,001,03,M
*S,002,00,M
*S,003,01,M
*S,004,02,M
*S,005,03,M
*S,006,02,M
*S,007,02,M
```

TM 27

```
*S,008,02,M
*S,009,02,M
*S,010,02,M
*S,011,02,M
*S,012,03,M
*S,013,03,M
*S,014,03,M
*S,015,02,M
*S,016,03,M
*S,017,03,M
*S,018,04,M
*S,019,04,M
*S,020,04,M
*S,021,04,M
*S,022,04,M
*S,023,04,M
*S,024,04,M
*S,025,04,M
*S,026,04,M
*S,027,04,M
*S,028,04,M
*S,029,04,M
*S,030,04,M
*S,031,04,M
*S,032,04,M
*S,033,04,M
*S,034,04,M
*S,035,04,M
*S,036,04,M
*V  1700 MACRO ASSEMBLER 3.
*K,I6
*L,LIBMAC
*B  'LIBMAC'   '  DECK-ID G01  MSOS 4.1'
*L,ASSEM
*B  'ASSEM'    '  DECK-ID G02  MSOS 4.1'
*K,P8
*P,F
*B  'PASS1'    '  DECK-ID G03  MSOS 4.1'
*B  'PA1PR2'   '  DECK-ID G04  MSOS 4.1'
*T
*K,I8
*N,PASS1,,,B
*K,I6
*K,P8
*P,F
*B  'PASS2'    '  DECK-ID G05  MSOS 4.1'
*B  'PA2PR2'   '  DECK-ID G06  MSOS 4.1'
*T
*K,I8
*N,PASS2,,,B
*K,I6
*K,P8
*P,F
*B  'PASS3'    '  DECK-ID G07  MSOS 4.1'
*B  'PA3PR2'   '  DECK-ID G08  MSOS 4.1'
*B  'PA3PR3'   '  DECK-ID G09  MSOS 4.1'
*T
*K,I8
*N,PASS3,,,B
*K,I6
```

```
*K.P8
*P.F
*B  'TABLST'   '   DECK-ID G10  MSOS 4.1'
*T
*K.I8
*N.TABLST...B
*K.I6
*K.P8
*P.F
*B  'XREF'     '   DECK-ID G11  MSOS 4.1'
*K.I8
*N.XREF...B
*K.I6
*N.MACSKL...B
*B     'MACSKL'
*N.MACROS...B
*B     'MACROS'
*V  DEBUGGING AND CHECKOUT
*K.I6
*L.TRACE
*B  'TRACE'    '   DECK-ID H32  MSOS 4.1'
*V  SYSTEM UTILITY PROGRAMS
*K.I6
*L.LULIST
*B  'LULIST'   '   DECK-ID J01  MSOS 4.1'
*L.LISTR
*B  'LISTR'    '   DECK-ID J02  MSOS 4.1'
*L.OPSORT
*B  'OPSORT'   '   DECK-ID J03  MSOS 4.1'
*L.EESORT
*B  'EESORT'   '   DECK-ID J04  MSOS 4.1'
*L.COSY
*B  'COSY'     '   DECK-ID J05  MSOS 4.1'
*L.LCOSY
*B  'LCOSY'    '   DECK-ID J06  MSOS 4.1'
*L.CYFT
*B  'CYFT'     '   DECK-ID J07  MSOS 4.1'
*L.IOUP
*B  'IOUP'     '   DECK-ID J08  MSOS 4.1'
*K.P8
*P.F
*B  'IOUP'     '   DECK-ID J08  MSOS 4.1'
*B  'IOUPV4'   '   DECK-ID J09  MSOS 4.1'
*T
*K.I8
*N.IOUPV4...B
*K.I6
*L.DTLP
*B  'DTLP'     '   DECK-ID J10  MSOS 4.1'
*K.P8
*P.F
*B  'DSKTAP'   '   DECK-ID J11  MSOS 4.1'
*B  'DSKEOC'   '   DECK-ID J12  MSOS 4.1'
*B  'DSKDHX'   '   DECK-ID J13  MSOS 4.1'
*B  'DSKCDP'   '   DECK-ID J14  MSOS 4.1'
*B  'DSKMTI'   '   DECK-ID J15  MSOS 4.1'
*B  'DSKMTO'   '   DECK-ID J16  MSOS 4.1'
*B  'DSKMMD'   '   DECK-ID J18  MSOS 4.1'
*T
*K.I8
```

```
*N,DSKTAP,..B
*K,I6
*L,SETPV4
*B  'SPCALL'   '   DECK-ID J21   MSOS 4.1'
*K,P8
*P,F
*B  'SPOLY1'   '   DECK-ID J22   MSOS 4.1'
*B  'STPV4'    '   DECK-ID J23   MSOS 4.1'
*B  'IERROR'   '   DECK-ID J24   MSOS 4.1'
*B  'MCTDK'    '   DECK-ID J25   MSOS 4.1'
*B  'GETPAG'   '   DECK-ID J26   MSOS 4.1'
*B  'CONPRT'   '   DECK-ID J27   MSOS 4.1'
*B  'REDCON'   '   DECK-ID J28   MSOS 4.1'
*B  'CONDEC'   '   DECK-ID J29   MSOS 4.1'
*B  'ORDERM'   '   DECK-ID J30   MSOS 4.1'
*B  'TREAD'    '   DECK-ID J31   MSOS 4.1'
*B  'ASCOUT'   '   DECK-ID J32   MSOS 4.1'
*B  'PARAMS'   '   DECK-ID J33   MSOS 4.1'
*B  'DISKIO'   '   DECK-ID J34   MSOS 4.1'
*T
*K,I8
*N,STP1V4...B
*K,I6
*K,P8
*P,F
*B  'SPOLY2'   '   DECK-ID J35   MSOS 4.1'
*B  'SUP'      '   DECK-ID J36   MSOS 4.1'
*B  'IERROR'   '   DECK-ID J24   MSOS 4.1'
*B  'GETPAG'   '   DECK-ID J26   MSOS 4.1'
*B  'BTOA'     '   DECK-ID J37   MSOS 4.1'
*B  'ISTAT'    '   DECK-ID J38   MSOS 4.1'
*B  'SCIO'     '   DECK-ID J39   MSOS 4.1'
*B  'SCRD'     '   DECK-ID J40   MSOS 4.1'
*B  'REDCON'   '   DECK-ID J28   MSOS 4.1'
*B  'ICAT'     '   DECK-ID J41   MSOS 4.1'
*B  'BUFIN'    '   DECK-ID J42   MSOS 4.1'
*B  'MOVE'     '   DECK-ID J43   MSOS 4.1'
*B  'TREAD'    '   DECK-ID J31   MSOS 4.1'
*B  'ASCOUT'   '   DECK-ID J32   MSOS 4.1'
*B  'PARAMS'   '   DECK-ID J33   MSOS 4.1'
*B  'DISKIO'   '   DECK-ID J34   MSOS 4.1'
*T
*K,I8
*N,STP2V4...B
*V  SCMM TEST ROUTINES
*K,I6
*K,P8
*P,F
*B  'SCMTTY'   '   DECK-ID E02   MSOS 4.1'
*T
*K,I8
*N,SCMTTY...B
*K,I6
*K,P8
*P,F
*B  'SCMDK1'   '   DECK-ID E08   MSOS 4.1'
*T
*K,I8
*N,SCMDK1...B
*K,I6
```

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```
*K.P8
*P.F
*B   'SCMDVP'   '  DECK-ID E09  MSOS 4.1'
*T
*K.I8
*N.SCMDVP...B
*K.I6
*K.P8
*P.F
*B   'SCMPRT'   '  DECK-ID E11  MSOS 4.1'
*T
*K.I8
*N.SCMPRT...B
*K.I6
*K.P8
*P.F
*B   'SCMMTT'   '  DECK-ID E12  MSOS 4.1'
*T
*K.I8
*N.SCMMTT...B
*K.I6
*K.P8
*P.F
*B   'SCMCRD'
*T
*K.I8
*N.SCMCRD...B
*V   INSTALL LIBRARY BUILDER
*K.I6
*L.LIBILD
*B   'LIBILD'   '  DECK-ID B01  MSOS 4.1'
*K.P8
*P.F
*B   'LIBIDO'   '  DECK-ID B02  MSOS 4.1'
*B   'CONVRS'   '  DECK-ID B03  MSOS 4.1'
*B   'MESSY'    '  DECK-ID B04  MSOS 4.1'
*B   'LJA2B'    '  DECK-ID B05  MSOS 4.1'
*B   'MOVECH'   '  DECK-ID B06  MSOS 4.1'
*B   'PICKUP'   '  DECK-ID B07  MSOS 4.1'
*B   'IOSUB'    '  DECK-ID B08  MSOS 4.1'
*T
*K.I8
*N.LIBIDO...B
*K.I6
*K.P8
*P.F
*B   'HELPER'   '  DECK-ID B09  MSOS 4.1'
*B   'MOVECH'   '  DECK-ID B06  MSOS 4.1'
*B   'HELP0'    '  DECK-ID B10  MSOS 4.1'
*B   'HELP1'    '  DECK-ID B11  MSOS 4.1'
*B   'HELP2'    '  DECK-ID B12  MSOS 4.1'
*B   'HELP3'    '  DECK-ID B13  MSOS 4.1'
*B   'HELP4'    '  DECK-ID B14  MSOS 4.1'
*B   'HELP5'    '  DECK-ID B15  MSOS 4.1'
*B   'HELP8'    '  DECK-ID B16  MSOS 4.1'
*B   'HELP9'    '  DECK-ID B17  MSOS 4.1'
*B   'HELP10'   '  DECK-ID B18  MSOS 4.1'
*B   'HELP11'   '  DECK-ID B19  MSOS 4.1'
*B   'HELP12'   '  DECK-ID B20  MSOS 4.1'
*B   'HELP13'   '  DECK-ID B21  MSOS 4.1'
```

```
*B   'HELP14'   '   DECK-ID B22   MSOS 4.1'
*T
*K,I8
*N,HELPER,,,B
*V   INSTALL SKELETON EDITOR
*K,I6
*L,SKED
*B   'SKED'      '   DECK-ID B23   MSOS 4.1'
*K,P8
*P,F
*B   'SKFILE'    '   DECK-ID B24   MSOS 4.1'
*T
*K,I8
*N,SKFILE,,,B
*V   SYSTEM INITIALIZER
*K,I6
*L,SILP
*B   'SILP'      '   DECK-ID B25   MSOS 4.1'
*K,P8
*P,F
*B   'CONTRL'    '   DECK-ID B26   MSOS 4.1'
*B   'ILOAD'     '   DECK-ID B27   MSOS 4.1'
*B   'LDRTBL'    '   DECK-ID B28   MSOS 4.1'
*B   'I1'        '   DECK-ID B29   MSOS 4.1'
*B   'I2'        '   DECK-ID B30   MSOS 4.1'
*B   'Q1711'     '   DECK-ID B31   MSOS 4.1'
*B   'Q40421'    '   DECK-ID B34   MSOS 4.1'
*B   'IDRIV'     '   DECK-ID B35   MSOS 4.1'
*B   'QMT7TK'    '   DECK-ID B36   MSOS 4.1'
*B   'MDRIV'     '   DECK-ID B42   MSOS 4.1'
*B   'QDK85X'    '   DECK-ID B44   MSOS 4.1'
*B   'QCDDMY'    '   DECK-ID B50   MSOS 4.1'
*B   'QPTDMY'    '   DECK-ID B51   MSOS 4.1'
*T
*K,I8
*N,SI,,,B
*V   SMM  BOOTSTRAPS
*K,I6
*L,SMM7T
*B   'SMM1'      '   DECK-ID B54   MSOS 4.1'
*L,SMM430
*B   'SMM4'
*Z
*K,I10,P11,L9
*CTO,    MSOS 4.1 INSTALLATION COMPLETED - YOU MAY AUTOLOAD
*Z
```

4.3.4 Creating a New Install File

In this process, three tapes are used. These tapes are as follows:

1) Binary copy of the modified form of SYSDAT
2) Modified skeleton
3) MSOS library tape

The program LIBILD is used to construct a new install file. Typing on the teletype is as follows:

```
MI
*BATCH
J
*JOB
J
*LIBILD
CONTROL LU   =
DEFS LU      =
INSTALL LU   = 13
NEWLIB LU    =
LIB 01 LU    = 10
LIB 02 LU    = 10
LIB 03 LU    =
SKELETON LU  = 10

 LOAD LIBRARY INPUT   02 ON LU    10.  CR WHEN READY.

LOAD SKEL/INSTAL, CR WHEN READY

LIBRARY BUILD COMPLETE
TYPE *Z TO TERMINATE OR
TYPE *C TO CONTINUE WITH CURRENT SKELETON AND/OR
OUTPUT LIBRARY LU'S *Z
J
```

Note that a carriage return only is entered as the response to the query CONTROL LU=. This is because subsequent control statements will be read from the comments device. A carriage return is the response to the query DEFS LU= since the install file is to be created according to a skeleton and not according to a definitions deck. The response to INSTALL LU= indicates the install file will be written on tape unit 1. No new output library is to be created. Therefore a carriage return only is entered following the query NEWLIB LU=.

4.3.5 Loading the New System

Using the new install file and the system initializer program, the new system may be loaded. The procedure used is described in the 1700 MSOS 4 Installation Handbook, Publication No. 39520900. Typing on the teletype is as follows:

```
MI
*BATCH
J
*JOB
J
*SILP
THE INITIALIZER WILL BE MOVED TO LOCATION 5CFF AND EXECUTED

TURN OFF PROTEC SWITCH AND TYPE CARRIAGE RETURN
```

At this point before typing carriage return, the system disk pack is removed, and a scratch pack is mounted. The new system will be loaded on the scratch pack.

Typing on the teletype then proceeds as follows:

```
MSOS 4.1 SYSTEM INITIALIZER
FWA OF CONTRL = 5CEE

DATE MM/DD/YY
10/10/74

Q
*C,7
*C,7

Q
*V
INITIALIZATION COMPLETED - YOU MAY AUTOLOAD

MSOS 4.1--PSR LEVEL 86    10/10/74

ANN'S TEST SYSTEM

32K MODE

ENTER DATE/TIME   MMDDYYHHMM

1010741945
DATE: 10 OCT 74    TIME: 1945:00
MI
*BATCH
*CTO,    MSOS 4.1 INSTALLATION COMPLETED - YOU MAY AUTOLOAD

MSOS 4.1--PSR LEVEL 86    10/10/74

ANN'S TEST SYSTEM

32K MODE

ENTER DATE/TIME   MMDDYYHHMM

1010741958
DATE: 10 OCT 74    TIME: 1958:00
```

4.3.6 SCMM Verification of Added Driver

This verification procedure is described in the Small Computer Maintenance Monitor Reference Manual, Publication No. 39520200. Three punch tests and three read tests are ~~perf~~ performed. Typing on the teletype is as follows:

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```
MI
SCMM
SCMM IN
10/15/74  0900
CONTROL, TEST ID
SRT,CRD
BEGIN CARD R/P TEST
DLU,SECTIONS,CARDS
19,2,10
END CARD R/P TEST,  0010 CARDS  0000 ERRORS
SCMM OUT
10/15/74  0900
MI
SCMM
SCMM IN
10/15/74  0900
CONTROL, TEST ID
SRT,CRD
BEGIN CARD R/P TEST
DLU,SECTIONS,CARDS
19,4,10
END CARD R/P TEST,  0010 CARDS  0000 ERRORS
SCMM OUT
10/15/74  0901
MI
SCMM
SCMM IN
10/15/74  0901
CONTROL, TEST ID
SRT,CRD
BEGIN CARD R/P TEST
DLU,SECTIONS,CARDS
19,8,10
SPECIAL PATTERN FOR TEST 3
ABC
END CARD R/P TEST,  0010 CARDS  0000 ERRORS
SCMM OUT
10/15/74  0901
MI
SCMM
SCMM IN
10/15/74  0914
CONTROL, TEST ID
SRT,CRD
BEGIN CARD R/P TEST
DLU,SECTIONS,CARDS
19,80,10
SPECIAL PATTERN FOR TEST 3
ABC
END CARD R/P TEST,  0010 CARDS  0000 ERRORS
SCMM OUT
10/15/74  0915
```

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```
MI
SCMM
SCMM IN
10/15/74  0916
CONTROL, TEST ID
SRT,CRD
BEGIN CARD R/P TEST
DLU,SECTIONS,CARDS
19,20,10
END CARD R/P TEST,  0010 CARDS  0000 ERRORS
SCMM OUT
10/15/74  0916
MI
SCMM
SCMM IN
10/15/74  0917
CONTROL, TEST ID
SRT,CRD
BEGIN CARD R/P TEST
DLU,SECTIONS,CARDS
19,40,10
END CARD R/P TEST,  0010 CARDS  0000 ERRORS
SCMM OUT
10/15/74  0918
```

CHAPTER 5. ADDITION OF THE FILE MANAGER

5.1 SYSDAT CHANGES REQUIRED

To add a File Manager it is necessary to modify SYSDAT Section ADA, File Manager Data, SYSDAT Section ADB, Job Processor File Parameters; and SYSDAT Section ADC, Preset Protected Entry Points for Use by Unprotected Programs.

5.1.1 Section ADA, File Manager Data Parameter

In modifying Section ADA, File Manager Data, it is necessary to define the parameters needed by the File Manager. These include the parameters FISLU, MAXMMA, RPTPER, FDTPER, FIDSEC, FIBLSA, FIBNIX, FSLIST, FSLLTH, FSLEND, and ADRFMS. The method of defining each of these parameters is described in Article 1.79.

There may be from one to nine File Manager mass memory units. For File Manager mass memory unit n, $0 \le n \le 8$ the following parameter values must be defined:

1) file space list for this device
2) LUEn
3) NUMFSn
4) starting sector of file space on this device (This is ADRFMS if n = 0; BEGLUn otherwise.)

The file space list for a given device is defined as described in Article 1.79. If only non-indexed files are to be defined, these having a variety of file record lengths,

and more than one mass memory unit is available for file space, it may be most efficient to have different segment lengths in each file space list. For example, if there are two units available for file space, and file records will have lengths 1, 2, 3, 4, and 6 sectors, the following file space lists might be defined.

File Manager Unit 0 file space list:

```
NUM  0,1          THREAD OF SEGMENTS ONE SECTOR LONG
NUM  0,2          THREAD OF SEGMENTS TWO SECTORS LONG
```

File Manager Unit 1 file space list:

```
NUM  0,3          THREAD OF SEGMENTS THREE SECTORS LONG
NUM  0,4          THREAD OF SGEMENTS FOUR SECTORS LONG
NUM  0,6          THREAD OF SEGMENTS SIX SECTORS LONG
```

The parameter LUEn is defined according to the description in Article 1.79.

The size and starting sector of the file space are dependent on the File Manager unit number ,n, and on whether that unit is the library unit. There are three cases to consider.

5.1.1.1 Size and Start of File Space on File Manager Unit 0 Where Unit 0 is the Library Unit

First consider the case n=0 where FISLU is the logical unit number of the library unit. In this case, NUMFS0 is the number of sectors on the library unit to be used for file space. The value of NUMFS0 must be large enough to contain the FIS directory (one sector), the FIS blocks (approximately 100 sectors for 100-500 files), plus any file indexed directories and file records to be stored on the library unit. The value of NUMFS0 must be small enough so that required scratch, the system, and NUMFS0 sectors of file space will fit on the library unit. The principal size requirement for the scratch area is that it be large enough to contain temporary storage for the Macro Assembler to assemble the largest program in the system. The Macro Assembler requires three sectors of scratch for each record in a program. Typically, SYSDAT is the largest program in the system. For example, SYSDAT might contain 2000 records. Then 6000 sectors of scratch would be required. The scratch requirement may be partly or wholly satisfied outside the library unit if other mass memory units are available. The number of sectors required by the unmodified system is contained in core location $C1_{16}$. (Refer to Article 1.5.)

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The modified system will require additional sectors for storage of the added File Manager modules. Typically the system will require 1000 sectors or less.

Let T = total sectors on library unit

S = number of sectors needed to contain system

C = number of sectors required for scratch on the library unit

M = number of sectors required for FIS directory, FIS blocks and any file records or file indexed directories to be stored on library unit.

Then it is required that NUMFSO satisfy the following:

$$M \leq NUMFSO \leq T-(S+C)$$

The approximation of M, S, and C have been discussed. The value of T is dependent on the mass memory device used as the library unit. The value of T may be obtained from Figure 5-1.

DEVICE	TOTAL NUMBER SECTORS
1733-1/853 Disk	15,995
1738/853 Disk	15,995
1733-1/854 Disk	32,475
1738/854 Disk	32,475
1733-2/856-2 Cartridge Disk	23,543
1733-2/856-4 Cartridge Disk	32,767
1739-1 Cartridge Disk	23,543
1751-A Drum	679
1751-C Drum	1,361
1751-D Drum	2,044
1751-E Drum	2,727
1751-F Drum	3,409
1751-G Drum	4,092
1751-H Drum	4,775
1751-J Drum	5,457
1752-1 Drum	2,043
1752-2 Drum	6,140
1752-3 Drum	12,284
1752-4 Drum	16,380

FIGURE 5-1

NUMBER OF SECTORS ON MASS MEMORY DEVICES

The start of file space on the library unit is defined by ADRFMS as described in Article 1.79.

5.1.1.2 Size and Start of File Space on File Manager Unit 0, Where Unit 0 is Not the Library Unit

In this case FISLU specifies a logical unit other than the library unit and there is no file space on the library unit. Referring to Article 5.1.1.1, the minimal requirement for file space size is the same. However, the upper bound on file space size is different from the upper bound imposed by the library unit. A non-library mass memory unit in a released system contains one of the following:

1) scratch only,
2) scratch and software buffer areas
3) software buffer area(s) and file space,
4) file space only,
or 5) user data only

For a non-library unit, NUMFSn must be small enough so that any required scratch, software buffer areas, or user data together with the file space will fit on the unit. The scratch requirements were discussed in Article 5.1.1.1.
If there is software buffering in the system, then one or more of the following sections will appear in SYSDAT:

Section ABA, 1713 Paper Tape Software Buffered Physical Device Table

Section ABV, 1728-430 Punch Software Buffered Physical Device Table

Section ABY, 1777/1723 Paper Tape Punch Software Buffered Physical Device Table

Section ACA, 364-4 Communications Multiplexor Software Buffered Physical Device Table

To determine if there is software buffering on a particular logical unit, it is necessary to examine the value of MMLU, logical unit number, in each software buffered physical device table in SYSDAT. The size and position of a given software buffer may be determined by examining the values of FMSB, FLSB, and LLSB in the BUFFER macro expansion. (Refer to Article 1.27.) All software buffers are placed together after the end of scratch on a non-library unit. Thus, to determine the beginning of the software buffer area on a non-library unit, it is only necessary to consider the pair FMSB, FLSB which have minimum value as a pair. For this pair the sector, S, and word within the sector W_S may be computed as follows:

$$S = \left\lfloor (FMSB \cdot 8000_{16} + FLSB)/96 \right\rfloor + 1$$

$$W_S = FMSB \cdot 8000_{16} + FLSB - 96 \cdot (S-1)$$

Where $\lfloor x \rfloor$ is the greatest integer less than or equal to x. For example, if FMSB is 1 and FLSB is $6D58_{16}$, then S is 633 and W_S is 88. Thus the number of sectors required for software buffering on this unit is

$$B = T' - (S-1)$$

Where T' is the total sectors on this unit (from Figure 5-1).

Let T' = total sectors on this unit (from Figure 5-1)

B = total sectors needed for software buffering on this unit

S' = number of sectors needed for scratch on this unit

U = number of sectors required for user tables.

M' = number of sectors required for FIS directory. FIS blocks and any file records or file indexed directories to be stored on this unit (Refer to Article 5.1.1.1).

Then it is required that

$$M' \leq NUMFS0 \leq T' - (B + S' + U)$$

The positioning of file space may be anywhere on the unit as long as sufficient space is left for any necessary scratch, user tables, and/or software buffers. Thus, in general, the value of ADRFMS will not be one of the entries in Figure 1-82, since those entries are based on the assumption that File Manager Unit 0 is the library unit. A typical entry defining ADRFMS would be

```
ADRFMS  ADC  1
```

5.1.1.3 Size and Start of File Space on File Manager Unit n, n>0

The size of file space on any File Manager unit other than the unit specified by FISLU is determined in the manner described in Article 5.1.1.2 except that the minimum file space required does not include space for the FIS directory and FIS blocks.

Let

T'' = total sectors on this unit (from Figure 5-1)

B' = total sectors needed for software buffering on this unit

S'' = number of sectors needed for scratch on this unit

U' = number of sectors required for user tables on this unit

M'' = number of sectors required for any file records and file indexed directories to be stored on this unit.

Then it is required that

$$M'' \leq NUMFSn \leq T'' - (B'+S''+U')$$

The methods of evaluating T'', B', S'' and U' are the same as for evaluating T', B, S' and U, as described in Article 5.1.1.2.

The start of file space on this unit is designated by BEGLUn. File space may begin at any sector as long as sufficient space is left for any necessary scratch, user tables, and/or software buffers. A typical entry for File Manager unit 1 would be

```
EQU  BEGLU1{1}
```

5.1.2 Section ADB, Job Processor File Parameters

When adding the File Manager it is necessary to delete the dummy definition of RELFIL in this section to avoid duplicate entry points in the system. The records to be deleted are those shown in lines *ABD0100 and *ABD0200 of Figure 1-83.

5.1.3 Section ADC, Presets

Records *ADC0210 through *ADC0710 of Figure 1-84 must be added to Section ADC so that the File Manager request processors may be accessed by unprotected programs.

5.2 SKELETON CHANGES REQUIRED

It may be necessary to change the value of N4, the length of allocatable area 4. File Manager requirements for the size of area 4 are discussed in Article 1.58. The form of the *S statement which determines the value of N4 is shown in Article 2.2.

The File Manager requires the addition of the core resident File Manager modules as listed in Group G, Article 2.1, and the mass resident File Manager modules as listed in Group R, Article 2.1. The accompanying *S statements which determine the values of FRMP01, FRMP02, ..., FMRM12 are shown in Article 2.2.

The values of BGNMON and ENDOV4 must be decreased to allow room for the core resident File Manager modules. (Refer to Article 2.2.)

Skeleton modifications are shown in the example in Article 5.3.3.

5.3 Example of File Manager Addition

The example described in this section is the addition of the File Manager to the system built in the Chapter 4 example. The capability to use cards, as added in Chapter 4, will be utilized to illustrate the method of system customization by use of cards.

5.3.1 Dumping SYSDAT and the Skeleton onto Cards

In the Chapter 4 example, a COSY tape of SYSDAT was created. To convert the COSY information to Hollerith and dump it onto cards, the following control cards may be read from the card reader following a *BATCH request from the teletype:

```
*JOB
*COSY
SYSDAT  DCK/ I=06, H=11
        END/
```

To dump the skeleton from the previous example onto cards, the program SKED is used to build the skeleton from the previous install file tape and to dump the information onto cards.

5.3.2 Modification of SYSDAT

- Addition of Second Mass Memory Unit

In order to have more than one File Manager mass memory unit in this example, a second disk drive was added to the system. Specifically, a 1738-853 was added. The addition of this device necessitates changes in the following sections of SYSDAT:

- LOG1A Logical Units Table, Section AAM
- LOG1 Logical Units Table, Section AAN
- LOG2 Logical Units Table, Section AAO
- Diagnostic Tables, Section AAP
- 1738-853/854 Physical Device Table, Section ABJ

The above sections would not normally be modified when adding a File Manager. Therefore the SYSDAT modifications of these sections will not be shown here, except for the LOG1A Table.

The previous LOG1A Table is shown in Chapter 4. The new table includes logical unit 20, the 1738-853/854 Disk, unit 1; and logical unit 21, the diagnostic logical unit for the 1738-853/854 Disk, unit 1. After modification, the LOG1A Table is as follows:

```
*           L O G I C A L   U N I T   T A B L E S   ( L O G 1 A )          00589
*                                                                          00590
*                                                                          00591
        ENT   LOG1A     PHYSICAL DEVICES ADDRESSES BY LOGICAL UNIT         00592
        ENT   NUMLU                                                        00593

LOG1A   ADC   NUMLU           NUMBER OF LOGICAL UNITS                      00595
        ADC   PCORE           1    CORE ALLOCATOR                          00596
        ADC   PDUMMY          2    DUMMY LOGICAL UNIT                      00597
        ADC   PDUMMY          3    DUMMY LOGICAL UNIT                      00598
        ADC   P1711           4    1711 TELETYPE, 713-10 CRT               00599
        ADC   PCOSY1          5    COSY DRIVER, FIRST UNIT                 00600
        ADC   P731U0          6    UNBUFFERED 1731-601 MAG TAPE, UNIT 0    00601
        ADC   PDUMMY          7    DUMMY LOGICAL UNIT                      00602
        ADC   P17380          8    1738 853/4 DISK, UNIT 0                 00603
        ADC   P40421          9    1740-501/1742 LINE PRINTER              00604
        ADC   P1728           10   1728/430 CARD READER                 ***00605
        ADC   P1728           11   1728/430 CARD PUNCH  @@@@@@@@@@@@@@@@@@@@@@***00606
FTN740  ADC   P40421          12   1740-501/1742 FORTRAN LINE PRINTER      00607
        ADC   P731U1          13   UNBUFFERED 1731-601 MAG TAPE, UNIT 1    00608
X1711   ADC   P1711           14   DIAGNOSTIC 1711 TELETYPE, 713-10 CRT    00609
X17380  ADC   P17380          15   DIAGNOSTIC 1738 853/4 DISK, UNIT 0      00610
X40421  ADC   P40421          16   DIAGNOSTIC 1740-501/1742 LINE PRINTER   00611
X731U1  ADC   P731U1          17   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 1    00612
X731U0  ADC   P731U0          18   DIAGNOSTIC 1731-601 MAG TAPE, UNIT 0    00613
X1728   ADC   P1728           19   DIAGNOSTIC 1728/430 CARD READER/PUNCH***00614
        ADC   P17381          20   1738 853/4 DISK, UNIT 1
X17381  ADC   P17381          21   DIAGNOSTIC 1738 853/4 DISK, UNIT 1
NUMLU   EQU   NUMLU(*-LOG1A-1)                                             00615
```

• File Manager Parameters

File Manager Data, Section ADA, must be changed to define those parameters required by the File Manager. Prior to the addition of the File Manager, Section ADA was as follows:

```
*        M I S C E L L A N E O U S   I N F O R M A T I O N
*
*        F I L E   M A N A G E R   D A T A
*
*        THESE ENTRIES ALLOW PROPER SYSTEM LINKAGE FOR IF THE FILE
*        MANAGER IS NOT SELECTED.

    ENT  FSLIST
    ENT  ADRFMS,NUMFS0
    EQU  FSLIST($7FFF)
    EQU  ADRFMS($7FFF),NUMFS0($7FFF)

    ENT  BEGLU1,NUMFS1
    EQU  BEGLU1($7FFF),NUMFS1($7FFF)

    ENT  BEGLU2,NUMFS2
    EQU  BEGLU2($7FFF),NUMFS2($7FFF)

    ENT  BEGLU3,NUMFS3
    EQU  BEGLU3($7FFF),NUMFS3($7FFF)

    ENT  BEGLU4,NUMFS4
    EQU  BEGLU4($7FFF),NUMFS4($7FFF)

    ENT  BEGLU5,NUMFS5
    EQU  BEGLU5($7FFF),NUMFS5($7FFF)

    ENT  BEGLU6,NUMFS6
    EQU  BEGLU6($7FFF),NUMFS6($7FFF)

    ENT  BEGLU7,NUMFS7
    EQU  BEGLU7($7FFF),NUMFS7($7FFF)

    ENT  BEGLU8,NUMFS8
    EQU  BEGLU8($7FFF),NUMFS8($7FFF)
```

The parameters in this section are defined according to the description in Article 5.1.1. In this example, there are two File Manager mass memory units.

• Library Unit {Unit 0} File Space

The File Manager will principally use the library unit for storage of the following:

FIS Directory	1 sector
FIS Blocks	3 sectors each
Non-indexed file records	1 sector each

Therefore a file space list of one-sector segments and three sector segments is defined. A relatively small amount of file space is to be used on the library unit. The value selected for NUMFS0 is 1000 sectors. According to Article 5.1.1, the starting sector of file space on the library unit is defined by BEGFMS when the library unit is a 1738-853/854 Disk. The parameters defining file space on the library unit are shown in Figure 5-2.

• Unit 1 File Space

File Manager Unit 1 will be used for the storage of indexed as well as non-indexed files. The indexed files will principally have a key length of four words and will not be indexed linked. The number of expected key values for any of these files is between 1000 and 2000. According to the File Manager Reference Manual, Section A. 4.1, a KIS Directory for such a file will have a length defined as

$\lceil (4+\text{SRNEKV})/96 \rceil$ Sectors

where $\lceil x \rceil$ is the least integer greater than or equal to x. Thus, the KIS Directory length is between $\left\lceil \frac{4+31}{96} \right\rceil$ and $\left\lceil \frac{4+44}{96} \right\rceil$, or one sector. According to Section A.4.2 of the File Manager Reference Manual, a KIS block for such a file will have a length of

$$\left\lceil \frac{3+(2\cdot \text{NUMPTR}+\text{KEYLTH}) \quad \text{SRNEKV}}{96} \right\rceil \text{ sectors.}$$

This implies KIS block length is between

$$\left\lceil \frac{3+6\cdot 31}{96} \right\rceil \qquad \text{and} \qquad \left\lceil \frac{3+6\cdot 44}{96} \right\rceil$$

Some KIS blocks will, thus, be 2 sectors long and some will be 3 sectors long. Files stored on File Manager Unit 1 will have records of length 1, 2, 3 and 4 sectors. For these reasons the file space space list will contain segments of 1, 2, 3, and 4 sectors on this unit. The entire unit is to be devoted to file space. Therefore BEGLU1=1. The value of NUMFS1 is 15,995, as obtained from Figure 5-1. The parameters defining file space on this unit are shown in Figure 5-2.

```
*        M I S C E L L A N E O U S   I N F O R M A T I O N              01414
*                                                                       01415
*        F I L E   M A N A G E R   D A T A                              01416
*                                                                       01417

       ENT   FISLU           LOGICAL UNIT OF FIS DIRECTORY AND BLOCKS
       ENT   MAXMMA          MAXIMUM NO. OF MASS MEMORY ATTEMPTS ON ERROR
       ENT   RPTPER          REQUEST PROCESSOR TIMEOUT PERIOD
       ENT   FIDSEC          FIS DIRECTORY, S SECTOR ADDRESS
       ENT   FIBLSA          SECTOR ADDRESS OF LAST FIS BLOCK
       ENT   FDTPER          FILE/DIRECTORY TIMEOUT PERIOD
       ENT   FIBNIX          INDEX TO THE NEXT AVAILABLE LOCATION IN FIBLSA
       ENT   FSLIST          START OF FILE SPACE LIST
       ENT   FSLLTH          FILE SPACE LIST LENGTH
       ENT   FSLEND          END OF FILE SPACE LIST
       ENT   ADRFMS          BEGINNING OF FILE MANAGER SPACE ON LIB UNIT

       EQU   FISLU(LBUNIT)
       EQU   MAXMMA(1)
       EQU   FDTPER(10)      (1/10 SEC.)
       EQU   RPTPER(10)      (1/10 SEC.)

       EXT   BEGFMS
ADRFMS ADC   BEGFMS          BEGINNING OF FILE MANAGER SPACE ON LIB UNIT
************   THE FOLLOWING MUST BE IN ORDER            ****************
FIDSEC ADC   0
FIBLSA ADC   0
FIBNIX ADC   0
FSLIST EQU   FSLIST(*)

**********           START OF LOGICAL UNIT ENTRIES                 ******

*        L O G I C A L   U N I T   D A T A ,   U N I T   0
       ENT   NUMFS0
       EQU   NUMFS0(1000)    NUMBER OF FILE SECTORS - UNIT 0

LUE0   VFD   X9/LUEL0,X7/LBUNIT LU ENTRY LENGTH(7-15), LOGICAL UNIT(0-6)
       ADC   0               ADDRESS OF FILE SPACE POOL
       ADC   0               NUMBER OF AVAILABLE SECTORS
       ADC   NUMFS0          NUMBER OF SECTORS IN THIS FILE SPACE
       NUM   0,1             THREAD OF ONE SECTOR LONG

       NUM   0,3             THREAD OF THREE SECTORS LONG

LUEL0  EQU   LUEL0(*-LUE0)
```

FIGURE 5-2 SYSDAT Section ADA, File Manager Data, After Addition of File Manager

```
*         L O G I C A L   U N I T   D A T A ,   U N I T   1
*
       ENT  BEGLU1
       ENT  NUMFS1
       EQU  LUNIT1(20)     LOGICAL UNIT OF FILE MANAGER UNIT 1
       EQU  BEGLU1(1)      BEGINNING FILE SECTOR - UNIT 1
       EQU  NUMFS1(15995)  NUMBER OF FILE SECTORS - UNIT 1

LUE1   VFD  X9/LUEL1,X7/LUNIT1  LU ENTRY LENGTH(7-15), LOGICAL UNIT(0-6)
       ADC  BEGLU1         ADDRESS OF FILE SPACE POOL
       ADC  0              NUMBER OF AVAILABLE SECTORS
       ADC  NUMFS1         NUMBER OF SECTORS IN THIS FILE SPACE
       NUM  0,1            THREAD OF ONE SECTOR LONG

       NUM  0,2            THREAD OF TWO SECTORS LONG

       NUM  0,3            THREAD OF THREE SECTORS LONG

       NUM  0,4            THREAD OF FOUR SECTORS LONG

LUEL1  EQU  LUEL1(*-LUE1)
```

Figure 5-2 Continued

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• Section ADB, Job Processor File Parameters and Section ADC, Presets

Sections ADB and ADC are modified as described in Article 5.1.2 and 5.1.3.

5.3.3 Modifying the Skeleton

The skeleton is modified according to the procedure described in Article 5.2. In this case it is unnecessary to modify the value of N4, since N4 is already large enough to allow File Manager requests from the background. In this example BGNMON and ENDOV4 are each decreased by 500_{16} to allow space for the File Manager core resident modules. The system construction date is modified by changing SYSMON, SYSDAY, and SYSYER. The skeleton before modification is the second of the two skeletons listed in Article 4.3.3. The skeleton after modification is as follows:

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```
*S,SYSLVL,$3836
*S,N4,$3000
*S,SYSMON,$3130
*S,SYSDAY,$3234
*S,SYSYER,$3734
*V
*V        1700 MASS STORAGE OPERATING SYSTEM - VER. 4.1
*V
*V        ANN'S TEST SYSTEM
*V
*YM,LIBEDT,1
*YM,LOADSD,2
*YM,JOBENT,3
*YM,JOBPRO,4
*YM,PROTEC,5
*YM,JPLOAD,6
*YM,JPCHGE,7
*YM,JPT13,8
*YM,JCRDV4,9
*YM,JLGOV4,10
*YM,JPSTV4,11
*YM,NAMEV4,12
*YM,JPFLV4,13
*YM,AFILV4,14
*YM,RESTOR,15
*YM,RCOVER,16
*YM,BRKPT,17
*YM,ODEBUG,18
*YM,SYSCOP,19
*YM,SYSSEG,20
*YM,MIPRO,21
*YM,TDFUNC,22
*YM,EFSTOR,23
*YM,EFLIST,24
*YM,SCMM17,25
*YM,VERIFY,26
*YM,DUMMY1,27
*YM,DUMMY2,28
*YM,DUMMY3,29
*YM,DUMMY4,30
*YM,DUMMY5,31
*YM,DUMMY6,32
*YM,DUMMY7,33
*YM,DUMMY8,34
*YM,DUMMY9,35
*YM,DUMMY0,36
*S,ENDOV4,$66FF
*S,BGNMON,$6700
*S,MSIZV4,$7FFF
*S,SECTOR,$7EDA
*
*L        SYSTEM DATA PROGRAM
*B  'SYSDAT'  '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*L        SPACE REQUEST PROCESSOR
*B  'SPACE'   '  DECK-ID A02  MSOS 4.1'
*
*         SYSTEM CORE RESIDENT PROGRAMS
*
*LP       MONITOR
*B  'NMONI'   '  DECK-ID A03  MSOS 4.1'
```

```
*B   'NDISP'   '  DECK-ID A04  MSOS 4.1'
*B   'RW'      '  DECK-ID A06  MSOS 4.1'
*B   'T14'     '  DECK-ID A07  MSOS 4.1'
*B   'T16'     '  DECK-ID A08  MSOS 4.1'
*B   'PARAME'  '  DECK-ID A09  MSOS 4.1'
*B   'COMMON'  '  DECK-ID A10  MSOS 4.1'
*B   'NIPROC'  '  DECK-ID A11  MSOS 4.1'
*B   'ALVOL'   '  DECK-ID A13  MSOS 4.1'
*B   'OFVOL'   '  DECK-ID A14  MSOS 4.1'
*B   'ALCORE'  '  DECK-ID A15  MSOS 4.1'
*B   'DCORE'   '  DECK-ID A16  MSOS 4.1'
*B   'NFNR'    '  DECK-ID A18  MSOS 4.1'
*B   'NCMPRQ'  '  DECK-ID A19  MSOS 4.1'
*B   'MAKQ'    '  DECK-ID A20  MSOS 4.1'
*B   'ADEV'    '  DECK-ID A21  MSOS 4.1'
*B   'TMINT'   '  DECK-ID A22  MSOS 4.1'
*B   'DTIMER'  '  DECK-ID A23  MSOS 4.1'
*B   'TOD'     '  DECK-ID A24  MSOS 4.1'
*B   'MINT'    '  DECK-ID A25  MSOS 4.1'
*B   'TRVEC'   '  DECK-ID D01  MSOS 4.1'
*LP       DEBUGGING / CHECKOUT
*B   'SNAPOL'  '  DECK-ID H01  MSOS 4.1'
*B   'DMP421'  '  DECK-ID H03  MSOS 4.1'
*B   'BDK85X'  '  DECK-ID H05  MSOS 4.1'
*LP       FILE MANAGER
*B   'FILMGR'  '  DECK-ID F01  MSOS 4.1'
*B   'RSPCV4'  '  DECK-ID F02  MSOS 4.1'
*B   'SRHFIS'  '  DECK-ID F03  MSOS 4.1'
*LP       CORE RESIDENT DRIVERS
*B   'EFDATA'  '  DECK-ID C01  MSOS 4.1'
*B   'DUMMY'   '  DECK-ID C02  MSOS 4.1'
*B   'ALAQ'    '  DECK-ID C03  MSOS 4.1'
*B   'D1711'   '  DECK-ID C05  MSOS 4.1'
*B   'D1738'   '  DECK-ID C08  MSOS 4.1'
*B   'REWCK'   '  DECK-ID C13  MSOS 4.1'
*B   'MMEXEC'  '  DECK-ID C15  MSOS 4.1'
*B   'NXTLOC'  '  NEXT AVAILABLE LOCATION'
*
*         SYSTEM MASS RESIDENT PROGRAMS
*
*M                  LIBEDT        1
*B   'LIBEDT'  '  DECK-ID D02  MSOS 4.1'
*M                  LOADSD        2
*B   'LOAD1'   '  DECK-ID D03  MSOS 4.1'
*B   'BRNCH1'  '  DECK-ID D04  MSOS 4.1'
*B   'LIDRV1'  '  DECK-ID D05  MSOS 4.1'
*B   'LCDRV1'  '  DECK-ID D06  MSOS 4.1'
*B   'LMDRV1'  '  DECK-ID D07  MSOS 4.1'
*B   'LLDRV1'  '  DECK-ID D08  MSOS 4.1'
*B   'ADJOF1'  '  DECK-ID D09  MSOS 4.1'
*B   'CNVRT1'  '  DECK-ID D10  MSOS 4.1'
*B   'LSTOT1'  '  DECK-ID D11  MSOS 4.1'
*B   'LINK11'  '  DECK-ID D12  MSOS 4.1'
*B   'LOADR1'  '  DECK-ID D13  MSOS 4.1'
*B   'NAMPR1'  '  DECK-ID D14  MSOS 4.1'
*B   'RBDBZ1'  '  DECK-ID D15  MSOS 4.1'
*B   'ENTEX1'  '  DECK-ID D16  MSOS 4.1'
*B   'XFRPR1'  '  DECK-ID D17  MSOS 4.1'
*B   'STBASE'  '  DECK-ID D18  MSOS 4.1'
*B   'LNKENT'  '  DECK-ID D19  MSOS 4.1'
```

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```
*B   'LNKCR1'   '  DECK-ID D20  MSOS 4.1'
*B   'PATCH'    '  DECK-ID D21  MSOS 4.1'
*B   'TBSCH1'   '  DECK-ID D22  MSOS 4.1'
*B   'HASH'     '  DECK-ID D23  MSOS 4.1'
*B   'TBSTR1'   '  DECK-ID D24  MSOS 4.1'
*B   'PAGE'     '  DECK-ID D25  MSOS 4.1'
*B   'PROGLD'   '  DECK-ID D26  MSOS 4.1'
*B   'SCAN1'    '  DECK-ID D27  MSOS 4.1'
*B   'CHPU1'    '  DECK-ID D28  MSOS 4.1'
*B   'ADJOV2'   '  DECK-ID D29  MSOS 4.1'
*B   'ADRPR1'   '  DECK-ID D30  MSOS 4.1'
*M             JOBENT       3
*B   'JOBENT'   '  DECK-ID D31  MSOS 4.1'
*B   'T11'      '  DECK-ID D32  MSOS 4.1'
*B   'T7'       '  DECK-ID D33  MSOS 4.1'
*B   'T5'       '  DECK-ID D34  MSOS 4.1'
*B   'T3'       '  DECK-ID D35  MSOS 4.1'
*S,N1,P
*M             JOBPRO       4
*B   'JOBPRO'   '  DECK-ID D36  MSOS 4.1'
*B   'ONE'      '  DECK-ID D37  MSOS 4.1'
*B   'TWO'      '  DECK-ID D38  MSOS 4.1'
*B   'THREE'    '  DECK-ID D39  MSOS 4.1'
*S,N2,P
*M             PROTEC       5
*B   'BPROTK'   '  DECK-ID D41  MSOS 4.1'
*B   'JBKILL'   '  DECK-ID D42  MSOS 4.1'
*M             JPLOAD       6
*B   'JPLOAD'   '  DECK-ID D43  MSOS 4.1'
*M             JPCHGE       7
*B   'JPCHGE'   '  DECK-ID D44  MSOS 4.1'
*B   'ASCHEX'   '  DECK-ID D45  MSOS 4.1'
*M             JPT13        8
*B   'T13'      '  DECK-ID D46  MSOS 4.1'
*M             JCRDV4       9
*B   'JCRDV4'   '  DECK-ID D47  MSOS 4.1'
*M             JLGOV4      10
*B   'JLGOV4'   '  DECK-ID D48  MSOS 4.1'
*M             JPSTV4      11
*B   'JPSTV4'   '  DECK-ID D49  MSOS 4.1'
*M             NAMEV4      12
*B   'NAMEV4'   '  DECK-ID D50  MSOS 4.1'
*M             JPFLV4      13
*B   'JPFLV4'   '  DECK-ID D51  MSOS 4.1'
*M             AFILV4      14
*B   'JPF2V4'   '  DECK-ID D52  MSOS 4.1'
*M             RESTOR      15
*B   'RESTOR'   '  DECK-ID D53  MSOS 4.1'
*M             RCOVER      16
*B   'RCOVER'   '  DECK-ID H09  MSOS 4.1'
*B   'OUTSEL'   '  DECK-ID H10  MSOS 4.1'
*B   'RDMPV4'   '  DECK-ID H11  MSOS 4.1'
*B   'MASDMP'   '  DECK-ID H12  MSOS 4.1'
*M             BRKPT       17
*B   'BRKPTD'   '  DECK-ID H13  MSOS 4.1'
*B   'SIFT'     '  DECK-ID H14  MSOS 4.1'
*B   'BIASCI'   '  DECK-ID H15  MSOS 4.1'
*B   'RETJMP'   '  DECK-ID H16  MSOS 4.1'
*B   'JUMPTO'   '  DECK-ID H17  MSOS 4.1'
*B   'ENTER'    '  DECK-ID H18  MSOS 4.1'
```

