

ASSIGN M:CI,(FILE,RTR00T,IDOOCI)

METASYM CI,L0,CN

•SS R0,R1,R2,R3,R4,R5,R6,R7,R8,R9,R10,R11,R12,R13,R14,R15

•SS SR1,SR2,SR3,SR4,D1,D2,D3,D4,s

•END

ALL⁰CAT:UN

239=	EQU	1360/LI					
ALTERR							
175/	REF	2230/BEZ	2232/B				
BLCKD:MASK							
163/	REF	1105/CW					
BT31T00							
121/	EQU	122/EQU	124/EQU	126/EQU	127/EQU	166/REF	208/EQU
210/	EQU	211/EQU	230/EQU	233/EQU	237/EQU	331/LW	337/LW
343/	LW	349/LW	690/CW	1345/LW	1351/LW	1353/LW	1544/0R
1725/	0R	1772/0R	1776/0R				
CALBAD							
160/	REF	834/B	993/B	1276/B	1524/B	1663/B	1680/B
CHKBIT							
167/	REF	1545/BAL	1562/BAL	1567/BAL			
CHKBIT1							
167/	REF	1539/BAL					
CHKG1							
641=	BDR	647/BNE	651/BNE				
CHKG2							
640/	BE	644=LI					
CHK1							
324/	BLE	326=B					
CNVL							
453=	CH	455/BDR					
CNV0K							
454/	BE	458=LH					
C15HIGH							
200=	EQU	203/DATA					
C15LOW							
197=	EQU	203/DATA	835/LI				
C15TV							
835/	LI	842=EQU					
C19CS							
205=	EQU	1256/SLS					
D							
88=	EQU	404/LI	533/LI	596/LI	696/LI	644/LI	648/LI

	975/LI 2096/LI	976/LI 2147/LI	1091/LI	1209/LI	1235/LI	2003/LI	2011 ² /LI
DCTSIZ	165/REF	697/CI	734/LI				
DCT1A	165/REF	737/CH					
DCT1P	165/REF	699/LH	735/CH				
DCT12	164/REF 1773/STW	1548/LW 1836/STW	1560/STS 1889/LW	1597/STW	1719/LW	1722/STW	1771/LW
DCT13	164/REF	1770/STD	1888/LD	1935/LD			
DCT15	164/REF	1534/LB	1601/STB	1686/CB	1717/LB		
DCT19	173/REF	1886/LB	1933/LB				
DCT3	164/REF	1531/LB	1682/LB	1878/LB			
DEV	213-EQU	695/LW					
DIC	1406/CI						
DOWND	236-EQU	1532/CI	1683/CI				
DRIVE10	172/REF	1727/BAL					
E:ART	161/REF	2137/LI					
E:QFI	161/REF	1012/LI					
ENBSR4	173/REF	1718/BEZ	1720/BGEZ	2172/BANZ	2174/BE		
EXHI0	1708/B	1712-EQU					
EXIT	1551-PULL	1556/BIF					

EXSC	1578/B	1595=SCREECH		
EXUIMASK	162/REF	1101/CW		
EX1A	1568/B	1604=LW		
EX1B	1571=SLS	1605/B		
EX11	1525/LI	1530=BCS		
EX12	1515/BLZ	1525=LI		
EX14	1538=PUSH	1602/B		
EX15	1546/B	1553=LW		
EX16	1563/B	1565=PUSH		
EX17	1550/BNEZ	1562=BAL		
EX18	1535/BEZ	1596=STW		
EX19	1555/BLE	1557=LW		
EX21	1653/BCR	1664=LI		
EX22	1664/LI	1681=BCS		
EX23	1679=LW	1681/BCS	1684/BAZ	1687/BNE
EX24	1669/BCR	1682=LB		
EX25	1690=EQU	1715/BAL		
FCD	689/LW			
FLG/INH				

FLGIINHR	233•EQU	925/BR				
FLGILIC	234•EQU	928/AND	1008/AND	1219/AND		
FLGILICR	230•EQU	1329/CW	1347/CW	1349/BR		
FPTDCB	231•EQU	1331/AND				
FPTEA	209•EQU	1526/CI	1666/CI			
FPTF1	208•EQU	1598/CW				
GINT1	207•EQU	1327/CI				
HIBRET	1999/BGE	2003•LI				
HOLDON	1724/LI	1727•BAL				
HOLD2	1328/BAZ	1342•EQU				
ICB	1348/BANZ	1359•ENABLE				
ICBBLNK	159/REF	405/LI	974/LI			
ICBCLK	112•EQU					
ICBDL	111•EQU					
ICBDLDATA	100•EQU	1205/AI	1206/LW	2224/AI	2227/STS	2235/AI
ICBDLFLG	104•EQU					
ICBENTPSD0	102•EQU					
ICBGJACN	103•EQU	2236/LW				
	109•EQU	648/LI	2007/LM			

ICBGJNME							
ICBGJNME	108-EQU	644/LI	2008/LM				
ICBGJPRI							
ICBGUN	106-EQU	2003/LI					
ICBGUN	107-EQU	636/LI	2011/LI				
ICBICBADR							
ICBINT	105-EQU						
ICBINT	98-EQU	404/LI	533/LI	1997/INT	2131/LW	2170/LW	2242/INT
ICBLNK							
ICBLNK	93-EQU	1252/STW					
ICBPRI							
ICBPRI	101-EQU	976/LI	1234/AI	2098/LW	2126/STS	2163/STS	
ICBPRI0							
ICBPRI0	97-EQU	1209/LI	1235/LI	2147/LI			
ICBPSD1							
ICBPSD1	95-EQU	596/LI	1996/AI	2050/AI			
ICBPSD2							
ICBPSD2	96-EQU						
ICBSIZE							
ICBSIZE	160/REF	410/AI	982/AI				
ICBSTAT							
ICBSTAT	92-EQU	406/LW	489/LW	544/LW	566/STS	568/STS	571/STS
ICBSTAT	573/STS	575/AND	576/STW	581/LW	592/STW	978/LW	1082/LW
ICBSTAT	1214/LW	1217/STW	1247/LW	2150/STS			
ICBSYSEP							
ICBTUN	113-EQU						
ICBTUN	110-EQU						
ICBTYP1							
ICBTYP1	115-EQU						
ICBTYP2							
ICBTYP2	116-EQU	995/CI	1086/CI				
ICBTYP3							
ICBTYP3	117-EQU	1245/CI					
ICBUN							

ICBXPSD	99•EQU	975/LI	1091/LI	2096/LI
INHIBIT	94•EQU			
INH0FF	910/BEZ	920•EQU		
INHRET	924/BEZ	928•AND		
INTCONAD	926•STH	929/B		
INTCONEXU1	567/B	573•STS		
INTCONEXU2	531/EXU	551•EQU		
INTCONR	532/EXU	563•EQU		
INTCON2	565/B	569/B	575•AND	
INTCON3	536/BG	581•LW		
INTCON4	533•LI	577/B		
INTCON5	583/BE	589•CW		
INTCON6	587/BANZ	590/BANZ	594•CW	
INTLBSIZ	547/B	591•AND		
INTLB1	159/REF	452/LI		
INTLB2	159/REF	453/CH		
INTLB3	159/REF	458/LH		
INTRTNA	170/REF	459/LB		
	1224/BEZ	1233/BG	1243•ENABLE	

INTRTNB	1222=LI	1230/BNE			
INTRTNERR	1203/BEZ	1275=LW			
INTRTNX	1249/BEZ	1255/B	1264=LI		
INTRTN1	1246/BNE	1256=SLS			
INTRTN2	1259/BNE	1263=BAL			
INTSIM	168/REF	1726/B			
INTSTAT	146/DEF	1068/BAL	1077=BAL		
INTSTATX	1081/B	1100/BANZ	1126/B	1128/B	1130=STB
INTSTAT1	1106/BANZ	1124=LI			
INTSTAT2	1078/BCS	1082=LW			
INTSTAT3	1087/BNE	1091=LI			
INTSTAT4	1102/BANZ	1127=LI			
INTSTAT5	1104/BANZ	1129=LI			
IOINST	1689/EXU	1705=EGU			
IOQB	166/REF	1774/INT			
IOSCU	173/REF	1880/BEZ	1893/B		
IOS1	1775/BCR	1777=AI			
IOWAIT:MASK	162/REF	1103/CW			
JIDCBLL					

J:ICBHDR	167/REF	687/CLM					
	163/REF	1200/LW	1207/STS	1346/STS	1352/STS	1580/STS	1700/STS
J:TCB	2225/LW	2228/STS	2233/LW				
JB:PRIV	175/REF	2229/LW	2243/LW				
JX:CMAP	161/REF	323/CB					
LCT1	167/REF	772/LOAD					
	1405/BANZ	1418=LB					
LCT2	1407/BANZ	1413/BEZ	1420=LB				
LCT3	1414=EXU	1419/B	1421/B				
LOCATE	409/BE	414=LW					
LOCICB1	400/BAZ	403=LI					
LOCNA	407/BGEZ	410=AI					
LOOP	406=LW	411/BDR					
LOOP1	639=CB	641/BDR					
LOOP2	978=LW	983/BDR					
MASKS	167/REF	286/AND	289/AND	491/AND	692/AND	696/AND	914/AND
	1084/AND	1228/AND	1257/AND	1549/AND	1559/LW	1688/AND	2105/AND
	2112/AND						
MAXG	168/REF	638/LI					
MONORG	161/REF	535/CI					
MONPROC							

	75=SET						
MTBINST	1409/EXU	1411/EXU	1414/EXU	1416/EXU	1424=MTB		
MTRTNO	164/REF	1265/B					
NB31T80	119/EQU	123/EQU	125/EQU	166/REF	231/EQU	234/EQU	1215/AND
	1216/AND	1721/AND	1835/AND				
NEWQNW	165/REF	1577/BAL					
NINTS	159/REF	403/LI	977/LI				
NXTDCT	735=CH	739/BDR					
PB:LCT	170/REF	1424/MTB	1425/MTB				
QFINA	979/BGEZ	982=AI	999/BG				
QFIBK	996/BE	1000=LI					
QFI1	981/BE	994=BAL					
RBBATIUN	240=EQU	1363/LI					
RT:GINT	152/DEF	1953=EQU					
RT:GINTP	173/REF	1990/INT	1995/INT				
RT:INTENTRY	154/DEF	2180=EQU					
RT:UINT	153/DEF	2016=EQU					
RT:UINTP	174/REF	2046/INT	2049/INT				
RTALTCP	134/DEF	785=EQU					
RTCALOK							

RTCAL15CODES	824/BCR	835=LI				
RTCHKGUN	203=DATA	823/CLM				
RTCHKPRIV	145/DEF	600=ERU	1088/BAL			
RTCLOCK#	136/DEF	294=ERU	907/BAL	1322/BAL	1512/BAL	1652/BAL
RTCNVXTX	176/REF	854/LI				
RTCONNECT#	138/DEF	401/BAL	417=ERU			
RTCU	176/REF	849/LI				
RTDCBCHK	150/DEF	1839=ERU				
RTDEVCHK	140/DEF	654=ERU	1528/BAL	1668/BAL		
RTDISCON#	141/DEF	703=ERU	1527/BAZ	1667/BAZ		
RTERRIBADCAL	176/REF	850/LI				
RTERRIINTRTN	223=ERU	833/LI				
RTERRIIBEX1	225=DATA	1275/LW				
RTERRIIBEX2	227=DATA	1662/LW				
RTERRIPARAM	228=DATA	1679/LW				
RTERRIQF1	226=DATA	1523/LW				
RTGJOBCON#	224=DATA	992/LW				
RTHOLD	176/REF	848/LI				
	853/B	1278=ERU				

RTICBHDR	163/REF	1251/LW	1253/STW		
RTICBTYP	139/DEF	462=EQU	994/BAL	1085/BAL	1244/BAL
RTINT	149/DEF	1780=EQU			
RTINTCON	851/B	857=EQU			
RTINTCONTRL	494=EQU	915/BAL	1261/BAL	1263/BAL	
RTINTRTN	144/DEF	1133=EQU			
RTINTSTAT	855/B	1016=EQU			
RTIDEX1	846/B	1473=EQU			
RTIDEX2	847/B	1607=EQU			
RTIDSTRT	148/DEF	1730=EQU			
RTLCT	143/DEF	1334/BAL	1357/BAL	1368=EQU	
RTLCCICB	137/DEF	363=EQU	911/BAL	1077/BAL	
RTNRRTSEG	162/REF	837/LI			
RTQFI	852/B	931=EQU			
RTRESDF#	170/REF	843/LI			
RTRETC	332/B	338/B	344/B	352=EQU	
RTRET1	172/REF	1837/B			
RTRET2	172/REF	1831/BCS	1834/BANZ		
RTRBOT					

RTSETCCO	3•EQU 346•EQU 1581/B	4/DEF 916/B	927/B	1073/B	1330/BAZ	1338/B	1366/B
RTSETCC1	328•EQU	908/BCS	1323/BCS	1513/BCS	1533/BAZ	1537/BNE	
RTSETCC2	334•EQU	912/BCR	1072/BE	1362/BCS	1365/BCS	1552/B	1599/BAZ
RTSETCC3	340•EQU	1529/BCS	1530/BCS				
RTSIZE	147/DEF	1361/BAL	1364/BAL	1427•EQU			
RTSTARTIO#	165/REF	845/LI					
RTSTOPIO#	165/REF	844/LI					
RTS1	1468/BLEZ	1470•LW					
RTT0	151/DEF	1895•EQU					
RTVTP	142/DEF	742•EQU	1541/BAL	1554/BAL			
RTWD	135/DEF	249•EQU	541/BAL	2002/BAL	2135/BAL	2176/BAL	
SIAC0RE	160/REF	1463/LW					
SIBADFLG	164/REF	350/STS	1354/STS				
SICUN	161/REF 1569/LW	921/LW 1600/LW	973/LW 1685/LW	1006/LW	1208/LW	1324/LW	1536/CW
SICUP	174/REF	1213/STW	1242/STW	2151/CW			
SIGJOBACN	168/REF	650/CD					
SIGJOBTBL	168/REF	646/CD					

S:RTCORE	161/REF	1337/AWM	1358/AWM	1464/SW
S:RTIR	174/REF	2154/STW		
S:RTUN	175/REF	2155/STW		
S:STL#	170/REF	1466/LW		
SB:GJOBUN	168/REF	639/CB		
S:OREJECT	237-EQU	1879/AND		
SL:RSVP	171/REF	1467/SW		
STATA	121-EQU	545/CW	555/LW	589/CW
STATAE	120-EQU	554/LW		
STATAETR	221-EQU	553/LW		
STATAR	119-EQU			
STATBLK	218-EQU	1125/LI		
STATC	127-EQU			
STATE	122-EQU	556/LW	594/CW	
STATER	123-EQU	557/LW	574/LW	
STATEXU	215-EQU	1127/LI		
STATINTSHFT	130-EQU	1083/SLS		
STATIONW	217-EQU	1129/LI		
STATNA				

STATB	219-EQU	1071/CI	1080/LI				
STATRIG	126-EQU	1248/AND					
STATRIGR	124-EQU	559/LW	586/CW				
STATWAIT	125-EQU	591/AND					
STATYPSHFT	216-EQU	1096/LI					
TIGJOB	129-EQU	490/SLS					
TIOVERLAY	174/REF	2009/BAL					
TIPULLE	166/REF	838/B					
TIREG	176/REF	2177/B	2249/B				
TIRUE	160/REF	1013/BAL					
TISAVE	175/REF	2158/B					
TISSE	167/REF	1994/BAL	2048/BAL				
TISSEM	174/REF	2013/B	2053/B				
TITOTSZ	169/REF	1264/LI					
TIUTSXTS	160/REF	1335/BAL	1355/BAL	1462/BAL			
TIC	176/REF	2231/BAL					
TRAPEXIT	1404/CI						
TSTACK	162/REF	361/B	1014/B	1716/LI	1728/B		
	358/AW	1003/AW	1069/LW	1547/LW*	1557/LW*	1692/LW	2237/LW

UBIACP	2247/LW						
UBIAPB	169/REF	1418/LB					
UBIAPR	169/REF	1410/LB					
UBIASP	169/REF	1408/LB					
UBIDB	169/REF	1412/LB					
UBIOV	169/REF	1420/LB					
UBIPRI0	169/REF	1415/LB					
UBIPRI0	173/REF	1212/STB	1240/STB	1570/LB			
UBIPRI0B	173/REF	998/CB	1211/STB	1232/CB	1236/LB	1241/STB	2143/CB
	2145/LB	2146/STB					
UBIUS	163/REF	1095/LB					
UFLAGS	77-SET						
UHIDL	174/REF	1010/LH	1221/LH	2104/LH	2161/LH	2165/STH	
UHIFLG	164/REF	922/LH	926/STH	1007/LH	1009/STH	1218/LH	1220/STH
	1403/LH						
UHIFLG2	163/REF	1326/LH	1332/STH	1350/STH			
UINT0	155/DEF	2051/BAL	2055-EQU				
UINT01	2098-LW	2100/ANLZ					
UINT1	2112-AND	2119/B					
UINT2	2113/BEZ	2117/BL	2121-LI				

UINT3	2129=LC	2166/B					
UINT4	2106/BEZ	2110/BL	2161=LH				
UINT5	2133/BANZ	2136=LB					
UINT6	2130/BCR	2141=LB					
UINT65	2144/BG	2147=LI					
UINT7	2152/BG	2156=ENABLE					
UINT8	2102/BCS	2170=LW					
UTSPRBC	76=SET						
W	89=EQW	406/LW	489/LW	544/LW	566/STS	568/STS	571/STS
	573/STS	575/AND	576/STW	581/LW	592/STW	978/LW	1082/LW
	1205/AI	1206/LW	1214/LW	1217/STW	1234/AI	1247/LW	1252/STW
	1996/AI	1997/INT	2007/LM	2008/LM	2050/AI	2098/LW	2126/STS
	2131/LW	2150/STS	2163/STS	2170/LW	2224/AI	2227/STS	2235/AI
	2236/LW	2242/INT					
WAITIMASK	162/REF	1099/CW					
XFO	174/REF	2137/AND					
XF1FFFFFFF	172/REF	221/EQW					
X1	211=EQW	1097/LW					
X1FFFE	171/REF	359/AND	1004/AND	1696/AND			
X3FFE00	172/REF	774/LW					
X560	1556/BIF						

YC	172/REF	1579/LW	1699/LW	1832/CW
YF	171/REF	356/LW	1001/LW	1697/LW
YFF	174/REF	2099/LW		
YFFFF	171/REF	451/BR		
Y06	86/REF	120/EQU		
Y2	210-EQU	2149/LW		
24BM14	175/REF	2248/STW*		
24BM18	175/REF	2241/STW*		

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*M*      RTR00T RESIDENT REAL-TIME MODULE
*
RTR00T  EQU      $
DEF      RTR00T      MODULE BIAS
*****
*P*      NAME:      RTR00T
*,*
*,*      PURPOSE:  TO PROVIDE THE RESIDENT INTERFACE FOR ALL CAL1,5'S
*,*      (EXCEPT M:EXU, M:MASTER & M:SLAVE WHICH ARE HANDLED
*,*      IN ALTCP.
*,*
*,*      TO PROVIDE THE INTERRUPT HANDLERS FOR REAL AND PSEUDO
*,*      INTERRUPTS.
*,*
*,*      TO PROVIDE THE I/O SUBROUTINES WHICH ARE REQUIRED ONLY
*,*      AS THE RESULT OF M:IOEX (REAL-TIME) CAL1,5'S.
*,*
*,*      DESCRIPTION: ALL CAL1,5'S (EXCEPT AS NOTED ABOVE) PASS
*,*      THROUGH RTR00T. CONTROL IS PASSED TO THE RTNR MODULE
*,*      IN THE RTOV OVERLAY FOR THE FOLLOWING CAL1,5'S:
*,*
*,*      RESDF MEMORY      (FPT CODE = .1B)
*,*      M:STOPIO          .1C
*,*      M:STARTIO        .1D
*,*      M:JOBBCON        .20
*,*      M:CONNECT        .21
*,*      M:DISCONNECT     .22
*,*      M:CLOCK          .26
*,*      ALL OTHERS ARE HANDLED IN RTR00T:
*,*      M:IOEX (SIO)     (FPT CODE = .1E)
*,*      M:IOEX (TIO/TDV/HIO) .1F
*,*      M:INTCON/M:INHIBIT .23
*,*      M:QFI            .24
*,*      M:HOLD           .25
*,*      M:INTSTAT        .27
*,*
*,*      REAL-TIME INTERRUPT-RECEIVING ROUTINES ALSO RESIDE
*,*      IN RTR00T (THEY INTERFACE TO THE SCHEDULER).
    
