HP 3000 Computer Systems

SERIES 37/MICRO FAMILY

CE HANDBOOK

HEWLETT PACKARD

8010 FOOTHILLS BLVD., ROSEVILLE, CA 95678

FEDERAL COMMUNICATION COMMISSION RADIO
FREQUENCY INTERFERENCE STATEMENT

The United States Federal Communications Commission (in Subpart J, of Part 15, Docket 20780) has specified that the following notice be brought to the attention of the users in this product:

"Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested for compliance with the limits for Class A computing devices pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference."

LIST OF EFFECTIVE PAGES

The List of Effective Pages gives the date of the most recent version of each page in the manual. To verify that your manual contains the most current information, check the dates printed at the bottom of each page with those listed below. The date on the bottom of each page reflects the edition or subsequent update in which that page was printed.

PRINTING HISTORY

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by the customer. The dates on the title page change only when a new edition or a new update is published. No information is incorporated into a reprinting unless it appears as a prior update; the edition does not change when an update is incorporated.

PREFACE

This manual contains data for the low-end HP 3000 HP-IB version computer systems (Series 37, MICRO 3000XE, MICRO 3000 and MICRO 3000LX/GX). The manual is divided into eleven sections, covering both system-specific and system-common information. This manual contains the following sections:

PRODUCT INFORMATION
Processor, memory, I/O specifications.

ENVIRONMENTAL/INSTALLATION/PM
Environmental and electrical specifications and preventive maintenance requirements.

CONFIGURATION
Hardware and software requirements for standard system operation.

TROUBLESHOOTING
System troubleshooting philosophy, troubleshooting tools.

DIAGNOSTICS
Simple operating instructions for the system diagnostics.

ADJUSTMENTS
Description of field adjustments.

PERIPHERALS
System-related peripheral information. Refer to the appropriate peripheral handbook to service peripherals.

REPLACEABLE PARTS
Diagrams/lists of replaceable parts/part numbers.

DIAGRAMS
Illustrations of PCAs containing field-replaceable parts, indicators, and/or test points; power supplies.

REFERENCE
ASCII code table, RS-232-C signal descriptions, modem and cable pin connections.

SERVICE NOTES
Space for service notes.

The appropriate installation manual is shipped with each system. In addition, refer to the three-volume Diagnostic Manual Set (P/N 30070-60068).

v

This page was left blank intentionally.

CONTENTS

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (continued)

CONTENTS (continued)

Section 9
DIAGRAMS

Section 10
REFERENCE

Section 11
SERVICE NOTES

TABLES

ILLUSTRATIONS

PRODUCT INFORMATION	SECTION
	1

This section provides an overview of the HP 3000 Series 37 and MICRO 3000 Family computer systems specifications and descriptions of system control panels.

SERIES 37/MICRO 3000XE

The following is a list of general specifications for the HP 3000 Series 37/MICRO 3000XE computers.

Processor

The Series 37 CPU is a printed circuit assembly (PCA) consisting of microprogrammed architecture implemented with a CMOS gate-array processor chip, control store, and a battery-backed Time of Century (TOC) clock. The MICRO 3000XE CPU uses an NMOSIII VLSI processor chip.

Word Length	16 bits
Microinstruction Execution Time	170 nsec (fast WCS-Series 37) * 340 nsec (slow WCS-Series 37) * 114 nsec (MICRO 3000XE)
Physical Address Space	16 Mbyte (maximum)
Maximum Code Segment Size/ Maximum Data Segment Size/ Maximum Number CST/DST Entries and Maximum Number of User Code Segments Per Program	MPE-dependent
Decimal Arithmetic	28 digits resolution
Real-Time Clock Resolution	1 ms

* The Series 37 contains both slow and fast WCS.

Memory

Semiconductor memory with single-bit error correction and double-bit error detection.

Word Length	39 bits (32 bits for data and 7 bits for error detection/correction)
Error Detection	2 bits or more per 39-bit word
Error Correction	1 bit per 39-bit word
Memory Size (integrated controller and array)	S37: 512 Kbytes (64K RAM chips), or 1 Mbyte (256K RAM chips), or 2 Mbytes (256K RAM chips) MICRO 3000XE: 2, 4 Mbytes
Maximum Memory per System	4 Mbytes (2x2 Mb - Series 37) 8 Mbytes (2x4 Mb - MICRO 3000XE)
Minimum Battery Backup Time	15 minutes

Input/Output Structure

Common synchronous bus structure with individual data channels.

Channel Types:

Peripheral I/O Channels (for HP-IB compatible devices)	3 maximum (2 high-speed)
Maximum Number of Devices	6 per channel
Maximum Transfer Rate	1 Mbyte/second
Maximum Total Cable Length	7 meters plus 1 meter/device load to maximum of 15 meters
INP (3000XE)	1 in 5-slot configuration 3 with extender
LANIC (3000XE)	1
Asynchronous Terminal Processor (for RS-232-C compatible devices)	4 maximum (Series 37) 7 maximum; 2 in SPU, 5 in Extender (MICRO 3000XE)
ATP/37 (TIC)	7 ports (6 3-pin RS-232-C direct connect and 1 25-pin RS-232-C modem ports)
ATP/M - 3 types	8 ports (7 3-pin RS-232-C direct connect and 1 25-pin RS-232-C modem port)
	8 ports (4 25-pin RS-232-C direct connect and 4 25-pin RS-232-C modem ports)
	8 ports (7 5-pin RS-422-C direct connect and 1 25-pin RS-232-C modem port)
Data Rates	300, 600, 1200, 2400, 4800, 9600, and 19200 Baud
Maximum RS-232-C Cable Length per Port	15 m (49.22 ft)

> **NOTE**

All maximums cannot exist concurrently due to slot limitations. For example (on a system with an I/O Extender), 7 ATP/Ms will use all option slots, allowing only a single PIC, a single memory board, and no LANIC or INP.

System Front Panel/Indicators

The SPU front panel, shown in figure 1-1, is a module that contains necessary circuits to perform the control and monitoring of the HP 3000 Series 37/MICRO 3000XE systems.
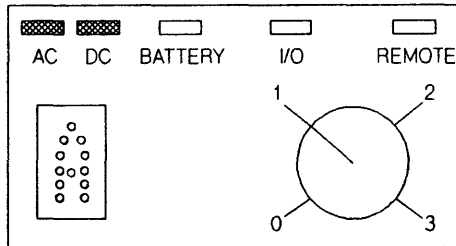
Figure 1-1. SPU Keyswitch and Indicators (Series 37/MICRO 3000XE)

SPU/Extender Indicators:

AC indicator - lights if AC power is applied. Power is applied to the battery charger.

DC indicator - lights if DC power is present. Lights when AC power is present and the keyswitch is in positions 1, 2, or 3.

Battery indicator - lights if the SPU is operating on battery back-up power. This condition can only occur if the front panel keyswitch is in positions 1, 2, or 3 and AC power is lost.

SPU Indicators:

I/O indicator - lights when the Channel Program Service Request (CSRQ) signal is asserted. It does not light if ATP/M (TIC) or memory operations are being executed. During normal operation, it will appear to be lit continuously because channel programs are executed frequently. It can light when the keyswitch is in positions 1, 2, or 3.

Remote indicator - lights if the keyswitch is in position 3 and the modem status lines Data Set Ready (DSR) and Clear to Send (CTS) are asserted. This indicates a terminal connected to port 7 via a modem to control the system.

LED indicator - displays MPE status codes (described in Section 4 of this manual).

Extender Indicators:

The I/O Extender does not have an I/O indicator, a remote indicator, or an LED display.

SERIES 37/MICRO 3000XE/MICRO 3000 KEYSWITCH FUNCTIONS

Table 1-1 describes the keyswitch functions.

Table 1-1. Series 37/MICRO 3000XE/MICRO 3000 Keyswitch Functions

KEYSWITCH POSITION	MODE	ASSOCIATED ACTION
0	DC Off	DC power is off. Battery DC is off.
1	Normal	The system console is on port 0, channel 1. Control B is not recognized in this position.
2	Local	The system console on port 0, channel 1 is active and can execute the Control B sequence. If a remote console was active, data will continue to echo to both the local and the remote consoles.
3 (See note below)	Remote	The terminal on remote port (port 7), channel 1 is the active console and can execute the Control B sequence. The local console on port 0 monitors and displays remote console data transfers. Note that this position is the same as LOCAL if there is no remote console connected. Remote mode is only entered if Clear to Send and Data Set Ready are asserted on the remote port.

```
NOTE
```

If there is a remote terminal on the system and the SPU keyswitch is in position 3, remote terminal keyboard control will revert to the console when the keyswitch is moved to position 2.

MICRO 3000

The following is a list of general specifications for the MICRO 3000 Computer System.

Processor

The processor printed circuit assembly (PCA) contains the CPU, memory, and an HP-IB interface (PIC). The MICRO 3000 processor chip (MPC) is an NMOS III VLSI implementation of the main blocks of the Series 37 CPU PCA. External support circuitry for clock generation, TOC, and the basic CPU functions are also on the processor PCA.

Word Length	16 bits
CPU Cycle Time	113.3 nsec
Physical Address Space	16 Mbyte (maximum)
Maximum Code Segment Size/ Maximum Data Segment Size/ Maximum Number CST/DST Entries and Maximum Number of User Code Segments Per Program	MPE-dependent
Decimal Arithmetic	28 digits resolution
Real-Time Clock Resolution	1 ms

Memory

Semiconductor memory with parity checking (on the CPU board.)

Word Length	17 bits (16 bits for data and one bit for parity checking).
Parity Checking	Single bit error detection on 16 bit word.
Memory Size (integrated controller and array)	2 or 4 Mbytes (on processor PCA using 1 Mbit DRAMs).
Maximum Memory per System	4 Mbytes
Minimum Battery Backup Time	15 minutes

Input/Output Structure

Common synchronous bus structure with individual data channels.

Channel Types:

Peripheral I/O Channels (located on the CPU board) (for HP-IB compatible devices)	1 maximum
Maximum Number of Devices	6 per channel
Maximum Transfer Rate	1 Mbyte/second
Maximum Total Cable Length	7 meters plus 1 meter/device load to maximum of 15 meters
INP	1
LANIC	1
Asynchronous Terminal Processor (for RS-232-C/ RS-422 compatible devices)	2 maximum (16 ports)
ATP/M	4 modem, 4 direct connect (junction panel dependent)
	8 25-pin RS-232-C ports (junction panel dependent)
Data Rates	300, 600, 1200, 2400, 4800, 9600, and 19200 Baud
Maximum RS-232-C Cable Length per Port	15 m (49.22 ft)

System Front Panel/Indicators

The system front panel shown in figure 1-2 displays the status of the MICRO 3000 system during selftest and normal operation.
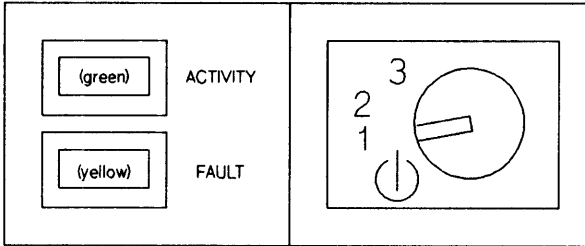
Figure 1-2. System Front Panel (MICRO 3000)

ACTIVITY LED (green) - indicates the state of the CPU after selftest successfully completes execution.

FAULT LED (yellow) - indicates the error results of the selftest which executes immediately upon power-on. See Table 5-6 for MICRO 3000 power-on LED selftest error codes.

After selftest completes, the FAULT LED turns off. The ACTIVITY LED remains on or flashes rapidly depending on the state of the CPU.

See Table 1-1 for a list of keyswitch functions.

MICRO 3000LX/GX

The following is a list of general specifications for the MICRO 3000LX/GX Computer Systems.

Processor

The processor printed circuit assembly (PCA) contains the CPU, memory, and an HP-IB interface (PIC). The MICRO 3000 processor chip (MPC) is an NMOS III VLSI implementation of the main blocks of the Series 37 CPU PCA. External support circuitry for clock generation, TOC, and the basic CPU functions are also on the processor PCA.

Word Length	16 bits
CPU Cycle Time	113.3 nsec
Physical Address Space	16 Mbyte (maximum)
Maximum Code Segment Size/ Maximum Data Segment Size/ Maximum Number CST/DST Entries and Maximum Number of User Code Segments Per Program	MPE-dependent
Decimal Arithmetic	28 digits resolution
Real-Time Clock Resolution	1 ms

Memory

Semiconductor memory with parity checking (on the CPU board.)

Word Length	17 bits (16 bits for data and one bit for parity checking).
Parity Checking	Single bit error detection on 16 bit word.
Memory Size (integrated controller and array)	2 or 4 Mbytes (on processor PCA using 1 Mbit DRAMs).
Maximum Memory per System	4 Mbytes
Minimum Battery Backup Time	15 minutes

Input/Output Structure

Common synchronous bus structure with individual data channels.

Channel Types:

Peripheral I/O Channels (located on the CPU board) (for HP-IB compatible devices)	1 maximum
Maximum Number of Devices	6 per channel
Maximum Transfer Rate	1 Mbyte/second
Maximum Total Cable Length	7 meters plus 1 meter/device load to maximum of 15 meters
Asynchronous Terminal Processor (for RS-232-C/ RS-422 compatible devices)	2 maximum (16 ports)
ATP/M	5 25-pin RS-232-C ports (5 direct connect or 4 modem and 1 direct connect)
	8 25-pin RS-232-C ports (8 direct connect or 4 modem and 4 direct connect)
	16 25-pin RS-232-C ports (16 direct connect or 8 modem and 8 direct connect)
Data Rates	300, 600, 1200, 2400, 4800, 9600, and 19200 Baud
Maximum RS-232-C Cable Length per Port	15 m (49.22 ft)

Keyswitch Positions and Functions

The keyswitch positions and their functions are described below. See figure 1-3.
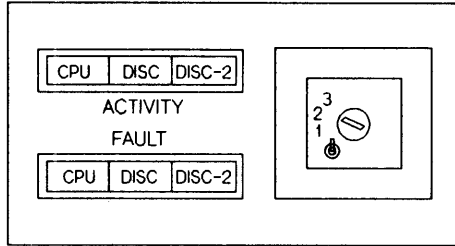
Figure 1-3. System Keyswitch and Indicator Lights

O--STANDBY MODE

In this position AC power is still supplied to the computer, but the processor, embedded discs, and embedded cartridge tape drive are not running. DC power is off and battery power is off.

1--NORMAL MODE

Selecting "1" turns the computer on and initially lights both the green "ACTIVITY" and yellow "FAULT" indicators on the system front panel.

These lights indicate that the computer self-test is executing. Two megabytes of memory will take about 30 seconds. Four megabytes of memory will take one minute.

If the self-test is successful, the green indicator stays on (until MPE comes up), the yellow indicator goes out.

2--LOCAL SERVICE MODE

Selecting this position allows the execution of individual self-test diagnostics when directed by qualified service personnel.

3--REMOTE SERVICE MODE

This position allows HP service personnel to run diagnostic tests on your HP MICRO 3000LX/GX via a modem (allows all console commands to be executed remotely).

CPU Activity and Fault Indicators

FAULT--the CPU FAULT light will be out during normal operation.

ACTIVITY--the CPU ACTIVITY light will be on or flash quickly when the computer is busy.

IDLE--the CPU ACTIVITY light will flash at a rate of one flash per second when the computer is idle (paused, waiting for instructions).

Disc Activity and Fault Indicators

The DISC-2 FAULT and ACTIVITY lights will operate only if a second disc is installed in the HP MICRO 3000GX.

FAULT--the DISC and DISC-2 FAULT lights will be out during normal operation.

ACTIVITY--the DISC and DISC-2 ACTIVITY lights will be on or will flash rapidly when the computer is busy.

Cartridge Tape Drives

The HP MICRO 3000LX/GX can have one of two cartridge tape drives installed in the cabinet. The HP 9144S is a 16-track cartridge tape drive. The HP 9145S is a 32-track cartridge tape drive.

HP 9144S Cartridge Tape Drive Front Panel

The HP 9144S cartridge tape drive front panel has an UNLOAD button, an EJECT button, a Busy lamp, a Protect lamp, and a Fault lamp. See figure 1-4.

The Busy lamp is lit when the tape drive is active.

The Protect lamp is lit when a write-protected cartridge has been inserted or after a write operation to a marginal tape has been attempted.

The Fault lamp is lit when the drive or cartridge has failed.

16 TRACK

Cartridge   Unload   Eject   Busy   Fault   Protect
Slot   Button   Button Lamp   Lamp   Lamp
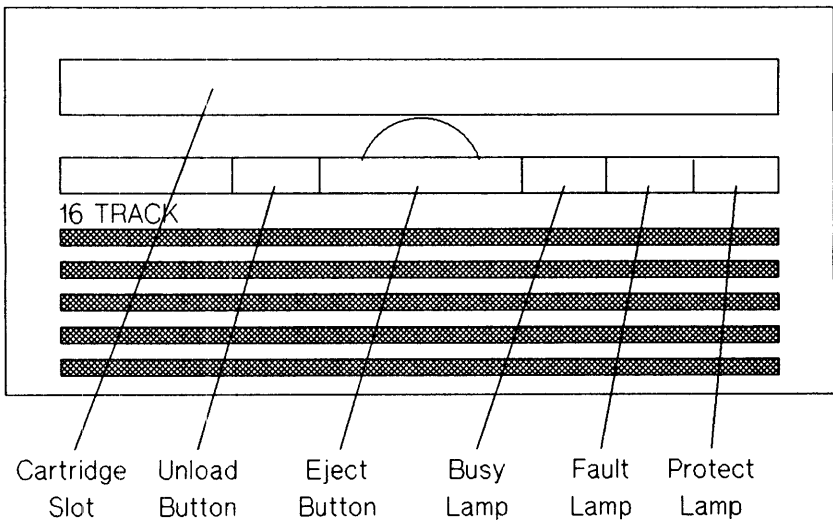
Figure 1-4. HP 9144S Cartridge Tape Drive

HP 9145S Cartridge Tape Drive Front Panel

The HP 9145S cartridge tape drive front panel has an UNLOAD button, an EJECT button, a Busy lamp, a Protect lamp, a Fault lamp, a Clean lamp, and a Loaded lamp. See figure 1-5.

The Busy lamp is lit when the tape drive is active.

The Protect lamp is lit when a write-protected cartridge has been inserted or after a write operation to a marginal tape has been attempted.

The Fault lamp is lit when the drive or cartridge has failed.

The Clean lamp is lit when the tape head needs cleaning.

The Loaded lamp is lit when a tape cartridge is loading, unloading, or loaded.
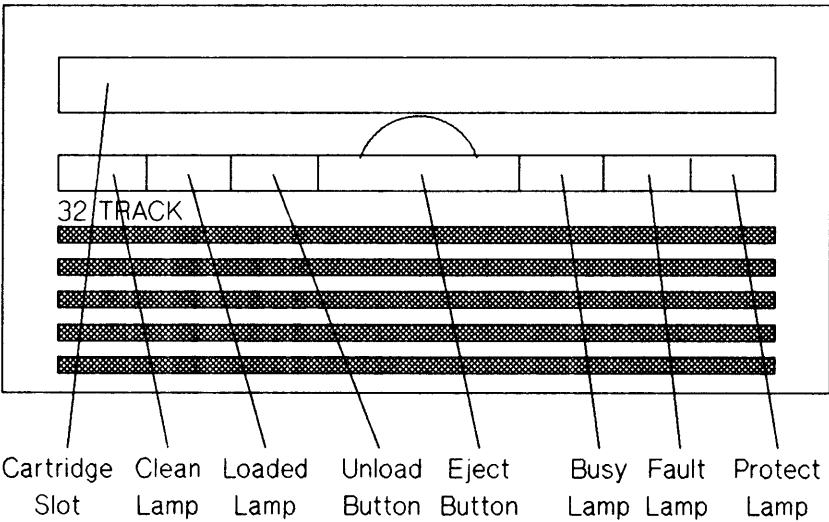
Figure 1-5. HP 9145S Cartridge Tape Drive

ENVIRONMENTAL/INSTALLATION/PM

This section describes environmental, installation and preventive maintenance requirements for the HP 3000 Series 37 and MICRO 3000 Family computer systems.

SERIES 37/MICRO 3000XE SPECIFICATIONS

The following is a listing of environmental specifications for the HP 3000 Series 37/MICRO 3000XE SPU and I/O Extender. Refer to the appropriate peripheral data sheets to get the information necessary to calculate the environmental specifications for the entire computer system.

Environmental Data

The environmental data includes physical requirements, electrical requirements, and DC supply voltages and currents.

SPU/EXTENDER PHYSICAL REQUIREMENTS

Dimensions:

	SPU/Extender	Cabinet
Height	156 mm (6.14 in.) ea.	720 mm (33 in.)
Depth	400 mm (15.75 in.) ea.	711 mm (32.5 in.)
Width	325 mm (12.8 in.) ea.	375 mm (15 in.)
Weight (uncrated)	16 kg (35 lbs) ea.	33 kg (73 lbs)
Weight (shipping)	18 kg (40 lbs) - SPU 16 kg (35 lbs) - ext	43 kg (95 lbs) - U.S. 52 kg (114 lbs) -int

Environment:

Temperature

Operating	0 - 55 deg C (32 - 131 deg F) (Series 37) 10 - 40 deg C (50 - 104 deg F) (MICRO 3000XE)
Non-Operating (shipping/storage)	-40 to 75 deg C (-40 to 167 deg F)

Humidity:

Operating (non-condensing)	20 % RH to 90 % RH (Series 37) 20 % RH to 80 % RH (MICRO 3000XE)
Non-Operating (shipping/storage)	0 % RH to 100 % RH (Series 37) 10 % RH to 90 % RH (MICRO 3000XE)

Altitude:

Operating	4545 m (15,000 ft)
Non-Operating	15,151 m (50,000 ft)

ELECTRICAL REQUIREMENTS

System Power:

Frequency

45 to 66 Hz (Series 37)
48 to 66 Hz (MICRO 3000XE)

Voltages
  nominal
  maximum

100-120 VAC or 200-240 VAC
90-132 VAC or 180-264 VAC

Current (at full load)

4 A 100 VAC with extender (Series 37)
3 A at 100 VAC/6 A with extender (3000XE)
2 A at 200 VAC/4 A with extender (3000XE)

Power Line Disturbance

	TYPICAL	WORST CASE
Volts	1000 V (peak)	1000 V (peak)
Width	10 usec	100 usec
Rise	1. 5 usec	100 nsec
Fall	1. 5 usec	100 nsec

Circuit Breaker Rating

15 A (for devices in system cabinet)

Power Connection

Power strip provided for peripherals inside system cabinet.

Heat Dissipation

1639 BTUs/hour (Series 37)
3278 BTUs/hour (MICRO 3000XE)

DC Supply Voltages/Currents

+5 volts	20 A
+5 B*	3 A
+5 SB (standby battery power)	3 A
+12 Volts	2 A
-12 Volts	1. 25 A

Hold-up

One cycle of input AC can be dropped without causing a Power Fail condition.

*When AC is applied, +5B current is provided by the power supply.

PCA POWER CONSUMPTION

Current Drain (Amperes)

Supply	+5V	+5V B	+5V SB	+12V	-12V
PIC	3.57	-----	-----	0.01	----
TIC/ATP/M	3.70	-----	-----	0.06	0.06
0.5MB MEM	2.80	1.32	0.75	-----	-----
1.0MB MEM	2.80	.90	.46	-----	-----
2.0MB MEM	2.80	1.32	0.83	-----	-----
4.0MB MEM	1.80	1.30	0.50	-----	-----
CPU	4.10	0.61	0.85	0.03	-----
INP	2.20	0.55	0.26	0.11	0.20
LAN					
StarLAN	5.5	-----	-----	-----	-----
ThinLAN	5.5	-----	-----	0.5	-----

The limits on any mix of five assemblies in one card cage should not exceed the following:

Supply	+5V	+5V B	+5V SB	+12V	-12V
Current	20.0	3.0	3.0	2.0	1.25

Installation

(Refer to the HP 3000 Series 37XE Installation Manual, P/N 30457-90009 or to the HP 3000 MICRO 3000XE Installation Manual, P/N 30474-90001.) The appropriate installation manual is shipped with each system.

Preventive Maintenance

There is no preventive maintenance (PM) on the Series 37/MICRO 3000XE SPU or extender. Refer to the appropriate peripheral manuals to develop a PM schedule for your customer's system. The low-end system support log shipped with each system provides space to record PM.

MICRO 3000 SPECIFICATIONS

Environmental Data

The environmental data includes physical requirements, electrical requirements, and DC supply voltages and currents.

PHYSICAL REQUIREMENTS

Dimensions:

	SPU	**Cabinet**	**ISS**
Height	179 mm (7.1 in.)	720 mm (28.3 in.)	720 mm (28.3 in.)
Depth	419 mm (16.5 in.)	711 mm (27.9 in.)	711 mm (27.9 in.)
Width	325 mm (12.8 in.)	375 mm (15 in.)	375 mm (15 in.)
Weight (uncrated)	13.6 kg (30 lbs)	33 kg (73 lbs)	83 kg (183 lbs)
Weight (shipping)	18.2 kg (40 lbs)	43 kg (95 lbs) U.S.	109 kg (240 lbs)

Environment:

Temperature

Operating	10 to 40 deg C (50 to 104 deg F)
Non-Operating (shipping/storage)	-40 to 75 deg C (-40 to 167 deg F)

Humidity:

Operating (non-condensing)	20% RH to 80% RH
Non-Operating (shipping/storage)	10% RH to 90 % RH

Altitude:

Operating	4545 m (15,000 ft)
Non-Operating	15,151 m (50,000 ft)

ELECTRICAL REQUIREMENTS

System Power:

Frequency	48 to 66 Hz
Voltages	
nominal	100-120 VAC or 200-240 VAC
maximum	90-132 VAC or 180-264 VAC
Current (at full load)	4 A maximum at 100 VAC

Power Line Disturbance

	TYPICAL	WORST CASE
Volts	1000 V (peak)	1000 V (peak)
Width	10 usec	100 usec
Rise	1.5 usec	100 nsec
Fall	1.5 usec	100 nsec

Circuit Breaker Rating	15 A (for devices in system cabinet)
Power Connection	Power strip provided for peripherals inside system cabinet.
Heat Dissipation	1639 BTUs/hour

DC Supply Voltages/Currents

+5 volts	20 A
+5 B*	3 A
+5 SB (standby battery power)	3 A
+12 Volts	2 A
-12 Volts	1.25 A

Hold-up	One cycle of input AC can be dropped without causing a Power Fail condition.

*When AC is applied, +5B current is provided by the power supply.

PCA POWER CONSUMPTION

Current Drain (Amperes)

Supply	+5V	+5V B	+5V SB	+12V	-12V
ATP/M	3.70	-----	-----	0.06	0.06
CPU 2.0 MB MEM	4.189	1.476	1.056	-----	-----
CPU 4.0 MB MEM	4.619	2.596	1.786	-----	-----
INP	2.20	0.55	0.26	0.11	0.20
LAN					
STARLAN	5.5	-----	-----	-----	-----
THINLAN	5.5	-----	-----	0.5	-----

The limits on any mix of five assemblies in one card cage should not exceed the following:

Supply	+5V	+5V B	+5V SB	+12V	-12V
Current	20.0	3.0	3.0	2.0	1.25

Installation

(Refer to the HP MICRO 3000 Installation Manual (P/N 30534-90003).

Preventive Maintenance

There is no preventive maintenance on the HP MICRO 3000 SPU. Refer to the appropriate peripheral manuals to develop a preventive maintenance schedule for your customer's system.

MICRO 3000LX/GX SPECIFICATIONS

The system specifications for the HP MICRO 3000GX are listed below.