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```
*B   'ENTCOR'   '  DECK-ID H19   MSOS 4.1'
*B   'PRTREG'   '  DECK-ID H20   MSOS 4.1'
*B   'TERMIN'   '  DECK-ID H21   MSOS 4.1'
*B   'RESUME'   '  DECK-ID H22   MSOS 4.1'
*B   'DPCORB'   '  DECK-ID H23   MSOS 4.1'
*B   'MSDMPB'   '  DECK-ID H24   MSOS 4.1'
*B   'SETBPP'   '  DECK-ID H25   MSOS 4.1'
*M              ODEBUG        18
*B   'ODEBUG'   '  DECK-ID H26   MSOS 4.1'
*M              SYSCOP        19
*B   'SYSCOP'   '  DECK-ID H27   MSOS 4.1'
*M              SYSSEG        20
*B   'CO1ST'    '  DECK-ID H28   MSOS 4.1'
*B   'CO2ND'    '  DECK-ID H29   MSOS 4.1'
*B   'CO3RD'    '  DECK-ID H30   MSOS 4.1'
*B   'COLAST'   '  DECK-ID H31   MSOS 4.1'
*M              MIPRO         21
*B   'MIPRO'    '  DECK-ID A26   MSOS 4.1'
*M              TDFUNC        22
*B   'TDFUNC'   '  DECK-ID A27   MSOS 4.1'
*M              EFSTOR        23
*B   'EFSTOR'   '  DECK-ID A28   MSOS 4.1'
*M              EFLIST        24
*B   'EFLIST'   '  DECK-ID A29   MSOS 4.1'
*M              SCMM17        25
*B   'SCMEXC'   '  DECK-ID E01   MSOS 4.1'
*M              VERIFY        26
*B   'VERFY1'   '  DECK-ID A30   MSOS 4.1'
*M              DUMMY1        27
*M              DUMMY2        28
*M              DUMMY3        29
*M              DUMMY4        30
*M              DUMMY5        31
*M              DUMMY6        32
*M              DUMMY7        33
*M              DUMMY8        34
*M              DUMMY9        35
*M              DUMMY0        36
*
*          MASS RESIDENT DRIVERS
*
*M              COSY DRIVER
*B   'DCOSY'    '  DECK-ID C28   MSOS 4.1'
*   COSY,S
    COSY,P
                1731 601 MAG TAPE
     'D1731U'   '  DECK-ID C33   MSOS 4.1'
*    'FRWA'     '  DECK-ID C34   MSOS 4.1'
*B   'FRWB'     '  DECK-ID C35   MSOS 4.1'
*B   'RWBA'     '  DECK-ID C36   MSOS 4.1'
*B   'MAXRVU'   '  DECK-ID C37   MSOS 4.1'
*S,S1731U,S
*S,L1731U,P
*M              1740-501/1742 LINE PRINTER
*B   'D40421'   '  DECK-ID C46   MSOS 4.1'
*S,S40421,S
*S,L40421,P
*M
*B   'D1728'    '  DECK-ID C48   MSOS 4.1'
*B   'CP026'    '  DECK-ID C54   MSOS 4.1'
```

```
*B  'CR026'   '  DECK-ID C52  MSOS 4.1'
*S,S1728,S
*S,L1728,P
*
*         MASS RESIDENT FILE MANAGER
*
*M
*B  'DEFFIL'  '  DECK-ID F05  MSOS 4.1'
*B  'FILSPC'  '  DECK-ID F06  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP01,S
*M
*B  'RELFIL'  '  DECK-ID F08  MSOS 4.1'
*B  'RELSPC'  '  DECK-ID F09  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP02,S
*M
*B  'DEFIDX'  '  DECK-ID F10  MSOS 4.1'
*B  'SQRTFM'  '  DECK-ID F11  MSOS 4.1'
*B  'FILSPC'  '  DECK-ID F06  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP03,S
*M
*B  'LOKFIL'  '  DECK-ID F12  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP04,S
*M
*B  'UNLFIL'  '  DECK-ID F13  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP05,S
*M
*B  'STOSEQ'  '  DECK-ID F14  MSOS 4.1'
*B  'FILSPC'  '  DECK-ID F06  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP06,S
*M
*B  'STODIR'  '  DECK-ID F15  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP07,S
*M
*B  'STOIDX'  '  DECK-ID F16  MSOS 4.1'
*B  'HASHCD'  '  DECK-ID F17  MSOS 4.1'
*B  'GETKID'  '  DECK-ID F18  MSOS 4.1'
*B  'FILSPC'  '  DECK-ID F06  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP08,S
*M
*B  'RTVSEQ'  '  DECK-ID F19  MSOS 4.1'
*B  'RTNSPC'  '  DECK-ID F20  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP09,S
*M
*B  'RTVDIR'  '  DECK-ID F21  MSOS 4.1'
*B  'RTNSPC'  '  DECK-ID F20  MSOS 4.1'
*B  'RPEND'   '  DECK-ID F07  MSOS 4.1'
*S,FMRP10,S
*M
*B  'RTVIDX'  '  DECK-ID F22  MSOS 4.1'
*B  'HASHCD'  '  DECK-ID F17  MSOS 4.1'
*B  'GETKID'  '  DECK-ID F18  MSOS 4.1'
```

```
*B  'RTNSPC'   '  DECK-ID F20  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP11,S
*M
*B  'RTVIDO'   '  DECK-ID F23  MSOS 4.1'
*B  'GETKID'   '  DECK-ID F18  MSOS 4.1'
*B  'RTNSPC'   '  DECK-ID F20  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP12,S
*M
*B  'FMDUMY'   '  DECK-ID F04  MSOS 4.1'
*S,FMREND,S
*S,BEGFMS,S      SPECIFY THE SYSTEM FILE SPACE
*M,BEGFMS+1000
*M
*B  'FMDUMY'   '  DECK-ID F04  MSOS 4.1'
*T        END OF SYSTEM
*JOB,INSTAL,SYSTEM
*K,I6
*LIBEDT
*K,I6
*V  DEFINE REQUEST PRIORITIES
*S,001,03,M
*S,002,00,M
*S,003,01,M
*S,004,02,M
*S,005,03,M
*S,006,02,M
*S,007,02,M
*S,008,02,M
*S,009,02,M
*S,010,02,M
*S,011,02,M
*S,012,03,M
*S,013,03,M
*S,014,03,M
*S,015,02,M
*S,016,03,M
*S,017,03,M
*S,018,04,M
*S,019,04,M
*S,020,04,M
*S,021,04,M
*S,022,04,M
*S,023,04,M
*S,024,04,M
*S,025,04,M
*S,026,04,M
*S,027,04,M
*S,028,04,M
*S,029,04,M
*S,030,04,M
*S,031,04,M
*S,032,04,M
*S,033,04,M
*S,034,04,M
*S,035,04,M
*S,036,04,M
*V  1700 MACRO ASSEMBLER 3.
*K,I6
```

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```
*L,LIBMAC
*B  'LIBMAC'   '  DECK-ID G01  MSOS 4.1'
*L,ASSEM
*B  'ASSEM'    '  DECK-ID G02  MSOS 4.1'
*K,P8
*P,F
*B  'PASS1'    '  DECK-ID G03  MSOS 4.1'
*B  'PA1PR2'   '  DECK-ID G04  MSOS 4.1'
*T
*K,I8
*N,PASS1,,,B
*K,I6
*K,P8
*P,F
*B  'PASS2'    '  DECK-ID G05  MSOS 4.1'
*B  'PA2PR2'   '  DECK-ID G06  MSOS 4.1'
*T
*K,I8
*N,PASS2,,,B
*K,I6
*K,P8
*P,F
*B  'PASS3'    '  DECK-ID G07  MSOS 4.1'
*B  'PA3PR2'   '  DECK-ID G08  MSOS 4.1'
*B  'PA3PR3'   '  DECK-ID G09  MSOS 4.1'
*T
*K,I8
*N,PASS3,,,B
*K,I6
*K,P8
*P,F
*B  'TABLST'   '  DECK-ID G10  MSOS 4.1'
*T
*K,I8
*N,TABLST,,,B
*K,I6
*K,P8
*P,F
*B  'XREF'     '  DECK-ID G11  MSOS 4.1'
*K,I8
*N,XREF,,,B
*K,I6
*N,MACSKL,,,B
*B     'MACSKL'
*N,MACROS,,,B
*B     'MACROS'
*V  DEBUGGING AND CHECKOUT
*K,I6
*L,TRACE
*B  'TRACE'    '  DECK-ID H32  MSOS 4.1'
*V  SYSTEM UTILITY PROGRAMS
*K,I6
*L,LULIST
*B  'LULIST'   '  DECK-ID J01  MSOS 4.1'
*L,LISTR
*B  'LISTR'    '  DECK-ID J02  MSOS 4.1'
*L,OPSORT
*B  'OPSORT'   '  DECK-ID J03  MSOS 4.1'
*L,EESORT
*B  'EESORT'   '  DECK-ID J04  MSOS 4.1'
```

```
*L,COSY
*B  'COSY'     '  DECK-ID J05  MSOS 4.1'
*L,LCOSY
*B  'LCOSY'    '  DECK-ID J06  MSOS 4.1'
*L,CYFT
*B  'CYFT'     '  DECK-ID J07  MSOS 4.1'
*L,IOUP
*B  'IOUP'     '  DECK-ID J08  MSOS 4.1'
*K,P8
*P,F
*B  'IOUP'     '  DECK-ID J08  MSOS 4.1'
*B  'IOUPV4'   '  DECK-ID J09  MSOS 4.1'
*T
*K,I8
*N,IOUPV4,,,B
*K,I6
*L,DTLP
*B  'DTLP'     '  DECK-ID J10  MSOS 4.1'
*K,P8
*P,F
*B  'DSKTAP'   '  DECK-ID J11  MSOS 4.1'
*B  'DSKEQC'   '  DECK-ID J12  MSOS 4.1'
*B  'DSKOHX'   '  DECK-ID J13  MSOS 4.1'
*B  'DSKCDR'   '  DECK-ID J14  MSOS 4.1'
*B  'DSKMTI'   '  DECK-ID J15  MSOS 4.1'
*B  'DSKMTO'   '  DECK-ID J16  MSOS 4.1'
*B  'DSKMMD'   '  DECK-ID J18  MSOS 4.1'
*T
*K,I8
*N,DSKTAP,,,B
*K,I6
*L,SETPV4
*B  'SPCALL'   '  DECK-ID J21  MSOS 4.1'
*K,P8
*P,F
*B  'SPOLY1'   '  DECK-ID J22  MSOS 4.1'
*B  'STPV4'    '  DECK-ID J23  MSOS 4.1'
*B  'IERROR'   '  DECK-ID J24  MSOS 4.1'
*B  'MCTOK'    '  DECK-ID J25  MSOS 4.1'
*B  'GETPAG'   '  DECK-ID J26  MSOS 4.1'
*B  'CONPRT'   '  DECK-ID J27  MSOS 4.1'
*B  'REDCON'   '  DECK-ID J28  MSOS 4.1'
*B  'CONDEC'   '  DECK-ID J29  MSOS 4.1'
*B  'ORDERM'   '  DECK-ID J30  MSOS 4.1'
*B  'IREAD'    '  DECK-ID J31  MSOS 4.1'
*B  'ASCOUT'   '  DECK-ID J32  MSOS 4.1'
*B  'PARAMS'   '  DECK-ID J33  MSOS 4.1'
*B  'DISKIO'   '  DECK-ID J34  MSOS 4.1'
*T
*K,I8
*N,STP1V4,,,B
*K,I6
*K,P8
*P,F
*B  'SPOLY2'   '  DECK-ID J35  MSOS 4.1'
*B  'SUP'      '  DECK-ID J36  MSOS 4.1'
*B  'IERROR'   '  DECK-ID J24  MSOS 4.1'
*B  'GETPAG'   '  DECK-ID J26  MSOS 4.1'
*B  'BTOA'     '  DECK-ID J37  MSOS 4.1'
*B  'ISTAT'    '  DECK-ID J38  MSOS 4.1'
```

```
*B  'SCIO'    '  DECK-ID J39  MSOS 4.1'
*B  'SCRD'    '  DECK-ID J40  MSOS 4.1'
*B  'REDCON'  '  DECK-ID J28  MSOS 4.1'
*B  'ICAT'    '  DECK-ID J41  MSOS 4.1'
*B  'BUFIN'   '  DECK-ID J42  MSOS 4.1'
*B  'MOVE'    '  DECK-ID J43  MSOS 4.1'
*B  'IREAD'   '  DECK-ID J31  MSOS 4.1'
*B  'ASCOUT'  '  DECK-ID J32  MSOS 4.1'
*B  'PARAMS'  '  DECK-ID J33  MSOS 4.1'
*B  'DISKIO'  '  DECK-ID J34  MSOS 4.1'
*T
*K,I8
*N,STP2V4,,,B
*V  SCMM TEST ROUTINES
*K,I6
*K,P8
*P,F
*B  'SCMTTY'  '  DECK-ID E02  MSOS 4.1'
*T
*K,I8
*N,SCMTTY,,,B
*K,I6
*K,P8
*P,F
*B  'SCMDK1'  '  DECK-ID E08  MSOS 4.1'
*T
*K,I8
*N,SCMDK1,,,B
*K,I6
*K,P8
*P,F
*B  'SCMDVP'  '  DECK-ID E09  MSOS 4.1'
*T
*K,I8
*N,SCMDVP,,,B
*K,I6
*K,P8
*P,F
*B  'SCMPRT'  '  DECK-ID E11  MSOS 4.1'
*T
*K,I8
*N,SCMPRT,,,B
*K,I6
*K,P8
*P,F
*B  'SCMMTT'  '  DECK-ID E12  MSOS 4.1'
*T
*K,I8
*N,SCMMTT,,,B
*K,I6
*K,P8
*P,F
*B  'SCMCRD'  '  DECK-ID E03  MSOS 4.1'
*T
*K,I8
*N,SCMCRD,,,B
*V  INSTALL LIBPARY BUILDER
*K,I6
*L,LIBILD
*B  'LIBILD'  '  DECK-ID B01  MSOS 4.1'
```

```
*K,P8
*P,F
*B  'LIBIDO'  '  DECK-ID B02  MSOS 4.1'
*B  'CONVRS'  '  DECK-ID B03  MSOS 4.1'
*B  'MESSY'   '  DECK-ID B04  MSOS 4.1'
*B  'LJA28'   '  DECK-ID B05  MSOS 4.1'
*B  'MOVECH'  '  DECK-ID B06  MSOS 4.1'
*B  'PICKUP'  '  DECK-ID B07  MSOS 4.1'
*B  'IOSUB'   '  DECK-ID B08  MSOS 4.1'
*T
*K,I8
*N,LIBIDO,,,B
*K,I6
*K,P8
*P,F
*B  'HELPER'  '  DECK-ID B09  MSOS 4.1'
*B  'MOVECH'  '  DECK-ID B06  MSOS 4.1'
*B  'HELP0'   '  DECK-ID B10  MSOS 4.1'
*B  'HELP1'   '  DECK-ID B11  MSOS 4.1'
*B  'HELP2'   '  DECK-ID B12  MSOS 4.1'
*B  'HELP3'   '  DECK-ID B13  MSOS 4.1'
*B  'HELP4'   '  DECK-ID B14  MSOS 4.1'
*B  'HELP5'   '  DECK-ID B15  MSOS 4.1'
*B  'HELP8'   '  DECK-ID B16  MSOS 4.1'
*B  'HELP9'   '  DECK-ID B17  MSOS 4.1'
*B  'HELP10'  '  DECK-ID B18  MSOS 4.1'
*B  'HELP11'  '  DECK-ID B19  MSOS 4.1'
*B  'HELP12'  '  DECK-ID B20  MSOS 4.1'
*B  'HELP13'  '  DECK-ID B21  MSOS 4.1'
*B  'HELP14'  '  DECK-ID B22  MSOS 4.1'
*T
*K,I8
*N,HELPER,,,B
*V  INSTALL SKELETON EDITOR
*K,I6
*L,SKED
*B  'SKED'    '  DECK-ID B23  MSOS 4.1'
*K,P8
*P,F
*B  'SKFILE'  '  DECK-ID B24  MSOS 4.1'
*T
*K,I8
*N,SKFILE,,,B
*V  SYSTEM INITIALIZER
*K,I6
*L,SILP
*B  'SILP'    '  DECK-ID B25  MSOS 4.1'
*K,P8
*P,F
*B  'CONTRL'  '  DECK-ID B26  MSOS 4.1'
*B  'ILOAD'   '  DECK-ID B27  MSOS 4.1'
*B  'LDRTBL'  '  DECK-ID B28  MSOS 4.1'
*B  'I1'      '  DECK-ID B29  MSOS 4.1'
*B  'I2'      '  DECK-ID B30  MSOS 4.1'
*B  'Q1711'   '  DECK-ID B31  MSOS 4.1'
*B  'Q40421'  '  DECK-ID B34  MSOS 4.1'
*B  'IDRIV'   '  DECK-ID B35  MSOS 4.1'
*B  'QMT7TK'  '  DECK-ID B36  MSOS 4.1'
*B  'MDRIV'   '  DECK-ID B42  MSOS 4.1'
*B  'QDK85X'  '  DECK-ID B44  MSOS 4.1'
```

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```
*B  'QCDDMY'   '  DECK-ID B50  MSOS 4.1'
*B  'QPTDMY'   '  DECK-ID B51  MSOS 4.1'
*T
*K,I8
*N,SI,,,B
*V  SMM  BOOTSTRAPS
*K,I6
*L,SMM7T
*B  'SMM1'     '  DECK-ID B54  MSOS 4.1'
*L,SMM430
*B  'SMM4'     '  DECK-ID B57  MSOS 4.1'
*Z
*K,I10,P11,L9
*CTO,   MSOS 4.1 INSTALLATION COMPLETED - YOU MAY AUTOLOAD
*Z
*END
```

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5.3.4 Creating a New Install File

The program LIBILD is used to create a new install file. The MSOS library tape will be read from tape unit 0. The modified binary of SYSDAT and the modified skeleton will be read from the card reader. The install file will be output on tape unit 1. Typing on the teletype is as follows. {Logical unit numbers are as defined in the LOG1A Table in Article 5.3.2.}

```
MI
*BATCH
L,10 FAILED 02
ACTION
CU
J
*JOB
J
*LIBILD
CONTROL LU  =
DEFS LU     =
INSTALL LU  = 13
NEWLIB LU   =
LIB 01 LU   = 6
LIB 02 LU   = 10
LIB 03 LU   =
SKELETON LU = 10

 LOAD LIBRARY INPUT   02 ON LU    10.  CR WHEN READY.

 LOAD SKEL/INSTAL, CR WHEN READY

 LIBRARY BUILD COMPLETE
 TYPE *Z TO TERMINATE OR
 TYPE *C TO CONTINUE WITH CURRENT SKELETON AND/OR
 OUTPUT LIBRARY LU'S *Z
J
```

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5.3.5 Loading the New System

Using the new install tape, the new system may be loaded by means of the system initializer program. The procedure is as described in the 1700 MSOS 4 Installation Handbook. Typing on the teletype, continued from the teletype print-out in Article 5.3.4, is as follows:

```
*SILP
THE INITIALIZER WILL BE MOVED TO LOCATION 5CFF AND EXECUTED

TURN OFF PROTEC SWITCH AND TYPE CARRIAGE RETURN
```

At this point the system disk pack is removed. A scratch pack on which the new system will be built is mounted. A carriage return is entered on the teletype, and the procedure continues.

```
MSOS 4.1 SYSTEM INITIALIZER
FWA OF CONTRL = 5CFF

DATE MM/DD/YY
10/21/74

C
*C,7
*C,7

Q
*V
```

```
INITIALIZATION COMPLETED - YOU MAY AUTOLOAD

MSOS 4.1--PSR LEVEL 86    10/24/74

SET PROGRAM PROTECT

ANN'S TEST SYSTEM

65K MODE

CHECKING FILES -  OK

ENTER DATE/TIME  MMDDYYHHMM

1024741118
DATE: 24 OCT 74   TIME: 1118:00
MI
*BATCH
*CTO,   MSOS 4.1 INSTALLATION COMPLETED - YOU MAY AUTOLOAD

MSOS 4.1--PSR LEVEL 86   10/24/74

SET PROGRAM PROTECT

ANN'S TEST SYSTEM

65K MODE

CHECKING FILES -  OK

ENTER DATE/TIME  MMDDYYHHMM

1024711136
DATE: 24 OCT 71   TIME: 1136:00
```

5.3.6 Verification of File Manager Addition

The new system including the File Manager may be verified as described in the Installation Handbook.

6.1 Addition of Compiler

A user who does not have a FORTRAN Compiler in the MSOS 4 System he originally ordered from Control Data may add either the FORTRAN 3.2A Compiler or the FORTRAN 3.2B Compiler to his system. A description of the two compilers may be found in the 1700 MSOS 4 MS FORTRAN version 3A/B Reference Manual. To add FORTRAN, the user must first order the installation materials for the compiler he desires from Control Data. (Refer to the 1700 MSOS 4 Ordering Bulletin.) The FORTRAN installation materials sent to the user are as follows:

1) A FORTRAN install file including either the FORTRAN 3.2A compiler or the FORTRAN 3.2B compiler together with those FORTRAN Input/Output Library modules specified by the user.
2) FORTRAN binaries file, which includes the following in binary form:
   a. each module of the particular FORTRAN compiler ordered
   b. each module of the FORTRAN Reentrant Library
   c. each module of the FORTRAN Input/Output Library
   d. each module of the FORTRAN Limited Input/Output Library

The FORTRAN installation file contains all necessary control cards so that the compiler and the FORTRAN Input/Output Library may be installed by placing this file in the standard input device and entering a manual interrupt followed by a *BATCH command from the comment device. Alternately, a skeleton may be built using the FORTRAN install file and the SKED program. The skeleton records thus produced are then incorporated into the current system skeleton. A new install tape is created using LIBILD and a new system is built according to the procedure in the Installation Handbook. This method is the one used in the example in Article 6.3. It is longer than the first method, but it has the advantage of including FORTRAN within the skeleton so that a FORTRAN update may be made when necessary. (Refer to Chapter 7.)

6.2 Addition of FORTRAN Reentrant Library

The FORTRAN Reentrant Library is the library used by a FORTRAN program running in the foreground. The modules always included in this library are listed in Article 2.1, Group K. Modules optionally included in this library are listed in Article 2.1, Group K1 and Group L. A user who ordered FORTRAN, but not the reentrant FORTRAN library, with the MSOS system originally ordered from Control Data, will have the FORTRAN reentrant library modules included in the MSOS binary file he received at the time of system installation. A user who orders FORTRAN subsequent to a complete system order will have the FORTRAN reentrant library modules included in the FORTRAN binary file he receives as a part of the FORTRAN installation materials.

6.2.1 SYSDAT Changes Required

The volatile block stack in SYSDAT Section AAK must be modified. The number of FORTRAN foreground priority levels must be equated to the variable NFTNLV and to the variable NFDLVL in this section. (Refer to Article 1.11)

The maximum number of FORTRAN foreground priority levels is three. If only one FORTRAN level is to be available in the foreground, no additional volatile is needed, and the variables NFTNLV and NFDLVL may remain at zero.

Reentrant FORTRAN Information, Section ACS of SYSDAT, must be added. (Refer to Article 1.71 for a general description and to Article 6.3.1 for an example)

Section ACY of SYSDAT must be modified. (Refer to Article 1.77 for a general description and to Article 6.3.1 for an example.}

6.2.2 Skeleton Changes Required

To add reentrant FORTRAN, the *B control record for NDISP must be replaced by a *B record for RDISP.

To add reentrant FORTRAN, control records must be added to the system skeleton. To add the minimum reentrant FORTRAN library, the following control records must be inserted in the skeleton, between the *B record for the last core resident driver and the *B record for the module NXTLOC. The deck identification field of each *B record may be omitted. If reentrant FORTRAN programs are to use the formatting routines HEXASC, HEXDEC, ASCII, DECHEX, AFORM, RFORM, and FLOATG, a *B record for each of the modules in Group K1, Article 2.1, should be inserted between the *B record for Q8QFXR and the *B record for NXTLOC. (Refer to the example in Article 6.3.2)

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```
*LD       REENTRANT FORTRAN RUNTIME LIBRARY
*B   ≠FORTR≠    ≠   DECK-ID A01   3.2 FTN RUNTIME≠
*B   ≠Q8PRMR≠   ≠   DECK-ID B01   3.2 FTN RUNTIME≠
*B   ≠PARAPR≠   ≠   DECK-ID B02   3.2 FTN RUNTIME≠
*B   ≠Q8EXPR≠   ≠   DECK-ID B03   3.2 FTN RUNTIME≠
*B   ≠Q8ABR≠    ≠   DECK-ID B04   3.2 FTN RUNTIME≠
*B   ≠SQRTFR≠   ≠   DECK-ID B05   3.2 FTN RUNTIME≠
*B   ≠SIGNR≠    ≠   DECK-ID B06   3.2 FTN RUNTIME≠
*B   ≠FXFLR≠    ≠   DECK-ID B07   3.2 FTN RUNTIME≠
*B   ≠EXPRGR≠   ≠   DECK-ID B08   3.2 FTN RUNTIME≠
*B   ≠LNPRGR≠   ≠   DECK-ID B09   3.2 FTN RUNTIME≠
*B   ≠TANHR≠    ≠   DECK-ID B10   3.2 FTN RUNTIME≠
*B   ≠SNCSR≠    ≠   DECK-ID B11   3.2 FTN RUNTIME≠
*B   ≠ARCPGR≠   ≠   DECK-ID B12   3.2 FTN RUNTIME≠
*B   ≠IFALTR≠   ≠   DECK-ID B13   3.2 FTN RUNTIME≠
*B   ≠FLOATR≠   ≠   DECK-ID B14   3.2 FTN RUNTIME≠
*B   ≠Q8GIOR≠   ≠   DECK-ID C01   3.2 FTN RUNTIME≠
*B   ≠BINARR≠   ≠   DECK-ID C02   3.2 FTN RUNTIME≠
*B   ≠IOCODR≠   ≠   DECK-ID D01   3.2 FTN RUNTIME≠
*B   ≠INITLR≠   ≠   DECK-ID D02   3.2 FTN RUNTIME≠
*B   ≠RSTORR≠   ≠   DECK-ID D03   3.2 FTN RUNTIME≠
*B   ≠GETCHR≠   ≠   DECK-ID D04   3.2 FTN RUNTIME≠
*B   ≠IPACKR≠   ≠   DECK-ID D05   3.2 FTN RUNTIME≠
*B   ≠UPDATR≠   ≠   DECK-ID D06   3.2 FTN RUNTIME≠
*B   ≠DECPLR≠   ≠   DECK-ID D07   3.2 FTN RUNTIME≠
*B   ≠INTGRR≠   ≠   DECK-ID D08   3.2 FTN RUNTIME≠
*B   ≠SPACER≠   ≠   DECK-ID D09   3.2 FTN RUNTIME≠
*B   ≠HOLR≠     ≠   DECK-ID D10   3.2 FTN RUNTIME≠
*B   ≠DCHXR≠    ≠   DECK-ID D11   3.2 FTN RUNTIME≠
*B   ≠HXASCR≠   ≠   DECK-ID D12   3.2 FTN RUNTIME≠
*B   ≠AFMTOR≠   ≠   DECK-ID D13   3.2 FTN RUNTIME≠
*B   ≠RFMTOR≠   ≠   DECK-ID D14   3.2 FTN RUNTIME≠
*B   ≠AFMTIR≠   ≠   DECK-ID D15   3.2 FTN RUNTIME≠
*B   ≠RFMTIR≠   ≠   DECK-ID D16   3.2 FTN RUNTIME≠
*B   ≠ASCHXR≠   ≠   DECK-ID D17   3.2 FTN RUNTIME≠
*B   ≠HXDCR≠    ≠   DECK-ID D18   3.2 FTN RUNTIME≠
*B   ≠FLOTIR≠   ≠   DECK-ID D19   3.2 FTN RUNTIME≠
*B   ≠FOLTR≠    ≠   DECK-ID D20   3.2 FTN RUNTIME≠
*B   ≠EOLTR≠    ≠   DECK-ID D21   3.2 FTN RUNTIME≠
*B   ≠FWRITR≠   ≠   DECK-ID D22   3.2 FTN RUNTIME≠
*B   ≠INTIIR≠   ≠   DECK-ID D23   3.2 FTN RUNTIME≠
*B   ≠FORMTR≠   ≠   DECK-ID D24   3.2 FTN RUNTIME≠
*B   ≠Q8GEIR≠   ≠   DECK-ID D25   3.2 FTN RUNTIME≠
*B   ≠Q8GFLR≠   ≠   DECK-ID D26   3.2 FTN RUNTIME≠
*B   ≠Q8GFXR≠   ≠   DECK-ID D27   3.2 FTN RUNTIME≠
```

If reentrant FORTRAN programs are to use double precision a *B record is necessary for each module listed in Group L of Article 2.2.

In most cases the values of ENDOV4 and BGNMON must be decreased when adding the reentrant FORTRAN library. (Refer to Article 2.2) The value of BGNMON must be small enough so that the reentrant FORTRAN library will fit into core. (See figure 2-1) The total length of the modules to be added may be obtained by using EESORT as described in Article 2.2, or by loading the modules in the background, using the *L Job Processor command. The latter method is simpler when obtaining the total length of a large number of modules. This method is illustrated in Article 6.3.2.

When adding the reentrant FORTRAN library two things happen which decrease the size of unprotected core.

1) The value of ENDOV4 is decreased by the total length of the FORTRAN reentrant library modules added.

2) The size of SYSDAT is increased as described in Article 6.2.1. The effects of these changes may be seen by referring to Figure 2-1.

   It may be necessary for the user to decrease the value of N4 so that the size of unprotected core will be large enough.

The FORTRAN requirements for unprotected core are shown in Table 6-1. An example showing now N4 is changed is included in Article 6.3.2.

TABLE 6-1

FORTRAN REQUIREMENTS FOR

UNPROTECTED CORE

	MINIMUM NUMBER WORDS IN UNPROTECTED	
FORTRAN 3.2A COMPILER	8,192	(= 2000_{16})
FORTRAN 3.2B COMPILER	16,384	(= 4000_{16})
INPUT/OUTPUT LIBRARY OR LIMITED INPUT/OUTPUT LIBRARY WITH SINGLE PRECISION NUMBERS ONLY	4,096	(= 1000_{16})
INPUT/OUTPUT LIBRARY OR LIMITED INPUT/OUTPUT LIBRARY WITH DOUBLE PRECISION AND SINGLE PRECISION NUMBERS	12,288	(= 3000_{16})

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The user should modify the values of SYSMON, SYSDAY, and SYSYER to correspond to the new system build date.

6.2.3 Creating a New Install File and Building a New System

A new install file may be created by using the program LIBILD together with the following:

1) the revised skeleton
2) a binary of the revised SYSDAT
3) the current install file
4) the FORTRAN binaries file (if FORTRAN was ordered subsequent to initial MSOS 4.1 installation)
5) the MSOS binaries file (if FORTRAN was included in the initial MSOS 4.1 installation or if this file includes the most recent versions of RDISP)
6) the MSOS updates file (if this file includes the most recent version of RDISP)

It is important that the revised SYSDAT binary be presented as input to LIBILD before the current install file so that the one revised version of SYSDAT will be the one on the new install file.

Using the new install file and the program SILP the new system including the reentrant FORTRAN library may be built. An example of this procedure appears in Article 6.3.3.

6.3 Example of the Addition of FORTRAN Compiler, the FORTRAN Input/Output Library and the FORTRAN Reentrant Library.

In this example, the user's current system is the system built in Article 5.3. The user wishes to add the FORTRAN 3.2A compiler, the FORTRAN Input/Output Library to be used by background FORTRAN programs, and the FORTRAN reentrant library to be used by foreground FORTRAN programs. Only single precision routines are to be included in the foreground and background FORTRAN libraries. The special formatting routines are to be included in both libraries. This example uses magnetic tape as the installation medium.

6.3.1 SYSDAT Changes

The addition of the FORTRAN compiler and the background FORTRAN library do not effect SYSDAT. The addition of the Reentrant FORTRAN library effects three sections of SYSDAT as described in Article 6.2.1. In Section AAK of SYSDAT before revision, the variables NFTNLV and NFDLVL are equated to zero. In this example the user wishes to have three priority levels available for FORTRAN foreground programs. Thus NFTNLV and NFDLVL are equated to three, as seen in the revised version of SYSDAT Section AAK, as follows:

```
*              S T O R A G E   S T A C K S
*
*
NUMPRI EQU NUMPRI(16)      NUMBER OF SYSTEM PRIORITY LEVELS
EXTVOL EQU EXTVOL(00)      AMOUNT OF EXTRA VOLATILE STORAGE
*
NFTNLV EQU NFTNLV(3)       NUMBER OF REENTRANT FORTRAN LEVELS
NEDLVL EQU NEDLVL(3)       NUMBER OF REENTRANT ENCODE/DECODE LEVELS


*
*                    I N T E R R U P T   S T A C K
*
       ENT  INTSTK         CONTENTS,  1 = Q-REGISTER
*                                     2 = A-REGISTER
*                                     3 = I-REGISTER
*                                     4 = P-REGISTER
*                                     5 = PRIORITY LEVEL AND OVERFLOW
*                                         INDICATOR (BIT 15)
*
INTSTK BZS  INTSTK(5*NUMPRI)


*
*                    V O L A T I L E   B L O C K   S T A C K
*
       ENT  VOLBLK         CONTENTS,  1 = Q-REGISTER
       ENT  VOLEND                    2 = A-REGISTER
*                                     3 = I-REGISTER
*                                     4 = USER ASSIGNMENTS
*                                     .
*                                     N = USER ASSIGNMENTS
*
VOLBLK BZS  VOLBLK(18*NUMPRI+98*NFTNLV+57*NEDLVL+EXTVOL+1)
VOLEND EQU  VOLEND(*)       END OF VOLATILE
```

The increase in the size of the volatile block stack is 155 words for each FORTRAN foreground priority level added. Thus, the increase in the volatile block stack in this example is 465 words. SYSDAT Section ACS must be added. In this example only single precision routines are to be included in the reentrant FORTRAN library. The entry point DOUT is included to link the double precision entry point referenced by FORMTR. The value of FMASK is

0070_{16} to indicate that priority levels 4, 5, and 6 are to be FORTRAN foreground priority levels. This section of SYSDAT appears as follows in this example:

```
*              M I S C E L L A N E O U S   I N F O R M A T I O N
*
*              F O R T R A N   R E E N T R A N T   I N F O R M A T I O N
*
         ENT   FMASK,FLIST
         EXT   Q8QF2I,Q8QI2F,Q8QF2F,QSAVE,E4SAVE
         EXT   RETAD,KG47V4,KG48V4,KG49V4
         EXT   ABS,SQRT,SIGN,IFIX,FLOAT
         EXT   EXP,ALOG,TANH,SIN,COS,ATAN,IFALT
         EXT   FLOT,ARGUD

FMASK    NUM   $0070           FORTRAN REENTRANT LEVELS (BIT 0 = LEVEL 0)

*        TABLE OF FORTRAN ENTRY POINTS SAVED TO MAINTAIN REENTRANCY

*        ENTRY POINT           PROGRAM       DESCRIPTION
*        -----------           -------       -----------

FLIST    ADC   FEND
         ADC   Q8QF2I          Q8EXPR   FLOAT-TO-INTEGER FUNCTION
         ADC   Q8QI2F          Q8EXPR   INTEGER-TO-FLOAT FUNCTION
         ADC   Q8QF2F          Q8EXPR   FLOAT-TO-FLOAT   FUNCTION
         ADC   QSAVE           Q8EXPR   Q-REGISTER       STORAGE
         ADC   E4SAVE          Q8EXPR   LOCATION $E4     STORAGE
         ADC   RETAD           Q8EXPR   RETURN ADDRESS STORAGE
         ADC   KG47V4          Q8EXPR   TEMPORARY        STORAGE
         ADC   KG48V4          Q8EXPR   TEMPORARY        STORAGE
         ADC   KG49V4          Q8EXPR   TEMPORARY        STORAGE
         ADC   ABS             Q8ABR    ABSOLUTE VALUE FUNCTION
         ADC   SQRT            SQRTFR   SQUARE ROOT FUNCTION
         ADC   SIGN            SIGNR    INTRINSIC FUNCTION SIGN
         ADC   IFIX            FXFLR    INTRINSIC FUNCTION IFIX
         ADC   FLOAT           FXFLR    INTRINSIC FUNCTION FLOAT
         ADC   EXP             EXPRGR   EXTERNAL FUNCTION EXP
         ADC   ALOG            LNPRGR   EXTERNAL FUNCTION ALOG
         ADC   TANH            TANHR    EXTERNAL FUNCTION TANH
         ADC   SIN             SNCSR    EXTERNAL FUNCTION SIN
         ADC   COS             SNCSR    EXTERNAL FUNCTION COS
         ADC   ATAN            ARCPGR   EXTERNAL FUNCTION ATAN
         ADC   IFALT           IFALTR   EXTERNAL FUNCTION IFALT
         ADC   FLOT            FLOATR   FLOATING POINT PROCESSOR
         ADC   ARGUD           Q8QIO    TEMPORARY STORAGE
FEND     EQU   FEND(*-FLIST-1)

*              F O R T R A N   R E E N T R A N T   I N F O R M A T I O N
*



*        THIS ENTRY IS PROVIDED TO ALLOW COMPATIBILITY BETWEEN THE
*        NON-REENTRANT (BACKGROUND) FORTRAN AND REENTRANT FORTRAN

         ENT   Q8STP

Q8STP    NOP   0               FORTRAN    STOP
         JMP-  (ABTSP)
*        LINK THE DOUBLE PRECISION ENTRY POINT REFERENCED BY 'FORMTR'

         ENT   DOUT
         EQU   DOUT($7FFF)
```

Section ACY of SYSDAT must be modified. Prior to modification this section of SYSDAT is as follows:

```
*          M I S C E L L A N E O U S   I N F O R M A T I O N
*
*          S Y S T E M   C H E C K O U T   P A R A M E T E R S


*       THE STARTING SECTOR OF THE FAILED CORE IMAGE IS SPECIFIED BY
*       THE NAME COBOPS.  THIS AREA MUST BE SIZED TO ACCOMODATE A
*       FAILED IMAGE OF THE SIZE SPECIFIED BY NAME MSIZV4.  THE FAILED
*       IMAGE MUST RESIDE ON THE LIBRARY MASS MEMORY UNIT.  IF THE
*       MASS MEMORY LIBRARY UNIT IS A CARTRIDGE DISK, THE IMAGE AREA
*       CANNOT OVERLAP FROM ONE PLATTER TO THE OTHER.

        ENT  COBOPS
COBOPS  EQU COBOPS($7D83)   START SECTOR OF FAILED IMAGE



*       THIS ENTRY IS PROVIDED TO LINK THE FORTRAN REENTRANCY DATA
*       ENTRY POINTS

        ENT   FMASK,FLIST

        EQU   FMASK($7FFF),FLIST($7FFF)
```

The patches for FMASK and FLIST must be removed, as these entry points are now defined in Section ACS of SYSDAT. The patch for NDISP must be inserted, as the module NDISP will be replaced by RDISP in building the new system. After modification Section ACY of SYSDAT is as follows:

```
*         M I S C E L L A N E O U S   I N F O R M A T I O N
*
*         S Y S T E M   C H E C K O U T   P A R A M E T E R S


*      THE STARTING SECTOR OF THE FAILED CORE IMAGE IS SPECIFIED BY
*      THE NAME COBOPS.  THIS AREA MUST BE SIZED TO ACCOMODATE A
*      FAILED IMAGE OF THE SIZE SPECIFIED BY NAME MSIZV4.  THE FAILED
*      IMAGE MUST RESIDE ON THE LIBRARY MASS MEMORY UNIT.  IF THE
*      MASS MEMORY LIBRARY UNIT IS A CARTRIDGE DISK, THE IMAGE AREA
*      CANNOT OVERLAP FROM ONE PLATTER TO THE OTHER.

       ENT  COBOPS
COBOPS EQU COBOPS($7000)  START SECTOR OF FAILED IMAGE


*      THIS ENTRY IS PROVIDED TO LINK THE NO-FORTRAN DISPATCHER
*      ENTRY POINT

       ENT  NDISP

       EQU  NDISP($7FFF)
```

6.3.2 Skeleton Modifications

Before modification the skeleton is as listed in Article 5.3.3. Referring to this listing, record 61 must be replaced by a *B record for the module RDISP. The control records needed to load the reentrant FORTRAN library are inserted between record 97 and record 98 of the previous skeleton. The formatting routines listed in Group K1 of Article 2.1 are included, but the double precision routines are not included. The control records needed to load the FORTRAN 3.2A Compiler and the FORTRAN Input/Output Library are inserted between records 611 and 612 of the previous skeleton.