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106	LIST	ICBGJPRI EQU	24,6	BYTE
107	LIST	ICBGUN EQU	29,7	BYTE
108	LIST	ICBGJNME EQU	4,8	DOUBLE-WORD
109	LIST	ICBGJACN EQU	5,10	DOUBLE-WORD
110	LIST	ICBTUN EQU	1,1	WORD
111	LIST	ICBCLK EQU	2,2	WORD
112	LIST	ICBBLNK EQU	4,4	WORD
113	LIST	ICBSYSEP EQU	3,3	WORD
114		*		
115	00000000	ICBTYP1 EQU	0	ICBSTATYP FOR TYPE-I ICB
116	00000001	ICBTYP2 EQU	1	ICBSTATYP FOR TYPE-II ICB
117	00000002	ICBTYP3 EQU	2	ICBSTATYP FOR TYPE-III ICB
118		*		
119	FR	STATAR EQU	NB31T00+X1A'	ICBSTAT MASK ARMED BIT RESET
120	EXT	STATAE EQU	Y06	ARMED AND ENABLED
121	FR	STATA EQU	BT31T00+26	ARMED
122	FR	STATE EQU	BT31T00+27	ENABLED
123	FR	STATER EQU	NB31T00+X1B'	ENABLED BIT RESET
124	FR	STATRIG EQU	BT31T00+28	TRIGGERED
125	FR	STATRIGR EQU	NB31T00+X1C'	TRIGGERED BIT RESET
126	FR	STAT0 EQU	BT31T00+29	ONESHOT BIT
127	FR	STATC EQU	BT31T00+31	CLEAR BIT
128		*		
129	FFFFFFE9	STATYPSHFT EQU	.23	SHIFT-COUNT TO RIGHT, JUSTIFY STATYP
130	FFFFFFE7	STATINTSHFT EQU	.25	SHIFT-COUNT TO RIGHT, JUSTIFY STATIN
131		*		
132		END		

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PAGE
DEF RTALTCP CAL1,5 DRIVER
DEF RTWD SUBR TO FORMAT & ISSUE WD INSTR
DEF RTCHKPRIV SUBR TO CHECK USER PRIVILEGE
DEF RTL0CICB SUBR TO LOCATE A GIVEN ICB
DEF RTCNVTXT SUBR TO CONVERT INT LBL TO INT ADR
DEF RTICBTYP SUBR TO EXTRACT ICBSTATYP
DEF RTDCBCHK SUBR TO VALIDATE IOEX DCB
DEF RTDEVCHK SUBR TO VALIDATE IOEX DEVICE ADR
DEF RTVTP SUBR TO CONVERT VIRT ADR TO PHY ADR
DEF RTLCT SUBR TO ADJUST PB:LCT
DEF RTINTRTN HANDLER FOR MI:INTRTN CAL1,5
DEF RTCHKGUN SUBR TO VALIDATE ICBGUN
DEF INTSTAT SUBR FOR MI:INTSTAT HANDLER
DEF RTSIZE SUBR TO SIZE=UP USER
DEF RTIOSTRT IOQ SUBR FOLLOWING IOEX SIG
DEF RTINT IOQ SUBR FOR IOEX INTERRUPT
DEF RTCU IOQ SUBR FOR IOEX CLEANUP
DEF RTTB IOQ SUBR FOR IOEX TIME=OUT
DEF RTIGINT INTERRUPT HANDLER (MI:GJOBCON)
DEF RTIUINT INTERRUPT HANDLER (MI:CONNECT)
DEF RT:INTENTRY ROUTINE TO PROCESS INTERRUPT DB:LIS
DEF UINTQ SUBR TO QUE INTERRUPT DB:LIST ITEM

REF INTLBSIZ,INTLB1,INTLB2,NINTS,ICB,ICBSIZE,
,CALBAD,T:REG,T:TOTST,S:ACORE,S:RTCORE,
,M0NORG,JB:PRIV,E:ART,EIQFI,S:GUN,RTNRRTSEG,
,TRAPEXIT,EXU:MASK,WAIT:MASK,IOWAIT:MASK,BLCKD:MASK,
,UB:US,UH:FLG2,J:ICBHDR,RTICBHDR,MTRTNO,
,UH:FLG,S:BADFLG,DCT3,DCT12,DCT13,DCT15,NEWQNW,
,RTSTOPIO#,RTSTARTIO#,DCT1A,DCT1P,DCTSIZ,IOQB,
,BT3:TB0,NB3:TB0,T:OVERLAY,T:SAVE,
,J:DCBLL,JX:CMAP,MASKS,CHKBIT,CHKBIT1,INTSIM,
,MAXG,SB:GJOBUN,SIGJOBTL,SIGJOBACN,T:ISSEM,
,UB:IASP,UB:Apr,UB:Ap0,UB:0V,UB:ACp,UB:DB,PB:LCT;

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R T R O B T D A T A

170 ,INTLB3,RTRESDF#,S:STL#,SL:RSVP,
 171 ,YF,X1FFFE,YFFFF,XF1FFFFFFF,
 172 ,YC,X3FFE00,RTRET1,RTRET2,DRIVEI8,DCT19,
 173 ,ENBSR4,UB:PRI8B,UB:PRI8,I8SCU,RT:GINTP,T:GJOB,
 174 ,T:SSSE,RT:UINTP,YFF,UH:DL,XFO,S:ICUP,S:IRTIR,S:RTUN,
 175 ,TIRUE,JITCB,ALTERR,24BM18,24BM14,T:PULLF,
 176 ,RTGJOBCON#,T:UTSXTS,RTCONNECT#,RTDISCON#,RTCLOCK#

SYMBOLIC REGISTER DEFINITIONS

177	*			
178	*			
179	*			
180	R0	EQU	0	
181	R1	EQU	1	
182	R2	EQU	2	
183	R3	EQU	3	
184	R4	EQU	4	
185	R5	EQU	5	
186	R6	EQU	6	
187	R7	EQU	7	
188	R8	EQU	8	
189	R9	EQU	9	
190	R10	EQU	10	
191	R11	EQU	11	
192	R12	EQU	12	
193	R13	EQU	13	
194	R14	EQU	14	
195	R15	EQU	15	

196	*			
197	C15LOW	EQU	X'1B'	LOWEST CAL1,5 FPT CODE, EXCEPT:
198	*			M:MASTER/MISLAVE WHICH ARE HANDLED
199	*			IN ALTCP
200	C15HIGH	EQU	X'27'	HIGHEST CAL1,5 FPT CODE, EXCEPT;
201	*			M:EXU WHICH IS HANDLED IN ALTCP

202		BOUND	8	
203	01 0000	00000018 A	RTCAL15CODES DATA	C15LOW,C15HIGH
	01 0001	00000027 A		

204		*		
205	FFFFFF#8	C19CS	EQU	=8
				SHIFT COUNT TO RIGHT=JUSTIFY CODE


```

206 *
207 00000001 FPTF1 EQU 1 ON/OFF BIT (M:IOBLD)
208 0000001F S FPTEA EQU BT31T80+31 'EA' PRESENCE BIT (M:IOEX)
209 00008000 FPTDCB EQU X'8000' 'DCB' PRESENCE BIT (M:IOEX)
210 0000001E S Y2 EQU BT31T80+30 'ON=DE-LIST' FLAG
211 00000001 S X1 EQU BT31T80+1
212 *
213 00000001 DEV EQU 1 WA(DCBDEV)
214 *
215 00000080 STATEXU EQU X'80' 'EXECUTABLE' CODE (M:INTSTAT)
216 00000040 STATWAIT EQU X'40' 'QFI' CODE (M:INTSTAT)
217 00000020 STATIOW EQU X'20' 'IO/WAIT' CODE (M:INTSTAT)
218 00000010 STATBLK EQU X'10' 'BLOCKED' CODE (M:INTSTAT)
219 00000001 STATNA EQU 1 'NOT ACTIVE' CODE (M:INTSTAT)
220 *
221 EXT STATAETR EQU XF1FFFFFF 'ARMD/ENBLD/TRGRD' BITS RESET
222 *
223 000000AE RTERR:BADCAL EQU X'AE'
224 01 00002 010000B8 A RTERR:QFI DATA X'010000B8'
225 01 00003 020000B8 A RTERR:INTRTN DATA X'020000B8'
226 01 00004 050000B8 A RTERR:PARAM DATA X'050000B8'
227 01 00005 010000B9 A RTERR:IOEX1 DATA X'010000B9'
228 01 00006 020000B9 A RTERR:IOEX2 DATA X'020000B9'
229 *
230 0000000C S FLGILIC EQU BT31T80+12 UH:FLG2 MASK: LOCKED-IN-CORE BIT
231 0000000C S FLGILICR EQU NB31T80+12 LIC BIT RESET
232 *
233 00000002 S FLG:INH EQU BT31T80+2 UH:FLG MASK: SOFTWARE INHIBIT BIT
234 00000002 S FLG:INHR EQU NB31T80+2 SOFTWARE INHIBIT-RESET
235 *
236 00000020 DOWND EQU X'20' DCT3 FLAG = 'DEVICE DOWN' (PRE-EMPTED)
237 00000004 S SIGREJECT EQU BT31T80+4 SIG REJECT BIT MASK OF DCT3
238 *
239 00000002 ALLOCAT:UN EQU 2 ALLOCAT'S USER #
240 00000003 RBBAT:UN EQU 3 RBBAT'S USER #
241 *
242 TITLE 'RT USER-SERVICE SUBROUTINES'

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RT USER-SERVICE SUBROUTINES

25

SECTION III

SUBROUTINES

01 000n7

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*****
*
*                               S E C T I O N   I I I
*
*                               S U B R O U T I N E S
*
*****
RTWD      EQU      * *****
*
*F*      NAME:      RTWD
*,*
*,*      PURPOSE:   FORMAT AND ISSUE AN INTERRUPT CONTROL WD INSTRUCTION.
*,*
*,*      DESCRIPTION: (SEE 'D' REPORT)
*****
*
*D*      NAME:      RTWD
*,*
*,*      REGISTERS:  R3, R13, R14 ARE VULNERABLE.
*,*
*,*      CALL:      BAL,R0
*,*
*,*      INTERFACE: NONE
*,*
*,*      ENVIRONMENT: MASTER/MAPPED OR UNMAPPED.
*,*
*,*      INPUT:     R3 = EFFECTIVE ADDRESS OF 'WD' INSTRUCTION
*,*                  (E.G., X1X00' WHERE X = WD CODE)
*,*      R10 = INTERRUPT ADDRESS
*,*
*,*      OUTPUT:   (HARDWARE INTERRUPT STATUS IS ALTERED)
*,*
*,*      DESCRIPTION: INTERRUPT CONTROL SUBROUTINE *
*,*                  FROM THE INTERRUPT ADDRESS, THE GROUP CODE IS
*,*                  DERIVED AS WELL AS THE BIT MASK FOR THE 'WD'
*,*                  INSTRUCTION'S REGISTER. FINALLY, A 'WD' INSTRUCTION
*,*                  IS EXECUTED TO CHANGE THE INTERRUPT'S STATUS.
*****

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```

280
281 01 00007 3200000A A
282 01 00008 20DFFFC0 A
283 01 00009 25D0007C A
284 01 0000A 47D00003 A
285 01 0000B 32D0000A A
286 01 0000C 48D00004 N
287 01 0000D 22E08000 A
288 01 0000E 3AD0000D A
289 01 0000F 48D00007 N
290 01 00010 A5E0000D A
291 01 00011 FDE00003 A
292 01 00012 F8000000 A

```

```

LW,R13 R10
AI,R13 =X1401
SLS,R13 =4
STS,R13 R3
LW,R13 R10
AND,R13 MASKS+4
LI,R14 X'80001
LCW,R13 R13
AND,R13 MASKS+7
S,R14 *R13
WD,R14 *R3
B *R0

```

```

PICK UP INT. ADR.
* DEVELOP *
* GROUP *
* CODE *
PICK UP INT. ADR. AGAIN
MASK OFF LEVEL
SET UP SHIFT INSTR. WITH R13 AS E.A.

MASK OFF SHIFT COUNT
SHIFT IT
*****
RETURN

```

293
294 01 00013

PAGE
RTCHKPRIV EQU \$ *****

295 *
296 *F* NAME: RTCHKPRIV
297 *,*
298 *,* PURPOSE: VALIDATE USER'S PRIVILEGE LEVEL.
299 *,*
300 *,* DESCRIPTION: (SEE 'D' REPORT)
301 *****

302 *D* NAME: RTCHKPRIV
303 *,*
304 *,* REGISTERS: R15 IS VULNERABLE.
305 *,*
306 *,* CALL: BAL,RO
307 *,*
308 *,* INTERFACE: NONE
309 *,*
310 *,* ENVIRONMENT: MASTER/MAPPED
311 *,*
312 *,* INPUT: JBIPRIV
313 *,*
314 *,* OUTPUT: CONDITION CODE 1 IS SET = 0 (IF JBIPRIV >= X'E0')
315 *,* 1 (IF JBIPRIV < X'E0')
316 *,*
317 *,* DESCRIPTION: JBIPRIV IS COMPARED AGAINST THE VALUE X'E0' AND
318 *,* CONDITION CODE 1 IS SET AS INDICATED ABOVE.
319 *****

320 *
321 01 00013 22F000E0 A LI,R15 X'E0' MINIMUM REAL-TIME PRIVILEGE
322 01 00014 02200000 A LCI 0 SET NORMAL RETURN
323 01 00015 71F00000 X CB,R15 JBIPRIV X'E0' ; JBIPRIV
324 01 00016 68200018 BLE CHK1 PRIV: BK
325 01 00017 02200080 A LCI 8 SET ABNORMAL RETURN
326 01 00018 F8000000 A CHK1 B *R0 RETURN

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RT USER-SERVICE SUBROUTINES

327
 328 01 00019
 329
 330
 331 01 00019 32200020 N
 332 01 0001A 68000022
 333

PAGE
 RTSETCC1 EQU \$ *****
 * PASSES CC SETTING VIA R2 TO RTRETC
 *
 LW,R2 BT31T00+32
 B RTRETC
 SPACE 5

334 01 0001B
 335
 336
 337 01 0001B 3220001F N
 338 01 0001C 68000022
 339

RTSETCC2 EQU \$ *****
 * PASSES CC SETTING VIA R2 TO RTRETC
 *
 LW,R2 BT31T00+31
 B RTRETC
 SPACE 5

340 01 0001D
 341
 342
 343 01 0001D 3220001E N
 344 01 0001E 68000022
 345

RTSETCC3 EQU \$ *****
 * PASSES CC SETTING VIA R2 TO RTRETC
 *
 LW,R2 BT31T00+30
 B RTRETC
 SPACE 5

346 01 0001F
 347
 348

RTSETCC0 EQU \$ *****
 * PASSES CC SETTING VIA R2 TO RTRETC
 *

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349 01 0001F 32300020 N
350 01 00020 47300000 X
351 01 00021 22200000 A
352      01 00022
353
354
355 01 00022 6D000027 A
356 01 00023 32300000 X
357 01 00024 225FFFFEF A
358 01 00025 30500000 X
359 01 00026 4B500000 X
360 01 00027 472A0000 A
361 01 00028 68000000 X

```

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RTRETC
*
*

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RT USER-SERVICE SUBROUTINES 29
LW,R3 BT31T00*32
STS,R3 S;BADFLG SET (RT=ACTIVITY) BIT
LI,R2 0
EQU $ *****
STORES CONDITION CODE (PASSED IN R2) INTO USER PSD
*****
ENABLE *****
LW,R3 YF CC MASK
LI,R5 =17 DISPL. BACK INTO TSTACK
AW,R5 TSTACK
AND,R5 X1FFFE INSURE DOUBLE-WORD BOUND
STS,R2 0,R5 SET CC'S
B TRAPEXIT EXIT CALL PROCESSING

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362
363 01 00029
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PAGE
RTLBCICB EQU $ *****
*
*F* NAME: RTLBCICB
*,*
*,* PURPOSE: FIND AN ACTIVE ICB ASSOCIATED WITH A GIVEN INTERRUPT
*,* ADDRESS OR LABEL.
*,*
*,* DESCRIPTION: (SEE 'D' REPORT)
*****
*D* NAME: RTLBCICB
*,*
*,* REGISTERS: R1, R4, R5, R14, R15 ARE VULNERABLE.
*,*
*,* CALL: BAL,R0
*,*
*,* INTERFACE: RTCNVTXT
*,*
*,* ENVIRONMENT: MASTER/MAPPED OR UNMAPPED
*,*
*,* INPUT: R6 = INTERRUPT ADDRESS OR TEXT LABEL.
*,* ICB TABLES
*,*
*,* OUTPUT: R2 = ADDRESS OF CORRESPONDING ICB (IF THERE IS ONE)
*,* CONDITION CODES 3/4 = 0 (IF THERE ISN'T AN ICB
*,* ASSOCIATED)
*,*
*,* DESCRIPTION: WE ARE TRYING TO LOCATE THE ICB THAT IS
*,* ASSOCIATED WITH THE SPECIFIED INTERRUPT ADDRESS OR
*,* TEXT LABEL. IF THE X'18000' BIT OF R6 IS SET THEN
*,* RTCNVTXT IS CALLED TO CONVERT THE TEXT LABEL TO AN
*,* INTERRUPT ADDRESS. NEXT THE ICBINT AND ICBSTAT
*,* FIELDS OF ALL ICBs ARE SCANNED TO FIND THE ACTIVE ICB
*,* ASSOCIATED WITH THE SPECIFIED INTERRUPT AND R2 AND
*,* CONDITION CODES 3/4 ARE SET ACCORDINGLY.
*****
*
```


416
417 01 0003A

```

PAGE EQU $ *****
*
*F* NAME: RTCNVTXT
*,*
*,* PURPOSE: CONVERT AN INTERRUPT LABEL TO AN INTERRUPT ADDRESS
*,* AND PROVIDE A DEFAULT EXECUTION PRIORITY.
*,*
*,* DESCRIPTION: (SEE 'D' REPORT)
*****
*D* NAME: RTCNVTXT
*,*
*,* REGISTERS: R1 IS VULNERABLE.
*,*
*,* CALL: BAL,R15
*,*
*,* INTERFACE: NONE
*,*
*,* ENVIRONMENT: MASTER/MAPPER OR UNMAPPED.
*,*
*,* INPUT: R6 = TEXT LABEL
*,* INTLB1, INTLB2, INTLB3.
*,*
*,* OUTPUT: R6 = INTERRUPT ADDRESS ASSOCIATED WITH TEXT LABEL.
*,* R14 = DEFAULT EXECUTION PRIORITY ASSOCIATED WITH TEXT
*,* LABEL DEFINED BY SYSGEN.
*,* CONDITION CODES 3/4 ARE SET = 0 (IF TEXT LABEL IS
*,* UNKNOWN)
*,*
*,* DESCRIPTION: INTLB1 IS SCANNED FOR A MATCH WITH THE TEXT
*,* LABEL; IF FOUND, INTLB2 AND INTLB3 ARE USED TO
*,* SUPPLY THE INTERRUPT'S ADDRESS AND DEFAULT EXECUTION
*,* PRIORITY.
*****
*
OR,R6 YFFF SIGN=EXTEND THE TEXT LABEL
LI,R1 INTLBSIZ=1 SYSGEN=DEFINED SIZE OF TABLE

```

450
451 01 0003A 49600000 X
452 01 0003B 221FFFFFF N

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 453 01 0003C 51620000 X
 454 01 0003D 48300041
 455 01 0003E 4410003C
 456 01 0003F 22600000 A
 457 01 00040 F800000F A
 458 01 00041 52620000 X
 459 01 00042 72E20000 X
 460 01 00043 F800000F A

RT USER-SERVICE SUBROUTINES 33

CNVL	CH,R6	INTLB1,R1	FIND TEXT LBL. IN TABLE
	BF	CNVOK	FOUND IT
	BDR,R1	CNVL	
	LI,R6	0	DIDN'T FIND IT
	B	*R15	ABNORMAL RETURN WITH R2=0
CNVOK	LH,R6	INTLB2,R1	PICK UP INT. ADR. FROM PARALLEL TABLE
	LB,R14	INTLB3,R1	PICK UP DEFAULT EXEC.PRI0.
	B	*R15	RETURN

461
462 01 00044

PAGE EQU * *****

463

F NAME: RTICBTYP

464

,

465

, PURPOSE: DETERMINE ICB-TYPE.

466

,

467

, DESCRIPTION: (SEE 'D' REPORT)

468

469

D NAME: RTICBTYP

470

,

471

, REGISTERS: NONE

472

,

473

, CALL: BAL,R12

474

,

475

, INTERFACE: NONE

476

,

477

, ENVIRONMENT: MASTER/MAPPED OR UNMAPPED.

478

,

479

, INPUT: R2 = ICB ADDRESS
ASSOCIATED ICB.