PHYSICAL SPECIFICATIONS

Width (top)	212 millimeters/8. 4 inches
Width (base)	360 millimeters/14. 2 inches
Height	609 millimeters/24 inches
Length	539 millimeters/21. 2 inches
Weight	36 kilograms/80 pounds (estimated)

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	5 to 40 degrees C (41 to 104 degrees F)
Storage Temperature *	-40 to 65 degrees C (-40 to 149 degrees F)
Maximum Rate of Temperature Change	20 degrees C (36 degrees F per hour)
Operating Humidity	20 to 80 % with maximum wet-bulb (non-condensing) not to exceed 26 degrees C (79 degrees F)
Non-operating Humidity	2 to 98 % (non-condensing)
Operating Altitude	0 to 4572 m (0 to 15,000 ft)
Nonoperating Altitude	-305 to 15,240 m (-1000 to 50,000 ft)
Heat Dissipation	1450 BTU/hr (estimated)

* - assumes no cartridge tape is in the cartridge tape drive

ELECTROMAGNETIC SUSCEPTIBILITY SPECIFICATIONS

Radiated	</= 1 V/meter from 14 kHz to 1 GHz
Conducted	3 V RMS 30 Hz to 50 Hz 1 V RMS 50 Hz to 400 Hz
Magnetic	1 gauss 47. 5 Hz to 198 Hz
Electrostatic Discharge	15 kV - no effect 25 kV - no hardware failure

POWER SPECIFICATIONS

Voltage – nominal	100 to 120 VAC or 200 to 240 VAC
Voltage range	90 to 132 VAC or 198 to 264 VAC
Current	4. 5 amperes maximum 100 - 120 VAC 2. 5 amperes maximum 200 - 240 VAC
Power	425 watts at maximum output load capability (line nominal range)
Frequency	47 to 63 Hz
Neutral-to-Ground Voltage	1 volt maximum
Holdup	With full load on the power supply, minimum line frequency, and minimum line voltage, one entire cycle of input AC can be omitted without causing a Power Fail condition. (20 msec at 50 Hz, 16 msec at 60 Hz)
Power Line Disturbance	(normal and common mode) the system should perform with no change in output in the presence of the following:

Voltage	Rise	Fall	Width
1000V (peak)	1.5 usec	1.5 usec	10 usec
1000V (peak)	100 nsec	100 nsec	100 usec

Battery Backup	No less than 15 minutes

PCA POWER CONSUMPTION

Current Drain (Amperes)

Supply	+5V	+5V B	+5V SB	+12V	-12V
ATP/M	3.70	-----	-----	0.06	0.06
CPU 2.0 MB MEM	4.189	1.476	1.056	-----	-----
CPU 4.0 MB MEM	4.619	2.596	1.786	-----	-----
INP	2.20	0.55	0.26	0.11	0.20
LAN					
STARLAN	5.5	-----	-----	-----	-----
THINLAN	5.5	-----	-----	0.5	-----

The limits on any mix of five assemblies in one card cage should not exceed the following:

Supply	+5V	+5V B	+5V SB	+12V	-12V
Current	20.0	3.0	3.0	2.0	1.25

Installation

Refer to the HP MICRO 3000LX Installation Manual (P/N 32520-90001) or the HP MICRO 3000GX Installation Manual (P/N 32536-90001).

Preventive Maintenance

There is no preventive maintenance on the HP MICRO 3000LX or HP MICRO 3000GX SPU. Refer to the appropriate peripheral manuals to develop a preventive maintenance schedule for your customer's system.

The configuration data in this section provides hardware and I/O software data required to operate a standard configuration HP 3000 Series 37 and MICRO 3000 Family computer systems. The hardware data contains card cage assignments, cable routing and connections, and channel and device assignments. I/O software data consists of a list of I/O drivers required to support an I/O device. Refer to HP 3000 System Configuration Guide, part number 5953-7573 for additional information on system configuration.

SERIES 37/MICRO 3000XE SYSTEM CONFIGURATION

The Series 37/XE and the MICRO 3000XE system configuration information is the same except for memory configuration.

Hardware Configuration

There are two versions of the Series 37. The Series 37 is the single SPU, while the Series 37XE adds the I/O extender. The MICRO 3000XE can be either the SPU (Series 37 upgrades only) or SPU/extender system.

Figure 3-1 illustrates the minimum configuration, while Figure 3-2 illustrates the SPU and extender.

Slot #

	Channel #	
5	CPU	5
4	PIC	4
3	Optional (Mem, ATP/M, PIC, INP, LANIC)	3 SPU
2	Memory	2
1	Terminal Controller	1
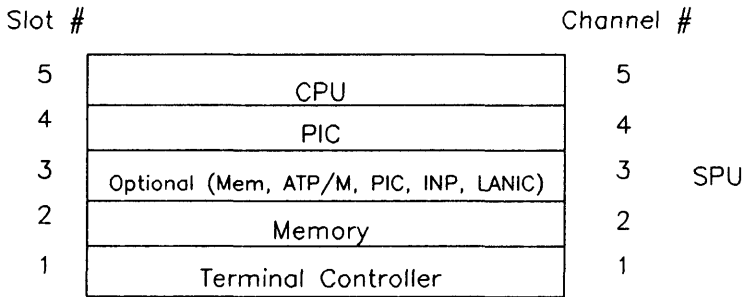
Figure 3-1. Series 37/MICRO 3000XE Hardware Configuration

Slot #   Channel #

5	CPU	5	
4	PIC*	4	
3	Optional Memory** or I/O	3	SPU
2	Memory**	2	
1	Terminal Controller	1	

E5	*PIC from main slot 4	13	
E4		12	
E3		11	I/O Extender
E2		10	
E1	LANIC/StarLAN	9	
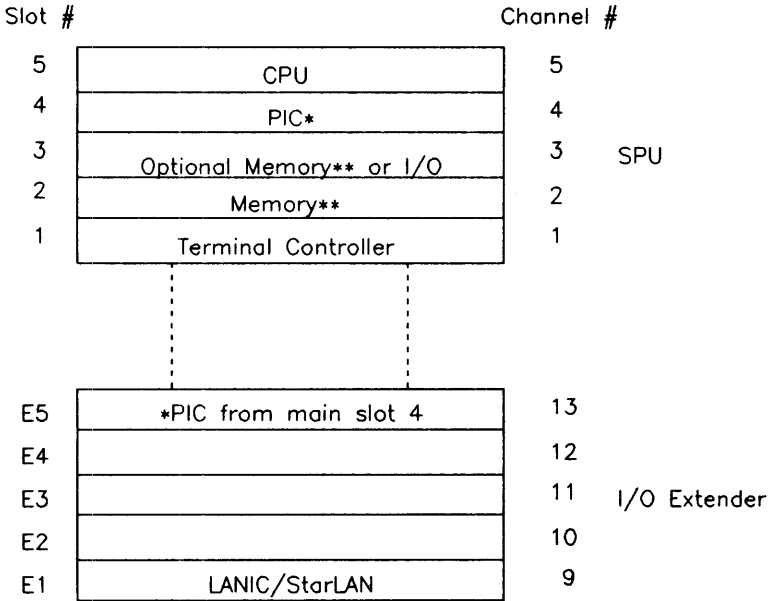
*If the extender is empty, the PIC in SPU slot 4 must be moved to the extender (preferably slot 5). The extender must have a load for correct system operation.

**Series 37/XE - If more than one memory board is used, the boards must be the same density (e.g. 1 MB with 1 MB).

MICRO 3000XE can mix 2 MB and 4 MB PCAs.

Figure 3-2. Series 37XE/MICRO 3000XE Hardware Configuration

Card Cage Configuration Rules

The following Series 37/MICRO 3000XE configuration rules apply to the SPU (main) and extender card cages.

CPU   Must be in slot 5 of the SPU.

Memory   Series 37/XE - possible memory combinations:

Slot 3 -   *   .5 MB   *   1 MB   *   2 MB
Slot 2 - .5 MB   .5 MB   1 MB   1 MB   2 MB   2 MB

MICRO 3000XE - possible memory combinations (minimum 2 MB):

Slot 3 - 1 MB**   *   2 MB   4 MB   *   4 MB
Slot 2 - 1 MB**   2 MB   2 MB   2 MB   4 MB   4 MB

* = slot empty or occupied by an I/O card
** = upgrades from Series 37/XE only

Terminal   The first terminal controller PCA must be installed in slot 1 of the SPU. A terminal
Controller   controller cannot be installed in slot 2 or 5 of the SPU.

A maximum of four terminal controllers can be installed in the system.

PIC   Slot 4 of the SPU is the standard location for the PIC -- it is not a hardware
restriction.

Extender   There must be at least one PCA installed in the I/O extender.

SIMB Parity A special tool designed for troubleshooting system hardware modules.   Can be
Board   installed an any unused slot except 1, 2, or 5 in the SPU.

Breakpoint   A special tool designed for high-level troubleshooting.   Can be installed in any
Board   unused slot except slots 1, 2, or 5 in the SPU.

LANIC/   Install as far from the CPU as possible (slot 3 in a single-box system, slot E1 in an
StarLAN   extender system). Must be installed in a higher priority slot than any of the PICs.

Maximum of 1 allowed.

INP   Install in slot 3 of the SPU - or any slot in the I/O Extender.

Maximum of 3 allowed.

Figure 3-3 illustrates the backpanel connectors on the Series 37/MICRO 3000XE.
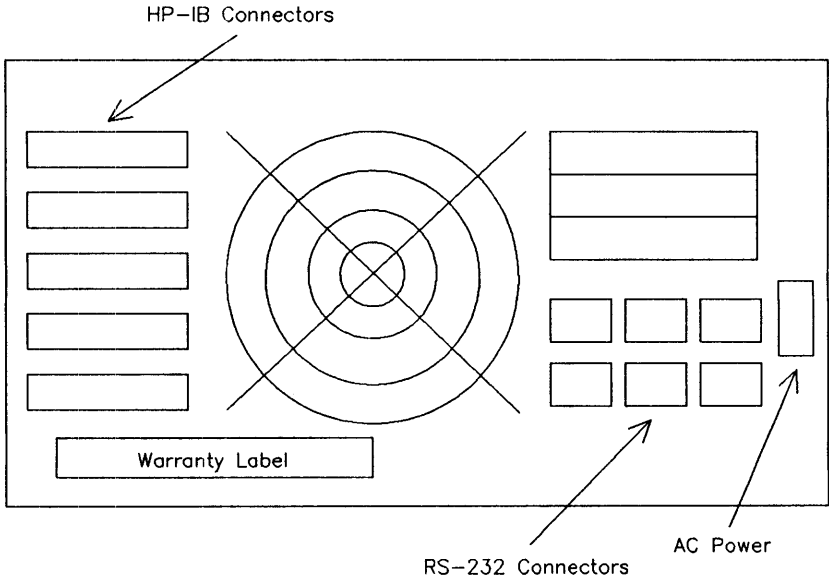
HP—IB Connectors

Figure 3-3. Series 37/MICRO 3000XE Backpanel Connectors

| NOTE |

ESD protection caps must be placed over the open ends of HP-IB connectors.

REMOTE CONSOLE

To use port 7 for the remote console, the DSR and CTS modem lines must be asserted and the SPU keyswitch must be set to the REMOTE position.

Channel and Device Assignments

The channel numbers for the Series 37/MICRO 3000XE SPU and I/O Extender are shown in Figure 3-4.
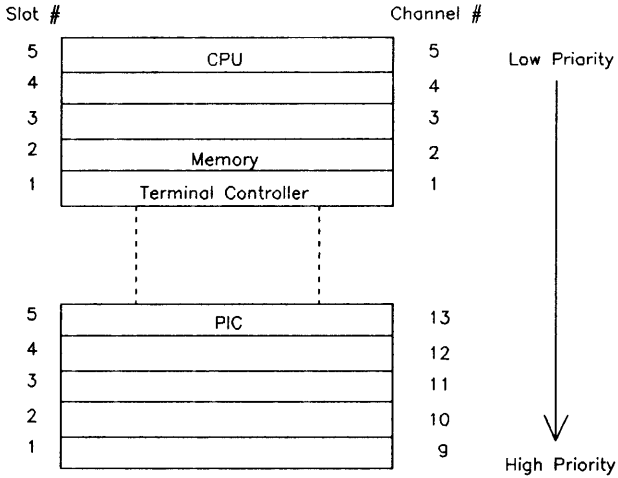
Figure 3-4. Channel Number Assignment for the Series 37/MICRO 3000XE

The Peripheral Interface Controller (PIC) can be channel #3, 4, 9 - 13.

I/O Extender slots have higher priority than SPU slots. Within a given card cage (SPU or I/O Extender), the priority increases as the assigned channel/slot number decreases.

MICRO 3000 SYSTEM CONFIGURATION

The MICRO 3000 system consists of a single SPU.

Hardware Configuration

Figure 3-5 illustrates the MICRO 3000 hardware configuration.

Channel #   Slot #

4	Processor (CPU/Memory/HP–IB)	4
3	Optional (2nd ATP/M, INP)	3
2	Optional (2nd ATP/M, LANIC)	2
1	Advanced Terminal Processor	1

SPU

Figure 3-5. MICRO 3000 Hardware Configuration.

Card Cage Configuration Rules

The following configuration rules apply to the MICRO 3000 SPU card cage.

Processor	The processor must be installed in slot 4. (The processor includes the CPU, Memory, and PIC.)
ATP/M	The first ATP/M PCA must be installed in slot 1. An additional ATP/M can be installed in either slot 2 or 3.
StarLAN/ ThinLAN	Only one LANIC (IEEE 802.3/ThinLAN or StarLAN) is supported, and must be installed in slot 2.
INP	Only one INP is supported and must be installed in slot 3.

MICRO 3000LX SYSTEM CONFIGURATION

Card Cage Configuration

The card cage configuration is described below. The card cage is shown in figure 3-6.

Processor   must be in slot 4.

ATP/M   must be in slot 3.

INP   must be in slot 2.

LAN   must be in slot 1.

Tape   installed in the slot to the right of the Processor.
Controller

SLOT

1	2	3	4	T A P E C O N T R O L L E R
L A N o n l y	I N P o n l y	A T P	P R O C E S S O R	

| 2 | | 1 | 4 | |

CHANNEL

Figure 3-6. MICRO 3000LX Card Cage Configuration

Disc Configuration

The hardware configuration of the embedded disc is implemented by the Option/Address switch. This switch is located on the right side of the Enhanced Small Device Interface (ESDI) of the disc. It is set to 00001 at the factory. Do not reset it to any other value.

Tape Configuration

The address switch of the Tape Controller PCA is set to 3 at the factory. Do not alter this switch setting.

MICRO 3000GX SYSTEM CONFIGURATION

Card Cage Configuration

The card cage configuration is described below. The card cage is shown in figure 3-7. You can install only one INP in the system.

Slot 4	Processor.
Slot 3	ATP/M.
Slot 2	INP must be in slot 2 if a LAN is installed in slot 1. A second ATP/M can be installed in slot 2.
Slot 1	LAN can be in slot 1. In this case, the INP must be in slot 2. If a second ATP/M is installed in slot 2, the INP must be in slot 1.
Tape Controller	installed in the slot to the right of the Processor.

SLOT

1	2	3	4	T A P E C O N T R O L L E R
I N P	o r	I N P	s e c o	F i r s t	P R O C E S S O R
	L A N	o r	n d		
		A T P / M	A T P / M		

2	3	1	4

CHANNEL
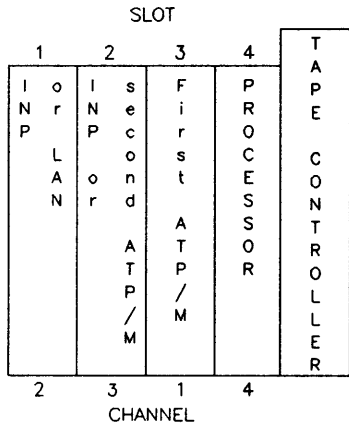
Figure 3-7. MICRO 3000GX Card Cage Configuration

Disc Configuration

The hardware configuration of each embedded disc is implemented by the Option/Address switch. This switch is located on the right side of the ESDI interface of the disc. It is set to 00001 at the factory. Do not reset it to any other value.

Tape Configuration

The address switch of the Tape Controller PCA is set to 3 at the factory. Do not alter this switch setting. If the embedded cartridge tape drive is not installed, an external tape drive can be assigned the HP-IB address 3. This address is reserved for tape devices.

SYSTEM CABLING (Series 37/XE, MICRO 3000, MICRO 3000XE)

The system cables that interface with the peripherals are external to the SPU and/or the I/O Extender.

The Peripheral Interface Controller (PIC) interface is located on the processor PCA and connects to peripherals with the standard HP-IB cables. The ATP37/M PCAs connect to peripherals with the cables described in Table 3-1. The ATP37 is not supported on the MICRO 3000.

Table 3-1. ATP37/M Connection Cables

Workstation	Product Number	Cable Description
Connecting to an ATP37/M RS-232-C (25-pin):		
150 2625A 2628A	13242N/M/Y	male (25-pin)/male (25-pin) length 5 meters (16 ft.)
2623A 2624B	13222N/M/Y	male (25-pin)/male (25-pin) length 5 meters (16 ft.)
2392A	40242M/Y	male (25-pin)/male (25-pin) length 5 meters; RFI filter
Connecting to an ATP37/M RS-232-C (3-pin):		
150 2625A 2628A	13242X	male (3-pin)/male (25-pin) length 5 meters (16 ft.)
2623A 2624B	13222X	male (3-pin)/male (50-pin) length 5 meters (16 ft.)
2392A	40242X	male (3-pin)/male (25-pin) length 5 meters; RFI filter
Connecting to an ATP37/M RS-422 (5-pin):		
150 2625A 2628A	13242P	male (5-pin)/male (25-pin) length 5 meters (16 ft.)
2623A 2624B	13222P	male (5-pin)/male (50-pin) length 5 meters (16 ft.)
2392A	40242P	male (5-pin)/male (25-pin) length 5 meters; RFI filter

SYSTEM CABLING (MICRO 3000LX/GX)

External HP-IB peripherals are not supported on the HP MICRO 3000LX.

Peripherals supported on the HP MICRO 3000GX are listed in the HP 3000 Computer System Configuration Guide, (P/N 5954-9354).

The Peripheral Interface Controller (PIC) interface is located on the processor PCA and connects to embedded peripherals. External HP-IB connection is provided only on the HP MICRO 3000GX. The ATP/M PCAs connect to RS-232-C peripherals via the PDP. The ATP/M PCAs connect to peripherals with the cables described in Table 3-2. The ATP37 is not supported on the MICRO 3000LX/GX.

Table 3-2. ATP/M Connection Cables

Workstation	Product Number	Cable Description
Connecting to an ATP37/M RS-232-C (25-pin):		
150 2625A 2628A	13242N/M/Y	male (25-pin)/male (25-pin) length 5 meters (16 ft.)
2623A 2624B	13222N/M/Y	male (25-pin)/male (25-pin) length 5 meters (16 ft.)
2392A	40242M/Y	male (25-pin)/male (25-pin) length 5 meters; RFI filter

This page was left blank intentionally.

SYSTEM START-UP PROCEDURES

To execute system start-up, perform the procedure illustrated in Figure 3-8.
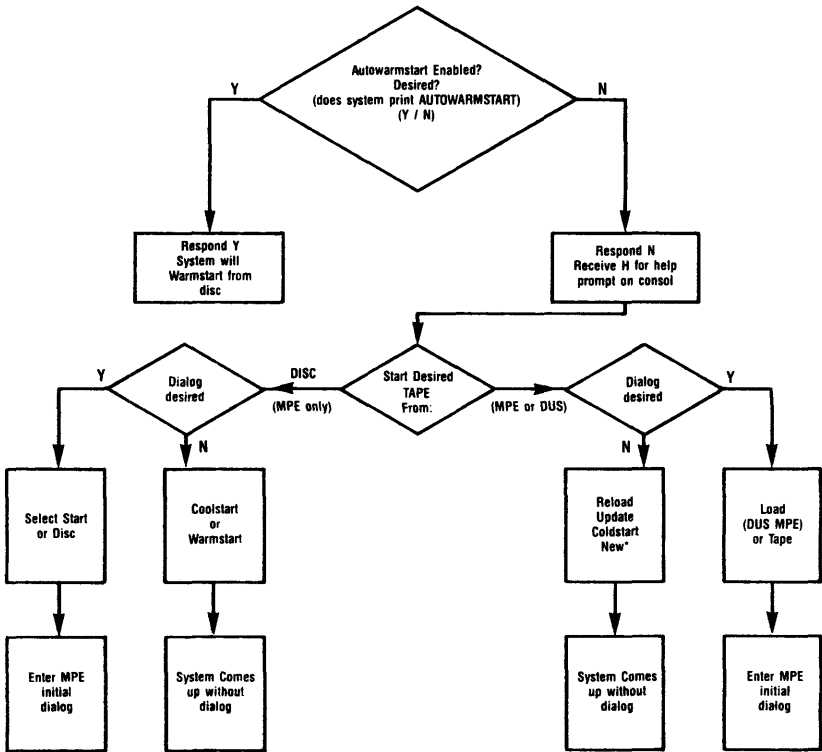
*NEW used ONLY for initial software installation from FOS tape

**Figure 3-8. Series 37/MICRO 3000XE/MICRO 3000/MICRO 3000LX/GX
System Start-Up Flowchart**

SYSTEM I/O VERIFICATION USING IOMAP

To run IOMAP, enter TE at the H for HELP -> prompt to enter test mode. Enter IOMAP at the TEST prompt. Enter a count parameter to loop IOMAP.

The IOMAP utility has two purposes:

- provides a display of the system physical I/O configuration

- checks out the basic hardware I/O system.

The following is an example of an IOMAP screen display (for Series 37/MICRO 3000XE):

```
                        SYSTEM I/O CONFIGURATION
----------------------------------------------------------------------------
Number of banks = nn
Load:        Channel 4 Device 3
Start/Dump:  Channel 4 Device 1
----------------------------------------------------------------------------
Slot 1 Channel 1 ID = 4 - Terminal Interface Controller
----------------------------------------------------------------------------
Slot 4 Channel 4 ID = 12 - Peripheral Interface Channel
  Device 1 ID = 0220 - 7945 Disc Drive
  Device 3 ID = 0260 - 9144 Cartridge Tape Unit
----------------------------------------------------------------------------
Slot E5 Channel 13 ID = 2 - Peripheral Interface Channel
  Device 2 ID = 0208 - 7912 Disc Drive
----------------------------------------------------------------------------
```

HP MICRO 3000LX/GX SYSTEM I/O VERIFICATION USING IOMAP

To run IOMAP, enter TE at the H for HELP -> prompt to enter test mode. Enter IOMAP at the TEST prompt. Enter a count parameter to loop IOMAP.

The IOMAP utility has two purposes:

- provides a display of the system physical I/O configuration

- checks out the basic hardware I/O system.

The following is an example of an IOMAP screen display (for HP MICRO 3000LX/GX systems):

```
                        System I/O Configuration
----------------------------------------------------------------------
Memory Size (MEGABYTES)  =  4
Load:
Channel  4 Device 3
Start/Dump:
Channel  4 Device 1
----------------------------------------------------------------------
Channel  1  ID=4  - Terminal Interface Controller
----------------------------------------------------------------------
Channel  4  ID=2  - Peripheral Interface Channel
   Device 1 ID=022E  - HPIB peripheral device
   Device 2 ID=022E  - HPIB peripheral device
   Device 3 ID=0260  - 9144 Cartridge Tape Unit *
   Device 3 ID=0268  - 9145 Cartridge Tape Unit *
----------------------------------------------------------------------
```

* Only one on these devices will be configured in the system at one time.

The troubleshooting information in this section is designed to assist the CE with servicing the HP 3000 Series 37/XE and MICRO 3000 Family. System halt and error messages are listed.

SYSTEM TROUBLESHOOTING PHILOSOPHY

The following are basic system troubleshooting steps:

1. Power-on -----> system selftest

2. Cold load
   - O/S
   - DUS

3. Run available diagnostics.

When encountering problems at step 1 above, use the following troubleshooting procedure:

```
Power on (keyswitch position 1)

        if no power,
---------------------------> check power/power supply


Microcode selftest will execute

        if not,
---------------------------> check system front panel indicators


Speedsense prompt will appear

        if not,
---------------------------> check system front panel indicators
                             verify minimum system/configuration

Bring up I/O map

---------------------------> verify device connection/identification


Run appropriate system diagnostics (DUS)


Run peripheral selftests.
```

MICRO 3000 INTEGRATED SYSTEM SOLUTION (ISS)

ISS systems are pre-installed and tested at the factory. MPE is pre-loaded, making it unnecessary to run the disc exerciser.

If you experience problems during system installation, observe the front panel indicators to verify that there are no system problems introduced during shipment.

| NOTE |

The console shipped with the system has not been tested with the system. If the console won't speedsense, check the front panel indicators.

FAULT-TOLERANT HARDWARE WORK-AROUNDS

MICRO 3000XE – if there are intermittent cache errors, disable cache. Cache can be disabled/enabled when in test mode with the following commands:

DC – Disable Cache
EC – Enable Cache

| NOTE |

Cache will be re-enabled when the system is powered-on and system selftest executes or when the cache test is initialized.

MICRO 3000 – Memory: In a 4 Mbyte system, selftest will pass with just the first 2 Mbytes of memory. If an error occurs in the upper 2 Mbytes of memory, the system will come up to a Control B prompt. To bypass bad memory, reconfigure MPE for 2 Mbytes. Replace the bad PCA when a new one is available.

MICRO 3000 REMOTE SUPPORT

When discussing MICRO 3000 problems over the telephone, keep in mind that the following information is shipped to the customer with the system. It is printed on an 8 1/2 X 11" laminated sheet titled

<center>"HP MICRO 3000 QUICK REFERENCE CARD".</center>

If both you and the customer have this information in hand, it may help to clearly communicate system problems.

<center>

NOTE

</center>

> If during normal operation, a power failure occurs, both the ACTIVITY and FAULT indicators will light. This action indicates that battery power is retaining memory.

0--STANDBY MODE

In this position AC power is still supplied to the computer, but the processor is NOT running. DC power is off.

1--NORMAL MODE

Selecting "1" turns the computer on and initially lights both the green ACTIVITY and yellow FAULT indicators on the front panel. (See Figure 4-1.)
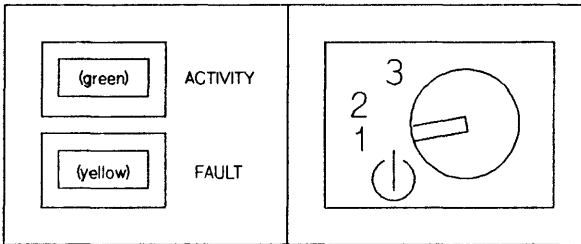
Figure 4-1. MICRO 3000 Keyswitch Positions

These lights indicate that the computer selftest is executing. Two megabytes of memory will take about 45 seconds. Four megabytes of memory will take one minute.