In this example the control records needed to load the compiler, the background FORTRAN library, and the reentrant FORTRAN library must be punched on cards. To obtain the control cards to load the compiler and the background library the program SKED is used to build a skeleton from the FORTRAN install tape, and to dump the skeleton onto cards. The procedure is as follows. The FORTRAN install tape is mounted on tape unit 0, logical unit 6. Typing on the comment device is as follows:

```
*JOB
J
*SKED
SKED IN

NEXT
BUILD,6

NEXT
DUMP,11
```

The resulting skeleton is as follows:

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```
*V  .FORTRAN COMPILER 3.2 A
*K,I6
*L,FTN
*E   ≠FTNA≠     ≠  COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*K,P8
*F,F
*E   ≠FTNA≠     ≠  COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
```

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```
*B   ≠GOA≠       ≠   DECK-ID F02 FORTRAN 3.2A≠
*B   ≠IOPRBA≠    ≠   DECK-ID F08 FORTRAN 3.2A≠
*B   ≠CNVT≠      ≠   DECK-ID A01 FORTRAN 3.2A≠
*B   ≠CONV≠      ≠   DECK-ID F03 FORTRAN 3.2A≠
*B   ≠DIAG≠      ≠   DECK-ID F04 FORTRAN 3.2A≠
*B   ≠GETC≠      ≠   DECK-ID F13 FORTRAN 3.2A≠
*B   ≠GETSYM≠    ≠   DECK-ID F12 FORTRAN 3.2A≠
*B   ≠OUTENT≠    ≠   DECK-ID A07 FORTRAN 3.2A≠
*B   ≠PACK≠      ≠   DECK-ID F09 FORTRAN 3.2A≠
*B   ≠Q8PRMS≠    ≠   DECK-ID F10 FORTRAN 3.2A≠
*B   ≠STORE≠     ≠   DECK-ID F11 FORTRAN 3.2A≠
*B   ≠SYMBOL≠    ≠   DECK-ID A03 FORTRAN 3.2A≠
*B   ≠LOCLAA≠    ≠   DECK-ID F17 FORTRAN 3.2A≠
*B   ≠DUMYAA≠    ≠   DECK-ID F18 FORTRAN 3.2A≠
*B   ≠PHASEA≠    ≠   DECK-ID A08 FORTRAN 3.2A≠
*B   ≠ARAYSZ≠    ≠   DECK-ID A42 FORTRAN 3.2A≠
*B   ≠CPLOOP≠    ≠   DECK-ID A43 FORTRAN 3.2A≠
*B   ≠ENDDO≠     ≠   DECK-ID A20 FORTRAN 3.2A≠
*B   ≠GNST≠      ≠   DECK-ID A06 FORTRAN 3.2A≠
*B   ≠IGETCF≠    ≠   DECK-ID F14 FORTRAN 3.2A≠
*B   ≠OPTION≠    ≠   DECK-ID F15 FORTRAN 3.2A≠
*B   ≠PLABEL≠    ≠   DECK-ID A09 FORTRAN 3.2A≠
*B   ≠Q8GBDS≠    ≠   DECK-ID A10 FORTRAN 3.2A≠
*B   ≠RDLABL≠    ≠   DECK-ID A11 FORTRAN 3.2A≠
*B   ≠SAVEID≠    ≠   DECK-ID A04 FORTRAN 3.2A≠
*B   ≠STCHAR≠    ≠   DECK-ID A12 FORTRAN 3.2A≠
*B   ≠ENDLOC≠    ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTAA,,,B
*K,I6
*K,P8
*F,F,,MARKER
*B   ≠FTNA≠      ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B   ≠GOA≠       ≠   DECK-ID F02 FORTRAN 3.2A≠
*B   ≠IOPRBA≠    ≠   DECK-ID F08 FORTRAN 3.2A≠
*B   ≠CNVT≠      ≠   DECK-ID A01 FORTRAN 3.2A≠
*B   ≠CONV≠      ≠   DECK-ID F03 FORTRAN 3.2A≠
*B   ≠DIAG≠      ≠   DECK-ID F04 FORTRAN 3.2A≠
*B   ≠GETC≠      ≠   DECK-ID F13 FORTRAN 3.2A≠
*B   ≠GETSYM≠    ≠   DECK-ID F12 FORTRAN 3.2A≠
*B   ≠OUTENT≠    ≠   DECK-ID A07 FORTRAN 3.2A≠
*B   ≠PACK≠      ≠   DECK-ID F09 FORTRAN 3.2A≠
*B   ≠Q8PRMS≠    ≠   DECK-ID F10 FORTRAN 3.2A≠
*B   ≠STORE≠     ≠   DECK-ID F11 FORTRAN 3.2A≠
*B   ≠SYMBOL≠    ≠   DECK-ID A03 FORTRAN 3.2A≠
*B   ≠LOCLAB≠    ≠   DECK-ID F19 FORTRAN 3.2A≠
*B   ≠DUMYAB≠    ≠   DECK-ID F20 FORTRAN 3.2A≠
*B   ≠BYEQPR≠    ≠   DECK-ID A19 FORTRAN 3.2A≠
*B   ≠DFLOT≠     ≠   DECK-ID F06 FORTRAN 3.2A≠
*B   ≠DUMVOL≠    ≠   DECK-ID F07 FORTRAN 3.2A≠
*B   ≠DXP9≠      ≠   DECK-ID F05 FORTRAN 3.2A≠
*B   ≠GETF≠      ≠   DECK-ID A05 FORTRAN 3.2A≠
*B   ≠GPLT≠      ≠   DECK-ID A02 FORTRAN 3.2A≠
*B   ≠SAVEID≠    ≠   DECK-ID A04 FORTRAN 3.2A≠
*B   ≠STCHAR≠    ≠   DECK-ID A12 FORTRAN 3.2A≠
*B   ≠SUBPPR≠    ≠   DECK-ID A23 FORTRAN 3.2A≠
*B   ≠TYPE≠      ≠   DECK-ID A13 FORTRAN 3.2A≠
*B   ≠ENDLOC≠    ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
```

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```
*K,I8
*N,FORTAB,,,B
*K,I6
*K,P8
*F,F,,MARKER
*B    ≠FTNA≠       ≠    COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B    ≠GOA≠        ≠    DECK-ID F02 FORTRAN 3.2A≠
*B    ≠IOPRBA≠     ≠    DECK-ID F08 FORTRAN 3.2A≠
*B    ≠CNVT≠       ≠    DECK-ID A01 FORTRAN 3.2A≠
*B    ≠CONV≠       ≠    DECK-ID F03 FORTRAN 3.2A≠
*B    ≠DIAG≠       ≠    DECK-ID F04 FORTRAN 3.2A≠
*B    ≠GETC≠       ≠    DECK-ID F13 FORTRAN 3.2A≠
*B    ≠GETSYM≠     ≠    DECK-ID F12 FORTRAN 3.2A≠
*B    ≠OUTENT≠     ≠    DECK-ID A07 FORTRAN 3.2A≠
*B    ≠PACK≠       ≠    DECK-ID F09 FORTRAN 3.2A≠
*B    ≠Q8PRMS≠     ≠    DECK-ID F10 FORTRAN 3.2A≠
*B    ≠STORE≠      ≠    DECK-ID F11 FORTRAN 3.2A≠
*B    ≠SYMBOL≠     ≠    DECK-ID A03 FORTRAN 3.2A≠
*B    ≠LOCLAC≠     ≠    DECK-ID F21 FORTRAN 3.2A≠
*B    ≠DUMYAC≠     ≠    DECK-ID F22 FORTRAN 3.2A≠
*B    ≠ASGNPR≠     ≠    DECK-ID A32 FORTRAN 3.2A≠
*B    ≠BDCPR≠      ≠    DECK-ID A33 FORTRAN 3.2A≠
*B    ≠CFIVOC≠     ≠    DECK-ID A34 FORTRAN 3.2A≠
*B    ≠CKIVC≠      ≠    DECK-ID A35 FORTRAN 3.2A≠
*B    ≠CKNAME≠     ≠    DECK-ID A36 FORTRAN 3.2A≠
*B    ≠COMNPR≠     ≠    DECK-ID A15 FORTRAN 3.2A≠
*B    ≠DFLOT≠      ≠    DECK-ID F06 FORTRAN 3.2A≠
*B    ≠DIMPR≠      ≠    DECK-ID A16 FORTRAN 3.2A≠
*B    ≠DUMVOL≠     ≠    DECK-ID F07 FORTRAN 3.2A≠
*B    ≠DXP9≠       ≠    DECK-ID F05 FORTRAN 3.2A≠
*B    ≠ERBPR≠      ≠    DECK-ID A38 FORTRAN 3.2A≠
*B    ≠EXRLPR≠     ≠    DECK-ID A24 FORTRAN 3.2A≠
*B    ≠GETF≠       ≠    DECK-ID A05 FORTRAN 3.2A≠
*B    ≠GPLT≠       ≠    DECK-ID A02 FORTRAN 3.2A≠
*B    ≠RDLABL≠     ≠    DECK-ID A11 FORTRAN 3.2A≠
*B    ≠TYPEPR≠     ≠    DECK-ID A18 FORTRAN 3.2A≠
*B    ≠ENDLOC≠     ≠    DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTAC,,,B
*K,I6
*K,P8
*F,F,,MARKER
*B    ≠FTNA≠       ≠    COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B    ≠GOA≠        ≠    DECK-ID F02 FORTRAN 3.2A≠
*B    ≠IOPRBA≠     ≠    DECK-ID F08 FORTRAN 3.2A≠
*B    ≠CNVT≠       ≠    DECK-ID A01 FORTRAN 3.2A≠
*B    ≠CONV≠       ≠    DECK-ID F03 FORTRAN 3.2A≠
*B    ≠DIAG≠       ≠    DECK-ID F04 FORTRAN 3.2A≠
*B    ≠GETC≠       ≠    DECK-ID F13 FORTRAN 3.2A≠
*B    ≠GETSYM≠     ≠    DECK-ID F12 FORTRAN 3.2A≠
*B    ≠OUTENT≠     ≠    DECK-ID A07 FORTRAN 3.2A≠
*B    ≠PACK≠       ≠    DECK-ID F09 FORTRAN 3.2A≠
*B    ≠Q8PRMS≠     ≠    DECK-ID F10 FORTRAN 3.2A≠
*B    ≠STORE≠      ≠    DECK-ID F11 FORTRAN 3.2A≠
*B    ≠SYMBOL≠     ≠    DECK-ID A03 FORTRAN 3.2A≠
*B    ≠LOCLAD≠     ≠    DECK-ID F23 FORTRAN 3.2A≠
*B    ≠DUMYAD≠     ≠    DECK-ID F24 FORTRAN 3.2A≠
*B    ≠ASEMPR≠     ≠    DECK-ID A40 FORTRAN 3.2A≠
*B    ≠DFLOT≠      ≠    DECK-ID F06 FORTRAN 3.2A≠
```

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```
*B    ≠DUMVOL≠     ≠   DECK-ID F07 FORTRAN 3.2A≠
*B    ≠DXP9≠       ≠   DECK-ID F05 FORTRAN 3.2A≠
*B    ≠GETF≠       ≠   DECK-ID A05 FORTRAN 3.2A≠
*B    ≠GPLT≠       ≠   DECK-ID A02 FORTRAN 3.2A≠
*B    ≠IGETCF≠     ≠   DECK-ID F14 FORTRAN 3.2A≠
*B    ≠PUNT≠       ≠   DECK-ID A27 FORTRAN 3.2A≠
*B    ≠RDLABL≠     ≠   DECK-ID A11 FORTRAN 3.2A≠
*B    ≠SUBSCR≠     ≠   DECK-ID A17 FORTRAN 3.2A≠
*B    ≠ENDLOC≠     ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTAD,,,B
*K,I6
*K,P8
*F,F,,MARKER
*B    ≠FTNA≠       ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B    ≠GOA≠        ≠   DECK-ID F02 FORTRAN 3.2A≠
*B    ≠IOPRBA≠     ≠   DECK-ID F08 FORTRAN 3.2A≠
*B    ≠CNVT≠       ≠   DECK-ID A01 FORTRAN 3.2A≠
*B    ≠CONV≠       ≠   DECK-ID F03 FORTRAN 3.2A≠
*B    ≠DIAG≠       ≠   DECK-ID F04 FORTRAN 3.2A≠
*B    ≠GETC≠       ≠   DECK-ID F13 FORTRAN 3.2A≠
*B    ≠GETSYM≠     ≠   DECK-ID F12 FORTRAN 3.2A≠
*B    ≠OUTENT≠     ≠   DECK-ID A07 FORTRAN 3.2A≠
*B    ≠PACK≠       ≠   DECK-ID F09 FORTRAN 3.2A≠
*B    ≠Q8PRMS≠     ≠   DECK-ID F10 FORTRAN 3.2A≠
*B    ≠STORE≠      ≠   DECK-ID F11 FORTRAN 3.2A≠
*B    ≠SYMBOL≠     ≠   DECK-ID A03 FORTRAN 3.2A≠
*B    ≠LOCLAE≠     ≠   DECK-ID F25 FORTRAN 3.2A≠
*B    ≠DUMYAE≠     ≠   DECK-ID F26 FORTRAN 3.2A≠
*B    ≠CONSUB≠     ≠   DECK-ID A30 FORTRAN 3.2A≠
*B    ≠DATAPR≠     ≠   DECK-ID A31 FORTRAN 3.2A≠
*B    ≠DFLOT≠      ≠   DECK-ID F06 FORTRAN 3.2A≠
*B    ≠DUMVOL≠     ≠   DECK-ID F07 FORTRAN 3.2A≠
*B    ≠DXP9≠       ≠   DECK-ID F05 FORTRAN 3.2A≠
*B    ≠GETF≠       ≠   DECK-ID A05 FORTRAN 3.2A≠
*B    ≠GPLT≠       ≠   DECK-ID A02 FORTRAN 3.2A≠
*B    ≠STCHAR≠     ≠   DECK-ID A12 FORTRAN 3.2A≠
*B    ≠ENDLOC≠     ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTAE,,,B
*K,I6
*K,P8
*F,F,,MARKER
*B    ≠FTNA≠       ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B    ≠GOA≠        ≠   DECK-ID F02 FORTRAN 3.2A≠
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*B    ≠DUMYAF≠     ≠   DECK-ID F28 FORTRAN 3.2A≠
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*N,FORTAF,,,B
*K,I6
*K,P8
*F,F,,MARKER
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*K,I6
*K,P8
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*K,I6
*K,P8
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*K,I8
*N,FORTAI,,,B
*K,I6
*K,P8
*P,F
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*T
*K,I8
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*K,I6
*K,P8
*F,F,,MARKER
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*B   ≠KPCSTK≠        ≠    DECK-ID B05 FORTRAN 3.2A≠
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*K,I8
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*K,I6
*K,P8
*F,F,,MARKER
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*K,I6
*K,F8
*F,F,,MARKER
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*N,FORTBD,,,B
*K,I6
*K,F8
*F,F,,MARKER
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*N,FORTBE,,,B
*K,I6
*K,P8
*P,F,,MARKER
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*K,I8
*N,FORTBF,,,B
*K,I6
*K,P8
*P,F
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*B   ≠INOUT≠     ≠   DECK-ID C11 FORTRAN 3.2A≠
*B   ≠LABEL≠     ≠   DECK-ID C14 FORTRAN 3.2A≠
*B   ≠LABIN≠     ≠   DECK-ID C15 FORTRAN 3.2A≠
*B   ≠Q8PRMS≠    ≠   DECK-ID F10 FORTRAN 3.2A≠
*B   ≠REED≠      ≠   DECK-ID C17 FORTRAN 3.2A≠
*B   ≠SYMSCN≠    ≠   DECK-ID C19 FORTRAN 3.2A≠
*B   ≠LOCLCA≠    ≠   DECK-ID F52 FORTRAN 3.2A≠
*B   ≠DUMYCA≠    ≠   DECK-ID F53 FORTRAN 3.2A≠
*B   ≠PHASEC≠    ≠   DECK-ID C13 FORTRAN 3.2A≠
*B   ≠ENDLOC≠    ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTCA,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   ≠FTNA≠      ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B   ≠GOC≠       ≠   DECK-ID F50 FORTRAN 3.2A≠
*B   ≠IOPRBC≠    ≠   DECK-ID F51 FORTRAN 3.2A≠
*B   ≠BKDWN≠     ≠   DECK-ID C01 FORTRAN 3.2A≠
*B   ≠BLDUP≠     ≠   DECK-ID C02 FORTRAN 3.2A≠
*B   ≠BSS≠       ≠   DECK-ID C03 FORTRAN 3.2A≠
*B   ≠CHKWD≠     ≠   DECK-ID C04 FORTRAN 3.2A≠
*B   ≠CON≠       ≠   DECK-ID C07 FORTRAN 3.2A≠
*B   ≠COUNT≠     ≠   DECK-ID C08 FORTRAN 3.2A≠
*B   ≠DATAST≠    ≠   DECK-ID C09 FORTRAN 3.2A≠
*B   ≠GETSYM≠    ≠   DECK-ID C10 FORTRAN 3.2A≠
*B   ≠INOUT≠     ≠   DECK-ID C11 FORTRAN 3.2A≠
*B   ≠LABEL≠     ≠   DECK-ID C14 FORTRAN 3.2A≠
*B   ≠LABIN≠     ≠   DECK-ID C15 FORTRAN 3.2A≠
*B   ≠Q8PRMS≠    ≠   DECK-ID F10 FORTRAN 3.2A≠
*B   ≠REED≠      ≠   DECK-ID C17 FORTRAN 3.2A≠
*B   ≠SYMSCN≠    ≠   DECK-ID C19 FORTRAN 3.2A≠
*B   ≠LOCLCB≠    ≠   DECK-ID F54 FORTRAN 3.2A≠
*B   ≠CHCP≠      ≠   DECK-ID C05 FORTRAN 3.2A≠
*B   ≠CL12≠      ≠   DECK-ID C06 FORTRAN 3.2A≠
*B   ≠SKIP≠      ≠   DECK-ID C18 FORTRAN 3.2A≠
*B   ≠IXOPT≠     ≠   DECK-ID C12 FORTRAN 3.2A≠
*B   ≠QXLD≠      ≠   DECK-ID C16 FORTRAN 3.2A≠
*B   ≠ENDLOC≠    ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTCB,,,B
*K,I6
*K,P8
*P,F
*B   ≠FTNA≠      ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B   ≠GOOD≠      ≠   DECK-ID F55 FORTRAN 3.2A≠
*B   ≠INDEX≠     ≠   DECK-ID D01 FORTRAN 3.2A≠
*B   ≠IOPRBD≠    ≠   DECK-ID F56 FORTRAN 3.2A≠
*B   ≠NPUNCH≠    ≠   DECK-ID D02 FORTRAN 3.2A≠
*B   ≠Q8PRMS≠    ≠   DECK-ID F10 FORTRAN 3.2A≠
*B   ≠LOCLDA≠    ≠   DECK-ID F58 FORTRAN 3.2A≠
*B   ≠DUMYDA≠    ≠   DECK-ID F59 FORTRAN 3.2A≠
*B   ≠PHASE6≠    ≠   DECK-ID D03 FORTRAN 3.2A≠
*B   ≠BEGINO≠    ≠   DECK-ID D21 FORTRAN 3.2A≠
*B   ≠CONV≠      ≠   DECK-ID F57 FORTRAN 3.2A≠
*B   ≠FINISH≠    ≠   DECK-ID D22 FORTRAN 3.2A≠
*B   ≠GETSYM≠    ≠   DECK-ID D16 FORTRAN 3.2A≠
```

```
*E    ≠IACON≠     ≠   DECK-ID D17 FORTRAN 3.2A≠
*E    ≠IHCON≠     ≠   DECK-ID D18 FORTRAN 3.2A≠
*E    ≠NWRITE≠    ≠   DECK-ID D19 FORTRAN 3.2A≠
*E    ≠PACK≠      ≠   DECK-ID F09 FORTRAN 3.2A≠
*E    ≠SYMSCN≠    ≠   DECK-ID D20 FORTRAN 3.2A≠
*E    ≠ENDLOC≠    ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTDA,,,B
*K,I6
*K,P8
*F,F,,MARKER
*E    ≠FTNA≠      ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*E    ≠GOOD≠      ≠   DECK-ID F55 FORTRAN 3.2A≠
*E    ≠INDEX≠     ≠   DECK-ID D01 FORTRAN 3.2A≠
*E    ≠IOPRBD≠    ≠   DECK-ID F56 FORTRAN 3.2A≠
*E    ≠NPUNCH≠    ≠   DECK-ID D02 FORTRAN 3.2A≠
*E    ≠Q8PRMS≠    ≠   DECK-ID F10 FORTRAN 3.2A≠
*E    ≠LOCLDB≠    ≠   DECK-ID F60 FORTRAN 3.2A≠
*E    ≠DUMYDB≠    ≠   DECK-ID F61 FORTRAN 3.2A≠
*E    ≠AMOUT≠     ≠   DECK-ID D04 FORTRAN 3.2A≠
*E    ≠BKDWN≠     ≠   DECK-ID D06 FORTRAN 3.2A≠
*E    ≠COLNT≠     ≠   DECK-ID D07 FORTRAN 3.2A≠
*E    ≠GETSYM≠    ≠   DECK-ID D14 FORTRAN 3.2A≠
*E    ≠LABOUT≠    ≠   DECK-ID D08 FORTRAN 3.2A≠
*E    ≠NP2OUT≠    ≠   DECK-ID D09 FORTRAN 3.2A≠
*E    ≠RBDX≠      ≠   DECK-ID D10 FORTRAN 3.2A≠
*E    ≠RBPK≠      ≠   DECK-ID D11 FORTRAN 3.2A≠
*E    ≠SYMSCN≠    ≠   DECK-ID D15 FORTRAN 3.2A≠
*E    ≠TABDEC≠    ≠   DECK-ID D12 FORTRAN 3.2A≠
*E    ≠UNPUNC≠    ≠   DECK-ID D13 FORTRAN 3.2A≠
*E    ≠ENDLOC≠    ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTDB,,,B
*K,I6
*K,P8
*F,F,,MARKER
*E    ≠FTNA≠      ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*E    ≠GOOD≠      ≠   DECK-ID F55 FORTRAN 3.2A≠
*E    ≠INDEX≠     ≠   DECK-ID D01 FORTRAN 3.2A≠
*E    ≠IOPRBD≠    ≠   DECK-ID F56 FORTRAN 3.2A≠
*E    ≠NPUNCH≠    ≠   DECK-ID D02 FORTRAN 3.2A≠
*E    ≠Q8PRMS≠    ≠   DECK-ID F10 FORTRAN 3.2A≠
*E    ≠LOCLDC≠    ≠   DECK-ID F62 FORTRAN 3.2A≠
*E    ≠ADMAX≠     ≠   DECK-ID D05 FORTRAN 3.2A≠
*E    ≠GETSYM≠    ≠   DECK-ID D14 FORTRAN 3.2A≠
*E    ≠TABDEC≠    ≠   DECK-ID D12 FORTRAN 3.2A≠
*E    ≠SYMSCN≠    ≠   DECK-ID D15 FORTRAN 3.2A≠
*E    ≠ENDLOC≠    ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTDC,,,B
*K,I6
*K,P8
*F,F
*E    ≠FTNA≠      ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*E    ≠GOE≠       ≠   DECK-ID F63 FORTRAN 3.2A≠
*E    ≠INDEX≠     ≠   DECK-ID E01 FORTRAN 3.2A≠
*E    ≠IOPRBD≠    ≠   DECK-ID F56 FORTRAN 3.2A≠
```

```
*B   ≠NPLNCH≠   ≠   DECK-ID E02 FORTRAN 3.2A≠
*B   ≠Q8PRMS≠   ≠   DECK-ID F10 FORTRAN 3.2A≠
*B   ≠LOCLDA≠   ≠   DECK-ID F58 FORTRAN 3.2A≠
*B   ≠DUMYDA≠   ≠   DECK-ID F59 FORTRAN 3.2A≠
*B   ≠PHASE6≠   ≠   DECK-ID E03 FORTRAN 3.2A≠
*B   ≠BEGINO≠   ≠   DECK-ID E19 FORTRAN 3.2A≠
*B   ≠CONV≠     ≠   DECK-ID F57 FORTRAN 3.2A≠
*B   ≠FINISH≠   ≠   DECK-ID E20 FORTRAN 3.2A≠
*B   ≠GETSYM≠   ≠   DECK-ID E14 FORTRAN 3.2A≠
*B   ≠IACON≠    ≠   DECK-ID E15 FORTRAN 3.2A≠
*B   ≠IHCON≠    ≠   DECK-ID E16 FORTRAN 3.2A≠
*B   ≠NWRITE≠   ≠   DECK-ID E17 FORTRAN 3.2A≠
*B   ≠PACK≠     ≠   DECK-ID F09 FORTRAN 3.2A≠
*B   ≠SETPRT≠   ≠   DECK-ID E18 FORTRAN 3.2A≠
*B   ≠SYMSCN≠   ≠   DECK-ID D20 FORTRAN 3.2A≠
*B   ≠ENDLOC≠   ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTEA,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   ≠FTNA≠     ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B   ≠GOE≠      ≠   DECK-ID F63 FORTRAN 3.2A≠
*B   ≠INDEX≠    ≠   DECK-ID E01 FORTRAN 3.2A≠
*B   ≠IOPRBD≠   ≠   DECK-ID F56 FORTRAN 3.2A≠
*B   ≠NPLNCH≠   ≠   DECK-ID E02 FORTRAN 3.2A≠
*B   ≠Q8PRMS≠   ≠   DECK-ID F10 FORTRAN 3.2A≠
*B   ≠LOCLDB≠   ≠   DECK-ID F60 FORTRAN 3.2A≠
*B   ≠DUMYDB≠   ≠   DECK-ID F61 FORTRAN 3.2A≠
*B   ≠AMOUT≠    ≠   DECK-ID E04 FORTRAN 3.2A≠
*B   ≠BKDWN≠    ≠   DECK-ID E06 FORTRAN 3.2A≠
*B   ≠CONV≠     ≠   DECK-ID F57 FORTRAN 3.2A≠
*B   ≠COUNT≠    ≠   DECK-ID E07 FORTRAN 3.2A≠
*B   ≠GETSYM≠   ≠   DECK-ID E14 FORTRAN 3.2A≠
*B   ≠IACON≠    ≠   DECK-ID E15 FORTRAN 3.2A≠
*B   ≠IHCON≠    ≠   DECK-ID E16 FORTRAN 3.2A≠
*B   ≠LABOUT≠   ≠   DECK-ID E08 FORTRAN 3.2A≠
*B   ≠NP2OUT≠   ≠   DECK-ID E09 FORTRAN 3.2A≠
*B   ≠NWRITE≠   ≠   DECK-ID E17 FORTRAN 3.2A≠
*B   ≠PACK≠     ≠   DECK-ID F09 FORTRAN 3.2A≠
*B   ≠RBDX≠     ≠   DECK-ID E10 FORTRAN 3.2A≠
*B   ≠RBFK≠     ≠   DECK-ID E11 FORTRAN 3.2A≠
*B   ≠SETPRT≠   ≠   DECK-ID E18 FORTRAN 3.2A≠
*B   ≠SYMSCN≠   ≠   DECK-ID D20 FORTRAN 3.2A≠
*B   ≠TABDEC≠   ≠   DECK-ID E12 FORTRAN 3.2A≠
*B   ≠UNPUNC≠   ≠   DECK-ID E13 FORTRAN 3.2A≠
*B   ≠ENDLOC≠   ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTEB,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   ≠FTNA≠     ≠   COPYRIGHT CONTROL DATA CORPORATION 1973 SL-0≠
*B   ≠GOE≠      ≠   DECK-ID F63 FORTRAN 3.2A≠
*B   ≠INDEX≠    ≠   DECK-ID E01 FORTRAN 3.2A≠
*B   ≠IOPRBD≠   ≠   DECK-ID F56 FORTRAN 3.2A≠
*B   ≠NPLNCH≠   ≠   DECK-ID E02 FORTRAN 3.2A≠
*B   ≠Q8PRMS≠   ≠   DECK-ID F10 FORTRAN 3.2A≠
```

```
*E   ≠LOCLDC≠   ≠   DECK-ID F62 FORTRAN 3.2A≠
*E   ≠ADMAX≠    ≠   DECK-ID E05 FORTRAN 3.2A≠
*E   ≠GETSYM≠   ≠   DECK-ID E14 FORTRAN 3.2A≠
*E   ≠SYMSCN≠   ≠   DECK-ID D20 FORTRAN 3.2A≠
*E   ≠TABDEC≠   ≠   DECK-ID E12 FORTRAN 3.2A≠
*E   ≠ENDLOC≠   ≠   DECK-ID F16 FORTRAN 3.2A≠
*T
*K,I8
*N,FORTEC,,,B
*V   NON-REENTRANT FTN. LIBRARY
*K,I6
*L,READ
*E    ≠FORTN≠     ≠   DECK-ID F01   3.2 FTN RUNTIME≠
*L,G8PREP
*E    ≠Q8PRMS≠    ≠   DECK-ID G01   3.2 FTN RUNTIME≠
*L,G8QF2I
*E    ≠Q8EXPN≠    ≠   DECK-ID G02   3.2 FTN RUNTIME≠
*L,ABS
*E    ≠Q8AB≠      ≠   DECK-ID G03   3.2 FTN RUNTIME≠
*L,SQRT
*E    ≠SQRTF≠     ≠   DECK-ID G04   3.2 FTN RUNTIME≠
*L,SIGN
*E    ≠SIGN≠      ≠   DECK-ID G05   3.2 FTN RUNTIME≠
*L,FLOAT
*E    ≠FXFL≠      ≠   DECK-ID G06   3.2 FTN RUNTIME≠
*L,EXP
*E    ≠EXPPRG≠    ≠   DECK-ID G07   3.2 FTN RUNTIME≠
*L,ALOG
*E    ≠LNUPRG≠    ≠   DECK-ID G08   3.2 FTN RUNTIME≠
*L,TANH
*E    ≠TANH≠      ≠   DECK-ID G09   3.2 FTN RUNTIME≠
*L,SIN
*E    ≠SINCOS≠    ≠   DECK-ID G10   3.2 FTN RUNTIME≠
*L,ATAN
*E    ≠ARCTPG≠    ≠   DECK-ID G11   3.2 FTN RUNTIME≠
*L,IFALT
*E    ≠IFALT≠     ≠   DECK-ID G12   3.2 FTN RUNTIME≠
*L,FLOT
*E    ≠FLOAT≠     ≠   DECK-ID G13   3.2 FTN RUNTIME≠
*L,G8IFRM
*E    ≠Q8IFRM≠    ≠   DECK-ID H01   3.2 FTN RUNTIME≠
*L,G8FS
*E    ≠Q8FS≠      ≠   DECK-ID H02   3.2 FTN RUNTIME≠
*L,G8TRAN
*E    ≠Q8TRAN≠    ≠   DECK-ID H03   3.2 FTN RUNTIME≠
*L,G8QINI
*E    ≠Q8QINI≠    ≠   DECK-ID H04   3.2 FTN RUNTIME≠
*L,G8QEND
*E    ≠Q8QEND≠    ≠   DECK-ID H05   3.2 FTN RUNTIME≠
*L,G8CMP0
*E    ≠Q8CMP≠     ≠   DECK-ID H06   3.2 FTN RUNTIME≠
*L,G8RWBU
*E    ≠Q8RWBU≠    ≠   DECK-ID H07   3.2 FTN RUNTIME≠
*L,G8ERRM
*E    ≠Q8ERRM≠    ≠   DECK-ID H08   3.2 FTN RUNTIME≠
*L,G8DFNF
*E    ≠Q8DFIO≠    ≠   DECK-ID H09   3.2 FTN RUNTIME≠
*L,G8QX
*E    ≠Q8QX≠      ≠   DECK-ID H10   3.2 FTN RUNTIME≠
*L,G8QUN1
```

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```
*L,G8FGET
*E    ≠Q8FGET≠     ≠    DECK-ID H12    3.2 FTN RUNTIME≠
*L,G8MAGT
*E    ≠Q8MAGT≠     ≠    DECK-ID H13    3.2 FTN RUNTIME≠
*L,EOF
*E    ≠TAPCON≠     ≠    DECK-ID H14    3.2 FTN RUNTIME≠
*L,IOCK
*E    ≠IOCK≠       ≠    DECK-ID H15    3.2 FTN RUNTIME≠
*L,G8PSE
*E    ≠PSSTOP≠     ≠    DECK-ID H16    3.2 FTN RUNTIME≠
*L,G8PAND
*E    ≠Q8PAND≠     ≠    DECK-ID H17    3.2 FTN RUNTIME≠
*L,G8EXP1
*E    ≠Q8EXP1≠     ≠    DECK-ID H18    3.2 FTN RUNTIME≠
*L,G8EXP9
*E    ≠Q8EXP9≠     ≠    DECK-ID H19    3.2 FTN RUNTIME≠
*L,SETBFR
*E    ≠Q8QGTX≠     ≠    DECK-ID H20    3.2 FTN RUNTIME≠
*L,ENCODE
*E    ≠IOCODE≠     ≠    DECK-ID J01    3.2 FTN RUNTIME≠
*L,COMMON
*E    ≠PSUEDO≠     ≠    DECK-ID J02    3.2 FTN RUNTIME≠
*L,IGETCH
*E    ≠IGETCH≠     ≠    DECK-ID J03    3.2 FTN RUNTIME≠
*L,IPACK
*E    ≠IPACK≠      ≠    DECK-ID J04    3.2 FTN RUNTIME≠
*L,UPDATE
*E    ≠UPDATN≠     ≠    DECK-ID J05    3.2 FTN RUNTIME≠
*L,DECPL
*E    ≠DECPL≠      ≠    DECK-ID J06    3.2 FTN RUNTIME≠
*L,INTGR
*E    ≠INTGR≠      ≠    DECK-ID J07    3.2 FTN RUNTIME≠
*L,SPACEX
*E    ≠SPACEN≠     ≠    DECK-ID J08    3.2 FTN RUNTIME≠
*L,HOLRTH
*E    ≠HOLRTH≠     ≠    DECK-ID J09    3.2 FTN RUNTIME≠
*L,DCHX
*E    ≠DCHX≠       ≠    DECK-ID J10    3.2 FTN RUNTIME≠
*L,HXASC
*E    ≠HXASC≠      ≠    DECK-ID J11    3.2 FTN RUNTIME≠
*L,AFRMOT
*E    ≠AFRMOT≠     ≠    DECK-ID J12    3.2 FTN RUNTIME≠
*L,RFRMOT
*E    ≠RFRMOT≠     ≠    DECK-ID J13    3.2 FTN RUNTIME≠
*L,AFRMIN
*E    ≠AFRMIN≠     ≠    DECK-ID J14    3.2 FTN RUNTIME≠
*L,RFRMIN
*E    ≠RFRMIN≠     ≠    DECK-ID J15    3.2 FTN RUNTIME≠
*L,ASCHX
*E    ≠ASCHX≠      ≠    DECK-ID J16    3.2 FTN RUNTIME≠
*L,HXDC
*E    ≠HXDC≠       ≠    DECK-ID J17    3.2 FTN RUNTIME≠
*L,FLOTIN
*E    ≠FLOTIN≠     ≠    DECK-ID J18    3.2 FTN RUNTIME≠
*L,FOUT
*E    ≠FOUT≠       ≠    DECK-ID J19    3.2 FTN RUNTIME≠
*L,EOUT
*E    ≠EOUT≠       ≠    DECK-ID J20    3.2 FTN RUNTIME≠
*L,EWRITE
```

```
*E   ≠EWRITE≠    ≠   DECK-ID J21   3.2 FTN RUNTIME≠
*L,INITL1
*E   ≠INITL1≠    ≠   DECK-ID J22   3.2 FTN RUNTIME≠
*L,FORMTR
*E   ≠FORMTN≠    ≠   DECK-ID J23   3.2 FTN RUNTIME≠
*L,G8QFI
*E   ≠Q8GFI≠     ≠   DECK-ID J24   3.2 FTN RUNTIME≠
*L,G8QFL
*E   ≠Q8QFL≠     ≠   DECK-ID J25   3.2 FTN RUNTIME≠
*L,G8QFX
*E   ≠Q8QFX≠     ≠   DECK-ID J26   3.2 FTN RUNTIME≠
*L,HEXASC
*E   ≠HEXASC≠    ≠   DECK-ID J27   3.2 FTN RUNTIME≠
*L,HEXDEC
*E   ≠HEXDEC≠    ≠   DECK-ID J28   3.2 FTN RUNTIME≠
*L,ASCII
*E   ≠ASCII≠     ≠   DECK-ID J29   3.2 FTN RUNTIME≠
*L,DECHEX
*E   ≠DECHEX≠    ≠   DECK-ID J30   3.2 FTN RUNTIME≠
*L,AFORM
*E   ≠AFORM≠     ≠   DECK-ID J31   3.2 FTN RUNTIME≠
*L,RFORM
*E   ≠RFORM≠     ≠   DECK-ID J32   3.2 FTN RUNTIME≠
*L,FLOATG
*E   ≠FLOATG≠    ≠   DECK-ID J33   3.2 FTN RUNTIME≠
*L,G8DXP1
*E   ≠DBLDMY≠
*Z
*CTC, INSTALLATION COMPLETED.
*L
```

S14

The FORTRAN reentrant library modules are not present on the FORTRAN install tape, but are present on the FORTRAN binaries tape. In this example the user keypunches the skeleton *B cards for these modules and one *LP card to precede this set of *B cards. (Refer to Article 6.2.2) This is the simplest method of producing these cards. It is also possible to use SKED to generate these cards. However, the reentrant library modules are not together on the tape. Therefore, numberous deletions must be performed, either by the SKET DELETE command or by the user later eliminating unneeded punched cards.

The reentrant library modules in this example are the core modules listed in Article 2.1, Group K together with the formatting routines listed in Article 2.1, Group K1. (Refer to the skeleton listing later in this article.)

The addition of the reentrant FORTRAN library modules requires that the value of BGNMON and the value of ENDOV4 be decreased. The total length of the reentrant library modules to be added is obtained by loading these modules in the background, using the *L job processor command. The procedure is as follows: A skeleton is put together with a *B card for each module to be included in the FORTRAN reentrant library. A *B record for ENDLOC is placed after these cards. (This could be the *B record for any module on the FORTRAN binaries tape.) After that a *END card completes the skeleton. A listing of this skeleton follows.

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```
*B   ≠FORTR≠    ≠   DECK-ID A01   3.2 FTN RUNTIME≠
*B   ≠Q8PRMR≠   ≠   DECK-ID B01   3.2 FTN RUNTIME≠
*B   ≠PARABR≠   ≠   DECK-ID B02   3.2 FTN RUNTIME≠
*B   ≠Q8EXPR≠   ≠   DECK-ID B03   3.2 FTN RUNTIME≠
*B   ≠Q8ABR≠    ≠   DECK-ID B04   3.2 FTN RUNTIME≠
*B   ≠SQRTFR≠   ≠   DECK-ID B05   3.2 FTN RUNTIME≠
*B   ≠SIGNR≠    ≠   DECK-ID B06   3.2 FTN RUNTIME≠
*B   ≠FXFLR≠    ≠   DECK-ID B07   3.2 FTN RUNTIME≠
*B   ≠EXPRGR≠   ≠   DECK-ID B08   3.2 FTN RUNTIME≠
*B   ≠LNPRGR≠   ≠   DECK-ID B09   3.2 FTN RUNTIME≠
*B   ≠TANHR≠    ≠   DECK-ID B10   3.2 FTN RUNTIME≠
*B   ≠SNCSR≠    ≠   DECK-ID B11   3.2 FTN RUNTIME≠
*B   ≠ARCPGR≠   ≠   DECK-ID B12   3.2 FTN RUNTIME≠
*B   ≠IFALTR≠   ≠   DECK-ID B13   3.2 FTN RUNTIME≠
*B   ≠FLOATR≠   ≠   DECK-ID B14   3.2 FTN RUNTIME≠
*B   ≠Q8QIOR≠   ≠   DECK-ID C01   3.2 FTN RUNTIME≠
*B   ≠BINARR≠   ≠   DECK-ID C02   3.2 FTN RUNTIME≠
*B   ≠IOCODR≠   ≠   DECK-ID D01   3.2 FTN RUNTIME≠
*B   ≠INITLR≠   ≠   DECK-ID D02   3.2 FTN RUNTIME≠
*B   ≠RSTORR≠   ≠   DECK-ID D03   3.2 FTN RUNTIME≠
*B   ≠GETCHR≠   ≠   DECK-ID D04   3.2 FTN RUNTIME≠
*B   ≠IPACKR≠   ≠   DECK-ID D05   3.2 FTN RUNTIME≠
*B   ≠UPDATR≠   ≠   DECK-ID D06   3.2 FTN RUNTIME≠
*B   ≠DECPLR≠   ≠   DECK-ID D07   3.2 FTN RUNTIME≠
*B   ≠INTGRR≠   ≠   DECK-ID D08   3.2 FTN RUNTIME≠
*B   ≠SPACER≠   ≠   DECK-ID D09   3.2 FTN RUNTIME≠
*B   ≠HOLR≠     ≠   DECK-ID D10   3.2 FTN RUNTIME≠
*B   ≠DCHXR≠    ≠   DECK-ID D11   3.2 FTN RUNTIME≠
*B   ≠HXASCR≠   ≠   DECK-ID D12   3.2 FTN RUNTIME≠
*B   ≠AFMTOR≠   ≠   DECK-ID D13   3.2 FTN RUNTIME≠
*B   ≠RFMTOR≠   ≠   DECK-ID D14   3.2 FTN RUNTIME≠
*B   ≠AFMTIR≠   ≠   DECK-ID D15   3.2 FTN RUNTIME≠
*B   ≠RFMTIR≠   ≠   DECK-ID D16   3.2 FTN RUNTIME≠
*B   ≠ASCHXR≠   ≠   DECK-ID D17   3.2 FTN RUNTIME≠
*B   ≠HXDCR≠    ≠   DECK-ID D18   3.2 FTN RUNTIME≠
*B   ≠FLOTIR≠   ≠   DECK-ID D19   3.2 FTN RUNTIME≠
*B   ≠FOUTR≠    ≠   DECK-ID D20   3.2 FTN RUNTIME≠
*B   ≠EOUTR≠    ≠   DECK-ID D21   3.2 FTN RUNTIME≠
*B   ≠EWRITR≠   ≠   DECK-ID D22   3.2 FTN RUNTIME≠
*B   ≠INTIIR≠   ≠   DECK-ID D23   3.2 FTN RUNTIME≠
*B   ≠FORMTR≠   ≠   DECK-ID D24   3.2 FTN RUNTIME≠
*B   ≠Q8GFIR≠   ≠   DECK-ID D25   3.2 FTN RUNTIME≠
*B   ≠Q8GFLR≠   ≠   DECK-ID D26   3.2 FTN RUNTIME≠
*B   ≠Q8GFXR≠   ≠   DECK-ID D27   3.2 FTN RUNTIME≠
*B   ≠HEXAR≠    ≠   DECK-ID D28   3.2 FTN RUNTIME≠
*B   ≠HEXDR≠    ≠   DECK-ID D29   3.2 FTN RUNTIME≠
*B   ≠ASCIIR≠   ≠   DECK-ID D30   3.2 FTN RUNTIME≠
*B   ≠DECHXR≠   ≠   DECK-ID D31   3.2 FTN RUNTIME≠
*B   ≠AFORMR≠   ≠   DECK-ID D32   3.2 FTN RUNTIME≠
*B   ≠RFORMR≠   ≠   DECK-ID D33   3.2 FTN RUNTIME≠
*B   ≠FLOTGR≠   ≠   DECK-ID D34   3.2 FTN RUNTIME≠
*B   ≠ENDLOC≠
*END
```

The FORTRAN binaries tape is mounted on tape unit 0, logical unit 6. A scratch tape is mounted on tape unit 1, logical unit 13. The skeleton is loaded in the card reader. A short install tape is created by the following commands to LIBILD.

```
MI
*BATCH
L,10 FAILED 06
ACTION
CU
J
*JOB
J
*LIBILD
CONTROL LU    =
DEFS LU       =
INSTALL LU    = 13
NEWLIB LU     =
LIB 01 LU     = 06
LIB 02 LU     =
SKELETON LU = 10
LOAD SKEL/INSTAL, CR WHEN READY
LIBRARY BUILD COMPLETE
TYPE *Z TO TERMINATE OR
TYPE *C TO CONTINUE WITH CURRENT SKELETON AND/OR
OUTPUT LIBRARY LU'S *Z
J
```

The install file created is then loaded by the job processor with the following commands.

```
*REW,13,6
J
*L,13
```

The job processor output is as follows:

518 6-31

```
FORTR    4998   DECK-ID A01   3.2 FTN RUNTIME        SUMMARY-079
Q8PRMR   4ACA   DECK-ID B01   3.2 FTN RUNTIME        SUMMARY-079
PAPABR   4AE1   DECK-ID B02   3.2 FTN RUNTIME        SUMMARY-081
Q8FXPR   4AF2   DECK-ID B03   3.2 FTN RUNTIME        SUMMARY-079
Q8ABR    4BA3   DECK-ID B04   3.2 FTN RUNTIME        SUMMARY-079
SQRTFR   4BBA   DECK-ID B05   3.2 FTN RUNTIME        SUMMARY-079
SIGNR    4C15   DECK-ID B06   3.2 FTN RUNTIME        SUMMARY-079
FXFLR    4C41   DECK-ID B07   3.2 FTN RUNTIME        SUMMARY-079
EXPRGR   4CAC   DECK-ID B08   3.2 FTN RUNTIME        SUMMARY-079
LNPRGR   4D4E   DECK-ID B09   3.2 FTN RUNTIME        SUMMARY-079
TANHR    4DC8   DECK-ID B10   3.2 FTN RUNTIME        SUMMARY-079
SNCSR    4E34   DECK-ID B11   3.2 FTN RUNTIME        SUMMARY-079
ARCPGR   4F00   DECK-ID B12   3.2 FTN RUNTIME        SUMMARY-079
IFALTR   4F99   DECK-ID B13   3.2 FTN RUNTIME        SUMMARY-079
FLOATR   4FB0   DECK-ID B14   3.2 FTN RUNTIME        SUMMARY-079
Q8QIOR   51AC   DECK-ID C01   3.2 FTN RUNTIME        SUMMARY-082
BINARR   530E   DECK-ID C02   3.2 FTN RUNTIME        SUMMARY-079
IOCCDR   535B   DECK-ID D01   3.2 FTN RUNTIME        SUMMARY-079
INITLR   538F   DECK-ID D02   3.2 FTN RUNTIME        SUMMARY-079
RSTCRR   539E   DECK-ID D03   3.2 FTN RUNTIME        SUMMARY-079
GETCHR   53AE   DECK-ID D04   3.2 FTN RUNTIME        SUMMARY-079
IPACKR   53C8   DECK-ID D05   3.2 FTN RUNTIME        SUMMARY-079
UPDATR   53FF   DECK-ID D06   3.2 FTN RUNTIME        SUMMARY-079
DECPLR   540C   DECK-ID D07   3.2 FTN RUNTIME        SUMMARY-079
INTGRR   5432   DECK-ID D08   3.2 FTN RUNTIME        SUMMARY-079
SPACER   545F   DECK-ID D09   3.2 FTN RUNTIME        SUMMARY-079
HOLR     5477   DECK-ID D10   3.2 FTN RUNTIME        SUMMARY-079
DCHXR    550B   DECK-ID D11   3.2 FTN RUNTIME        SUMMARY-079
HXASCR   557E   DECK-ID D12   3.2 FTN RUNTIME        SUMMARY-079
AFMTOR   55D1   DECK-ID D13   3.2 FTN RUNTIME        SUMMARY-079
RFMTOR   55FB   DECK-ID D14   3.2 FTN RUNTIME        SUMMARY-079
AFMTIR   5614   DECK-ID D15   3.2 FTN RUNTIME        SUMMARY-079
RFMTIR   5642   DECK-ID D16   3.2 FTN RUNTIME        SUMMARY-079
ASCHXR   5659   DECK-ID D17   3.2 FTN RUNTIME        SUMMARY-079
HXDCR    5694   DECK-ID D18   3.2 FTN RUNTIME        SUMMARY-079
FLOTIR   5724   DECK-ID D19   3.2 FTN RUNTIME        SUMMARY-079
FOUTR    576E   DECK-ID D20   3.2 FTN RUNTIME        SUMMARY-079
EOUTR    57F7   DECK-ID D21   3.2 FTN RUNTIME        SUMMARY-079
EWRITR   58DF   DECK-ID D22   3.2 FTN RUNTIME        SUMMARY-079
INTIIR   58EB   DECK-ID D23   3.2 FTN RUNTIME        SUMMARY-079
FORMTR   5908   DECK-ID D24   3.2 FTN RUNTIME        SUMMARY-081
Q8QFIR   5ADD   DECK-ID D25   3.2 FTN RUNTIME        SUMMARY-079
Q8QFLR   5AF7   DECK-ID D26   3.2 FTN RUNTIME        SUMMARY-079
Q8QFXR   5B26   DECK-ID D27   3.2 FTN RUNTIME        SUMMARY-079
HEXAR    5B5D   DECK-ID D28   3.2 FTN RUNTIME        SUMMARY-079
HEXDR    5B75   DECK-ID D29   3.2 FTN RUNTIME        SUMMARY-079
ASCIIR   5B92   DECK-ID D30   3.2 FTN RUNTIME        SUMMARY-079
DECHXR   5BA7   DECK-ID D31   3.2 FTN RUNTIME        SUMMARY-079
AFORMR   5BC7   DECK-ID D32   3.2 FTN RUNTIME        SUMMARY-079
RFORMR   5BE3   DECK-ID D33   3.2 FTN RUNTIME        SUMMARY-079
FLOTGR   5BFF   DECK-ID D34   3.2 FTN RUNTIME        SUMMARY-079
ENDLOC   5C1B   DECK-ID F16 FORTRAN 3.2A             SUMMARY-074
```

The job processor output lists the load address of each module. The total length of the modules FORTR, Q8PRMR, ..., FLOTGR is the difference between the load address for ENDLOC and the load address for FORTR, or $5C1B_{16} - 4998_{16} = 1283_{16}$. From Article 5.3.3, the previous values of ENDOV4 and BGNMON were $66FF_{16}$ and 6700_{16} respectively. In the new skeleton ENDOV4 will have the value $547C_{16}$ BGNMON, the value $547D_{16}$.