480

,

481

,

482

, OUTPUT: R3 = RIGHT-JUSTIFIED VALUE FROM ICBSTATYP (ICB TYPE)

483

,

484

, DESCRIPTION: THE VALUE IN ICBTYP IS EXTRACTED FROM THE ICB
AND RIGHT-JUSTIFIED IN R3.

485

,

486

487

*

488

01 00044 32340000 A

LW,R3 ICBSTAT(W),R2 PICK UP ICBSTAT WORD

489 01 00045 25300069 A

SL,S,R3 STATYPSHFT RIGHT-JUSTIFY ICBSTATYP

491 01 00046 48300002 N

AND,R3 MASKS+2 MASK IT OFF

492 01 00047 F800000C A

B *R12 RETURN

493 PAGE
494 RTINTCONTROL EQU 01 00048

```

495 *
496 *F* NAME: RTINTCONTROL
497 *,*
498 *,* PURPOSE: CHANGE THE STATUS OF THE INTERRUPT ASSOCIATED WITH A
499 *,* GIVEN ICB.
500 *,*
501 *,* DESCRIPTION: (SEE 'D' REPORT)
502 *****
503 *D* NAME: RTINTCONTROL
504 *,*
505 *,* REGISTERS: R0, R3, R6, R7, R10, R13, R14 ARE VULNERABLE.
506 *,*
507 *,* CALL: BAL,R15
508 *,*
509 *,* INTERFACE: RTWD
510 *,*
511 *,* ENVIRONMENT: MASTER/MAPPED OR UNMAPPED.
512 *,*
513 *,* INPUT: R2 = ICB ADDRESS
514 *,* R6 = 'WD' CODE (FOR CHANGING INTERRUPT'S STATUS)
515 *,* ASSOCIATED ICB, MONARG
516 *,*
517 *,* OUTPUT: ICBSTAT REFLECTS CURRENT STATUS OF INTERRUPT.
518 *,* (INTERRUPT'S STATUS IS CHANGED PER REQUEST).
519 *,*
520 *,* DESCRIPTION: INTERRUPT CONTROL SUBROUTINE *
521 *,* ICBSTAT FIELD OF THE ASSOCIATED ICB IS UPDATED
522 *,* TO REFLECT THE CURRENT REQUEST'S ACTIVITY. THEN, IF
523 *,* A REAL INTERRUPT, ITS STATUS IS CHANGED VIA A CALL TO
524 *,* RTWD. IF A PSEUDO INTERRUPT, THE CURRENT STATUS
525 *,* OF THE INTERRUPT (FROM ICBSTAT) IS CHECKED TO SEE IF
526 *,* FURTHER ACTION IS NECESSARY (E.G., A TRIGGER REQUEST
527 *,* MUST INSURE THAT THE PSEUDO INTERRUPT IS ARMED AND
528 *,* ENABLED FIRST BEFORE XPSD'ING INTO THE ASSOCIATED ICB
529 *****

```

```

530
531 01 00048 670C0059
532 01 00049 670C0061
533 01 0004A 2270000D A
534 01 0004B D2AE0002 A
535 01 0004C 21A00000 N
536 01 0004D 6920006E
537 01 0004E 25600008 A
538 01 0004F 22301000 A
539 01 00050 22700700 A
540 01 00051 47600003 A
541 01 00052 6A000007
542 01 00053 21600700 A
543 01 00054 F930000F A
544 01 00055 32740000 A
545 01 00056 3170001A N
546 01 00057 F940000F A
547 01 00058 68000078
548
549
550
551 01 00059
552 01 00059 F800000F A
553 01 0005A 32700000 X
554 01 0005B 32700000 X
555 01 0005C 3270001A N
556 01 0005D 3270001B N
557 01 0005E 3270001B N
558 01 0005F F800000F A
559 01 00060 3270001C N
560
561
562
563 01 00061
564 01 00061 02000000 A
565 01 00062 6800006B
566 01 00063 47740000 A
    
```

```

*
INTCON3
EXU      INTCNEXU1,R6
EXU      INTCNEXU2,R6
LI,R7    ICBINT(D)
LH,R10   +R2,R7
CI,R10   M0N0RG
BG       INTCN2
SLS,R6   8
LI,R3    X'1000'
LI,R7    X'0700'
STS,R6   R3
BAL,R0   RTWD
CI,R6    X'700'
BNE      +R15
LW,R7    ICBSTAT(W),R2
CW,R7    STATA
BANZ     +R15
B        INTCN6
*
*
*
INTCNEXU1 EQU      $
B          +R15
LW,R7     STATAETR
LW,R7     STATAE
LW,R7     STATA
LW,R7     STATE
LW,R7     STATER
B          +R15
LW,R7     STATRIG
*
*
*
INTCNEXU2 EQU      $
N0P
B          INTCNR
STS,R7    ICBSTAT(W),R2
    
```

```

* SET UP *
* ICBSTAT *
PICK UP INT. ADR. FROM ICB
IS IT REAL OR PSEUDO
MUST BE PSEUDO
SHIFT WD.CODE TO POSITION IN WD INS
SET UP EFFECTIVE ADR. OF WD
WD.CODE MASK
SET CODE
ISSUE WD INSTR.
TRIGGER REQUEST
NO
IS INT. ARMED
YES, THEN LEAVE 'TRIG' BIT SET
RESET 'TRIG' BIT IN ICBSTAT
    
```

```

FPT=WD CODE
0
1
2
3
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7
    
```

```

FPT=WD CODE
0
1
2
    
```

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37

567	01	00064	68000069	B	INTCONAD	3		
568	01	00065	47740000	A	STS,R7	ICBSTAT(W),R2	4	
569	01	00066	6800006B	B	INTCONR	5		
570	01	00067	02000000	A	NRP	6		
571	01	00068	47740000	A	STS,R7	ICBSTAT(W),R2	7	
572				*				
573	01	00069	47740000	A	INTCONAD	STS,R7	ICBSTAT(W),R2	SET ARMED BIT IN ICBSTAT
574	01	0006A	3270001B	N	LW,R7	STATER	ICBSTAT MASK	
575	01	0006B	4B740000	A	INTCONR	AND,R7	ICBSTAT(W),R2	RESET VARIOUS BITS IN ICBSTAT
576	01	0006C	35740000	A	STW,R7	ICBSTAT(W),R2		
577	01	0006D	6800004A		B	INTCON3	RETURN	
578				*				
579				*			SPECIAL PROCESSING FOR PSEUDO INTS.	
580				*				
581	01	0006E	32740000	A	INTCON2	LW,R7	ICBSTAT(W),R2	
582	01	0006F	21600007	A	CI,R6	7		IS THE REQUEST 'TRIGGER'?
583	01	00070	68300076		BE	INTCON4		YES
584	01	00071	21600004	A	CI,R6	4		IS THE REQUEST 'ENABLE'?
585	01	00072	F930000F	A	BNE	*R15		NO
586	01	00073	3170001C	N	CW,R7	STATRIG		IS THERE A TRIGGER PENDING
587	01	00074	6940007B		BANZ	INTCON5		YES
588	01	00075	F800000F	A	B	*R15		RETURN
589	01	00076	3170001A	N	INTCON4	CW,R7	STATA	IS THE ICB ARMED
590	01	00077	6940007B		BANZ	INTCON5		YES
591	01	00078	4B70001C	N	INTCON6	AND,R7	STATRIGR	RESET ICBSTAT TRIGGER BIT
592	01	00079	35740000	A	STW,R7	ICBSTAT(W),R2		
593	01	0007A	F800000F	A	B	*R15		RETURN
594	01	0007B	3170001B	N	INTCON5	CW,R7	STATE	IS THE ICB ENABLED
595	01	0007C	F840000F	A	BAZ	*R15		NO
596	01	0007D	22600001	A	LI,R6	ICBPSD1(D)		
597	01	0007E	8F2C0002	A	XPSD,2	*R2,R6		'TRIGGER' THE PSEUDO INTERRUPT
598	01	0007F	F800000F	A	B	*R15		

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600 01 00080
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PAGE
RTCHKGUN EQU $ *****
*
*F* NAME: RTCHKGUN
*,*
*,* PURPOSE: DETERMINE IF ICBGUN CONTAINS A VALID USER # FOR A
*,* GHOST JOB ASSOCIATED WITH A TYPE=2 ICB.
*,*
*,* DESCRIPTION: (SEE 'D' REPORT)
*****
*D* NAME: RTCHKGUN
*,*
*,* REGISTERS: R1, R3, R6, R7 ARE VULNERABLE.
*,*
*,* CALL: BAL,RO
*,*
*,* INTERFACE: NONE
*,*
*,* ENVIRONMENT: MASTER/MAPPED OR UNMAPPED.
*,*
*,* INPUT: R2 = ICB ADDRESS
*,* SBIGJOBUN, SIGJOB_TBL, SIGJOBACN
*,* ASSOCIATED ICB
*,*
*,* OUTPUT: R5 = USER # OF GHOST JOB ASSOCIATED WITH THE ICB
*,* (IF THE GHOST JOB IS, IN FACT ACTIVE).
*,* 0 IF NOT ACTIVE AT THE TIME OF THE REQUEST.
*,*
*,* DESCRIPTION: VERIFIES THAT ICBGUN CONTAINS A VALID USER # FOR
*,* AN ACTIVE (OR SLEEPING) GHOST JOB.
*,* SBIGJOBUN IS SEARCHED TO FIND THE MATCHING USER
*,* # OF ICBGUN; IF FOUND, S;GJOB_TBL AND S;GJOBACN ARE
*,* VERIFIED AGAINST ICBGUNME AND ICBGJACN; IF EVERYTHING
*,* MATCHES, THE USER # OF THE ACTIVE (OR SLEEPING) GHOST
*,* IS PASSED TO THE CALLER.
*****
*

```

H01 13:49 SEP 08, '75
 636 01 00080 2230001D A
 637 01 00081 F2560002 A
 638 01 00082 22300000 N
 639 01 00083 71560000 X LOOP1
 640 01 00084 68300088
 641 01 00085 64300083 CHKG1
 642 01 00086 22500000 A
 643 01 00087 F8000000 A
 644 01 00088 22100004 A CHKG2
 645 01 00089 92620002 A
 646 01 0008A 11660000 X
 647 01 0008B 69300085
 648 01 0008C 22100005 A
 649 01 0008D 92620002 A
 650 01 0008E 11660000 X
 651 01 0008F 69300085
 652 01 00090 F8000000 A

RT USER-SERVICE SUBROUTINES

LI,R3 ICBGUN(D)
 LB,R5 *R2,R3 PICK UP GJOB USER #
 LI,R3 MAXG SET UP LOOP THROUGH GJOB TABLES
 CB,R5 SB;GJOBUN,R3 IS THIS THE ONE
 BE CHKG2 YES
 BDR,R3 LOOP1 NO
 LI,R5 0 SET UP INOT ACTIVE! RETURN
 B *R0 RETURN
 LI,R1 ICBGJNME(D)
 LD,R6 *R2,R1 PICK UP GJOB NAME
 CD,R6 S;GJOBTL,R3 IS THIS IT
 BNE CHKG1 NO
 LI,R1 ICBGJACN(D)
 LD,R6 *R2,R1 PICK UP GJOB ACCOUNT
 CD,R6 S;GJOBACN,R3 IS THIS IT
 BNE CHKG1 NR
 B *R0 RETURN WITH R5=GJOB USER #

653
654 01 00091

```

PAGE
RTDCBCHK EQU $ *****
*
*F* NAME: RTDCBCHK
*,*
*,* PURPOSE: VALIDATE THE DCB PASSED VIA STOPIO/STARTIO/IOEX
*,* CALL,S'IS:
*,*
*,* DESCRIPTION: (SEE 'D' REPORT)
*****
*D* NAME: RTDCBCHK
*,*
*,* REGISTERS: R3 IS VULNERABLE.
*,*
*,* CALL: BAL,R5
*,*
*,* INTERFACE: NONE
*,*
*,* ENVIRONMENT: MASTER/MAPPED
*,*
*,* INPUT: R6 = DCB ADDRESS
*,* ASSOCIATED DCB, DCT,P, J,DCBLL
*,*
*,* OUTPUT: CONDITION CODES SET = 0 (IF DCB IS OK FOR AN IOEX CALL)
*,* R2 = DCT INDEX ASSOCIATED WITH DEVICE DCB
*,* R6 = DEVICE ADDRESS ASSOCIATED WITH DCB
*,*
*,* DESCRIPTION: VERIFIES THAT THE DCB PASSED VIA AN MISTOPIO/
*,* STARTIO/IOEX REQUEST IS A VALID, OPEN, DEVICE-ASSIGNED
*,* DCB.
*****
*
```

```

685 01 00091 32200006 A
686 01 00092 25200077 A
687 01 00093 19200000 X
688 01 00094 699A0000 A
689 01 00095 322C0000 A
```

```

LW,R2 R6 PICK UP DCB ADR.
SL,S,R2 =9 CONVERT TO PAGE #
CLM,R2 J,DCBLL IS IT A DCB
BCS,9 0,R5 NO
LW,R2 FCD,R6 ASSUME IT'S OK
```

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690	01	00096	31200016	N
691	01	00097	684A0000	A
692	01	00098	4B200004	N
693	01	00099	21200003	A
694	01	0009A	693A0000	A
695	01	0009B	322C0001	A
696	01	0009C	4B200008	N
697	01	0009D	21200000	N
698	01	0009E	692A0000	A
699	01	0009F	52640000	X
700	01	000A0	02200000	A
701	01	000A1	680A0000	A

RT	USER=SERVICE	SUBROUTINES
CW,R2	BT31T80+22	IS IT OPEN
BAZ	0,R5	NO
AND,R2	MASKS+4	PICK UP DCBASN
CI,R2	3	IS IT DEVICE=TYPE
BNE	0,R5	NO
LW,R2	DEV,R6	
AND,R2	MASKS+8	DCBDEV
CI,R2	DCTSIZ	VALID DCT INDEX
BG	0,R5	NO
LH,R6	DCT1P,R2	PICK UP DEVICE ADDRESS
LCI	0	
B	0,R5	RETURN

H01 13:49 SEP 08, 1975

RT USER-SERVICE SUBROUTINES

702
703 01 000A2

PAGE
RTDEVCHK EQU \$ *****

704 *
705 *F* NAME: RTDEVCHK
706 *,*
707 *,* PURPOSE: VALIDATE THE DEVICE ADDRESS PASSED VIA STOP10/
708 *,* START10/IOEX CALLS.
709 *,*
710 *,*

711 *****
712 *D* DESCRIPTION: (SEE ID REPORT)
713 *,*
714 *,* NAME: RTDEVCHK
715 *,*
716 *,* REGISTERS: NONE
717 *,*
718 *,* CALL: BAL,R5
719 *,*
720 *,* INTERFACE: NONE
721 *,*
722 *,* ENVIRONMENT: MASTER/MAPPED OR UNMAPPED
723 *,*
724 *,* INPUT: R6 = DEVICE ADDRESS
725 *,* DCT1P, DCT1A
726 *,*
727 *,* OUTPUT: CONDITION CODES 3/4 SET = 0 (IF DEVICE ADDRESS IS
728 *,* VALID)
729 *,* R2 = DCT INDEX ASSOCIATED WITH DEVICE ADDRESS.
730 *,* R6 = DEVICE ADDRESS (UNCHANGED)
731 *,*
732 *,* DESCRIPTION: THE DEVICE ADDRESS PASSED BY THE CALLER IS
733 *,* VERIFIED AGAINST DCT1P/DCT1A.
734 *,*
735 *,* *****

734 01 000A2 22200000 N
735 01 000A3 51640000 X
736 01 000A4 683A0000 A
737 01 000A5 51640000 X
738 01 000A6 683A0000 A

NXTDCT L1,R2 DCT517
CH,R6 DCT1P,R2 IS THIS THE ONE
BE 0,R5 YES-RETURN WITH CC3/4 = 0
CH,R6 DCT1A,R2 NO-TRY ALTERNATE
BE 0,R5 YES-RETURN WITH CC3/4 = 0

H01 13:49 SEP 08, 1975
739 01 000A7 642000A3
740 01 000A8 680A0000 A

RT USER-SERVICE SUBROUTINES
BDR,R2 NXTDCT LOOP
B 0,R5 RETURN WITH CC3 OR CC4 SET

H01 13:49 SEP 08, 1975

RT USER SERVICE SUBROUTINES

741
742 01 000A9

RTVTP

PAGE
EQU

* *****

743

*

744

F

NAME: RTVTP

745

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746

,

PURPOSE: CONVERT A GIVEN VIRTUAL ADDRESS TO A PHYSICAL ADDRESS.

747

,

748

,

DESCRIPTION: (SEE 'D' REPORT)

749

750

D

NAME: RTVTP

751

,

752

,

REGISTERS: R4 AND R5 ARE VULNERABLE.

753

,

754

,

CALL: BAL,R3

755

,

756

,

INTERFACE: NONE

757

,

758

,

ENVIRONMENT: MASTER/MAPPED

759

,

760

,

INPUT: R6 = VIRTUAL ADDRESS

761

,

JX:CMAP

762

,

763

,

OUTPUT: R6 = PHYSICAL ADDRESS

764

,

765

,

DESCRIPTION: CONVERTS A GIVEN VIRTUAL ADDRESS TO A PHYSICAL ADDRESS BY FILTERING THE ADDRESS THRU JX:CMAP IN THE USER'S JIT.

766

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767

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768

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*

770

01 000A9 32400006 A

LW,R4 R6

USE R4 TO CONVERT TO VIRT PG #

771

01 000AA 25400077 A

SLS,R4 =9

772

01 000AB 72480000 N

LOAD,R4 JX:CMAP,R4

PICK UP PHYSICAL PG #
CONVERT IT TO PG ADDRESS

773

01 000AC 25400009 A

SLS,R4 9

PAGE MASK

774

01 000AD 32500000 X

LW,R5 X3FF00

CONVERT R6 TO A PHYSICAL ADR

775

01 000AE 47400006 A

STS,R4 R6

IS PHY ADR < 128K

776

01 000AF 2161FFFF A

CI,R6 X11FFFF!

LET CALLER DECIDE

777

01 000B0 68060000 A

B 0,R3

H01 13149 SEP 08, 175
778

RT CAL1 SERVICE ENTRY POINTS
TITLE 'RT CAL1 SERVICE ENTRY POINTS'

45

M01 13:49 SEP 08, 1975

RT CAL1 SERVICE ENTRY POINTS

46

SECTION III:

CAL1 ENTRY POINTS

01 000B1

```

*****
*
*                               S E C T I O N   I I I I
*
*                               C A L 1   E N T R Y   P O I N T S
*****
RTALTCP EQU      * *****
*
*F*      NAME:      RTALTCP
*,*
*,*      PURPOSE:   TO CHANNEL ALL CAL1,5 REQUESTS (EXCEPT M:EXU, M:MASTER
*,*                & M:SLAVE) TO THE APPROPRIATE RECEIVER.
*,*
*,*      DESCRIPTION: ALL CAL1,5'S (EXCEPT AS NOTED ABOVE) ARE PASSED
*,*                HERE VIA CALPROC AND ALTCP FOR DISPATCHING.
*****
*D*      NAME:      RTALTCP
*,*
*,*      REGISTERS:  STANDARD CAL1 REGISTER SETUP
*,*
*,*      CALL:      BAL,R11 (FROM ALTCP, IF SYSTEM IS REAL-TIME)
*,*                RETURN IS TO TRAPEXIT
*,*
*,*      INTERFACE: TRANSFERS TO APPROPRIATE CAL1,5 RECEIVER IN
*,*                EITHER RTROOT (RESIDENT) OR RTNR (RTOV OVERLAY).
*,*                IF FPT CODE IS ILLEGAL, USER IS ABORTED VIA
*,*                CALBAD (IN ALTCP).
*,*
*,*      ENVIRONMENT: MAPPED/MASTER; CAL1,5 RECEIVERS REQUIRE REAL-
*,*                TIME PRIVILEGE LEVEL (X'EO') FOR ALL CAL1,5'S
*,*                EXCEPT MICLOCK (X'80') AND MIINTSTAT.
*,*
*,*      INPUT:     R6 = WORD 0 OF CAL1,5 FPT
*,*                R7 = POINTER TO WORD 1 OF FPT
*,*                R8 = FPT CODE (BYTE 0 OF WORD 0 OF FPT)
*,*                R11= RETURN ADDRESS (TRAPEXIT)
*,*