If the selftest is successful, the green indicator stays on (until MPE comes up), the yellow indicator goes out, and your screen will look like the example below:

If the selftest is successful, the green indicator stays on (until MPE comes up), the yellow indicator goes out, and your screen will look like the example below:

```
Power on Self Test
Memory Test passed
Memory Size (MEGABYTES) = nn
Channel 1 - Terminal Interface Controller
Channel 4 - Peripheral Interface Controller

1 - NORMAL
H for help ->
```
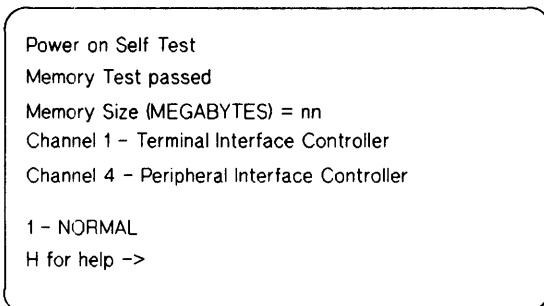
Figure 4-2. MICRO 3000 Selftest Passed Display

At this point you can start the system from either a disc or tape. You will know that the start was successful when you receive the appropriate option response, for example "COOLSTART/WARMSTART".
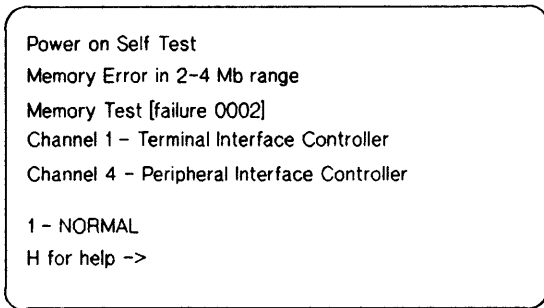
SELFTEST FAILURE--If, during your wait for the selftest to complete, the FAULT indicator stays on or continually blinks, it means there is a problem that needs to be fixed. (Refer to Table 4-1.)

Table 4-1. MICRO 3000 Error Codes

Number of Blinks	Action You Should Take
None. Stays on solid.	Call Response Center.
Flashing continuously.	Check for an illegal configuration (3 ATP/Ms).
Two, then repeat.	Call Response Center.
Three, then repeat.	Check that the terminal connector cable is connected tightly both to the terminal and to the ATP/M junction panel, port 0 (channel 1 of SPU). Check also that the terminal is powered ON, and is in REMOTE mode.

MEMORY FAILURE--If you get the message in Figure 4-3, reconfigure the system for two megabytes.

```
Power on Self Test
Memory Error in 2-4 Mb range
Memory Test [failure 0002]
Channel 1 - Terminal Interface Controller
Channel 4 - Peripheral Interface Controller

1 - NORMAL
H for help ->
```

Figure 4-3. MICRO 3000 Selftest Failed Display

2--LOCAL SERVICE MODE

Selecting this position allows the execution of individual selftest diagnostics when directed by qualified service personnel.

3--REMOTE SERVICE MODE

This position allows HP service personnel to run diagnostic tests on your MICRO 3000 via a modem (allows all console commands to be executed remotely).

ACTIVITY/FAULT INDICATORS

FAULT--the FAULT LED will be out during normal operation.

ACTIVITY--the ACTIVITY LED will be on or flash quickly when the computer is busy.

IDLE--the ACTIVITY LED will flash at a rate of one blink per second when the computer is idle (paused, waiting for instructions).

MICRO 3000LX/GX SYSTEM SELF-TEST

The CPU, embedded discs, and embedded cartridge tape drive are tested by Self-test when the following steps are performed.

1. Check that the system power cord and any external peripheral power cords are connected to the AC power outlets. Check that the console power switch is ON.

2. Ensure that the console and peripherals are ON LINE. Move the keyswitch on the system from position 0 to position 1 This turns on system power and starts the system self-test. Self-test takes about 30 seconds for a 2 Mbyte system and about one minute for a 4 Mbyte system.

Check the following:

A. The CPU ACTIVITY and FAULT lights are lit;

B. The DISC ACTIVITY and FAULT lights are flashing;

C. The DISC-2 ACTIVITY and FAULT lights are flashing if a second disc is installed;

D. The cartridge tape Busy light is lit if a cartridge tape is installed. A cartridge tape should not be installed when self-test is initiated.

When self-test has completed, the CPU ACTIVITY light, the DISC ACTIVITY light, the DISC-2 ACTIVITY light (if installed), are lit. All cartridge tape Drive indicators should be off.

The following screen is then displayed on the console:

```
Power on Self Test
Memory Test passed
Memory Size (MEGABYTES) = nn *
Channel 1 - Terminal Interface Controller
Channel 4 - Peripheral Interface Controller

1 - NORMAL
H for help ->
```
*nn = 2 or 4

Figure 4-4. MICRO 3000LX/GX Self-Test Passed Display

At this point you can start the system from either a disc or tape. You will know that the start was successful when you receive the appropriate option response, for example "COOLSTART/WARMSTART".

Self-test from Console

The following specific tests allow you to run the individual portions of self-test.

You can start self-test in two ways.

1. You can run self-test as described in the paragraphs above,

OR

2. If the MPE operating system is running, you can perform an orderly system shutdown by simultaneously pressing the CTRL and A keys and typing SHUTDOWN.

3. Turn the keyswitch to position 2.

4. Type TEST on the console keyboard. You will see this menu displayed:

```
ROM Versions:

AL [ 1 ] [ count ]
CH [ an ] [ count  [ ,chan ] ]
CP [ u ] [ count ]
E [ xit ]
I [ omap ]  [ count ]
M [ emory ]  [ count ]
PON [ count ]

2 - LOCAL  ( from NORMAL )
Test ->
```

Figure 4-5. MICRO 3000LX/GX Diagnostic Display

5. The prompt Test -> is displayed at the bottom of the menu.

At this point, you can execute any or all of the tests.

```
                    System I/O Configuration
--------------------------------------------------------------------------
Memory Size (MEGABYTES)  =  4
Load:
Channel  4 Device 3
Start/Dump:
Channel  4 Device 1
--------------------------------------------------------------------------
Channel  1  ID=4  - Terminal Interface Controller
--------------------------------------------------------------------------
Channel  4  ID=2  - Peripheral Interface Channel
  Device 1 ID=022E  - HPIB peripheral device
  Device 2 ID=022E  - HPIB peripheral device
  Device 3 ID=0260  - 9144 Cartridge Tape Unit *
  Device 3 ID=0268  - 9145 Cartridge Tape Unit *
--------------------------------------------------------------------------
```

* Only one on these devices will be configured in the system at one time.

Self-test Fault Analysis

SELFTEST FAILURE--If the FAULT indicator stays on or continually blinks while self-test is running, it means there is a problem that needs to be fixed.

MEMORY FAILURE--If you get the message in figure 4-6, reconfigure the system for two megabytes.

```
Power on Self Test

Memory Error in 2-4 Mb range

Memory Test [failure 0002]
Channel 1 - Terminal Interface Controller

Channel 4 - Peripheral Interface Controller


1 - NORMAL
H for help ->
```

Figure 4-6. MICRO 3000LX/GX Self-Test Failed Display

Troubleshooting

This page left blank intentionally.

LISTLOG5

LISTLOG5 is a utility program used to print the contents in sequential order of any MPE log file record types existing on the system.

Default output is to the line printer.

To output to the terminal :FILE LOGLIST=$STDLIST

To run program :RUN LISTLOG5.PUB.SYS

```
LIST LOG FILE PROGRAM VERSION 00.00 mm/dd/yy
ENTER FIRST AND LAST LOG FILE TO BE ANALYZED
FIRST?2842
LAST?2842                                      (NOTE: do not enter latest file)
ENTER EVENTS TO BE PRINTED
TYPE NO.    EVENT
    0       LOG FAILURE
    1       SYSTEM UP
    2       JOB INITIATION
    3       JOB TERMINATION
    4       PROCESS TERMINATION
    5       FILE CLOSE
    6       SYSTEM SHUTDOWN
    7       POWER FAILURE
    8       SPOOLING LOG RECORD
    9       LINE DISCONNECTION
   10       LINE CLOSE
   11       I/O ERRORS
   12       PRIVATE VOLUMES
   13       PRIVATE VOLUMES
   14       TAPE LABELS
   15       CONSOLE LOG
   16       PROGRAM FILE EVENT
   17       CALL PROGRESS SIGNALS
   18       DCE PROVIDED INFO
   46       MAINTENANCE REQUEST
ENTER EVENT NUMBERS SEPARATED BY COMMAS.
11
DO YOU WANT TO PURGE LOG FILES?NO
DO YOU WISH TO RUN AGAIN (Y OR N)?NO

END OF PROGRAM

:RUN LISTLOG5.PUB.SYS


ENTER FIRST AND LAST LOG FILE TO BE ANALYZED
FIRST?_____(Enter nnnn from above)
LAST?_____(If no new logs have been opened after number nnnn, LAST
         will also be nnnn, so just hit <CR>.)
```

Troubleshooting

```
ENTER EVENTS TO BE PRINTED
TYPE NO.        EVENT
    0           LOG FAILURE
    :           :

   11           I/O ERRORS
    :           :
```

ENTER EVENT NUMBERS SEPARATED BY COMMAS. A CARRIAGE RETURN ASSUMES ALL EVENTS
WILL BE EVALUATED.

11 (An entry of 11 is shown, since we are only interested in I/O errors.)

The Listlog 5 output will be directed to the line printer; ensure that the line printer is online.

DO YOU WANT TO PURGE LOG FILES? NO

(If the previous FREE 5 listing indicated the disc was getting low on space – less than 15% free – you
may wish to enter YES to purge the log files. Never purge log files without the customer's OK.)

DO YOU WISH TO RUN AGAIN (Y OR N?) N

END OF PROGRAM

Examine LISTLOG 5 printout for Disc and/or Tape errors.

MEMORY ERROR LOGGING UTILITY (Series 37/MICRO 3000XE)

NOTE

This utility will return no errors when executed on the MICRO 3000 because parity-only memory is used.

The memory logging utility is used to examine the error history of memory. The utility consists of the following:

- Memory error logging process (MEMLOGP)

- Memory error log analysis program (MEMLOGAN)

- Memory error logging internal update program (MEMTIMER)

- Memory error log file (MEMLOG)

NOTE

The above files reside in PUB.SYS.

Memlogan

MEMLOGAN (MEMLOGAN.PUB.SYS) is the utility that reads and interprets the error information logged and kept in the MEMLOG file. Refer to Table 4-2 for an example of the Memlogan Error Printout Format.

To run the program enter:

```
:FILE OUT;DEV=LP (optional)
:RUN MEMLOGAN.PUB.SYS
```

NOTE

If an additional error is encountered by MEMLOGAN, the program will print the appropriate error information and then terminate.

Table 4-2. MEMLOGAN Format (Series 37/MICRO 3000XE)

```
+--------------------------------------------------------------------+
|              ADDRESS            |       ERROR TYPE      |  ERROR  |
|---------------------------------|-----------------------|---------|
|   BOARD       |      ROW        |   TYPE   BIT   CHIP   |  COUNT  |
+--------------------------------------------------------------------+
```

VALUES:

board   The board ID number is displayed as 0 or 1. Board 0 resides in
                slot 2 and board 1 resides in slot 3.

row   This identifies the row in which the faulty RAM is located. It
                is not displayed if there is a multiple bit error.

type   Type of error detected, as follows:

                        CHECK   *Check bit error.*

                        DATA   *Data bit error.*

                        MULTIPLE BIT ERROR   *Error is more than one bit.*

                                                If a multiple bit error is indicated,
                                                no bit or chip information is given.

bit   If *type* = CHECK, *bit* is the failing check bit (0 through 6).

                If *type* = DATA, *bit* is the failing data bit (0 through 31).

chip   Chip on which error occurred, in format:

                U*n*

                Variable *n* is a digit indicating the chip number.

count   The number of logging intervals during which this error was
                detected at least once.   This value does not represent the
                number of times that an error was actually detected.

Use of Parameters

PARM=0; Causes the current contents of MEMLOG to be printed on the output device. The contents of
the file will not be changed. This is the default PARM value.

PARM=1; Causes the current contents of MEMLOG to be printed on the output device after which the
file is reset to a no-error state. All previously logged errors are deleted from the log file.

NOTE

When a system is initialized for the first time or the memory size is changed, MEMLOGAN should be run with PARM=1 as soon as the system is up and running. This will ensure a clean MEMLOG file and that subsequent error counts are valid. Also, use PARM=1 if the power has been down for any reason.

PARM=2; Causes the current contents of MEMLOG to be printed on the output device after which the file is deleted from the system. (This is the only way to remove the MEMLOG file from the system and normally only the system manager would use the PARM value).

Memtimer

MEMTIMER (MEMTIMER.PUB.SYS) is the utility program which allows the user to modify the interval of time between successive memory log updates. To run the program enter:

:RUN MEMTIMER;PARM=n

        n=logging interval in seconds

        Default period is 10 minutes for the Series 37/MICRO 3000XE.

WORKOUT2/WORKSER

WORKOUT2 is an online program that exercises both disc and tape drives. WORKOUT2 can open 64 disc files and four tape files. It writes 512 records to disc and/or tape, writes a file mark, and rewinds or resets to the beginning of the disc or tape files. WORKOUT2 then reads records, comparing the read and write buffers and reporting any errors. (WORKOUT2 writes 4095-word records.) If the SORT option is invoked, the program sorts the first and last disc file. WORKOUT2 requires the following parameters: Cap=IA,BA;Maxdata=%75000.

WORKSER is similar to WORKOUT2, but is designed for serial devices (cartridge tapes, tapes, and discs used as serial devices). WORKSER is the preferred exerciser for cartridge tapes.

WORKSER can open 64 disc files, and only one tape file. It writes 8192-word records until the end of the tape, writes a file mark, and rewinds. The program then reads the tape, comparing read/write buffers and reporting any errors. Run the program just as you would run WORKOUT2, substituting "WORKSER" for "WORKOUT2".

In the following example, entries made by the operator are underlined. Pressing (RETURN) in response to questions selects the default answer.

To initiate the WORKOUT2 program, enter:

:RUN WORKOUT2[;PARM=]

> Three options are available but not mandatory:

> ;PARM=1

> > Eliminates comparing data buffers after each READ.

> ;PARM=2

> > Causes END OF PASS messages to be displayed at System Console as well as with $STDLIST.

> ;PARM=3

> > Accomplishes both of the above.

NUMBER OF DISC FILES? 2

> Assuming sufficient space was shown during "RUN FREE5" enter any number from 0-64. WORKOUT2 will attempt to open that number of files. Each work file requires approximately 10,000 sectors.

LDN FOR FILE #1? 1 (Default is 0.)

LDN FOR FILE #2? 1 (Default is 0.)

> The above example assumes that only the system disc is currently online. If more discs are present, specify any appropriate LDEV number from 0-255. When zero is entered, WORKOUT2 spreads its files over all devices in class DISC.

IS A SORT TO BE DONE? <u>NO</u> (Default is NO.)

> This question is only asked if the answer to "NUMBER OF DISC FILES?" above was 2 or greater. A "YES" answer causes file 1 to be sorted and written to file n; where "n" is the last file specified. For example, if you specified 2 disc files above and answered this question with "Y" the program would write to file 1, read back the data, sort it, then write it to file 2. Doing a sort significantly lengthens the program run time.

NUMBER OF TAPE FILES? <u>1</u> (if a tape unit is available;default is 0)

> Enter a number from 0-4.

NUMBER OF PASSES? <u>1</u> (Default is 0.)

> Any number from 0-32767 may be entered. The default value of 0 causes the program to terminate immediately.

?TIME/SESSION #/PIN #/LDEV #FOR "WRKTAPE1" ON TAPE (NUM)?

=<u>REPLY PIN#, LDEV#</u>

> This question and its reply are displayed only if the answer to NUMBER OF TAPE FILES? was greater than 0. Be sure you have mounted a "scratch" tape or one whose contents you do not mind losing.

<time> START

> WORKOUT2 now attempts to open the files. If all files are successfully opened, no message appears. If any file cannot be opened, a message to that effect appears. Each pass is followed by a message telling how many files were successfully opened.

```
TIME    END OF PASS 1   FILES:  DISC=2,  TAPE= 1
TAPE    #RETRYS
 1              7
```

END OF PROGRAM

FREE5

FREE5 details the contiguous free space on each mounted disc volume and the total free space on each disc volume, and the total free space in the system. HP recommends 15% free space on each disc. This utility does not list private volumes. Use VINIT to list private volumes.

```
:FILE FREE5OUT;DEV=LP
:RUN FREE5.PUB.SYS

VOLUME=MH7958U0
LARGEST FREE AREA=26112

 SIZE   COUNT   SPACE   AVERAGE
>100000  0      0        0
>10000   1      26112    26112
>1000    2      8836     4418
>100     14     3062     218
>10      100    3118     31
>1       318    844      2
TOTAL FREE SPACE=41972

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

VOLUME=MH7958U1
LARGEST FREE AREA=82
 SIZE   COUNT   SPACE   AVERAGE
>100000  0      0        0
>10000   0      0        0
>1000    0      0        0
>100     0      0        0
>10      26     985      37
>1       242    547      2
TOTAL FREE SPACE=1532

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

SYSTEM TOTAL FREE SPACE=43504

END OF PROGRAM
```

SADUTIL

SADUTIL is a stand-alone utility program used to recover files from a down system, and to perform other disc operations. Refer to MPE System Utilities Reference Manual P/N 32033-90008. SADUTIL performs the following functions:

- When used with RECOVER5 utility, recreates disc files.

- Recovers MPE files that have become logically inoperable because of a catastrophic condition (invalid system file directory, or bad cold-load information).

The following is a list of SADUTIL commands (refer to the Utilities manual for more information):

CLID	Rewrites the Cold Load IDs on all discs.
CONF	Initiates the device configuration dialogue for the configuration of additional devices.
COPY	Copies the contents of one disc pack to another.
EDIT	Modifies the contents of a disc volume.
FIND	Scans a system disc for file labels.
OUTM	Sets the output mode of print functions to printer or console.
PDSK	Prints an octal or ASII dump of any given area of a specified disc volume.
PDTT	Prints the Defective Track Table of a specified disc volume.
PFIL	Prints descriptions of files contained in the system file directory.
PVOL	Prints information contained in the volume label of a specified disc volume.
SAVE	Retrieves files from disc and copies them to magnetic tape. Can not be used with private volumes.
STOP	Terminates the SADUTIL program.

MPE STATUS CODES (SERIES 37/MICRO 3000XE)

— Run Mode. Not processing interrupts and not executing the Pause instruction.

— Processing interrupts on the Interrupt Control Stack (ICS).

— Executing the Pause instruction.

— Looping between the conditions that display the A and C codes.

— Looping between the conditions that display the A and D codes.

— Looping among the conditions that display the A, C, and D codes.

— Looping between the conditions that display the C and D codes.

MAINTENANCE MODE (SERIES 37/MICRO 3000 FAMILY)

The maintenance mode microcode (residing on CPU) contains:

- the code for maintenance and test mode commands
- selftest

The Control B detection logic resides on the TIC/ATP/M. Only the TIC/ATP/M in slot 1 (channel 1) of the SPU card cage can have the Control B logic enabled.

To enable the logic:

- turn SPU keyswitch to the local (2) or remote (3) position
- console must be connected to port 0 (local) or port 7 (remote)

When the Control B sequence is initiated, software execution halts and the H for help-> prompt is displayed. The maintenance microcode begins execution.

<div align="center">

NOTE

</div>

> The MPE environment is protected only if you execute a Run, Help, Enable Warmstart (EW), Disable Warmstart (DW), Speed, or Dump command. If any other commands are executed, MPE is not protected.

If the system is hung, or there is no READ pending, a Control B issued from the local/remote console cannot be executed. To force a Control B, a Forced Maintenance Mode (FMM) switch has been added to the TIC/ATP/M date code 2516 and later. Remove the front panel to access the switch. It is located on the backplane edge of the TIC/ATP/M, near the loop pins.

FAILURE MESSAGES (SERIES 37/MICRO 3000 FAMILY)

NOTE

Refer to Tables 5-13, 5-14, and 5-15 for TOC RAM data and status information.

The following is a summary of failure messages on the Series 37 and MICRO 3000 Family systems:

A.   HALT nn: Halt main instruction executed by MPE; nn is halt instruction parameter printed in decimal.

B.   SYSTEM HALT nn:

        1 STT Violation Segment 1
        2 Absent Trap While on ICS
        3 Code Segment 1 Trap Violation
        4 ICS Stack Overflow
        5 Undefined
        6 Initial Program Load Failure
        7 Illegal S Bank at QI-5 during IXIT
        8 Undefined
        9 PSEB instruction found and QI - 18 = 0.

C.   SYSTEM FAILURE #enum:

STATUSsnum

DELTAPpnum

When a system failure occurs, a message appears on the System Console in the above format, where:

enum is the error number that identifies the error type.

snum is the code segment number from which the system failure was called.

pnum is the program counter (Delta-P) offset into code segment.

Refer to the System Operations and Resource Management Manual P/N 32033-90005, supplied to System Managers, for the names of the modules in which the failure was detected, the cause of errors, and what action should be taken in response to the messages.

SIMB BREAKPOINT BOARD (SERIES 37/MICRO 3000XE)

The Series 37 and MICRO 3000XE have an SIMB breakpoint board for trapping reads/writes. The procedure can be controlled with the built-in softpanel or the 9836-based maintenance panel.

```
┌─────────────┐
│    NOTE     │
└─────────────┘
```

The MICRO 3000 does not support the use of a SIMB breakpoint board.

INSTALLATION. The breakpoint board (P/N 30457-60022) can be installed in slots 3 or 4 in the SPU or I/O extender card cage.

PROGRAMMING/USE. Using the SIMB breakpoint board with the softpanel allows for breaking on absolute memory addresses for software debugging or tracing. The breakpoint capability includes two addresses, designated as A and B. These addresses can be set up as a range, allowing breakpointing of a memory region.

All memory breakpoint commands require the SIMB breakpoint board.

The commands for the memory breakpoint board are as follows:

"SMB [$^{A:}_{B:}$] bank.numeric[,$^{(RD)}_{(WR)}$][,RA]

Sets a memory breakpoint. Defaults to breakpoint A. RD and WR are to specify read or write only. The default is read/write. RA sets up range mode, and must be specified on the last address entered. For example, to set a range breakpoint for reads to address range 1000 to 2000 in bank 0, enter the sequence:

                    SMB A:0.1000 followed by
                    SMB B:0.2000,RA

"CMB "
Clears all memory breakpoints.

"SMD bit pattern"
Sets a data pattern for the breakpoint. This feature is useful when a particular data pattern shows up at random in a table. A single 16-bit word can be specified, made up of 0's, 1's, and X's (don't cares).

The SMD command, when used, must follow the setting up of the range.

"SB "
Shows the current state of the breakpoints A and B, the ranging flag, and the data pattern.

DIAGNOSTIC. The breakpoint board can be diagnosed by using system debug to access absolute addresses. A more complete diagnosis can be found in the 9836-based maintenance panel. The Test Breakpoint (TB) command will run a diagnostic on the breakpoint board. It takes about 7 seconds.

SIMB PARITY ET (SERIES 37/MICRO 3000XE)

The SIMB ET allows for parity checking on SIMB-based systems which do not have built-in parity checking (e.g. the MICRO 3000XE). It can also be used on SIMB-based systems which do have parity checking (e.g. the Series 37) to determine the source of SIMB parity errors and to test the parity detection circuitry.

INSTALLATION. The SIMB ET is a PCA (P/N 30474-60008) that can be installed in any available slot in the SPU or I/O Extender on a properly configured system.

OPERATION. Power-on the system. All LEDs and indicators on the ET will be blank. When a parity error is detected, the information is latched into the indicators until you toggle the RESET switch or until you cycle power.

The SIMB ET will: (1) monitor the SIMB and generate -BPER whenever a bus parity error is detected and (2) latch the +FRMCHAN lines and display them in the hex display LED. The quadrant containing the error will be contained in the discrete LEDs.

Figure 4-7 illustrates the switches and indicators on the SIMB Parity ET.
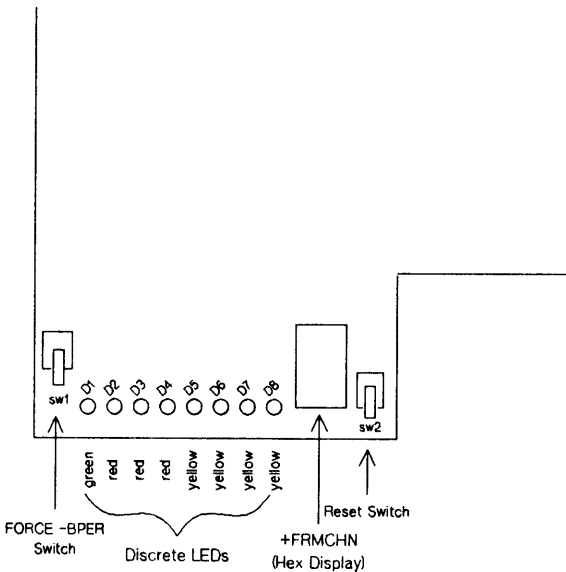
Figure 4-7. SIMB Parity ET Switches and Indicators

SW1 - Force -BPER Switch: checks operation of the ET by forcing a parity error. Verifies the CPU is capable of fielding the -BPER interrupt.

SW2 - Reset Switch

Hex Display - displays the +FRMCHAN lines.

Discrete LEDs - display the quadrant containing the error.

Table 4-3 lists the parity bits, the field that each checks, and the corresponding quadrant (quadrant numbers correspond to the LED numbers in Figure 4-7).

Table 4-3. SIMB Parity ET Fields/Quadrants

PARITY BIT	BUS BITS	QUADRANT	LED COLOR
+PA0	-OP<0:2>	1	Green
+PA1	-ADDR<8:15>	2	Red
+PA2	-ADDR<16:23>	3	Red
+PA3	-ADDR<24:31>	4	Red
+PD0	-DATA<0:7>	5	Yellow
+PD1	-DATA<8:15>	6	Yellow
+PD2	-DATA<16:23>	7	Yellow
+PD3	-DATA<24:31>	8	Yellow

CONTRIBUTED SLEUTHSM PROGRAM

The following program can be used as an aid in troubleshooting.

DISC VOLUME AND COLD LOAD PROGRAM REWRITE

This program will allow you to rewrite the disc volume name and cold load program.

$$\boxed{\textbf{CAUTION}}$$

Use this program only as a last resort. You must know the correct contents of cylinder zero and sector zero.

```
5000 DEV 0,<CHAN NO.>,<DEV NO.>,10,0,<IMB NO.>
5010 DB AA,128,0
5020 DB BB,128,0
5030 RC 0
5040 SKRD 0,AA(0),0
5050 FOR A:= 0 TO 15
5060 LET BB(A):=AA(A)
5070 PRINT "WORK  ";A;" CONTAINS ":AA(A)
5080 PRINT "WISH TO CHANGE (Y/N)?"
5090 INPUT B
5100 IF B="N" THEN 5130
5110 PRINT "ENTER IN OCTAL NEW VALUE?"
5120 INPUT B BB(A)
5130 NEXT 5050
5140 PRINT "OK TO WRITE TO DISC (Y/N)?"
5150 INPUT B
5160 IF B="N" THEN 5250
5170 RC 0
5180 SKWD 0,BB(0),0
5190 SKRD 0,AA(0),0
5200 CB AA(0),BB(0),128
5210 IF INDEX= -1 THEN 5260
5220 PRINT "DISC WRITE OK READ ERROR WISH TO RETRY (Y/N)?"
5230 INPUT B
5240 IF B="Y" THEN 5170
5250 PRINT "REQUEST NOT GRANTED"
5260 PRINT "END OF PROGRAM"
5270 END
```

This section provides mini-operating instructions for diagnostics and selftests used with the Series 37 and MICRO 3000 Family computer systems. For detailed information refer to the three volume HP 3000 HP-IB Computer Systems Diagnostic Manual Set, P/N 30070-60068.