Currently, unprotected core starts at 4998_{16}. This location is contained in Section AAB of SYSDAT. It also is shown in the job processor output as the load location of the first module loaded into unprotected core. Unless N4 is changed, the new start of unprotected core will be at location 4998_{16} plus the increase in the size of SYSDAT. The increase in the size of SYSDAT due to the changes described in Article 6.3.1 is 492 = $1EC_{16}$ words. If the start of unprotected core is at $4998_{16} + 1EC_{16}$, then the new size of unprotected core will be ENDOV4 - $(4998_{16} + 1EC_{16}) = 547C_{16} - (4998_{16} + 1EC_{16}) = 8F8_{16}$. However, the FORTRAN 3.2A compiler requires 2000_{16} words of unprotected core. (Refer to Table 6-11.) This means that the start of unprotected must be decreased by $2000_{16} - 8F8_{16} = 1708_{16}$ words. To decrease the start of unprotected, the size of allocatable core area 4 must be decreased by this amount Therefore, in the new skeleton, the user sets N4 = $3000_{16} - 1708_{16} = 18F8_{16} = 6392$. (The previous value of N4 was 3000_{16}) This size for allocatable area 4 is large enough to handle background File Manager requests and other requirements for area 4. (Refer to Article 1.58)

In addition to modifying ENDOV4, BGNMON, and N4, the user updates the values of SYSMON and SYSDAY in the skeleton. The new skeleton is as follows:

```
*S,SYSMON,$3131
*S,SYSDAY,$3132
*S,SYSYER,$3734
*S,SYSLVL,$3836
*S,N4,$18F8
*V
*V        1700 MASS STORAGE OPERATING SYSTEM - VER. 4.1
*V
*V        ANN'S TEST SYSTEM
*V
*YM,LIBEDT,1
*YM,LOADSD,2
*YM,JOBENT,3
*YM,JOBPRO,4
*YM,PROTEC,5
*YM,JPLOAD,6
*YM,JPCHGE,7
*YM,JPT13,8
*YM,JCRDV4,9
*YM,JLGOV4,10
*YM,JPSTV4,11
*YM,NAMEV4,12
*YM,JPFLV4,13
*YM,AFILV4,14
*YM,RESTOR,15
*YM,RCOVER,16
*YM,BRKPT,17
*YM,ODEBUG,18
*YM,SYSCOP,19
*YM,SYSSEG,20
*YM,MIPRO,21
*YM,TDFUNC,22
*YM,EFSTOR,23
*YM,EFLIST,24
*YM,SCMM17,25
*YM,VERIFY,26
*YM,DUMMY1,27
*YM,DUMMY2,28
*YM,DUMMY3,29
*YM,DUMMY4,30
*YM,DUMMY5,31
*YM,DUMMY6,32
*YM,DUMMY7,33
*YM,DUMMY8,34
*YM,DUMMY9,35
*YM,DUMMY0,36
*S,ENDOV4,$547C
*S,BGNMON,$547D
*S,MSIZV4,$7FFF
*S,SECTOR,$7EDA
*
*L        SYSTEM DATA PROGRAM
*B  'SYSDAT'  '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*L        SPACE REQUEST PROCESSOR
*B  'SPACE'   '  DECK-ID A02  MSOS 4.1'
*
*         SYSTEM CORE RESIDENT PROGRAMS
*
*LP       MONITOR
*B  'NMONI'   '  DECK-ID A03  MSOS 4.1'
```

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```
*B    'RDISP'
*B    'RW'       '  DECK-ID A06  MSOS 4.1'
*B    'T14'      '  DECK-ID A07  MSOS 4.1'
*B    'T16'      '  DECK-ID A08  MSOS 4.1'
*B    'PARAME'   '  DECK-ID A09  MSOS 4.1'
*B    'COMMON'   '  DECK-ID A10  MSOS 4.1'
*B    'NIPROC'   '  DECK-ID A11  MSOS 4.1'
*B    'ALVOL'    '  DECK-ID A13  MSOS 4.1'
*B    'DEVOL'    '  DECK-ID A14  MSOS 4.1'
*B    'ALCORE'   '  DECK-ID A15  MSOS 4.1'
*B    'DCORE'    '  DECK-ID A16  MSOS 4.1'
*B    'NFNR'     '  DECK-ID A18  MSOS 4.1'
*B    'NCMPRQ'   '  DECK-ID A19  MSOS 4.1'
*B    'MAKQ'     '  DECK-ID A20  MSOS 4.1'
*B    'ADEV'     '  DECK-ID A21  MSOS 4.1'
*B    'TMINT'    '  DECK-ID A22  MSOS 4.1'
*B    'DTIMER'   '  DECK-ID A23  MSOS 4.1'
*B    'TOD'      '  DECK-ID A24  MSOS 4.1'
*B    'MINT'     '  DECK-ID A25  MSOS 4.1'
*B    'TRVEC'    '  DECK-ID D01  MSOS 4.1'
*LP          DEBUGGING / CHECKOUT
*B    'SNAPOL'   '  DECK-ID H01  MSOS 4.1'
*B    'DMP421'   '  DECK-ID H03  MSOS 4.1'
*B    'BDK85X'   '  DECK-ID H05  MSOS 4.1'
*LP          FILE MANAGER
*B    'FILMGR'   '  DECK-ID F01  MSOS 4.1'
*B    'RSPCV4'   '  DECK-ID F02  MSOS 4.1'
*B    'SRHFIS'   '  DECK-ID F03  MSOS 4.1'
*LP          CORE RESIDENT DRIVERS
*B    'EFDATA'   '  DECK-ID C01  MSOS 4.1'
*B    'DUMMY'    '  DECK-ID C02  MSOS 4.1'
*B    'ALAQ'     '  DECK-ID C03  MSOS 4.1'
*B    'D1711'    '  DECK-ID C05  MSOS 4.1'
*B    'D1738'    '  DECK-ID C08  MSOS 4.1'
*B    'REWCK'    '  DECK-ID C13  MSOS 4.1'
*B    'MMEXEC'   '  DECK-ID C15  MSOS 4.1'
*LP          REENTRANT FORTRAN RUNTIME LIBRARY
*B    'FORTR'    '  DECK-ID A01  3.2 FTN RUNTIME'
*B    'Q8PRMR'   '  DECK-ID B01  3.2 FTN RUNTIME'
*B    'PARABR'   '  DECK-ID B02  3.2 FTN RUNTIME'
*B    'Q8EXPR'   '  DECK-ID B03  3.2 FTN RUNTIME'
*B    'Q8ABER'   '  DECK-ID B04  3.2 FTN RUNTIME'
*B    'SQRTFR'   '  DECK-ID B05  3.2 FTN RUNTIME'
*B    'SIGNR'    '  DECK-ID B06  3.2 FTN RUNTIME'
*B    'EXFLR'    '  DECK-ID B07  3.2 FTN RUNTIME'
*B    'EXPRGR'   '  DECK-ID B08  3.2 FTN RUNTIME'
*B    'LNPRGR'   '  DECK-ID B09  3.2 FTN RUNTIME'
*B    'TANHR'    '  DECK-ID B10  3.2 FTN RUNTIME'
*B    'SNCSR'    '  DECK-ID B11  3.2 FTN RUNTIME'
*B    'ARCPGR'   '  DECK-ID B12  3.2 FTN RUNTIME'
*B    'IFALTR'   '  DECK-ID B13  3.2 FTN RUNTIME'
*B    'FLOATR'   '  DECK-ID B14  3.2 FTN RUNTIME'
*B    'Q8QICR'   '  DECK-ID C01  3.2 FTN RUNTIME'
*B    'BINARR'   '  DECK-ID C02  3.2 FTN RUNTIME'
*B    'IOCODR'   '  DECK-ID D01  3.2 FTN RUNTIME'
*B    'INITLR'   '  DECK-ID D02  3.2 FTN RUNTIME'
*B    'RSTORR'   '  DECK-ID D03  3.2 FTN RUNTIME'
*B    'GETCHR'   '  DECK-ID D04  3.2 FTN RUNTIME'
*B    'IPACKR'   '  DECK-ID D05  3.2 FTN RUNTIME'
*B    'UPDATR'   '  DECK-ID D06  3.2 FTN RUNTIME'
```

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```
*B   'DECPLR'   '  DECK-ID D07  3.2 FTN RUNTIME'
*B   'INTGRR'   '  DECK-ID D08  3.2 FTN RUNTIME'
*B   'SPACER'   '  DECK-ID D09  3.2 FTN RUNTIME'
*B   'HOLR'     '  DECK-ID D10  3.2 FTN RUNTIME'
*B   'DCHXR'    '  DECK-ID D11  3.2 FTN RUNTIME'
*B   'HXASCR'   '  DECK-ID D12  3.2 FTN RUNTIME'
*B   'AFMTOR'   '  DECK-ID D13  3.2 FTN RUNTIME'
*B   'RFMTOR'   '  DECK-ID D14  3.2 FTN RUNTIME'
*B   'AFMTIR'   '  DECK-ID D15  3.2 FTN RUNTIME'
*B   'RFMTIR'   '  DECK-ID D16  3.2 FTN RUNTIME'
*B   'ASCHXR'   '  DECK-ID D17  3.2 FTN RUNTIME'
*B   'HXDCR'    '  DECK-ID D18  3.2 FTN RUNTIME'
*B   'FLOTIR'   '  DECK-ID D19  3.2 FTN RUNTIME'
*B   'FOUTR'    '  DECK-ID D20  3.2 FTN RUNTIME'
*B   'EOUTR'    '  DECK-ID D21  3.2 FTN RUNTIME'
*B   'EWRITR'   '  DECK-ID D22  3.2 FTN RUNTIME'
*B   'INTI1R'   '  DECK-ID D23  3.2 FTN RUNTIME'
*B   'FORMTR'   '  DECK-ID D24  3.2 FTN RUNTIME'
*B   'Q8QFIR'   '  DECK-ID D25  3.2 FTN RUNTIME'
*B   'Q8QFLR'   '  DECK-ID D26  3.2 FTN RUNTIME'
*B   'Q8QFXR'   '  DECK-ID D27  3.2 FTN RUNTIME'
*B   'HEXAR'    '  DECK-ID D28  3.2 FTN RUNTIME'
*B   'HEXDR'    '  DECK-ID D29  3.2 FTN RUNTIME'
*B   'ASCIIR'   '  DECK-ID D30  3.2 FTN RUNTIME'
*B   'DECHXR'   '  DECK-ID D31  3.2 FTN RUNTIME'
*B   'AFORMR'   '  DECK-ID D32  3.2 FTN RUNTIME'
*B   'RFORMR'   '  DECK-ID D33  3.2 FTN RUNTIME'
*B   'FLOTGR'   '  DECK-ID D34  3.2 FTN RUNTIME'
*B   'NXTLOC'   '  NEXT AVAILABLE LOCATION'
*
*          SYSTEM MASS RESIDENT PROGRAMS
*
*M                 LIBEDT        1
*B   'LIBEDT'   '  DECK-ID D02  MSOS 4.1'
*M                 LOADSD        2
*B   'LOAD1'    '  DECK-ID D03  MSOS 4.1'
*B   'BRNCH1'   '  DECK-ID D04  MSOS 4.1'
*B   'LIDRV1'   '  DECK-ID D05  MSOS 4.1'
*B   'LCDRV1'   '  DECK-ID D06  MSOS 4.1'
*B   'LMDRV1'   '  DECK-ID D07  MSOS 4.1'
*B   'LLDRV1'   '  DECK-ID D08  MSOS 4.1'
*B   'ADJOF1'   '  DECK-ID D09  MSOS 4.1'
*B   'CNVRT1'   '  DECK-ID D10  MSOS 4.1'
*B   'LSTOT1'   '  DECK-ID D11  MSOS 4.1'
*B   'LINK11'   '  DECK-ID D12  MSOS 4.1'
*B   'LOADR1'   '  DECK-ID D13  MSOS 4.1'
*B   'NAMPR1'   '  DECK-ID D14  MSOS 4.1'
*B   'RBDBZ1'   '  DECK-ID D15  MSOS 4.1'
*B   'ENTEX1'   '  DECK-ID D16  MSOS 4.1'
*B   'XFRPR1'   '  DECK-ID D17  MSOS 4.1'
*B   'STBASE'   '  DECK-ID D18  MSOS 4.1'
*B   'LNKENT'   '  DECK-ID D19  MSOS 4.1'
*B   'LNKCR1'   '  DECK-ID D20  MSOS 4.1'
*B   'PATCH'    '  DECK-ID D21  MSOS 4.1'
*B   'TBSCH1'   '  DECK-ID D22  MSOS 4.1'
*B   'HASH'     '  DECK-ID D23  MSOS 4.1'
*B   'TBSTR1'   '  DECK-ID D24  MSOS 4.1'
*B   'PAGE'     '  DECK-ID D25  MSOS 4.1'
*B   'PROGLD'   '  DECK-ID D26  MSOS 4.1'
*B   'SCAN1'    '  DECK-ID D27  MSOS 4.1'
```