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H01 13'49' SEP 08, 175

RT CAL1 SERVICE ENTRY POINTS

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 823 01 000B1 19800000
 824 01 000B2 689000B5
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 831
 832
 833 01 000B3 22E000AE A
 834 01 000B4 68000000 X
 835 01 000B5 2210009E
 836 01 000B6 F7020008 A
 837 01 000B7 22200000 N
 838 01 000B8 68000000 X
 839
 840
 841
 842 01 000B9 22000000 N
 843 01 000BA 22000000 N
 844 01 000BB 22000000 N
 845 01 000BC 680001B5
 846 01 000BD 680001FF
 847 01 000BE 22000000 N
 848 01 000BF 22000000 N
 849 01 000C0 22000000 N
 850 01 000C1 680000C6
 851 01 000C2 680000D9
 852

```

*,*      DESCRIPTION: R8 IS VERIFIED AS BEING A LEGAL FPT CODE FOR A
*,*      CAL1,5 (ABORT CODE OF XIAE! IF ILLEGAL).
*,*      CONTROL IS THEN PASSED TO APPROPRIATE RECEIVER
*,*      IN RTR00T OR RTNR (RT0V OVERLAY) VIA C15TV (TRANS-
*,*      FER VECTOR.
*****
*
CLM,R8   RTCAL15CODES   IS THIS A VALID FPT CODE
BCR,9    RTCAL0K        YES
*****
*E*      ERROR: AE=00
*,*
*,*      DESCRIPTION: THE USER HAS ISSUED A CAL1,5 WITH AN INVALID
*,*      FPT CODE.
*,*
*,*      REGISTERS: R8 = THE INVALID FPT CODE
*****
RTERR:BADCAL
CALBAD   ERROR EXIT
C15TV=C15L0W SET UP TRANSFER VECTOR
*RB,R1    GO TO APPROPRIATE ROUTINE OR:
RTNRRTSEG LOAD OVERLAY SEGMENT
TIOVERLAY *****
*
*
*
C15TV    EQU          $
LI,RO    RTRESDF#     X'1B' RESDP PAGES CAL
LI,RO    RTST0PI0#   X'1C' MIST0PI0
LI,RO    RTSTARTI0# X'1D' MISTARTI0
B        RTI0EX1     X'1E' MI0EX (SI0)
B        RTI0EX2     X'1F' MI0EX (TIO/TDV/HI0)
LI,RO    RTGJ0BC0N#  X'20' MI0GJ0BC0N
LI,RO    RTC0NNECT#  X'21' MI0C0NNECT
LI,RO    RTDISC0N#  X'22' MIDISC0NNECT
B        RTINTC0N    X'23' MI0INTC0N
B        RTQFI       X'24' MI0QFI

```


H01 13:49 SEP 08 '75
853 01 000C3 4800016D
854 01 000C4 22000000 N
855 01 000C5 480000FB

RT CALL SERVICE ENTRY POINTS
B RTHOLD X1251 M: H0LD
L1,RO RTCLOCK# X1261 M: CLOCK
B RTINTSTAT X1271 M: INTSTAT

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857 01 000C6
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PAGE
RTINTCON EQU      * *****
*
*F*      NAME:      RTINTCON
*,*
*,*      PURPOSE:    TO PROCESS THE M:INTCON & M:INHIBIT CALLS
*,*
*,*      DESCRIPTION:  ALLOWS ANY USER WITH REAL-TIME PRIVILEGES TO
*,*                   CONTROL THE STATE OF A REAL OR PSEUDO INTERRUPT.
*,*                   PERMISSABLE REQUESTS:
*,*                               ARM & ENABLE
*,*                               ARM & DISABLE
*,*                               DISARM
*,*                               ENABLE
*,*                               DISABLE
*,*                               TRIGGER
*,*                               INHIBIT (VIA SOFTWARE)
*,*
*,*      REFERENCE:   CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL
*****
*D*      NAME:      RTINTCON
*,*
*,*      REGISTERS:   STANDARD CALL REGISTER SETUP
*,*
*,*      CALL:        VIA RTALTCP (NOT CALLABLE EXTERNALLY)
*,*
*,*      INTERFACE:   RTCHKPRIV, RTL0CICB, RTINTCONTROL
*,*
*,*      ENVIRONMENT: MAPPED/MASTER; PRIVILEGE LEVEL MUST = X'EO'.
*,*                   THERE MUST BE A CURRENTLY ACTIVE ICB ASSOCIATED WITH
*,*                   THE INTERRUPT TO BE CONTROLLED (IF M:INTCON)
*,*
*,*      INPUT:       R6 = WORD 0 OF CALL,5 FPT
*,*                   R7 = POINTER TO WORD 1 OF FPT
*,*                   R11 = RETURN ADDRESS (TRAPEXIT)
*,*                   ASSOCIATED ICB

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907 01 000C6 6A000013
908 01 000C7 69800019
909 01 000C8 32600006 A
910 01 000C9 683000D0
911 01 000CA 6A000029
912 01 000CB 68300018
913 01 000CC 326E0000 A
914 01 000CD 4B600003 N
915 01 000CE 6AF00048
916 01 000CF 6800001F
917
918
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920 01 000D0 00000
921 01 000D1 32400000 X
922 01 000D2 52580000 X
923 01 000D3 326E0000 A
924 01 000D4 683000D7
925 01 000D5 49500002 N
926 01 000D6 55580000 X
927 01 000D7 6800001F
928 01 000D8 4B500002 N
929 01 000D8 680000D5
    
```

```

**
**      OUTPUT:  IF M:INTCON = ICB (ICBSTAT)
**                IF M:INHIBIT = UH:FLG
**                S:BADFLG
**
**      DESCRIPTION: IF M:INTCON = THE ICB (ICBSTAT) WILL BE MARKED PER
**                    THE REQUEST AND THE SPECIFIED
**                    INTERRUPT'S STATE WILL BE MODIFIED
**                    A IWD: INSTRUCTION (IF REAL),
**                    IF M:INHIBIT = THE 'REAL-TIME INHIBIT' BIT OF
**                    UH:FLG WILL BE SET/RESET DEPENDING
**                    UPON THE REQUEST.
*****
*
*      BAL,R0      RTCHKPRIV      JB:PRIV >= X'EO'
*      BCS,8       RTSETCC1       NA
*      LW,R6       R6             M:INHIBIT
*      BEZ        INHIBIT        YES
*      BAL,R0      RTLBCICB      RETURNS ICB ADR. IN R2
*      BCR,3       RTSFTCC2      NOT FOUND; ABNORMAL RETURN
*      LW,R6       O,R7          PICK UP      WD.CODE FROM FPT
*      AND,R6      MASKS+3       MASK IT
*      BAL,R15     RTINTCONTROL  SET UP ICBSTAT; SET INTERRUPT STATE
*      B           RTSETCC0      RETURN
*
*
*      INHIBIT    EQU            *      M:INHIBIT (SOFTWARE INT. INHIBIT)
*
*      LW,R4      S,CUN
*      LW,R5      UH:FLG,R4
*      LW,R6      O,R7
*      BEZ        INH0FF
*      BR,R5     FLG:INH
*      INHRET    STH,R5         PUT IT AWAY
*      B         RTSETCC0      RETURN TO USER
*      INH0FF    AND,R5        FLG:INH
*      B         INHRET
    
```

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 931 01 00009
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RTQFI
PAGE
EGU      $ *****

*
*F*     NAME:   RTQFI
*,*
*,*     PURPOSE: TO PROCESS THE MIQFI CAL1,5
*,*
*,*     DESCRIPTION:  ALLOWS ANY REAL-TIME USER WHO IS CENTRALLY
*,*                  CONNECTED TO ONE OR MORE INTERRUPTS TO BE PLACED IN
*,*                  THE 'SQFI' STATE TO AWAIT AN INTERRUPT.
*,*
*,*     REFERENCE:  CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL
*****
*D*     NAME:   RTQFI
*,*
*,*     REGISTERS:  STANDARD CAL1 REGISTER SETUP
*,*
*,*     CALL:      VIA RTALTCP (NOT CALLABLE EXTERNALLY)
*,*
*,*     INTERFACE:  TIREG, CALBAD (IF NO ICB IS ASSOCIATED WITH THE
*,*                  USER), RTICBTYP.
*,*
*,*     ENVIRONMENT: MAPPED/MASTER; USER MUST BE CENTRALLY CONNECTED
*,*                  TO ONE OR MORE INTERRUPTS PRIOR TO CAL1,5.
*,*
*,*     INPUT:     R6 = WORD 0 OF CAL1,5 FPT.
*,*                  R7 = POINTER TO WORD 1 OF FPT.
*,*                  R11 = RETURN ADDRESS (TRAPEXIT)
*,*                  ICB TABLES
*,*
*,*     OUTPUT:    UHIFLG
*,*
*,*     DESCRIPTION: ALL ICBs ARE SCANNED TO INSURE THAT THE
*,*                  USER IS CENTRALLY CONNECTED TO AT LEAST ONE INTERRUPT.
*,*                  IF NO ACTIVE ICB BELONGING TO THE USER IS FOUND, HE
*,*                  IS ABORTED (B8/01); OTHERWISE THE 'INHIBIT' BIT OF
*,*                  UHIFLG IS RESET AND THE USER'S UHIDL IS CHECKED TO SEE

```

RT CALL SERVICE ENTRY POINTS

```

*,* IF ANY INTERRUPT IS PENDING. IF NONE IS PENDING
*,* AN EIQFI EVENT IS REPORTED ON THE USER (VIA T:REG),
*,* OTHERWISE RETURN IS MADE DIRECTLY TO TRAPEXIT TO
*,* WHERE THE UH:DL ITEM WILL BE SERVICED.
*****

```

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967
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973 01 000D9 32100000 X
974 01 000DA 22200000 N
975 01 000DB 2240001C A
976 01 000DC 22500020 A
977 01 000DD 22A00000 N
978 01 000DE 32940000 A
979 01 000DF 481000E2
980 01 000E0 F1180002 A
981 01 000E1 483000E6
982 01 000E2 20200000 N
983 01 000E3 44A000DE
984
985
986
987
988
989
990
991
992 01 000E4 32E00002
993 01 000E5 48000000 X
994 01 000E6 4AC00044 A
995 01 000E7 21300001 A
996 01 000E8 483000EC
997 01 000E9 F29A0002 A
998 01 000EA 71920000 X
999 01 000EB 492000E2
1000 01 000EC 22200000 A
1001 01 000ED 32300000 X
1002 01 000EE 225FFFFE F A
1003 01 000EF 30500000 X

```

```

*
LW,R1 SICUN SET UP LOOP THROUGH ICB'S
LI,R2 ICB
LI,R4 ICBUN(D)
LI,R5 ICBPRI(D)
LI,R10 NINTS
LOOP2 LW,R9 ICBSTAT(W),R2 FIND AN ACTIVE ICB BELONGING TO USER
BGZ QFINA NOT ACTIVE IF BIT 0 IS RESET
CB,R1 *R2,R4 BELONG TO THIS USER
BE QFI1 YES
QFINA AI,R2 ICBSIZE INCREMENT TO NEXT ICB
BDR,R10 LOOP2 GO LOOK AT NEXT ONE

```

```

*****
*E* ERROR! B8=01
*,*
*,*
*,*
*,*
*,*

```

DESCRIPTION: AN M:QFI HAS BEEN ISSUED WHEN NO ICB'S WERE ASSOCIATED WITH THE USER.

REGISTERS: (NOTHING RELEVANT)

```

*****
LW,R14 RTERR:QFI DIDN'T FIND ONE
B CALBAD ABORT USER
QFI1 BAL,R12 RTICBTYP RETURNS ICBTYP IN R3
CI,R3 ICBTYP2 IS IT A GJOB ICB
BE QFI0K NO NEED TO CHECK PRIORITY
LB,R9 *R2,R5 ICBPRI
CB,R9 UBIPRI0B,R1 ICBPRI < UBIPRI0B
BG QFINA NO - GO CHECK NEXT ONE
QFI0K LI,R2 0 SET CONDITION CODE FOR EVENTUAL RET
LW,R3 YF CC MASK
LI,R5 =17
AW,R5 TSTACK DEVELOP PSD ADR. IN TSTACK

```

H01 13:49 SEP 08, 175

1004	01	000F0	4B500000	X
1005	01	000F1	472A0000	A
1006	01	000F2	32600000	X
1007	01	000F3	525C0000	X
1008	01	000F4	4B500002	N
1009	01	000F5	555C0000	X
1010	01	000F6	526C0000	X
1011	01	000F7	F930000B	A
1012	01	000F8	22600000	N
1013	01	000F9	6AB00000	X
1014	01	000FA	68000000	X

RT CALL SERVICE ENTRY POINTS

AND,R5	X1FFFE	MASK OFF ADDR.
STS,R2	0,R5	USER'S PSD IN TSTACK
LW,R6	SICUN	
LW,R5	UHIFLG,R6	
AND,R5	FLG:INHR	RESET 'INHIBIT' BIT IN UH:FLG
STH,R5	UH:FLG,R6	PUT IT AWAY
LW,R6	UHIDL,R6	ANYTHING TO DO
BNEZ	*R11	YES, EXIT TO TRAPEXIT
LI,R6	EIQFI	QUEUE FOR INTERRUPT; EVENT
BAL,R11	TIREG	REPORT EVENT & GIVE UP CONTRBL
B	TRAPEXIT	RETURN FOR INTERRUPT PROCESSING

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 1016 01 000FB
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PAGE
 RTINTSTAT EQU * *****
 *
 F NAME: RTINTSTAT
 ,
 , PURPOSE: TO PROCESS THE MIINTSTAT CALLS.
 ,
 , DESCRIPTION: ALLOWS ANY USER IN A REAL-TIME SYSTEM TO QUERY
 , THE STATUS OF ANY CENTRALLY CONNECTED REAL OR PSEUDO
 , INTERRUPT. INFORMATION RETURNED TO THE USER:
 , ARM/ENABLE/TRIGGER STATUS
 , USER # AND CURRENT STATE OF CENTRAL
 , LY CONNECTED USER OF THAT
 , INTERRUPT
 , JOB USER # (IF MIJOBCON)
 ,
 , REFERENCE: CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL
 , *****
 D NAME: RTINTSTAT
 ,
 , ENTRY: INTSTAT
 ,
 , REGISTERS: IF RTINTSTAT: STANDARD CALL REGISTER SETUP
 , IF INTSTAT: ALL REGISTERS ARE VULNERABLE.
 ,
 , CALL: IF RTINTSTAT: VIA RTALTOP (NOT CALLABLE EXTERNALLY)
 , IF INTSTAT: BAL,R11
 ,
 , INTERFACE: RTLOCICB, RTICBTYP, RTCHKGUN
 ,
 , ENVIRONMENT: IF RTINTSTAT: MAPPED/MASTER,
 , IF INTSTAT: MAPPED OR UNMAPPED, MASTER.
 ,
 , DATA: WAIT:MASK, EXU:MASK, IOWAIT:MASK, BLCKD:MASK.
 ,
 , INPUT: R6 # INTERRUPT ADDRESS
 , R11# RETURN ADDRESS (TRAPEXIT IF RTINTSTAT)

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RT CAL1 SERVICE ENTRY POINTS

1089 01 0010D 22300002 A
 1090 01 0010E 75560008 A
 1091 01 0010F 2230001C A
 1092 01 00110 F2560002 A
 1093 01 00111 22100001 A
 1094 01 00112 75520008 A
 1095 01 00113 725A0000 X
 1096 01 00114 22900040 A
 1097 01 00115 325A0001 N
 1098
 1099 01 00116 31500000 X
 1100 01 00117 69400125
 1101 01 00118 31500000 X
 1102 01 00119 69400122
 1103 01 0011A 31500000 X
 1104 01 0011B 69400124
 1105 01 0011C 31500000 X
 1106 01 0011D 69400120
 1107
 1108
 1109
 1110
 1111
 1112
 1113
 1114
 1115
 1116
 1117
 1118
 1119
 1120
 1121
 1122
 1123 01 0011E 0F000000 X
 01 0011F 00410001 A
 1124

LI,R3 2
 STB,R5 R8,R3 PUT IT AWAY
 INTSTAT3 LI,R3 ICBUN(D)
 LB,R5 *R2,R3 PICK UP USER #
 LI,R1 1
 STB,R5 R8,R1 PUT IT AWAY
 LB,R5 UBIUS,R5 PICK UP USER'S CURRENT STATE
 LI,R9 STATWAIT INITIALIZE R9 WITH 'QFI' CODE
 LW,R5 X1,R5 PICK UP ONE-BIT MASK CORRESPONDING
 TO USER'S STATE
 CW,R5 WAITIMASK IS THE STATE 'WAIT' OR 'QFI'
 BANZ INTSTATX YES
 CW,R5 EXUIMASK IS THE STATE 'EXECUTABLE',
 BANZ INTSTAT4 YES
 CW,R5 IOWAIT:MASK IS THE STATE 'IO-WAIT'
 BANZ INTSTAT5 YES
 CW,R5 BLCKD:MASK IS THE STATE 'BLOCKED'
 BANZ INTSTAT1 YES

 S SCREECH CODE: 41-01
 ,
 , REPORTED BY: RTR0BT
 ,
 , MESSAGE: FAILED TO FIND USER'S STATE (M:INTSTAT)
 ,
 , TYPE: SCREECH
 ,
 , REGISTERS: R2 = ADDRESS OF ICB BEING CHECKED
 ,
 , REMARKS: PROBABLY RESULTS FROM A STATE HAVING BEEN ADDED TO
 , SCHED WITHOUT UPDATING THE FOUR MASKS USED BY THE
 , M:INTSTAT ROUTINE (WAIT:MASK, EXU:MASK, IOWAIT:MASK,
 , BLCKD:MASK).

 SCREECH X'41',1
 INTSTAT1]

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RT CALL SERVICE ENTRY POINTS

57

1125	01	00120	22900010	A	LI,R9	STATBLK	'BLOCKED' CODE FOR R8 RETURN
1126	01	00121	68000125		B	INTSTATX	
1127	01	00122	22900080	A	INTSTAT4 LI,R9	STATEXU	'EXECUTABLE' CODE FOR R8 RETURN
1128	01	00123	68000125		B	INTSTATX	
1129	01	00124	22900020	A	INTSTAT5 LI,R9	STATIOW	'IO-WAIT' CODE FOR R8 RETURN
1130	01	00125	75900008	A	INTSTATX STB,R9	R8	PUT CODE AWAY
1131	01	00126	6800000B	A	B	*R11	RETURN TO CALLER

1132
1133 01 00127
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PAGE
RTINTRTN EQU * *****
*
*F* NAME: RTINTRTN
**
** PURPOSE: TO PROCESS THE M:INTRTN CAL1,5.
**
** DESCRIPTION: THE REAL-TIME USER'S CURRENT INTERRUPT PROCESSING
** ROUTINE IS EXITED, THE INTERRUPT STATUS IS SET PER THE
** USER'S REQUEST, AND CONTROL OF THE USER'S PROGRAM
** IS PASSED TO THE ENVIRONMENT IN THE USER'S TCB STACK
** (THIS WOULD USUALLY BE THE POINT OF INTERRUPTION).
**
** REFERENCE: CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL
*****
**D* NAME: RTINTRTN
**
** REGISTERS: STANDARD CAL1 REGISTER SETUP
**
** CALL: VIA RTALTCP (NOT CALLABLE EXTERNALLY)
**
** INTERFACE: RTICBTYP, RTINTCONTROL, CALBAD (IF THERE IS NO
** CURRENTLY ACTIVE ICB); EXITS VIA MTRTNO & T:SEM.
**
** ENVIRONMENT: MAPPED/MASTER.
**
** INPUT: R4(BITS 22-23) = INTERRUPT CONTROL CODE FROM CAL1,9:
** WHERE:
** -----
** 0 LEAVE
** 1 DISARM
** 2 ARM & ENABLE
** 3 ARM & DISABLE
**
** J:ICBHDR, UH:DL
** ASSOCIATED ICB
**

```

RT CALL SERVICE ENTRY POINTS
 OUTPUT: UBIPRIO, UBIPRIOB, SICUP, UHIFLG, RTICBHDR.