DIAGNOSTIC/UTILITY SYSTEM (DUS) PROGRAMS

▌(SERIES 37, MICRO 3000XE, MICRO 3000, MICRO 3000LX/GX)

The Diagnostic/Utility System (DUS) is a series of programs used to test the computer system. The CE invokes the applicable DUS diagnostic during the fault isolation process. The DUS is a COLDLOAD Tape. The following diagnostic programs are installed on DUS:

- Sleuth Simulator Program (SLEUTHSM IN AID)

- IOMAP (IOMAP)

- DMA Exerciser (DMAEXR)

- CS80 Offline Diagnostic (CS80EXER)

- CS80 Online Diagnostic (CS80UTIL)

- CS80 Device Diagnostic (CS80DIAG)

- ATP (ATPDIAG)

- SADUTIL (SADUTIL)

- Series 37 Diagnostics

- MICRO 3000XE Diagnostics

- MICRO 3000 Diagnostics

CREATING DIAGNOSTIC/UTILITY SYSTEM MEDIA

To create the DUS media, set up a file equation for media to be used:

```
:FILE MTAPE;DEV=TAPE;DEN=1600

:FILE CART;DEV=CTAPE(for ICT-CS80/9144A option)

:HELLO FIELD.SUPPORT,HP32231

:RUN COPYDUS.HP32231.SUPPORT
```

When media is mounted, ready and online, respond to I/O request.

LOADING THE DIAGNOSTIC/UTILITY SYSTEM (DUS)

To execute the Diagnostic/Utility System, perform the following procedure:

    a. Perform an MPE shutdown to properly log off all current sessions.

    b. Mount the DUS media.

    c. Type LOAD.

    d. The welcome message and prompt displayed are:

```
Diagnostic/Utility System (revision XX.XX)
Enter your program name (Type HELP for program information)
:
```

Sleuth Simulator Program

To execute the sleuth simulator program, perform the following procedure:

    a. When the DUS displays its title message and prompt, enter: AID.

    b. AID will respond with a prompt character (>) and line number: >10

    c. Enter LOAD SLEUTHSM. The Sleuth Simulator is now loaded.
       You can enter program statements or use available commands.

ENTERING A SLEUTH PROGRAM

Programs are entered at the first available AID line number after the simulator program. The simulator becomes part of the user program entered.

DELETING A SLEUTH PROGRAM

To erase specified lines of code generated by entries, use the delete command:

```
D(elete) 5000/5100
```

To erase both the Sleuth Simulator and user programs, enter the EP command.

SleuthSM Commands and Statements

The following is a list of SleuthSM Commands and Statements:

Mnemonic	Name	Function
ASSIGN	Assign D Buffer	Stores data into a buffer
BUMP	Bump Pass Counter	Increments the Reserved Variable PASSCOUNT and prints passcount on console
CHB	Change Buffer	Changes contents of specified buffer
DB	Define Buffer	Declares a buffer with a two alpha-character name
DEV	Device	Defines the characteristics of a particular device
ES	Enable Status	Enables automatic checking of device status
ESTA	Expected Status	Changes expected status of next statement that uses status checking
FOR	For-Step-Until	Provides a means of repeating a group of instructions
GET	Get	Reads channel number, error count, or unit number from the console
GOTO	Go To	Allows program to branch unconditionally to another statement
IF	If-Then Control	Allows executing program to evaluate special operator "exp" and transfer control to specified statement
IFN	If-Not-Then	Same as IF THEN except that "exp" is tested to be false
INPUT	Input Data	Receives input from console and assigns it to a variable
LET	Assignment	Allows assignment to a variable, data buffer, or string buffer the value of any variable, numeric, expression, or string
MC	Master Clear	Clears the specified unit by issuing a device clear
NEXT	End of For-Next Loop	Specifies end of a For-Next set of statements
PAUSE	Non-Error Pause	Creates an unconditional pause in the execution of the AID user program
PE	Pause on Error	Notifies user that an error has occurred and stops program execution

Mnemonic	Name	Function
PRINT	Print to Console Without Pause	Enables data, print spacing, or strings to be output to list device
PROC	Proceed	Enables or disables proceed mode
RAND	Randomize	Generates a positive random number and places it in the designated variable
RDB	Randomize Data Buffer	Defines randomized data buffers
SCB	Simulated Compare Buffer	Compares word by word each element of two buffers
SOUT	Switch Output	Outputs error messages to line printer or system console
SST	Suppress Status	Disables status checking for all succeeding statements
STAT	Status Dump	Obtains status from channel or device and prints out on system console
TIMEOUT	Channel Program Timeout Flag	Sets software timer for channel program. (Set to -1 to disable.)

Refer to Table 5-1 Simulated SleuthSM Commands.

DISC I/O STATEMENTS

Mnemonic	Name	Function
AR	Address Record	Sets logical address specified in cylinder, head and sector parameters into 13037 controller only.
CL	Clear	Clears any clock offset, status, interface busy bit, and waits for new command.
DS	Decremental Seek	Performs an initial seek to a specified location then decrements by one each time the instruction is executed.
Disp	Display	Displays the item specified in the type parameters for the LUN indicated.
FMT	Format	Formats a moving-head disc and verifies each track.
ID	Initialize Data	Performs an initialize operation on all 7906/7920/7925 disc drives, beginning with the designated cylinder, head, and sector until the word count of the buffer is exhausted.
IDI	Initialize Data Immediate	Performs an initialize operation on a moving-head disc. The internal disc address will be used as the starting point of the write.

DISC I/O STATEMENTS (cont.)

Mnemonic	Name	Function
IS	Incremental Seek	Performs an initial seek to a specified address and increments cylinder address each time instruction is executed.
IT	Incremental Track	Performs an initial seek to a specified address and increments head address each time instruction is executed.
POLL	Poll	Causes the disc controller to resume polling.
RC	Recalibrate	Performs recalibrate operation on moving-head disc.
RD	Read Data	Performs read operation on moving-head disc.
RDA	Request Disc Address	Returns the current disc address stored in the controller.
RDI	Read Data Immediate	Performs a read operation starting from the current disc address.
RFS	Read Full Sector	Causes full sector on moving head disc to be read.
RFSI	Read Full Sector Immediate	Causes full sector on moving head disc to be read, starting with the current disc address.
RQST	Request Status	Causes disc controller to return two status words.
RS	Random Seek	Causes moving-head disc to seek randomly.
RSA	Request Sector	Returns the current logical sector address under heads.
RSYN	Request Syndrome	Obtains seven-word syndrome from disc controller.
RWO	Read With Offset	Performs a read operation but offset word is sent to disc drive before executing.
RWOI	Read With Offset Immediate	Same as RWO except that heads are assumed to be positioned.

DISC I/O STATEMENTS (cont.)

Mnemonic	Name	Function
RWV	Read Without Verify	Performs a normal read but does not verify preceding sector.
RWVI	Read Without Verify Immediate	Same as RWV but starts at current address.
SEEK	Seek	Causes heads to be positioned over specified cylinder.
SFM	Set File Mask	Sets the file mask on the disc controller.
SKRD	Seek Read Data	Performs a seek to specified address and reads that data.
SKWD	Seek Write Data	Performs a seek to specified location, reads the data and writes it into the specified buffer.
VER	Verify	Verifies the data on a number of sectors on a moving head disc.
VERI	Verify Immediate	Verifies the data on a number of sectors on a moving head disc, starting with the internal address.
WD	Write Data	Writes data to specified location.
WDI	Write Data Immediate	Writes data to current address on moving head disc.
WFS	Write Full Sector	Writes data on full sector on moving head disc.
WFSI	Write Full Sector Immediate	Writes data on full sector using current location.

LINE PRINTER I/O STATEMENTS

RP	Ripple Print	Writes a ripple pattern on logical unit indicated and continues until stopped with CNTL Y or until 32767 lines have been printed.
WD	Write Data	Writes data from specified buffer onto line printer.

MAGNETIC TAPE I/O STATEMENTS

Mnemonic	Name	Function
BSF	Backspace File	Issues a backspace file to a magnetic tape unit.
BSR	Backspace Record	Causes the magnetic tape unit to backspace one record from the present position.
FSF	Forward Space File	Moves magnetic tape forward to next file.
FSR	Forward Space Record	Moves magnetic tape forward one record.
GAP	Gap	Writes a gap on the specified magnetic tape.
RD	Read Data	Performs a read operation.
REW	Rewind	Issues a rewind command to the specified magnetic tape unit.
REWOFF	Rewind and Reset	Rewinds and resets specified magnetic tape unit.
RRB	Read Record	Reads from last byte in record towards the first.
SELU	Select Unit	Selects the magnetic tape unit specified in the unit parameter.
WD	Write Data	Executes a write operation.
WFM	Write File Mark	Writes a file mark.

Table 5-1. Simulated SleuthSM Commands

SleuthSM Statement	HP AID Statement	HP AID Command
ACB - Access single word element in buf.	LET - Makes an assignment to any element of buffer.	
PUT - Prints a message on the console.	PRINT - Prints a message on the console.	
HALT - Halt computer (Causes a halt #17)	PAUSE - Creates an unconditional pause in the execution of an HP AID program.	
NOPR - No print (Turns off all messages except user Sleuth dialogue.)	Suppress - Suppresses all error messages.	SEPR - Suppress error printout. -or- SNPR - Suppress non-error printout.
PR - Print (Causes resumption of all printing.)	ENABLE - Enable error reporting.	EEPR - Enable error printout -or- ENPR - Enable non error printout
ZBUF (buf) - Zero- defined buffer.	DB Buf, length, 0	
DELY - Delays the software timer in increments of .1 second.	TIMEOUT - Delays the software timer in increments of 5 seconds.	

IOMAP

To execute IOMAP standard operating mode, perfrom the following procedure:

a. Install a Diagnostic/Utility System tape.

b. COLDLOAD the DUS programs.

c. When the DUS displays its title message and prompt, enter: IOMAP

d. IOMAP will respond with:

    IOMAP   REVISION xx.xx

    Enter:

        'GO' to continue

        'GO,1' to continue with printer output

        'GO 1' for Optional Test Sections

        'GO 1,1' to run Optional Sections with printer output

        'LC' to list Commands

e. Enter 'GO' or 'GO,1' and the IOMAP program will perform an identify to all devices, display the system I/O configuration table, and return control to the DUS.

    The following is an example of an IOMAP screen display:

```
              System I/O Configuration
---------------------------------------------------------------------
Memory Size  (MEGABYTES) = nn
Load:         Channel  4 Device 3
Start/Dump:   Channel  4 Device 1
---------------------------------------------------------------------
Slot   1   Channel  1  ID=4 - Terminal Interface Controller
---------------------------------------------------------------------
Slot   4   Channel  1  ID=2 - Peripheral Interface Controller
   Device  3  ID=$0260  - 9144 Cartridge Tape Unit
---------------------------------------------------------------------
```

```
┌─────────────┐
│    NOTE     │
└─────────────┘
```

The HP 7980A and HP 7980XC have the same ID code (!0180) and the same system configuration. IOMAP does not distinguish between the HP 7980A and the HP 7980XC. Run the Tape Drive Selftest to determine if the device is an HP 7980A or an HP 7980XC.

OPTIONAL OPERATING MODE

Three additional test sections are available in the optional mode.

Test Section 2 - Identify

Test Section 3 - Selftest

Test Section 4 - HP-IB Loopback

To execute any of these test sections:

a.   Enter: TEST SECTION <NO.>

b.   The following is displayed:

      TEST SECTION <NO.> --- <NAME>

c.   Enter legal channel and device numbers to execute test.

d.   Enter -2 to exit test section.

Supported Devices

IOMAP currently recognizes the following devices. All devices may not be supported by the current system.

ID CODE	HP DEVICE
!0001	7910 Fixed Disc
!0002	13037 Disc Controller for 7906/7920/7925 Disc Drives
!000F	Advanced Terminal Processor (ATP)
!0080	Flexible Disc Unit (Single Sided)
!0081	7902 Flexible Disc Unit (Double Sided)
!0082	12745 HP-IB Adapter for 13037 Disc Controller
!0100	31207 Writable Control Store
!0101	2893 Card Reader
!0102	9875 Cartridge Tape Controller
!0174	7974 Mag Tape Unit
!0176	7976 Mag Tape Unit
!0178	7478 Mag Tape Unit
!0183	7970E Mag Tape Controller
!0204	7911 Disc Drive
!0205	7911 Disc with Cartridge Tape
!0208	7912 Disc Drive
!0209	7914 Disc with Cartridge Tape
!020A	7914 Disc Drive
!0210	7931 Disc Drive

ID CODE	HP DEVICE
!0212	7933/7935 Disc Drive
!0215	7936 Disc Drive
!0214	7937 Disc Drive
!0220	7945A Disc Drive
!022A	7957A Disc Drive
!022B	7958A Disc Drive
!022C	7961A/97961A Disc Drive
!022D	7962A/97962A Disc Drive
!022E	7963A/97963A Disc Drive
!0240	Cartridge Tape Drive
!0260	9144A/9144S Cartridge Tape Drive
!0268	9145A/9145S Cartridge Tape Drive
!2000	9871 Character Printer
!2101	2563A Line Printer
!2101	2565A Line Printer
!2101	2566A Line Printer
!2001	2608A Dot Matrix Printer
!2101	2608S Dot Matrix Printer
!2002	2631A Serial Printer
!2004	268X Page Printer
!2005	9872 Plotter
!2006	7245 Plotter/Printer
!2009	2631B Serial Printer
!200A	2611/2613/2617/2619A Line Printer
!2080	Integrated Display System (IDS)
!2101	2608S/2563A Line Printer
!4000	31281 SDLC-EIA Interface
!4001	BYSINC Interface
!4002	30020A Intelligent Network Processor (INP)
!4003	30020B Intelligent Network Processor (INP)

DMA Exerciser Diagnostic (DMAEXR)

To execute the DMA exerciser diagnostic perform the following procedure:

a. Perform MPE 'SHUTDOWN'

b. COLDLOAD the Diagnostic/Utility System (DUS).

c. Once the DUS program has output its title message and prompt (:) enter DMAEXR.

d. The response should be:

    DMAEXR EXERCISER PROGRAM 'DMAEXR', version XX.XX.

e. A 'CTRL Y' may be entered at any time to abort the diagnostic.

f. For memory size, enter highest bank number + 00 (700 for 1 megabyte).

g. Enter number of transfers. 10 transfers per bank tested (60 for 1 megabyte).

This program is intended to provide an exhaustive check of the DMA operation. The full check requires two PIC assemblies. Follow the configuration instruction always using valid IMB, Channel and Device numbers.

CS80 DEVICE DIAGNOSTICS

CS80EXER Offline Diagnostic

CS80EXER is an offline Diagnostic/Utility System (DUS) diagnostic. It replaces CS80DIAG and is fully backward compatible, providing support for all CS80 devices. CS80EXER uses a format similar to CS80UTIL. CS80EXER is distributed with DUS revision 3.02 or later.

To execute CS80EXER, do this:

1) Perform an MPE SHUTDOWN.

2) Cold load the Diagnostic/Utility System (DUS).

3) When the DUS program displays the title message and prompt (:), enter CS80EXER.

4) The response is:

```
CS80EXER X.XX.XX (C) Hewlett-Packard Co., 1986

Please wait:  loading message file ...

CS80 Device Configuration

Logical Device? (Enter User Selected "LDEV" Number)
DRT?
List logical devices (Y/N)[N]?

CS80EXER>
```

After the desired devices are configured, the program prompts you for input with a CS80EXER> prompt.
For a list of available commands, enter HELP at the CS80EXER> prompt.

The CS80EXER SPARE command executes this algorithm:

```
                     Attempt to read target sector
                      and store in program buffer
                    /                           \
           Successful                          Unsuccessful
               |                                    |
               |                                Continue?
               |                                    |
               |                                    --->NO--->Exit
               |                                    |
               |                                   Yes
               \                                   /
        Attempt spare retaining data (target sector is lost)
              /                              \
        Successful                          Unsuccessful
            |                                    |
  If sector was recovered                    Continue?
  then rewrite target sector                     |
            |                                     --->NO--->Exit
          Exit                                    |
                                                 Yes
                                                  |
                        Attempt spare not retaining data (track is lost)
                                                  |
                                                Exit
```

```
┌──────────────┐
│    NOTE      │
└──────────────┘
```
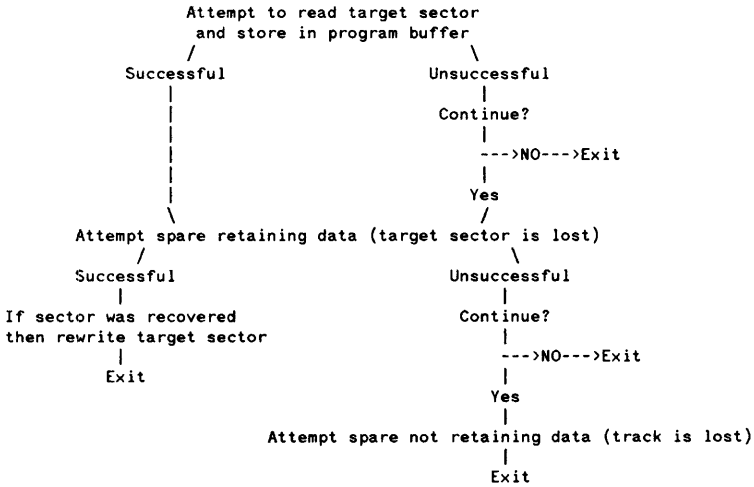
The user must ensure that data affected by sparing is properly taken care
of.

CS80UTIL Online Diagnostic

CS80UTIL normally resides in the CS80 group of the TELESUP account. CS80UTIL uses a message file called CS80MSG. CS80UTIL looks for CS80MSG in the user logon group. CS80UTIL will not run if the version of the message file is different from the program, or if it does not find a message file.

To execute CS80UTIL, enter the following system commands:

```
:HELLO MGR.TELESUP,CS80
:RUN CS80UTIL
(Program header will be displayed)
CS80UTIL>
```

For a list of available commands, enter HELP at the CS80UTIL> prompt.

The CS80UTIL SPARE command executes this algorithm:

```
                    Attempt to read target sector
                     and store in program buffer
                   /                            \
            Unsuccessful                     Successful
              /                                  |
          Continue?                              |
             |                                   |
    Exit<---NO<---                               |
             |                        Attempt spare retaining data
            Yes                           (target sector is lost)
             |                               |                  \
    Program will allow spare if:             |                   |
             |                           Successful              |
    1) Non-system volume with                |                   |
       no user data.              Rewrite target              Exit
    2) Sector in free space of       sector
       system volume disc.              |
    3) Sector in file that is          Exit
             |
   Exit<---Other<---
             |
    Attempt spare retaining data (target sector is lost)
                   |
                  Exit
```

```
                          ┌──────────┐
                          │  NOTE    │
                          └──────────┘
```

The user must ensure that files affected by sparing are handled properly.

Diagnostics

CS80 Device Diagnostic (CS80DIAG)

To execute CS80 device diagnostics, perform the following procedure:

a. Backup the system.

b. Perform an MPE 'SHUTDOWN'.

c. COLDLOAD the Diagnostic/Utility System.

d. Once the DUS program has output its title message and prompt (:) enter "CS80DIAG".

e. The response should be:

>   Program Loaded!!
>   nnnn>

The CS80DIAG is now loaded and can be run with the "RUN" command.

Diagnostics

This page was left blank intentionally.

TERMDSM

To execute TERMDSM, perform the following procedure:

1. TERMDSM Options

    a. Run diagnostics.

    b. Abort job(s).

    c. Abort I/O.

    d. Reset one or more ports and associated tables.

    e. Display tables.

    f. Dump one or more ports and associated tables.

    g. Obtain a list of broken ports.

2. Once you have created an MPE session, invoke TERMDSM by the following:

        RUN TERMDSM.PUB.SYS <cr>

        Use of TERMDSM requires (OP) capability. TERMDSM will output
        the following message after it has verified (OP) capability:

        TERMINAL DIAGNOSTIC--VERSION V.UU.FF
        Type HELP for aid

SADUTIL (SADUTIL)

SADUTIL is a stand-alone utility program used to perform disk operations. Refer to the MPE System Utilities Manual P/N 30000-90044.

Refer to Section 4 for SADUTIL command descriptions.

MEMORY DIAGNOSTIC (MDIAG37)

<div style="border:1px solid black; display:inline-block;">NOTE</div>

MDIAG37 can be used on the Series 37 computer system only. (MICRO 3000XE, MICRO 3000, and MICRO 3000LX/GX memory diagnostics are in the selftest and maintenance mode diagnostic microcode.)

To execute the Series 37 memory diagnostic, perform the following procedure:

a. Perform MPE shutdown to log off all users, if applicable.

b. Run the console selftest.

c. Fully reset the console.

d. Install a DUS tape in the cold-load device.

e. If the system is off, power it on by turning the keyswitch to the LOCAL or REMOTE position. If the system is already on, verify that the keyswitch is in the LOCAL or REMOTE position. Enter "LO".

f. DUS displays a welcome message and a prompt:

```
Diagnostic/Utility System (revision x.xx)
Enter your program name (Type HELP for information)
:
```

g. Type MDIAG37 in response to the prompt.

h. MDIAG37 loads and executes Test Section 1. The following message is then displayed:

```
HP 3000 Series 37 Memory Diagnostic - (MDIAG37 nn.nn XX/XX/XX)
Begin Section 1

Begin Step 11
If step 11 terminates with an error then there are fatal multiple-bit
errors in low memory and the diagnostic will fail to run properly.

Step 11 completed

Begin Step 12

Step 12 completed

Begin Step 13
```

```
Detected X banks of memory on X boards using 64K RAMS (or 256K)


Step 13 completed

Begin Step 14

Step 14 completed

End of Section 1

Type 'GO' to Continue (HELP to list commands)
>
```

i. At this point, GO will execute the default tests (all tests) after Section 1. To change the test selection, enter TEST with a "-" in front of the test numbers to delete those tests, or a "+" in front of the test numbers to add those tests. Without a "-" or a "+" MDIAG37 will perform just those test sections listed.

Examples:

```
        TEST -5,6,7 or TEST -5/7 will delete tests 5-7
        TEST +2,3,4 or TEST +2/4 will add tests 2-4
        TEST 1,2,3,6,9 to run tests 1,2,3,6,9 (go/no go)
```

If you inadvertently select no tests by deleting test sections, MDIAG37 will select all tests (default).

j. Unless the End of Program Pause has been enabled, control is returned to DUS when the diagnostic has been executed.

```
┌─────────────┐
│    NOTE     │
└─────────────┘
```

MDIAG37 version 2.00 (or later) should be used on any Series 37 system containing 30456 (1 MB) memory PCAs.

PERIPHERAL INTERFACE CONTROLLER DIAGNOSTIC (PICDIAG)

PICDIAG can be used with the Series 37, MICRO 3000XE, MICRO 3000, and MICRO 3000LX/GX computer systems.

The Peripheral Interface Controller (PIC) diagnostic is designed to verify correct operation of all functions of the PIC. A second PIC is required in order to fully test the HP-IB circuitry and the non-controller functions of the Advanced Interface Bus (ABI).

Version 3.00 (or later) is required to test REV C (VLSI) PIC PCAs. Version 3.04 is required to test the PIC on the MICRO 3000 processor PCA and the MICRO 3000XE PIC.

| NOTE |

On the MICRO 3000 and MICRO 3000LX/GX computer system, the PIC is located on the processor PCA. Only one PIC is supported. The PICDIAG does not fully test the HP-IB circuitry and the non-controller functions of the ABI. Any reference to the PIC PCA also includes the PIC circuitry located on the MICRO 3000 processor PCA.

To execute the PIC diagnostic, perform the following procedure:

a. Perform MPE shutdown to log off all users, if applicable.

b. Run the console selftest.

c. Fully reset the console.

d. Install a DUS tape in the coldload device.

e. If the system is off, power it on by turning the keyswitch to the LOCAL or REMOTE position. If the system is already on, verify that the keyswitch is in the LOCAL or REMOTE position. Load DUS.

f. DUS displays a welcome message and a prompt:

```
Diagnostic/Utility System (Revision nn.nn)
Enter your program name (Type help for program information)
:
```

g. Type PICDIAG in response to the prompt.

h. PICDIAG loads, then displays the following message:

```
PICDIAG xx.xx
    Default tests are 1-39,41-45.  Optional test is 40.
    Tests 40/45 require manual intervention.  Tests 41/45
    require a second PIC and HP-IB cable.

    Enter 'GO' to continue.
    >
```

The greater-than symbol (>) is the PICDIAG prompt.

Test 13 does not execute on the MICRO 3000 PIC located on the processor PCA.

i. At this point, you can select the diagnostic options by entering a command (enter HELP to see a list of commands available to you)

j. When you enter GO, the following prompt will be displayed:

```
The PATH number (0-2) of the PIC to be tested is?:
```

Enter the correct path number. You will receive the following prompt:

```
The CHANNEL number (1-15) of the PIC to be tested is?
```

Enter the correct PIC address. You will receive the following prompt:

```
The PATH number (0-2) of the second PIC is?
    The CHANNEL number (0-15) of the second PIC is?
```

Enter 0 if there is not a second PIC (steps 41-45 require a second PIC).

TERMINAL INTERFACE CONTROLLER DIAGNOSTIC (TICDIAG)

TICDIAG can be used with the Series 37, MICRO 3000XE, MICRO 3000, and MICRO 3000LX/GX computer systems.

To execute the Terminal Interface Controller (TIC) diagnostic, perform the following procedure:

a. Perform MPE shutdown to log off all users, if applicable.

b. Run the console selftest using the [Terminal Test] option of [Service Keys].

c. Fully reset the console by pressing [SHIFT] [CONTROL] [RESET].

d. Install a DUS tape in the cold-load device.

e. If loopback testing is desired, attach a hardware jumper between the loop test point and the ground test point near the backplane connector or attach the loopback hood(s) on the desired port(s).

f. Power-on the system by turning the keyswitch to NORMAL, LOCAL, or REMOTE. Use NORMAL if the console is local and connected to port 0 of channel 1. Only use LOCAL or REMOTE to test a TIC other than the one in channel 1. The microdiagnostic runs. To load DUS, type L (LOAD) in response to the prompt. Type H for HELP.

   Or, turn the keyswitch to LOCAL and use a [Control] B sequence to load DUS, following the above procedure. Turn the keyswitch back to NORMAL.

g. The Diagnostic/Utility system displays a welcome message and prompt:

    DIAGNOSTIC/UTILITY SYSTEM (REVISION nn.nn)

    ENTER YOUR PROGRAM NAME (TYPE HELP FOR PROGRAM INFORMATION)
    :

h. Type TICDIAG in response to the prompt.

i. TICDIAG loads and executes. The following message is displayed:

    Terminal Interface Card Offline Diagnostic   V - nn.nn

    Enter HELP in response to any question for an explanation of what is required.

    Enter EXIT in response to any question to terminate the program.

    Enter STATUS in response to any question to display the current diagnostic configuration.

j. TICDIAG prompts you for all information needed to run the tests. The first prompt asks for the channel number of the TIC under test. The channel number will be 1-5 for a basic system, or 1-5, 9-13 if an extender is used. If the channel number is 1, the TICDIAG later prompts you to redirect the printout. If redirected, you must select Port 0.

k.   TICDIAG prompts you to input the TIC type under test.   Type **HELP** for TIC identification
      information.

l.   TICDIAG prompts you for the amount and type of information that you want to print.   Answer
      these prompts with a YES or NO:

      ```
      Print Failure Messages (Default = NO)?

      Print Pass Messages (Default = NO)?

      Print Troubleshooting Messages (Default = NO)?
      ```

m.   TICDIAG prompts you for the list device. If the line printer is not specified by responding YES to
      the off-line prompt, the listing is sent to the system console. You can change the system console if
      the TIC under test has the system console on it and there is another TIC PCA in the system.

      ```
      Output results to Line Printer (Default = NO)?
      ```

      If the system console is on the TIC under test and the output is not directed to the line printer,
      TICDIAG will ask if you wish to change the system console to another TIC and port.

      ```
      Change the System Console Channel Number (Default = NO)?
      ```

      If answered YES:

      ```
      Channel Number of TIC to switch the System Console to:
      ```

n.   If the console is the list device, you can select to stop on errors.