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```
*B   'CHPU1'    '  DECK-ID D28  MSOS 4.1'
*B   'ADJOV2'   '  DECK-ID D29  MSOS 4.1'
*B   'ADRPR1'   '  DECK-ID D30  MSOS 4.1'
*M                 JOBENT        3
*B   'JOBENT'   '  DECK-ID D31  MSOS 4.1'
*B   'T11'      '  DECK-ID D32  MSOS 4.1'
*B   'T7'       '  DECK-ID D33  MSOS 4.1'
*B   'T5'       '  DECK-ID D34  MSOS 4.1'
*B   'T3'       '  DECK-ID D35  MSOS 4.1'
*S,N1,P
*M                 JOBPRO        4
*B   'JOBPRO'   '  DECK-ID D36  MSOS 4.1'
*B   'ONE'      '  DECK-ID D37  MSOS 4.1'
*B   'TWO'      '  DECK-ID D38  MSOS 4.1'
*B   'THREE'    '  DECK-ID D39  MSOS 4.1'
*S,N2,P
*M                 PROTEC        5
*B   'BPROTK'   '  DECK-ID D41  MSOS 4.1'
*B   'JBKILL'   '  DECK-ID D42  MSOS 4.1'
*M                 JPLOAD        6
*B   'JPLOAD'   '  DECK-ID D43  MSOS 4.1'
*M                 JPCHGE        7
*B   'JPCHGE'   '  DECK-ID D44  MSOS 4.1'
*B   'ASCHEX'   '  DECK-ID D45  MSOS 4.1'
*M                 JPT13         8
*B   'T13'      '  DECK-ID D46  MSOS 4.1'
*M                 JCRDV4        9
*B   'JCRDV4'   '  DECK-ID D47  MSOS 4.1'
*M                 JLGOV4       10
*B   'JLGOV4'   '  DECK-ID D48  MSOS 4.1'
*M                 JPSTV4       11
*B   'JPSTV4'   '  DECK-ID D49  MSOS 4.1'
*M                 NAMEV4       12
*B   'NAMEV4'   '  DECK-ID D50  MSOS 4.1'
*M                 JPFLV4       13
*B   'JPFLV4'   '  DECK-ID D51  MSOS 4.1'
*M                 AFILV4       14
*B   'JPF2V4'   '  DECK-ID D52  MSOS 4.1'
*M                 RESTOR       15
*B   'RESTOR'   '  DECK-ID D53  MSOS 4.1'
*M                 RCOVER       16
*B   'RCOVER'   '  DECK-ID H09  MSOS 4.1'
*B   'OUTSEL'   '  DECK-ID H10  MSOS 4.1'
*B   'RDMPV4'   '  DECK-ID H11  MSOS 4.1'
*B   'MASDMP'   '  DECK-ID H12  MSOS 4.1'
*M                 BRKPT        17
*B   'BRKPTD'   '  DECK-ID H13  MSOS 4.1'
*B   'SIFT'     '  DECK-ID H14  MSOS 4.1'
*B   'BIASCI'   '  DECK-ID H15  MSOS 4.1'
*B   'RETJMP'   '  DECK-ID H16  MSOS 4.1'
*B   'JUMPTO'   '  DECK-ID H17  MSOS 4.1'
*B   'ENTER'    '  DECK-ID H18  MSOS 4.1'
*B   'ENTCOR'   '  DECK-ID H19  MSOS 4.1'
*B   'PRTREG'   '  DECK-ID H20  MSOS 4.1'
*B   'TERMIN'   '  DECK-ID H21  MSOS 4.1'
*B   'RESUME'   '  DECK-ID H22  MSOS 4.1'
*B   'DPCORB'   '  DECK-ID H23  MSOS 4.1'
*B   'MSDMPB'   '  DECK-ID H24  MSOS 4.1'
*B   'SETBRP'   '  DECK-ID H25  MSOS 4.1'
*M                 ODEBUG       18
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*B   'ODEBUG'    '  DECK-ID H26  MSOS 4.1'
*M                 SYSCOP      19
*B   'SYSCOP'    '  DECK-ID H27  MSOS 4.1'
*M                 SYSSEG      20
*B   'C01ST'     '  DECK-ID H28  MSOS 4.1'
*B   'C02ND'     '  DECK-ID H29  MSOS 4.1'
*B   'C03RD'     '  DECK-ID H30  MSOS 4.1'
*B   'COLAST'    '  DECK-ID H31  MSOS 4.1'
*M                 MIPRO       21
*B   'MIPRO'     '  DECK-ID A26  MSOS 4.1'
*M                 TDFUNC      22
*B   'TDFUNC'    '  DECK-ID A27  MSOS 4.1'
*M                 EFSTOR      23
*B   'EFSTOR'    '  DECK-ID A28  MSOS 4.1'
*M                 EFLIST      24
*B   'EFLIST'    '  DECK-ID A29  MSOS 4.1'
*M                 SCMM17      25
*B   'SCMEXC'    '  DECK-ID E01  MSOS 4.1'
*M                 VERIFY      26
*B   'VERFY1'    '  DECK-ID A30  MSOS 4.1'
*M                 DUMMY1      27
*M                 DUMMY2      28
*M                 DUMMY3      29
*M                 DUMMY4      30
*M                 DUMMY5      31
*M                 DUMMY6      32
*M                 DUMMY7      33
*M                 DUMMY8      34
*M                 DUMMY9      35
*M                 DUMMY0      36
*
*          MASS RESIDENT DRIVERS
*
*M                 COSY DRIVER
*B   'DCOSY'     '  DECK-ID C28  MSOS 4.1'
*S,SCOSY,S
*S,LCOSY,P
*M                 1731 601 MAG TAPE
*B   'D1731U'    '  DECK-ID C33  MSOS 4.1'
*B   'FRWA'      '  DECK-ID C34  MSOS 4.1'
*B   'FRWB'      '  DECK-ID C35  MSOS 4.1'
*B   'RWBA'      '  DECK-ID C36  MSOS 4.1'
*B   'MAXRVU'    '  DECK-ID C37  MSOS 4.1'
*S,S1731U,S
*S,L1731U,P
*M                 1740-501/1742 LINE PRINTER
*B   'D40421'    '  DECK-ID C46  MSOS 4.1'
*S,S40421,S
*S,L40421,P
*M
*B   'D1728'     '  DECK-ID C48  MSOS 4.1'
*B   'CP026'     '  DECK-ID C54  MSOS 4.1'
*B   'CR026'     '  DECK-ID C52  MSOS 4.1'
*S,S1728,S
*S,L1728,P
*
*          MASS RESIDENT FILE MANAGER
*
*M
*B   'DEFFIL'    '  DECK-ID F05  MSOS 4.1'
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*B  'FILSPC'   '  DECK-ID F06  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP01,S
*M
*B  'RELFIL'   '  DECK-ID F08  MSOS 4.1'
*B  'RELSPC'   '  DECK-ID F09  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP02,S
*M
*B  'DEFIDX'   '  DECK-ID F10  MSOS 4.1'
*B  'SQRTFM'   '  DECK-ID F11  MSOS 4.1'
*B  'FILSPC'   '  DECK-ID F06  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP03,S
*M
*B  'LOKFIL'   '  DECK-ID F12  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP04,S
*M
*B  'UNLFIL'   '  DECK-ID F13  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP05,S
*M
*B  'STOSEQ'   '  DECK-ID F14  MSOS 4.1'
*B  'FILSPC'   '  DECK-ID F06  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP06,S
*M
*B  'STODIR'   '  DECK-ID F15  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP07,S
*M
*B  'STOIDX'   '  DECK-ID F16  MSOS 4.1'
*B  'HASHCD'   '  DECK-ID F17  MSOS 4.1'
*B  'GETKID'   '  DECK-ID F18  MSOS 4.1'
*B  'FILSPC'   '  DECK-ID F06  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP08,S
*M
*B  'RTVSEQ'   '  DECK-ID F19  MSOS 4.1'
*B  'RTNSPC'   '  DECK-ID F20  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP09,S
*M
*B  'RTVDIR'   '  DECK-ID F21  MSOS 4.1'
*B  'RTNSPC'   '  DECK-ID F20  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP10,S
*M
*B  'RTVIDX'   '  DECK-ID F22  MSOS 4.1'
*B  'HASHCD'   '  DECK-ID F17  MSOS 4.1'
*B  'GETKID'   '  DECK-ID F18  MSOS 4.1'
*B  'RTNSPC'   '  DECK-ID F20  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
*S,FMRP11,S
*M
*B  'RTVIDO'   '  DECK-ID F23  MSOS 4.1'
*B  'GETKID'   '  DECK-ID F18  MSOS 4.1'
*B  'RTNSPC'   '  DECK-ID F20  MSOS 4.1'
*B  'RPEND'    '  DECK-ID F07  MSOS 4.1'
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*S,FMRP12,S
*M
*B  'FMDUMY'  '  DECK-ID F04  MSOS 4.1'
*S,FMREND,S
*S,BEGFMS,S     SPECIFY THE SYSTEM FILE SPACE
*M,BEGFMS+1000
*M
*B  'FMDUMY'  '  DECK-ID F04  MSOS 4.1'
*T        END OF SYSTEM
*JOB,INSTAL,SYSTEM
*K,I6
*LIBEDT
*K,I6
*V  DEFINE REQUEST PRIORITIES
*S,001,03,M
*S,002,00,M
*S,003,01,M
*S,004,02,M
*S,005,03,M
*S,006,02,M
*S,007,02,M
*S,008,02,M
*S,009,02,M
*S,010,02,M
*S,011,02,M
*S,012,03,M
*S,013,03,M
*S,014,03,M
*S,015,02,M
*S,016,03,M
*S,017,03,M
*S,018,04,M
*S,019,04,M
*S,020,04,M
*S,021,04,M
*S,022,04,M
*S,023,04,M
*S,024,04,M
*S,025,04,M
*S,026,04,M
*S,027,04,M
*S,028,04,M
*S,029,04,M
*S,030,04,M
*S,031,04,M
*S,032,04,M
*S,033,04,M
*S,034,04,M
*S,035,04,M
*S,036,04,M
*V  1700 MACRO ASSEMBLER 3.
*K,I6
*L,LIBMAC
*B  'LIBMAC'  '  DECK-ID G01  MSOS 4.1'
*L,ASSEM
*B  'ASSEM'   '  DECK-ID G02  MSOS 4.1'
*K,P8
*P,F
*B  'PASS1'   '  DECK-ID G03  MSOS 4.1'
*B  'PA1PR2'  '  DECK-ID G04  MSOS 4.1'
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*T
*K,I8
*N,PASS1,,,B
*K,I6
*K,P8
*P,F
*B  'PASS2'    '  DECK-ID G05  MSOS 4.1'
*B  'PA2PR2'   '  DECK-ID G06  MSOS 4.1'
*T
*K,I8
*N,PASS2,,,B
*K,I6
*K,P8
*P,F
*B  'PASS3'    '  DECK-ID G07  MSOS 4.1'
*B  'PA3PR2'   '  DECK-ID G08  MSOS 4.1'
*B  'PA3PR3'   '  DECK-ID G09  MSOS 4.1'
*T
*K,I8
*N,PASS3,,,B
*K,I6
*K,P8
*P,F
*B  'TABLST'   '  DECK-ID G10  MSOS 4.1'
*T
*K,I8
*N,TABLST,,,B
*K,I6
*K,P8
*P,F
*B  'XREF'     '  DECK-ID G11  MSOS 4.1'
*K,I8
*N,XREF,,,B
*K,I6
*N,MACSKL,,,B
*B     'MACSKL'
*N,MACROS,,,B
*B     'MACROS'
*V  DEBUGGING AND CHECKOUT
*K,I6
*L,TRACE
*B  'TRACE'    '  DECK-ID H32  MSOS 4.1'
*V  SYSTEM UTILITY PROGRAMS
*K,I6
*L,LULIST
*B  'LULIST'   '  DECK-ID J01  MSOS 4.1'
*L,LISTR
*B  'LISTR'    '  DECK-ID J02  MSOS 4.1'
*L,OPSORT
*B  'OPSORT'   '  DECK-ID J03  MSOS 4.1'
*L,EESORT
*B  'EESORT'   '  DECK-ID J04  MSOS 4.1'
*L,COSY
*B  'COSY'     '  DECK-ID J05  MSOS 4.1'
*L,LCOSY
*B  'LCOSY'    '  DECK-ID J06  MSOS 4.1'
*L,CYFT
*B  'CYFT'     '  DECK-ID J07  MSOS 4.1'
*L,IOUP
*B  'IOUP'     '  DECK-ID J08  MSOS 4.1'
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*K,P8
*P,F
*B   'IOUP'      '   DECK-ID J08   MSOS 4.1'
*B   'IOUPV4'    '   DECK-ID J09   MSOS 4.1'
*T
*K,I8
*N,IOUPV4,,,B
*K,I6
*L,DTLP
*B   'DTLP'      '   DECK-ID J10   MSOS 4.1'
*K,P8
*P,F
*B   'DSKTAP'    '   DECK-ID J11   MSOS 4.1'
*B   'DSKEQC'    '   DECK-ID J12   MSOS 4.1'
*B   'DSKDHX'    '   DECK-ID J13   MSOS 4.1'
*B   'DSKCDR'    '   DECK-ID J14   MSOS 4.1'
*B   'DSKMTI'    '   DECK-ID J15   MSOS 4.1'
*B   'DSKMTO'    '   DECK-ID J16   MSOS 4.1'
*B   'DSKMMD'    '   DECK-ID J18   MSOS 4.1'
*T
*K,I8
*N,DSKTAP,,,B
*K,I6
*L,SETPV4
*B   'SPCALL'    '   DECK-ID J21   MSOS 4.1'
*K,P8
*P,F
*B   'SPOLY1'    '   DECK-ID J22   MSOS 4.1'
*B   'STPV4'     '   DECK-ID J23   MSOS 4.1'
*B   'IERROR'    '   DECK-ID J24   MSOS 4.1'
*B   'MCTDK'     '   DECK-ID J25   MSOS 4.1'
*B   'GETPAG'    '   DECK-ID J26   MSOS 4.1'
*B   'CONPRT'    '   DECK-ID J27   MSOS 4.1'
*B   'REDCON'    '   DECK-ID J28   MSOS 4.1'
*B   'CONDEC'    '   DECK-ID J29   MSOS 4.1'
*B   'ORDERM'    '   DECK-ID J30   MSOS 4.1'
*B   'IREAD'     '   DECK-ID J31   MSOS 4.1'
*B   'ASCOUT'    '   DECK-ID J32   MSOS 4.1'
*B   'PARAMS'    '   DECK-ID J33   MSOS 4.1'
*B   'DISKIO'    '   DECK-ID J34   MSOS 4.1'
*T
*K,I8
*N,STP1V4,,,B
*K,I6
*K,P8
*P,F
*B   'SPOLY2'    '   DECK-ID J35   MSOS 4.1'
*B   'SUP'       '   DECK-ID J36   MSOS 4.1'
*B   'IERROR'    '   DECK-ID J24   MSOS 4.1'
*B   'GETPAG'    '   DECK-ID J26   MSOS 4.1'
*B   'BTOA'      '   DECK-ID J37   MSOS 4.1'
*B   'ISTAT'     '   DECK-ID J38   MSOS 4.1'
*B   'SCIO'      '   DECK-ID J39   MSOS 4.1'
*B   'SCRD'      '   DECK-ID J40   MSOS 4.1'
*B   'REDCON'    '   DECK-ID J28   MSOS 4.1'
*B   'ICAT'      '   DECK-ID J41   MSOS 4.1'
*B   'BUFIN'     '   DECK-ID J42   MSOS 4.1'
*B   'MOVE'      '   DECK-ID J43   MSOS 4.1'
*B   'IREAD'     '   DECK-ID J31   MSOS 4.1'
*B   'ASCOUT'    '   DECK-ID J32   MSOS 4.1'
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*B  'PARAMS'  '  DECK-ID J33  MSOS 4.1'
*B  'DISKIO'  '  DECK-ID J34  MSOS 4.1'
*T
*K,I8
*N,STP2V4,,,B
*V  SCMM TEST ROUTINES
*K,I6
*K,P8
*P,F
*B  'SCMTTY'  '  DECK-ID E02  MSOS 4.1'
*T
*K,I8
*N,SCMTTY,,,B
*K,I6
*K,P8
*P,F
*B  'SCMDK1'  '  DECK-ID E08  MSOS 4.1'
*T
*K,I8
*N,SCMDK1,,,B
*K,I6
*K,P8
*P,F
*B  'SCMDVP'  '  DECK-ID E09  MSOS 4.1'
*T
*K,I8
*N,SCMDVP,,,B
*K,I6
*K,P8
*P,F
*B  'SCMPRT'  '  DECK-ID E11  MSOS 4.1'
*T
*K,I8
*N,SCMPRT,,,B
*K,I6
*K,P8
*P,F
*B  'SCMMTT'  '  DECK-ID E12  MSOS 4.1'
*T
*K,I8
*N,SCMMTT,,,B
*K,I6
*K,P8
*P,F
*B  'SCMCRD'  '  DECK-ID E03  MSOS 4.1'
*T
*K,I8
*N,SCMCRD,,,B
*V  INSTALL LIBRARY BUILDER
*K,I6
*L,LIBILD
*B  'LIBILD'  '  DECK-ID B01  MSOS 4.1'
*K,P8
*P,F
*B  'LIBIDO'  '  DECK-ID B02  MSOS 4.1'
*B  'CONVRS'  '  DECK-ID B03  MSOS 4.1'
*B  'MESSY'   '  DECK-ID B04  MSOS 4.1'
*B  'LJA2B'   '  DECK-ID B05  MSOS 4.1'
*B  'MOVECH'  '  DECK-ID B06  MSOS 4.1'
*B  'PICKUP'  '  DECK-ID B07  MSOS 4.1'
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*B  'IOSUB'    '  DECK-ID B08  MSOS 4.1'
*T
*K,I8
*N,LIBIO0,,,B
*K,I6
*K,P8
*P,F
*B  'HELPER'   '  DECK-ID B09  MSOS 4.1'
*B  'MOVECH'   '  DECK-ID B06  MSOS 4.1'
*B  'HELP0'    '  DECK-ID B10  MSOS 4.1'
*B  'HELP1'    '  DECK-ID B11  MSOS 4.1'
*B  'HELP2'    '  DECK-ID B12  MSOS 4.1'
*B  'HELP3'    '  DECK-ID B13  MSOS 4.1'
*B  'HELP4'    '  DECK-ID B14  MSOS 4.1'
*B  'HELP5'    '  DECK-ID B15  MSOS 4.1'
*B  'HELP8'    '  DECK-ID B16  MSOS 4.1'
*B  'HELP9'    '  DECK-ID B17  MSOS 4.1'
*B  'HELP10'   '  DECK-ID B18  MSOS 4.1'
*B  'HELP11'   '  DECK-ID B19  MSOS 4.1'
*B  'HELP12'   '  DECK-ID B20  MSOS 4.1'
*B  'HELP13'   '  DECK-ID B21  MSOS 4.1'
*B  'HELP14'   '  DECK-ID B22  MSOS 4.1'
*T
*K,I8
*N,HELPER,,,B
*V  INSTALL SKELETON EDITOR
*K,I6
*L,SKED
*B  'SKED'     '  DECK-ID B23  MSOS 4.1'
*K,P8
*P,F
*B  'SKFILE'   '  DECK-ID B24  MSOS 4.1'
*T
*K,I8
*N,SKFILE,,,B
*V  SYSTEM INITIALIZER
*K,I6
*L,SILP
*B  'SILP'     '  DECK-ID B25  MSOS 4.1'
*K,P8
*P,F
*B  'CONTRL'   '  DECK-ID B26  MSOS 4.1'
*B  'ILOAD'    '  DECK-ID B27  MSOS 4.1'
*B  'LDRTBL'   '  DECK-ID B28  MSOS 4.1'
*B  'I1'       '  DECK-ID B29  MSOS 4.1'
*B  'I2'       '  DECK-ID B30  MSOS 4.1'
*B  'Q1711'    '  DECK-ID B31  MSOS 4.1'
*B  'Q40421'   '  DECK-ID B34  MSOS 4.1'
*B  'IDRIV'    '  DECK-ID B35  MSOS 4.1'
*B  'QMT7TK'   '  DECK-ID B36  MSOS 4.1'
*B  'MDRIV'    '  DECK-ID B42  MSOS 4.1'
*B  'QDK85X'   '  DECK-ID B44  MSOS 4.1'
*B  'QCDDMY'   '  DECK-ID B50  MSOS 4.1'
*B  'QPTDMY'   '  DECK-ID B51  MSOS 4.1'
*T
*K,I8
*N,SI,,,B
*V  SMM  BOOTSTRAPS
*K,I6
*L,SMM7T
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*B  'SMM1'     '  DECK-ID B54  MSOS 4.1'
*L,SMM430
*B  'SMM4'     '  DECK-ID B57  MSOS 4.1'
*V  FORTRAN COMPILER 3.2A
*K,I6
*L,FTN
*B  'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*K,P8
*P,F
*B  'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOA'      '  DECK-ID F02 FORTRAN 3.2A'
*B  'IOPRBA'   '  DECK-ID F08 FORTRAN 3.2A'
*B  'CNVT'     '  DECK-ID A01 FORTRAN 3.2A'
*B  'CONV'     '  DECK-ID F03 FORTRAN 3.2A'
*B  'DIAG'     '  DECK-ID F04 FORTRAN 3.2A'
*B  'GETC'     '  DECK-ID F13 FORTRAN 3.2A'
*B  'GETSYM'   '  DECK-ID F12 FORTRAN 3.2A'
*B  'OUTENT'   '  DECK-ID A07 FORTRAN 3.2A'
*B  'PACK'     '  DECK-ID F09 FORTRAN 3.2A'
*B  'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B  'STORE'    '  DECK-ID F11 FORTRAN 3.2A'
*B  'SYMBOL'   '  DECK-ID A03 FORTRAN 3.2A'
*B  'LOCLAA'   '  DECK-ID F17 FORTRAN 3.2A'
*B  'DUMYAA'   '  DECK-ID F18 FORTRAN 3.2A'
*B  'PHASEA'   '  DECK-ID A08 FORTRAN 3.2A'
*B  'ARAYSZ'   '  DECK-ID A42'FORTRAN 3.2A'
*B  'CPLOOP'   '  DECK-ID A43 FORTRAN 3.2A'
*B  'ENDDO'    '  DECK-ID A29 FORTRAN 3.2A'
*B  'GNST'     '  DECK-ID A06 FORTRAN 3.2A'
*B  'IGETCF'   '  DECK-ID F14 FORTRAN 3.2A'
*B  'OPTION'   '  DECK-ID F15 FORTRAN 3.2A'
*B  'PLABEL'   '  DECK-ID A09 FORTRAN 3.2A'
*B  'Q8QBDS'   '  DECK-ID A10 FORTRAN 3.2A'
*B  'RDLABL'   '  DECK-ID A11 FORTRAN 3.2A'
*B  'SAVEID'   '  DECK-ID A04 FORTRAN 3.2A'
*B  'STCHAR'   '  DECK-ID A12 FORTRAN 3.2A'
*B  'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTAA,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOA'      '  DECK-ID F02 FORTRAN 3.2A'
*B  'IOPRBA'   '  DECK-ID F08 FORTRAN 3.2A'
*B  'CNVT'     '  DECK-ID A01 FORTRAN 3.2A'
*B  'CONV'     '  DECK-ID F03 FORTRAN 3.2A'
*B  'DIAG'     '  DECK-ID F04 FORTRAN 3.2A'
*B  'GETC'     '  DECK-ID F13 FORTRAN 3.2A'
*B  'GETSYM'   '  DECK-ID F12 FORTRAN 3.2A'
*B  'OUTENT'   '  DECK-ID A07 FORTRAN 3.2A'
*B  'PACK'     '  DECK-ID F09 FORTRAN 3.2A'
*B  'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B  'STORE'    '  DECK-ID F11 FORTRAN 3.2A'
*B  'SYMBOL'   '  DECK-ID A03 FORTRAN 3.2A'
*B  'LOCLAB'   '  DECK-ID F19 FORTRAN 3.2A'
*B  'DUMYAB'   '  DECK-ID F20 FORTRAN 3.2A'
*B  'BYEQPR'   '  DECK-ID A19 FORTRAN 3.2A'
*B  'DFLOT'    '  DECK-ID F06 FORTRAN 3.2A'
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*B  'DUMVOL'  '  DECK-ID F07 FORTRAN 3.2A'
*B  'DXP9'    '  DECK-ID F05 FORTRAN 3.2A'
*B  'GETF'    '  DECK-ID A05 FORTRAN 3.2A'
*B  'GPUT'    '  DECK-ID A02 FORTRAN 3.2A'
*B  'SAVEID'  '  DECK-ID A04 FORTRAN 3.2A'
*B  'STCHAR'  '  DECK-ID A12 FORTRAN 3.2A'
*B  'SUBPPR'  '  DECK-ID A23 FORTRAN 3.2A'
*B  'TYPE'    '  DECK-ID A13 FORTRAN 3.2A'
*B  'ENDLOC'  '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTAB,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'    '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOA'     '  DECK-ID F02 FORTRAN 3.2A'
*B  'IOPRBA'  '  DECK-ID F08 FORTRAN 3.2A'
*B  'CNVT'    '  DECK-ID A01 FORTRAN 3.2A'
*B  'CONV'    '  DECK-ID F03 FORTRAN 3.2A'
*B  'DIAG'    '  DECK-ID F04 FORTRAN 3.2A'
*B  'GETC'    '  DECK-ID F13 FORTRAN 3.2A'
*B  'GETSYM'  '  DECK-ID F12 FORTRAN 3.2A'
*B  'OUTENT'  '  DECK-ID A07 FORTRAN 3.2A'
*B  'PACK'    '  DECK-ID F09 FORTRAN 3.2A'
*B  'Q8PRMS'  '  DECK-ID F10 FORTRAN 3.2A'
*B  'STORE'   '  DECK-ID F11 FORTRAN 3.2A'
*B  'SYMBOL'  '  DECK-ID A03 FORTRAN 3.2A'
*B  'LOCLAC'  '  DECK-ID F21 FORTRAN 3.2A'
*B  'DUMYAC'  '  DECK-ID F22 FORTRAN 3.2A'
*B  'ASGNPR'  '  DECK-ID A32 FORTRAN 3.2A'
*B  'BDOPR'   '  DECK-ID A33 FORTRAN 3.2A'
*B  'CFIVOC'  '  DECK-ID A34 FORTRAN 3.2A'
*B  'CKIVC'   '  DECK-ID A35 FORTRAN 3.2A'
*B  'CKNAME'  '  DECK-ID A36 FORTRAN 3.2A'
*B  'COMNPR'  '  DECK-ID A15 FORTRAN 3.2A'
*B  'DFLOT'   '  DECK-ID F06 FORTRAN 3.2A'
*B  'DIMPR'   '  DECK-ID A16 FORTRAN 3.2A'
*B  'DUMVOL'  '  DECK-ID F07 FORTRAN 3.2A'
*B  'DXP9'    '  DECK-ID F05 FORTRAN 3.2A'
*B  'ERBPR'   '  DECK-ID A38 FORTRAN 3.2A'
*B  'EXRLPR'  '  DECK-ID A24 FORTRAN 3.2A'
*B  'GETF'    '  DECK-ID A05 FORTRAN 3.2A'
*B  'GPUT'    '  DECK-ID A02 FORTRAN 3.2A'
*B  'RDLABL'  '  DECK-ID A11 FORTRAN 3.2A'
*B  'TYPEPR'  '  DECK-ID A18 FORTRAN 3.2A'
*B  'ENDLOC'  '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTAC,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'    '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOA'     '  DECK-ID F02 FORTRAN 3.2A'
*B  'IOPRBA'  '  DECK-ID F08 FORTRAN 3.2A'
*B  'CNVT'    '  DECK-ID A01 FORTRAN 3.2A'
*B  'CONV'    '  DECK-ID F03 FORTRAN 3.2A'
*B  'DIAG'    '  DECK-ID F04 FORTRAN 3.2A'
*B  'GETC'    '  DECK-ID F13 FORTRAN 3.2A'
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*B   'GETSYM'   '   DECK-ID F12 FORTRAN 3.2A'
*B   'OUTENT'   '   DECK-ID A07 FORTRAN 3.2A'
*B   'PACK'     '   DECK-ID F09 FORTRAN 3.2A'
*B   'Q8PRMS'   '   DECK-ID F10 FORTRAN 3.2A'
*B   'STORE'    '   DECK-ID F11 FORTRAN 3.2A'
*B   'SYMBOL'   '   DECK-ID A03 FORTRAN 3.2A'
*B   'LOCLAD'   '   DECK-ID F23 FORTRAN 3.2A'
*B   'DUMYAD'   '   DECK-ID F24 FORTRAN 3.2A'
*B   'ASEMPR'   '   DECK-ID A40 FORTRAN 3.2A'
*B   'DFLOT'    '   DECK-ID F06 FORTRAN 3.2A'
*B   'DUMVOL'   '   DECK-ID F07 FORTRAN 3.2A'
*B   'DXP9'     '   DECK-ID F05 FORTRAN 3.2A'
*B   'GETF'     '   DECK-ID A05 FORTRAN 3.2A'
*B   'GPUT'     '   DECK-ID A02 FORTRAN 3.2A'
*B   'IGETCF'   '   DECK-ID F14 FORTRAN 3.2A'
*B   'PUNT'     '   DECK-ID A27 FORTRAN 3.2A'
*B   'RDLABL'   '   DECK-ID A11 FORTRAN 3.2A'
*B   'SUBSCR'   '   DECK-ID A17 FORTRAN 3.2A'
*B   'ENDLOC'   '   DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTAD,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'     '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOA'      '   DECK-ID F02 FORTRAN 3.2A'
*B   'IOPRBA'   '   DECK-ID F08 FORTRAN 3.2A'
*B   'CNVT'     '   DECK-ID A01 FORTRAN 3.2A'
*B   'CONV'     '   DECK-ID F03 FORTRAN 3.2A'
*B   'DIAG'     '   DECK-ID F04 FORTRAN 3.2A'
*B   'GETC'     '   DECK-ID F13 FORTRAN 3.2A'
*B   'GETSYM'   '   DECK-ID F12 FORTRAN 3.2A'
*B   'OUTENT'   '   DECK-ID A07 FORTRAN 3.2A'
*B   'PACK'     '   DECK-ID F09 FORTRAN 3.2A'
*B   'Q8PRMS'   '   DECK-ID F10 FORTRAN 3.2A'
*B   'STORE'    '   DECK-ID F11 FORTRAN 3.2A'
*B   'SYMBOL'   '   DECK-ID A03 FORTRAN 3.2A'
*B   'LOCLAE'   '   DECK-ID F25 FORTRAN 3.2A'
*B   'DUMYAE'   '   DECK-ID F26 FORTRAN 3.2A'
*B   'CONSUB'   '   DECK-ID A30 FORTRAN 3.2A'
*B   'DATAPR'   '   DECK-ID A31 FORTRAN 3.2A'
*B   'DFLOT'    '   DECK-ID F06 FORTRAN 3.2A'
*B   'DUMVOL'   '   DECK-ID F07 FORTRAN 3.2A'
*B   'DXP9'     '   DECK-ID F05 FORTRAN 3.2A'
*B   'GETF'     '   DECK-ID A05 FORTRAN 3.2A'
*B   'GPUT'     '   DECK-ID A02 FORTRAN 3.2A'
*B   'STCHAR'   '   DECK-ID A12 FORTRAN 3.2A'
*B   'ENDLOC'   '   DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTAE,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'     '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOA'      '   DECK-ID F02 FORTRAN 3.2A'
*B   'IOPRBA'   '   DECK-ID F08 FORTRAN 3.2A'
*B   'CNVT'     '   DECK-ID A01 FORTRAN 3.2A'
*B   'CONV'     '   DECK-ID F03 FORTRAN 3.2A'
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*B   'DIAG'     '   DECK-ID F04 FORTRAN 3.2A'
*B   'GETC'     '   DECK-ID F13 FORTRAN 3.2A'
*B   'GETSYM'   '   DECK-ID F12 FORTRAN 3.2A'
*B   'OUTENT'   '   DECK-ID A07 FORTRAN 3.2A'
*B   'PACK'     '   DECK-ID F09 FORTRAN 3.2A'
*B   'Q8PRMS'   '   DECK-ID F10 FORTRAN 3.2A'
*B   'STORE'    '   DECK-ID F11 FORTRAN 3.2A'
*B   'SYMBOL'   '   DECK-ID A03 FORTRAN 3.2A'
*B   'LOCLAF'   '   DECK-ID F27 FORTRAN 3.2A'
*B   'DUMYAF'   '   DECK-ID F28 FORTRAN 3.2A'
*B   'CHECKF'   '   DECK-ID A20 FORTRAN 3.2A'
*B   'FGETC'    '   DECK-ID A21 FORTRAN 3.2A'
*B   'FORK'     '   DECK-ID A22 FORTRAN 3.2A'
*B   'PEQVS'    '   DECK-ID A25 FORTRAN 3.2A'
*B   'PRNTNM'   '   DECK-ID A26 FORTRAN 3.2A'
*B   'STCHAR'   '   DECK-ID A12 FORTRAN 3.2A'
*B   'SYMSCN'   '   DECK-ID A28 FORTRAN 3.2A'
*B   'ENDLOC'   '   DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTAF,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'     '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOA'      '   DECK-ID F02 FORTRAN 3.2A'
*B   'IOPRBA'   '   DECK-ID F08 FORTRAN 3.2A'
*B   'CNVT'     '   DECK-ID A01 FORTRAN 3.2A'
*B   'CONV'     '   DECK-ID F03 FORTRAN 3.2A'
*B   'DIAG'     '   DECK-ID F04 FORTRAN 3.2A'
*B   'GETC'     '   DECK-ID F13 FORTRAN 3.2A'
*B   'GETSYM'   '   DECK-ID F12 FORTRAN 3.2A'
*B   'OUTENT'   '   DECK-ID A07 FORTRAN 3.2A'
*B   'PACK'     '   DECK-ID F09 FORTRAN 3.2A'
*B   'Q8PRMS'   '   DECK-ID F10 FORTRAN 3.2A'
*B   'STORE'    '   DECK-ID F11 FORTRAN 3.2A'
*B   'SYMBOL'   '   DECK-ID A03 FORTRAN 3.2A'
*B   'LOCLAG'   '   DECK-ID F29 FORTRAN 3.2A'
*B   'DUMYAG'   '   DECK-ID F30 FORTRAN 3.2A'
*B   'ARITH'    '   DECK-ID A14 FORTRAN 3.2A'
*B   'IGETCF'   '   DECK-ID F14 FORTRAN 3.2A'
*B   'PUNT'     '   DECK-ID A27 FORTRAN 3.2A'
*B   'TREE'     '   DECK-ID A41 FORTRAN 3.2A'
*B   'ENDLOC'   '   DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTAG,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'     '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOA'      '   DECK-ID F02 FORTRAN 3.2A'
*B   'IOPRBA'   '   DECK-ID F08 FORTRAN 3.2A'
*B   'CNVT'     '   DECK-ID A01 FORTRAN 3.2A'
*B   'CONV'     '   DECK-ID F03 FORTRAN 3.2A'
*B   'DIAG'     '   DECK-ID F04 FORTRAN 3.2A'
*B   'GETC'     '   DECK-ID F13 FORTRAN 3.2A'
*B   'GETSYM'   '   DECK-ID F12 FORTRAN 3.2A'
*B   'OUTENT'   '   DECK-ID A07 FORTRAN 3.2A'
*B   'PACK'     '   DECK-ID F09 FORTRAN 3.2A'
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*B   'Q8PRMS'    '  DECK-ID F10 FORTRAN 3.2A'
*B   'STORE'     '  DECK-ID F11 FORTRAN 3.2A'
*B   'SYMBOL'    '  DECK-ID A03 FORTRAN 3.2A'
*B   'LOCLAH'    '  DECK-ID F31 FORTRAN 3.2A'
*B   'DUMYAH'    '  DECK-ID F32 FORTRAN 3.2A'
*B   'IGETCF'    '  DECK-ID F14 FORTRAN 3.2A'
*B   'MODMXR'    '  DECK-ID A39 FORTRAN 3.2A'
*B   'PUNT'      '  DECK-ID A27 FORTRAN 3.2A'
*B   'ENDLOC'    '  DECK-ID F16 FORTRAN 3.2A'
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*K,I8
*N,FORTAH,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'      '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOA'       '  DECK-ID F02 FORTRAN 3.2A'
*B   'IOPRBA'    '  DECK-ID F08 FORTRAN 3.2A'
*B   'CNVT'      '  DECK-ID A01 FORTRAN 3.2A'
*B   'CONV'      '  DECK-ID F03 FORTRAN 3.2A'
*B   'DIAG'      '  DECK-ID F04 FORTRAN 3.2A'
*B   'GETC'      '  DECK-ID F13 FORTRAN 3.2A'
*B   'GETSYM'    '  DECK-ID F12 FORTRAN 3.2A'
*B   'OUTENT'    '  DECK-ID A07 FORTRAN 3.2A'
*B   'PACK'      '  DECK-ID F09 FORTRAN 3.2A'
*B   'Q8PRMS'    '  DECK-ID F10 FORTRAN 3.2A'
*B   'STORE'     '  DECK-ID F11 FORTRAN 3.2A'
*B   'SYMBOL'    '  DECK-ID A03 FORTRAN 3.2A'
*B   'LOCLAI'    '  DECK-ID F33 FORTRAN 3.2A'
*B   'DUMYAI'    '  DECK-ID F34 FORTRAN 3.2A'
*B   'IOSPR'     '  DECK-ID A37 FORTRAN 3.2A'
*B   'ENDDO'     '  DECK-ID A29 FORTRAN 3.2A'
*B   'RDLABL'    '  DECK-ID A11 FORTRAN 3.2A'
*B   'STCHAR'    '  DECK-ID A12 FORTRAN 3.2A'
*B   'ENDLOC'    '  DECK-ID F16 FORTRAN 3.2A'
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*K,I8
*N,FORTAI,,,B
*K,I6
*K,P8
*P,F
*B   'FTNA'      '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOB'       '  DECK-ID F35 FORTRAN 3.2A'
*B   'CNVT'      '  DECK-ID A01 FORTRAN 3.2A'
*B   'DUMMY'     '  DECK-ID B01 FORTRAN 3.2A'
*B   'FCMSTK'    '  DECK-ID B02 FORTRAN 3.2A'
*B   'GETSYM'    '  DECK-ID F12 FORTRAN 3.2A'
*B   'IOPRBB'    '  DECK-ID F36 FORTRAN 3.2A'
*B   'KCPART'    '  DECK-ID B03 FORTRAN 3.2A'
*B   'KOUTPT'    '  DECK-ID B04 FORTRAN 3.2A'
*B   'KPCSTK'    '  DECK-ID B05 FORTRAN 3.2A'
*B   'KPC3PR'    '  DECK-ID B06 FORTRAN 3.2A'
*B   'KSYMGN'    '  DECK-ID B07 FORTRAN 3.2A'
*B   'LABKPC'    '  DECK-ID B08 FORTRAN 3.2A'
*B   'LABLER'    '  DECK-ID B09 FORTRAN 3.2A'
*B   'PUNT'      '  DECK-ID B10 FORTRAN 3.2A'
*B   'CONV'      '  DECK-ID F03 FORTRAN 3.2A'
*B   'Q8PRMS'    '  DECK-ID F10 FORTRAN 3.2A'
*B   'STOREB'    '  DECK-ID F37 FORTRAN 3.2A'
*B   'SYMBOL'    '  DECK-ID B11 FORTRAN 3.2A'
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*B   'TSALOC'    '   DECK-ID B12 FORTRAN 3.2A'
*B   'LOCLBA'    '   DECK-ID F38 FORTRAN 3.2A'
*B   'DUMYBA'    '   DECK-ID F39 FORTRAN 3.2A'
*B   'PHASEB'    '   DECK-ID B21 FORTRAN 3.2A'
*B   'INXRST'    '   DECK-ID B19 FORTRAN 3.2A'
*B   'NOPROC'    '   DECK-ID B20 FORTRAN 3.2A'
*B   'READIR'    '   DECK-ID B22 FORTRAN 3.2A'
*B   'ENDLOC'    '   DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTBA,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'      '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOB'       '   DECK-ID F35 FORTRAN 3.2A'
*B   'CNVT'      '   DECK-ID A01 FORTRAN 3.2A'
*B   'DUMMY'     '   DECK-ID B01 FORTRAN 3.2A'
*B   'FCMSTK'    '   DECK-ID B02 FORTRAN 3.2A'
*B   'GETSYM'    '   DECK-ID F12 FORTRAN 3.2A'
*B   'IOPRBB'    '   DECK-ID F36 FORTRAN 3.2A'
*B   'KCPART'    '   DECK-ID B03 FORTRAN 3.2A'
*B   'KOUTPT'    '   DECK-ID B04 FORTRAN 3.2A'
*B   'KPCSTK'    '   DECK-ID B05 FORTRAN 3.2A'
*B   'KPC3PR'    '   DECK-ID B06 FORTRAN 3.2A'
*B   'KSYMGN'    '   DECK-ID B07 FORTRAN 3.2A'
*B   'LABKPC'    '   DECK-ID B08 FORTRAN 3.2A'
*B   'LABLER'    '   DECK-ID B09 FORTRAN 3.2A'
*B   'PUNT'      '   DECK-ID B10 FORTRAN 3.2A'
*B   'CONV'      '   DECK-ID F03 FORTRAN 3.2A'
*B   'Q8PRMS'    '   DECK-ID F10 FORTRAN 3.2A'
*B   'STOREB'    '   DECK-ID F37 FORTRAN 3.2A'
*B   'SYMBOL'    '   DECK-ID B11 FORTRAN 3.2A'
*B   'TSALOC'    '   DECK-ID B12 FORTRAN 3.2A'
*B   'LOCLBB'    '   DECK-ID F40 FORTRAN 3.2A'
*B   'DUMYBB'    '   DECK-ID F41 FORTRAN 3.2A'
*B   'AFIDL'     '   DECK-ID B25 FORTRAN 3.2A'
*B   'ASSEM'     '   DECK-ID B13 FORTRAN 3.2A'
*B   'BANANA'    '   DECK-ID B14 FORTRAN 3.2A'
*B   'END'       '   DECK-ID B16 FORTRAN 3.2A'
*B   'ENTCOD'    '   DECK-ID B17 FORTRAN 3.2A'
*B   'INXRST'    '   DECK-ID B19 FORTRAN 3.2A'
*B   'SUBFUN'    '   DECK-ID B23 FORTRAN 3.2A'
*B   'ENDLOC'    '   DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTBB,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'      '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOB'       '   DECK-ID F35 FORTRAN 3.2A'
*B   'CNVT'      '   DECK-ID A01 FORTRAN 3.2A'
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*B   'FCMSTK'    '   DECK-ID B02 FORTRAN 3.2A'
*B   'GETSYM'    '   DECK-ID F12 FORTRAN 3.2A'
*B   'IOPRBB'    '   DECK-ID F36 FORTRAN 3.2A'
*B   'KCPART'    '   DECK-ID B03 FORTRAN 3.2A'
*B   'KOUTPT'    '   DECK-ID B04 FORTRAN 3.2A'
*B   'KPCSTK'    '   DECK-ID B05 FORTRAN 3.2A'
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*B   'KPC3PR'   '   DECK-ID B06 FORTRAN 3.2A'
*B   'KSYMGN'   '   DECK-ID B07 FORTRAN 3.2A'
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*B   'LABLER'   '   DECK-ID B09 FORTRAN 3.2A'
*B   'PUNT'     '   DECK-ID B10 FORTRAN 3.2A'
*B   'CONV'     '   DECK-ID F03 FORTRAN 3.2A'
*B   'Q8PRMS'   '   DECK-ID F10 FORTRAN 3.2A'
*B   'STOREB'   '   DECK-ID F37 FORTRAN 3.2A'
*B   'SYMBOL'   '   DECK-ID B11 FORTRAN 3.2A'
*B   'TSALOC'   '   DECK-ID B12 FORTRAN 3.2A'
*B   'LOCLBC'   '   DECK-ID F42 FORTRAN 3.2A'
*B   'DUMYBC'   '   DECK-ID F43 FORTRAN 3.2A'
*B   'ASUPER'   '   DECK-ID B26 FORTRAN 3.2A'
*B   'ARAYSZ'   '   DECK-ID A42 FORTRAN 3.2A'
*B   'BGINDO'   '   DECK-ID B15 FORTRAN 3.2A'
*B   'CGOTO'    '   DECK-ID B27 FORTRAN 3.2A'
*B   'HELEN'    '   DECK-ID B18 FORTRAN 3.2A'
*B   'SYMSCN'   '   DECK-ID A28 FORTRAN 3.2A'
*B   'ENDLOC'   '   DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTBC,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'     '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOB'      '   DECK-ID F35 FORTRAN 3.2A'
*B   'CNVT'     '   DECK-ID A01 FORTRAN 3.2A'
*B   'DUMMY'    '   DECK-ID B01 FORTRAN 3.2A'
*B   'FCMSTK'   '   DECK-ID B02 FORTRAN 3.2A'
*B   'GETSYM'   '   DECK-ID F12 FORTRAN 3.2A'
*B   'IOPRBB'   '   DECK-ID F36 FORTRAN 3.2A'
*B   'KCPART'   '   DECK-ID B03 FORTRAN 3.2A'
*B   'KOUTPT'   '   DECK-ID B04 FORTRAN 3.2A'
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*B   'KSYMGN'   '   DECK-ID B07 FORTRAN 3.2A'
*B   'LABKPC'   '   DECK-ID B08 FORTRAN 3.2A'
*B   'LABLER'   '   DECK-ID B09 FORTRAN 3.2A'
*B   'PUNT'     '   DECK-ID B10 FORTRAN 3.2A'
*B   'CONV'     '   DECK-ID F03 FORTRAN 3.2A'
*B   'Q8PRMS'   '   DECK-ID F10 FORTRAN 3.2A'
*B   'STOREB'   '   DECK-ID F37 FORTRAN 3.2A'
*B   'SYMBOL'   '   DECK-ID B11 FORTRAN 3.2A'
*B   'TSALOC'   '   DECK-ID B12 FORTRAN 3.2A'
*B   'LOCLBB'   '   DECK-ID F40 FORTRAN 3.2A'
*B   'DUMYBB'   '   DECK-ID F41 FORTRAN 3.2A'
*B   'AFIDL'    '   DECK-ID B25 FORTRAN 3.2A'
*B   'ASSEM'    '   DECK-ID B13 FORTRAN 3.2A'
*B   'BANANA'   '   DECK-ID B14 FORTRAN 3.2A'
*B   'END'      '   DECK-ID B16 FORTRAN 3.2A'
*B   'ENTCOD'   '   DECK-ID B17 FORTRAN 3.2A'
*B   'INXRST'   '   DECK-ID B19 FORTRAN 3.2A'
*B   'SUBFUN'   '   DECK-ID B23 FORTRAN 3.2A'
*B   'ENDLOC'   '   DECK-ID F16 FORTRAN 3.2A'
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*P,F,,MARKER
*B   'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOB'      '  DECK-ID F35 FORTRAN 3.2A'
*B   'CNVT'     '  DECK-ID A01 FORTRAN 3.2A'
*B   'DUMMY'    '  DECK-ID B01 FORTRAN 3.2A'
*B   'FCMSTK'   '  DECK-ID B02 FORTRAN 3.2A'
*B   'GETSYM'   '  DECK-ID F12 FORTRAN 3.2A'
*B   'IOPRBB'   '  DECK-ID F36 FORTRAN 3.2A'
*B   'KCPART'   '  DECK-ID B03 FORTRAN 3.2A'
*B   'KOUTPT'   '  DECK-ID B04 FORTRAN 3.2A'
*B   'KPCSTK'   '  DECK-ID B05 FORTRAN 3.2A'
*B   'KPC3PR'   '  DECK-ID B06 FORTRAN 3.2A'
*B   'KSYMGN'   '  DECK-ID B07 FORTRAN 3.2A'
*B   'LABKPC'   '  DECK-ID B08 FORTRAN 3.2A'
*B   'LABLER'   '  DECK-ID B09 FORTRAN 3.2A'
*B   'PUNT'     '  DECK-ID B10 FORTRAN 3.2A'
*B   'CONV'     '  DECK-ID F03 FORTRAN 3.2A'
*B   'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B   'STOREB'   '  DECK-ID F37 FORTRAN 3.2A'
*B   'SYMBOL'   '  DECK-ID B11 FORTRAN 3.2A'
*B   'TSALOC'   '  DECK-ID B12 FORTRAN 3.2A'
*B   'LOCLBC'   '  DECK-ID F42 FORTRAN 3.2A'
*B   'DUMYBC'   '  DECK-ID F43 FORTRAN 3.2A'
*B   'ASUPER'   '  DECK-ID B26 FORTRAN 3.2A'
*B   'ARAYSZ'   '  DECK-ID A42 FORTRAN 3.2A'
*B   'BGINDO'   '  DECK-ID B15 FORTRAN 3.2A'
*B   'CGOTO'    '  DECK-ID B27 FORTRAN 3.2A'
*B   'HELEN'    '  DECK-ID B18 FORTRAN 3.2A'
*B   'SYMSCN'   '  DECK-ID A28 FORTRAN 3.2A'
*B   'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTBC,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOB'      '  DECK-ID F35 FORTRAN 3.2A'
*B   'CNVT'     '  DECK-ID A01 FORTRAN 3.2A'
*B   'DUMMY'    '  DECK-ID B01 FORTRAN 3.2A'
*B   'FCMSTK'   '  DECK-ID B02 FORTRAN 3.2A'
*B   'GETSYM'   '  DECK-ID F12 FORTRAN 3.2A'
*B   'IOPRBB'   '  DECK-ID F36 FORTRAN 3.2A'
*B   'KCPART'   '  DECK-ID B03 FORTRAN 3.2A'
*B   'KOUTPT'   '  DECK-ID B04 FORTRAN 3.2A'
*B   'KPCSTK'   '  DECK-ID B05 FORTRAN 3.2A'
*B   'KPC3PR'   '  DECK-ID B06 FORTRAN 3.2A'
*B   'KSYMGN'   '  DECK-ID B07 FORTRAN 3.2A'
*B   'LABKPC'   '  DECK-ID B08 FORTRAN 3.2A'
*B   'LABLER'   '  DECK-ID B09 FORTRAN 3.2A'
*B   'PUNT'     '  DECK-ID B10 FORTRAN 3.2A'
*B   'CONV'     '  DECK-ID F03 FORTRAN 3.2A'
*B   'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B   'STOREB'   '  DECK-ID F37 FORTRAN 3.2A'
*B   'SYMBOL'   '  DECK-ID B11 FORTRAN 3.2A'
*B   'TSALOC'   '  DECK-ID B12 FORTRAN 3.2A'
*B   'LOCLBD'   '  DECK-ID F44 FORTRAN 3.2A'
*B   'DUMYBD'   '  DECK-ID F45 FORTRAN 3.2A'
*B   'ARITHR'   '  DECK-ID B34 FORTRAN 3.2A'
*B   'FINK'     '  DECK-ID B28 FORTRAN 3.2A'
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*B  'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTBD,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOB'      '  DECK-ID F35 FORTRAN 3.2A'
*B  'CNVT'     '  DECK-ID A01 FORTRAN 3.2A'
*B  'DUMMY'    '  DECK-ID B01 FORTRAN 3.2A'
*B  'FCMSTK'   '  DECK-ID B02 FORTRAN 3.2A'
*B  'GETSYM'   '  DECK-ID F12 FORTRAN 3.2A'
*B  'IOPRBB'   '  DECK-ID F36 FORTRAN 3.2A'
*B  'KCPART'   '  DECK-ID B03 FORTRAN 3.2A'
*B  'KOUTPT'   '  DECK-ID B04 FORTRAN 3.2A'
*B  'KPCSTK'   '  DECK-ID B05 FORTRAN 3.2A'
*B  'KPC3PR'   '  DECK-ID B06 FORTRAN 3.2A'
*B  'KSYMGN'   '  DECK-ID B07 FORTRAN 3.2A'
*B  'LABKPC'   '  DECK-ID B08 FORTRAN 3.2A'
*B  'LABLER'   '  DECK-ID B09 FORTRAN 3.2A'
*B  'PUNT'     '  DECK-ID B10 FORTRAN 3.2A'
*B  'CONV'     '  DECK-ID F03 FORTRAN 3.2A'
*B  'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B  'STOREB'   '  DECK-ID F37 FORTRAN 3.2A'
*B  'SYMBOL'   '  DECK-ID B11 FORTRAN 3.2A'
*B  'TSALOC'   '  DECK-ID B12 FORTRAN 3.2A'
*B  'LOCLBE'   '  DECK-ID F46 FORTRAN 3.2A'
*B  'DUMYBE'   '  DECK-ID F47 FORTRAN 3.2A'
*B  'ACP'      '  DECK-ID B24 FORTRAN 3.2A'
*B  'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTBE,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOB'      '  DECK-ID F35 FORTRAN 3.2A'
*B  'CNVT'     '  DECK-ID A01 FORTRAN 3.2A'
*B  'DUMMY'    '  DECK-ID B01 FORTRAN 3.2A'
*B  'FCMSTK'   '  DECK-ID B02 FORTRAN 3.2A'
*B  'GETSYM'   '  DECK-ID F12 FORTRAN 3.2A'
*B  'IOPRBB'   '  DECK-ID F36 FORTRAN 3.2A'
*B  'KCPART'   '  DECK-ID B03 FORTRAN 3.2A'
*B  'KOUTPT'   '  DECK-ID B04 FORTRAN 3.2A'
*B  'KPCSTK'   '  DECK-ID B05 FORTRAN 3.2A'
*B  'KPC3PR'   '  DECK-ID B06 FORTRAN 3.2A'
*B  'KSYMGN'   '  DECK-ID B07 FORTRAN 3.2A'
*B  'LABKPC'   '  DECK-ID B08 FORTRAN 3.2A'
*B  'LABLER'   '  DECK-ID B09 FORTRAN 3.2A'
*B  'PUNT'     '  DECK-ID B10 FORTRAN 3.2A'
*B  'CONV'     '  DECK-ID F03 FORTRAN 3.2A'
*B  'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B  'STOREB'   '  DECK-ID F37 FORTRAN 3.2A'
*B  'SYMBOL'   '  DECK-ID B11 FORTRAN 3.2A'
*B  'TSALOC'   '  DECK-ID B12 FORTRAN 3.2A'
*B  'LOCLBF'   '  DECK-ID F48 FORTRAN 3.2A'
*B  'DUMYBF'   '  DECK-ID F49 FORTRAN 3.2A'
*B  'SUBPR3'   '  DECK-ID B33 FORTRAN 3.2A'
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*B  'INTRAM'   '  DECK-ID B29 FORTRAN 3.2A'
*B  'PARTSB'   '  DECK-ID B30 FORTRAN 3.2A'
*B  'SUBPR1'   '  DECK-ID B31 FORTRAN 3.2A'
*B  'SUBPR2'   '  DECK-ID B32 FORTRAN 3.2A'
*B  'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTBF,,,B
*K,I6
*K,P8
*P,F
*B  'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOC'      '  DECK-ID F50 FORTRAN 3.2A'
*B  'IOPRBC'   '  DECK-ID F51 FORTRAN 3.2A'
*B  'BKDWN'    '  DECK-ID C01 FORTRAN 3.2A'
*B  'BLDUP'    '  DECK-ID C02 FORTRAN 3.2A'
*B  'BSS'      '  DECK-ID C03 FORTRAN 3.2A'
*B  'CHKWD'    '  DECK-ID C04 FORTRAN 3.2A'
*B  'CON'      '  DECK-ID C07 FORTRAN 3.2A'
*B  'COUNT'    '  DECK-ID C08 FORTRAN 3.2A'
*B  'DATAST'   '  DECK-ID C09 FORTRAN 3.2A'
*B  'GETSYM'   '  DECK-ID C10 FORTRAN 3.2A'
*B  'INOUT'    '  DECK-ID C11 FORTRAN 3.2A'
*B  'LABEL'    '  DECK-ID C14 FORTRAN 3.2A'
*B  'LABIN'    '  DECK-ID C15 FORTRAN 3.2A'
*B  'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B  'REED'     '  DECK-ID C17 FORTRAN 3.2A'
*B  'SYMSCN'   '  DECK-ID C19 FORTRAN 3.2A'
*B  'LOCLCA'   '  DECK-ID F52 FORTRAN 3.2A'
*B  'DUMYCA'   '  DECK-ID F53 FORTRAN 3.2A'
*B  'PHASEC'   '  DECK-ID C13 FORTRAN 3.2A'
*B  'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTCA,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOC'      '  DECK-ID F50 FORTRAN 3.2A'
*B  'IOPRBC'   '  DECK-ID F51 FORTRAN 3.2A'
*B  'BKDWN'    '  DECK-ID C01 FORTRAN 3.2A'
*B  'BLDUP'    '  DECK-ID C02 FORTRAN 3.2A'
*B  'BSS'      '  DECK-ID C03 FORTRAN 3.2A'
*B  'CHKWD'    '  DECK-ID C04 FORTRAN 3.2A'
*B  'CON'      '  DECK-ID C07 FORTRAN 3.2A'
*B  'COUNT'    '  DECK-ID C08 FORTRAN 3.2A'
*B  'DATAST'   '  DECK-ID C09 FORTRAN 3.2A'
*B  'GETSYM'   '  DECK-ID C10 FORTRAN 3.2A'
*B  'INOUT'    '  DECK-ID C11 FORTRAN 3.2A'
*B  'LABEL'    '  DECK-ID C14 FORTRAN 3.2A'
*B  'LABIN'    '  DECK-ID C15 FORTRAN 3.2A'
*B  'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B  'REED'     '  DECK-ID C17 FORTRAN 3.2A'
*B  'SYMSCN'   '  DECK-ID C19 FORTRAN 3.2A'
*B  'LOCLCB'   '  DECK-ID F54 FORTRAN 3.2A'
*B  'CHOP'     '  DECK-ID C05 FORTRAN 3.2A'
*B  'CL12'     '  DECK-ID C06 FORTRAN 3.2A'
*B  'SKIP'     '  DECK-ID C18 FORTRAN 3.2A'
*B  'IXOPT'    '  DECK-ID C12 FORTRAN 3.2A'
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*B  'QXLD'      '  DECK-ID C16 FORTRAN 3.2A'
*B  'ENDLOC'    '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTCB,,,B
*K,I6
*K,P8
*P,F
*B  'FTNA'      '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOOD'      '  DECK-ID F55 FORTRAN 3.2A'
*B  'INDEX'     '  DECK-ID D01 FORTRAN 3.2A'
*B  'IOPRBD'    '  DECK-ID F56 FORTRAN 3.2A'
*B  'NPUNCH'    '  DECK-ID D02 FORTRAN 3.2A'
*B  'Q8PRMS'    '  DECK-ID F10 FORTRAN 3.2A'
*B  'LOCLDA'    '  DECK-ID F58 FORTRAN 3.2A'
*B  'DUMYDA'    '  DECK-ID F59 FORTRAN 3.2A'
*B  'PHASE6'    '  DECK-ID D03 FORTRAN 3.2A'
*B  'BEGINO'    '  DECK-ID D21 FORTRAN 3.2A'
*B  'CONV'      '  DECK-ID F57 FORTRAN 3.2A'
*B  'FINISH'    '  DECK-ID D22 FORTRAN 3.2A'
*B  'GETSYM'    '  DECK-ID D16 FORTRAN 3.2A'
*B  'IACON'     '  DECK-ID D17 FORTRAN 3.2A'
*B  'IHCON'     '  DECK-ID D18 FORTRAN 3.2A'
*B  'NWRITE'    '  DECK-ID D19 FORTRAN 3.2A'
*B  'PACK'      '  DECK-ID F09 FORTRAN 3.2A'
*B  'SYMSCN'    '  DECK-ID D20 FORTRAN 3.2A'
*B  'ENDLOC'    '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTDA,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'      '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOOD'      '  DECK-ID F55 FORTRAN 3.2A'
*B  'INDEX'     '  DECK-ID D01 FORTRAN 3.2A'
*B  'IOPRBD'    '  DECK-ID F56 FORTRAN 3.2A'
*B  'NPUNCH'    '  DECK-ID D02 FORTRAN 3.2A'
*B  'Q8PRMS'    '  DECK-ID F10 FORTRAN 3.2A'
*B  'LOCLDB'    '  DECK-ID F60 FORTRAN 3.2A'
*B  'DUMYDB'    '  DECK-ID F61 FORTRAN 3.2A'
*B  'AMOUT'     '  DECK-ID D04 FORTRAN 3.2A'
*B  'BKDWN'     '  DECK-ID D06 FORTRAN 3.2A'
*B  'COUNT'     '  DECK-ID D07 FORTRAN 3.2A'
*B  'GETSYM'    '  DECK-ID D14 FORTRAN 3.2A'
*B  'LABOUT'    '  DECK-ID D08 FORTRAN 3.2A'
*B  'NP2OUT'    '  DECK-ID D09 FORTRAN 3.2A'
*B  'RBDX'      '  DECK-ID D10 FORTRAN 3.2A'
*B  'RBPK'      '  DECK-ID D11 FORTRAN 3.2A'
*B  'SYMSCN'    '  DECK-ID D15 FORTRAN 3.2A'
*B  'TABDEC'    '  DECK-ID D12 FORTRAN 3.2A'
*B  'UNPUNC'    '  DECK-ID D13 FORTRAN 3.2A'
*B  'ENDLOC'    '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTDB,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'      '  COPYRIGHT CONTROL DATA CORPORATION 1973'
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*B   'GOOD'     '  DECK-ID F55 FORTRAN 3.2A'
*B   'INDEX'    '  DECK-ID D01 FORTRAN 3.2A'
*B   'IOPRBD'   '  DECK-ID F56 FORTRAN 3.2A'
*B   'NPUNCH'   '  DECK-ID D02 FORTRAN 3.2A'
*B   'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B   'LOCLDC'   '  DECK-ID F62 FORTRAN 3.2A'
*B   'ADMAX'    '  DECK-ID D05 FORTRAN 3.2A'
*B   'GETSYM'   '  DECK-ID D14 FORTRAN 3.2A'
*B   'TABDEC'   '  DECK-ID D12 FORTRAN 3.2A'
*B   'SYMSCN'   '  DECK-ID D15 FORTRAN 3.2A'
*B   'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTDC,,,B
*K,I6
*K,P8
*P,F
*B   'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOE'      '  DECK-ID F63 FORTRAN 3.2A'
*B   'INDEX'    '  DECK-ID E01 FORTRAN 3.2A'
*B   'IOPRBD'   '  DECK-ID F56 FORTRAN 3.2A'
*B   'NPUNCH'   '  DECK-ID E02 FORTRAN 3.2A'
*B   'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B   'LOCLDA'   '  DECK-ID F58 FORTRAN 3.2A'
*B   'DUMYDA'   '  DECK-ID F59 FORTRAN 3.2A'
*B   'PHASE6'   '  DECK-ID E03 FORTRAN 3.2A'
*B   'BEGINO'   '  DECK-ID E19 FORTRAN 3.2A'
*B   'CONV'     '  DECK-ID F57 FORTRAN 3.2A'
*B   'FINISH'   '  DECK-ID E20 FORTRAN 3.2A'
*B   'GETSYM'   '  DECK-ID E14 FORTRAN 3.2A'
*B   'IACON'    '  DECK-ID E15 FORTRAN 3.2A'
*B   'IHCON'    '  DECK-ID E16 FORTRAN 3.2A'
*B   'NWRITE'   '  DECK-ID E17 FORTRAN 3.2A'
*B   'PACK'     '  DECK-ID F09 FORTRAN 3.2A'
*B   'SETPRT'   '  DECK-ID E18 FORTRAN 3.2A'
*B   'SYMSCN'   '  DECK-ID D20 FORTRAN 3.2A'
*B   'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTEA,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOE'      '  DECK-ID F63 FORTRAN 3.2A'
*B   'INDEX'    '  DECK-ID E01 FORTRAN 3.2A'
*B   'IOPRBD'   '  DECK-ID F56 FORTRAN 3.2A'
*B   'NPUNCH'   '  DECK-ID E02 FORTRAN 3.2A'
*B   'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B   'LOCLDB'   '  DECK-ID F60 FORTRAN 3.2A'
*B   'DUMYDB'   '  DECK-ID F61 FORTRAN 3.2A'
*B   'AMOUT'    '  DECK-ID E04 FORTRAN 3.2A'
*B   'BKDWN'    '  DECK-ID E06 FORTRAN 3.2A'
*B   'CONV'     '  DECK-ID F57 FORTRAN 3.2A'
*B   'COUNT'    '  DECK-ID E07 FORTRAN 3.2A'
*B   'GETSYM'   '  DECK-ID E14 FORTRAN 3.2A'
*B   'IACON'    '  DECK-ID E15 FORTRAN 3.2A'
*B   'IHCON'    '  DECK-ID E16 FORTRAN 3.2A'
*B   'LABOUT'   '  DECK-ID E08 FORTRAN 3.2A'
*B   'NP2OUT'   '  DECK-ID E09 FORTRAN 3.2A'
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*B  'NWRITE'   '  DECK-ID E17 FORTRAN 3.2A'
*B  'PACK'     '  DECK-ID F09 FORTRAN 3.2A'
*B  'RBDX'     '  DECK-ID E10 FORTRAN 3.2A'
*B  'RBPK'     '  DECK-ID E11 FORTRAN 3.2A'
*B  'SETPRT'   '  DECK-ID E18 FORTRAN 3.2A'
*B  'SYMSCN'   '  DECK-ID D20 FORTRAN 3.2A'
*B  'TABDEC'   '  DECK-ID E12 FORTRAN 3.2A'
*B  'UNPUNC'   '  DECK-ID E13 FORTRAN 3.2A'
*B  'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTEB,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNA'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOE'      '  DECK-ID F63 FORTRAN 3.2A'
*B  'INDEX'    '  DECK-ID E01 FORTRAN 3.2A'
*B  'IOPRBD'   '  DECK-ID F56 FORTRAN 3.2A'
*B  'NPUNCH'   '  DECK-ID E02 FORTRAN 3.2A'
*B  'Q8PRMS'   '  DECK-ID F10 FORTRAN 3.2A'
*B  'LOCLOC'   '  DECK-ID F62 FORTRAN 3.2A'
*B  'ADMAX'    '  DECK-ID E05 FORTRAN 3.2A'
*B  'GETSYM'   '  DECK-ID E14 FORTRAN 3.2A'
*B  'SYMSCN'   '  DECK-ID D20 FORTRAN 3.2A'
*B  'TABDEC'   '  DECK-ID E12 FORTRAN 3.2A'
*B  'ENDLOC'   '  DECK-ID F16 FORTRAN 3.2A'
*T
*K,I8
*N,FORTEC,,,B
*V  NON-REENTRANT FTN. LIBRARY
*K,I6
*L,READ
*B  'FORTN'    '  DECK-ID F01  3.2 FTN RUNTIME'
*L,Q8PREP
*B  'Q8PRMS'   '  DECK-ID G01  3.2 FTN RUNTIME'
*L,Q8QF2I
*B  'Q8EXPN'   '  DECK-ID G02  3.2 FTN RUNTIME'
*L,ABS
*B  'Q8AB'     '  DECK-ID G03  3.2 FTN RUNTIME'
*L,SQRT
*B  'SQRTF'    '  DECK-ID G04  3.2 FTN RUNTIME'
*L,SIGN
*B  'SIGN'     '  DECK-ID G05  3.2 FTN RUNTIME'
*L,FLOAT
*B  'FXFL'     '  DECK-ID G06  3.2 FTN RUNTIME'
*L,EXP
*B  'EXPPRG'   '  DECK-ID G07  3.2 FTN RUNTIME'
*L,ALOG
*B  'LNUPRG'   '  DECK-ID G08  3.2 FTN RUNTIME'
*L,TANH
*B  'TANH'     '  DECK-ID G09  3.2 FTN RUNTIME'
*L,SIN
*B  'SINCOS'   '  DECK-ID G10  3.2 FTN RUNTIME'
*L,ATAN
*B  'ARCTPG'   '  DECK-ID G11  3.2 FTN RUNTIME'
*L,IFALT
*B  'IFALT'    '  DECK-ID G12  3.2 FTN RUNTIME'
*L,FLOT
*B  'FLOAT'    '  DECK-ID G13  3.2 FTN RUNTIME'
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*L,Q8IFRM
*B  'Q8IFRM'   '  DECK-ID H01  3.2 FTN RUNTIME'
*L,Q8FS
*B  'Q8FS'     '  DECK-ID H02  3.2 FTN RUNTIME'
*L,Q8TRAN
*B  'Q8TRAN'   '  DECK-ID H03  3.2 FTN RUNTIME'
*L,Q8QINI
*B  'Q8QINI'   '  DECK-ID H04  3.2 FTN RUNTIME'
*L,Q8QEND
*B  'Q8QEND'   '  DECK-ID H05  3.2 FTN RUNTIME'
*L,Q8CMP0
*B  'Q8CMP'    '  DECK-ID H06  3.2 FTN RUNTIME'
*L,Q8RWBU
*B  'Q8RWBU'   '  DECK-ID H07  3.2 FTN RUNTIME'
*L,Q8ERRM
*B  'Q8ERRM'   '  DECK-ID H08  3.2 FTN RUNTIME'
*L,Q8DFNF
*B  'Q8DFIO'   '  DECK-ID H09  3.2 FTN RUNTIME'
*L,Q8QX
*B  'Q8QX'     '  DECK-ID H10  3.2 FTN RUNTIME'
*L,Q8QUN1
*B  'Q8QUNI'   '  DECK-ID H11  3.2 FTN RUNTIME'
*L,Q8FGET
*B  'Q8FGET'   '  DECK-ID H12  3.2 FTN RUNTIME'
*L,Q8MAGT
*B  'Q8MAGT'   '  DECK-ID H13  3.2 FTN RUNTIME'
*L,EOF
*B  'TAPCON'   '  DECK-ID H14  3.2 FTN RUNTIME'
*L,IOCK
*B  'IOCK'     '  DECK-ID H15  3.2 FTN RUNTIME'
*L,Q8PSE
*B  'PSSTOP'   '  DECK-ID H16  3.2 FTN RUNTIME'
*L,Q8PAND
*B  'Q8PAND'   '  DECK-ID H17  3.2 FTN RUNTIME'
*L,Q8EXP1
*B  'Q8EXP1'   '  DECK-ID H18  3.2 FTN RUNTIME'
*L,Q8EXP9
*B  'Q8EXP9'   '  DECK-ID H19  3.2 FTN RUNTIME'
*L,SETBFR
*B  'Q8QGTX'   '  DECK-ID H20  3.2 FTN RUNTIME'
*L,ENCODE
*B  'IOCODE'   '  DECK-ID J01  3.2 FTN RUNTIME'
*L,COMMON
*B  'PSUEDO'   '  DECK-ID J02  3.2 FTN RUNTIME'
*L,IGETCH
*B  'IGETCH'   '  DECK-ID J03  3.2 FTN RUNTIME'
*L,IPACK
*B  'IPACK'    '  DECK-ID J04  3.2 FTN RUNTIME'
*L,UPDATE
*B  'UPDATN'   '  DECK-ID J05  3.2 FTN RUNTIME'
*L,DECPL
*B  'DECPL'    '  DECK-ID J06  3.2 FTN RUNTIME'
*L,INTGR
*B  'INTGR'    '  DECK-ID J07  3.2 FTN RUNTIME'
*L,SPACEX
*B  'SPACEN'   '  DECK-ID J08  3.2 FTN RUNTIME'
*L,HOLRTH
*B  'HOLRTH'   '  DECK-ID J09  3.2 FTN RUNTIME'
*L,DCHX
*B  'DCHX'     '  DECK-ID J10  3.2 FTN RUNTIME'
```

```
*L,HXASC
*B  'HXASC'    '  DECK-ID J11  3.2 FTN RUNTIME'
*L,AFRMOT
*B  'AFRMOT'   '  DECK-ID J12  3.2 FTN RUNTIME'
*L,RFRMOT
*B  'RFRMOT'   '  DECK-ID J13  3.2 FTN RUNTIME'
*L,AFRMIN
*B  'AFRMIN'   '  DECK-ID J14  3.2 FTN RUNTIME'
*L,RFRMIN
*B  'RFRMIN'   '  DECK-ID J15  3.2 FTN RUNTIME'
*L,ASCHX
*B  'ASCHX'    '  DECK-ID J16  3.2 FTN RUNTIME'
*L,HXDC
*B  'HXDC'     '  DECK-ID J17  3.2 FTN RUNTIME'
*L,FLOTIN
*B  'FLOTIN'   '  DECK-ID J18  3.2 FTN RUNTIME'
*L,FOUT
*B  'FOUT'     '  DECK-ID J19  3.2 FTN RUNTIME'
*L,EOUT
*B  'EOUT'     '  DECK-ID J20  3.2 FTN RUNTIME'
*L,EWRITE
*B  'EWRITE'   '  DECK-ID J21  3.2 FTN RUNTIME'
*L,INITL1
*B  'INITL1'   '  DECK-ID J22  3.2 FTN RUNTIME'
*L,FORMTR
*B  'FORMTN'   '  DECK-ID J23  3.2 FTN RUNTIME'
*L,Q8QFI
*B  'Q8QFI'    '  DECK-ID J24  3.2 FTN RUNTIME'
*L,Q8QFL
*B  'Q8QFL'    '  DECK-ID J25  3.2 FTN RUNTIME'
*L,Q8QFX
*B  'Q8QFX'    '  DECK-ID J26  3.2 FTN RUNTIME'
*L,HEXASC
*B  'HEXASC'   '  DECK-ID J27  3.2 FTN RUNTIME'
*L,HEXDEC
*B  'HEXDEC'   '  DECK-ID J28  3.2 FTN RUNTIME'
*L,ASCII
*B  'ASCII'    '  DECK-ID J29  3.2 FTN RUNTIME'
*L,DECHEX
*B  'DECHEX'   '  DECK-ID J30  3.2 FTN RUNTIME'
*L,AFORM
*B  'AFORM'    '  DECK-ID J31  3.2 FTN RUNTIME'
*L,RFORM
*B  'RFORM'    '  DECK-ID J32  3.2 FTN RUNTIME'
*L,FLOATG
*B  'FLOATG'   '  DECK-ID J33  3.2 FTN RUNTIME'
*L,Q8DXP1
*B  'DBLDMY'
*Z
*K,I10,P11,L9
*CTO,   MSOS 4.1 INSTALLATION COMPLETED - YOU MAY AUTOLOAD
*Z
*END
```

6.3.3 Creating a New Install
Tape, Building and Verifying the New System

The program LIBILD is used to create a new install file. Library Input to LIBILD consists of the following:

{1} The FORTRAN binaries tape
{2} Binary cards for the revised SYSDAT
{3} The current install tape
{4} MSOS binaries tape from which RDISP will be read

The library input is presented to LIBILD in the order listed above. The revised SYSDAT is input prior to the current install tape so that the revised version of SYSDAT will be the one incorporated into the new install file. Typing on the teletype is similar to that in Article 5.3.4. 6.37

Note:

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Using the new install file, the new system may be built and verified as described in the 1700 MSOS 4 Installation Handbook. Typing on the comment device for a similar procedure is found in Article 5.3.5.

6.4 Addition of Double Precision

6.4.1 Addition of Reentrant Double Precision

To add double precision capability to the reentrant FORTRAN library it is necessary to modify SYSDAT Section ACS. The table of reentrant FORTRAN entry points in this section must be enlarged to include the entry points of the reentrant FORTRAN double precision modules. The entry point DOUT must be removed from this section. {Refer to Article 1.7.1.}

The system skeleton must be modified by additn a *B record for each module listed in Group L of Article 2.1. The binary form of each module to be added is available in the MSOS binaries file if the FORTRAN compiler was a part of the 6-41
MSOS 4.1 system originally installed. If the FORTRAN compiler was added subsequent to the initial MSOS 4.1 installation, the binary form of each module to be added is to be found in the FORTRAN binaries file sent to the user when the compiler was added.

The addition of double precision to the reentrant FORTRAN library causes the values of ENDOV4 and BGNMON to be decreased. It causes the size of SYSDAT to increase. For these reasons it may be necessary to change the value of N4.

An example of the addition of double precision to the reentrant FORTRAN library is included in Article 6.4.3.

6.4.2 Addition of Double Precision to Input/Output Library 6-42

No SYSDAT changes are required to add double precision capability to the FORTRAN background library. The following records must be deleted from the skeleton:

```
*L,Q8DXPT
*B  ≠DBLDMY≠  ≠  DECK-ID K19  3.2 FTN RUNTIME≠
```

The following records must be added to the skeleton following the *B record for the module FLOATG. {The deck identification field is optional}.

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```
*L,Q8QDZI
*B   ≠DEXPN≠     ≠   DECK-ID K01   3.2 FTN RUNTIME≠
*L,Q8DBLE
*B   ≠Q8DBLE≠    ≠   DECK-ID K02   3.2 FTN RUNTIME≠
*L,SNGL
*B   ≠SNGL≠      ≠   DECK-ID K03   3.2 FTN RUNTIME≠
*L,DABS
*B   ≠Q8DABN≠    ≠   DECK-ID K04   3.2 FTN RUNTIME≠
*L,DSQRT
*B   ≠DSQRTN≠    ≠   DECK-ID K05   3.2 FTN RUNTIME≠
*L,DSIGN
*B   ≠Q8DSIG≠    ≠   DECK-ID K06   3.2 FTN RUNTIME≠
*L,DFLT
*B   ≠Q8DFLT≠    ≠   DECK-ID K07   3.2 FTN RUNTIME≠
*L,DEXP
*B   ≠DEXPFN≠    ≠   DECK-ID K08   3.2 FTN RUNTIME≠
*L,DLOG
*B   ≠DLOGN≠     ≠   DECK-ID K09   3.2 FTN RUNTIME≠
*L,DSIN
*B   ≠DSNCSN≠    ≠   DECK-ID K10   3.2 FTN RUNTIME≠
*L,DATAN
*B   ≠DATANN≠    ≠   DECK-ID K11   3.2 FTN RUNTIME≠
*L,DFLOT
*B   ≠DFLOTN≠    ≠   DECK-ID K12   3.2 FTN RUNTIME≠
*L,AVOLA
*B   ≠DUMVOL≠    ≠   DECK-ID K13   3.2 FTN RUNTIME≠
*L,DSTOR1
*B   ≠DRSTOR≠    ≠   DECK-ID K14   3.2 FTN RUNTIME≠
*L,Q8DXP1
*B   ≠Q8DXP1≠    ≠   DECK-ID K15   3.2 FTN RUNTIME≠
*L,Q8DXP9
*B   ≠Q8DXP9≠    ≠   DECK-ID K16   3.2 FTN RUNTIME≠
*L,Q8QDFN
*B   ≠Q8QDFN≠    ≠   DECK-ID K17   3.2 FTN RUNTIME≠
*L,DOUT
*B   ≠DOUTN≠     ≠   DECK-ID K18   3.2 FTN RUNTIME≠
```

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A binary copy of each module to be added is in the MSOS binaries file if the FORTRAN compiler was included in the system at the time of MSOS 4.1 installation. If the compiler was added later, the binaries needed are available in the FORTRAN binaries file sent to the user at the time the compiler was added.