1169 *,*
 1170 *,*
 1171 *,*
 1172 *,*
 1173 *,*
 1174 *,*
 1175 *,*
 1176 *,*
 1177 *,*
 1178 *,*
 1179 *,*
 1180 *,*
 1181 *,*
 1182 *,*
 1183 *,*
 1184 *,*
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 1186 *,*
 1187 *,*
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 1189 *,*
 1190 *,*
 1191 *,*
 1192 *,*
 1193 *,*
 1194 *,*
 1195 *,*
 1196 *,*

DESCRIPTION: THE USER IS EXITING AN INTERRUPT PROCESSING ROUTINE. THE CURRENTLY ACTIVE ROUTINE'S ICB IS POINTED TO BY THE ADDRESS IN JIICBHDR (IF THIS POINTER IS ZERO THE USER WILL BE ABORTED - B8/02). THE USER'S INTERRUPTED ENVIRONMENT IS IN HIS TCB STACK (THIS ENVIRONMENT MAY IN FACT HAVE BEEN ALTERED BY THE USER PRIOR TO ISSUING THE MIINTRN). IN ANY CASE, THE PRIORITY SAVED IN THE ICB (ICBPRI0) MUST BE RE-STORED TO UBIPRIO,UBIPRIOB,SICUP AND THE NEXT ICB IN THE JIICBHDR CHAIN (CHAINED THRU ICBDL) MUST BE PROMOTED. NEXT, UHIDL MUST BE SCANNED TO SEE IF THERE MIGHT BE A RECENTLY-ARRIVED HIGHER PRIORITY INTERRUPT WAITING (HIGHER THAN THE 'JUST RESTORED' UBIPRIOB PRIORITY). IF THERE IS, THEN UBIPRIOB IS COMPARED WITH THE PREVIOUSLY SAVED PRIORITY (IN THE ICB CHAINED INTO UHIDL) AND THE LOWER PRIORITY (HIGHER VALUE) IS SAVED IN THIS HIGH-PRIORITY ICB (ICBPRI0), AND UBIPRIO/UBIPRIOB/SICUP ARE SET TO REFLECT THE PRIORITY OF THIS NEW, HIGH-PRIORITY ICB. FINALLY, THE CURRENT ICB'S INTERRUPT STATUS IS SET PER THE USER'S REQUEST AND, IF A 'ONESHOT' MICLOCK ICB, THE ICB IS RETURNED TO THE FREE POOL OF ICBS (RTICBHDR), EXIT IS THRU MTRTND (IN ALTCP) AND TISSEM (IN SCHED).

1197 01 00127 32600004 A
 1198 01 00128 2250FFFF A
 1199 01 00129 6D000037 A
 1200 01 0012A 32200000 X
 1201 *
 1202 01 0012B 4B200005 A
 1203 01 0012C 6830016B
 1204 01 0012D 25200001 A
 1205 01 0012E 202FFFF8 A

 *
 LW,R6 R# PICK UP CODE BITS
 LI,R5 X1FFFF
 DISABLE *****
 LW,R2 JIICBHDR HEAD OF ICB'S ASSOCIATED WITH USER'S
 * CURRENTLY ACTIVE INTERRUPTS
 AND,R2 R5 MASK OFF ADR. FIELD...DA(ICBDL)
 BEZ INTRNERR THERE ISN'T ONE; ABORT USER
 SLS,R2 1 CONVERT TO WA(ICBDL)
 AI,R2 =ICBDL(W) R2=WA(ICB)

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1206	01	0012F	32440008	A
1207	01	00130	47400000	X
1208	01	00131	32300000	X
1209	01	00132	22500018	A
1210	01	00133	F20A0002	A
1211	01	00134	75060000	X
1212	01	00135	75060000	X
1213	01	00136	35000000	X
1214	01	00137	32C40000	A
1215	01	00138	4BC0001E	N
1216	01	00139	4BC0001C	N
1217	01	0013A	35C40000	A
1218	01	0013B	52C60000	X
1219	01	0013C	4BC00002	N
1220	01	0013D	55C60000	X
1221	01	0013E	52C60000	X
1222	01	0013F	22500FFF	A
1223	01	00140	4B50000C	A
1224	01	00141	68300154	
1225	01	00142	25500001	A
1226	01	00143	32CA0000	A
1227	01	00144	5200000C	A
1228	01	00145	4B000007	N
1229	01	00146	21000002	A
1230	01	00147	6930013F	
1231	01	00148	7200000C	A
1232	01	00149	71060000	X
1233	01	0014A	69200154	
1234	01	0014B	205FFFF8	A
1235	01	0014C	22100018	A
1236	01	0014D	72D60000	X
1237	01	0014E	F1D20005	A
1238	01	0014F	69100151	
1239	01	00150	F5D20005	A
1240	01	00151	75060000	X
1241	01	00152	75060000	X
1242	01	00153	35000000	X

INTRTNB

RT CAL1 SERVICE ENTRY POINTS	60	
LW,R4	ICBDL(W),R2	FIND NEXT ICB IN ACTIVE CHAIN
STS,R4	JIIICBHDR	ICBDL BECOMES HEAD;PRESERVE BIT 0
LW,R3	SICUN	GET CURRENT USER NUMBER
LI,R5	ICBPRI0(D)	DISP TO OLD PRIORITY
LB,R0	*R2,R5	GET IT FROM ICB
STB,R0	UBIPRI0B,R3	STORE IT IN BASE PRI0
STB,R0	UBIPRI0,R3	AND WORKING PRI0
STW,R0	SICUP	ANNOUNCE IT
LW,R12	ICBSTAT(W),R2	PICK UP ICB STATUS
AND,R12	NB31T00*30	TURN OFF ION=DL FLAG
AND,R12	NB31T00*28	TURN OFF 'TRIGGERED' BIT
STW,R12	ICBSTAT(W),R2	PUT ICB STATUS BACK
LW,R12	UHIFLG,R3	
AND,R12	FLG1;INHR	RESET 'INHIBIT' BIT IN UHIFLG
STH,R12	UHIFLG,R3	PUT IT AWAY
LW,R12	UH;DL,R3	GET DB LIST
LI,R5	X'FFFF'	MASK FOR FLINK
AND,R5	R12	GET POINTER
BEZ	INTRTNA	NONE
SLS,R5	1	WORD ADDRESS
LW,R12	0,R5	FLINK 0N
LH,R0	R12	GET TYPE
AND,R0	MASKS+7	SCRUB
CI,R0	2	TEST FOR INTENTRY
BNE	INTRTNB	No
LB,R0	R12	GET DB LIST PRI0
CB,R0	UBIPRI0B,R3	COMPARE WITH CURRENT
BG	INTRTNA	LESS, IGNORE IT
AI,R5	*ICBPRI(W)	GET BASE OF DB LIST
LI,R1	ICBPRI0(D)	DISP TO ICB OLD PRI0
LB,R13	UBIPRI0B,R3	GET USERS CURRENT PRI0
CB,R13	*R5,R1	CHECK FOR PREVIOUS SAVED PRIORITY
BL	*+2	REMEMBER LOWEST PRIORITY(HIGHEST NU
STB,R13	*R5,R1	SAVE IN TOP ICB
STB,R0	UBIPRI0,R3	SET AS CURRENT
STB,R0	UBIPRI0B,R3	FOR USER
STW,R0	SICUP	AND ANNOUNCE IT TO WORLD

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RT CAL1 SERVICE ENTRY POINTS

61

1243 01 00154 6D000027 A
 1244 01 00155 6AC00044
 1245 01 00156 21300002 A
 1246 01 00157 69300161
 1247 01 00158 32440000 A
 1248 01 00159 4B40001D N
 1249 01 0015A 68300169
 1250 01 0015B 6D000037 A
 1251 01 0015C 32500000 X
 1252 01 0015D 35540000 A
 1253 01 0015E 35200000 X
 1254 01 0015F 6D000027 A
 1255 01 00160 68000169
 1256 01 00161 25600078 A
 1257 01 00162 4B600002 N
 1258 01 00163 21600001 A
 1259 01 00164 69300168
 1260 01 00165 22600003 A
 1261 01 00166 6AF00048
 1262 01 00167 22600001 A
 1263 01 00168 6AF00048
 1264 01 00169 22600000 N
 1265 01 0016A 68000000 X
 1266
 1267
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 1272
 1273
 1274
 1275 01 0016B 32E00003
 1276 01 0016C 68000000 X

INTRTNA ENABLE *****
 BAL,R12 RTICBTYP RETURNS ICB-TYPE IN R9
 CI,R3 ICBTYP3 IS IT A CLOCK-TYPE ICB
 BNE INTRTN1 NO
 LW,R4 ICBSTAT(W),R2
 AND,R4 STAT0 'ONESHOT' BIT IN ICBSTAT SET
 BEZ INTRTNX NO
 DISABLE *****
 LW,R5 RTICBHDR HEAD OF FREE ICB'S
 STW,R5 ICBLNK(W),R2 INITIALIZE ICBSTAT & ICBLNK
 STW,R2 RTICBHDR FREED ICB BECOMES NEW HEAD OF CHAIN
 ENABLE *****
 B INTRTNX
 INTRTN1 SLS,R6 C19CS RIGHT-JUSTIFY WD-CODE FROM CAL1
 AND,R6 MASKS+2 MASK OFF LEGAL CODES
 CI,R6 1 IS THE REQUEST 'DISARM'
 BNE INTRTN2 NO
 LI,R6 3 ARM & DISABLE THE INT. FIRST
 BAL,R15 RTINTCONTROL CLEAR INTERRUPT
 LI,R6 1 NOW WE CAN DISARM IT
 INTRTN2 BAL,R15 RTINTCONTROL SET ICBSTAT;
 INTRTNX LI,R6 TISSEM SET UP RETURN ADR. FOR MTRTNO ROUTI
 B MTRTNO MITRTN PROCESSING IN ALTCP

 E ERROR! BB=02
 ,
 **, DESCRIPTION: AN M;INTRTN HAS BEEN ISSUED AND THERE WERE NO
 **, ACTIVE INTERRUPTS ASSOCIATED WITH THE USER (IE.,
 **, J;ICBHDR CHAIN WAS EMPTY).
 **,
 **, REGISTERS: (NOTHING RELEVANT)

 INTRTNERR LW,R14 RTERR;INTRTN ERROR CODE
 B CALBAD RETURN TO ALTCP TO ABORT USER

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RT CAL1 SERVICE ENTRY POINTS

1314
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 1322 01 0016D 6A000013
 1323 01 0016E 69800019
 1324 01 0016F 32400000 X
 1325 01 00170 6D000037 A
 1326 01 00171 52780000 X
 1327 01 00172 21600001 A
 1328 01 00173 6840017E
 1329 01 00174 3170000C N
 1330 01 00175 6840001F
 1331 01 00176 4B70000C N
 1332 01 00177 55780000 X
 1333 01 00178 22500001 A
 1334 01 00179 6A700196
 1335 01 0017A 6A700000 X
 1336 01 0017B 3A000000 A
 1337 01 0017C 66000000 X
 1338 01 0017D 6800001F
 1339
 1340
 1341
 1342 01 0017E
 1343 01 0017E 2560001C A
 1344 01 0017F 32800006 A
 1345 01 00180 3290001E N
 1346 01 00181 47800000 X
 1347 01 00182 3170000C N
 1348 01 00183 6940018E
 1349 01 00184 4970000C N
 1350 01 00185 55780000 X

 **
 **
 **
 **
 **
 **

ALLYCAT &/OR RBBAT WILL STILL FIT IN THE
 REMAINING FLUID CORE. JIICBHDR IS SET
 TO INDICATE WHETHER OR NOT TO PURGE THE
 USER'S DATA/PROCEDURE PAGES SHOULD HE
 EXIT WITHOUT UNLOCKING.

IF HOLD(OFF) = UN-DU? ALL OF THE ABOVE.

BAL,R0 RTCHKPRIV JBIPRIV >= X'E0'
 BCS,8 RTSETCC1 NO
 LW,R4 SICUN USER #

 DISABLE
 LW,R7 UHIFLG2,R4
 CI,R6 FPTF1 :OFF: SPECIFIED
 BAZ HOLDON NO
 CW,R7 FLG,LIC :LOCKED-IN-CORE: BIT SET
 BAZ RTSETCC0 NO
 AND,R7 FLG,LICR UHIFLG2 MASK: LIC BIT RESET
 STH,R7 UHIFLG2,R4 RESET UHIFLG2 BITS
 LI,R5 1 SET :DECREMENT: FLAG
 BAL,R7 RTLCT DECREMENT RB,LCT
 BAL,R7 TITBTSZ RETURNS USER'S :UNLOCKABLE: SIZE(R0)
 LCW,R0 R0
 AWM,R0 SIRTCORE DECREMENT COUNTER
 B RTSETCC0 RETURN TO USER

*
 *
 *

HOLDON EQU \$
 SLS,R6 28 SHIFT :PURGE: BIT
 LW,R8 R6 MOVE IT TO R8
 LW,R9 BT31TB0+30 MASK
 STS,R8 JIICBHDR SET/RESET FLAG
 CW,R7 FLG,LIC :LOCKED-IN-CORE: BIT SET
 BANZ HOLD2 YES
 BR,R7 FLG,LIC UHIFLG2 MASK: LIC BIT SET
 STH,R7 UHIFLG2,R4 TURN ON :LOCKED IN CORE: BIT

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1351	01	00186	32300020	N
1352	01	00187	47300000	X
1353	01	00188	3230001F	N
1354	01	00189	47300000	X
1355	01	0018A	6A700000	X
1356	01	0018B	22500000	A
1357	01	0018C	6A700196	
1358	01	0018D	66000000	X
1359	01	0018E	6D000027	A
1360	01	0018F	22400002	A
1361	01	00190	6A6001AB	
1362	01	00191	6910001B	
1363	01	00192	22400003	A
1364	01	00193	6A6001AB	
1365	01	00194	6910001B	
1366	01	00195	6800001F	

HOLD2

RT CAL1 SERVICE ENTRY POINTS 64

LW,R3	BT31T80+32	
STS,R3	J;ICBHDR	SET RT-CAL1-ISSUED BIT
LW,R3	BT31T80+31	
STS,R3	SIBADFLG	SET 'RT-LOCK-CORE' BIT
BAL,R7	TITOTSZ	RETURNS USER'S 'LOCKABLE' SIZE(R0)
LI,R5	0	SET 'INCREMENT' FLAG
BAL,R7	RTLCY	INCREMENT PBILCT
AWM,R0	S;RTCORE	REFLECT USER'S 'LOCKABLE' SIZE
ENABLE		*****
LI,R4	ALLOCAT:UN	ALLY'S USER #
BAL,R6	RTSIZE	SIZE HIM
BCS,1	RTSETCC2	IF HE WON'T FIT
LI,R4	RBBAT:UN	RBBAT'S USER #
BAL,R6	RTSIZE	SIZE HIM
BCS,1	RTSETCC2	IF HE WON'T FIT
B	RTSETCC0	RETURN TO USER

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1368 01 00196

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1403

01 00196 52F80000 X

RTLCT

PAGE EQU \$ *****

F NAME: RTLCT

, PURPOSE: TO PROVIDE A SUBROUTINE FOR RTR00T AND RTNR FOR KEEP-
, ING TRACK OF COMMON SHARED PROCEDURE THAT IS LOCKED-IN
, CORE BY ALL REAL-TIME USERS.

, DESCRIPTION: INCREMENTS OR DECREMENTS PBILCT FOR EVERY PIECE
, OF SHARED PROCEDURE ASSOCIATED WITH THE USER.

D NAME: RTLCT

, REGISTERS: R1 AND R15 ARE VULNERABLE.

, CALL: BAL,R7

, INTERFACE: NONE.

, ENVIRONMENT: MASTER MODE, MAPPED, UNMAPPED.

, INPUT: R4 = USER #
, R5 = 0 (IF PBILCT IS TO BE INCREMENTED)
, 1 (IF PBILCT IS TO BE DECREMENTED)
, UHIFLG, UBIAPR, UBIAP0, UBIASP, UBIOV, UB:ACP, UB:DB.

, OUTPUT: PBILCT (MODIFIED PER REQUEST).

, DESCRIPTION: PBILCT IS INCREMENTED OR DECREMENTED FOR EVERY
, PIECE OF SHARED PROCEDURE ASSOCIATED WITH THE USER.
, THIS IS NECESSARY IN ORDER TO KEEP FROM MULTIPLY
, ACCOUNTING FOR SHARED PROCEDURE ASSOCIATED WITH USERS
, WHO ISSUE MIHOLD CALIS.

LH,R15 UHIFLG,R4

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RT CAL1 SERVICE ENTRY POINTS

1404 01 00197 21F00080 A
 1405 01 00198 694001A5
 1406 01 00199 21F00040 A
 1407 01 0019A 694001A7
 1408 01 0019B 72180000 X
 1409 01 0019C 670A01A9
 1410 01 0019D 72180000 X
 1411 01 0019E 670A01A9
 1412 01 0019F 72180000 X
 1413 01 001A0 683001A7
 1414 01 001A1 670A01A9
 1415 01 001A2 72180000 X
 1416 01 001A3 670A01A9
 1417 01 001A4 680E0000 A
 1418 01 001A5 72180000 X
 1419 01 001A6 680001A1
 1420 01 001A7 72180000 X
 1421 01 001A8 680001A1
 1422
 1423
 1424 01 001A9 73120000 X
 1425 01 001AA 73F20000 X

LCT3

LCT1

LCT2

*

*

MTBINST

CI,R15 TIC
 BANZ LCT1
 CI,R15 DIC
 BANZ LCT2
 LB,R1 UBIAPR,R4
 EXU MTBINST,R5
 LB,R1 UBIAPB,R4
 EXU MTBINST,R5
 LB,R1 UBIASP,R4
 BEZ LCT2
 EXU MTBINST,R5
 LB,R1 UBI0V,R4
 EXU MTBINST,5
 B 0,R7
 LB,R1 UBIACP,R4
 B LCT3
 LB,R1 UBIDB,R4
 B LCT3

MTB,1 PBILCT,R1
 MTB,-1 PBILCT,R1

TEL IN CONTROL
 YES
 DELTA IN CONTROL
 YES
 ACCOUNT FOR SHRD PROC ROOT
 ACCOUNT FOR SHRD PROC OVERLY
 ANY SPECIAL SHRD PROCESSOR
 No...Go ACCOUNT FOR DELTA(MAYBE)
 ACCOUNT FOR IT
 ACCOUNT FOR SHRD MON OVERLY
 RETURN
 COMMAND PROCESSOR
 DEBUGGER
 COUNT IT UP
 COUNT IT DOWN

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RT CALL SERVICE ENTRY POINTS

1426
1427 01 001AB
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1461
1462 01 001AB 6A700000 X

```

RTSIZE PAGE EQU $ *****
*
*F* NAME: RTSIZE
*,*
*,* PURPOSE: TO PROVIDE A SUBROUTINE FOR CHECKING IF A USER WILL
*,* FIT IN 'UNLOCKED' CORE.
*,*
*,* DESCRIPTION: THE TOTAL AVAILABLE 'UNLOCKED' CORE SIZE IS
*,* COMPARED WITH THE USER'S CURRENT SIZE AND CONDITION
*,* CODES ARE SET TO REFLECT WHETHER HE WILL FIT.
*****
*D* NAME: RTSIZE
*,*
*,* REGISTERS: R15 THRU R7 ARE VULNERABLE.
*,*
*,* CALL: BAL,R6
*,*
*,* INTERFACE: T:T0TSZ
*,*
*,* ENVIRONMENT: MASTER MODE; MAPPED/UNMAPPED.
*,*
*,* INPUT: R4 = USER # OF USER TO BE SIZED.
*,* S;ACORE, S;RTCORE, S;STL#, SL;RSVP.
*,*
*,* OUTPUT: CONDITION CODE 4 = 0 (IF THE USER FITS).
*,* 1 (IF HE DOESN'T).
*,*
*,* DESCRIPTION: TIT0TSZ IS CALLED TO SIZE UP THE USER; THEN HIS
*,* SIZE IS COMPARED AGAINST:
*,* SIACORE = S;RTCORE + (S;STL# * SL;RSVP)
*,*
*,* -----|-----
*,* |
*,* > IF POSITIVE
*****
*
BAL,R7 TIT0TSZ RETURNS USER'S SIZE IN R0

```

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1463	01	001AC	32200000	X
1464	01	001AD	38200000	X
1465	01	001AE	38200000	A
1466	01	001AF	32100000	X
1467	01	001B0	38100000	X
1468	01	001B1	682001B3	
1469	01	001B2	30200001	A
1470	01	001B3	32200002	A
1471	01	001B4	680C0000	A

RTS1

RT CAL1 SERVICE ENTRY POINTS 68

LW,R2	S;ACORE	
SW,R2	SIRTCORE	YIELDS UNLOCKED AVAILABLE CORE
SW,R2	RO	AVAILABLE CORE USER SIZE
LW,R1	SISTL#	
SW,R1	SL;RVP	ARE THERE ANY STOLEN PAGES AROUND
BLEZ	RTS1	NO
AW,R2	R1	YES...ADD THEM IN
LW,R2	R2	SET CC'S
B	O,R6	RETURN

1472
1473 01 00185
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RTI0EX1 PAGE
EQU $ *****