      ```
      Stop on Errors (Default = NO)?
      ```

      If you answered YES, then when an error is detected, you are prompted to either cancel testing or to
      continue.

      ```
      Do you wish to Halt the Tests (Default = NO)?
      ```

o.   You can select to loop on a failure. TICDIAG will continuously loop the test that detected a
      failure.

      ```
      Loop on Error (Default = NO)?
      ```

p.   You are prompted for a loop count to specify the number of times each test repeats.   The maximum
      value is 32,767. Zero indicates continuous looping should be performed.

      ```
      Loop Count - (Zero for continuous looping/Default = 1):
      ```

q.   TICDIAG prompts for the SIB tests to run. If the console is on the TIC under test, a SIB test can't
      be run. Enter the tests by name or specify ALL or ONE.

      ```
      Enter SIB Tests to be Run:
      (Default = last set of tests Run, if any)
        >
      ```

ALL is the recommended response.

r.   TICDIAG prompts for the AIB tests to be run.

```
Enter AIB Tests to be Run:
(Default = last set of tests Run, if any)
>
```

ALL NO LOOPBACK is the recommended response when using the diagnostic in the field. Enter ALL if loopback connectors have been installed.

s.   If any AIB tests are selected, you are prompted for the numbers of the ports that need to be tested. Those ports which still have devices attached to them should not be selected. If the console is on the TIC under test, port 0 can't be specified.

```
  Enter Ports to be Tested:
(Default = last set of ports)
  >
```

Ports to be tested are specified by entering a list of the port numbers. The format is:

<integer>[/<integer>] [,<integer>[/<integer>],...]

If the list of ports is omitted, the last set of ports you selected will be tested. The lists of ports can include individual numbers and ranges of numbers.

For example, 1/3,5,7 is a valid list of numbers. It specifies that ports 1,2,3,5, and 7 are to be tested.

t.   TICDIAG then proceeds to test the TIC PCA. Upon completion, a message is displayed.

During TICDIAG execution, the output messages you specified are printed to the list device.

```
Testing Completed.
Channel/Loop Count/Output Changes (Default = NO) ?
```

You can run the test again and change the parameters by responding YES and answering the prompts with the desired changes.

PIC-TIC SIMB DIAGNOSTIC (PTSDIAG)

PTSDIAG can be used with the Series 37, MICRO 3000XE, MICRO 3000, and MICRO 3000LX/GX
computer systems.

To execute the PIC-TIC SIMB (PTS) diagnostic, perform the following procedure:

a.   Perform MPE shutdown to log off all users, if applicable.

b.   Run the console selftest.

c.   Fully reset the console.

d.   Install a DUS tape in the coldload device.

e.   Turn the keyswitch to the LOCAL (2) position.

f.   If Auto Warmstart is enabled, you are asked if you wish to run it.

    Warmstart? (Y/N)

    Respond with N for the second prompt. If Autowarmstart is not enabled, PTSDIAG goes directly to
    this second prompt.

    H for help->

    Respond to the prompt to load DUS with the command:

    L(OAD) Channel#,Device#

    The Channel and Device Numbers of the Coldload device are required unless you are using default
    values.

g.   DUS displays a welcome message and a prompt:

    Diagnostic/Utility System (Revision nn.nn)
    Enter your program name (Type help for program information)
    :

    Type PTSDIAG in response to the prompt.

h.   PTSDIAG will load and execute, displaying the following:

    HP3000 Series 37 PIC-TIC SIMB Diagnostic - (PTSDIAG nn.nn xx/xx/xx)

i.   PTSDIAG then prompts for PIC channel information:

    Select a PIC to act as a controller.

    What is the Path # of the Controller PIC (0-2)?

> What is the Channel # of the Controller PIC (1-15)?

> Will this be a single PIC test?

If NO, you are in a multiple PIC configuration and PTSDIAG displays questions to determine the configuration.

> Select a PIC to act as a Device and remove all its cables or devices other than the Coldload Device.

> What is the Path # of the Device PIC (0-2)?

> What is the Channel # of the Device PIC (1-15)?

PTSDIAG reminds you to connect the controller PIC to the device PIC with an HP-IB cable.

j. You are then asked if you want to add a third and fourth PIC. If yes, they are assigned as Busy PICs.

> Do you want a Busy PIC (Y/N)?

> What is the Path # of the Busy PIC (0-2)?

> What is the Channel # of the Busy PIC (1-15)?

k. This part of the PTSDIAG is reached directly if you are using a one PIC configuration, or after path and channel information, if you are using a multiple PIC system.

> Do you with to change the TIC channel under test? (Default channel = 1)

Use the default values for the next two questions:

> How many ports to use in tests (1-7)? (Default=7)

l. You are then prompted for the number of times to repeat the test.

> Enter the Loop count -0 for continuous looping (0-32767):

A value greater than 32767 causes PTSDIAG and DUS to abort. Stop looping by using CNTRL-Y.

m. PTSDIAG then prompts for information on error handling, reporting, and diagnostic control.

> Pause on Error (Y/N - N=Default)?

> Output results to Line-Printer (Y/N - N=Default)?

> Suppress results (Y/N - N=Default)?

> Suppress End of Program Pause (Y/N - N=Default)?

If you have disconnected the DUS tape drive while running PTSDIAG, answer the last question with N. DUS generates an error if no tape drive is attached.

n. If you request a pause, a prompt is displayed:

Enter 'GO' to continue, 'RUN' to restart, or 'EXIT' to return to DUS

If you enter RUN, PTSDIAG will ask if the PIC-TIC configuration will be changed.

Do you want to change PIC-TIC configuration (Y/N - N=Default)?

This will also allow you to change the diagnostic control configuration. If Y, you will be prompted for path/ channel information. IF N, the diagnostic will run with the previous configuration.

o.   EXIT will exit the diagnostic and return directly to DUS.

As PTSDIAG runs, a status message is displayed after every pass, providing the number of passes completed and the total number of errors. When the loop count has expired, a message is displayed and the programs returns to DUS:

PTSDIAG testing completed.

ONLINE DIAGNOSTICS

The following is a description of online diagnostic tests.

HP 2563A/2565A/2566A Line Printers

Enter the following system commands:

```
:HELLO FIELD.SUPPORT,HP32340
:RUN PD466A
```

The program will request user inputs for test configuration. Enter the appropriate values for each request:

Enter Model No.

Enter Number of Characters to be used (64/96/128).

For HP 2563A printers only: printer connected via multi-point terminal system (i.e., Remote) Y/N?

Enter Logical Dev. No.

Select Section Flags.

For looping and Status checks, use SLEUTHSM in offline Diagnostic/Utility System (DUS).

HP 2680A/2688A Page Printer Verifier

To execute the page printer verifier, perform the following procedure:

1. Verify proper online operation.

2. Enter the following system commands:

   ```
   :HELLO FIELD.SUPPORT,HP32340
   :RUN PD467A
   ```

3. Perform procedures requested by the verifier.

> **NOTE**
>
> Use the printer selftest function (on top panel keyboard) to run the complete set of printer diagnostics.

4. To run printer selftest, enter the following commands from the printer keyboard:

   a. Press HALT.
   b. Press 1
   c. Press ENTER
   d. Press RUN.

HP 7974A/78A Magnetic Tape Diagnostic

To execute the magnetic tape diagnostics, perform the following procedure:

```
:HELLO FIELD.SUPPORT,HP32340 (RETURN) :RUN PD471A (RETURN)
```

The HP 7974A Tape Diagnostic has no interactive test sections, but the user can select the following test parameters:

o   Enter sections separated by commas
o   Enter steps separated by commas
o   Enter loop count
o   Enter error parameters: error only, error pause, error count
o   Enter logical device number of tape unit under test

If all default parameters have been selected, the diagnostic will respond with a header and welcome message, and if no errors are generated, will output the following message:

```
Section 3 - Identify (5sec)
End Section 3, ID code of $174 was returned

Section 4 - Loopback (2min)
End Section 4

Section 5 - Power-on Selftest (30secs)
End Section 5

HP 7974A Magnetic Tape Diagnostic Normal Termination
```

SERIES 37 SYSTEM SELFTEST DIAGNOSTIC OVERVIEW

Selftest is the primary power-on test which verifies the correct operation of the logic necessary to load the system. The Series 37 does not have a special maintenance processor. The maintenance mode microcode resides on the CPU board and contains the code for interpreting maintenance mode commands and selftest.

Remaining diagnostics are installed on the Diagnostic Utility System (DUS) tape.

Selftest tests for a functioning:

> Central Processing Unit (CPU)
> Memory
> Terminal Interface Controller (TIC)
> Peripheral Interface Controller (PIC)
> Synchronous Intermodule Bus (SIMB)

Selftest executes when any of the following occur:

- Power-on via the keyswitch.

- Invoked by operator intervention while in maintenance mode.

- Restart after power failure.

The minimum hardware required to run selftest to completion and the power-on sequence are the same:

> CPU
> Memory
> TIC
> Console (connected to TIC channel 1/port 0)

If a required peripheral is not connected, all tests performed before attempting to test the required unconnected peripheral are valid.

Selftest in Detail

Detailed information about selftest and the correct syntax for maintenance and test mode commands is in the Series 37 Selftest and Maintenance Mode Diagnostic Manual (P/N 30457-90003). This manual is part of the HP 3000 Diagnostic Manual Set (P/N 30070-60068).

SERIES 37 SELFTEST OPERATING INSTRUCTIONS

To execute the power-on selftest, turn the keyswitch from position "0" to position "1", "2", or "3" which powers on the SPU and starts selftest.

The Control B detection logic is on the TIC/ATP/M. Only the TIC/ATP/M in slot 1/channel 1 can enable the Control B detection logic. To enable the logic, the keyswitch must be in either the "2" (LOCAL) or "3" (REMOTE) position. Only the system console connected to port "0" (LOCAL) or port "7" (REMOTE) can execute maintenance mode commands. See Table 5-8 for a list of maintenance mode commands.

The keyswitch directly effects the function of certain maintenance mode commands. Table 5-7 describes the keyswitch capabilities.

SERIES 37 POWER-ON SELFTEST EXECUTION

LED display will flash as follows:

```
"0", "1", and "2" ("2" may not be visible)  -  Loading WCS
         "5"                                 -  Testing CPU
         "8"                                 -  Testing memory
         "C"                                 -  Testing I/O cards
```

If any test fails, the failing assembly will be indicated in the LED (and on the console screen if the console path is operational). Table 5-2 lists the LED indications and error conditions during selftest.

SERIES 37 SELFTEST ERROR CODES

Table 5-2. Series 37 Power-On Selftest LED Error Codes

ERROR CODE LED DISPLAY	WHAT THE ERROR CODE MEANS
Steady "0"	Processor not executing micro-instructions or looping on first ones.
Steady "1"	Processor hung in initial WCS bootup from ROM.
Steady "2"	Initial WCS bootup from ROM failed data integrity test. A retry is being attempted.
Flashing "5" or Steady "5"	CPU PCA failed.
Flashing "B"	Memory test failed. Check memory, processor.
Flashing "C"	Console failed to speed sense. Check console, cable, RS-232 module.
Flashing "C" followed by Flashing "1"	Console TIC failed. Check TIC, RS-232 module, processor.
Steady "D"	IOMAP is executing.
Flashing "n"	PCA in slot "n" failed.
Flashing "E followed by Flashing "n"	Occurs for each PCA in slot n of the failing extender.
Steady "A"	All tests passed.

MICRO 3000XE SYSTEM SELFTEST DIAGNOSTIC OVERVIEW

Selftest is the primary power-on test which verifies the correct operation of the logic necessary to load the system. Selftest verifies the cold load path and tests functions in the following sequence:

    Central Processor Unit (CPU)
    Memory
    Cache
    Advanced Terminal Processor (ATP/M)
    Peripheral Interface Controller (PIC)

The minimum hardware required to run selftest to completion:

    Console (connected to ATP/M channel 1/port 0)
    MICRO 3000XE
        CPU
        Memory (2 MB)
        ATP/M
        PIC

If a required peripheral is not connected, all tests performed before attempting to test the required unconnected peripheral are valid.

Selftest executes when any of the following occur:

- Power-on via the keyswitch.

- Invoked by the operator while in maintenance mode.

- Restart after power failure

Test Execution Time

Test execution time varies with the amount of memory and the type and quantity of peripheral PCAs installed in the system.

    2 megabytes of memory   one minute

    4 megabytes of memory   two minutes

    8 megabytes of memory   four minutes

Selftest in Detail

Detailed information about selftest and the correct syntax for maintenance and test mode commands is in the MICRO 3000XE Selftest and Maintenance Mode Diagnostic Manual (P/N 30474-90003). This manual is part of the HP 3000 Diagnostic Manual Set (P/N 30070-60068).

MICRO 3000XE SELFTEST OPERATING INSTRUCTIONS

Turn the keyswitch from position "0" to position "1", "2", or "3" to power on the SPU and start selftest.

The maintenance mode microcode contains the code for interpreting maintenance and test mode commands, and the MICRO 3000XE selftest. The maintenance microcode resides on the CPU board.

The Control B detection logic resides on the ATP/M. Only the ATP/M in slot 1/channel 1 can enable the Control B logic. To enable the logic, the keyswitch must be in either the "2" (LOCAL) or "3" (REMOTE) position.

Only the system console connected to port 0 (LOCAL) or port 7 (REMOTE) can execute the maintenance mode commands. When all tests successfully complete, maintenance mode is entered and the "H for help ->" prompt is displayed.

The keyswitch directly effects the function of certain maintenance mode commands. Keyswitch capabilities are described in Table 5-7.

MICRO 3000XE POWER-ON SELFTEST EXECUTION

Selftest executes in the following sequence:

- All CPU chip functions and WCS are tested. LED displays "5" as these tests execute. Control module and test executor load into WCS. Control transfers to test executor. If an error is detected, "5" flashes three times then the LED displays two numbers in quick succession which give information about error cause. For interpretation of the number sequence, refer to Tables 5-3 and 5-4.

- Test executor loads memory, PIC, and ATP/M tests into WCS.

- All memory tests execute. LED displays a steady "B" as memory tests execute. If an error is detected, "B" flashes three times, then the LED displays three numbers in quick succession which give information about error cause. For interpretation of the number sequence, refer to Tables 5-3 and 5-5.

- Cache test executes. LED displays a steady "F" while cache test executes. Flashing "F" means cache test failed.

- ATP/M in slot 1 is tested. Console is speed sensed. LED displays a steady "C" while ATP/M test executes. Flashing "C" means ATP/M test failed. If the LED displays a flashing "C" without first displaying a steady "C", console speed sensing failed.

- PIC tests execute. PIC is put in loopback mode and a DMA test executes. The only part of PIC circuitry not tested are the four HP-IB transceivers.

- All other installed channels (ATP/Ms, PICs, or LANIC) are tested. Any failure is reported to the system console. LED displays a steady "A" if all tests have passed.

MICRO 3000XE SELFTEST ERROR CODES

Table 5-3. MICRO 3000XE Power-On Selftest LED Error Codes

ERROR CODE LED DISPLAY	WHAT THE ERROR CODE MEANS
"0"	Appears briefly at power-on.
Steady "5"	CPU tests are executing.
Flashing "5" followed by two flashing numbers	CPU test failed. Refer to Table 5-4.
Steady "B"	Memory test is executing.
Flashing "B" followed by three flashing numbers	Memory test failed. Refer to Table 5-5.
Steady "F"	Cache test is executing.
Flashing "F"	Cache test failed.
Steady "C"	ATP/M test is executing. System console is being speed sensed.
Steady "C" followed by flashing "C".	ATP/M failed.
Flashing "C" only. (Not preceded by steady "C")	System console speed sensing failed.
Steady "A"	All tests passed.

The error code LED displays a steady "5" as the CPU chip function and WCS are tested. If an error is detected, "5" flashes three times and the LED displays two additional error codes in quick succession which give further information about error cause. Table 5-4 lists the additional error codes.

Table 5-4. MICRO 3000XE CPU Selftest LED Error Codes

LED Display	What the Error Code Means:	
5 (flashing)	Error in ROM or WCS.	
0	A bad WCS location detected by WCS tests cannot be detected by error routine.	ERROR CODE
1	Single WCS RAM failure.	
2	Multiple WCS RAM failures.	
3	ROM failures.	
0	U122 failed.	FAILING PART NUMBER
1	U119 failed.	
2	U116 failed.	
3	U114 failed.	
5	U111 failed.	
6	U108 failed.	
4	U105 failed.	
7	U103 failed.	

The error code LED displays a steady "B" as the memory tests execute. If an error is detected, "B" flashes three times and the LED displays three additional error codes in quick succession which give further information about error cause. Table 5-5 lists the additional error codes.

Table 5-5. MICRO 3000XE Memory Selftest Error Codes

LED Display	What the Error Code Means:	
B (blinking)	A memory failure was detected	
0 1 2 3 4	Board is not identifiable Error upon accessing board #1 Error upon accessing board #2 Error upon accessing wrong board Error upon accessing wrong board	BOARD NUMBER
0 1 2 3 5 6 4 7	Power Fail Auto Restart test failed Memory size test failed Initialization test failed ⎫ Refresh test failed ⎬ One test Address test failed ⎭ Patterns test failed EDAC test failed ⎫ One test Transceivers test failed ⎭	TEST NUMBER
0 1 2 3 4 5 6 7 8	Memory is dead Memory size is not supported No MBV occurred. Memory size will default to 1 megabyte Double bit error occurred Double bit error did not occur when expected Data is wrong Syndrome is wrong Syndrome is not resetting Single bit error occurred	ERROR CODE

MICRO 3000 SYSTEM SELFTEST DIAGNOSTIC OVERVIEW

Selftest is the primary power-on test which verifies the correct operation of the logic necessary to load the system. Selftest verifies the cold load path and tests functions in the following sequence:

Central Processing Unit (CPU)
Memory
Advanced Terminal Processor (ATP/M)
Peripheral Interface Controller (PIC)

The minimum hardware required to run selftest to completion:

MICRO 3000 processor board (includes CPU/Memory/PIC)
ATP/M (installed in channel 1)
Console (connected to ATP/M channel 1/port 0)

If a required peripheral is not connected, all tests performed before attempting to test the required unconnected peripheral are valid.

Selftest executes when any of the following occur:

- Power-on via the keyswitch.

- Invoked by the operator while in maintenance mode.

- Restart after power failure.

Test Execution Time

Test execution time varies with the amount of memory and the type and quantity of peripheral PCAs installed in the system.

2 megabytes of memory   45 seconds

4 megabytes of memory   60 seconds

Front Panel LED Indicators

FAULT and ACTIVITY LED indicators are located on the MICRO 3000 front panel.

FAULT LED   indicates the result of selftest

ACTIVITY LED   indicates the state of the CPU after selftest

Selftest in Detail

Detailed information about selftest and the correct syntax for maintenance and test mode commands is in the MICRO 3000 Selftest and Maintenance Mode Diagnostic Manual (P/N 30534-90001). This manual is part of the HP 3000 Diagnostic Manual Set (P/N 30070-60068).

MICRO 3000 SELFTEST OPERATING INSTRUCTIONS

Turn the keyswitch from position "0" to position "1", "2", or "3" to power on the SPU and start selftest.

The maintenance mode microcode resides on the processor board and contains the code for interpreting maintenance and test mode commands, and the MICRO 3000 selftest. Only the system console connected to port 0 (LOCAL) or port 7 (REMOTE) can execute the maintenance mode commands.

The Control B detection logic resides on the ATP/M. Only the ATP/M in slot 1/channel 1 can enable the Control B logic. To enable the logic, the keyswitch must be in either the "2" (LOCAL) or "3" (REMOTE) position.

When all tests successfully complete, maintenance mode is entered and the "H for help ->" prompt is displayed.

Once MPE is running, the ACTIVITY LED flashes once per second if the PAUSE instruction is executing. Otherwise, the LED remains lit or flashes rapidly depending on how busy the SPU is. If any test fails, the failing assembly is indicated by the state of the two LEDs. An error message is sent to the system console if the system console path is operational. Refer to Table 5-6 for Power-On Selftest LED interpretation.

The keyswitch directly effects the function of certain maintenance mode commands. Keyswitch capabilities are described in Table 5-7.

MICRO 3000 POWER-ON SELFTEST EXECUTION

Selftest executes in the following sequence:

- All CPU chip functions and WCS are tested. The control module and test executor load into WCS. Control transfers to the test executor.

- Test executor loads the memory, PIC, and ATP/M tests into WCS.

- All memory tests execute.

- ATP/M in slot 1 is tested.

- System console is speed sensed.

- PIC tests execute. PIC enters loopback mode and a DMA test executes. The only part of PIC circuitry not tested are the four HP-IB transceivers.

- All other installed channels (ATP/M or LANIC) are tested. Any failure is reported to the system console.

MICRO 3000 POWER-ON SELFTEST ERROR CODES

Table 5-6. MICRO 3000 Power-On Selftest LED Interpretation

ACTIVITY LED	FAULT LED	LED INTERPRETATION	ACTION TO TAKE
OFF	OFF	No Power.	Check for AC. Measure DC supply output.
		Processor completely dead.	Replace processor.
ON	ON	Executing selftest.	Wait for selftest completion.
		System in battery back-up mode.	Wait for AC power return.
OFF	ON	CPU or 0-2 Mb memory failed.	Replace processor PCA.
OFF	Flashing single blink	Unsupported ATP/M detected. (Only two ATPs are supported.)	Remove unsupported ATP/M.
OFF	Flashing double blink	Console ATP/M failed.	Replace ATP/M in slot 1
			or
		Fast/slow SIMB I/F failed.	Replace processor PCA.
OFF	Flashing triple blink	Console failed to speed sense.	Check cable connection between console and ATP/M.
			Check that console is in REMOTE mode.
			Console may be defective. Attempt loopback datacomm test.
			Replace ATP/M.
ON or Flashing	OFF	Selftest execution complete. "H for help" prompt displayed.	

KEYSWITCH CAPABILITIES

Table 5-7. Series 37/MICRO 3000XE/MICRO 3000 Keyswitch

Keyswitch Position	DC Power Supplied?	Enable Selftest Looping?	PON Command Allowed?	Enable Control B?
0 STANDBY	NO	N/A	N/A	N/A
1 NORMAL	YES	NO	YES	NO
2 LOCAL (from NORMAL)	YES	YES	YES	YES
2 LOCAL (from REMOTE)	YES	YES	NO	YES (Local Console)
3 REMOTE	YES	YES	NO	YES (Remote Console)

MICRO 3000LX/GX SYSTEM SELF-TEST DIAGNOSTIC OVERVIEW

The CPU, embedded discs, and embedded cartridge tape drive are tested by Self-test when the following steps are performed.

1. Check that the system power cord and any external peripheral power cords are connected to the AC power outlets. Check that the console power switch is ON.

2. Ensure that the console and peripherals are ON LINE. Move the keyswitch on the system from position 0 to position 1. This turns on system power and starts the system self-test. Self-test takes about 30 seconds for a 2 Mbyte system and about one minute for a 4 Mbyte system.

Check the following:

A. The CPU ACTIVITY and FAULT lights are lit;

B. The DISC ACTIVITY and FAULT lights are flashing;

C. The DISC-2 ACTIVITY and FAULT lights are flashing if a second disc is installed;

D. The cartridge tape Busy light is lit if a cartridge tape is installed. A cartridge tape should not be installed when self-test is initiated.

When self-test has completed, the CPU ACTIVITY light, the DISC ACTIVITY light, the DISC-2 ACTIVITY light (if installed), are lit. All cartridge tape Drive indicators should be off.

At this point you can start the system from either a disc or tape. You will know that the start was successful when you receive the appropriate option response, for example "COOLSTART/WARMSTART".

Self-test Fault Analysis

SELFTEST FAILURE--If the FAULT indicator stays on or continually blinks while self-test is running, it means there is a problem that needs to be fixed.

Table 5-8 shows the states of the CPU ACTIVITY and FAULT indicators. It also shows the associated interpretation and corrective action for the fault conditions.

Table 5-8. MICRO 3000LX/GX CPU ACTIVITY and FAULT Self-Test Indicators

ACTIVITY	FAULT	MEANING	ACTION
OFF	OFF	No AC input power No DC voltage CPU chip defective	Check that the system is plugged in Measure DC supply Replace Processor
OFF	ON	CPU or MEMORY failed	Replace Processor
OFF	BLINKING	Illegal hardware configuration	Correct hardware configuration
OFF	FLASHING DOUBLE FLASH	ATP slot 3 failed SIMB slow-to-fast interface failed	Replace ATP in slot 3 Replace Processor
OFF	TRIPLE FLASH	Console did not speed sense	Console cable disconnected Console not in remote Console misconfigured Console cable defective or wrong cable Console inoperative PDP defective. Replace.
ON	ON	System in battery back-up mode	Restore AC power
ON	OFF	Normal completion state	None

NOTE

If a power failure occurs during normal operation, both the ACTIVITY and FAULT indicators will light. This action indicates that battery power is retaining memory.

Table 5-9 shows the states of the DISC and DISC-2 ACTIVITY and FAULT indicators. It also shows the associated interpretation and corrective action for the fault indicators.

Table 5-9. MICRO 3000LX/GX DISC ACTIVITY and FAULT Self-Test Indicators

ACTIVITY	FAULT	MEANING	ACTION
ON	ON	On for 5 seconds at power-on while disc controller runs self-test and disc spins up. Both LEDs remain on if disc fails self-test.	None Repair disc subsystem.
FLASHING	OFF	Disc being accessed by CPU	None
OFF	ON	Disc drive failed mechanism self-test.	Repair disc subsystem.
ON	OFF	Disc drive is in a ready state	None

MAINTENANCE MODE

Maintenance mode is automatically entered when the system is powered on. To enter maintenance mode from MPE or DUS, turn the keyswitch to position "2" (LOCAL), and press and hold the CTRL key while pressing "B". When you enter maintenance mode, software execution halts.

Maintenance mode allows the system operator to perform several functions:

> The LOAD command loads the MPE operating system from tape.

> The START command loads the MPE operating system from disc.

> The DUMP command always loads the dump software from the start device.

> The TEST command allows the system operator to run the power-on selftests with error messages displayed on the system console. The test mode also allows a limited looping feature. Tests can be looped with the *count* parameter. *Count* must be an integer between 1 and 9999; the default is 1. The looping feature is disabled when the keyswitch is in position "1" (NORMAL).

LOAD, START, and DUMP require a channel and device specification unless the default device has been set up by the ",P" and ",C" options.

LOAD default specifications are channel 4/device 3.

START and DUMP default specifications are channel 4/device 1.

> For Series 37, the valid channels for a START/DUMP are 3 or 4 for the main cardcage, and 9 through 13 for the extender.

> For MICRO 3000XE, the only valid channels for a START/DUMP are 3 or 4 for the main cardcage, and 9 through 13 for the extender.

> For MICRO 3000, the only valid channel for a START/DUMP is 4.

Use the ",P" or ",C" options to change the default device. ",P" updates the load or start device data in the TOC and initiates the LOAD or START. ",C" also updates the TOC LOAD or START data, but the LOAD or START is not performed. Default specifications for LOAD, START, and DUMP are written into the TOC if it has not been previously initialized.

RUN attempts to "run" the system if maintenance mode was entered via a Halt or Control B.

AUTOMATIC RESTART (AR) allows the system operator to retry the Power Fail Auto Restart capability if the system has made 5 unsuccessful tries of approximately 90 seconds each.

LOAD/START type commands (COL, COO, DIS, NEW, REL, TA, UPD, and WAR) use the load or start device stored in the TOC.

Table 5-10 lists the valid maintenance mode commands.

Table 5-10. Maintenance Mode Commands.