When adding double precision capability to the FORTRAN background library, it is important to remember that unprotected core must have a minimum size of 3000_{16}. {Table 6-1}

To insure adequate unprotected areas it may be necessary to modify the value of N4.

6.4.3 Example of Double Precision Additions

In this example, double precision capability is added to both the reentrant FORTRAN library and to the FORTRAN Input/Output library. The users current system is the system built in Article 6.3.3. As explained later in this article it is necessary in this example to increase the hardware core size.

Addition of double precision to the foreground library requires the modification of SYSDAT Section ACS, as described in Article 6.4.1. After modification Section ACS is as follows:

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```
*           M I S C E L L A N E O U S   I N F O R M A T I O N
*
*           F O R T R A N   R E E N T R A N T   I N F O R M A T I O N
*
        ENT    FMASK,FLIST
        EXT    Q8QF2I,Q8QI2F,Q8QF2F,QSAVE,E4SAVE
        EXT    RETAD,KG47V4,KG48V4,KG49V4
        EXT    ABS,SQRT,SIGN,IFIX,FLOAT
        EXT    EXP,ALOG,TANH,SIN,COS,ATAN,IFALT
        EXT    FLOT,ARGU0
        EXT    Q8QFLT,Q8QD2I,Q8QD2F,Q8QD2D
        EXT    DABS,DSQRT,DSIGN,SNGL,DFLT
        EXT    DEXP,DLOG,DSIN,DCOS,DATAN,DFLOT

FMASK   NUM    $0070          FORTRAN REENTRANT LEVELS (BIT 0 = LEVEL 0)

*       TABLE OF FORTRAN ENTRY POINTS SAVED TO MAINTAIN REENTRANCY

*       ENTRY POINT           PROGRAM       DESCRIPTION
*       -----------           -------       -----------

FLIST   ADC    FEND
        ADC    Q8QF2I         Q8EXPR      FLOAT-TO-INTEGER FUNCTION
        ADC    Q8QI2F         Q8EXPR      INTEGER-TO-FLOAT FUNCTION
        ADC    Q8QF2F         Q8EXPR      FLOAT-TO-FLOAT   FUNCTION
        ADC    QSAVE          Q8EXPR      Q-REGISTER       STORAGE
        ADC    E4SAVE         Q8EXPR      LOCATION $E4     STORAGE
        ADC    RETAD          Q8EXPR      RETURN ADDRESS   STORAGE
        ADC    KG47V4         Q8EXPR      TEMPORARY        STORAGE
        ADC    KG48V4         Q8EXPR      TEMPORARY        STORAGE
        ADC    KG49V4         Q8EXPR      TEMPORARY        STORAGE
        ADC    ABS            Q8ABR       ABSOLUTE VALUE FUNCTION
        ADC    SQRT           SQRTFR      SQUARE ROOT FUNCTION
        ADC    SIGN           SIGNR       INTRINSIC FUNCTION SIGN
        ADC    IFIX           FXFLR       INTRINSIC FUNCTION IFIX
        ADC    FLOAT          FXFLR       INTRINSIC FUNCTION FLOAT
        ADC    EXP            EXPRGR      EXTERNAL FUNCTION EXP
        ADC    ALOG           LNPRGR      EXTERNAL FUNCTION ALOG
        ADC    TANH           TANHR       EXTERNAL FUNCTION TANH
        ADC    SIN            SNCSR       EXTERNAL FUNCTION SIN
        ADC    COS            SNCSR       EXTERNAL FUNCTION COS
        ADC    ATAN           ARCPGR      EXTERNAL FUNCTION ATAN
        ADC    IFALT          IFALTR      EXTERNAL FUNCTION IFALT
        ADC    FLOT           FLOATR      FLOATING POINT PROCESSOR
        ADC    ARGU0          Q8QIO       TEMPORARY STORAGE
```

```
*        F O R T R A N   R E E N T R A N T   I N F O R M A T I O N
*
*        ENTRY POINT        PROGRAM      DESCRIPTION
*        -----------        -------      -----------

         ADC   Q8DFLT       Q8DBLR     INTEGER-TO-DOUBLE FUNCTION
         ADC   Q8QD2I       DEXPR      DOUBLE-TO-INTEGER FUNCTION
         ADC   Q8QD2F       DEXPR      DOUBLE-TO-SINGLE  FUNCTION
         ADC   Q8QD2D       DEXPR      DOUBLE-TO-DOUBLE  FUNCTION
         ADC   DABS         Q8DABR     DBL. PREC. ABSOLUTE VALUE FUNCTION
         ADC   DSQRT        DSQRTR     DBL. PREC. SQUARE ROOT FUNCTION
         ADC   DSIGN        DSIGNR     INTRINSIC FUNCTION DSIGN
         ADC   SNGL         SNGLR      INTRINSIC FUNCTION SNGL
         ADC   DFLT         Q8DFLR     INTRINSIC FUNCTION DFLT
         ADC   DEXP         DEXPFR     DBL. PREC. EXTERNAL FUNCTION EXP
         ADC   DLOG         DLOGR      DBL. PREC. EXTERNAL FUNCTION ALOG
         ADC   DSIN         DSNCSR     DBL. PREC. EXTERNAL FUNCTION SIN
         ADC   DCOS         DSNCSR     DBL. PREC. EXTERNAL FUNCTION COS
         ADC   DATAN        DATANR     DBL. PREC. EXTERNAL FUNCTION ATAN
         ADC   DFLOT        DFLOTR     DBL. PREC. FLOATING POINT PROCESSOR
FEND     EQU   FEND(*-FLIST-1)


*        F O R T R A N   R E E N T R A N T   I N F O R M A T I O N
*


*        THIS ENTRY IS PROVIDED TO ALLOW COMPATIBILITY BETWEEN THE
*        NON-REENTRANT (BACKGROUND) FORTRAN AND REENTRANT FORTRAN

         ENT   Q8STP

Q8STP    NOP   0                FORTRAN    STOP
         JMP-  (ADISP)
```

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The skeleton is modified as described in Article 6.4.1 and Article 6.4.2. The total length of the reentrant library modules to be added is determined by loading these modules in the background using a *L job processor command. This technique is illustrated in Article 6.3.2. The length of the modules is $9E6_{16}$. The modification of SYSDAT increases the start of unprotected by $15=F_{16}$ words. Therefore the effective decrease in the area available for allocatable area 4 and unprotected core is 9E6 + F = 9F5.

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The current system has $18F8_{16}$ words in allocatable area 4 and 2000_{16} words of unprotected core, or a total of $38F8_{16}$ available for area 4 and unprotected together. A decrease of $9F5_{16}$ would leave $2F03_{16}$ words available for these two areas. The Input/Output Library with double precision requires 3000_{16} words of unprotected core (Table 6-1). The minimum value of N4 which permits File Manager requests by background programs is $5DC_{16}$ (Article 1.5.8). Therefore, this system requires a total of $35DC_{16}$ words for unprotected and area 4 together. The differenc between the area needed and the area available is $35DC_{16}-2F03_{16}=6D9_{16}$.

The user first considers increasing available core by using the procedures described in Appendix A.

6-46C

Referring to Appendix A, $C0_{16}$ additional words could be made available by substituting the module PROTK for BPROTK, leaving 619_{16} words as the additional space which still must be made available. Again referring to Appendix A, the size of the mass resident driver buffer may be reduced. Its current size is $8C6_{16}$, as can be seen from Section AcR of SYSDAT, as follows:

```
*            M I S C E L L A N E O U S   I N F O R M A T I O N
*
*            M A S S   R E S I D E N T   D R I V E R S   B U F F E R
*
*            THIS BUFFER WILL CONTAIN THE MASS RESIDENT DRIVER(S)
*            WHEN THEY ARE IN CORE.   THE SMALLEST ALLOWABLE SIZE IS
*            EQUAL TO THE LARGEST MASS RESIDENT DRIVER IN THE SYSTEM.
*            OPTIMUM THROUGHPUT REQUIRES SIZING EQUAL TO THE TWO
*            LARGEST MASS RESIDENT DRIVERS IN THE SYSTEM.

        ENT    BUFF,BUFFE
        EQU    MBFSZ($08C6)

BUFF    BZS    BUFF(MBFSZ)
        EQU    BUFFE(*)
```

The size of the largest mass resident driver is approximated by examining the mass resident drivers portion of the system load map. This portion of the current system load map is as follows:

```
 *
 *         MASS RESIDENT DRIVERS
 *
 *M                   COSY DRIVER
       DCOSY       02BC        DECK-ID C28   MSCS 4.1                 SUMMARY-079
 *S,SCCSY,S
 *S,LCCSY,P
 *M                   1731 601 MAG TAPE
       D1731U      02C4        DECK-ID C33   MSCS 4.1                 SUMMARY-081
       FRWA        01F5        DECK-ID C34   MSCS 4.1                 SUMMARY-079
       FRWB        02C3        DECK-ID C35   MSCS 4.1                 SUMMARY-079
       PWBA        03C0        DECK-ID C36   MSCS 4.1                 SUMMARY-079
       MAXFVU      0440        DECK-ID C37   MSCS 4.1                 SUMMARY-081
 *S,S1731U,S
 *S,L1731U,P
 *M                   1740-501/1742 LINE PRINTER
       D4 421      02D4        DECK-ID C46   MSCS 4.1                 SUMMARY-082
 *S,S40421,S
 *S,L40421,P
 *M
       D1728       02D9        DECK-ID C48   MSCS 4.1                 SUMMARY-082
       CR 26       0384        DECK-ID C54   MSCS 4.1                 SUMMARY-079
       CR 26       03C4        DECK-ID C52   MSCS 4.1                 SUMMARY-079
 *S,S1728,S
 *S,L1728,P
 *
 *         MASS RESIDENT FILE MANAGER
 *
 *M
       DEFFIL      02E4        DECK-ID F05   MSCS 4.1                 SUMMARY-079
```

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The number to the right of the first module of a driver is
the sector number where the driver resides on mass memory.
The number to the right of a subsequent module is the driver
word count at the beginning of the module. In the user's 6-46F
current load map the largest mass resident driver is the 1731-601
magnetic tape driver, requiring between 15 and 16 sectors or
between $5A1_{16}$ and 600_{16} words. Thus, reducing the mass resident
driver buffer to this size from $8C6_{16}$ words would not provide
the additional 619_{16} words needed. In this example the user
requires all locations between NXTLOC and MSIAV4. Therefore,
no additional core may be made available from that area.

In this example the user attains the additional core needed
by adding a hardware module of 4K words of core (1000_{16} words = 6-46G
4096 words). The change in core size necessitates changing the
value of MSIZV4 in the skeleton from $7FFF_{16}$ to $8FFF_{16}$. With
the addition of 4K of core there are now $3F03_{16}$ words available
for unprotected core and allocatable area 4 together. In this
example the user wishes to maximize the unprotected area.
He therefore sets N4 to the value $5DC_{16}$. The previous value 6-46H
of BGNMON was $547D_{16}$. The new value of BGNMON will be $547D_{16}$ +
1000_{16} - $9E6_{16}$ = $5A97_{16}$. The new value of ENDOV4 will be $5A96_{16}$.

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In addition to the above skeleton changes, SYSMON and SYSDAY
are updated. Using the revised skeleton, the FORTRAN binaries
tape, the current install tape, and the binary cards for the
revised SYSDAT, a new install tape is created by use of LIBILD.

6-48

With the new install tape, a new system including double
precision in both the foreground and background libraries may
be built and verified. The procedure is described in the
1700 MSOS 4 Installation Handbook. An example of a similar
installation showing typing on the comment device is found in
Article 5.3.5. The first portion of the load map with FORTRAN
double precision added is as follows:

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```
DATE  11/16/74
*V
*S,SYSMON,$3131
*S,SYSDAY,$3136
*S,SYSYER,$3734
*S,SYSLVL,$3836
*S,N4,$05DC
*V
*V        1700 MASS STORAGE OPERATING SYSTEM - VER. 4.1
*V
*V        ANN≠S TEST SYSTEM
*V
*YM,LIBEDT,1
*YM,LOADSD,2
*YM,JOBENT,3
*YM,JOBPRO,4
*YM,PROTEC,5
*YM,JPLOAD,6
*YM,JPCHGE,7
*YM,JPT13,8
*YM,JCRDV4,9
*YM,JLGOV4,10
*YM,JPSTV4,11
*YM,NAMEV4,12
*YM,JEFLV4,13
*YM,AFILV4,14
*YM,RESTOR,15
*YM,RCOVER,16
*YM,BRKPT,17
*YM,ODEBUG,18
*YM,SYSCOP,19
*YM,SYSSEG,20
*YM,MIPRO,21
*YM,TDFUNC,22
*YM,EFSTOR,23
*YM,EFLIST,24
*YM,SCMM17,25
*YM,VERIFY,26
*YM,DUMMY1,27
*YM,DUMMY2,28
*YM,DUMMY3,29
*YM,DUMMY4,30
*YM,DUMMY5,31
*YM,DUMMY6,32
*YM,DUMMY7,33
*YM,DUMMY8,34
*YM,DUMMY9,35
*YM,DUMMY0,36
*S,MSIZV4,$8FFF
*S,ENDOV4,$5A96
*S,BGNMON,$5A97
*S,SECTOR,$7EDA
*
*L        SYSTEM DATA PROGRAM
    SYSDAT     0000      COPYRIGHT CONTROL DATA CORPORATION 1973
*L        SPACE REQUEST PROCESSOR
    SPACE      123A      DECK-ID 802  MSOS 4.1              SUMMARY-082
*
```

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```
DATE  11/16/74

*       SYSTEM CORE RESIDENT PROGRAMS
*
*LP      MONITOR
     NMONI     5A97      DECK-ID A03   MSCS 4.1                  SUMMARY-079
     RDISP     5ADB      DECK-ID A05   MSCS 4.1                  SUMMARY-079

     RW        5C75      DECK-ID A06   MSCS 4.1                  SUMMARY-079
     T14       5D30      DECK-ID A07   MSCS 4.1                  SUMMARY-079

     T16       5D41      DECK-ID A08   MSCS 4.1                  SUMMARY-079
     PARAME    5D4C      DECK-ID A09   MSCS 4.1                  SUMMARY-079

     COMMON    5DBD      DECK-ID A10   MSCS 4.1                  SUMMARY-079
     NIPROC    5DE4      DECK-ID A11   MSCS 4.1                  SUMMARY-079

     ALVOL     5E6D      DECK-ID A13   MSCS 4.1                  SUMMARY-079
     OFVOL     5E8A      DECK-ID A14   MSCS 4.1                  SUMMARY-079

     ALCORE    5E96      DECK-ID A15   MSCS 4.1                  SUMMARY-079
     DCORE     5F44      DECK-ID A16   MSCS 4.1                  SUMMARY-079

     NFNR      60CE      DECK-ID A18   MSCS 4.1                  SUMMARY-079
     NCMPRQ    6140      DECK-ID A19   MSCS 4.1                  SUMMARY-079

     MAKG      6170      DECK-ID A20   MSCS 4.1                  SUMMARY-081
     ADEV      619E      DECK-ID A21   MSCS 4.1                  SUMMARY-079

     TMINT     6306      DECK-ID A22   MSCS 4.1                  SUMMARY-079
     DTIMER    639D      DECK-ID A23   MSCS 4.1                  SUMMARY-079

     TCD       63BF      DECK-ID A24   MSCS 4.1                  SUMMARY-079
     MINT      640E      DECK-ID A25   MSCS 4.1                  SUMMARY-079

     TRVEC     651A      DECK-ID D01   MSCS 4.1                  SUMMARY-079
*LP      DEBUGGING / CHECKOUT

     SNAPOL    6562      DECK-ID H01   MSCS 4.1                  SUMMARY-079
     DMP421    661B      DECK-ID H03   MSCS 4.1                  SUMMARY-079

     BCK85X    66E4      DECK-ID H05   MSCS 4.1                  SUMMARY-079
*LP      FILE MANAGER

     FILMGR    672F      DECK-ID F01   MSCS 4.1                  SUMMARY-081
     RSPCV4    6954      DECK-ID F02   MSCS 4.1                  SUMMARY-079

     SRHFIS    6A44      DECK-ID F03   MSCS 4.1                  SUMMARY-079
*LP      CORE RESIDENT DRIVERS

     EFDATA    6BFD      DECK-ID C01   MSCS 4.1                  SUMMARY-079
     DUMMY     6D5B      DECK-ID C02   MSCS 4.1                  SUMMARY-079

     ALAQ      6D7E      DECK-ID C03   MSCS 4.1                  SUMMARY-081
     D1711     6DEC      DECK-ID C05   MSCS 4.1                  SUMMARY-082

     D1738     6F87      DECK-ID C08   MSCS 4.1                  SUMMARY-081
     REWCK     71CC      DECK-ID C13   MSCS 4.1                  SUMMARY-079

     MMEXEC    71EA      DECK-ID C15   MSCS 4.1                  SUMMARY-081
*LP      REENTRANT FORTRAN RUNTIME LIBRARY

     FORTR     735F      DECK-ID A01   3.2 FTN RUNTIME           SUMMARY-079
     Q8PRMR    7491      DECK-ID B01   3.2 FTN RUNTIME           SUMMARY-079

     PARABR    74A8      DECK-ID B02   3.2 FTN RUNTIME           SUMMARY-081
     Q8EXPR    74B9      DECK-ID B03   3.2 FTN RUNTIME           SUMMARY-079

     Q8ABR     756A      DECK-ID B04   3.2 FTN RUNTIME           SUMMARY-079
     SQRTFR    7581      DECK-ID B05   3.2 FTN RUNTIME           SUMMARY-079

     SIGNR     75DC      DECK-ID B06   3.2 FTN RUNTIME           SUMMARY-079
     FXFLR     7608      DECK-ID B07   3.2 FTN RUNTIME           SUMMARY-079

     EXPRGR    7673      DECK-ID B08   3.2 FTN RUNTIME           SUMMARY-079
     LNPRGR    7715      DECK-ID B09   3.2 FTN RUNTIME           SUMMARY-079

     TANHR     778F      DECK-ID B10   3.2 FTN RUNTIME           SUMMARY-079
     SNCSR     77FB      DECK-ID B11   3.2 FTN RUNTIME           SUMMARY-079

     ARCPGR    78C7      DECK-ID B12   3.2 FTN RUNTIME           SUMMARY-079
     IFALTR    7960      DECK-ID B13   3.2 FTN RUNTIME           SUMMARY-079

     FLOATR    7977      DECK-ID B14   3.2 FTN RUNTIME           SUMMARY-079
     Q8QIOR    7B73      DECK-ID C01   3.2 FTN RUNTIME           SUMMARY-082
```

559 (6-49D)

```
DATE  11/16/74
      BINARR    7CD5      DECK-ID C02   3.2 FTN RUNTIME        SUMMARY-079
      IOCCDR    7D22      DECK-ID D01   3.2 FTN RUNTIME        SUMMARY-079
      INITLR    7D56      DECK-ID D02   3.2 FTN RUNTIME        SUMMARY-079
      RSTORR    7D65      DECK-ID D03   3.2 FTN RUNTIME        SUMMARY-079
      GETCHR    7D75      DECK-ID D04   3.2 FTN RUNTIME        SUMMARY-079
      IBACKR    7D8F      DECK-ID D05   3.2 FTN RUNTIME        SUMMARY-079
      UPDATR    7DC6      DECK-ID D06   3.2 FTN RUNTIME        SUMMARY-079
      DECPLR    7DD3      DECK-ID D07   3.2 FTN RUNTIME        SUMMARY-079
      INTGRR    7DF9      DECK-ID D08   3.2 FTN RUNTIME        SUMMARY-079
      SPACER    7E26      DECK-ID D09   3.2 FTN RUNTIME        SUMMARY-079
      HOLR      7E3E      DECK-ID D10   3.2 FTN RUNTIME        SUMMARY-079
      DCHXR     7ED2      DECK-ID D11   3.2 FTN RUNTIME        SUMMARY-079
      HXASCR    7F45      DECK-ID D12   3.2 FTN RUNTIME        SUMMARY-079
      AFMTOR    7F98      DECK-ID D13   3.2 FTN RUNTIME        SUMMARY-079
      RFMTOR    7FC2      DECK-ID D14   3.2 FTN RUNTIME        SUMMARY-079
      AFMTIR    7FDB      DECK-ID D15   3.2 FTN RUNTIME        SUMMARY-079
      RFMTIR    8009      DECK-ID D16   3.2 FTN RUNTIME        SUMMARY-079
      ASCHXR    8020      DECK-ID D17   3.2 FTN RUNTIME        SUMMARY-079
      HXDCR     805B      DECK-ID D18   3.2 FTN RUNTIME        SUMMARY-079
      FLOTIR    80EB      DECK-ID D19   3.2 FTN RUNTIME        SUMMARY-079
      FOUTR     8135      DECK-ID D20   3.2 FTN RUNTIME        SUMMARY-079
      EOUTR     81BE      DECK-ID D21   3.2 FTN RUNTIME        SUMMARY-079
      EWRITR    82A6      DECK-ID D22   3.2 FTN RUNTIME        SUMMARY-079
      INTIIR    82B2      DECK-ID D23   3.2 FTN RUNTIME        SUMMARY-079
      FCRMTR    82CF      DECK-ID D24   3.2 FTN RUNTIME        SUMMARY-081
      Q8QFIR    84A4      DECK-ID D25   3.2 FTN RUNTIME        SUMMARY-079
      Q8QFLR    84BE      DECK-ID D26   3.2 FTN RUNTIME        SUMMARY-079
      Q8QFXR    84ED      DECK-ID D27   3.2 FTN RUNTIME        SUMMARY-079
      HEXAR     8524      DECK-ID D28   3.2 FTN RUNTIME        SUMMARY-079
      HEXDR     853C      DECK-ID D29   3.2 FTN RUNTIME        SUMMARY-079
      ASCIIR    8559      DECK-ID D30   3.2 FTN RUNTIME        SUMMARY-079
      DECHXR    856E      DECK-ID D31   3.2 FTN RUNTIME        SUMMARY-079
      AFORMR    858E      DECK-ID D32   3.2 FTN RUNTIME        SUMMARY-079
      RFORMR    85AA      DECK-ID D33   3.2 FTN RUNTIME        SUMMARY-079
      FLOTGR    85C6      DECK-ID D34   3.2 FTN RUNTIME        SUMMARY-079
      Q8DBLR    85E2      DECK-ID E01   3.2 FTN RUNTIME        SUMMARY-082
      DEXPR     85F7      DECK-ID E02   3.2 FTN RUNTIME        SUMMARY-079
      Q8DABR    8688      DECK-ID E03   3.2 FTN RUNTIME        SUMMARY-079
      DSQRTR    86A6      DECK-ID E04   3.2 FTN RUNTIME        SUMMARY-079
      DSIGNR    8726      DECK-ID E05   3.2 FTN RUNTIME        SUMMARY-079
      SNGLR     8756      DECK-ID E06   3.2 FTN RUNTIME        SUMMARY-079
      Q8DFLR    876C      DECK-ID E07   3.2 FTN RUNTIME        SUMMARY-079
      DEXPFR    8791      DECK-ID E08   3.2 FTN RUNTIME        SUMMARY-079
      DLOGR     884D      DECK-ID E09   3.2 FTN RUNTIME        SUMMARY-079
      DRSTRR    88F6      DECK-ID E10   3.2 FTN RUNTIME        SUMMARY-082
      DSNCSR    892C      DECK-ID E11   3.2 FTN RUNTIME        SUMMARY-079
      DATANR    8A3C      DECK-ID E12   3.2 FTN RUNTIME        SUMMARY-079
      DFLOTR    8B0F      DECK-ID E13   3.2 FTN RUNTIME        SUMMARY-079
      Q8QDFR    8EAB      DECK-ID E14   3.2 FTN RUNTIME        SUMMARY-079
      DCUTR     8EC7      DECK-ID E15   3.2 FTN RUNTIME        SUMMARY-079
      NXTLOC    8FD1      NEXT AVAILABLE LOCATION
*
*        SYSTEM MASS RESIDENT PROGRAMS
*
*M                  LIBEDT          1
      LIBEDT    0181      DECK-ID D02  MSCS 4.1              SUMMARY-081
*M                  LOADSD          2
```

6.5 Modification of Background Library

6.5.1 Extracting Q8QIO from Binaries File So That the Limited Input/Output Library May Be Used Optionally in the Background

This procedure assumes that the current FORTRAN background library includes modules with deck identifiers H01-H20 and J01-J26 as described in Table 2-1. In the strict sense this procedure is not a system customization since the system itself is not modified. The procedure described in this article shows how to exercise the runtime option of running a background FORTRAN program with the FORTRAN Limited Input/Output Library rather than the FORTRAN Input/Output Library. The basic method is to load the module Q8QIO with the user's program so that when the user's program is linked to the background library routines, the entry points in Q8QIO will be used first. This has the effect of making the FORTRAN Limited Input/Output Library the library used in executing the user's program.

The binary form of Q8QIO will be available in the MSOS binaries if a FORTRAN compiler was included in the system at the time of MSOS 4.1 installation. If FORTRAN was added subsequent to MSOS installation the Q8QIO binary will be found in the FORTRAN binaries file sent to the user at the time FORTRAN was added. If Q8QIO has been modified since release, it will be included in an update file.

The Q7QIO binary may be located within the appropriate binaries file by running the LISTR program with the binary file as input. This produces a list of the modules in the file and the number of records in each module. {Refer to the MSOS 4.1 Reference Manual}. Using this information the Q8QIO binary may be extracted from the binaries file.

For example, suppose the relevant binaries file is the FORTRAN 3.2A binaries file. A portion of the LISTR output of that file is as follows:

.	.	.	.	.	.	.
0329	Q8QGTR	0004	RECORDS	3938	TOTAL	RECORDS..
0330	Q8QGTX	0004	RECORDS	3942	TOTAL	RECORDS..
0331	Q8QIO	0010	RECORDS	3952	TOTAL	RECORDS..
0332	Q8QUNI	0006	RECORDS	3958	TOTAL	RECORDS..
0333	Q8QX	0007	RECORDS	3965	TOTAL	RECORDS..
0334	Q8RWBU	0010	RECORDS	3975	TOTAL	RECORDS..
0335	Q8TRAN	0076	RECORDS	4051	TOTAL	RECORDS..
.	.	.	.	.	.	.

The program LIBEDT may be used to extract the Q8QIO binary from a binary file. If the above file is on tape, logical unit G, and Q8QIO is to be punched on cards on logical unit 11 the LIBEDT commands to perform this transfer are as follows:

```
*JOB
*LIBEDT
*T,6,B,2,B,3942
```

The above transfers 3942 record to the dummy device, logical unit 2, thus advancing the tape to the beginning of Q8QIO.

```
*T,6,B,11,B,10
```

The above transfers the 10 records in Q8QIO to the card punch, logical unit 11.

The job setup for running a FORTRAN background program with the FORTRAN Limited Input/Output Library is shown in Figure 6-1.

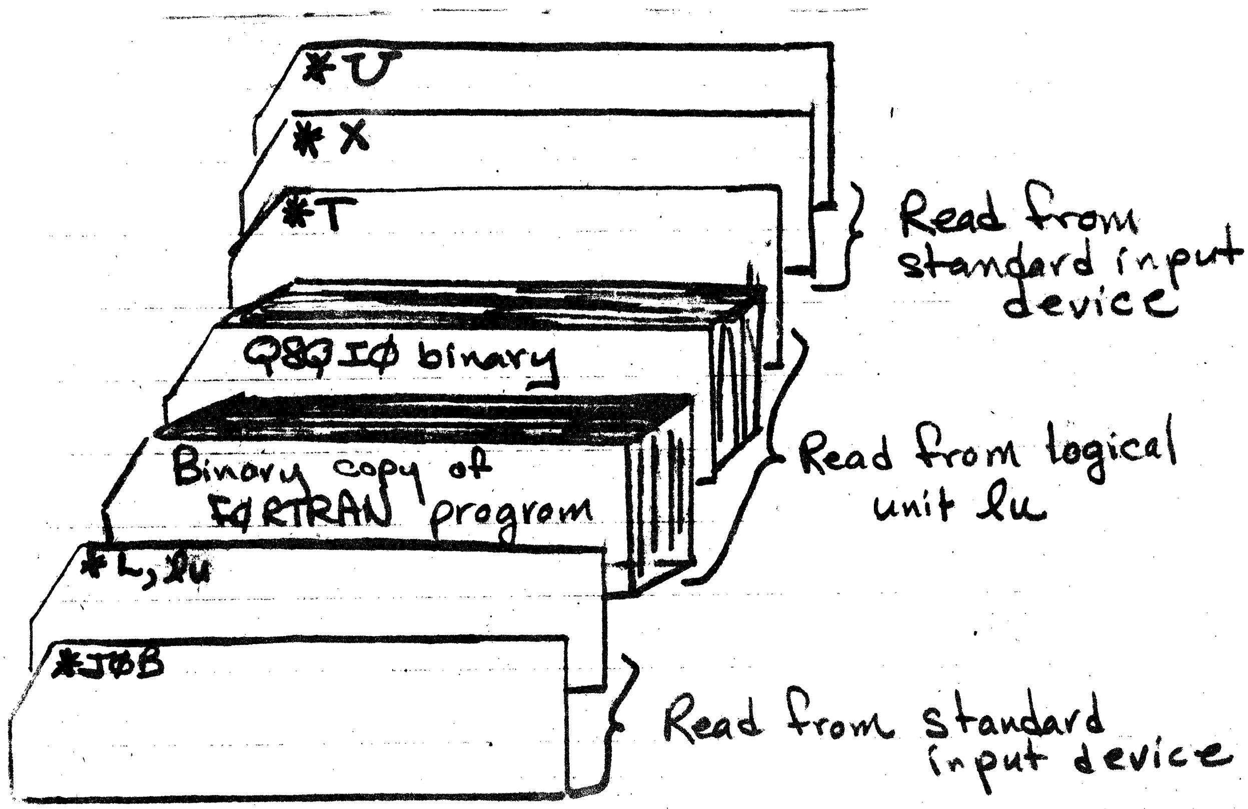

Figure 6-1. Job Setup for Running Background FORTRAN program with Limited Input/Output Library.

The setup is the same whether cards or tape is used. The value of lu in the second record designates the logical unit from which the binary records and the *T record are to be read by the loader. The *X and * U records are read by the Job Processor. In the figure it is assumed that logical unit lu designates the standard input device, but this need not be the case if the binary information and the *T record are separated from the other control records. To run with the FORTRAN Input/Output Library, the Q8QIO binary is omitted.

Consider now an example of a FORTRAN program run with the FORTRAN Input/Output Library and subsequently run with the FORTRAN Limited Input/Output Library. The FORTRAN source program and its compilation assembly list are as follows:

564 (6-51E)

```
        C THIS PROGRAM MAY BE USED TO DEMONSTRATE EXECUTION WITH THE
        C FORTRAN INPUT/OUTPUT LIBRARY AND EXECUTION WITH THE FORTRAN
        C LIMITED INPUT/OUTPUT LIBRARY
  1           DIMENSION IBUF(100)
        C THE CALL TO SETBFR IS NECESSARY WHEN RUNNING WITH THE FORTRAN
        C LIMITED INPUT/ OUTPUT LIBRARY
  2           CALL SETBFR (IBUF,100)
        C THE VALUE OF PI SHOULD BE PRINTED CORRECTLY BY BOTH THE FORTRAN
        C INPUT/ OUTPUT LIBRARY AND THE FORTRAN LIMITED INPUT/ OUTPUT LIBRARY
  3           PI =3.1415927
  4           WRITE (12,100) PI
        C THE VALUE OF TESTN WILL BE PRINTED CORRECTLY BY THE FORTRAN INPUT/
        C OUTPUT LIBRARY, BUT NOT BY THE FORTRAN LIMITED INPUT/ OUTPUT LIBRARY
  5           TESTN=600000.
  6           WRITE (12,200)  TESTN
  7       100 FORMAT (10X,3HPI=,2X,F9.7)
  8       200 FORMAT (* TESTN= *,F8.0)
  9           END

    0000  0000                NAM    Q8QNAM
                    .00001
    0000  186A      Q8QNAM    JMP*   .00002
    0001  0064      IBUF      BSS       100
    0065  0064      0064$     CON       100
    0066  0002      PI        BSS         2
    0068  0002      TESTN     BSS         2
    006A  5802      .00002    RTJ*   .00006
    006B  FF94                ADC    .00001
    006C  0001      .00006    BSS         1
    006D  C8FE                LDA*   .00006
    006E  88FC                ADD*   .00006     -1
    006F  68FC                STA*   .00006
2   0070  5400                RTJ+   SETBFR
    0071  7FFF
    0072  FF8E                ADC    IBUF
    0073  FFF1                ADC    0064$
3   0074  5400                RTJ+   DFLCT
    0075  7FFF
    0076  5B40                CON     23360
    0077  001D                ADC    4164..
    0078  5400                RTJ+   RSTCR1
    0079  7FFF
    007A  FFEB                ADC    PI
4   007B  5400                RTJ+   Q8QINI
    007C  7FFF
    007D  7A00                CON     31232
    007E  0004                CON         4
    007F  000C                CON        12
    0080  8019                ADC    100
4   0081  5400                RTJ+   Q8QX
    0082  7FFF
    0083  FFE2                ADC    PI
4   0084  5400                RTJ+   Q8QEND
    0085  7FFF
5   0086  5400                RTJ+   FLOT
    0087  7FFF
```

565

```
6     0088  5BD4            CON    23508
      0089  000E            ADC    4A49.
      008A  7FDD            ADC    TESTN
      008B  5CF0            RTJ*   (Q8GINI)
      008C  7A00            CON    31232
      008D  0006            CON        6
      008E  000C            CON       12
      008F  8015            ADC    200
6     0090  5CF1            RTJ*   (Q8GX    )
      0091  FFD6            ADC    TESTN
6     0092  5CF2            RTJ*   (Q8GEND)
      0093  1810            JMP*   .00007
      0094  4164  4164..    CON    16740
      0095  87ED            CON    -30738
      0096  69FC            CON    27132
      0097  4A49  4A49.     CON    19017
      0098  3E00            CON    15872
7     0099  000A  100       BSS       10
      0099  0099            ORG    100
      0099  2831            CON    10289
      009A  3058            CON    12376
      009B  2C33            CON    11315
      009C  4850            CON    18512
      009D  493D            CON    18749
      009E  2C32            CON    11314
      009F  582C            CON    22572
      00A0  4639            CON    17977
      00A1  2E37            CON    11831
      00A2  2920            CON    10528
      00A3  180A  .00007    JMP*   .00008
8     00A4  0009  200       BSS        9
      00A4  00A4            ORG    200
      00A4  2838            CON    10296
      00A5  4820            CON    18464
      00A6  5445            CON    21573
      00A7  5354            CON    21332
      00A8  4E3D            CON    20029
      00A9  202C            CON     8236
      00AA  4638            CON    17976
      00AB  2E30            CON    11824
      00AC  2920            CON    10528
9     00AD  5400  .00008    RTJ+   Q8STP
      00AE  7FFF
9     0000  0000            END        0

PROGRAM LENGTH $00AF (    175)

OPTS = RPAL

EXTERNALS

FLOT   Q8STP  Q8GINI Q8QX   Q8GEND DFLOT  RSTOR1
SETBFR
```

Running this program with the FORTRAN Input/Output Library {i.e., the usual way} produces a load map, entry point table, and program output as follows:

567 6-51H

```
L,10
   Q8QNAM    2C9E
X

   FLOAT     2D4D   DECK-ID G13   3.2 FTN RUNTIME          SUMMARY-079
   Q8QINI    2F9F   DECK-ID H04   3.2 FTN RUNTIME          SUMMARY-081

   Q8QEND    3076   DECK-ID H05   3.2 FTN RUNTIME          SUMMARY-079
   Q8CMP     3097   DECK-ID H06   3.2 FTN RUNTIME          SUMMARY-083

   Q8RWBL    317B   DECK-ID H07   3.2 FTN RUNTIME          SUMMARY-079
   Q8FRRM    328C   DECK-ID H08   3.2 FTN RUNTIME          SUMMARY-079

   Q8DFIC    335F   DECK-ID H09   3.2 FTN RUNTIME          SUMMARY-079
   Q8QX      3425   DECK-ID H10   3.2 FTN RUNTIME          SUMMARY-079

   Q8QUNI    348D   DECK-ID H11   3.2 FTN RUNTIME          SUMMARY-079
   Q8FGET    34DB   DECK-ID H12   3.2 FTN RUNTIME          SUMMARY-079

   Q8MAGT    3548   DECK-ID H13   3.2 FTN RUNTIME          SUMMARY-079
   TAPCON    359C   DECK-ID H14   3.2 FTN RUNTIME          SUMMARY-081

   PSSTOP    3644   DECK-ID H16   3.2 FTN RUNTIME          SUMMARY-079
   Q8PAND    367B   DECK-ID H17   3.2 FTN RUNTIME          SUMMARY-083

   Q8QGTX    36DD   DECK-ID H20   3.2 FTN RUNTIME          SUMMARY-079
   DFLCTN    36E5   DECK-ID K12   3.2 FTN RUNTIME          SUMMARY-079

   DUMVOL    3AAF   DECK-ID K13   3.2 FTN RUNTIME          SUMMARY-079
   DRSTOR    3ADF   DECK-ID K14   3.2 FTN RUNTIME          SUMMARY-079

   Q8IFRM    3B17   DECK-ID H01   3.2 FTN RUNTIME          SUMMARY-079
   Q8FS      3B56   DECK-ID H02   3.2 FTN RUNTIME          SUMMARY-079

   Q8TRAN    3D8A   DECK-ID H03   3.2 FTN RUNTIME          SUMMARY-079
   Q8EXP1    45D5   DECK-ID H18   3.2 FTN RUNTIME          SUMMARY-079

   Q8EXP9    4653   DECK-ID H19   3.2 FTN RUNTIME          SUMMARY-079
   Q8DXP1    4706   DECK-ID K15   3.2 FTN RUNTIME          SUMMARY-079

   Q8DXP9    47A6   DECK-ID K16   3.2 FTN RUNTIME          SUMMARY-079
   Q8PRMS    48AC   DECK-ID G01   3.2 FTN RUNTIME          SUMMARY-079
 ENTRY POINT TABLE-
   Q8DXP1    4706     Q8DXP2    4897     Q8QFLE    35E6     Q8QBCK    360C

   Q8INTE    317B     Q8DXP9    47B4     Q8MAGT    3548     Q8FGET    34E4
   Q8RWBL    31CB     EOF       35F5     Q8IGP     34DF     Q8BINB    3212

   Q8CCMI    3665     DSTOR1    3ADF     DSTOR2    3B01     Q8EOTT    3582
   Q8PSE     3644     Q8QX      3438     Q8QY      3431     Q8QZ      342B

   Q8PAND    367B     Q8IBUF    322B     Q8EXP1    45D5     Q8EXP2    46F8
   Q8CLRB    31A6     Q8EXP9    4661     RSTOR1    3AF1     Q8TRAN    4575

   Q8PSEN    3649     Q8UNIT    2FF8     Q8EXPT    46F6     Q8STP     365B
   FLOT      2D4F     AVOLR     3AB7     Q8MOVE    3476     Q8QTRM    343B

   Q8STPN    3662     Q8QUN1    348D     Q8QUN2    3491     Q8QUN3    34A0
   Q8QEND    3076     Q8QINI    2F9F     Q8DFIN    33DF     Q8QENS    3143

   Q8QWND    3603     Q8BFGB    31A3     AVOLA     3AAF     Q8DFNF    335F
   Q8IFRM    3B46     RECEND    3144     Q8QNAM    2C9E     Q8FPUT    3516

   Q8DFAD    3097     Q8RINT    31B5     Q8ERRM    328C     Q8FS      3D59
   Q8CMP0    3099     Q8CMP1    30D0     WRFLG     31CA     Q8SKIP    306F

   Q8FREM    32E3     Q8QTOM    3425     Q8LOCE    319E     Q8FERM    32D6
   Q8LOCF    34DC     Q8QGET    36DD     SETBFR    36E1     DFLOT     36F4
   Q8DXPT    4894     Q8PREP    48AC     Q8PKUF    48B9

        PI=   3.1415927
 TESTN=  600000.
   STOP
```

When the same program is loaded with a Q8QIO binary the FORTRAN Limited Input/Output Library is used during execution, and output is as follows:

```
L,10
   Q8QNAM   2C9E
   Q8QIO    2D4D   DECK-ID L01   3.2 FTN RUNTIME          SUMMARY-079
X
   FLOAT    2E4E   DECK-ID G13   3.2 FTN RUNTIME          SUMMARY-079
   PSSTOP   30A0   DECK-ID H16   3.2 FTN RUNTIME          SUMMARY-079

   Q8RAND   30D7   DECK-ID H17   3.2 FTN RUNTIME          SUMMARY-083
   PSUEDC   3139   DECK-ID J02   3.2 FTN RUNTIME          SUMMARY-079

   FORMTN   315E   DECK-ID J23   3.2 FTN RUNTIME          SUMMARY-079
   DFLCTN   333A   DECK-ID K12   3.2 FTN RUNTIME          SUMMARY-079

   DUMVOL   3704   DECK-ID K13   3.2 FTN RUNTIME          SUMMARY-079
   DKSTOR   3734   DECK-ID K14   3.2 FTN RUNTIME          SUMMARY-079

   DOUTN    376C   DECK-ID K18   3.2 FTN RUNTIME          SUMMARY-079
   IGFTCH   3877   DECK-ID J03   3.2 FTN RUNTIME          SUMMARY-079

   IPACK    388E   DECK-ID J04   3.2 FTN RUNTIME          SUMMARY-079
   UPDATN   38C8   DECK-ID J05   3.2 FTN RUNTIME          SUMMARY-079

   DECEL    38D2   DECK-ID J06   3.2 FTN RUNTIME          SUMMARY-079
   INTGR    38EF   DECK-ID J07   3.2 FTN RUNTIME          SUMMARY-079

   SPACEN   3915   DECK-ID J08   3.2 FTN RUNTIME          SUMMARY-079
   HOLRTH   3928   DECK-ID J09   3.2 FTN RUNTIME          SUMMARY-079

   DCHX     39AB   DECK-ID J10   3.2 FTN RUNTIME          SUMMARY-079
   HXASC    3A1B   DECK-ID J11   3.2 FTN RUNTIME          SUMMARY-079

   AFRMOT   3A67   DECK-ID J12   3.2 FTN RUNTIME          SUMMARY-079
   RFRMOT   3A8A   DECK-ID J13   3.2 FTN RUNTIME          SUMMARY-079

   AFRMIN   3A9E   DECK-ID J14   3.2 FTN RUNTIME          SUMMARY-079
   RFRMIN   3ACA   DECK-ID J15   3.2 FTN RUNTIME          SUMMARY-079

   ASCHX    3ADC   DECK-ID J16   3.2 FTN RUNTIME          SUMMARY-079
   HXDC     3B10   DECK-ID J17   3.2 FTN RUNTIME          SUMMARY-079

   FLOTIN   3B99   DECK-ID J18   3.2 FTN RUNTIME          SUMMARY-079
   FOUT     3BDE   DECK-ID J19   3.2 FTN RUNTIME          SUMMARY-079

   EOUT     3C64   DECK-ID J20   3.2 FTN RUNTIME          SUMMARY-079
   EWRITE   3D4D   DECK-ID J21   3.2 FTN RUNTIME          SUMMARY-079

   Q8QFI    3D5C   DECK-ID J24   3.2 FTN RUNTIME          SUMMARY-079
   Q8QFL    3D72   DECK-ID J25   3.2 FTN RUNTIME          SUMMARY-079

   Q8QFX    3D9D   DECK-ID J26   3.2 FTN RUNTIME          SUMMARY-079
   Q8QDFN   3DCD   DECK-ID K17   3.2 FTN RUNTIME          SUMMARY-079

 E10
 BINARY
```

NOTE: This message indicates that BINARY is an unpatched external. When running with Q8QIO it is necessary at this point to type * and press carriage return on the comment device. This causes the loader to ignore the unpatched external, BINARY, and to continue with the entry point table and program execution.

ENTRY POINT TABLE-

Q8QFL	3D72	DECPL	38D2	ASCHX	3ADC	QUOTE	3967
AFRMIN	349E	ISAVE	313B	Q8COMI	30C1	DSTOR1	3734
DSTCR2	3756	RFRMOT	3A8A	Q8PSE	30A0	Q8QX	2DE2
INTGR	38EF	Q8PAND	30D7	DOUT	376D	RSTOR1	3746
Q8PSEN	30A5	Q8QFI	3D5C	Q8STP	30B7	DCHX	39AB
FLOT	2E50	AVOLR	370C	Q8STPN	30BE	EWRITE	3D4D
AFRMOT	3A67	SPACEX	3915	IPACK	388E	Q8QEND	2E31
EOUT	3565	Q8QINI	2D82	HXASC	3A1B	Q8QGET	2E3E
FLOTIN	3B99	GETCH	3880	CHCNT	315F	AVOLA	3704
Q8QNAM	2C9E	IGETCH	3877	FGRMTR	3160	Q8QFX	3D9D
FOUT	3BDF	Q8QDFI	3DCD	HGLRTH	3928	DFLOT	3349
UPDATE	38C8	SETBFR	2D4D	RFRMIN	3ACA	IQERR	2E4B
COMMON	3139	HXDC	3B10				

```
        PI=  3.1415925
TESTN=  ********
 STOP
```

6.5.2 Making the Limited Input/Output Library the Only FORTRAN Background Library

The procedure described in this article is one which would not be performed by most users. The main reason a user might wish to make the Limited Input/Output Library the only FORTRAN background library would be that his only use of FORTRAN in the background would be to simulate the foreground. The reason this procedure is not often used is that while it does provide for simulation of the foreground FORTRAN library, it does not simulate other foreground conditions. The procedure is included for the sake of completeness.

To make the Limited Input/Output Library the only FORTRAN background library available, the skeleton must be modified so that those modules listed in Group V of Article 2.1 together with Q8AIO are included in the FORTRAN background library. The modules in Group VI of Article 2.1 may be optionally included. Either Group W or the module DBLDMY must be included. For this customization a module included in the FORTRAN background library must be in Group V, Group VI, or Group W or be Q8QIO or DBLDMY.

An example of that portion of the skeleton including the FORTRAN Limited Input/Output Library follows. In this example Group VI is included; Group W. is not.