*
*F* NAME: RTI0EX1
*,*
*,* PURPOSE: TO PROCESS THE MI:IOEX(SIO) CAL1,5.
*,*
*,* DESCRIPTION: PROVIDES A CAL1 INTERFACE TO QUEUE AN I/O REQUEST
*,* FOR A PRE-EMPTED DEVICE FROM A REAL-TIME USER.
*,*
*,* REFERENCE: CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL.
*****
*,* NAME: RTI0EX1
*,*
*,* REGISTERS: STANDARD CAL1 REGISTER SETUP.
*,*
*,* CALL: VIA RTALTCP (NOT CALLABLE EXTERNALLY).
*,*
*,* INTERFACE: CHKBIT1, CHKBIT, NEWQNW, CALBAD, RTCHKPRIV,
*,* RTDEVCHK, RTDCBCHK, RTVTP.
*,*
*,* ENVIRONMENT: MAPPED/MASTER; PRIVILEGE LEVEL MUST = X'EO'.
*,*
*,* INPUT: R6 = WORD 0 OF CAL1,5 FPT.
*,* R7 = POINTER TO WORD 1 OF FPT.
*,* R11 = RETURN ADDRESS (TRAPEXIT).
*,* DCT3, DCT12, DCT15, UB;PRIO.
*,*
*,* OUTPUT: JIICBHDR, DCT15.
*,*
*,* DESCRIPTION: THE FOLLOWING SECURITY CHECKS ARE MADE: USER'S
*,* PRIVILEGE LEVEL MUST = X'EO'; ICLIST; MUST HAVE BEEN
*,* SPECIFIED; DCB/DEVICE VALIDATION; THE DEVICE MUST BE
*,* PRE-EMPTED BY THIS USER; AND AN END-ACTION ADDRESS
*,* MUST HAVE BEEN PROVIDED (THIS ADDRESS MUST BE IN THE
*,* FIRST 128K OF MEMORY IF RUNNING ON A XEROX 560).
*,* THE FPT PARAMETERS ARE THEN FORMATTED FOR A CALL TO

```

```

1509
1510
1511
1512 01 001B5 6A000013
1513 01 001B6 69800019
1514 01 001B7 32EE0000 A
1515 01 001B8 691001BB
1516
1517
1518
1519
1520
1521
1522
1523 01 001B9 32E00004
1524 01 001BA 68000000 X
1525 01 001BB 225001C0
1526 01 001BC 21E08000 A
1527 01 001BD 684000A2
1528 01 001BE 6A500091
1529 01 001BF 69F0001D
1530 01 001C0 6930001D
1531 01 001C1 72540000 X
1532 01 001C2 21500020 A
1533 01 001C3 68400019
1534 01 001C4 72540000 X
1535 01 001C5 683001F7
1536 01 001C6 31500000 X
1537 01 001C7 69300019
1538 01 001C8 09200000 N
1539 01 001C9 6A200000 X
1540 01 001CA 3260000C A
1541 01 001CB 6A3000A9
1542 01 001CC 2560007F A
1543 01 001CD 3560000D A
1544 01 001CE 49D0001F N
1545 01 001CF 6A200000 X
    
```

```

*,*
NEWQNW TO QUEUE THE I/O REQUEST
*****
*
BAL,R0 RTCHKPRIV JBIPRIV => X'E0'
BCS,8 RTSETCC1 NO, ABNORMAL RETURN
LW,R14 O,R7 FPT(WORD 1)
BLZ EX12 IF PRESENCE BIT IS 8K
*****
*E* ERROR! BB=05
*,*
*,* DESCRIPTION: 'CLIST' WAS NOT SPECIFIED IN AN M:IOEX (SIO) FPT.
*,*
*,* REGISTERS: R14 = FPT PRESENCE BITS (WORD 1)
*****
LW,R14 RTERR;PARAM 'CLIST' IS MISSING
B CALBAD ABORT USER
EX12 LI,R5 EX11 SET POSSIBLE RETURN FROM RTDEVCHK
CI,R14 FPTDCB 'DEV' OR 'DCB' SPECIFIED
BAZ RTDEVCHK 'DEV' RETURNS VIA R5 WITH DCTX(R2)
BAL,R5 RTDCBCHK VALIDATE DCB=RETURNS DCTX IN R2
BCS,15 RTSETCC3 BAD DCB; ABNORMAL RETURN
EX11 BCS,3 RTSETCC3 BAD DEVICE ADR; ABN RETURN
LB,R5 DCT3,R2
CI,R5 DOWND IS DEVICE PRE-EMPTED
BAZ RTSETCC1 NO
LB,R5 DCT15,R2 DOES DEVICE BELONG TO THIS USER
BEZ EX18 IF NO USER IS ASSOCIATED WITH DEVICE
CW,R5 SICUN
EX14 BNE RTSETCC1 NO
PUSH R2 SAVE DCTX
BAL,R2 CHKBIT1 RETURNS 'CLIST' ADR IN R12
LW,R6 R12 CLIST ADR
BAL,R3 RTVTP RETURNS PHYSICAL ADR IN R6
SLS,R6 =1 CONVT TO DA('CLIST')
STW,R6 R13 SET UP FOR NEWQ
OR,R13 BT31T00*31 SET 'CI' BIT OF IOQB
BAL,R2 CHKBIT 'EA' SPECIFIED
    
```

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RT CAL1 SERVICE ENTRY POINTS

71

1546 01 001D0 680001D7
 1547 01 001D1 82200000 X
 1548 01 001D2 32C40000 X
 1549 01 001D3 4BC00016 N
 1550 01 001D4 693001E1
 1551 01 001D5 08200000 N EXIT
 1552 01 001D6 6800001B
 1553 01 001D7 3260000C A EX15
 1554 01 001D8 6A3000A9
 1555 01 001D9 682001DC
 1556 01 001DA 70200000 X
 01 001DB 692001D5
 1557 01 001DC 82200000 X EX19
 1558 01 001DD 09700000 N
 1559 01 001DE 32700016 N
 1560 01 001DF 47640000 X
 1561 01 001E0 08700000 N
 1562 01 001E1 6A200000 X EX17
 1563 01 001E2 680001E4
 1564 01 001E3 22C00000 A
 1565 01 001E4 09C00000 N EX16
 1566 01 001E5 22000000 A
 1567 01 001E6 6A200000 X
 1568 01 001E7 680001FD
 1569 01 001E8 32500000 X
 1570 01 001E9 725A0000 X
 1571 01 001EA 25E00019 A EX1B
 1572 01 001EB 49D0000E A
 1573 01 001EC 08E00000 N
 1574 01 001ED 08C00000 N
 1575 01 001EE 5550000C A
 1576 01 001EF 22F00000 A
 1577 01 001FO 6AB00000 X
 1578 01 001F1 680001F5
 1579 01 001F2 32300000 X
 1580 01 001F3 47300000 X
 1581 01 001F4 6800001F

EXIT

EX15

EX19

EX17

EX16

EX1B

B EX15
 LW,R2 +TSTACK
 LW,R12 DCT12,R2
 AND,R12 MASKS+22
 BNEZ EX17
 PULL R2
 B RTSETCC2
 LW,R6 R12
 BAL,R3 RTVTP
 BLE EX19
 BIF,X560 EXIT
 LW,R2 +TSTACK
 PUSH R7
 LW,R7 MASKS+22
 STS,R6 DCT12,R2
 PULL R7
 BAL,R2 CHKBIT
 B EX16
 LI,R12 0
 PUSH R12
 LI,R0 0
 BAL,R2 CHKBIT
 B EX1A
 LW,R5 S;CUN
 LB,R5 UB;PRI0,R5
 SLS,R14 25
 OR,R13 R14
 PULL R14
 PULL R12
 STH,R5 R12
 LI,R15 0
 BAL,R11 NEWQNW
 B EXSC
 LW,R3 YC
 STS,R3 JIICBHDR
 B RTSETCCO

YES
 NO...GET DCTX
 WAS 'EA' ADDRESS SPECIFIED AT
 TIME OF STOP10 REQUEST
 YES...CONTINUE
 NO...RESTORE STACK
 ABNORMAL RETURN
 RETURNS PHYSICAL ADR IN R6
 PHY ADR < 128K
 CAN'T ALLOW EXECUTION ADR > 128K
 GET DCTX
 SAVE CHKBIT REGISTER
 MASK FOR STS
 SAVE 'EA' ADR; PRESERVE BIT 0
 WAS 'T0' SPECIFIED
 YES
 NO, DEFAULT IS ZERO
 SAVE 'T0' VALUE
 NO END-ACTION FROM REQC0M
 RETURNS 'PRI' IN R12
 IF 'PRI' WAS SPECIFIED
 CURRENT EXECUTION PRIORITY
 R14 HAS BEEN SET UP BY CHKBIT
 SET 'REL' BIT IF SPECIFIED IN FPT
 GET 'T0' VALUE FROM STACK
 RESTORE DCTX TO R12 FROM STACK
 SET UP FOR NEWQ
 SET UP FOR NEWQ

 BAD RETURN FROM NEWQ
 SET 'RT-ACTIVITY' BIT &
 'IOEX-ACTIVITY' BIT IN JIT
 RETURN TO USER

MO1 13:49 SEP 08, '75

RT CALL SERVICE ENTRY POINTS

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01	001F5	0F000000	X
01	001F6	00410010	A

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01	001F7	35540000	X
01	001F8	31E0001F	N
01	001F9	6840001B	
01	001FA	32500000	X
01	001FB	75540000	X
01	001FC	680001C8	

01	001FD	3250000C	A
01	001FE	680001EA	

 S SCREECH CODE: 41=10
 ,
 , REPORTED BY: RTR0BT
 ,
 , MESSAGE: BAD IOEX CALL TO NEWQ
 ,
 , TYPE: SCREECH
 ,
 , REGISTERS: SET-UP FOR BAL,11 NEWQNW
 ,
 , REMARKS: NEWQNW RETURNED TO BAL+1:

 EXSC SCREECH X'41',X'10'
 EX1B J SYSCON WAS USED TO PRE-EMPTY DEVICE
 STW,R5 DCT12,R2 ZERO DCT12
 CW,R14 FPTEA WAS 'EA' SPECIFIED
 BAZ RTSETCC2 NO, ABNORMAL RETURN
 LW,R5 SICUN
 STB,R5 DCT15,R2 SINCE SYSCON DOESN'T SET DCT15
 B EX14 CONTINUE
 *
 EX1A LW,R5 R12 MOVE PRI TO R5
 B EX1B CONTINUE

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RT CALL SERVICE ENTRY POINTS

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1607 01 001FF
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PAGE
EQU      * *****
RTIOEX2
*
*F*     NAME:      RTIOEX2
*,*
*,*     PURPOSE:   TO PROCESS THE M:IOEX(TIO/TDV/HIO) CALLS.
*,*
*,*     DESCRIPTION: PROVIDES A CALL INTERFACE TO ISSUE AN I/O
*,*                   INSTRUCTION (TIO/TDV/HIO) TO A PRE-EMPTED DEVICE FOR
*,*                   A REAL-TIME USER.
*,*
*,*     REFERENCE:  CP.V SYSTEMS PROGRAMMER REFERENCE MANUAL.
*****
*,*     NAME:      RTIOEX2
*,*
*,*     REGISTERS:  STANDARD CALL REGISTER SETUP.
*,*
*,*     CALL:       VIA RTALTCP (NOT CALLABLE EXTERNALLY).
*,*
*,*     INTERFACE:  INTSIM AND DRIVEIO (IN IOQ) ARE CALLED (ON AN HIO
*,*                   REQUEST); CALBAD (ON AN ABNORMAL CONDITION);
*,*                   RTCHKPRIV, RTDEVCHK, RTDCBCHK, ENBSR4.
*,*
*,*     ENVIRONMENT: MAPPED/MASTER; PRIVILEGE LEVEL MUST = X'E0'.
*,*
*,*     INPUT:      R6 = WORD 0 OF CALLS FPT.
*,*                   R7 = POINTER TO WORD 1 OF FPT.
*,*                   R11 = RETURN ADDRESS (TRAPEXIT).
*,*                   DCT3, DCT12, DCT15.
*,*
*,*     OUTPUT:     JIICBHDR, DCT12.
*,*
*,*     DESCRIPTION: THE FOLLOWING SECURITY CHECKS ARE MADE: USER'S
*,*                   PRIVILEGE LEVEL MUST = X'E0'; DCB/DEVICE VALIDATION;
*,*                   AND THE DEVICE MUST HAVE BEEN PRE-EMPTED BY THIS USER
*,*                   (SINCE THE CONDITION CODES RETURNED TO THE USER
*,*                   (VIA THE STACK) ARE THOSE OF THE EXECUTED INSTRUCTION.

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RT CALL SERVICE ENTRY POINTS 74

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1651
1652 01 001FF 6A000013
1653 01 00200 68800203

BAL,R0 RTCHKPRIV JBIPRIV = X'EO'
BCR,8 EX21 YES

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1661
1662 01 00201 32E00005
1663 01 00202 68000000 X
1664 01 00203 2250020B
1665 01 00204 324E0000 A
1666 01 00205 21408000 A
1667 01 00206 684000A2
1668 01 00207 6A500091
1669 01 00208 68F0020C

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1679 01 00209 32E00006

EX23 LW,R14 RTERR:IOEX2 NO, ABORT USER

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RT CAL1 SERVICE ENTRY POINTS

1680 01 0020A 48000000 X
 1681 01 0020B 69300209
 1682 01 0020C 72540000 X
 1683 01 0020D 21500020 A
 1684 01 0020E 68400209
 1685 01 0020F 32500000 X
 1686 01 00210 71540000 X
 1687 01 00211 69300209
 1688 01 00212 4B400002 N
 1689 01 00213 6708021F
 1690 01 00214
 1691 01 00214 74000002 A
 1692 01 00215 32500000 X
 1693 01 00216 358BFFF9 A
 1694 01 00217 359BFFFA A
 1695 01 00218 205FFFEF A
 1696 01 00219 4B500000 X
 1697 01 0021A 32300000 X
 1698 01 0021B 472A0000 A
 1699 01 0021C 32300000 X
 1700 01 0021D 47300000 X
 1701 01 0021E 8800000B A
 1702
 1703
 1704
 1705 01 0021F
 1706 01 0021F 0D800006 A
 1707 01 00220 0E800006 A
 1708 01 00221 68000222
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 1712 01 00222
 1713 01 00222 6D000037 A
 1714 01 00223 0F800006 A
 1715 01 00224 6AB00214
 1716 01 00225 22B00000 N

EX22

EX24

EX25

I0INST

EXH10

B CALRAD
 BCS,3 EX23
 LB,R5 DCT3,R2
 CI,R5 DOWND
 BAZ EX23
 LW,R5 SICUN
 CB,R5 DCT15,R2
 BNE EX23
 AND,R4 MASKS+2
 EXU I0INST,R4
 EQU \$
 STCF R2
 LW,R5 TSTACK
 STW,R8 *7,R5
 STW,R9 *6,R5
 AI,R5 *17
 AND,R5 X1FFFF
 LW,R3 YF
 STS,R2 0,R5
 LW,R3 YC
 STS,R3 J,ICBHDR
 B *R11

RETURN HERE FROM RTDEVCHK

IS DEVICE PRE-EMPTED
NO; ABORT USER

DOES IT BELONG TO THIS USER

NO; ABORT
MASK OFF CODE
EXECUTE INSTRUCTION

SAVE CONDITION CODES

SAVE R8 IN USER'S R8 IN STACK

SAVE R9 IN USER'S R9 IN STACK

PRINT TO PSD IN STACK

INSURE DBL=WD BOUND

CC MASK

PUT CCIS IN USER'S PSD

SET 'IRT-ACTIVITY' BIT &
'IBEX-ACTIVITY' BIT IN JIT

RETURN

\$ *****

*R6

*R6

EXH10

H10 LOGIC REQUIRES I00 MANIPULATION

\$

*R6

EX25

TRAPEXIT

SAVE STATUS
SET RETURN ADR

H01 13149 SEP 08, 175
 1717 01 00226 72440000 X
 1718 01 00227 68300000 X
 1719 01 00228 32440000 X
 1720 01 00229 68100000 X
 1721 01 0022A 4B400020 N
 1722 01 0022B 35440000 X
 1723 01 0022C 32100002 A
 1724 01 0022D 22500230
 1725 01 0022E 49500020 N
 1726 01 0022F 68000000 X
 1727 01 00230 6A200000 X
 1728 01 00231 68000000 X
 1729

HI0RET

RT CAL1 SERVICE ENTRY POINTS
 LB,R4 DCT15,R2 PRE-EMPTED DEVICE
 BEZ ENBSR4 NO, EXIT CAL1 PROCESSING
 LW,R4 DCT12,R2 INTERRUPT PENDING
 BGEZ ENBSR4 NO, EXIT CAL1 PROCESSING
 AND,R4 NB31T00+32 YES...RESET 'INT PEND' FLAG
 STW,R4 DCT12,R2 PUT IT AWAY
 LW,R1 R2 SET UP R1(DCTx) FOR INTSIM(I0Q)
 LI,R5 HI0RET SET RETURN FROM INTSIM
 BR,R5 BT31T00+32 SET FLAG IN LINK REGISTER
 B INTSIM SETS 'CLEANUP PENDING'
 BAL,R2 DRIVEI0 DO CLEANUP; RETURNS ENABLED
 B TRAPEXIT EXIT
 TITLE 'I 0 Q S U B R O U T I N E S'

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01 00232

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```
I O Q          S U B R O U T I N E S          77
RTIOSTRT EQU  * *****
*
*F*          NAME:      RTIOSTRT
*,*
*,*          PURPOSE:  PROVIDES AN EXTENSION OF IOQ FOR IOEX REQUESTS FOLLOW-
*,*                    ING A SUCCESSFUL 'SIO'.
*,*
*,*          DESCRIPTION: PERFORMS THE SPECIAL PROCESSING REQUIRED OF IOQ
*,*                    FOLLOWING A SUCCESSFUL 'SIO' IN ORDER TO MAKE THE
*,*                    DEVICE LOOK (NOT BUSY) TO THE (REGULAR) I/O SYSTEM.
*,* *****
*D*          NAME:      RTIOSTRT
*,*
*,*          REGISTERS:  R0 AND R15 ARE VULNERABLE.
*,*
*,*          CALL:      BAL,R7 (FROM IOSTRT IN IOQ)
*,*
*,*          INTERFACE:  NONE
*,*
*,*          ENVIRONMENT: MASTER/UNMAPPED.
*,*
*,*          INPUT:     R1 = DCT INDEX
*,*                    R3 = IOQ INDEX
*,*                    R9 = FUTURE CONTENTS OF DCT5
*,*                    IOQ8 (HAS CHANNEL STATUS FLAG FROM IOEX REQUEST)
*,*
*,*          OUTPUT:    R4 = HANDLER FLAGS
*,*                    R9 = DCT5
*,*                    DCT12, DCT13
*,*
*,*          DESCRIPTION: THE SIO STATUS REGISTERS ARE STORED INTO DCT13;
*,*                    THE HIGH-ORDER BIT OF DCT12 IS SET (INDICATING THAT A
*,*                    R/T I/O INTERRUPT IS EXPECTED); THE HIGH-ORDER BIT
*,*                    OF R4 IS SET IF THE USER HAS REQUESTED THAT THE
*,*                    CHANNEL BE FREED IMMEDIATELY; AND FINALLY, R9 IS SET
*,*                    UP SO THE DEVICE WILL APPEAR TO BE (NOT BUSY) AFTER
*,*                    IOSTRT3 (IN IOQ) MODIFIES R9 PRIOR TO STORING IT AWAY
```

1767
 1768
 1769
 1770 01 00232 15C20000 X
 1771 01 00233 32020000 X
 1772 01 00234 49000020 N
 1773 01 00235 35020000 X
 1774 01 00236 6BF60000 X
 1775 01 00237 68200239
 1776 01 00238 49400020 N
 1777 01 00239 20900080 A
 1778 01 0023A 680E0000 A

```

*,*
IN DCT5.
*****
*
  STD,R12  DCT13,R1      SAVE SIO REGISTERS
  LW,R0    DCT12,R1
  BR,R0    BT31T00+32   SET 'INTERRUPT PENDING' BIT
  STW,R0   DCT12,R1     PUT IT AWAY
  INT,R15  IOQB,R3      'REL' SPECIFIED ON CALL
  BCR,2    IOS1         NO
  BR,R4    BT31T00+32   SET SUBCHANNEL RELEASE BIT
  AI,R9    X'80'        SET UP R9 AS DCT5
  B        Q,R7         RETURN TO IOQ AT IBSTRT3
IOS1
  
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1825 01 0023B 4D440000 A
1826 01 0023C 74000004 A
1827 01 0023D 02200060 A
      01 0023E 0B200000 N
1828 01 0023F 6ABC0000 A
1829 01 00240 02200060 A
      01 00241 0A200000 N
1830 01 00242 4D440000 A
1831 01 00243 69800000 X
1832 01 00244 31500000 X
1833
1834 01 00245 69400000 X
1835 01 00246 4B600020 N
1836 01 00247 356E0000 X
1837 01 00248 68000000 X

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I B Q

S U B R O U T I N E S

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AND CONTROL IS PASSED TO THE USER'S END-ACTION ROUTINE
(FROM DCT12) VIA A BAL ON R11. UPON RETURN, ANOTHER
TIO IS ISSUED TO OBTAIN THE DEVICE/CHANNEL STATUS.
IF THE DEVICE/CHANNEL IS STILL ACTIVE, RETURN IS TO
RTRET2 (IN I00); IF NOT ACTIVE, RETURN IS TO RTRET1
(IN I00) AFTER FIRST RE-SETTING THE HIGH-ORDER BIT OF
DCT12 (IOEX DEVICE BUSY BIT).

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TIO,R4 0,R2      TIO STATUS TO R4/R5
STCF    R4        CCIS T00
PUSH    6,R2      SAVE R2, R3, & R7

BAL,R11 0,R6      GET USER'S END ACTION ADDRESS
PULL    6,R2      RESTORE REGS

TIO,R4 0,R2      GET LATEST TIO STATUS
BCS,8   RTRET2   NO...LEAVE CHANNEL BUSY
CW,R5   YC       CHECK TIO STATUS FOR DEVICE STATUS
                          INT PENDING OR DEVICE UNAVAILABLE
                          DEVICE/CHANNEL IS BUSY
BANZ    RTRET2   RESET 'INT PEND' FLAG
AND,R6  NB31T00+32
STW,R6  DCT12,R7 PUT IT BACK
B       RTRET1   RETURN TO I00 ... CLEAR CHANNEL

```


'NORMAL' COMPLETION.