COMMAND	DESCRIPTION
AR	Retry Automatic Restart.
COLDSTART	Perform COLDSTART using load device. Refer to Note 1 below.
COOLSTART	Perform COOLSTART using start device. Refer to Note 1 below.
DISC	Perform START using start device. Refer to Note 2 below.
DUMP	Perform DUMP using indicated or start device.
DW	Disable Automatic Warmstart.
EW	Enable Automatic Warmstart.
HELP	Display help messages.
LOAD	Perform LOAD (has options). Refer to Note 2 below.
NEWSYSTEM	Perform initial software installation.
PANEL	Enter softpanel.
RELOAD	Perform RELOAD using load device. Refer to Note 1 below.
RUN	Run system (return to MPE) after Control B halt.
SPEED	Allows the system operator to change system console speed.
START	Perform START (has options). Refer to Note 2 below.
TAPE	Perform LOAD using load device. Refer to Note 2 below.
TEST	Enter selftest mode.
UPDATE	Perform UPDATE using load device. Refer to Note 1 below.
WARMSTART	Perform WARMSTART using start device. Refer to Note 1 below.

Notes:

1. These commands do not allow changes to the software configuration.

2. These commands do allow changes to the software configuration (INITIAL dialogue).

Diagnostics

The additional maintenance mode commands in Table 5-11. can be used with the MICRO 3000XE system only.

Table 5-11. Additional MICRO 3000XE Maintenance Mode Commands

COMMAND	DESCRIPTION
DC	Disable Cache
EC	Enable Cache

TEST MODE

Use the maintenance mode TE[st] command to enter test mode.

Test mode allows the system operator to select portions of the power-on selftest, or an additional CPU test with error messages displayed on the system console. Test mode also allows for looping up to 9999 times; the default is 1.

Table 5-12 lists the commands available in test mode.

Table 5-12. Test Mode Commands

COMMAND	DESCRIPTION
ALL	Run all selftests 1-9999 times.
CHANNEL	Loop channel test 1-9999 times.
CPU	Loop CPU test 1-9999 times.
EXIT	Return to maintenance mode.
HELP	Lists test mode commands and displays the ROM version number.
IOMAP	Loop IOMAP 1-9999 times.
MEMORY	Loop memory test 1-9999 times.
PON	Run or loop power-on selftest.

TOC RAM DATA AND STATUS TABLES

Below are tables defining the TOC RAM locations displayed on the system console during selftest execution.

Table 5-13. TOC RAM Data and Status

TOC RAM ADDRESS	STATUS AND DATA STORED IN TOC RAM ADDRESS
$0A	Register A
$0B	Register B
$0C	Register C
$0D	Register D
$0E	Undefined
$0F	Console ATP/M port 0 interrupt time-out flag*
$10	Last stop information. See Table 5-12.
$11	Start device
$12	Load device
$13	Undefined
$14	Test loop counter (lower byte)
$15	Test loop counter (upper byte)
$16-$3F	Undefined

* If the ATP/M port 0 interrupt time-out flag is set (contains $AA) this means port 0 of the ATP/M in slot 1 of the SPU has failed to produce an expected interrupt within 500 milliseconds and the microcode has timed-out. This flag should be checked if the RUN command can't be executed. If the flag is set, port 0 configuration information was not stored and couldn't be restored upon executing the RUN command.

Table 5-14. Last-Stop Value Meanings

VALUE	MEANING
$00-$0F	Halts 0 through 15 (halt instructions executed)
$10-$1F	System Halt 0 through 15 (firmware detected traps). See Table 5-13.
$20	WCS parity error
$21	Watchdog Timer
$22	Power failure
$23	Control B (maintenance mode invoked)
$24	Multiple bit parity error
$25	SIMB bus parity error
$26	Simultaneous Cache Hit in Sets A and B
$27	Cache Tag Set B Parity Error
$28	Cache Tag Set A Parity Error
$29	Cache Data Parity Error
$2A-$7E	Undefined
$7F	MPE UP status removed by software. Disables Power Fail Auto Restart.
$80	System was running MPE or other software. Enables Power Fail Auto Restart.
$81-$FF	Unused. These values may be seen upon TOC power-on.

NOTE

Values between $00 and $FF not shown in Table 5-14 are undefined.

Table 5-15. System Halt Causes

SYSTEM HALT	TOC VALUE	CAUSE
1	$11	STT violation segment 1
2	$12	Absent trap while on ICS
3	$13	Code segment 1 trap violation
4	$14	ICS stack overflow
6	$16	Initial program load failure
7	$17	Illegal SBnk at QI-5 during IXIT
9	$19	Psuedo-Enable when enabled

NOTE

Values between $10 and $1F not shown in Table 5-15 are undefined.

Diagnostics

This page was left blank intentionally.

There are no field adjustments for the Series 37/MICRO 3000XE SPUs or I/O Extenders, or the MICRO 3000 and MICRO 3000LX/GX SPUs.

I

Adjustments

This page was left blank intentionally.

This section contains status formats for a few of the peripherals supported on the Series 37, MICRO 3000XE, MICRO 3000, and MICRO 3000LX/GX systems.

Refer to the appropriate peripheral CE Handbook for specific peripheral maintenance and troubleshooting procedures.

For INP and LANIC information, refer to the HP 3000 Computer System Data Communications Hardware Products CE Handbook (P/N 5957-4655).

HP 7914/7933/7935 AND 9140A STATUS FORMAT

Refer to Table 7-1 for a description of the bit definitions for status words 1-4. For further detail on Error Reporting Fields refer to CS80 Instruction Set Programming Manual P/N 5955-3442.

Table 7-1. HP 7914/33/35 and 9140A Status Bit Definitions

Status Word No. 1

Word Bit No.	Error Reporting Field	Description
0	0	Not Used.
1	1	Not Used.
2	2	**Channel Parity Error** - A channel command was received without odd parity.
3	3	Not Used.
4	4	Not Used.
5	5	**Illegal Opcode** - An unrecognizable opcode was received.
6	6	**Module Addressing** - An illegal volume or unit number was specified for this device.
7	7	**Address Bounds** - The target address has exceeded the bounds for this device.
8	8	**Parameter Bounds** - A parameter (other than unit, volume, or target address) is not allowed for this device.
9	9	**Illegal Parameter** - A parameter field was the wrong length for the opcode preceding it.
10	10	**Message Sequence** - The message sequence has been violated. (Error suppressed if any reject or fault errors have occurred prior to sequence error.)
11	11	Not Used.
12	12	**Message Length** - The total length of the execution message differs from the current default value.
13	13	Not Used.
14	14	Not Used.
15	15	Not Used.

Status Word No. 2

Word Bit No.	Error Reporting Field	Description
0	16	Not Used.
1	17	Cross-Unit - An error had occurred during a Copy Data operation.
2	18	Not Used.
3	19	Controller Fault - A hardware fault occurred in the controller.
4	20	Not Used.
5	21	Not Used.
6	22	Unit Fault - A hardware fault has occurred in the unit addressed.
7	23	Not Used.
8	24	Diagnostic Result - The hardware failed the diagnostic indicated in the parameter field.
9	25	Not Used.
10	26*	Operator Request - Release required for operator request (e.g., load/unload, restore).
11	27*	Diagnostic Request - Release required for diagnostics initiated from control panel (e.g., HIO, self test).
12	28*	Internal Maintenance - Release required for internal maintenance (e.g., head alignment, error log).
13	29	Not Used.
14	30	Power Fail - The power to the unit failed, a diagnostic destroyed configuration, or a pack was loaded. Device should be reconfigured.
15	31	Retransmit - The preceding transaction should be retried.

* Release required - This command can not be executed until after release is granted to the device.

Status Word No. 3

Word Bit No.	Error Reporting Fields	Description
0	32	**Illegal Parallel Operation** – The requested operation can't be executed in parallel with some other operation(s) currently in progress.
1	33	**Uninitialized Media** – The host attempted to access unformatted media, or unusable media has been loaded.
2	34	**No Spares Available** – Spare Block can't be executed due to lack of spare media.
3	35	**Not Ready** – The selected unit is not ready for access at this time (e.g., heads or media not yet fully loaded).
4	36	**Write Protect** – The selected volume is write protected.
5	37	**No Data Found** – A block accessed during a read has not been written.
6	38	Not Used.
7	39	Not Used.
8	40	**Unrecoverable Data Overflow** – The previous transaction generated more than one unrecoverable data error. The entire transfer should be considered in error.
9	41	**Unrecoverable Data** – Unrecoverable data at indicated block(s).
10	42	Not Used.
11	43	**End of File** – End of file encountered on file structured device.
12	44	**End of Volume** – The host attempted to access across a volume boundary.
13	45	Not Used.
14	46	Not Used.
15	47	Not Used.

Status Word No. 4

Word Bit No.	Error Reporting Fields	Description
0	48	**Operator Request** – Release requested for operator request (e.g., load/unload, restore).
1	49	**Diagnostic Request** – Release request initiated from diagnostic control panel (e.g., HIO, self test).
2	50	**Internal Maintenance** – Release requested for internal maintenance (e.g., head alignment, error log).
3	51	**Media Wear** – Only one spare track (disc) or one spare block (tape) remaining.
4	52	**Latency Induced** – A latency was induced during the transfer due to slow transfer rate or seek retry.
5	53	Not Used.
6	54	Not Used.
7	55	**Auto Sparing Invoked** – A defective block has been automatically spared by the device.
8	56	Not Used.
9	57	**Recoverable Data Overflow** – The previous transaction generated more than one recoverable data error.
10	58	**Marginal Data** – Data was recovered, but with difficulty.
11	59	**Recoverable Data** – A latency was introduced in order to correct a data error.
12	60	Not Used.
13	61	**Maintenance Track Overflow** – Error and fault log area is full.
14	62	Not Used.
15	63	Not Used.

HP 7974/78 MAGNETIC TAPE DRIVE

Refer to Table 7-2 for a description of the bit definitions for status bytes 1-3. Status byte 4 contains two fields; the retry count for the last read or write operation (bits 3-7) and the error detail of a command reject error (bits 0-2). The three bits of command reject detail are decoded as follows:

    000 = no further detail
    001 = no further detail
    010 = device reject; see byte 5
    011 = protocol reject; see byte 5
    100 = no further detail
    101 = prior error reject; see byte 5
    110 = no further detail
    111 = selftest failure

Table 7-2. HP 7974/78 Status Bit Definitions

Status Byte No. 1

Byte Bit No.	HP-IB Data Line No.	Description
0	8	EOF - End of File detected.
1	7	BOT/LP - Beginning of Tape/Load Point.
2	6	EOT - End of Tape.
3	5	STE - Single Track Error (recovered error).
4	4	Command reject (see byte 4 for details).
5	3	File Project (not write enabled; no write ring).
6	2	Unrecovered error.
7	1	Unit Online.

Status Byte No. 2

Byte Bit No.	HP-IB Data Line No.	Description
0	8	In GCR (6250 CPI Density) mode.
1	7	Unknown density on tape.
2	6	Data Parity Error.
3	5	Data Error (Timing).
4	4	Tape Runaway.
5	3	Door Open.
6	2	Not Used.
7	1	Immediate report enable.

Status Byte No. 3

Byte Bit No.	HP-IB Data Line No.	Description
0	8	In PE (1600 CPI Density) mode.
1	7	In NRZI (800 CPI Density) mode.
2	6	Power Restored.
3	5	HP-IB Command Parity Error.
4	4	Tape position is unknown (unrecovered).
5	3	Tape drive formatter error.
6	2	Tape drive servo error.
7	1	Tape drive controller error.

The fifth status byte contains binary coded information regarding the specific error encountered. The sixth status byte is used only for reporting the transparent status of hard and soft errors while in immediate report mode. This byte indicates which command had the error. It contains the number of commands sent and reported since the command in question was issued.

HP 2563A/3565A/2566A LINE PRINTER

See Figure 7-1 for a layout of the HP-IB interface connector and refer to Table 7-3 for a description of the status bit definitions for status word 1.

147018-30
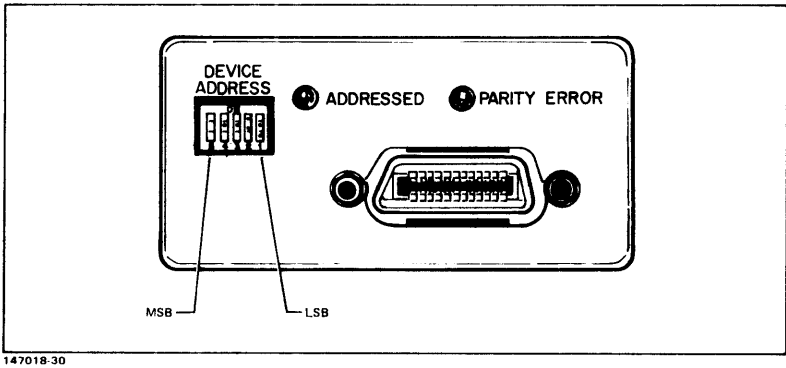
Figure 7-1. HP-IB Interface Connector and Device Address Switches

DEVICE ADDRESS Switches*	5	4	3	2	1
Binary representation	16	8	4	2	1
Example device address (7)	0	0	1	1	1

1 = on
0 = off

*Note: On the 256XA printers, this is done via the keypad.

Table 7-3. HP 2563A/2565A/2566A Status Bit Definitions

Status Word No. 1

```
+--------------------------------------------------------------+
| 0  1  2  3  4  5  6  7 | 8  9  10  11  12  13  14  15        |
--------------------------------------------------------------
| | | | | | | | | |     |  |  |   |   |   |   |   |            |
| | | | | | | | | |     |  |  |   |   |   |   |   Not          |
| | | | | | | | | |     |  |  |   |   |   |   |   Used         |
| | | | | | | | | |     |  |  |   |   |   |  Platen/ribbon     |
| | | | | | | | | |     |  |  |   |   |  6/8 Lines per         |
| | | | | | | | | |     |  |  |   |  Inch                      |
| | | | | | | | | |     |  |  |  SelfTest Mode                 |
| | | | | | | | | |     |  |  Paper Error                      |
| | | | | | | | | |     |  SelfTest Failure                   |
| | | | | | | | | |    Print Mechanism Failure                |
| | | | | | | | |  OnLine                                      |
| | | | | | | | Power Restored                                |
| | | | | | | Not Used                                        |
| | | | | | 6/8 Lines per Inch                                |
| | | | | VFC Initialized                                     |
| | | | VFC Channel 12 (top of form)                          |
| | | VFC Channel 9 (bottom of form)                          |
| | Not Ready                                                 |
| OnLine                                                      |
+--------------------------------------------------------------+
```

HP 2680A/2688A PAGE PRINTER

I/O Status

The HP 2680A status reports contains 16 data words to indicate the condition of the HP 2680A system. The status report is used to diagnose HP 2680A system faults. The following is an example of an I/O display in response to the OCTAL command.

| NOTE |

Words 2 through 15 and bits 1,2,3 and 4 of word 1 are cleared when-ever the I/O status block is returned to the host system.

WORD	I/O STATUS	ENV STATUS
0	%004004	%000020
1	%000000	%027511
2	%000000	%000057
3	%000000	%010100
4	%001000	%070101
5	%000000	%000654
6	%000000	%000000
7	%000000	%000102
8	%000000	%021156
9	%000000	%000000
10	%000000	%000675
11	%000000	%004102
12	%000000	%000000
13	%000001	%000000
14	%000000	%000000
15	%000000	%000000

I/O Status Word 0

Word 0 identifies status words containing valid information. Each bit, starting with bit one, indicates
the status word (1-15) containing valid information. For example, if bit 4 is set (1), then word four con-
tains valid status data.

```
-------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
-------------------------------------------------------
      |    | | |                    |   |   |   |
      |    | | |                    |   |   |   |
      ---------------------------------------------
                        |
                        |STATUS WORDS CONTAINING
                        VALID DATA.
```

I/O Status Word 1

```
-------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
-------------------------------------------------------
  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |
  |  |  |  |  |  +-----------------------------------+
  |  |  |  |  |                     |
  |  |  |  |  |                     |
  |  |  |  |  |                  RESERVED
  |  |  |  |  |
  |  |  |  |  |---> TRANSMISSION ERROR DETECTED IN PRINTER
  |  |  |  |        (CHANNEL COMMAND ERRONEOUS OR
  |  |  |  |        DATA LENGTH ERROR).
  |  |  |  |
  |  |  |  |------> PARITY ERROR DETECTED IN HP-IB.
  |  |  |
  |  |  |
  |  |  |--------> POWER UP COMPLETED SINCE LAST I/O
  |  |             ,STATUS READ.
  |  |
  |  |------------> MESSAGE BEING DISPLAYED ON HP 2680A PRINTER.
  |
  |---------------> 0=ONLINE, 1=OFFLINE.
```

I/0 Status Word 2 - Unused

I/O Status Word 3 - Machine Control System (MCS) Fault Member

```
---------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
---------------------------------------------------------
```

Contains octal word indicating a given machine fault (i.e., paper jam, out-of-paper). The status word is
translated to a message and displayed on the printer readout LED display.

I/O Status Word 4

```
------------------------------------------------------->
| 0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15 |
---------------------------------------------------------
| BIT      |                    DESCRIPTION                          |
--------|------------------------------------------------
|          |                                                         |
|   0      |     No memory available for attempted                   |
|          |     character set load.                                 |
|          |                                                         |
|   1      |     No memory available for attempted                   |
|          |     form load.                                          |
|          |                                                         |
|   2      |     No memory available for attempted                   |
|          |     VFC load.                                           |
|          |                                                         |
|   3      |     An attempt was made to print data without           |
|          |     a selected character set.                           |
|          |                                                         |
|   4      |     An attempt was made to select an undefined          |
|          |     form.                                               |
|          |                                                         |
|   5      |     An attempt was made to print data without           |
|          |     a selected Vertical Form Control (VFC).              |
|          |                                                         |
|   6      |     An attempt was made to print data without           |
|          |     a selected Logical Page Table (LPT).                |
|          |                                                         |
|   7      |     An attempt was made to move pen off the             |
|          |     logical page.                                       |
|          |                                                         |
|   8      |     The printer could not process all data              |
|          |     before transfer was made to the                     |
|          |     drum/paper. Data will be lost.                      |
|          |                                                         |
|   9      |     Data block contains format error. Invalid           |
|          |     function code or record/block size error.           |
|          |                                                         |
|  10      |     Missing multi-copy forms table.  An attempt|
|          |     was made to use a multi-copy forms table            |
|          |     that was not loaded for this job.                   |
|          |                                                         |
---------------------------------------------------------
```

I/O Status Word 4 (con't.)

```
-----------------------------------------------------------
| BIT   |                 DESCRIPTION                       |
|-------|---------------------------------------------------|
|       |                                                   |
|  11   |    Maximum number of copies per physical page     |
|       |    has been exceeded.                             |
|       |                                                   |
|  12   |    A command or function code was received        |
|       |    without a job in process.                      |
|       |                                                   |
|  13   |    No user memory available.  User memory         |
|       |    is loaded with character sets, VFC's, forms    |
|       |    and data.  The current data transmitted        |
|       |    cannot be processed and will be lost.          |
|       |                                                   |
|  14   |    A VFC is selected by a logical page table      |
|       |    entry which has word ten (line spacing on      |
|       |    page) less than or equal to zero.              |
|       |                                                   |
|  15   |    A skip was made to a non-existent VFC.         |
-----------------------------------------------------------
```

I/O Status Word 5

```
-----------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
-----------------------------------------------------------
| BIT   |                 DESCRIPTION                       |
|-------|---------------------------------------------------|
|       |                                                   |
|   0   |    Logical page was truncated to fit on the       |
|       |    physical page.                                 |
|       |                                                   |
|   1   |    Page size requested by programmer does not     |
|       |    match page length set by operator. The         |
|       |    operator-set page length will be used.         |
|       |                                                   |
|   2   |    No character set selected when print           |
|       |    record was processed. Record was skipped.      |
|       |                                                   |
| 3-15  |    Unused.                                        |
-----------------------------------------------------------
```

Peripherals

I/O Status Word 6

```
-------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
-------------------------------------------------------
|  BIT  |                DESCRIPTION                    |
--------|----------------------------------------------
|       |                                              |
|   0   |   Not enough memory for picture download.    |
|       |                                              |
|   1   |   Attempt to print more than 64 pictures on  |
|       |   a physical page.                           |
|       |                                              |
|   2   |   Attempt to print a picture which is not    |
|       |   present.                                   |
|       |                                              |
| 3-15  |   Unused.                                    |
|       |                                              |
-------------------------------------------------------
```

I/O Status Words 7-11 - Reserved for future use.

┌─────────────┐
│   **NOTE**   │
└─────────────┘

I/O Status Words 12,13,14, and 15 are double word
integers.

I/O Status Word 12

```
-------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
-------------------------------------------------------
```

Contains error record number defined by word 4. Information is reported during a
JOB function.

I/O Status Word 13

```
-------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
-------------------------------------------------------
```

Contains error record number defined by word 4. Information is reported during a JOB function.

I/O Status Word 14

```
----------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
----------------------------------------------------------
```

Contains sheet number where error occurred as defined by word 4. Information is reported during a job function.

I/O Status Word 15

```
----------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
----------------------------------------------------------
```

Contains sheet number where error occured as defined by word 4. Information is reported during a job function.

Environmental Status

The environmental status report contains 16 data words indicating current configuration, print job, and printer mode of the HP 2680A page printer. Data is supplied to assist in the interpretation of diagnostic data. The following is a description of the bit definitions for status words 0 through 15.

Environmental Status Word 0

```
----------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
----------------------------------------------------------
   |  |  |  |  |  |  |  |  |  |   |   |   |   |   |
   ----------------------    ----------------------------
            |                             |
            |                             |
   Number of data blocks       Size of incoming data buffer
   in the incoming data        in 512 word blocks.
   buffer.
```

Environmental Status Word 1

```
----------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
----------------------------------------------------------
```

Number of twenty word buckets available.

Peripherals

Environmental Status Word 2

```
---------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
---------------------------------------------------------
```

Maximum number of buckets used since last job open.

Environmental Status Word 3

```
---------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
---------------------------------------------------------
  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |
  ----------  ----------------     --------------------
      |               |                     |
      |               |             Number of forms loaded in
      |               |             printer.
      |               |
      |               |--------->Number of VFC's loaded in
      |                          printer.
      |
      |------------------------>Amount of Printer Memory:
                                00=128K words
                                01=256K words
```

Environmental Status Word 4

```
---------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
---------------------------------------------------------
---------------------------------------------------------
  |  |  |  |  |  |  |  |  |  |   |   |   |   |   |   |
  ----------  ----------------     --------------------
      |               |                     |
      |               |             Character sets loaded in
      |               |             printer.
      |               |
      |               |--------->Number of active logical
      |                          pages.
      |
      |------------------------>HP-IB address (dev 0-7).
```

Environmental Status Word 5

```
------------------------------------------------------------
| 0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15 |
------------------------------------------------------------
```

Number of character set dot/bit image (words+3)/4 plus the number
of proportional spacing (words used plus 3)/4.

Environmental Status Word 6

```
------------------------------------------------------------
| 0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15 |
------------------------------------------------------------
```

Number of form dots per bit (words + 3)/4 plus the number of form
triplet (words plus 3)/4.

Environmental Status Word 7

```
------------------------------------------------------------
| 0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15 |
------------------------------------------------------------
```

Number of VFC words loaded.

Environmental Status Word 8

```
------------------------------------------------------------
| 0   1   2   3   4   5   6   7   8   9   10   11   12   13   14   15 |
------------------------------------------------------------
    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
    ---------------------        ---------------------------
            |                                |
            |                                |
  Page length in the          Page width in direction of laser
  direction of paper          scan, in 0.1 inch increments.
  motion, in 0.25"
  increments.
```

Peripherals

Environmental Status Word 9

```
---------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
---------------------------------------------------------
  |  |  |  |  |  |  |  |  |  |  |   |   |    |   |   |
  ---------------------------------------       |   |   |
                      |                          |   |   |
                      |                          |   |   |
                                                 |   |   |
                  NOT USED                       |   |   |
                                                 |   |   |
                                                 |   |   |
  End of job encountered while printer           |   |   |
  was in the silent running mode.     <------    |   |
                                                     |   |
                                                     |   |
  Form not printed on page as form started          |   |
  before the quarter inch margin on the top         |   |
  or bottom of page.  Error was caused either <--|   |
  by programmer error, or operator used the             |
  registration switches to locate the form off         |
  the page.                                             |
                                                        |
                                                        |
                                                        |
  Data truncated from top or bottom of page.            |
  Programming error occurred or operator moved          |
  the print of the page with the registration   <----|
  switches.
```

Environmental Status Word 10

```
---------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
---------------------------------------------------------
```

Number of USER AREA words actually loaded, plus 3 divided by 4.

Environmental Status Word 11

```
---------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
---------------------------------------------------------
```

Date code of DCS firmware currently installed.

Environmental Status Word 12

```
------------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
------------------------------------------------------------
```

Number of non blank characters clipped (not printed) on this job.

Environmental Status Word 13

```
------------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
------------------------------------------------------------
```

Reserved.

Environmental Status Word 14 and 15

```
------------------------------------------------------------
| 0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15 |
------------------------------------------------------------
```

Number of physical pages printed since last job open (signed double integer). Indicates total number of physical pages printed for this job since the environmental status block read function.

HP 97961B/62B/63B DISC DRIVES

The HP 97961B/62B/63B disc drives are installed in the HP MICRO 3000LX/GX systems as embedded peripherals. Refer to the CE SERVICE HANDBOOK for 79XX SERIES DISC DRIVES, part number 07961-90905, for information about the HP 97961B/62B/63B disc drives.

HP 9144S TAPE DRIVE

The HP 9144S Tape Drive is installed in the HP MICRO 3000LX/GX systems as an embedded peripheral. Refer to the CE SERVICE HANDBOOK for HP 1/4-INCH TAPE DRIVES (HP 9144A TAPE DRIVE), part number 09144-90039, for information about the HP 9144S Tape Drive.

HP 9145S TAPE DRIVE

The HP 9145S Tape Drive is installed in the HP MICRO 3000LX/GX systems as an embedded peripheral. Refer to the CE SERVICE HANDBOOK for HP 1/4-INCH TAPE DRIVES (HP 9145A TAPE DRIVE), part mumber 09145-90039, for information about the HP 9145S Tape Drive.

REPLACEABLE PARTS

This section is composed of illustrations and parts lists for the Series 37 and MICRO 3000 Family com-
puter systems. The primary purpose is to provide part number data needed by the Customer Engineer
when ordering replacement parts.

HOW TO USE THE PARTS CATALOG

This parts catalog is supplied for HP 3000 Computer Systems only as a means of obtaining part number information for replaceable parts. Unless otherwise specified, listed parts are field replaceable (refer to symbol definitions).

The parts catalog is organized in the order of significant major assemblies, followed by subassemblies and associated parts. When the part number is unknown, use the illustrations to locate the major assembly or subassembly. Then refer to the associated parts list for the indexed part number corresponding to the index number on the illustration. The parts list contains the description, part number, and quantity per unit.

DEFINITION OF SYMBOLS

E (Exchange) - Indicates that the part/assembly is on the exchange parts program (Blue Stripe). These parts are ordered from Product Support Division (PRSD).

C (Consumable) - Indicates that the part/assembly is considered consumable and that the broken or damaged part is discarded after replacement. These parts are ordered from Corporate Parts Center (CPC) or Parts Center Europe (PCE).

F (Fabricated) - Indicates that the item is considered a low failure rate item and as such, is built and supplied upon demand. These parts are ordered from CPC or PCE.

NR (Not Recommended for Replacement) - Order next higher assembly.

REF - Indicates for reference only.

| NOTE |

The system cabinet information applies to the Series 37, MICRO 3000XE, and MICRO 3000 computer systems. All other information is system-specific and is clearly described as such in the figure titles.