```
*L,ENCODE
*B  ≠IOCODE≠   ≠  DECK-ID J01  3.2 FTN RUNTIME≠
*L,COMMON
*B  ≠PSUEDO≠   ≠  DECK-ID J02  3.2 FTN RUNTIME≠
*L,IGETCH
*B  ≠IGETCH≠   ≠  DECK-ID J03  3.2 FTN RUNTIME≠
*L,IPACK
*B  ≠IPACK≠    ≠  DECK-ID J04  3.2 FTN RUNTIME≠
*L,UPDATE
*B  ≠UPDATN≠   ≠  DECK-ID J05  3.2 FTN RUNTIME≠
*L,DECPL
*B  ≠DECPL≠    ≠  DECK-ID J06  3.2 FTN RUNTIME≠
*L,INTGR
*B  ≠INTGR≠    ≠  DECK-ID J07  3.2 FTN RUNTIME≠
*L,SPACEX
*B  ≠SPACEN≠   ≠  DECK-ID J08  3.2 FTN RUNTIME≠
*L,HOLRTH
*B  ≠HOLRTH≠   ≠  DECK-ID J09  3.2 FTN RUNTIME≠
*L,DCHX
*B  ≠DCHX≠     ≠  DECK-ID J10  3.2 FTN RUNTIME≠
*L,HXASC
*B  ≠HXASC≠    ≠  DECK-ID J11  3.2 FTN RUNTIME≠
*L,AFRMCT
*B  ≠AFRMCT≠   ≠  DECK-ID J12  3.2 FTN RUNTIME≠
```

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```
*L,RFRMCT
*B  ≠RFRMCT≠   ≠  DECK-ID J13  3.2 FTN RUNTIME≠
*L,AFRMIN
*B  ≠AFRMIN≠   ≠  DECK-ID J14  3.2 FTN RUNTIME≠
*L,RFRMIN
*B  ≠RFRMIN≠   ≠  DECK-ID J15  3.2 FTN RUNTIME≠
*L,ASCHX
*B  ≠ASCHX≠    ≠  DECK-ID J16  3.2 FTN RUNTIME≠
*L,HXDC
*B  ≠HXDC≠     ≠  DECK-ID J17  3.2 FTN RUNTIME≠
*L,FLOTIN
*B  ≠FLOTIN≠   ≠  DECK-ID J18  3.2 FTN RUNTIME≠
*L,FOUT
*B  ≠FOUT≠     ≠  DECK-ID J19  3.2 FTN RUNTIME≠
*L,EOUT
*B  ≠EOUT≠     ≠  DECK-ID J20  3.2 FTN RUNTIME≠
*L,EWRITE
*B  ≠EWRITE≠   ≠  DECK-ID J21  3.2 FTN RUNTIME≠
*L,INITL1
*B  ≠INITL1≠   ≠  DECK-ID J22  3.2 FTN RUNTIME≠
*L,FORMTR
*B  ≠FORMTN≠   ≠  DECK-ID J23  3.2 FTN RUNTIME≠
*L,Q8QFI
*B  ≠Q8QFI≠    ≠  DECK-ID J24  3.2 FTN RUNTIME≠
*L,Q8QFL
*B  ≠Q8QFL≠    ≠  DECK-ID J25  3.2 FTN RUNTIME≠
*L,Q8QFX
*B  ≠Q8QFX≠    ≠  DECK-ID J26  3.2 FTN RUNTIME≠
*L,HEXASC
*B  ≠HEXASC≠   ≠  DECK-ID J27  3.2 FTN RUNTIME≠
*L,HEXDEC
*B  ≠HEXDEC≠   ≠  DECK-ID J28  3.2 FTN RUNTIME≠
*L,ASCII
*B  ≠ASCII≠    ≠  DECK-ID J29  3.2 FTN RUNTIME≠
*L,DECHEX
*B  ≠DECHEX≠   ≠  DECK-ID J30  3.2 FTN RUNTIME≠
*L,AFORM
*B  ≠AFORM≠    ≠  DECK-ID J31  3.2 FTN RUNTIME≠
*L,RFORM
*B  ≠RFORM≠    ≠  DECK-ID J32  3.2 FTN RUNTIME≠
*L,FLOATG
*B  ≠FLOATG≠   ≠  DECK-ID J33  3.2 FTN RUNTIME≠


*L,Q8QINI
*B  ≠Q8QIO≠
*L,Q8DXF1
*B  ≠DALDMY≠   ≠  DECK-ID K19  3.2 FTN RUNTIME≠
```

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The module Q8QIO is available from the MSOS binaries file if FORTRAN was part of the initial MSOS 4.1 installation. Otherwise Q8QIO is available from the FORTRAN binaries file. Using the modified skeleton the appropriate binaries file, and the current install file, a new install file may be created by using LIBILD. The new install file may then be used to build and verify a new system, as described in the 1700 MSOS 4 Installation Handbook.

6.5.3 Making the Limited Input/Output Library the Principal FORTRAN Background Library with the Input/Output Library Available Optionally 6-56

For this customization the skeleton must be modified so that the modules with the following deck identifiers form the core of the FORTRAN background library:

H01-H03
H06-H09
H11-H19
J01-J26
H21

K01-K18 or K19

In additbn the modules with the following deck identifiers optionally:

J27-J33

Q8QIO is available in the MSOS binaries file if FORTRAN was included in the initial MSOS 4.1 installation. Otherwise it is available in the FORTRAN binaries file sent to the user at the time FORTRAN was added. Using the revised skeleton, the appropriate binaries fiel, and the current install file, a new install file may be created by the use of LIBILD. The new install file may then be used to build a new system using the procedure described in the 1700 MSOS 4 Installation Handbook. {Refer also to Article 2.1 for more information on this customization}.

CHAPTER 7 - INSTALLATION OF PSR CORRECTIVE CODE

An MSOS corrective code file is a set of programs in binary form such that each program in the file has been modified by Control Data since the initial issuance of MSOS 4. A binary in the update file is the new modified version of the program. Associated with each file is a PSR level. A file for a given PSR level contains the modified version of each program having a PSR at that level as well as the modified version of each program having a PSR which was written subsequent to the corrective code release. For example, the MSOS update file for PSR Level 86 contains those modules with PSR's at levels 82-85 which were written after MSOS 4.1 release, as well as those modules with PSR's at Level 86. An MSOS file may be on cards, magnetic tape, or paper tape. The file media should correspond to the user's installation medium. PSR corrective code is released periodically.

A FORTRAN corrective code file is defined similarly to an MSOS file. A given FORTRAN update file will apply to either the FORTRAN 3A compiler or to the FORTRAN 3B compiler. The user should obtain the FORTRAN file corresponding to the particular compiler he has, if his system includes FORTRAN. This file will include any FORTRAN library module updates as well as the compiler updates. As for an MSOS file, FORTRAN . files are issued periodically by Control Data, and each FORTRAN update file contains preceding as well as current updates. A FORTRAN update file sent to a user may be on cards, magnetic tape, or paper tape.

7.1 Updating a System Using Cards

If the installation medium is cards, the user receives an MSOS file on cards and either a FORTRAN 3.2A update file or a FORTRAN 3.2B update file on cards if his system includes FORTRAN. For each binary program in the received, the user must find the module with the same name in the current install file. He then deletes the binary cards for this module from the current install file, replacing them with the binary cards for the updated module. By running the LISTR program with the update cards as input, a list may be obtained of the name of each updated module and the number of cards in each module. (Refer to the MSOS 4.1 Reference Manual). This information is helpful in separating the binary decks in the update file. For further information on identifying a binary deck, refer to the MSOS 4.1 Reference Manual, Section 4.3, Card Reader/Punch Drivers.

In addition to replacing current binaries by updated binaries, it is necessary to change the *S system initializer control statements in the install file which define SYSLVL, SYSMON, SYSDAY, and SYSYER. (Refer to Article 2.2)

Using the new install file, the updated system may be built according to the procedure described in the MSOS 4.1 Installation Handbook. Should the system initializer print an error message indicating core has been exceeded, this may be due to an increase in size in one or more updated core resident modules. In this case BGNMON and ENDOV4 should be decreased. (Refer to Article 2.2.)

7.2 Updating a System Using Magnetic Tape or Paper Tape

When using tape, a skeleton corresponding to the latest install file must first be obtained. This may be done by using the program SKED, as shown in the example in Article 7.3. The skeleton should be modified to change the *S system initializer control statement defining SYSLVL, SYSMON, SYSDAY, and SYSYER. Again, the program SKED may be used. The procedure is then to use LIBILD to create a new install file in which the updated binaries from the update tape(s) received replace the corresponding modules in the current install file. This is done by first presenting the update tapes as library input to LIBILD followed by the current install tape. (Refer to Article 7.3.) With the new install tape, the updated system may be built by following the procedure in the MSOS Installation Handbook. As noted in Article 7.1, a system initializer error message may mean that ENDOV4 and BGNMON must be decreased.

7.3 Example of System Update Using Magnetic Tape

In this example magnetic tape is the installation medium. It should be noted that the update procedure for paper tape is essentially the same.

In this example the installed system includes the FORTRAN 3.2B compiler. Therefore, the user received two update tapes, one for MSOS 4.1 and one for FORTRAN 3.2 B.

The procedure is as described in Article 7.2. A skeleton is obtained from the install file and modified by using SKED. The latest install file is mounted on tape unit 0, logical unit 6. In this example the system has been updated or customized since initial installation and thus the install file is the first and only file on this tape. A scratch tape is mounted on tape unit 1, logical unit 16. The typing on the teletype is as follows:

```
MI
*BATCH
L,10 FAILED 02
ACTION
CU
J
*JOB
J
*SKED
SKED IN

NEXT
CAT
```

The BUILD command builds the skeleton from the install file. The CATLOG command lists the skeleton records. The first ten records of the skeleton are as follows:

```
 1  *S,SYSMON,$3036
 2  *S,SYSDAY,$3135
 3  *S,SYSYER,$3734
 4  *S,SYSLVL,$3833
 5  *V
 6  *V        1700 MASS STORAGE OPERATING SYSTEM - VER. 4.1
 7  *V
 8  *V        1700 ↑ 3 -- 32K SYSTEM
 9  *V
10  *YM,LIBEDT,1
```

The PSR level is to be changed from 83 to 87. The date of system build is to be changed from 6/15/74 to 10/29/74. The following commands to SKED are used to make these changes.

```
NEXT
INSERT,3,4
*S,SYSLVL,$3837
*S,SYSMON,$3130
*S,SYSDAY,$3239

NEXT
DELETE,1,2

NEXT
DELETE,4,4

NEXT
DUMP,16

NEXT
EXIT

J
```

The dump command results in the revised skeleton being listed on the line printer and being dumped on tape unit one. The first ten records of the revised skeleton are as follows:

```
 1  *S,SYSVER,$3734
 2  *S,SYSLVL,$3837
 3  *S,SYSMON,$3130
 4  *S,SYSDAY,$3239
 5  *V
 6  *V        1700 MASS STORAGE OPERATING SYSTEM - VER. 4.1
 7  *V
 8  *V        1700 ↑ 3 -- 32K SYSTEM
 9  *V
10  *YM,LIBEDT,1
```

The second step is to use LIBILD to generate an updated install file. A scratch tape is mounted on tape unit 1, logical unit 16. There are three input library tapes, the MSOS 4.1 update tape, the FORTRAN 3.2B update tape, and the most recent install file. The update tapes must be read first. This is because when LIBILD encounters more than one binary copy of a program specified by the skeleton, it is the first binary that is placed in the install file. The MSOS 4.1 library tape originally sent to the user as a part of the installation materials may be used as LIBILD input instead of the current install file, but then a fourth input library, a binary of the current SYSDAT, must also be input to LIBILD. The three input library tapes are to be read from tape unit 0, logical unit 6. Typing on the teletype proceeds as follows:

```
*LIBILD
CONTROL LU    =
DEFS LU       =
INSTALL LU    = 16
NEWLIB LU     =
LIB 01 LU     = 6
LIB 02 LU     = 6
LIB 03 LU     = 6
LIB 04 LU     =
SKELETON LU   = 6

 LOAD LIBRARY INPUT   02 ON LU    06.  CR WHEN READY.

 LOAD LIBRARY INPUT   03 ON LU    06.  CR WHEN READY.

LOAD SKEL/INSTAL. CR WHEN READY

LIBRARY BUILD COMPLETE
TYPE *Z TO TERMINATE OR
TYPE *C TO CONTINUE WITH CURRENT SKELETON AND/OR
OUTPUT LIBRARY LU'S *Z
J
*REW,16,6
J
```

The third step is to use the updated install file to build a new system including the updates. The procedure is as described in the 1700 MSOS 4 Installation Handbook. Typing on the teletype continues as follows:

```
*SILP
THE INITIALIZER WILL BE MOVED TO LOCATION 5CFF AND EXECUTED

TURN OFF PROTEC SWITCH AND TYPE CARRIAGE RETURN
```

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At this point the disk pack on disk unit 0 is removed. A scratch pack is mounted. The new system will be built on the scratch pack. After entering a carriage return typing on the teletype continues.

```
MSOS 4.1 SYSTEM INITIALIZER
FWA OF CONTRL = 5CFF

DATE MM/DD/YY
10/29/74

Q
*C,7
*C,7

Q
*V
INITIALIZATION COMPLETED - YOU MAY AUTOLOAD

MSOS 4.1--PSR LEVEL 87   10/29/74

SET PROGRAM PROTECT

1700 # 3 -- 32K SYSTEM

65K MODE

CHECKING FILES -  OK

ENTER DATE/TIME  MMDDYYHHMM

1029741050
DATE: 29 OCT 74   TIME: 1050:00
```

581

MI
*BATCH
*CTO, MSOS 4.1 INSTALLATION COMPLETED - YOU MAY AUTOLOAD

MSOS 4.1--PSR LEVEL 87 10/29/74

SET PROGRAM PROTECT

1700 # 3 -- 32K SYSTEM

65K MODE

CHECKING FILES - OK

ENTER DATE/TIME MMDDYYHHMM

1029741118
DATE: 29 OCT 74 TIME: 1118:00

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Chapter 8. Addition of a User-Written Core Resident Application Program.

In general it is not necessary to modify SYSDAT when adding a core resident application program. The skeleton must be modified to include the necessary control records to load the core resident program. The program to be added may be loaded in either Part 0 or Part 1. If loaded in Part 0 and unprotected core is also in Part 0, the program to be added must be loaded between SYSDAT and SPACE. This insures that protected allocatable core is contiguous with unprotected core, thus permitting core swaps when necessary. If loaded in Part 1, the program to be added should be inserted just before the dummy module NXTLOC. If the new program is loaded in Part 1 it will usually be necessary to modify the skeleton records which define ENDOV4 and BGNMON. This will necessitate changing the value of N4 in some cases.

If the core resident program is to be a system library program a *Y record must be added to the skeleton so that the added program will be included in the system library directory. The possible advantages of including a core resident program in the system library are (1) the program may be accessed by a monitor schedule request and (2) LIBEDT may be used to replace the core resident program by a new version of the program so long as the length of the revised program does not exceed the length of the original ordinal loaded into core.

The following example illustrates the addition of a core resident program to the system library. The base system in this example is the system built in Article 6.4.3. The source and assembly list of the program to be added are as follows:

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```
      PROGRAM CORESO
C THIS PROGRAM MAY BE USED TO DEMONSTRATE THE LOADING OF A CORE
C RESIDENT ORDINAL INTO THE SYSTEM LIBRARY
      DIMENSION IBUF (38)
      CALL SETBFR(IBUF,38)
      WRITE (4,100)
  100 FORMAT (  * HELLO THIS IS CORESO *  )
      END

 0000  0000                  NAM    CORESO

 0000  1828        CORESO    JMP*   .00001
 0001  0026        IBUF      BSS        38

 0027  0026        0026$     CON        38
 0028  5400        .00001    RTJ+   SETBFR

 0029  7FFF
 002A  0001  P               ADC    IBUF
 002B  0027  P               ADC    0026$
 002C  5400                  RTJ+   Q8QINI
 002D  7FFF
 002E  7200                  CON     29184
 002F  0004                  CON         4
 0030  0004                  CON         4
 0031  0033  P               ADC    100
 0032  180F                  JMP*   .00004

 0033  000E        100       BSS        14
 0033  0033                  ORG    100

 0033  2832                  CON     10290
 0034  3248                  CON     12872

 0035  2048                  CON      8264
 0036  454C                  CON     17740

 0037  4C4F                  CON     19535
 0038  2054                  CON      8276

 0039  4849                  CON     18505
 003A  5320                  CON     21280

 003B  4953                  CON     18771
 003C  2043                  CON      8259

 003D  4F52                  CON     20306
 003E  4553                  CON     17747

 003F  4F20                  CON     20256
 0040  2920                  CON     10528

 0041  5400        .00004    RTJ+   Q8STP
 0042  7FFF

 0000  0000                  END         0

PROGRAM LENGTH $0043 (     67)

ERRS = PAL

EXTERNALS
Q8STP  Q8QINI  SETBFR
```

The user wishes to load this program in Part 1.

The first part of the revised skeleton is shown in Figure 8-1. Skeleton records 165 and 166 are included to load CORESO as a Part 1 core resident program.

The length of this program is 43_{16} words, meaning that the new value of BGNMON will be $5A97_{16}$ - 43_{16} = $5A54_{16}$, and the new value of ENDOV4 is $5A96_{16}$ - 43_{16} = $5A53_{16}$. The decrease of 43_{16} words available to unprotected and allocatable area 4 together still allow area 4 to remain at $5DC_{16}$ words, since a decrease of 43_{16} in unprotected core leaves 3927_{16} - 43_{16} = $38E4_{16}$ words of unprotected. This is ample for the needs of the system. Skeleton records 49 and 50 show the revised definitions of ENDOV4 and BGNMON.

The program added is to be a system library program. Therefore a *Y system initializer record must be added for this program. This record must precede the *YM records for mass memory resident system library programs. The *Y record will have the form *Y,CORESO,n. The value of n defined as the total number of *L and *LP records preceding the *B record for CORESO. This includes the *LP record immediately preceding the *B record for CORESO. Referring to Figure 8-1, the proper value for n is this example is 8. The *Y record for CORESO is skeleton record 11. The core resident ordinals and mass resident ordinals are numbered independently. Therefore, there is no need to modify the *YM records in the skeleton. The LIBEDT *S control records, skeleton records 393 through 428, need not be modified since they only pertain to the setting of core request priorities for mass resident ordinals. If, however, the user plans to schedule the core resident ordinal by means of a monitor indirect scheduler request, pointing to the system library directory entry as the parameter list, he must set up the request priority within the directory.

SYS

```
*S,SYSMON,$3131
*S,SYSDAY,$3233
*S,SYSYER,$3734
*S,SYSLVL,$3836
*S,N4,$05DC
*V
*V        1700 MASS STORAGE OPERATING SYSTEM - VER. 4.1
*V
*V        ANN≠S TEST SYSTEM
*V
*Y,CORES0,8
*YM,LIBEDT,1
*YM,LOADSD,2
*YM,JOBENT,3
*YM,JOBPRO,4
*YM,PROTEC,5
*YM,JPLOAD,6
*YM,JPCHGE,7
*YM,JPT13,8
*YM,JCRDV4,9
*YM,JLGOV4,10
*YM,JPSTV4,11
*YM,NAMEV4,12
*YM,JPFLV4,13
*YM,AFILV4,14
*YM,RESTOR,15
*YM,RCOVER,16
*YM,BRKPT,17
*YM,ODEBUG,18
*YM,SYSCOP,19
*YM,SYSSEG,20
*YM,MIPRO,21
*YM,TDFUNC,22
*YM,EFSTOR,23
*YM,EFLIST,24
*YM,SCMM17,25
*YM,VERIFY,26
*YM,DUMMY1,27
*YM,DUMMY2,28
*YM,DUMMY3,29
*YM,DUMMY4,30
*YM,DUMMY5,31
*YM,DUMMY6,32
*YM,DUMMY7,33
*YM,DUMMY8,34
*YM,DUMMY9,35
*YM,DUMMY0,36
*S,MSIZV4,$8FFF
*S,ENDOV4,$5A53
*S,BGNMON,$5A54
*S,SECTOR,$7FCA
*
*L        SYSTEM DATA PROGRAM
*P   ≠SYSDAT≠   ≠   COPYRIGHT CONTROL DATA CORPORATION 1973≠
*L        SPACE REQUEST PROCESSOR
*P   ≠SPACE≠    ≠   DECK-ID A02   MSOS 4.1≠
*
*         SYSTEM CORE RESIDENT PROGRAMS
```

Figure 8-1 Partial List of Skeleton for Addition of Core Resident ordinal.

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```
*
*LP       MONITOR
*B   ≠NMONI≠    ≠   DECK-ID A03   MSOS 4.1≠
*B   ≠RDISP≠
*B   ≠RW≠       ≠   DECK-ID A06   MSOS 4.1≠
*B   ≠T14≠      ≠   DECK-ID A07   MSOS 4.1≠
*B   ≠T16≠      ≠   DECK-ID A08   MSOS 4.1≠
*B   ≠PARAME≠   ≠   DECK-ID A09   MSOS 4.1≠
*B   ≠COMMON≠   ≠   DECK-ID A10   MSOS 4.1≠
*B   ≠NIPROC≠   ≠   DECK-ID A11   MSOS 4.1≠
*B   ≠ALVOL≠    ≠   DECK-ID A13   MSOS 4.1≠
*B   ≠OFVOL≠    ≠   DECK-ID A14   MSOS 4.1≠
*B   ≠ALCORE≠   ≠   DECK-ID A15   MSOS 4.1≠
*B   ≠DCORE≠    ≠   DECK-ID A16   MSOS 4.1≠
*B   ≠NENR≠     ≠   DECK-ID A18   MSOS 4.1≠
*B   ≠NCMPRQ≠   ≠   DECK-ID A19   MSOS 4.1≠
*B   ≠MAKQ≠     ≠   DECK-ID A20   MSOS 4.1≠
*B   ≠ADEV≠     ≠   DECK-ID A21   MSOS 4.1≠
*B   ≠TMINT≠    ≠   DECK-ID A22   MSOS 4.1≠
*B   ≠DTIMER≠   ≠   DECK-ID A23   MSOS 4.1≠
*B   ≠TOD≠      ≠   DECK-ID A24   MSOS 4.1≠
*B   ≠MINT≠     ≠   DECK-ID A25   MSOS 4.1≠
*B   ≠TRVEC≠    ≠   DECK-ID D01   MSOS 4.1≠
*LP       DEBUGGING / CHECKOUT
*B   ≠SNAPOL≠   ≠   DECK-ID E01   MSOS 4.1≠
*B   ≠DMP421≠   ≠   DECK-ID E03   MSOS 4.1≠
*B   ≠BDK85X≠   ≠   DECK-ID E05   MSOS 4.1≠
*LP       FILE MANAGER
*B   ≠FILMGR≠   ≠   DECK-ID F01   MSOS 4.1≠
*B   ≠RSPCV4≠   ≠   DECK-ID F02   MSOS 4.1≠
*B   ≠SRHFIS≠   ≠   DECK-ID F03   MSOS 4.1≠
*LP       CORE RESIDENT DRIVERS
*B   ≠EFDATA≠   ≠   DECK-ID C01   MSOS 4.1≠
*B   ≠DUMMY≠    ≠   DECK-ID C02   MSOS 4.1≠
*B   ≠ALAQ≠     ≠   DECK-ID C03   MSOS 4.1≠
*B   ≠D1711≠    ≠   DECK-ID C05   MSOS 4.1≠
*B   ≠D1738≠    ≠   DECK-ID C08   MSOS 4.1≠
*B   ≠REWCK≠    ≠   DECK-ID C13   MSOS 4.1≠
*B   ≠MMEXEC≠   ≠   DECK-ID C15   MSOS 4.1≠
*LP       REENTRANT FORTRAN RUNTIME LIBRARY
*B   ≠FORTR≠    ≠   DECK-ID A01   3.2 FTN RUNTIME≠
*B   ≠Q8PRMR≠   ≠   DECK-ID B01   3.2 FTN RUNTIME≠
*B   ≠PARABR≠   ≠   DECK-ID B02   3.2 FTN RUNTIME≠
*B   ≠Q8EXPR≠   ≠   DECK-ID B03   3.2 FTN RUNTIME≠
*B   ≠Q8ABR≠    ≠   DECK-ID B04   3.2 FTN RUNTIME≠
*B   ≠SQRTFR≠   ≠   DECK-ID B05   3.2 FTN RUNTIME≠
*B   ≠SIGNR≠    ≠   DECK-ID B06   3.2 FTN RUNTIME≠
*B   ≠FXFLR≠    ≠   DECK-ID B07   3.2 FTN RUNTIME≠
*B   ≠EXPRGR≠   ≠   DECK-ID B08   3.2 FTN RUNTIME≠
*B   ≠LNPRGR≠   ≠   DECK-ID B09   3.2 FTN RUNTIME≠
*B   ≠TANHR≠    ≠   DECK-ID B10   3.2 FTN RUNTIME≠
*B   ≠SNCSR≠    ≠   DECK-ID B11   3.2 FTN RUNTIME≠
*B   ≠ARCPGR≠   ≠   DECK-ID B12   3.2 FTN RUNTIME≠
*B   ≠IFALTR≠   ≠   DECK-ID B13   3.2 FTN RUNTIME≠
*B   ≠FLOATR≠   ≠   DECK-ID B14   3.2 FTN RUNTIME≠
*B   ≠Q8QIOR≠   ≠   DECK-ID C01   3.2 FTN RUNTIME≠
*B   ≠BINARR≠   ≠   DECK-ID C02   3.2 FTN RUNTIME≠
*B   ≠IOCODR≠   ≠   DECK-ID D01   3.2 FTN RUNTIME≠
*B   ≠INITLR≠   ≠   DECK-ID D02   3.2 FTN RUNTIME≠
*B   ≠RSTORR≠   ≠   DECK-ID D03   3.2 FTN RUNTIME≠
```

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```
*B   ≠GETCHR≠   ≠   DECK-ID D04   3.2 FTN RUNTIME≠
*B   ≠IPACKR≠   ≠   DECK-ID D05   3.2 FTN RUNTIME≠
*B   ≠UPDATR≠   ≠   DECK-ID D06   3.2 FTN RUNTIME≠
*B   ≠DECPLR≠   ≠   DECK-ID D07   3.2 FTN RUNTIME≠
*B   ≠INTGRR≠   ≠   DECK-ID D08   3.2 FTN RUNTIME≠
*B   ≠SPACER≠   ≠   DECK-ID D09   3.2 FTN RUNTIME≠
*B   ≠HOLR≠     ≠   DECK-ID D10   3.2 FTN RUNTIME≠
*B   ≠DCHXR≠    ≠   DECK-ID D11   3.2 FTN RUNTIME≠
*B   ≠HXASCR≠   ≠   DECK-ID D12   3.2 FTN RUNTIME≠
*B   ≠AFMTOR≠   ≠   DECK-ID D13   3.2 FTN RUNTIME≠
*B   ≠RFMTOR≠   ≠   DECK-ID D14   3.2 FTN RUNTIME≠
*B   ≠AFMTIR≠   ≠   DECK-ID D15   3.2 FTN RUNTIME≠
*B   ≠RFMTIR≠   ≠   DECK-ID D16   3.2 FTN RUNTIME≠
*B   ≠ASCHXR≠   ≠   DECK-ID D17   3.2 FTN RUNTIME≠
*B   ≠HXDCR≠    ≠   DECK-ID D18   3.2 FTN RUNTIME≠
*B   ≠FLOTIR≠   ≠   DECK-ID D19   3.2 FTN RUNTIME≠
*B   ≠FOLTR≠    ≠   DECK-ID D20   3.2 FTN RUNTIME≠
*B   ≠EOLTR≠    ≠   DECK-ID D21   3.2 FTN RUNTIME≠
*B   ≠EWRITR≠   ≠   DECK-ID D22   3.2 FTN RUNTIME≠
*B   ≠INTIIR≠   ≠   DECK-ID D23   3.2 FTN RUNTIME≠
*B   ≠FORMTR≠   ≠   DECK-ID D24   3.2 FTN RUNTIME≠
*B   ≠Q8QFIR≠   ≠   DECK-ID D25   3.2 FTN RUNTIME≠
*B   ≠Q8QFLR≠   ≠   DECK-ID D26   3.2 FTN RUNTIME≠
*B   ≠Q8QFXR≠   ≠   DECK-ID D27   3.2 FTN RUNTIME≠
*B   ≠HEXAR≠    ≠   DECK-ID D28   3.2 FTN RUNTIME≠
*B   ≠HEXDR≠    ≠   DECK-ID D29   3.2 FTN RUNTIME≠
*B   ≠ASCIIR≠   ≠   DECK-ID D30   3.2 FTN RUNTIME≠
*B   ≠DECHXR≠   ≠   DECK-ID D31   3.2 FTN RUNTIME≠
*B   ≠AFORMR≠   ≠   DECK-ID D32   3.2 FTN RUNTIME≠
*B   ≠RFORMR≠   ≠   DECK-ID D33   3.2 FTN RUNTIME≠
*B   ≠FLOTGR≠   ≠   DECK-ID D34   3.2 FTN RUNTIME≠
*B   ≠Q8DBLR≠   ≠   DECK-ID E01   3.2 FTN RUNTIME≠
*B   ≠DEXPR≠    ≠   DECK-ID E02   3.2 FTN RUNTIME≠
*B   ≠Q8DABR≠   ≠   DECK-ID E03   3.2 FTN RUNTIME≠
*B   ≠DSQRTR≠   ≠   DECK-ID E04   3.2 FTN RUNTIME≠
*B   ≠DSIGNR≠   ≠   DECK-ID E05   3.2 FTN RUNTIME≠
*B   ≠SNGLR≠    ≠   DECK-ID E06   3.2 FTN RUNTIME≠
*B   ≠Q8DFLR≠   ≠   DECK-ID E07   3.2 FTN RUNTIME≠
*B   ≠DEXPFR≠   ≠   DECK-ID E08   3.2 FTN RUNTIME≠
*B   ≠DLOGR≠    ≠   DECK-ID E09   3.2 FTN RUNTIME≠
*B   ≠DRSTRR≠   ≠   DECK-ID E10   3.2 FTN RUNTIME≠
*B   ≠DSNCSR≠   ≠   DECK-ID E11   3.2 FTN RUNTIME≠
*B   ≠DATANR≠   ≠   DECK-ID E12   3.2 FTN RUNTIME≠
*B   ≠DFLOTR≠   ≠   DECK-ID E13   3.2 FTN RUNTIME≠
*B   ≠Q8GDFR≠   ≠   DECK-ID E14   3.2 FTN RUNTIME≠
*B   ≠DOLTR≠    ≠   DECK-ID E15   3.2 FTN RUNTIME≠
*LP       CORE RESIDENT SYSTEM LIBRARY PROGRAM, ORDINAL 1
*B   ≠CORESO≠
*B   ≠NXTLOC≠   ≠   NEXT AVAILABLE LOCATION≠
*
*         SYSTEM MASS RESIDENT PROGRAMS
*
*M                  LIBEDT        1
*B   ≠LIBEDT≠   ≠   DECK-ID D02   MSOS 4.1≠
*M                  LOADSD        2
*B   ≠LOAD1≠    ≠   DECK-ID D03   MSOS 4.1≠
*B   ≠BRNCH1≠   ≠   DECK-ID D04   MSOS 4.1≠
*B   ≠LIDRV1≠   ≠   DECK-ID D05   MSOS 4.1≠
*B   ≠LCDRV1≠   ≠   DECK-ID D06   MSOS 4.1≠
*B   ≠LMDRV1≠   ≠   DECK-ID D07   MSOS 4.1≠
```

Figure 8-1 Continued

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```
*B    ≠LLDRV1≠     ≠   DECK-ID D08   MSOS 4.1≠
*B    ≠ADJOF1≠     ≠   DECK-ID D09   MSOS 4.1≠
*B    ≠CNVRT1≠     ≠   DECK-ID D10   MSOS 4.1≠
*B    ≠LSTOT1≠     ≠   DECK-ID D11   MSOS 4.1≠
*B    ≠LINK11≠     ≠   DECK-ID D12   MSOS 4.1≠
*B    ≠LOADR1≠     ≠   DECK-ID D13   MSOS 4.1≠
*B    ≠NAMPR1≠     ≠   DECK-ID D14   MSOS 4.1≠
*B    ≠RBDBZ1≠     ≠   DECK-ID D15   MSOS 4.1≠
*B    ≠ENTEX1≠     ≠   DECK-ID D16   MSOS 4.1≠
*B    ≠XFRPR1≠     ≠   DECK-ID D17   MSOS 4.1≠
*B    ≠STBASE≠     ≠   DECK-ID D18   MSOS 4.1≠
*B    ≠LNKENT≠     ≠   DECK-ID D19   MSOS 4.1≠
*B    ≠LNKCR1≠     ≠   DECK-ID D20   MSOS 4.1≠
*B    ≠PATCH≠      ≠   DECK-ID D21   MSOS 4.1≠
*B    ≠TBSCH1≠     ≠   DECK-ID D22   MSOS 4.1≠
*B    ≠HASH≠       ≠   DECK-ID D23   MSOS 4.1≠
*B    ≠TBSTR1≠     ≠   DECK-ID D24   MSOS 4.1≠
*B    ≠PAGE≠       ≠   DECK-ID D25   MSOS 4.1≠
*B    ≠PROGLD≠     ≠   DECK-ID D26   MSOS 4.1≠
*B    ≠SCAN1≠      ≠   DECK-ID D27   MSOS 4.1≠
*B    ≠CHPU1≠      ≠   DECK-ID D28   MSOS 4.1≠
*B    ≠ADJOV2≠     ≠   DECK-ID D29   MSOS 4.1≠
*B    ≠ADRPR1≠     ≠   DECK-ID D30   MSOS 4.1≠
*M                    JOBENT         3
*B    ≠JOBENT≠     ≠   DECK-ID D31   MSOS 4.1≠
*B    ≠T11≠        ≠   DECK-ID D32   MSOS 4.1≠
*B    ≠T7≠         ≠   DECK-ID D33   MSOS 4.1≠
*B    ≠T5≠         ≠   DECK-ID D34   MSOS 4.1≠
*B    ≠T3≠         ≠   DECK-ID D35   MSOS 4.1≠
*S,N1,P
*M                    JOBPRC         4
*B    ≠JOBPRO≠     ≠   DECK-ID D36   MSOS 4.1≠
*B    ≠ONE≠        ≠   DECK-ID D37   MSOS 4.1≠
*B    ≠TWO≠        ≠   DECK-ID D38   MSOS 4.1≠
*B    ≠THREE≠      ≠   DECK-ID D39   MSOS 4.1≠
*S,N2,P
*M                    PROTEC         5
*B    ≠BPROTK≠     ≠   DECK-ID D41   MSOS 4.1≠
*B    ≠JBKILL≠     ≠   DECK-ID D42   MSOS 4.1≠
*M                    JPLOAD         6
*B    ≠JPLOAD≠     ≠   DECK-ID D43   MSOS 4.1≠
*M                    JPCHGE         7
*B    ≠JPCHGE≠     ≠   DECK-ID D44   MSOS 4.1≠
*B    ≠ASGHEX≠     ≠   DECK-ID D45   MSOS 4.1≠
*M                    JPT13          8
*B    ≠T13≠        ≠   DECK-ID D46   MSOS 4.1≠
*M                    JCRDV4         9
*B    ≠JCRDV4≠     ≠   DECK-ID D47   MSOS 4.1≠
*M                    JLGOV4        10
*B    ≠JLGOV4≠     ≠   DECK-ID D48   MSOS 4.1≠
*M                    JPSTV4        11
*B    ≠JPSTV4≠     ≠   DECK-ID D49   MSOS 4.1≠
*M                    NAMEV4        12
*B    ≠NAMEV4≠     ≠   DECK-ID D50   MSOS 4.1≠
*M                    JPFLV4        13
*B    ≠JPFLV4≠     ≠   DECK-ID D51   MSOS 4.1≠
*M                    AFILV4        14
*B    ≠JPF2V4≠     ≠   DECK-ID D52   MSOS 4.1≠
*M                    RESTOR        15
*B    ≠RESTOR≠     ≠   DECK-ID D53   MSOS 4.1≠
```

Figure 8-1 Continued

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```
*M                        RCOVER         16
*B     ≠RCOVER≠     ≠     DECK-ID H09    MSOS 4.1≠
*B     ≠OUTSEL≠     ≠     DECK-ID H10    MSOS 4.1≠
*B     ≠RDMPV4≠     ≠     DECK-ID H11    MSOS 4.1≠
*B     ≠MASDMP≠     ≠     DECK-ID H12    MSOS 4.1≠
*M                        BRKPT          17
*B     ≠BRKPTD≠     ≠     DECK-ID H13    MSOS 4.1≠
*B     ≠SIFT≠       ≠     DECK-ID H14    MSOS 4.1≠
*B     ≠BIASCI≠     ≠     DECK-ID H15    MSOS 4.1≠
*B     ≠RETJMP≠     ≠     DECK-ID H16    MSOS 4.1≠
*B     ≠JUMPTO≠     ≠     DECK-ID H17    MSOS 4.1≠
*B     ≠ENTER≠      ≠     DECK-ID H18    MSOS 4.1≠
*B     ≠ENTCOR≠     ≠     DECK-ID H19    MSOS 4.1≠
*B     ≠PRTREG≠     ≠     DECK-ID H20    MSOS 4.1≠
*B     ≠TERMIN≠     ≠     DECK-ID H21    MSOS 4.1≠
*B     ≠RESUME≠     ≠     DECK-ID H22    MSOS 4.1≠
*B     ≠DPCORR≠     ≠     DECK-ID H23    MSOS 4.1≠
*B     ≠MSDMPB≠     ≠     DECK-ID H24    MSOS 4.1≠
*B     ≠SETBRP≠     ≠     DECK-ID H25    MSOS 4.1≠
*M                        ODEBUG         18
*B     ≠ODEBUG≠     ≠     DECK-ID H26    MSOS 4.1≠
*M                        SYSCOP         19
*B     ≠SYSCOP≠     ≠     DECK-ID H27    MSOS 4.1≠
*M                        SYSSEG         20
*B     ≠C01ST≠      ≠     DECK-ID H28    MSOS 4.1≠
*B     ≠C02ND≠      ≠     DECK-ID H29    MSOS 4.1≠
*B     ≠C03RD≠      ≠     DECK-ID H30    MSOS 4.1≠
*B     ≠C0LAST≠     ≠     DECK-ID H31    MSOS 4.1≠
*M                        MIPRO          21
*B     ≠MIPRO≠      ≠     DECK-ID A26    MSOS 4.1≠
*M                        TDFUNC         22
*B     ≠TDFUNC≠     ≠     DECK-ID A27    MSOS 4.1≠
*M                        EFSTOR         23
*B     ≠EFSTOR≠     ≠     DECK-ID A28    MSOS 4.1≠
*M                        EFLIST         24
*B     ≠EFLIST≠     ≠     DECK-ID A29    MSOS 4.1≠
*M                        SCMM17         25
*B     ≠SCMEXC≠     ≠     DECK-ID E01    MSOS 4.1≠
*M                        VERIFY         26
*B     ≠VERFY1≠     ≠     DECK-ID A30    MSOS 4.1≠
*M                        DUMMY1         27
*M                        DUMMY2         28
*M                        DUMMY3         29
*M                        DUMMY4         30
*M                        DUMMY5         31
*M                        DUMMY6         32
*M                        DUMMY7         33
*M                        DUMMY8         34
*M                        DUMMY9         35
*M                        DUMMY0         36
*
*               MASS RESIDENT DRIVERS
*
*M                        COSY DRIVER
*B     ≠DCOSY≠      ≠     DECK-ID C28    MSOS 4.1≠
*S,SCOSY,S
*S,LCOSY,P
*M                        1731 601 MAG TAPE
*B     ≠D1731U≠     ≠     DECK-ID C33    MSOS 4.1≠
*B     ≠FRWA≠       ≠     DECK-ID C34    MSOS 4.1≠
```

Figure 8-1 Continued

```
*B   ≠FRWB≠      ≠   DECK-ID C35   MSOS 4.1≠
*B   ≠RWBA≠      ≠   DECK-ID C36   MSOS 4.1≠
*B   ≠MAXRVU≠    ≠   DECK-ID C37   MSOS 4.1≠
*S,S1731U,S
*S,L1731U,P
*M                  1740-501/1742 LINE PRINTER
*B   ≠D40421≠    ≠   DECK-ID C46   MSOS 4.1≠
*S,S40421,S
*S,L40421,P
*M
*B   ≠D1728≠     ≠   DECK-ID C48   MSOS 4.1≠
*B   ≠CP026≠     ≠   DECK-ID C54   MSOS 4.1≠
*B   ≠CR026≠     ≠   DECK-ID C52   MSOS 4.1≠
*S,S1728,S
*S,L1728,P
*
*           MASS RESIDENT FILE MANAGER
*
*M
*B   ≠DEFFIL≠    ≠   DECK-ID F05   MSOS 4.1≠
*B   ≠FILSPC≠    ≠   DECK-ID F06   MSOS 4.1≠
*B   ≠RPEND≠     ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP01,S
*M
*B   ≠RELFIL≠    ≠   DECK-ID F08   MSOS 4.1≠
*B   ≠RELSPC≠    ≠   DECK-ID F09   MSOS 4.1≠
*B   ≠RPEND≠     ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP02,S
*M
*B   ≠DEFIDX≠    ≠   DECK-ID F10   MSOS 4.1≠
*B   ≠SORTFM≠    ≠   DECK-ID F11   MSOS 4.1≠
*B   ≠FILSPC≠    ≠   DECK-ID F06   MSOS 4.1≠
*B   ≠RPEND≠     ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP03,S
*M
*B   ≠LOKFIL≠    ≠   DECK-ID F12   MSOS 4.1≠
*B   ≠RPEND≠     ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP04,S
*M
*B   ≠UNLFIL≠    ≠   DECK-ID F13   MSOS 4.1≠
*B   ≠RPEND≠     ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP05,S
*M
*B   ≠STGSEQ≠    ≠   DECK-ID F14   MSOS 4.1≠
*B   ≠FILSPC≠    ≠   DECK-ID F06   MSOS 4.1≠
*B   ≠RPEND≠     ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP06,S
*M
*B   ≠STGDIR≠    ≠   DECK-ID F15   MSOS 4.1≠
*B   ≠RPEND≠     ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP07,S
*M
*B   ≠STGIDX≠    ≠   DECK-ID F16   MSOS 4.1≠
*B   ≠HASHCD≠    ≠   DECK-ID F17   MSOS 4.1≠
*B   ≠GETKID≠    ≠   DECK-ID F18   MSOS 4.1≠
*B   ≠FILSPC≠    ≠   DECK-ID F06   MSOS 4.1≠
*B   ≠RPEND≠     ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP08,S
*M
*B   ≠RTVSEQ≠    ≠   DECK-ID F19   MSOS 4.1≠
```

Figure 8-1 Continued

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```
*B   ≠RTNSPC≠   ≠   DECK-ID F20   MSOS 4.1≠
*B   ≠RPEND≠    ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP09,S
*M
*B   ≠RTVDIR≠   ≠   DECK-ID F21   MSOS 4.1≠
*B   ≠RTNSPC≠   ≠   DECK-ID F20   MSOS 4.1≠
*B   ≠RPEND≠    ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP10,S
*M
*B   ≠RTVIDX≠   ≠   DECK-ID F22   MSOS 4.1≠
*B   ≠HASHCD≠   ≠   DECK-ID F17   MSOS 4.1≠
*B   ≠GETKID≠   ≠   DECK-ID F18   MSOS 4.1≠
*B   ≠RTNSPC≠   ≠   DECK-ID F20   MSOS 4.1≠
*B   ≠RPEND≠    ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP11,S
*M
*B   ≠RTVIDO≠   ≠   DECK-ID F23   MSOS 4.1≠
*B   ≠GETKID≠   ≠   DECK-ID F18   MSOS 4.1≠
*B   ≠RTNSPC≠   ≠   DECK-ID F20   MSOS 4.1≠
*B   ≠RPEND≠    ≠   DECK-ID F07   MSOS 4.1≠
*S,FMRP12,S
*M
*B   ≠FMDUMY≠   ≠   DECK-ID F04   MSOS 4.1≠
*S,FMREND,S
*S,BEGFMS,S       SPECIFY THE SYSTEM FILE SPACE
*M,BEGFMS+1000
*M
*B   ≠FMDUMY≠   ≠   DECK-ID F04   MSOS 4.1≠
*T          END OF SYSTEM
*JOB,INSTAL,SYSTEM
*K,I6
*LIBEDT
*K,I6
*V   DEFINE REQUEST PRIORITIES
*S,001,03,M
*S,002,00,M
*S,003,01,M
*S,004,02,M
*S,005,03,M
*S,006,02,M
*S,007,02,M
*S,008,02,M
*S,009,02,M
*S,010,02,M
*S,011,02,M
*S,012,03,M
*S,013,03,M
*S,014,03,M
*S,015,02,M
*S,016,03,M
*S,017,03,M
*S,018,04,M
*S,019,04,M
*S,020,04,M
*S,021,04,M
*S,022,04,M
*S,023,04,M
*S,024,04,M
*S,025,04,M
*S,026,04,M
```