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1875
1876
1877
1878 01 00249 72C20000 X
1879 01 0024A 4BC00004 N
1880 01 0024B 68300000 X
1881
1882 01 0024C 02200070 A
      01 0024D 08D00000 N
1883 01 0024E 32700001 A
1884 01 0024F 221FFFFFF A
1885 01 00250 22200000 A
1886 01 00251 723E0000 X
1887 01 00252 75300003 A
1888 01 00253 124E0000 X
1889 01 00254 326E0000 X
1890 01 00255 6ABC0000 A
1891 01 00256 02200070 A
      01 00257 0AD00000 N
1892 01 00258 22C00000 A
1893 01 00259 68000000 X
    
```

```

***
*****
*
LB,R12  DCT3,R1      PICK UP FLAGS
AND,R12 SI0REJECT   ABNORMAL CLEANUP
BEZ     I0SCU        NO
*
PUSH    7,R13       YES...GO TO USER'S END-ACTION ADR.

LW,R7   R1          DCT INDEX
LI,R1   *1          'SI0REJECT' FLAG
LI,R2   0           FLAG REGISTER TO EA ROUTINE
LB,R3   DCT19,R7    SI0 CONDITION CODES AT FAILURE
STB,R3  R3         POSITION THEM
LD,R4   DCT13,R7    SI0 STATUS REGS AT FAILURE
LW,R6   DCT12,R7    USER'S END-ACTION ADR.
BAL,R11 0,R6       GO TO HIM
PULL    7,R13

LI,R12  0           HANDLER FLAG
B       I0SCU       RETURN TO IOQ
    
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I O Q S U B R O U T I N E S

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RTT0

PAGE EQU \$ *****

NAME: RTT0

PURPOSE: PROVIDES THE INTERFACE BETWEEN IOQ (AT DEVICE TIME-OUT TIME) AND THE REAL-TIME USER'S END ACTION ROUTINE.

DESCRIPTION: DETECTION OF A TIME-OUT OF A PRE-EMPTED DEVICE CAUSES CONTROL TO BE PASSED TO RTT0 WHERE CONTROL IS, IN TURN, PASSED TO THE REAL-TIME USER'S END-ACTION ROUTINE.

REFERENCE: CP-V SYSTEMS PROGRAMMER REFERENCE MANUAL (USER INTERFACE IS DESCRIBED HERE).

NAME: RTT0

REGISTERS: R2 THRU R7 ARE VULNERABLE.

CALL: BAL ON R11 FROM TIME-OUT PROCESSING IN IOQ; NOT CALLABLE EXTERNALLY.

INTERFACE: CALLS THE REAL-TIME USER'S END-ACTION ROUTINE.

ENVIRONMENT: MASTER/UNMAPPED.

INPUT: R1 = DCT INDEX;
R6 = USER'S END-ACTION ROUTINE ADDRESS.
DCT19, DCT13

OUTPUT: NONE

DESCRIPTION: UPON DETECTING AN OVER DUE INTERRUPT FROM AN MII0EX REQUEST, IOQ CALLS RTT0 WHICH IN TURN PASSES CONTROL TO THE USER'S END-ACTION ROUTINE (VIA DCT12).

H01 13:49 SEP 08, '75

I O Q S U B R O U T I N E S

84

1931								
1932	01	0025A	22200000	A	LI,R2	0	SET 'TIME-OUT' FLAG	
1933	01	0025B	72320000	X	LB,R3	DCT19,R1	PICK UP SIO CC'S	
1934	01	0025C	75300003	A	STB,R3	R3	POSITION THEM	
1935	01	0025D	12420000	X	LD,R4	DCT13,R1	SIO STATUS REGISTERS TO R4/R5	
1936	01	0025E	09100000	N	PUSH	R1	SAVE DCTX	
1937	01	0025F	09800000	N	PUSH	R11	SAVE RETURN	
1938	01	00260	32700001	A	LW,R7	R1	DCT INDEX TO R7	
1939	01	00261	22100000	A	LI,R1	0	SET 'TIME-OUT' FLAG(#2)	
1940	01	00262	6ABC0000	A	BAL,R11	0,R6	GO TO USER'S EA ROUTINE	
1941	01	00263	08B00000	N	PULL	R11		
1942	01	00264	08100000	N	PULL	R1		
1943	01	00265	F800000B	A	B	*R11	RETURN TO IOQ	

H01 13149 SEP 08, 1951

1944
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1951

I B O S U B R O U T I N E S
PAGE

85

* SECTION IV:
*
* INTERRUPT PROCESSING ROUTINES

PCC 0

H01 13:49 SEP 08 1975
01 00266

I N T E R R U P T H A N D L E R

86

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```
RTIGINT EQU *
*
*F* NAME: RTIGINT
*,*
*,* PURPOSE: TO HANDLE INTERRUPTS FROM INTERRUPTS WHICH HAVE BEEN
*,* CENTRALLY CONNECTED TO REAL-TIME USERS VIA M:GJOBCON.
*,*
*,* DESCRIPTION: PLACES A SPECIFIED GHOST JOB INTO EXECUTION AS
*,* THE RESULT OF THE OCCURRENCE OF A REAL OR PSEUDO
*,* INTERRUPT WHICH HAS BEEN CENTRALLY-CONNECTED VIA
*,* M:GJOBCON.
*****
*D* NAME: RTIGINT
*,*
*,* REGISTERS: NONE
*,*
*,* CALL: INTERRUPT DRIVEN (REAL OR PSEUDO)
*,*
*,* INTERFACE: T:SAVE, T:GJOB, T:SSE
*,*
*,* ENVIRONMENT: MASTER/UNMAPPED.
*,*
*,* INPUT: ENTRY IS MADE VIA AN XPSD WHICH POINTS AT THE INTERRUPT
*,* CONTROL BLOCK (ICB) FOR THIS INTERRUPT.
*,*
*,* OUTPUT: T:GJOB INITIATES THE SPECIFIED GHOST JOB.
*,*
*,* DESCRIPTION: A STANDARD ENVIRONMENT IS SAVED IN THE UNMAPPED
*,* STACK; INFORMATION ABOUT THE INTERRUPT IS OBTAINED
*,* FROM THE ASSOCIATED ICB AND, IF REAL, THE
*,* INTERRUPT IS CLEARED (ARMED/ENABLED); THE SPECIFIED
*,* GHOST JOB (FROM INFORMATION IN THE ICB) IS THEN ACT-
*,* IVATED VIA A BAL TO T:GJOB; THE GHOST JOB'S USER
*,* # IS SAVED IN THE ICB AND EXIT IS TAKEN THROUGH T:SSE.
*****
PUSH 6,13 SAVE SOME WORKING REGISTERS
```

01 00266 02200060 A

H01 13:49 SEP 08, '78

	01	00267	08D00000	N
1990	01	00268	6B100000	X
1991	01	00269	92000001	A
1992				
1993				
1994	01	0026A	6A200000	X
1995	01	0026B	6B100000	X
1996	01	0026C	201FFFFE	A
1997	01	0026D	6B720006	A
1998	01	0026E	21701000	A
1999	01	0026F	6B100273	
2000	01	00270	32A00007	A
2001	01	00271	22301200	A
2002	01	00272	6A000007	
2003	01	00273	22200018	A
2004	01	00274	F2F40001	A
2005	01	00275	09100000	N
2006	01	00276	02200020	A
2007	01	00277	2A82000A	A
2008	01	00278	2A020008	A
2009	01	00279	6AA00000	X
2010	01	0027A	08100000	N
2011	01	0027B	2220001D	A
2012	01	0027C	F5440001	A
2013	01	0027D	68000000	X
2014				

I N T E R R U P T		H A N D L E R	
INT,1	RTIGINTP		GET POINTER TO ICB
LD,0	*1		GET REAL PSD AT INTERRUPT
			SINCE WE ARE HERE AS THE RESULT
			OF TWO CONSECUTIVE XPSD EXECUTIONS
			SAVE A STANDARD ENVIRONMENT
BAL,2	TISAVE		RECONSTRUCT POINTER TO ICB
INT,1	RTIGINTP		POINT TO BASE OF ICB
AI,1	*ICBPSD1(W)		GET INTERRUPT ADDRESS
INT,7	ICBINT(W),1		CHECK FOR PSEUDO INTERRUPT
CI,7	XI1000!		YES
BGE	GINT1		GET INTERRUPT ADDRESS
LW,R10	R7		ARM AND ENABLE (CLEAR)
LI,R3	XI1200!		DO WRITE DIRECT
BAL,R0	RTWD		POINT TO PRIORITY FOR GHOST
LI,R2	ICBGJpRI(D)		GET IT FOR GJOB START
LB,R15	*R1,R2		SAVE ICB ADDRESS
PUSH	R1		SET TO MOVE TWO WORDS
LCI	2		GET ACCOUNT
LM,8	ICBGJACN(W),1		GET NAME FOR GHOST
LM,0	ICBGJNME(W),1		INITIATE THAT GHOST
BAL,10	TIGJOB		RESTORE ICB ADDRESS
PULL	R1		DISPLACEMENT TO USER NUMBER OF GHOST
LI,R2	ICBGUN(D)		SAVE USER NUMBER ASSIGNED
STB,R4	*R1,R2		GO SCHEDULE
B	TISSE		

GINT1

H01 13:49 SEP 08, 1975
01 0027E

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2051

01 0027E 02200060 A
01 0027F 0BD00000 N

01 00280 6B100000 X
01 00281 92000001 A
01 00282 6A200000 X
01 00283 6B100000 X
01 00284 201FFFFE A
01 00285 6AB00287

```

I N T E R R U P T      H A N D L E R                               88
RT:UINTEQU * *****

*F* NAME: RT:UINTEQU
*,*
*,* PURPOSE: TO HANDLE INTERRUPTS FROM INTERRUPTS WHICH HAVE BEEN
*,* CENTRALLY CONNECTED TO REAL-TIME USERS VIA MICCONNECT.
*,*
*,* DESCRIPTION: SAVES A STANDARD ENVIRONMENT AND THEN CALLS
*,* UINTEQU TO PROCESS THE INTERRUPT; EXITS THRU TISSE.
*****
*D* NAME: RT:UINTEQU
*,*
*,* REGISTERS: NONE
*,*
*,* CALL: INTERRUPT DRIVEN (REAL OR PSEUDO)
*,*
*,* INTERFACE: TISAVE, UINTEQU, TISSE
*,*
*,* ENVIRONMENT: MASTER/UNMAPPED
*,*
*,* INPUT: ENTRY IS MADE VIA AN XPSD WHICH POINTS AT THE
*,* INTERRUPT CONTROL BLOCK (ICB) FOR THE INTERRUPT.
*,*
*,* OUTPUT: A STANDARD ENVIRONMENT IS SAVED AND UINTEQU IS CALLED.
*,*
*,* DESCRIPTION: SAVES A STANDARD ENVIRONMENT AND THEN CALLS UINTEQU
*,* TO PROCESS THE INTERRUPT; EXITS THRU TISSE.
*****
*
PUSH 6,13

INT,1 RT:UINTEQU GET ICB POINTER
LD,0 *1 GET PSD
BAL,2 TISAVE SAVE A STANDARD ENVIRONMENT
INT,1 RT:UINTEQU RESTORE ICB POINTER
AI,1 =ICBPSD1(W) POINT TO BASE OF ICB
BAL,R11 UINTEQU QUEUE INTERRUPT FOR USER

```

H01 13:49 SEP 08, 1975
2052
2053 01 00286 68000000 X *

I N T E R R U P T
B T;SSE

H A N D L E R
AND REPORT TO SCHEDULER
EXIT TO SWAPSCHEULER

H01 13:49 SEP 08, 1955
01 002R7

INTERRUPT HANDLER 90

2055 UINTQ
2056 *
2057 *F*
2058 **,
2059 **,
2060 **,
2061 **,
2062 **,
2063 **,
2064 **,
2065 **,
2066 *****
2067 *D*
2068 **,
2069 **,
2070 **,
2071 **,
2072 **,
2073 **,
2074 **,
2075 **,
2076 **,
2077 **,
2078 **,
2079 **,
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2081 **,
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2083 **,
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2089 **,
2090 **,
2091 **,

EDU * *****
NAME: UINTQ
PURPOSE: PROVIDES A SUBROUTINE FOR RT:UINT & CLOCK4 TO PROCESS
A CENTRALLY-CONNECTED REAL OR PSEUDO INTERRUPT
(MICONNECT/MICLOCK)
DESCRIPTION: PROVIDES A SUBROUTINE TO QUEUE ICB LIST ENTRY FOR
A USER RESULTING FROM A CENTRALLY CONNECTED INTERRUPT
AND TO REPORT IT TO THE SCHEDULER.

NAME: UINTQ
REGISTERS: ALL VOLATILE.
CALL: BAL,R11
INTERFACE: TIRUE, ENBSR4
ENVIRONMENT: MASTER/UNMAPPED, CALLED DISABLED, ENABLES ON EXI
INPUT: R1 = ADDRESS OF ASSOCIATED ICB,
ASSOCIATED ICB, UB,PRI0B, UH,DL, S,CUP
OUTPUT: ASSOCIATED ICB, UH,DL, SIRTIR, SIRTUN, UB,PRI0B.
DESCRIPTION: THE ICB,DL PORTION OF THE ASSOCIATED ICB IS
CHAINED INTO UH,DL BASED UPON PRIORITY (ICBPRI). IF
THE CURRENT ICB'S PRIORITY IS HIGHER THAN THE USER'S
UB,PRI0B, THEN UB,PRI0B IS SAVED IN ICB,PRI0 (OLD
PRIORITY) AND ICB,PRI0 BECOMES UB,PRI0B. OTHERWISE
UB,PRI0B REMAINS AS IS, AND ZERO IS SAVED IN ICB,PRI0.
FINALLY, THE 'ON-DB-LIST' FLAG IS SET IN THE ICB (TO
PREVENT CIRCULAR CHAINS); ICB,PRI0 IS COMPARED AGAINST
S,CUP (CURRENT USER'S PRIORITY), AND IF GREATER,
SIRTIR AND SIRTUN ARE SET TO FORCE A RE-SCHEDULE (TO

INTERRUPT HANDLER

BY-PASS (MIN). IN EITHER CASE, AN EVENT IS REPORTED (VIA TRUE) AND UINTE EXITS TO THE CALLER.

2092
2093
2094
2095
2096 01 00287 2220001C A
2097 01 00288 F2540001 A
2098 01 00289 32820008 A
2099 01 0028A 32900000 X
2100 01 0028B 44C00289
2101 01 0028C F0200001 A
2102 01 0028D 692002C7
2103 01 0028E 25C0007F A
2104 01 0028F 522A0000 X
2105 01 00290 4820000C N
2106 01 00291 683002C1
2107 01 00292 32300002 A
2108 01 00293 12640000 A
2109 01 00294 45800006 A
2110 01 00295 691002C1
2111
2112 01 00296 4860000C N
2113 01 00297 6830029E
2114 01 00298 32200006 A
2115 01 00299 126C0000 A
2116 01 0029A 45800006 A
2117 01 0029B 6910029E
2118 01 0029C 32300002 A
2119 01 0029D 68000296
2120
2121 01 0029E 22D00FFF A
2122 01 0029F 12660000 A
2123 01 002A0 25300001 A
2124 01 002A1 47C60000 A
2125 01 002A2 22700FFF A
2126 01 002A3 47620008 A
2127
2128

UINTE01 LI,2 ICBUN(D) INDEX TO ASSOCIATED USER NUMBER
LB,5 *1,2 GET USER NUMBER
LW,8 ICBPRI(W),1 GET ICB PRIORITY
LW,9 YFF MASK FOR PRI0
ANLZ,12 UINTE01 WA OF ICB DO LIST BLOCK
LC *R1 CHECK FOR ALREADY ON DO LIST
BCS,2 UINTE8 YES...GET OUT SMARTLY
SLS,12 *1 CONVERT TO DOUBLE WORD ADDRESS
LW,2 UHIDL,5 GET USERS DO LIST ENTRY
AND,2 MASKS+12 EXTRACT CHAIN POINTER
BEZ UINTE4 NULL
LW,3 2 REMEMBER CURRENT ENTRY
LD,6 0,2 GET HEADER OF FIRST BLOCK
CS,8 6 CHECK PRIORITY
BL UINTE4 CHAIN AT HEAD
UINTE1 AND,6 MASKS+12 MASK FLINK TO NEXT BLOCK
BEZ UINTE2 AT END, QUEUE TO TAIL
LW,2 6 SAVE CURRENT ENTRY
LD,6 0,6 FLINK
CS,8 6 CHECK PRI0
BL UINTE2 THIS IS THE PLACE
LW,3 2 REMEMBER CURRENT ENTRY
B UINTE1 KEEP GOING
UINTE2 LI,13 XFFFF! MASK FOR ACTIVE POINTER BITS
LD,6 0,3 PICK UP FORWARD LINK FROM PREVIOUS
SLS,3 1 CONVERT TO WORD ADDRESS
STS,12 0,3 MAKE PREVIOUS POINT TO US
LI,7 XFFFF! MASK
STS,6 ICBPRI(W),1 AND MAKE US POINT TO FLINK

H01 13:49 SEP 08, 1975

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2129 01 002A4 F0200001 A
2130 01 002A5 684002AF
2131 01 002A6 32A20006 A
2132 01 002A7 21A0F000 A
2133 01 002A8 694002AB
2134 01 002A9 22301200 A
2135 01 002AA 6A000007
2136 01 002AB F2400001 A
2137 01 002AC 4B400000 X
2138 01 002AD 20400006 A
2139 01 002AE F5400001 A
2140
2141 01 002AF 72000008 A
2142 01 002B0 22400000 A
2143 01 002B1 710A0000 X
2144 01 002B2 692002B5
2145 01 002B3 724A0000 X
2146 01 002B4 750A0000 X
2147 01 002B5 22600018 A
2148 01 002B6 F54C0001 A
2149 01 002B7 3230001E N
2150 01 002B8 47320000 A
2151 01 002B9 31000000 X
2152 01 002BA 692002BE
2153 01 002BB 22900000 A
2154 01 002BC 35900000 X
2155 01 002BD 35500000 X
2156 01 002BE 6D000027 A
2157 01 002BF 22600000 N
2158 01 002C0 68000000 X
2159
2160
2161 01 002C1 522A0000 X
2162 01 002C2 22300FFF A
2163 01 002C3 47220008 A
2164 01 002C4 4A20000C A
2165 01 002C5 552A0000 X

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          I N T E R R U P T           H A N D L E R           92
          LC          *1           GET CLEAR FLAG
          BCR,4       UINT6         EITHER; NO ICLEAR; OR CLK-TYPE ICB
          LW,R10      ICBINT(W),R1  GET INTERRUPT ADDRESS
          CI,R10      X'F000'      CHECK FOR PSEUDO
          BANZ        UINT5         YES
          LI,R3       X'1200'      ARM AND ENABLE (CLEAR)
          BAL,R0      RTWD         DO WRITE DIRECT
          LB,4        *1           GET INTERRUPT STATUS
          AND,4       XFO          RESET
          AI,4        6            SET ARM AND ENABLE
          STB,4       *1           RESTORE

          *
          UINT6       LB,0         8           GET CURRENT INTERRUPT PRI0
          LI,R4       0            ZAPPER FOR OLD PRI0
          CB,R0       UBIPRI0B,R5  CHECK FOR CURRENT USER PRI0
          BG          UINT65       LOWER
          LB,R4       UBIPRI0B,R5  GET OLD VALUE
          STB,R0     UBIPRI0B,R5  RAISE HIS PRI0
          LI,R6       ICBPRI0(D)  DISP TO OLD PRI0
          STB,R4     *R1,R6       SAVE OLD PRI0
          LW,R3       Y2          SET ON-DE-LIST FLAG
          STS,R3     ICBSTAT(W),R1 TO PREVENT CIRCULAR CHAINS
          CW,0       SICUP        CHECK AGAINST CURRENT USER
          BG          UINT7       LOWER
          LI,9       0            SET FLAG
          STW,9      SIRTIR      IN SIRTIR TO BYPASS QMIN
          STW,5      SIRTUN      AND REMEMBER REAL TIME USER
          ENABLE     UINT7
          LI,6       E;ART       ADD REAL TIME TASK
          B          T;RUE       REPORT USER EVENT

          *
          *
          UINT4       LH,2        UHIDL,5    GET DB LIST POINTER
          LI,3        X'FFFF'     MASK FOR POINTER BITS
          STS,2       ICBPRI(W),1  REMEMBER FLINK
          LS,2        12          GET NEW HEAD
          STH,2       UHIDL,5     STORE NEW HEAD