SERIES 37/MICRO 3000XE PARTS CATALOG
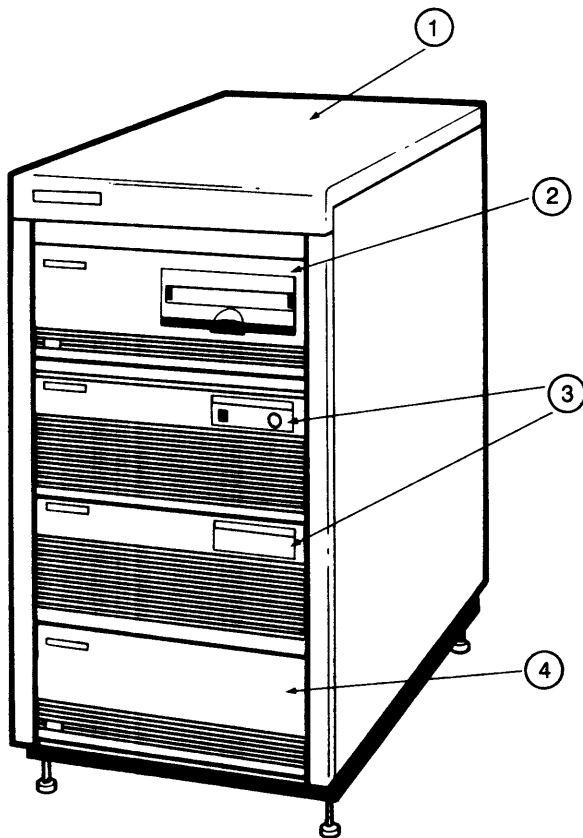
Figure 8-1. HP 3000 Series 37/MICRO 3000XE Computer System

Figure and Index #	Description	H.P. Part Number	Def of Sym	Qty
8-1-1	System Cabinet (see Figure 8-2)	30463-60015		
-2	Tape Drive			
-3	SPU and I/O Extender (see Figure 8-3)	30457-00010		
	PCAs:			
	CPU (Series 37)	30457-69001	E	
	CPU (MICRO 3000XE)	30474-69001	E	
	PIC	30459-69002	E	
	TIC/ATP37	30460-69001	E	
	ATP/M (RS-232)	40290-69001	E	
	ATP/M (RS-422)	40290-69002	E	
	0.5 Mb Memory(Series 37)	30461-69001	E	
	1 Mb Memory	30456-69001	E	
	2 Mb Memory	30462-69001	E	
	4 Mb Memory(MICRO 3000XE)	30482-69001	E	
	LANIC	30243-69001	E	
	INP	30244-69002	E	
	StarLAN	30265-69001	E	
-4	Disc Drive			
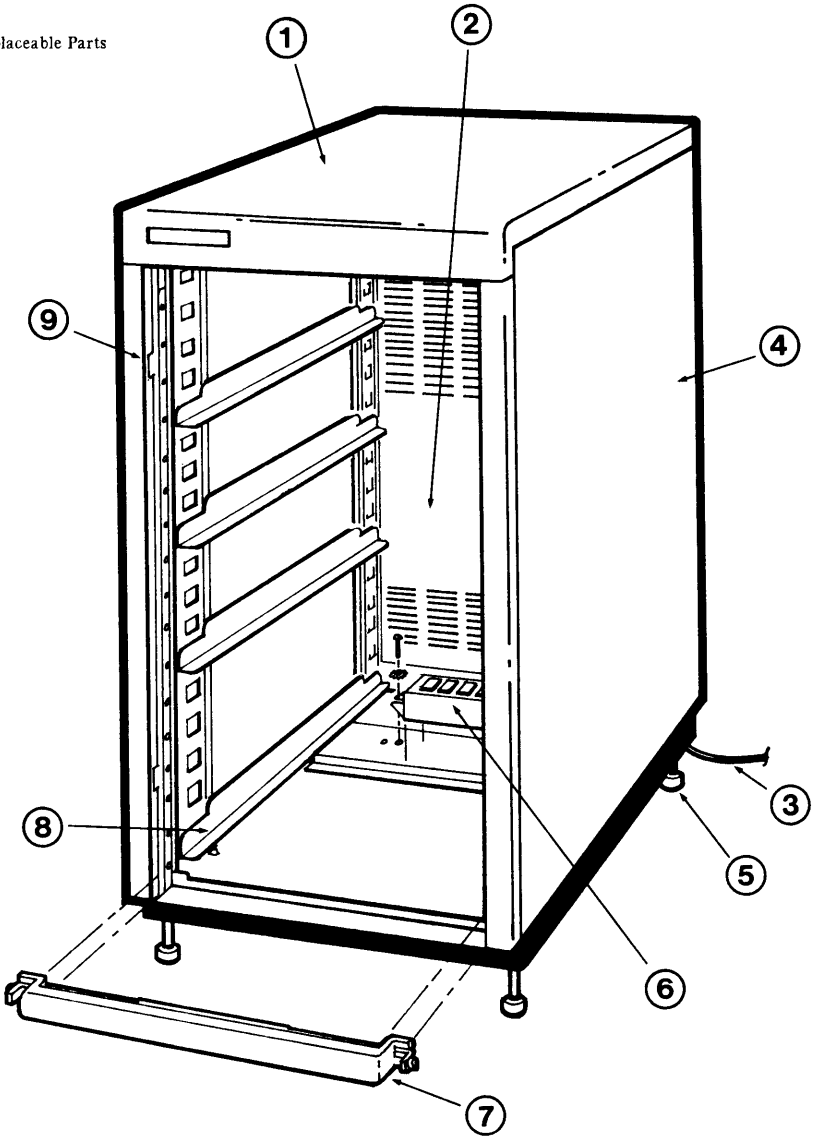
Figure 8-2. System Cabinet (Series 37/MICRO 3000XE/MICRO 3000)

```
Figure                                  H.P.          Def
   and           Description            Part           of       Qty
Index #                                Number         Sym
-------------------------------------------------------------------
8-2        System Cabinet           30463-60015

  -1       Top Assembly             5061-3136          C

  -2       Rear Door Assembly       30463-60016        C

  -3       Power Cord               8120-1575          C

  -4       Side Panel Assembly (old) 30463-60006       C

           Side Panel Assembly (new) 5061-3137         C

  -5       Leveling Pad (old)       0403-0484          C

           Leveling Pad (new)       0403-0419          C

           Caster (old)             1492-0083          C

           Caster (new)             1492-0122          C

  -6       Power Tap (International) 1252-0539          C

           Power Tap (U.S.)         1252-0481 (old)    C
                                    1252-2177 (new)    C

  -7       Filler Panel             5041-1307          C

  -8       Rail                     30463-00021        C

  -9       Front Locking Strip (old) 92211-60005       C

           Front Locking Strip (new) 5061-3139         C

not shown: Module Lock              30463-40005        C

           Ball Stud                1390-0573          C

           Misc. Parts Kit          30457-60014        C

           Key                      03131-00483        C

           touch-up spray paints:
           Parchment White          6010-1148          C

           Dove Gray (front locking 6010-1146          C
             strip and top)

           French Gray (sides/      6010-1147          C
             rear door)
```
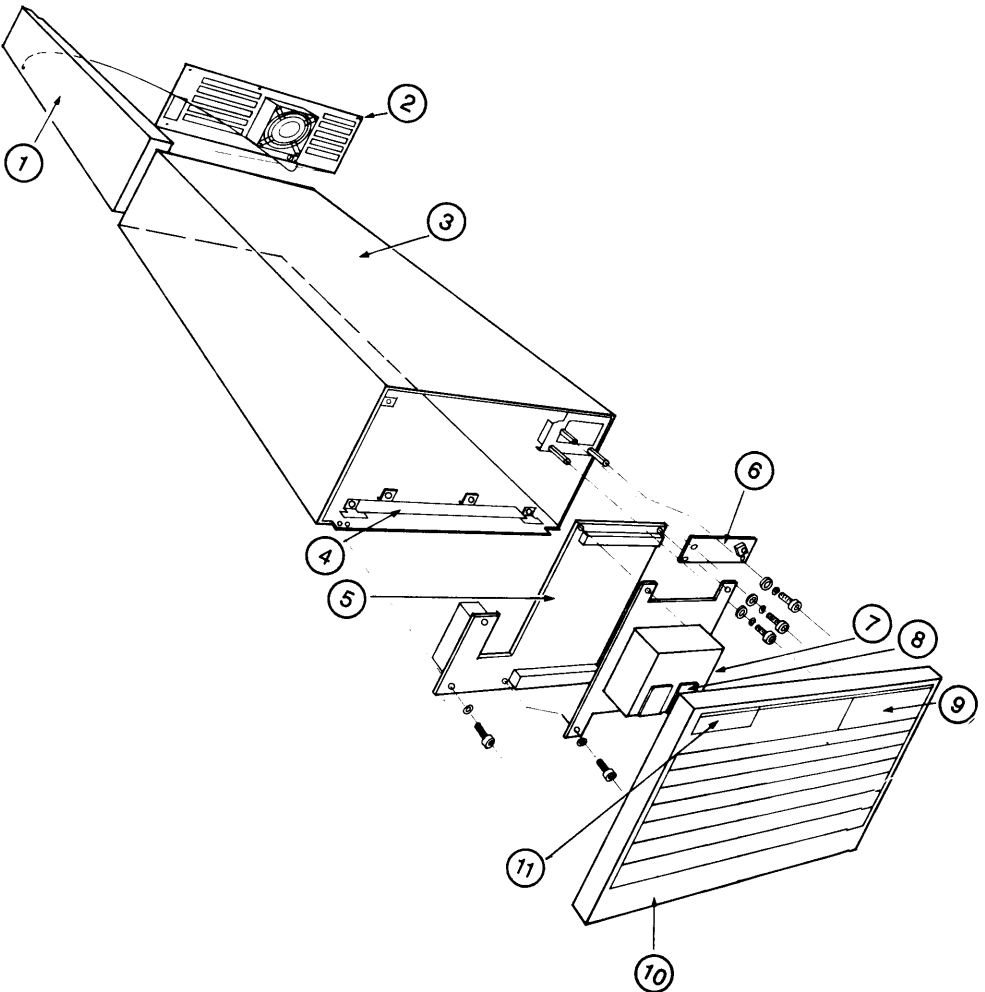
Figure 8-3. HP 3000 Series 37/MICRO 3000XE SPU and I/O Extender

```
Figure                                     H.P.       Def
   and          Description                Part        of        Qty
Index #                                   Number      Sym
-------------------------------------------------------------------------
8-3           Card Cage Assembly          30457-00010
              (SPU or I/O Extender)

  -1          DC Power Supply (old)       0950-1668     C
                                          0957-0011     E

              DC Power Supply (new)       0950-1850     C
                                          0957-0011     E

  -2          Rear Panel (no labels)      30457-00001*  REF

              Rear Panel Assembly         30457-60013*  F
               (no labels)

  -3          SPU Outer Cover             30457-60029   C

              I/O Extender Outer Cover    30458-00001   C

  -4          Bracket                     30457-00018   F

  -5          Backplane PCA (old)         30457-60002   C

              Backplane PCA (new)         30474-60006   C

  -6          SPU Display Panel PCA       30457-60003   F

              I/O Extender Display PCA    30458-60002   F

              Display Panel Cable (for    30457-60008   C
               SPU or I/O Extender)

  -7          Battery Pack/Fuse           1420-0343     C

  -8          Battery Holder              30457-00011   F

  -9          Label - SPU display panel   30457-80200   C

              Label - Extender display    30458-80200   C
                 panel

 -10          SPU Bezel Assembly (no      30457-60005   F
               ID/Display Panel label)

              Extender Bezel Assembly     30458-60008   F
               (no ID/Display Panel
                label)
```
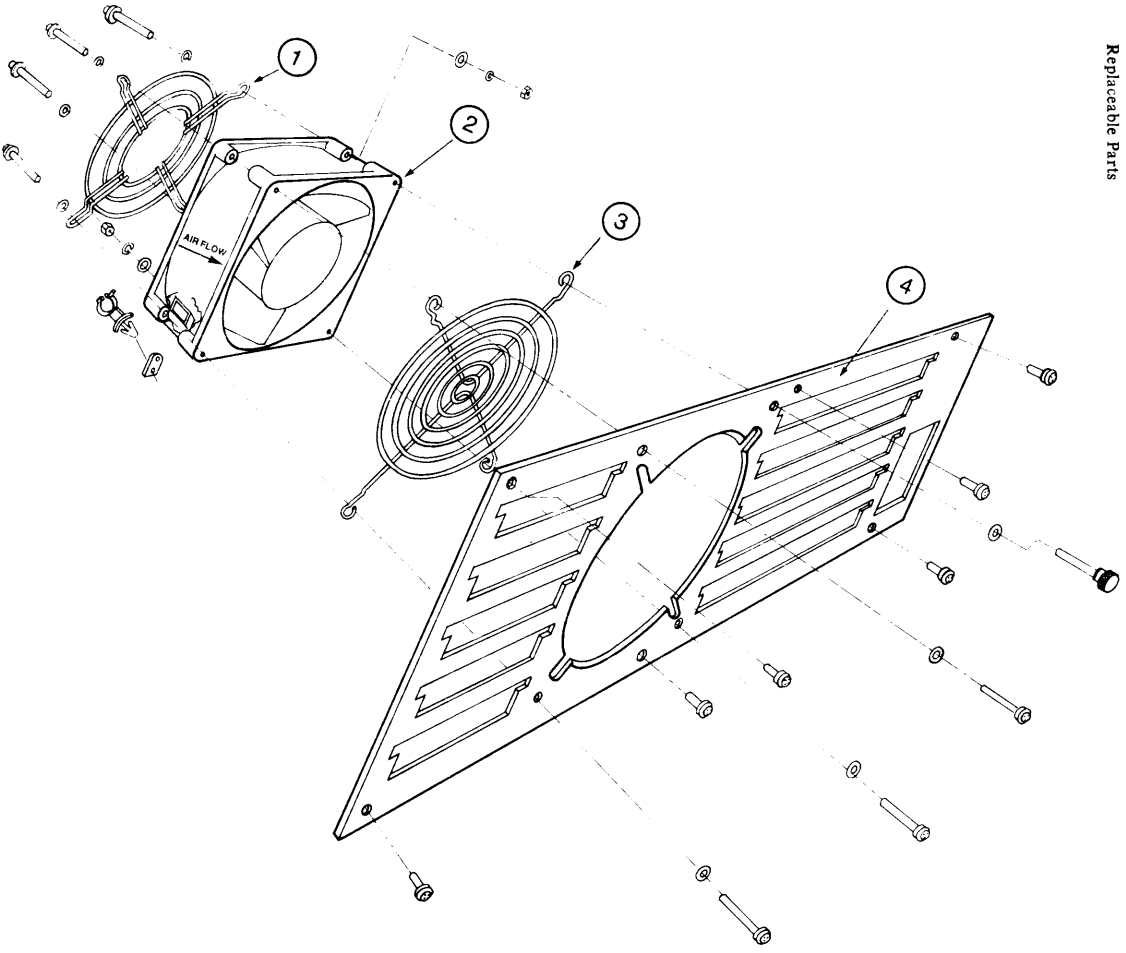
Figure 8-4. HP 3000 Series 37/MICRO 3000XE SPU Rear Panel Assembly

AIR FLOW

Figure and Index #	Description	H.P. Part Number	Def of Sym	Qty
8-4	Rear Panel Assembly (no labels)	30457-60013	F	
-1	Fan Grill	3160-0092		
-2	Tubaxial Fan (old)	3160-0408		
	Tubaxial Fan (new)	3160-0485		
-3	Finger Guard	3160-0434		
-4	Rear Panel Sheet Metal	30457-40001	F	
	Plastic Cover Plate (sm) (fits over slots on left)	30457-40002		
	Plastic Cover Plate (lg) (fits over slots on right)	30457-40003		
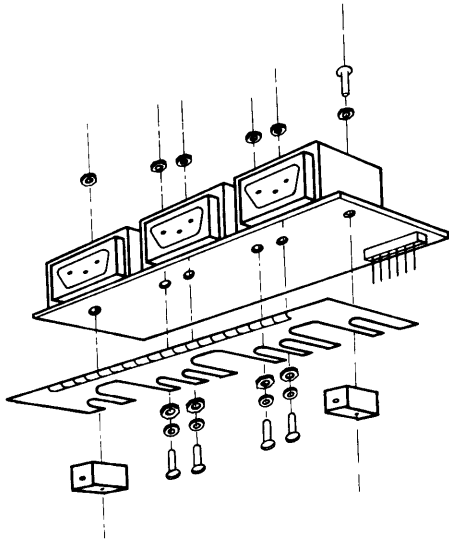
Figure 8-5. HP 3000 Series 37/MICRO 3000XE RS-232 Assembly

Figure and Index #	Description	H.P. Part Number	Def of Sym	Qty
8-5-1	RS-232 Interface Assembly	30466-60001	C	
-2	Upper RS-232 PCA	30466-60002	C	
-3	Lower RS-232 PCA	30466-60003	C	
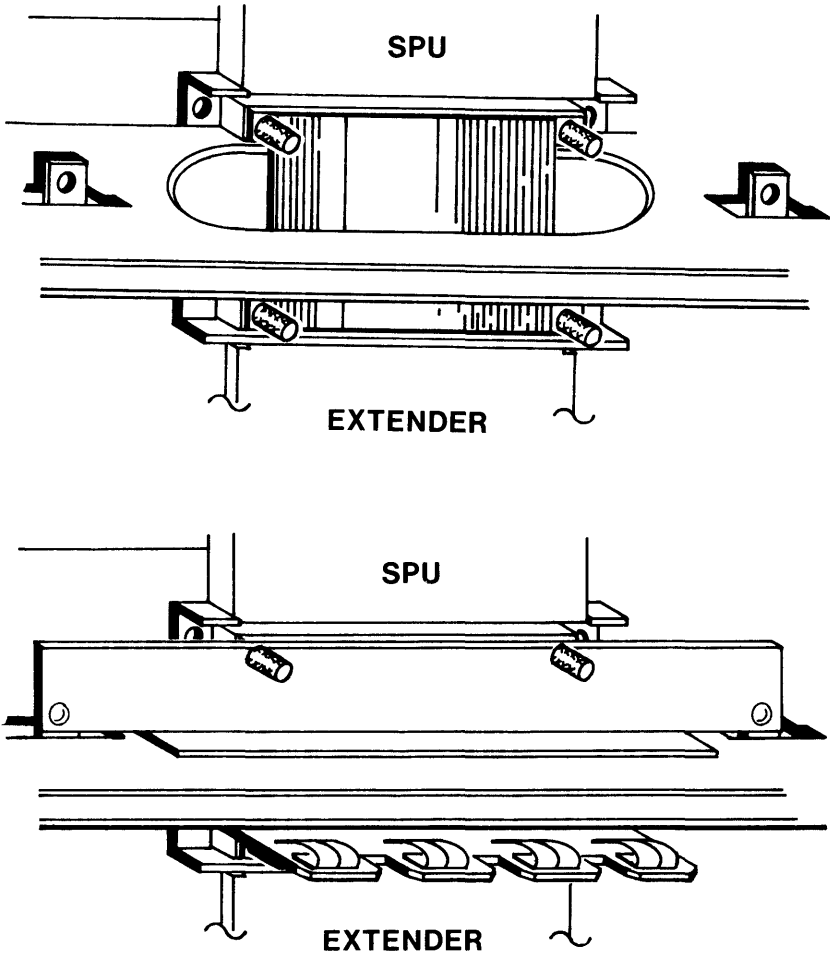
Figure 8-6. HP 3000 Series 37/MICRO 3000XE RFI Assembly

Figure and Index	Description	H.P. Part Number	Def of Sym	Qty
8-6	RFI Bracket for Extender	30474-80201	C	
	EMI Bracket for Extender	30458-00003	C	

MICRO 3000 PARTS CATALOG
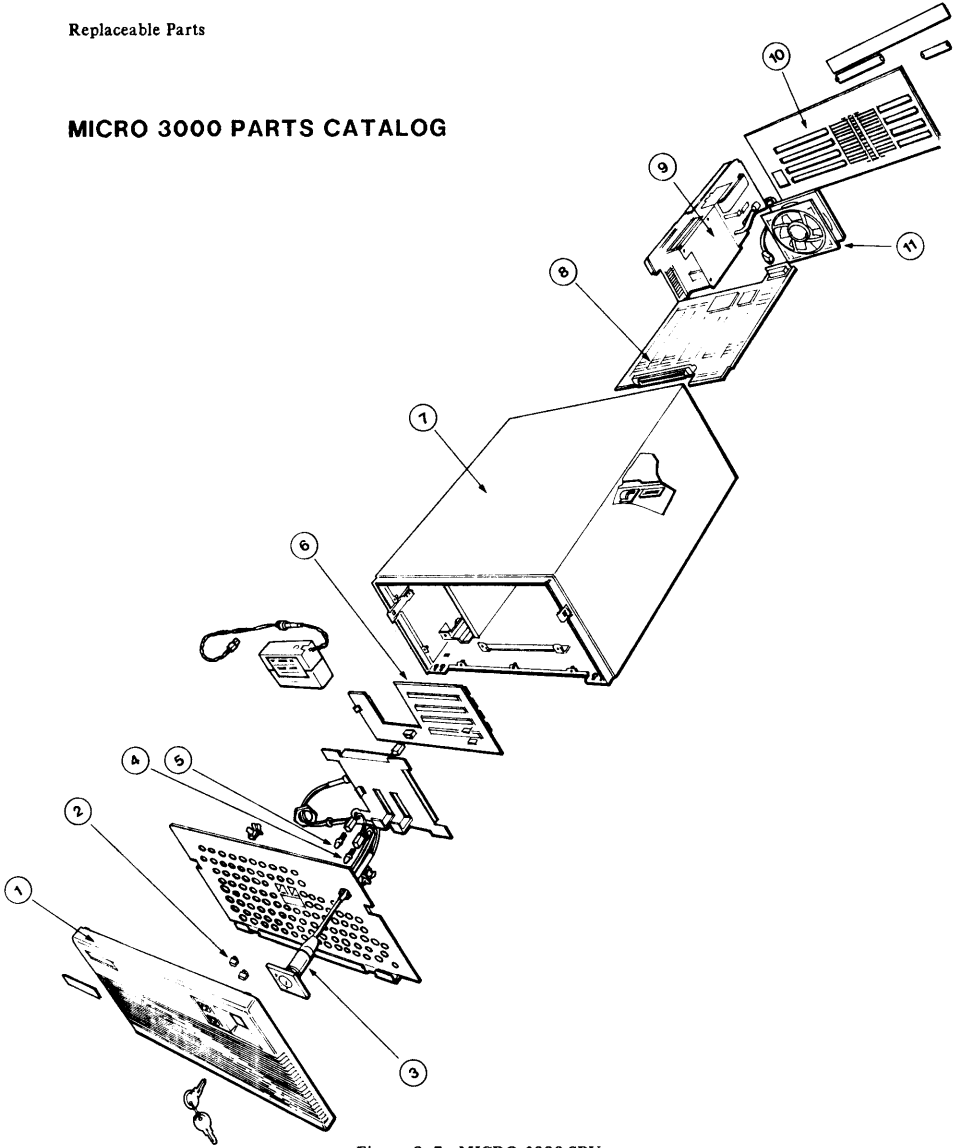
Figure 8-7. MICRO 3000 SPU

Figure and Index #	Description	H.P. Part Number	Def of Sym	Qty
8-7	MICRO 3000 SPU	30534-90005		
-1	Front Bezel	30534-40001	F	
-2	Light Pipe	09817-4770	F	
-3	Keyswitch Assembly	30534-60008	F	
-4	Yellow LED	HLMP-3850	C	
-5	Green LED	HLMP-3950	C	
-6	Backplane	30534-60002	F	
-7	Cover	30534-00002	F	
-8	2 Mbyte CPU Board	30534-60001 (new)		
		30534-69001 (exchange)	E	
	4 Mbyte CPU Board	30534-60010 (new)		
		30534-69010 (exchange)	E	
-9	Power Supply	0950-1850 (new)		
-10	Rear Panel	30534-00001	F	
-11	Fan	3160-0485	C	
not shown:	Battery/Fuse Assembly	30457-60011	C	
	Key (included in Misc. Parts Kit (P/N 30534-60009)	1535-4228	C	
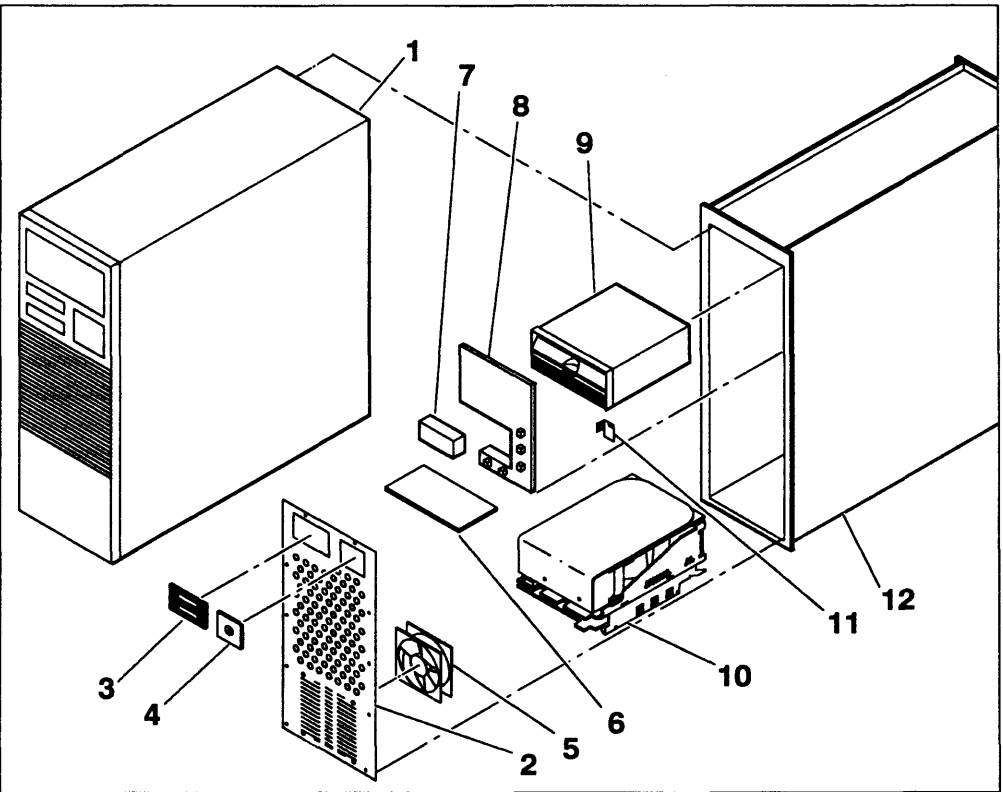
Figure 8-8. MICRO 3000LX/GX SPU