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```
419   *S,027,04,M
420   *S,028,04,M
421   *S,029,04,M
422   *S,030,04,M
423   *S,031,04,M
424   *S,032,04,M
425   *S,033,04,M
426   *S,034,04,M
427   *S,035,04,M
428   *S,036,04,M
```

Figure 8-1 Continued

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Using the program LIBILD, the revised skeleton, the binary cards for CORESO, and the current system install tape, a new install file incorporating CORESO may be built. With this new install tape a new system is built and verified following the procedure in the 1700 MSOS 4 Installation Handbook. When the new system is built the user gets a listing of the system library directory using the LIBEDT *DM command. This listing is as follows:

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1	42[illegible]0	8F8E	0000	0000			
1	0030	1838	0000	1F64	04A5	0000	0181
2	0000	0000	0000	0000	0CB2	0000	01BE
3	0010	1EDA	0000	646A	0297	0000	01E0
4	0020	1CC2	0000	000E	0218	0000	01E7
5	0030	1838	0000	1CD7	0488	0000	01ED
6	0020	1CC2	0000	0000	0192	0000	01FB
7	0020	0000	0000	0000	014D	0000	0200
8	0020	0000	0000	0000	018C	0000	0204
9	0020	1CC2	0000	0000	0148	0000	0209
10	0020	0000	0000	0000	00DB	0000	020D
11	0020	0000	0000	0000	0062	0000	0210
12	0030	1838	0000	000E	02E2	0000	0212
13	0030	0000	0000	0000	0270	0000	021A
14	0030	0000	0000	0000	0367	0000	0221
15	0020	0000	0000	0000	00C9	0000	022B
16	0030	0000	0000	0000	034D	0000	022E
17	0030	0000	0000	0000	0568	0000	0237
18	0044	0000	0000	0000	11B3	0000	0246
19	0040	0000	0000	0000	0192	0000	0276
20	0040	0000	0000	0000	14A0	0000	027B
21	0043	0000	0000	0000	01E1	0000	02B2
22	0044	125A	0000	0001	0160	0000	02B8
23	0044	125A	0000	6C71	0184	0000	02BC
24	0040	0000	0000	0000	07A1	0000	02C1
25	0040	0000	0000	0000	05A4	0000	02D6
26	0040	0000	0000	0000	001A	0000	02E6
27	0040	0000	0000	0000	0000	0000	02E7
28	0040	0000	0000	0000	0000	0000	02E7

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29	0040	0000	0000	0000	0000	0000	02E7
30	0040	0000	0000	0000	0000	0000	02E7
31	0040	0000	0000	0000	0000	0000	02E7
32	0040	0000	0000	0000	0000	0000	02E7
33	0040	0000	0000	0000	0000	0000	02E7
34	0040	0000	0000	0000	0000	0000	02E7
35	0040	0000	0000	0000	0000	0000	02E7
36	0040	0000	0000	0000	0000	0000	02E7

FINI

The first entry is for CORESO. The second directory entry is for the first mass memory ordinal, LIBEDT.

The following is a portion of the system load map including CORESO.

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```
*
*L        SYSTEM DATA PROGRAM
     SYSDAT      0000        COPYRIGHT CONTROL DATA CORPORATION 1973
*L        SPACE REQUEST PROCESSOR
     SPACE       123E        DECK-ID A02   MSCS 4.1            SUMMARY-082


DATE  11/23/74

*M                LIBEDT          1
     LIBEDT      0181        DECK-ID D02   MSCS 4.1            SUMMARY-081
*M                LOADSD          2
     LOAD1       01BE        DECK-ID D03   MSCS 4.1            SUMMARY-081
     BRNCH1      0236        DECK-ID D04   MSCS 4.1            SUMMARY-081
     LIDRV1      0393        DECK-ID D05   MSCS 4.1            SUMMARY-079
     LCDRV1      03E4        DECK-ID D06   MSCS 4.1            SUMMARY-079
     LMDRV1      0411        DECK-ID D07   MSCS 4.1            SUMMARY-079
     LLDRV1      0430        DECK-ID D08   MSCS 4.1            SUMMARY-079
     ADJCF1      043E        DECK-ID D09   MSCS 4.1            SUMMARY-079
     CNVRT1      044A        DECK-ID D10   MSCS 4.1            SUMMARY-079
     LSTCT1      0462        DECK-ID D11   MSCS 4.1            SUMMARY-079
     LINK11      04B5        DECK-ID D12   MSCS 4.1            SUMMARY-079
     LOADR1      04F8        DECK-ID D13   MSCS 4.1            SUMMARY-079
     NAMPR1      056C        DECK-ID D14   MSCS 4.1            SUMMARY-081
     PRDBZ1      0605        DECK-ID D15   MSCS 4.1            SUMMARY-079
     ENTEX1      06FE        DECK-ID D16   MSCS 4.1            SUMMARY-079
     XFRPR1      0734        DECK-ID D17   MSCS 4.1            SUMMARY-079
     STBASE      0745        DECK-ID D18   MSCS 4.1            SUMMARY-081
     LNKENT      081F        DECK-ID D19   MSCS 4.1            SUMMARY-079
     LNKCR1      083B        DECK-ID D20   MSCS 4.1            SUMMARY-079
     CATCH       087C        DECK-ID D21   MSCS 4.1            SUMMARY-079
     TESCH1      08BE        DECK-ID D22   MSCS 4.1            SUMMARY-079
     HASH        0906        DECK-ID D23   MSCS 4.1            SUMMARY-079
     TESTP1      091F        DECK-ID D24   MSCS 4.1            SUMMARY-079
     PAGE        0973        DECK-ID D25   MSCS 4.1            SUMMARY-079
     PROGLD      0A63        DECK-ID D26   MSCS 4.1            SUMMARY-079
     SCAN1       0B65        DECK-ID D27   MSCS 4.1            SUMMARY-079
     CHPL1       0C2B        DECK-ID D28   MSCS 4.1            SUMMARY-079
     ADJCV2      0C38        DECK-ID D29   MSCS 4.1            SUMMARY-079
     ADRPR1      0C51        DECK-ID D30   MSCS 4.1            SUMMARY-079
*M                JOBENT          3
     JOBENT      01F0        DECK-ID D31   MSCS 4.1            SUMMARY-079
     T11         00CC        DECK-ID D32   MSCS 4.1            SUMMARY-079
     T7          0103        DECK-ID D33   MSCS 4.1            SUMMARY-081
     T5          0213        DECK-ID D34   MSCS 4.1            SUMMARY-079
     T3          0267        DECK-ID D35   MSCS 4.1            SUMMARY-079
*S,N1,P
*M                JOBPRO          4
     JOBPRO      01E7        DECK-ID D36   MSCS 4.1            SUMMARY-081
     ONE         020D        DECK-ID D37   MSCS 4.1            SUMMARY-081
     TWO         0210        DECK-ID D38   MSCS 4.1            SUMMARY-081
     THREE       0213        DECK-ID D39   MSCS 4.1            SUMMARY-081

*S,N2,P
```

```
*
*        SYSTEM CORE RESIDENT PROGRAMS
*
*LP          MONITOR
      NMONI      5A54      DECK-ID A03   MSCS 4.1                  SUMMARY-079

      RDISP      5A98      DECK-ID A05   MSCS 4.1                  SUMMARY-079
      RW         5C32      DECK-ID A06   MSCS 4.1                  SUMMARY-079

      T14        5CED      DECK-ID A07   MSCS 4.1                  SUMMARY-079
      T16        5CFE      DECK-ID A08   MSCS 4.1                  SUMMARY-079

      PARAME     5D09      DECK-ID A09   MSCS 4.1                  SUMMARY-079
      COMMON     5D7A      DECK-ID A10   MSCS 4.1                  SUMMARY-079

      NIPROC     5DA1      DECK-ID A11   MSCS 4.1                  SUMMARY-079
      ALVOL      5E2A      DECK-ID A13   MSCS 4.1                  SUMMARY-079

      OFVOL      5E47      DECK-ID A14   MSCS 4.1                  SUMMARY-079
      ALCORE     5E53      DECK-ID A15   MSCS 4.1                  SUMMARY-079

      DCORE      5F01      DECK-ID A16   MSCS 4.1                  SUMMARY-079
      NFNR       608B      DECK-ID A18   MSCS 4.1                  SUMMARY-079

      NCMPRQ     60FD      DECK-ID A19   MSCS 4.1                  SUMMARY-079
      MAKG       612D      DECK-ID A20   MSCS 4.1                  SUMMARY-081

      ADEV       615B      DECK-ID A21   MSCS 4.1                  SUMMARY-079
      TMINT      62C3      DECK-ID A22   MSCS 4.1                  SUMMARY-079

      DTIMER     635A      DECK-ID A23   MSCS 4.1                  SUMMARY-079
      TCD        637C      DECK-ID A24   MSCS 4.1                  SUMMARY-079

      MINT       63CB      DECK-ID A25   MSCS 4.1                  SUMMARY-079
      TRVEC      64D7      DECK-ID D01   MSCS 4.1                  SUMMARY-079
*LP          DEBUGGING / CHECKOUT
      SNAPOL     651F      DECK-ID H01   MSCS 4.1                  SUMMARY-079

      DMP421     65D8      DECK-ID H03   MSCS 4.1                  SUMMARY-079
      BCK85X     66A1      DECK-ID H05   MSCS 4.1                  SUMMARY-079
*LP          FILE MANAGER
      FILMGR     66EC      DECK-ID F01   MSCS 4.1                  SUMMARY-081

      RSPCV4     6911      DECK-ID F02   MSCS 4.1                  SUMMARY-079
      SRHFIS     6A01      DECK-ID F03   MSCS 4.1                  SUMMARY-079
*LP          CORE RESIDENT DRIVERS
      EFDATA     6BBA      DECK-ID C01   MSCS 4.1                  SUMMARY-079

      DUMMY      6D18      DECK-ID C02   MSCS 4.1                  SUMMARY-079
      ALAG       6D3B      DECK-ID C03   MSCS 4.1                  SUMMARY-081

      D1711      6DA9      DECK-ID C05   MSCS 4.1                  SUMMARY-082
      D1738      6F44      DECK-ID C08   MSCS 4.1                  SUMMARY-081

      REWCK      7189      DECK-ID C13   MSCS 4.1                  SUMMARY-079
      MMEXEC     71A7      DECK-ID C15   MSCS 4.1                  SUMMARY-081
*LP          REENTRANT FORTRAN RUNTIME LIBRARY
      FCRTR      731C      DECK-ID A01   3.2 FTN RUNTIME           SUMMARY-079

      Q8PRMR     744E      DECK-ID B01   3.2 FTN RUNTIME           SUMMARY-079
      PARABR     7465      DECK-ID B02   3.2 FTN RUNTIME           SUMMARY-081

      Q8EXPR     7476      DECK-ID B03   3.2 FTN RUNTIME           SUMMARY-079
      Q8ABR      7527      DECK-ID B04   3.2 FTN RUNTIME           SUMMARY-079

      SQRTFR     753E      DECK-ID B05   3.2 FTN RUNTIME           SUMMARY-079
      SIGNR      7599      DECK-ID B06   3.2 FTN RUNTIME           SUMMARY-079

      FXFLR      75C5      DECK-ID B07   3.2 FTN RUNTIME           SUMMARY-079
      EXPRGR     7630      DECK-ID B08   3.2 FTN RUNTIME           SUMMARY-079

      LNPRGR     76D2      DECK-ID B09   3.2 FTN RUNTIME           SUMMARY-079
      TANHR      774C      DECK-ID B10   3.2 FTN RUNTIME           SUMMARY-079

      SNCSR      77B8      DECK-ID B11   3.2 FTN RUNTIME           SUMMARY-079
      ARCPGR     7884      DECK-ID B12   3.2 FTN RUNTIME           SUMMARY-079

      IFALTR     791D      DECK-ID B13   3.2 FTN RUNTIME           SUMMARY-079
      FLOATR     7934      DECK-ID B14   3.2 FTN RUNTIME           SUMMARY-079
```

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Q8QIOR    7B30    DECK-ID C01   3.2 FTN RUNTIME    SUMMARY-082
BINARR    7C92    DECK-ID C02   3.2 FTN RUNTIME    SUMMARY-079
IOCODR    7CDF    DECK-ID D01   3.2 FTN RUNTIME    SUMMARY-079
INITLR    7D13    DECK-ID D02   3.2 FTN RUNTIME    SUMMARY-079
RSTORR    7D22    DECK-ID D03   3.2 FTN RUNTIME    SUMMARY-079
GETCHR    7D32    DECK-ID D04   3.2 FTN RUNTIME    SUMMARY-079
IPACKR    7D4C    DECK-ID D05   3.2 FTN RUNTIME    SUMMARY-079
UPDATR    7D83    DECK-ID D06   3.2 FTN RUNTIME    SUMMARY-079
DECPLR    7D90    DECK-ID D07   3.2 FTN RUNTIME    SUMMARY-079
INTGRR    7DB6    DECK-ID D08   3.2 FTN RUNTIME    SUMMARY-079
SPACER    7DE3    DECK-ID D09   3.2 FTN RUNTIME    SUMMARY-079
HOLR      7DFB    DECK-ID D10   3.2 FTN RUNTIME    SUMMARY-079
DCHXR     7E8F    DECK-ID D11   3.2 FTN RUNTIME    SUMMARY-079
HXASCR    7F02    DECK-ID D12   3.2 FTN RUNTIME    SUMMARY-079
AFMTOR    7F55    DECK-ID D13   3.2 FTN RUNTIME    SUMMARY-079
RFMTOR    7F7F    DECK-ID D14   3.2 FTN RUNTIME    SUMMARY-079
AFMTIR    7F98    DECK-ID D15   3.2 FTN RUNTIME    SUMMARY-079
RFMTIR    7FC6    DECK-ID D16   3.2 FTN RUNTIME    SUMMARY-079
ASCHXR    7FDD    DECK-ID D17   3.2 FTN RUNTIME    SUMMARY-079
HXDCR     8018    DECK-ID D18   3.2 FTN RUNTIME    SUMMARY-079
FLOTIR    80A8    DECK-ID D19   3.2 FTN RUNTIME    SUMMARY-079
FCUIR     80F2    DECK-ID D20   3.2 FTN RUNTIME    SUMMARY-079
ECUTR     817B    DECK-ID D21   3.2 FTN RUNTIME    SUMMARY-079
EWRITR    8263    DECK-ID D22   3.2 FTN RUNTIME    SUMMARY-079
INTI1R    826F    DECK-ID D23   3.2 FTN RUNTIME    SUMMARY-079
FCRMTR    828C    DECK-ID D24   3.2 FTN RUNTIME    SUMMARY-081
Q8QFIR    8461    DECK-ID D25   3.2 FTN RUNTIME    SUMMARY-079
Q8QFLR    847B    DECK-ID D26   3.2 FTN RUNTIME    SUMMARY-079
Q8QFXR    84AA    DECK-ID D27   3.2 FTN RUNTIME    SUMMARY-079
HEXAR     84E1    DECK-ID D28   3.2 FTN RUNTIME    SUMMARY-079
HEXDR     84F9    DECK-ID D29   3.2 FTN RUNTIME    SUMMARY-079
ASCIIR    8516    DECK-ID D30   3.2 FTN RUNTIME    SUMMARY-079
DECHXR    852B    DECK-ID D31   3.2 FTN RUNTIME    SUMMARY-079
AFORMR    854B    DECK-ID D32   3.2 FTN RUNTIME    SUMMARY-079
RFORMR    8567    DECK-ID D33   3.2 FTN RUNTIME    SUMMARY-079
FLOTGR    8583    DECK-ID D34   3.2 FTN RUNTIME    SUMMARY-079
Q8DBLR    859F    DECK-ID E01   3.2 FTN RUNTIME    SUMMARY-082
DEXPR     85B4    DECK-ID E02   3.2 FTN RUNTIME    SUMMARY-079
Q8DABR    8645    DECK-ID E03   3.2 FTN RUNTIME    SUMMARY-079
DSQRTR    8663    DECK-ID E04   3.2 FTN RUNTIME    SUMMARY-079
DSIGNR    86E3    DECK-ID E05   3.2 FTN RUNTIME    SUMMARY-079
SNGLR     8713    DECK-ID E06   3.2 FTN RUNTIME    SUMMARY-079
Q8DFLR    8729    DECK-ID E07   3.2 FTN RUNTIME    SUMMARY-079
DEXPFR    874E    DECK-ID E08   3.2 FTN RUNTIME    SUMMARY-079
DLOGR     880A    DECK-ID E09   3.2 FTN RUNTIME    SUMMARY-079
DFSTRR    88B3    DECK-ID E10   3.2 FTN RUNTIME    SUMMARY-082
DSNCSR    88E9    DECK-ID E11   3.2 FTN RUNTIME    SUMMARY-079
DATANR    89F9    DECK-ID E12   3.2 FTN RUNTIME    SUMMARY-079
DFLCTR    8ACC    DECK-ID E13   3.2 FTN RUNTIME    SUMMARY-079
Q8QDFR    8E68    DECK-ID E14   3.2 FTN RUNTIME    SUMMARY-079
DCUTR     8E84    DECK-ID E15   3.2 FTN RUNTIME    SUMMARY-079
*LP          CORE RESIDENT SYSTEM LIBRARY PROGRAM, ORDINAL 1
  CCRESO    8F8E
  NXTLOC    8FD1        NEXT AVAILABLE LOCATION
*
*           SYSTEM MASS RESIDENT PROGRAMS
*
```

Following system installation the user autoloads the system. As a test case he runs CORESO by pressing STEP, clearing the P, X, and I registers, setting P=8F8E$_{16}$, and pressung RUN. Typing on the comment device is as follows:

```
MSOS 4.1--PSR LEVEL 86    11/23/74

ANN'S TEST SYSTEM

65K MODE

CHECKING FILES -  OK

ENTER DATE/TIME  MMDDYYHHMM
 123741317
  TE: 23 NOV 74    TIME: 1317:00
   'LO THIS IS CORESO
```

Note that CORESO cannot be accessed via MIPRO since it is a core resident ordinal.

APPENDIX A

INCREASING AVAILABLE CORE WITHOUT ADDING HARDWARE CORE MODULES

In a system with mass resident drivers the size of the mass resident driver buffer may be reduced. In a standard released system this buffer is large enough to accommodate the two largest mass resident drivers. Although throughput may be slowed, this buffer may be decreased in size, perhaps to accommoduate the two smallest mass resident drivers, or perhaps to accommodate only the largest mass resident driver. The mass resident buffer size is specified by the parameter MBFSZ in Section ACR of SYSDAT. (Refer to Article 1.70.)

In a system which includes the buffered protect processor, BPROTK, the unbuffered protect processor, UPROTK, may be substituted. The difference between the two processors is described in Article 2.1, under Group M. The length of BPROTK is 488_{16}. The length of UPROTK is $3C8_{16}$. Thus, this substitution saves $C0_{16}$(=192) words of core. To make this change, the system skeleton must be changed. If the skeleton is on cards, the appropriate card is modified. If on tape, SKED, the skeleton editor program, may be used to make the change. (Refer to Article 4.3.3 for examples of the use of SKED.)

It is assumed in this manual that the user wishes to save the words from NXTLOC to MSIZV4 for some purpose of his own. If, however, he finds that he does not need all these locations, BGNMON and ENDLOC may be increased accordingly, thereby making more core available.

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Appendix B

Listing of FORTRAN 3.2B
Skeleton Records

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```
*V  FORTRAN COMPILER 3.2 B
*K,I6
*L,FTN
*B  'FTNB'     '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*K,P8
*P,F
*B  'FTNB'     '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOA'      '   DECK-ID 02F FORTRAN 3.2B'
*B  'CFIVOC'   '   DECK-ID 34A FORTRAN 3.2B'
*B  'CKNAME'   '   DECK-ID 36A FORTRAN 3.2B'
*B  'CNVT'     '   DECK-ID 01A FORTRAN 3.2B'
*B  'CONV'     '   DECK-ID 03F FORTRAN 3.2B'
*B  'DIAG'     '   DECK-ID 04F FORTRAN 3.2B'
```

```
*B   'DXP9'      '   DECK-ID 05F FORTRAN 3.2B'
*B   'DFLOT'     '   DECK-ID 06F FORTRAN 3.2B'
*B   'DUMVOL'    '   DECK-ID 35F FORTRAN 3.2B'
*B   'GETC'      '   DECK-ID 14F FORTRAN 3.2B'
*B   'GETF'      '   DECK-ID 04A FORTRAN 3.2B'
*B   'GETSYM'    '   DECK-ID 07F FORTRAN 3.2B'
*B   'GPUT'      '   DECK-ID 02A FORTRAN 3.2B'
*B   'IGETCF'    '   DECK-ID 15F FORTRAN 3.2B'
*B   'IOPRBA'    '   DECK-ID 08F FORTRAN 3.2B'
*B   'PACK'      '   DECK-ID 09F FORTRAN 3.2B'
*B   'Q8PRMS'    '   DECK-ID 10F FORTRAN 3.2B'
*B   'RDLABL'    '   DECK-ID 10A FORTRAN 3.2B'
*B   'STORE'     '   DECK-ID 11F FORTRAN 3.2B'
*B   'SYMBOL'    '   DECK-ID 03A FORTRAN 3.2B'
*B   'ENDDO'     '   DECK-ID 29A FORTRAN 3.2B'
*B   'GNST'      '   DECK-ID 05A FORTRAN 3.2B'
*B   'OPTION'    '   DECK-ID 16F FORTRAN 3.2B'
*B   'OUTENT'    '   DECK-ID 06A FORTRAN 3.2B'
*B   'PHASEA'    '   DECK-ID 07A FORTRAN 3.2B'
*B   'PLABEL'    '   DECK-ID 08A FORTRAN 3.2B'
*B   'STCHAR'    '   DECK-ID 11A FORTRAN 3.2B'
*B   'TYPE'      '   DECK-ID 12A FORTRAN 3.2B'
*B   'SAVEID'    '   DECK-ID 13A FORTRAN 3.2B'
*B   'LOCLA1'    '   DECK-ID 12F FORTRAN 3.2B'
*B   'DUMYA1'    '   DECK-ID 13F FORTRAN 3.2B'
*B   'Q8QBDS'    '   DECK-ID 09A FORTRAN 3.2B'
*B   'ENDLOC'    '   DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTA1,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B   'FTNB'      '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOA'       '   DECK-ID 02F FORTRAN 3.2B'
*B   'CFIVOC'    '   DECK-ID 34A FORTRAN 3.2B'
*B   'CKNAME'    '   DECK-ID 36A FORTRAN 3.2B'
*B   'CNVT'      '   DECK-ID 01A FORTRAN 3.2B'
*B   'CONV'      '   DECK-ID 03F FORTRAN 3.2B'
*B   'DIAG'      '   DECK-ID 04F FORTRAN 3.2B'
*B   'DXP9'      '   DECK-ID 05F FORTRAN 3.2B'
*B   'DFLOT'     '   DECK-ID 06F FORTRAN 3.2B'
*B   'DUMVOL'    '   DECK-ID 35F FORTRAN 3.2B'
*B   'GETC'      '   DECK-ID 14F FORTRAN 3.2B'
*B   'GETF'      '   DECK-ID 04A FORTRAN 3.2B'
*B   'GETSYM'    '   DECK-ID 07F FORTRAN 3.2B'
*B   'GPUT'      '   DECK-ID 02A FORTRAN 3.2B'
*B   'IGETCF'    '   DECK-ID 15F FORTRAN 3.2B'
*B   'IOPRBA'    '   DECK-ID 08F FORTRAN 3.2B'
*B   'PACK'      '   DECK-ID 09F FORTRAN 3.2B'
*B   'Q8PRMS'    '   DECK-ID 10F FORTRAN 3.2B'
*B   'RDLABL'    '   DECK-ID 10A FORTRAN 3.2B'
*B   'STORE'     '   DECK-ID 11F FORTRAN 3.2B'
*B   'SYMBOL'    '   DECK-ID 03A FORTRAN 3.2B'
*B   'ENDDO'     '   DECK-ID 29A FORTRAN 3.2B'
*B   'GNST'      '   DECK-ID 05A FORTRAN 3.2B'
*B   'OPTION'    '   DECK-ID 16F FORTRAN 3.2B'
*B   'OUTENT'    '   DECK-ID 06A FORTRAN 3.2B'
*B   'PHASEA'    '   DECK-ID 07A FORTRAN 3.2B'
*B   'PLABEL'    '   DECK-ID 08A FORTRAN 3.2B'
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```
*B  'STCHAR'   '  DECK-ID 11A FORTRAN 3.2B'
*B  'TYPE'     '  DECK-ID 12A FORTRAN 3.2B'
*B  'SAVEID'   '  DECK-ID 13A FORTRAN 3.2B'
*B  'LOCLA2'   '  DECK-ID 18F FORTRAN 3.2B'
*B  'DUMYA2'   '  DECK-ID 19F FORTRAN 3.2B'
*B  'BYEQPR'   '  DECK-ID 19A FORTRAN 3.2B'
*B  'CHECKF'   '  DECK-ID 20A FORTRAN 3.2B'
*B  'COMNPR'   '  DECK-ID 15A FORTRAN 3.2B'
*B  'CONSUB'   '  DECK-ID 30A FORTRAN 3.2B'
*B  'DATAPR'   '  DECK-ID 31A FORTRAN 3.2B'
*B  'DIMPR'    '  DECK-ID 16A FORTRAN 3.2B'
*B  'EXRLPR'   '  DECK-ID 24A FORTRAN 3.2B'
*B  'FGETC'    '  DECK-ID 21A FORTRAN 3.2B'
*B  'FORK'     '  DECK-ID 22A FORTRAN 3.2B'
*B  'PEQVS'    '  DECK-ID 25A FORTRAN 3.2B'
*B  'PRNTNM'   '  DECK-ID 26A FORTRAN 3.2B'
*B  'SUBPPR'   '  DECK-ID 23A FORTRAN 3.2B'
*B  'SYMSCN'   '  DECK-ID 28A FORTRAN 3.2B'
*B  'TYPEPR'   '  DECK-ID 18A FORTRAN 3.2B'
*B  'ENDLOC'   '  DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTA2,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNB'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOA'      '  DECK-ID 02F FORTRAN 3.2B'
*B  'CFIVOC'   '  DECK-ID 34A FORTRAN 3.2B'
*B  'CKNAME'   '  DECK-ID 36A FORTRAN 3.2B'
*B  'CNVT'     '  DECK-ID 01A FORTRAN 3.2B'
*B  'CONV'     '  DECK-ID 03F FORTRAN 3.2B'
*B  'DIAG'     '  DECK-ID 04F FORTRAN 3.2B'
*B  'DXP9'     '  DECK-ID 05F FORTRAN 3.2B'
*B  'DFLOT'    '  DECK-ID 06F FORTRAN 3.2B'
*B  'DUMVOL'   '  DECK-ID 35F FORTRAN 3.2B'
*B  'GETC'     '  DECK-ID 14F FORTRAN 3.2B'
*B  'GETF'     '  DECK-ID 04A FORTRAN 3.2B'
*B  'GETSYM'   '  DECK-ID 07F FORTRAN 3.2B'
*B  'GPUT'     '  DECK-ID 02A FORTRAN 3.2B'
*B  'IGETCF'   '  DECK-ID 15F FORTRAN 3.2B'
*B  'IOPRBA'   '  DECK-ID 08F FORTRAN 3.2B'
*B  'PACK'     '  DECK-ID 09F FORTRAN 3.2B'
*B  'Q8PRMS'   '  DECK-ID 10F FORTRAN 3.2B'
*B  'RDLABL'   '  DECK-ID 10A FORTRAN 3.2B'
*B  'STORE'    '  DECK-ID 11F FORTRAN 3.2B'
*B  'SYMBOL'   '  DECK-ID 03A FORTRAN 3.2B'
*B  'ENDDO'    '  DECK-ID 29A FORTRAN 3.2B'
*B  'GNST'     '  DECK-ID 05A FORTRAN 3.2B'
*B  'OPTION'   '  DECK-ID 16F FORTRAN 3.2B'
*B  'OUTENT'   '  DECK-ID 06A FORTRAN 3.2B'
*B  'PHASEA'   '  DECK-ID 07A FORTRAN 3.2B'
*B  'PLABEL'   '  DECK-ID 08A FORTRAN 3.2B'
*B  'STCHAR'   '  DECK-ID 11A FORTRAN 3.2B'
*B  'TYPE'     '  DECK-ID 12A FORTRAN 3.2B'
*B  'SAVEID'   '  DECK-ID 13A FORTRAN 3.2B'
*B  'LOCLA3'   '  DECK-ID 20F FORTRAN 3.2B'
*B  'DUMYA3'   '  DECK-ID 21F FORTRAN 3.2B'
*B  'ARAYSZ'   '  DECK-ID 42A FORTRAN 3.2B'
*B  'ASEMPR'   '  DECK-ID 40A FORTRAN 3.2B'
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*B  'ASGNPR'   '  DECK-ID 32A FORTRAN 3.2B'
*B  'BDOPR'    '  DECK-ID 33A FORTRAN 3.2B'
*B  'CHECKF'   '  DECK-ID 20A FORTRAN 3.2B'
*B  'CKIVC'    '  DECK-ID 35A FORTRAN 3.2B'
*B  'CONSUB'   '  DECK-ID 30A FORTRAN 3.2B'
*B  'CPLOOP'   '  DECK-ID 43A FORTRAN 3.2B'
*B  'FGETC'    '  DECK-ID 21A FORTRAN 3.2B'
*B  'FORK'     '  DECK-ID 22A FORTRAN 3.2B'
*B  'ERBPR'    '  DECK-ID 38A FORTRAN 3.2B'
*B  'MODMXR'   '  DECK-ID 39A FORTRAN 3.2B'
*B  'PUNT'     '  DECK-ID 27A FORTRAN 3.2B'
*B  'ENDLOC'   '  DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTA3,,,B
*K,I6
*K,P8
*P,F,,MARKER
*B  'FTNB'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOA'      '  DECK-ID 02F FORTRAN 3.2B'
*B  'CFIVOC'   '  DECK-ID 34A FORTRAN 3.2B'
*B  'CKNAME'   '  DECK-ID 36A FORTRAN 3.2B'
*B  'CNVT'     '  DECK-ID 01A FORTRAN 3.2B'
*B  'CONV'     '  DECK-ID 03F FORTRAN 3.2B'
*B  'DIAG'     '  DECK-ID 04F FORTRAN 3.2B'
*B  'DXP9'     '  DECK-ID 05F FORTRAN 3.2B'
*B  'DFLOT'    '  DECK-ID 06F FORTRAN 3.2B'
*B  'DUMVOL'   '  DECK-ID 35F FORTRAN 3.2B'
*B  'GETC'     '  DECK-ID 14F FORTRAN 3.2B'
*B  'GETF'     '  DECK-ID 04A FORTRAN 3.2B'
*B  'GETSYM'   '  DECK-ID 07F FORTRAN 3.2B'
*B  'GPUT'     '  DECK-ID 02A FORTRAN 3.2B'
*B  'IGETCF'   '  DECK-ID 15F FORTRAN 3.2B'
*B  'IOPRBA'   '  DECK-ID 08F FORTRAN 3.2B'
*B  'PACK'     '  DECK-ID 09F FORTRAN 3.2B'
*B  'Q8PRMS'   '  DECK-ID 10F FORTRAN 3.2B'
*B  'RDLABL'   '  DECK-ID 10A FORTRAN 3.2B'
*B  'STORE'    '  DECK-ID 11F FORTRAN 3.2B'
*B  'SYMBOL'   '  DECK-ID 03A FORTRAN 3.2B'
*B  'ENDDO'    '  DECK-ID 29A FORTRAN 3.2B'
*B  'GNST'     '  DECK-ID 05A FORTRAN 3.2B'
*B  'OPTION'   '  DECK-ID 16F FORTRAN 3.2B'
*B  'OUTENT'   '  DECK-ID 06A FORTRAN 3.2B'
*B  'PHASEA'   '  DECK-ID 07A FORTRAN 3.2B'
*B  'PLABEL'   '  DECK-ID 08A FORTRAN 3.2B'
*B  'STCHAR'   '  DECK-ID 11A FORTRAN 3.2B'
*B  'TYPE'     '  DECK-ID 12A FORTRAN 3.2B'
*B  'SAVEID'   '  DECK-ID 13A FORTRAN 3.2B'
*B  'LOCLA4'   '  DECK-ID 22F FORTRAN 3.2B'
*B  'DUMYA4'   '  DECK-ID 23F FORTRAN 3.2B'
*B  'ARITH'    '  DECK-ID 14A FORTRAN 3.2B'
*B  'SUBSCR'   '  DECK-ID 17A FORTRAN 3.2B'
*B  'TREE'     '  DECK-ID 41A FORTRAN 3.2B'
*B  'ENDLOC'   '  DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTA4,,,B
*K,I6
*K,P8
*P,F,,MARKER
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*B   'FTNB'      '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOA'       '   DECK-ID 02F FORTRAN 3.2B'
*B   'CFIVOC'    '   DECK-ID 34A FORTRAN 3.2B'
*B   'CKNAME'    '   DECK-ID 36A FORTRAN 3.2B'
*B   'CNVT'      '   DECK-ID 01A FORTRAN 3.2B'
*B   'CONV'      '   DECK-ID 03F FORTRAN 3.2B'
*B   'DIAG'      '   DECK-ID 04F FORTRAN 3.2B'
*B   'DXP9'      '   DECK-ID 05F FORTRAN 3.2B'
*B   'DFLOT'     '   DECK-ID 06F FORTRAN 3.2B'
*B   'DUMVOL'    '   DECK-ID 35F FORTRAN 3.2B'
*B   'GETC'      '   DECK-ID 14F FORTRAN 3.2B'
*B   'GETF'      '   DECK-ID 04A FORTRAN 3.2B'
*B   'GETSYM'    '   DECK-ID 07F FORTRAN 3.2B'
*B   'GPUT'      '   DECK-ID 02A FORTRAN 3.2B'
*B   'IGETCF'    '   DECK-ID 15F FORTRAN 3.2B'
*B   'IOPRBA'    '   DECK-ID 08F FORTRAN 3.2B'
*B   'PACK'      '   DECK-ID 09F FORTRAN 3.2B'
*B   'Q8PRMS'    '   DECK-ID 10F FORTRAN 3.2B'
*B   'RDLABL'    '   DECK-ID 10A FORTRAN 3.2B'
*B   'STORE'     '   DECK-ID 11F FORTRAN 3.2B'
*B   'SYMBOL'    '   DECK-ID 03A FORTRAN 3.2B'
*B   'ENDDO'     '   DECK-ID 29A FORTRAN 3.2B'
*B   'GNST'      '   DECK-ID 05A FORTRAN 3.2B'
*B   'OPTION'    '   DECK-ID 16F FORTRAN 3.2B'
*B   'OUTENT'    '   DECK-ID 06A FORTRAN 3.2B'
*B   'PHASEA'    '   DECK-ID 07A FORTRAN 3.2B'
*B   'PLABEL'    '   DECK-ID 08A FORTRAN 3.2B'
*B   'STCHAR'    '   DECK-ID 11A FORTRAN 3.2B'
*B   'TYPE'      '   DECK-ID 12A FORTRAN 3.2B'
*B   'SAVEID'    '   DECK-ID 13A FORTRAN 3.2B'
*B   'LOCLA5'    '   DECK-ID 24F FORTRAN 3.2B'
*B   'DUMYA5'    '   DECK-ID 25F FORTRAN 3.2B'
*B   'BDOPR'     '   DECK-ID 33A FORTRAN 3.2B'
*B   'CKIVC'     '   DECK-ID 35A FORTRAN 3.2B'
*B   'IOSPR'     '   DECK-ID 37A FORTRAN 3.2B'
*B   'ENDLOC'    '   DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTA5,,,B
*K,I6
*K,P8
*P,F
*B   'FTNB'      '   COPYRIGHT CONTROL DATA CORPORATION 1973'
*B   'GOB'       '   DECK-ID 26F FORTRAN 3.2B'
*B   'CNVT'      '   DECK-ID 01A FORTRAN 3.2B'
*B   'DUMMY'     '   DECK-ID 01B FORTRAN 3.2B'
*B   'FCMSTK'    '   DECK-ID 02B FORTRAN 3.2B'
*B   'GETSYM'    '   DECK-ID 07F FORTRAN 3.2B'
*B   'IOPRBB'    '   DECK-ID 27F FORTRAN 3.2B'
*B   'KCPART'    '   DECK-ID 03B FORTRAN 3.2B'
*B   'KOUTPT'    '   DECK-ID 04B FORTRAN 3.2B'
*B   'KPCSTK'    '   DECK-ID 05B FORTRAN 3.2B'
*B   'KPC3PR'    '   DECK-ID 06B FORTRAN 3.2B'
*B   'KSYMGN'    '   DECK-ID 07B FORTRAN 3.2B'
*B   'LABKPC'    '   DECK-ID 08B FORTRAN 3.2B'
*B   'LABLER'    '   DECK-ID 09B FORTRAN 3.2B'
*B   'PUNT'      '   DECK-ID 10B FORTRAN 3.2B'
*B   'CONV'      '   DECK-ID 03F FORTRAN 3.2B'
*B   'Q8PRMS'    '   DECK-ID 10F FORTRAN 3.2B'
*B   'STOREB'    '   DECK-ID 34F FORTRAN 3.2B'
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*B  'SYMBOL'   '  DECK-ID 11B FORTRAN 3.2B'
*B  'TSALOC'   '  DECK-ID 12B FORTRAN 3.2B'
*B  'ARAYSZ'   '  DECK-ID 42A FORTRAN 3.2B'
*B  'ASSEM'    '  DECK-ID 13B FORTRAN 3.2B'
*B  'BANANA'   '  DECK-ID 14B FORTRAN 3.2B'
*B  'BGINDO'   '  DECK-ID 15B FORTRAN 3.2B'
*B  'END'      '  DECK-ID 16B FORTRAN 3.2B'
*B  'ENTCOD'   '  DECK-ID 17B FORTRAN 3.2B'
*B  'HELEN'    '  DECK-ID 18B FORTRAN 3.2B'
*B  'INXRST'   '  DECK-ID 19B FORTRAN 3.2B'
*B  'NOPROC'   '  DECK-ID 20B FORTRAN 3.2B'
*B  'PHASEB'   '  DECK-ID 21B FORTRAN 3.2B'
*B  'READIR'   '  DECK-ID 22B FORTRAN 3.2B'
*B  'SUBFUN'   '  DECK-ID 23B FORTRAN 3.2B'
*B  'SYMSCN'   '  DECK-ID 28A FORTRAN 3.2B'
*B  'ACP'      '  DECK-ID 24B FORTRAN 3.2B'
*B  'AFIDL'    '  DECK-ID 25B FORTRAN 3.2B'
*B  'ASUPER'   '  DECK-ID 26B FORTRAN 3.2B'
*B  'CGOTO'    '  DECK-ID 27B FORTRAN 3.2B'
*B  'FINK'     '  DECK-ID 28B FORTRAN 3.2B'
*B  'INTRAM'   '  DECK-ID 29B FORTRAN 3.2B'
*B  'PARTSB'   '  DECK-ID 30B FORTRAN 3.2B'
*B  'SUBPR1'   '  DECK-ID 31B FORTRAN 3.2B'
*B  'SUBPR2'   '  DECK-ID 32B FORTRAN 3.2B'
*B  'SUBPR3'   '  DECK-ID 33B FORTRAN 3.2B'
*B  'ARITHR'   '  DECK-ID 34B FORTRAN 3.2B'
*B  'ENDLOC'   '  DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTB1,,,B
*K,I6
*K,P8
*P,F
*B  'FTNB'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOC'      '  DECK-ID 28F FORTRAN 3.2B'
*B  'BKDWN'    '  DECK-ID 01C FORTRAN 3.2B'
*B  'BLDUP'    '  DECK-ID 02C FORTRAN 3.2B'
*B  'BSS'      '  DECK-ID 03C FORTRAN 3.2B'
*B  'CHKWD'    '  DECK-ID 04C FORTRAN 3.2B'
*B  'CHOP'     '  DECK-ID 05C FORTRAN 3.2B'
*B  'CL12'     '  DECK-ID 06C FORTRAN 3.2B'
*B  'CON'      '  DECK-ID 07C FORTRAN 3.2B'
*B  'COUNT'    '  DECK-ID 08C FORTRAN 3.2B'
*B  'DATAST'   '  DECK-ID 09C FORTRAN 3.2B'
*B  'GETSYM'   '  DECK-ID 10C FORTRAN 3.2B'
*B  'INOUT'    '  DECK-ID 11C FORTRAN 3.2B'
*B  'IOPRBC'   '  DECK-ID 29F FORTRAN 3.2B'
*B  'IXOPT'    '  DECK-ID 12C FORTRAN 3.2B'
*B  'LABEL'    '  DECK-ID 14C FORTRAN 3.2B'
*B  'LABIN'    '  DECK-ID 15C FORTRAN 3.2B'
*B  'PHASEC'   '  DECK-ID 13C FORTRAN 3.2B'
*B  'Q8PRMS'   '  DECK-ID 10F FORTRAN 3.2B'
*B  'QXLD'     '  DECK-ID 16C FORTRAN 3.2B'
*B  'REED'     '  DECK-ID 17C FORTRAN 3.2B'
*B  'SKIP'     '  DECK-ID 18C FORTRAN 3.2B'
*B  'SYMSCN'   '  DECK-ID 19C FORTRAN 3.2B'
*B  'ENDLOC'   '  DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTC1,,,B
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*K,I6
*K,P8
*P,F
*B  'FTNB'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOOD'     '  DECK-ID 30F FORTRAN 3.2B'
*B  'AMOUT'    '  DECK-ID 01D FORTRAN 3.2B'
*B  'ADMAX'    '  DECK-ID 02D FORTRAN 3.2B'
*B  'BEGINO'   '  DECK-ID 03D FORTRAN 3.2B'
*B  'BKDWN'    '  DECK-ID 04D FORTRAN 3.2B'
*B  'COUNT'    '  DECK-ID 05D FORTRAN 3.2B'
*B  'FINISH'   '  DECK-ID 06D FORTRAN 3.2B'
*B  'GETSYM'   '  DECK-ID 10C FORTRAN 3.2B'
*B  'IACON'    '  DECK-ID 07D FORTRAN 3.2B'
*B  'IHCON'    '  DECK-ID 08D FORTRAN 3.2B'
*B  'INDEX'    '  DECK-ID 09D FORTRAN 3.2B'
*B  'IOPRBD'   '  DECK-ID 31F FORTRAN 3.2B'
*B  'LABOUT'   '  DECK-ID 10D FORTRAN 3.2B'
*B  'NP2OUT'   '  DECK-ID 11D FORTRAN 3.2B'
*B  'NPUNCH'   '  DECK-ID 12D FORTRAN 3.2B'
*B  'NWRITE'   '  DECK-ID 13D FORTRAN 3.2B'
*B  'PACK'     '  DECK-ID 09F FORTRAN 3.2B'
*B  'PHASE6'   '  DECK-ID 14D FORTRAN 3.2B'
*B  'Q8PRMS'   '  DECK-ID 10F FORTRAN 3.2B'
*B  'RBDX'     '  DECK-ID 15D FORTRAN 3.2B'
*B  'RBPK'     '  DECK-ID 16D FORTRAN 3.2B'
*B  'SYMSCN'   '  DECK-ID 17D FORTRAN 3.2B'
*B  'TABDEC'   '  DECK-ID 18D FORTRAN 3.2B'
*B  'UNPUNC'   '  DECK-ID 19D FORTRAN 3.2B'
*B  'CONV'     '  DECK-ID 33F FORTRAN 3.2B'
*B  'ENDLOC'   '  DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTD1,,,8
*K,I6
*K,P8
*P,F
*B  'FTNB'     '  COPYRIGHT CONTROL DATA CORPORATION 1973'
*B  'GOE'      '  DECK-ID 32F FORTRAN 3.2B'
*B  'AMOUT'    '  DECK-ID 01E FORTRAN 3.2B'
*B  'ADMAX'    '  DECK-ID 02E FORTRAN 3.2B'
*B  'BEGINO'   '  DECK-ID 03E FORTRAN 3.2B'
*B  'BKDWN'    '  DECK-ID 04E FORTRAN 3.2B'
*B  'CONV'     '  DECK-ID 33F FORTRAN 3.2B'
*B  'COUNT'    '  DECK-ID 05E FORTRAN 3.2B'
*B  'FINISH'   '  DECK-ID 06E FORTRAN 3.2B'
*B  'GETSYM'   '  DECK-ID 10C FORTRAN 3.2B'
*B  'IACON'    '  DECK-ID 07E FORTRAN 3.2B'
*B  'IHCON'    '  DECK-ID 08E FORTRAN 3.2B'
*B  'INDEX'    '  DECK-ID 09E FORTRAN 3.2B'
*B  'IOPRBD'   '  DECK-ID 31F FORTRAN 3.2B'
*B  'LABOUT'   '  DECK-ID 10E FORTRAN 3.2B'
*B  'NP2OUT'   '  DECK-ID 11E FORTRAN 3.2B'
*B  'NPUNCH'   '  DECK-ID 12E FORTRAN 3.2B'
*B  'NWRITE'   '  DECK-ID 13E FORTRAN 3.2B'
*B  'PACK'     '  DECK-ID 09F FORTRAN 3.2B'
*B  'PHASE6'   '  DECK-ID 14E FORTRAN 3.2B'
*B  'Q8PRMS'   '  DECK-ID 10F FORTRAN 3.2B'
*B  'RBDX'     '  DECK-ID 15E FORTRAN 3.2B'
*B  'RBPK'     '  DECK-ID 16E FORTRAN 3.2B'
*B  'SETPRT'   '  DECK-ID 17E FORTRAN 3.2B'
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*B  'SYMSCN'  '  DECK-ID 17D FORTRAN 3.2B'
*B  'TABDEC'  '  DECK-ID 18E FORTRAN 3.2B'
*B  'UNPUNC'  '  DECK-ID 19E FORTRAN 3.2B'
*B  'ENDLOC'  '  DECK-ID 17F FORTRAN 3.2B'
*T
*K,I8
*N,FORTE1,,,8
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