```

H01 13149 SEP 08, '75
 2166 01 002C6 680002A4
 2167
 2168
 2169
 2170 01 002C7 32A20006 A
 2171 01 002C8 21A0F000 A
 2172 01 002C9 69400000 X
 2173 01 002CA 21A0005A A
 2174 01 002CB 68300000 X
 2175 01 002CC 22301200 A
 2176 01 002CD 6A000007
 2177 01 002CE 68000000 X

93

I N T E R R U P T H A N D L E R

B UINT3

*
 *
 *
 UINT8

LW,10	ICBINT(W),1	GET INT ADR
CI,10	X'F000'	CHECK FOR PSEUDO
BANZ	ENBSR4	IF PSEUDO
CI,10	X'5A'	CHECK FOR CLOCK
BE	ENBSR4	IF CLOCK
LI,3	X'1200'	
BAL,0	RTWD	CLEAR THE INTERRUPT (ARM & ENABLE)
B	T:PULLE	GET OUT QUICKLY

I N T E R R U P T H A N D L E R

2179
 2180 01 002CF
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 2215

```

*
RT:INTENTRY EQU *
*
*F*      NAME:      RT:INTENTRY
**
**      PURPOSE:   TO RESCHEDULE A USER BASED ON INFORMATION IN THE
**                DO-LIST CHAINED INTO THE HEAD OF UH,DL.
**
**      DESCRIPTION: UPON DETECTING THAT AN ICB DO-LIST HAS BEEN
**                  CHAINED ONTO THE HEAD OF A USER'S UHIDL, SCHED
**                  EXITS TO RT:INTENTRY WHERE THE USER'S INTERRUPT
**                  PROCESSING ROUTINE ENVIRONMENT IS MOVED INTO HIS STACK
**                  AND CONTROL IS PASSED TO HIM.
*****
*D*      NAME:      RT:INTENTRY
**
**      REGISTERS:  NOT RELEVANT
**
**      CALL:       DIRECT BRANCH FROM DO-LIST PROCESSING IN SCHED.
**
**      INTERFACE:  ALTERR, TIUTSXTS, TIPULLE.
**
**      ENVIRONMENT: MASTER/MAPPED; CALLED DISABLED.
**
**      INPUT:      R4 = USER #
**                  R5 = DOUBLEWORD ADDRESS OF DO-LIST BLOCK
**                  ASSOCIATED ICB
**                  J:ICBHDR
**
**      OUTPUT:     J:ICBHDR
**
**      DESCRIPTION: ICBDL OF THE HIGHEST PRIORITY ICB IS UPDATED
**                  WITH THE CURRENT CONTENTS OF J:ICBHDR (IN CASE WE
**                  ARE INTERRUPTING AN INTERRUPT PROCESSING ROUTINE).
**                  THE CURRENT ENVIRONMENT IS MOVED INTO THE USER'S ICB
**                  STACK AND THE PSD OF THAT ENVIRONMENT IS UPDATED TO
**                  REFLECT THE ADDRESS OF THE USER'S INTERRUPT PROCESSING
    
```

I N T E R R U P T H A N D L E R

 *

ROUTINE (FROM ICBENTPSDO). THE ADDRESS OF THE
 INTERRUPTING INTERRUPT IS STORED IN THE TOP OF THE
 STACK AND WE EXIT TO THE USER VIA T:PULLE.

2216
 2217
 2218
 2219
 2220
 2221 01 002CF 22600005 A
 2222 01 002D0 25500001 A
 2223 01 002D1 2270FFFF A
 2224 01 002D2 205FFFF8 A
 2225 01 002D3 32800000 X
 2226 01 002D4 2290FFFF A
 2227 01 002D5 478A0008 A
 2228 01 002D6 47600000 X
 2229 01 002D7 32100000 X
 2230 01 002D8 68300000 X
 2231 01 002D9 6A400000 X
 2232 01 002DA 68000000 X
 2233 01 002DB 32500000 X
 2234 01 002DC 25500001 A
 2235 01 002DD 205FFFF8 A
 2236 01 002DE 32AA0009 A
 2237 01 002DF 32600000 X
 2238 01 002E0 21600001 A
 2239 01 002E1 684002E3
 2240 01 002E2 20600001 A
 2241 01 002E3 B5AC0000 X
 2242 01 002E4 68BA0006 A
 2243 01 002E5 32200000 X
 2244 01 002E6 32340000 A
 2245 01 002E7 35B60000 A
 2246 01 002E8 203FFFFE A
 2247 01 002E9 32200000 X
 2248 01 002EA B5340000 X
 2249 01 002EB 68000000 X

LW,R6	R5	R5=DA(ICBDL)
SLS,R5	1	CONVERT TO WA(ICBDL)
LI,R7	X'FFFF'	MASK
AI,R5	=ICBDL(W)	POINT TO BASE OF ICB
LW,R8	J:ICBHDR	GET HEAD OF CURRENT CHAIN
LI,R9	X'FFFF'	MASK
STS,R8	ICBDL(W),R5	POINT TO REST OF CHAIN
STS,R6	J:ICBHDR	SET NEW HEAD (DA(ICBDL))
LW,R1	J:TCB	GET USER'S TCB POINTER
BEZ	ALTERR	NONE
BAL,R4	T:UTSXTS	MOVE ENVIRONMENT TO STACK
B	ALTERR	SOME KIND OF PROBLEM
LW,R5	J:ICBHDR	PICK UP DA(ICBDL) OF 1ST ICB
SLS,R5	1	CONVERT TO WA(ICBDL)
AI,R5	=ICBDL(W)	POINT TO TOP OF ICB
LW,R10	ICBENTPSDO(W),R5	GET PSD
LW,R6	TSTACK	
CI,R6	1	CHECK FOR ODD
BAZ	*+2	NO
AI,R6	1	
STW,R10	*24BM18,R6	SET NEW PSD
INT,R11	ICBINT(W),R5	GET INTERRUPT
LW,R2	J:TCB	
LW,R3	0,R2	GET TOP OF TCB STACK
STW,R11	0,R3	REMEMBER ADDRESS OF CURRENT INT
AI,R3	=18	
LW,R2	TSTACK	
STW,R3	*24BM14,R2	SET PSD POINTER
B	T:PULLE	GO TO HIM

MO1 13:49 SEP 08, 1975
2251

I N T E R R U P T H A N D L E R
E N D

96

CONTROL SECTION SUMMARY: 01 002EC PT 0

ABA/00000004	ACD/00000015	ACNDISP/00000009	ACNMAX/0000000C
ACS/00000005	AGV/00000000	ALL ⁰ CAT:UN/00000002	ANSPR ⁰ C/00000000
ARS/00000004	ASN/00000000	AT:NVAT/00000005	ATEYLBIT/00008000
ATPRIVBIT/00004000	BAATNGC/00000007	BAAVRNBU/00000005	BACIS/0000002C
BACBS/0000002C	BACSc/00000038	BACVI/00000024	BACV ⁰ /00000024
BADEVTP/00000006	BADSC/0000004C	BADSI/00000007	BAFCN/0000001C
BAFILDISP/0000002C	BAFUNM/00000002	BAHSC/00000050	BAIMT/00000038
BAKEYM/00000030	BALVA/00000029	BANLR/00000015	BANRA/00000008
BA ⁰ RG/00000017	BA ⁰ Vc/0000002D	BARAX/00000015	BARND ⁰ EV/00000016
BASCR/00000044	BASLIDES/00000003	BASPARE/0000004F	BASyA/0000004D
BAT/000000100	BAVDcTX/00000028	BAVNB/0000002C	BAVSND/00000024
BBUD/00000010	BCDA/0000000F	BFL/00000010	BITS/00000000
BLINK/00000000	BLK/00000006	BTD/00000000	BUF/00000002
BUFF1/00009400	BUFF2/00009600	BUFSIZ/00000800	BUFX/00000009
BUF1/FUNc	BUF1MSK/0000001F	BUF2/FUNc	BUF2MSK/000003E0
CB ⁰ D/00000012	CCBD/00000004	CDA/00000008	CDAM/00000002
CFU/00000001	CFUPRIVBIT/00010000	CHKG1/01 00085	CHKG2/01 00088
CHK1/01 00018	CIS/0000000B	CLK/0000000C	CMD/00000014
CNVL/01 0003C	CNV ⁰ K/01 00041	CBS/0000000B	CSC/0000000E
CVA/00000014	CVI/00000009	CV ⁰ /00000009	CYL/00000000
c15HIGH/00000027	c15L ⁰ W/0000001B	c15TV/01 000B9	c19cS/FFFFFFF8
D/00000001	DCBCDAM/00000015	DCBCYLBIT/00020000	DCBN ⁰ SEPBIT/00000200
DCBPRIVBIT/00000800	DCBPR ⁰ C/00000000	DCBS/00002000	DCBSWXVBIT/00008000
DELA/00000400	DEV/00000001	DIC/00000040	DIR/00000000
DISCBPR ⁰ C/00000000	D ⁰ WN ⁰ /00000020	DPADFDA/00010002	DPDFDA/00010004
DSC/00000013	DSI/00000001	EGV/00000000	EBP/00000000
ERA/00000003	EXH ⁰ /01 00222	EXIT/01 001D5	EXSC/01 001F5
EXT/00000000	EX1A/01 001FD	EX1B/01 001EA	EX11/01 001c0
EX12/01 001BB	EX14/01 001C8	EX15/01 001D7	EX16/01 001E4
EX17/01 001E1	EX18/01 001F7	EX19/01 001DC	EX21/01 00203
EX22/01 0020B	EX23/01 00209	EX24/01 0020C	EX25/01 00214
FCD/00000000	FCN/00000007	FC ⁰ N/00000000	FDA/00000001
FILDISP/0000000B	FIL1/00000005	FLD/00000015	FLG;INH/00000002 S
FLGIINHR/00000002 S	FLG;LIC/0000000C S	FLG;LICR/0000000C S	FLINK/00000001
FLP/00000006	FNEMAX/00000020	FPARAM/0000000B	FPTDCB/00008000
FPT ⁰ EA/0000001F S	FPTF1/00000001	FRM/00000000	FSP/00000007

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FUN/00000001
 HAACD/0000002A
 HAPBD/00000029
 H0LD0N/01 0017E
 ICBBLNK/LIST
 ICBDLFLG/LIST
 ICBGJPRI/LIST
 ICBLNK/LIST
 ICBPSD2/LIST
 ICBTYP1/00000000
 ICBXPSD/LIST
 INHRET/01 0000E
 INTC0NEXU2/01 00061
 INTC0N4/01 00076
 INTRTNB/01 0013F
 INTRTN2/01 00168
 INTSTAT3/01 0010F
 I0S1/01 00239
 KEYM/0000000C
 LDA/00000007
 L0BP/01 00030
 LSLIDES/0000004D
 MIDIS/0000000C
 MPBITS/00000000
 NLR/00000005
 NVA/00000008
 NXTF/00000005
 PAT/00000011
 PRIV/00000000
 QFI1/01 000E6
 RLIM/00000015
 RSZ/00000003
 RTERR:BADCAL/000000AE
 RTERR:I0EX1/01 00005
 RTERR:PARAM/01 00004
 RTINTC0N/01 000C6
 RTI0EX1/01 001B5

I N T E R R U P T H A N D L E R

FVA/00000014
 HACCB0/00000008
 HASND/00000019
 H0LD2/01 0018E
 ICBCLK/LIST
 ICBENTPSD0/LIST
 ICBGUN/LIST
 ICBPRI/LIST
 ICBSTAT/LIST
 ICBTYP2/00000001
 IMT/0000000E
 INIT/00000000
 INTC0NR/01 0006B
 INTC0N5/01 0007B
 INTRTNERR/01 0016B
 INTSTATX/01 00125
 INTSTAT4/01 00122
 JIC/000000200
 LCT1/01 001A5
 L0CATE/01 00038
 L0BP1/01 00083
 LVA/0000000A
 MIUD/00000010
 MT0INST/01 001A9
 N0SEP/00000000
 NWK/00000005
 0NWK/00000005
 PBD/00000014
 QBUF/00000007
 RAX/00000005
 RNDEV/00000005
 RTCAL0K/01 000B5

 RTINTC0NTR0L/01 00048
 RTI0EX2/01 001FF

GAVAL/00000003
 HACMD/00000028
 HIBRET/01 00230
 HSC/00000014
 ICBDL/LIST
 ICBGJACN/LIST
 ICBICBADR/LIST
 ICBPRI0/LIST
 ICBSEYSEP/LIST
 ICBTYP3/00000002
 INHIBIT/01 000D0
 INTC0NAD/01 00069
 INTC0N2/01 0006E
 INTC0N6/01 00078
 INTRTNX/01 00169
 INTSTAT1/01 00120
 INTSTAT5/01 00124
 KAD/00000012
 LCT2/01 001A7
 L0CICB1/01 0002D
 L0BP2/01 000DE
 MAXACN/00000010
 M0D/00000000
 NAV/00000004
 N0U/00000000
 NXTA/00000010
 0RG/00000005
 PCK/00000000
 QFINA/01 000E2
 RBBAT:UN/00000003
 RNR/00000010
 RTCALIS00DES/01 00000
 RTERR:INTRTN/01 00003
 RTERR:I0EX2/01 00006
 RTERR:QFI/01 00002

 RTQFI/01 000D9

GINT1/01 00273
 HAFLD/0000002B
 HLC/00000013
 HWD0SI/00000003
 ICBDLDATA/LIST
 ICBGJNME/LIST
 ICBINT/LIST
 ICBPSD1/LIST
 ICBTUN/LIST
 ICBUN/LIST
 INH0FF/01 000D7
 INTC0NEXU1/01 00059
 INTC0N3/01 0004A
 INTRTNA/01 00154
 INTRTN1/01 00161
 INTSTAT2/01 00106
 I0INST/01 0021F
 KBUF/0000000A
 LCT3/01 001A1
 L0CNA/01 00034
 LRDL0/0000004E
 MBG/00000000
 M0NPR0C/00000001
 NAVX/00000002
 NRA/00000002
 NXTDCT/01 000A3
 0VC/0000000B
 PPSWP/00000010
 QFI0K/01 000EC
 RDLO/0000004C
 RST0RE/00000014

 RTH0LD/01 0016D
 RTINTSTAT/01 000FB
 RTR/00000001

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I N T E R R U P T H A N D L E R

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RTRETC/01 00022
 RTSETCC3/01 0001D
 R1/00000001
 R13/0000000D
 R3/00000003
 R7/00000007
 SCR/00000011
 SJAC/00001000
 STATA/0000001A S
 STATBLK/00000010
 STATEXU/00000000
 STATNA/00000001
 STATWAIT/00000040
 S69PR8C/00000001
 TIC/000000080
 TRN/00000005
 UINT01/01 00289
 UINT4/01 002C1
 UINT7/01 002BE
 UTSPR8C/00000001
 VSND/00000009
 VT8C:NVAT/00000005
 WFNEMAX/00000008
 X1/00000001 S

RTSETCC0/01 0001F
 RTS1/01 001B3
 R10/0000000A
 R14/0000000E
 R4/00000004
 R8/00000008
 SEQ/00000005
 SND/0000000C
 STATAE/EXT
 STATAE/EXT
 STATAE/EXT
 STATC/0000001F S
 STATINTSHFT/FFFFFFE7
 STATB/0000001D S
 STATYPSHFT/FFFFFFE9
 TAB1/0000000F
 TLB/0000000E
 TTL/00000000
 UINT1/01 00296
 UINT5/01 002AB
 UINT8/01 002C7
 VDCTX/0000000A
 VT8C:BITMAP/00000007
 VT8C:SNVD/00000003
 WRDLO/00000013
 Y2/0000001E S

RTSETCC1/01 00019
 RWS/0000000D
 R11/0000000B
 R15/0000000F
 R5/00000005
 R9/00000009
 SID/00000015
 SGS/00000014
 STATAETR/EXT
 STATE/0000001B S
 STATRIG/0000001C S
 SVA/00000013
 TCFU/0000000F
 TBF/00000000
 TYC/00000002
 UINT2/01 0029E
 UINT6/01 002AF
 ULB/0000000C
 VFC/00000000
 W/00000002
 WXBUSIZ/00000100

RTSETCC2/01 0001B
 R0/00000000
 R12/0000000C
 R2/00000002
 R6/00000006
 SCFU/00000004
 SI8REJECT/00000004 S
 SREC/00000006
 STATAR/0000001A S
 STATER/0000001B S
 STATI8W/00000020
 STATRIGR/0000001C S
 SWXV/00000000
 TDA/00000005
 T8PMASK/00007C00
 UFLAGS/00000001
 UINT3/01 002A4
 UINT65/01 002B5
 USR/00000000
 VNB/0000000B
 VT8C:MAPWL/00000004
 WAT/00000000
 XBUSIZ/00000400

* EXTERNAL DEFINITIONS

INTSTAT/01 00101
 RT:UINT/01 0027E
 RTCNVTXT/01 0003A
 RTICBTYP/01 00044
 RTLCT/01 00196
 RTT8/01 0025A

RTIGINT/01 00266
 RTALTCP/01 000B1
 RTCU/01 00249
 RTINT/01 0023B
 RTL8C:ICB/01 00029
 RTVTP/01 000A9

RT:INTENTRY/01 002CF
 RTCHKGUN/01 00080
 RTDCBCHK/01 00091
 RTINTRTN/01 00127
 RTR8BT/01 00000
 RTWRD/01 00007

RTCHKPRIV/01 00013
 RTDEVCHK/01 000A2
 RTI8STRT/01 00232
 RTSIZE/01 001AB
 UINTQ/01 00287

* PRIMARY REFERENCES

ALTERR
 DCTSIZ
 DCT3
 ICBSIZE
 I8SCU

BLCKDIMASK
 DCT1A
 DRIVEI8
 INTLBSIZ
 I8WAIT:MASK

BT3:IT80
 DCT1P
 EIART
 INTLB1
 JIDCBL

C:CPU
 DCT12
 EIQFI
 INTLB2
 J:ICBHDR

CALBAD
 DCT13
 ENBSR4
 INTLB3
 J:TCB

CHKBIT
 DCT15
 EXUMASK
 INTSIM
 JB:PRIV

CHKBIT1
 DCT19
 ICB
 I8Q8
 JX:ICMAP

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MASKS	MAXG
PBILCT	RCVPSD
RTGJOBCON#	RTICBHDR
RTSTOPID#	S:ACORE
SIRTCORE	S:RTIR
TIOVERLAY	TIPULLE
TITOTSZ	TIUTSXTS
UBIASP	UBIDB
UHIFLG	UHIFLG2
YC	YF

I N T E R R U P T

M0N0RG	MTRTNO
RTIGINTP	RTIUINTP
RTNRRTSEG	RTRESDF#
SIBADFLG	SICUN
SIRTUN	SISL#
TIREG	TIRUE
TRAPEXIT	TSTACK
UB:0V	UB:PRI0
WAIT:MASK	XFO
YFF	YFFFF

H A N D L E R

NB3100	NEWQNW
RTCLACK#	RYCONNECT#
RTRET1	RTRET2
SICUP	S:GJOBACN
SBIGJOBUN	SL:RSVP
TISAVE	TISSE
UB:ACP	UB:AP0
UB:PRI0B	UB:US
XF1FFFFFF	X1FFFE
Y06	248M14

100

NINTS
RTDISCON
RTSTARTI
S:GJOBTB
T:GJOB
TISSEM
UB:APR
UH:DL
X3FFFE00
248M18

- * NO SECONDARY REFERENCES
- * NO UNDEFINED SYMBOLS
- * ERROR SEVERITY LEVEL: 0
- * NO ERROR LINES