LG200121_003
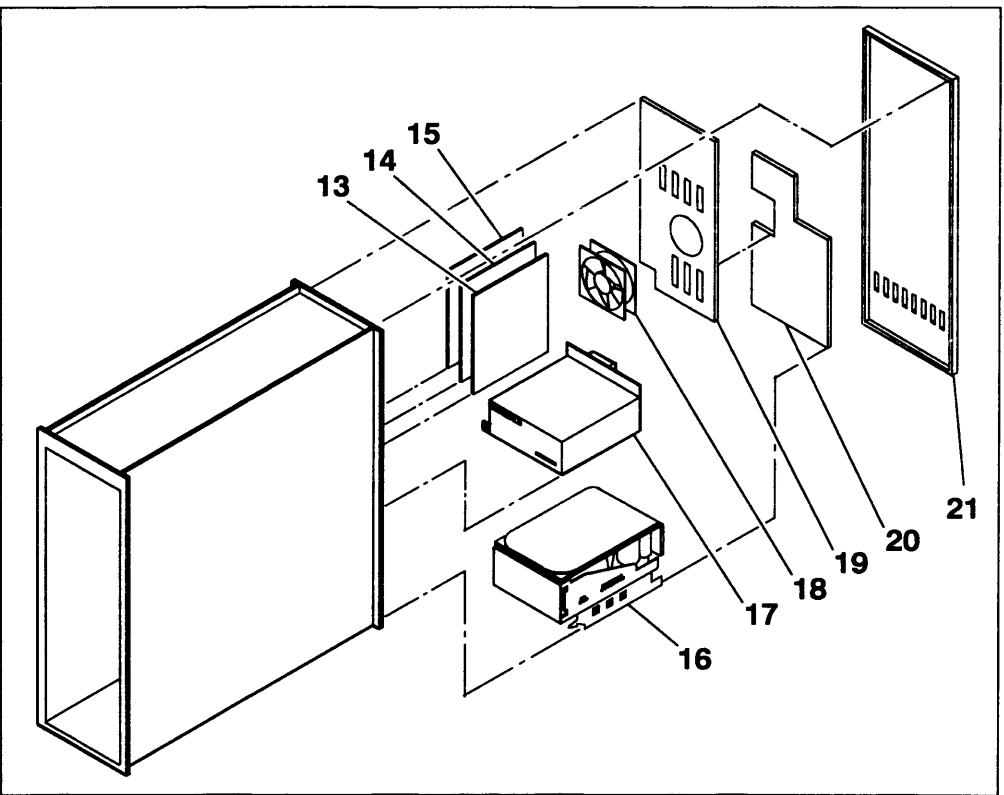
Figure 8-8. MICRO 3000LX/GX SPU (continued)

LG200121_004

Figure and Index #	Description	H.P. Part Number	Def of Sym	Qty
8-8	MICRO 3000LX SPU			
	MICRO 3000GX SPU			
-1	is made up of the following			
	Front Panel Bezel	32520-40001		
	Left Cover	D1612-40009		
	Right Cover	D1612-40010		
	Base	D1612-40003		
-2	EMI Shield Assy	32520-60015		
-3	Fault/Activity Display	32520-60010		
-4	Keyswitch Assembly	32520-60008		
	Key	1535-4228		
-5	Fan/Cable Assembly (Front)	3160-0548		
-6	Air Baffle	32520-00047		
-7	Battery/Fuse Assembly	1420-0343		
-8	Backplane PCA - LX	32520-60012		
-8	Backplane PCA - GX	32520-60009		
-9	Cartridge Tape Drive Mech	09144-69051		
	CTD Mech w/RWS PCA	09145-69101		
	CTD Controller PCA	09144-69515		
	CTD Controller PCA	09145-69515		
	CTD Read/Write/Servo PCA	09144-69518		
-10,16	81 MB Disc Assembly	07961-69051		
-10,16	152 MB Disc Assembly	07962-69051		
-10,16	304 MB Disc Assembly	07963-69051		
	Disc HPIB Controller PCA	07961-69010		

Figure and Index #	Description	H.P. Part Number	Def of Sym	Qty
-11	Partition Support	32520-00043		
-12	Chassis Assembly	32520-60014		
-13	INP	30244-69002		
-14	ATP/M (RS-232)	40290-69011		
-15	Processor PCA (2 MB)	30534-69001		
-15	Processor PCA (4 MB)	30534-69010		
-17	Power Supply	0950-1888		
-18	Fan/Cable Assembly (Rear)	3160-0485		
-19	Rear Inner Panel Assy	32520-60016		
-20	PDP - 5 port - LX	32520-60003		
-20	PDP - 8 port - LX	32520-60011		
-20	PDP - 8 port - GX	32520-60002		
-20	PDP - 16 port - GX	32520-60001		
-21	Bustle 16	32520-00030		
-21	Bustle 8	32520-00029		
-21	Bustle 5	32520-00028		
	Filler Panel 8 - 16	32520-00024		
	Cable - HPIB Main	32520-63005		
	Cable - Disc 1 Mech Power	32520-63006		
	Cable - Disc 1 Cntl Power	32520-63007		
	Cable - Disc 1 HPIB	32520-63001		
	Cable - Disc 2 Mech Power	32520-63010		
	Cable - Disc 2 Cntl Power	32520-63011		
	Cable - Disc 2 HPIB	32520-63002		

Replaceable Parts

Figure and Index #	Description	H.P. Part Number	Def of Sym	Qty
	Cable - Tape Cntl Power	32520-60009		
	Cable - Tape Mech Power	32520-60008		
	Cable - Tape Cntl Data	32520-63004		
	Cable - Tape Display	32520-63003		
	Core Mounting Clip	9170-1387		
	Magnetic Core	9170-1392		

DIAGRAMS

The PCA diagrams contained in this section have been prepared from factory drawings to assist the CE in troubleshooting the system.

PCA DIAGRAMS

Figures 9-1 through 9-8 illustrate *printed circuit assemblies.*
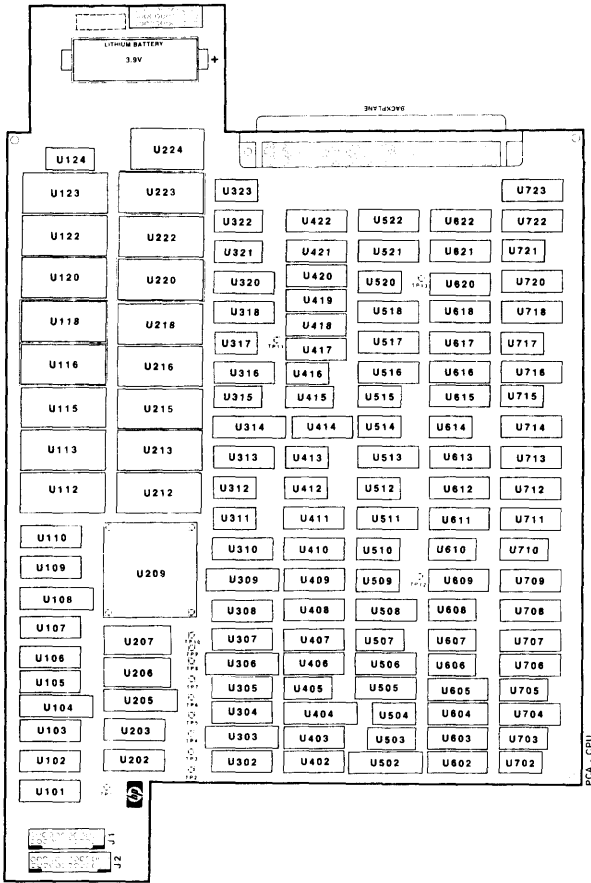
Figure 9-1. Series 37 CPU (P/N 30457-60001) Part Locations
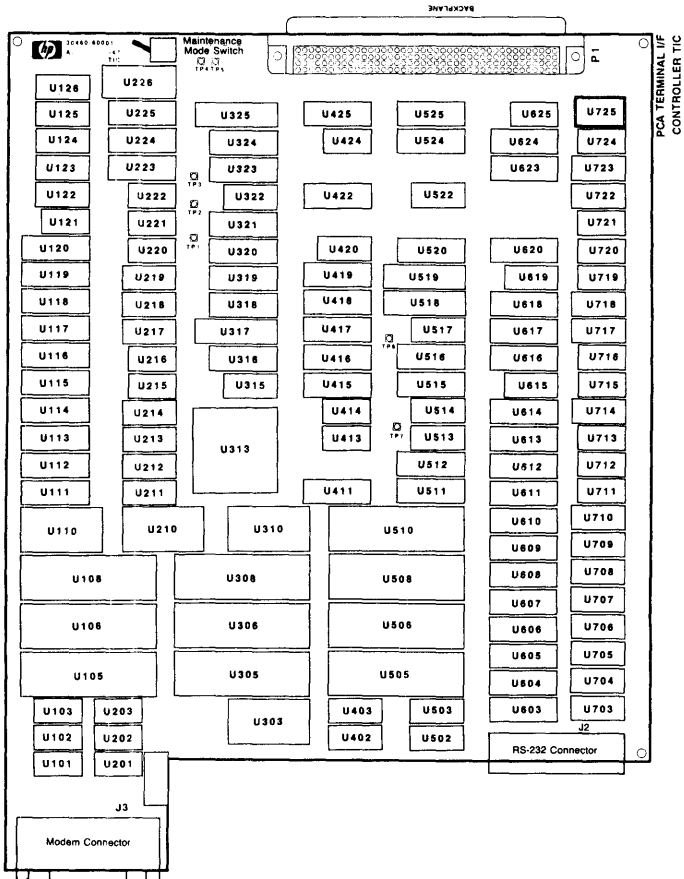
Figure 9-2. Terminal Interface Controller (TIC or ATP37) PCA
(P/N 30460-60001)
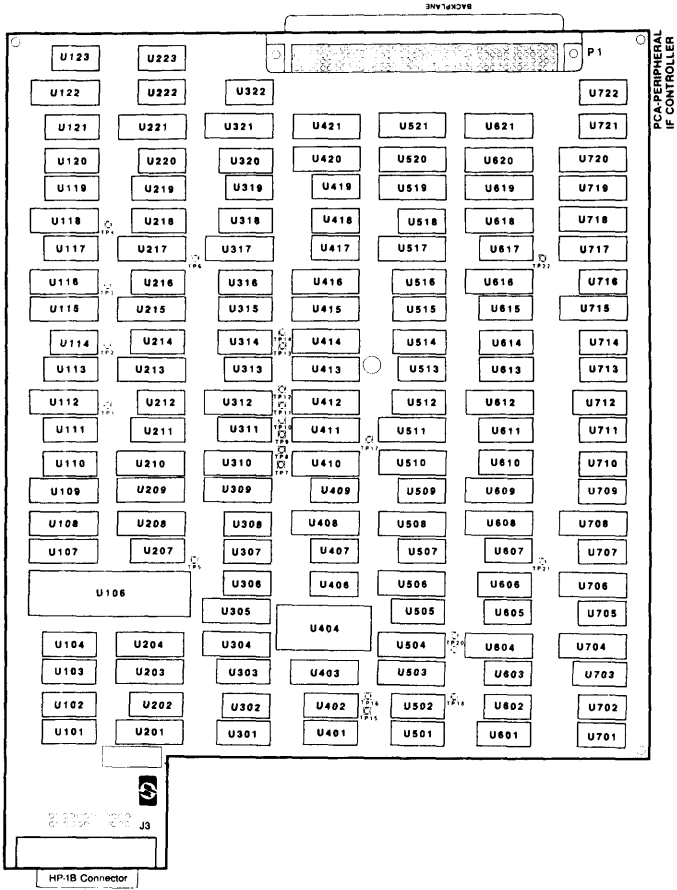
**Figure 9-3. Peripheral Interface Controller (PIC) PCA
(P/N 30459-60001)**
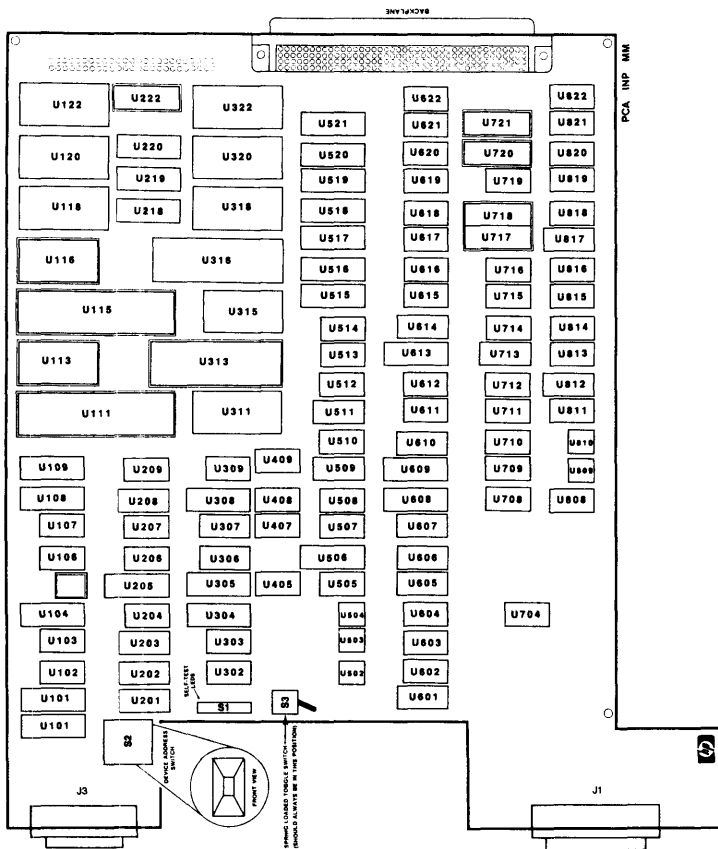
Figure 9-4. Intelligent Network Processor (INP) PCA
(P/N 30244-60002)

BACKPLANE

P1

PCA - MEMORY .5MB AND 1MB
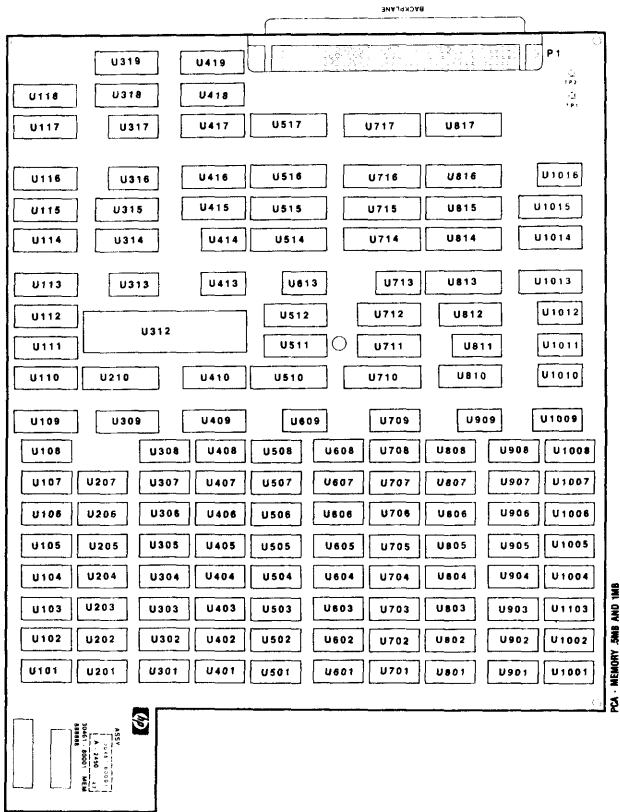
Figure 9-5. .5 MB and 2 MB Memory PCAs
(.5 MB - P/N 30461-60001 - loaded with **64K RAMS**)
(2 MB - P/N 30462-60001 - loaded with **256K RAMS**)
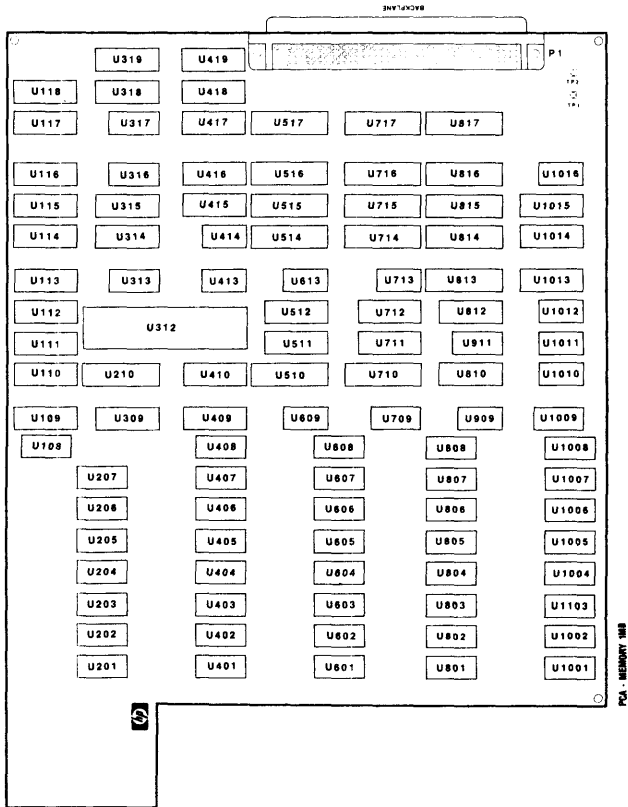
Figure 9-6. 1 MB Memory PCA
(P/N 30456-80001)
(loaded with 256K RAMS)
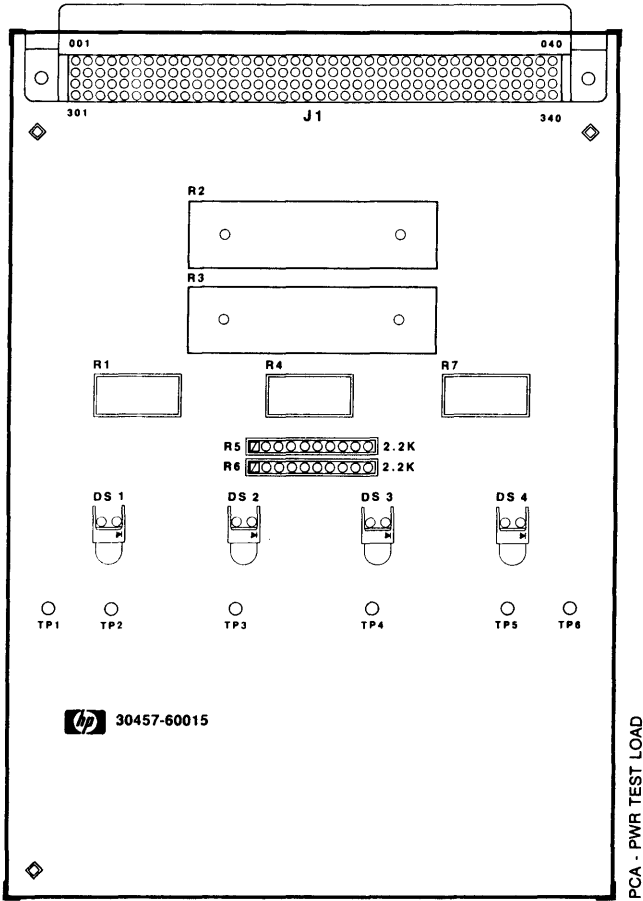
Figure 9-7. Test Load Board PCA
(P/N 30457-60015)
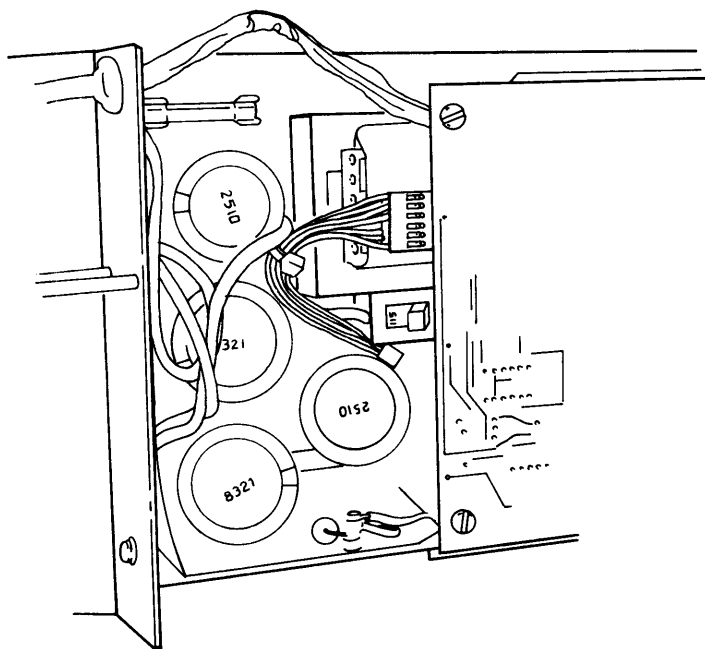
Figure 9-8. Series 37 Power Supply

This section contains reference Tables 10-1 through 10-6 to aid in troubleshooting HP 3000 Series 37, MICRO 3000XE, and MICRO 3000 computer systems.

Reference

Table 10-1. ASCII Code Table

HOW TO USE THIS TABLE

- The table is sorted by character code, each code being represented by its decimal, octal, and hexadecimal equivalent.

- Each row of the table gives the ASCII and EBCDIC meaning of the character code, the ASCII↔EBCDIC conversion code, and the Hollerith representation (punched card code) for the ASCII character.

The following examples describe several ways of using the table:

Example 1: Suppose you want to determine the ASCII code for the $ character. Scan down the ASCII graphic column until you locate $, then look left on that row to find the character code — 36 (dec), 044 (oct), and 24 (hex). This is the code used by an ASCII device (terminal, printer, computer, etc.) to represent the $ character. Its Hollerith punched card code is 11-3-8.

Example 2: The character code 5B (hex) is the EBCDIC code for what character? Also, when 5B is converted to ASCII (for example, by FCOPY with the EBCDICIN option), what is the octal character code? First, locate 5B in the hex character code column and move right on that row to the EBCDIC graphic which is $. The next column to the right gives the conversion to ASCII, 044. As a check, find 044 (oct) in the character code column, look right to the ASCII graphic column and note that $ converted to EBCDIC is 133 (oct) which equals 5B (hex).

| CHAR CODE Dec	Oct	Hex	ASCII Cntl/Gph	ASCII to EBCDIC (Oct)	Hollerith	EBCDIC Cntl/Gph	EBCDIC to ASCII (Oct)
0	000	00	NUL	000	12-0-1-8-9	NUL	000
1	001	01	SOH	001	12-1-9	SOH	001
2	002	02	STX	002	12-2-9	STX	002
3	003	03	ETX	003	12-3-9	ETX	003
4	004	04	EOT	067	7-9	PF	234
5	005	05	ENQ	055	0-5-8-9	HT	011
6	006	06	ACK	056	0-6-8-9	LC	206
7	007	07	BEL	057	0-7-8-9	DEL	177
8	010	08	BS	026	11-6-9		227
9	011	09	HT	005	12-5-9		215
10	012	0A	LF	045	0-5-9	SMM	216
11	013	0B	VT	013	12-3-8-9	VT	013
12	014	0C	FF	014	12-4-8-9	FF	014
13	015	0D	CR	015	12-5-8-9	CR	015
14	016	0E	SO	016	12-6-8-9	SO	016
15	017	0F	SI	017	12-7-8-9	SI	017
16	020	10	DLE	020	12-11-1-8-9	DLE	020
17	021	11	DC1	021	11-1-9	DC1	021
18	022	12	DC2	022	11-2-9	DC2	022
19	023	13	DC3	023	11-3-9	TM	023
20	024	14	DC4	074	4-8-9	RES	235
21	025	15	NAK	075	5-8-9	NL	205
22	026	16	SYN	062	2-9	BS	010
23	027	17	ETB	046	0-6-9	IL	207
24	030	18	CAN	030	11-8-9	CAN	030
25	031	19	EM	031	11-1-8-9	EM	031
26	032	1A	SUB	077	7-8-9	CC	222
27	033	1B	ESC	047	0-7-9	CU1	217
28	034	1C	FS	034	11-4-8-9	IFS	034
29	035	1D	GS	035	11-5-8-9	IGS	035
30	036	1E	RS	036	11-6-8-9	IRS	036
31	037	1F	US	037	11-7-8-9	IUS	037
32	040	20	SP	100	Blank	DS	200
33	041	21	!	117	12-7-8	SOS	201
34	042	22	"	177	7-8	FS	202
35	043	23	=	173	3-8		203
36	044	24	$	133	11-3-8	BYP	204
37	045	25	%	154	0-4-8	LF	012
38	046	26	&	120	12	ETB	027
39	047	27	'	175	5-8	ESC	033
40	050	28	(	115	12-5-8		210
41	051	29	)	135	11-5-8		211
42	052	2A	*	134	11-4-8	SM	212
43	053	2B	+	116	12-6-8	CU2	213
44	054	2C	,	153	0-3-8		214
45	055	2D	-	140	11	ENQ	005
46	056	2E	.	113	12-3-8	ACK	006
47	057	2F	/	141	0-1	BEL	007
48	060	30	0	360	0		220
49	061	31	1	361	1		221
50	062	32	2	362	2	SYN	026
51	063	33	3	363	3		223
52	064	34	4	364	4	PN	224
53	065	35	5	365	5	RS	225
54	066	36	6	366	6	UC	226
55	067	37	7	367	7	EOT	004
56	070	38	8	370	8		230
57	071	39	9	371	9		231
58	072	3A	:	172	2-8		232
59	073	3B	;	136	11-6-8	CU3	233
60	074	3C	<	114	12-4-8	DC4	024
61	075	3D		176	6-8	NAK	025
62	076	3E	>	156	0-6-8		236
63	077	3F	?	157	0-7-8	SUB	032
64	100	40	@	174	4-8	SP	040
65	101	41	A	301	12-1		240
66	102	42	B	302	12-2		241
67	103	43	C	303	12-3		242
68	104	44	D	304	12-4		243
69	105	45	E	305	12-5		244
70	106	46	F	306	12-6		245
71	107	47	G	307	12-7		246
72	110	48	H	310	12-8		247
73	111	49	I	311	12-9		250
74	112	4A	J	321	11-1	¢	133
75	113	4B	K	322	11-2	.	056
76	114	4C	L	323	11-3	<	074
77	115	4D	M	324	11-4	(	050
78	116	4E	N	325	11-5	+	053
79	117	4F	O	326	11-6	|	041
80	120	50	P	327	11-7	&	046
81	121	51	Q	330	11-8		251
82	122	52	R	331	11-9		252
83	123	53	S	342	0-2		253
84	124	54	T	343	0-3		254
85	125	55	U	344	0-4		255
86	126	56	V	345	0-5		256
87	127	57	W	346	0-6		257
88	130	58	X	347	0-7		260
89	131	59	Y	350	0-8		261
90	132	5A	Z	351	0-9	!	135
91	133	5B	[	112	12-2-8	$	044
92	134	5C	\	340	0-2-8	*	052
93	135	5D	]	132	11-2-8	)	051
94	136	5E	^	137	11-7-8	;	073
95	137	5F	_	155	0-5-8	¬	136

Table 10-1. ASCII Code Table (Con't.)

Dec	Oct	Hex	Cntl/Gph	to EBCDIC (Oct)	Hollerith	Cntl/Gph	to ASCII (Oct)
96	140	60	.	171	1-8	-	055
97	141	61	a	201	12-0-1	/	057
98	142	62	b	202	12-0-2		262
99	143	63	c	203	12-0-3		263
100	144	64	d	204	12-0-4		264
101	145	65	e	205	12-0-5		265
102	146	66	f	206	12-0-6		266
103	147	67	g	207	12-0-7		267
104	150	68	h	210	12-0-8		270
105	151	69	i	211	12-0-9		271
106	152	6A	j	221	12-11-1	:	174
107	153	6B	k	222	12-11-2	,	054
108	154	6C	l	223	12-11-3	%	045
109	155	6D	m	224	12-11-4	_	137
110	156	6E	n	225	12-11-5	>	076
111	157	6F	o	226	12-11-6	?	077
112	160	70	p	227	12-11-7		272
113	161	71	q	230	12-11-8		273
114	162	72	r	231	12-11-9		274
115	163	73	s	242	11-0-2		275
116	164	74	t	243	11-0-3		276
117	165	75	u	244	11-0-4		277
118	166	76	v	245	11-0-5		300
119	167	77	w	246	11-0-6		301
120	170	78	x	247	11-0-7		302
121	171	79	y	250	11-0-8		140
122	172	7A	z	251	11-0-9	:	072
123	173	7B	{	300	12-0	=	043
124	174	7C	|	152	12-11	@	100
125	175	7D	}	320	11-0	'	047
126	176	7E	~	241	11-0-1		075
127	177	7F	DEL	007	12-7-9		042
128	200	80		040	11-0-1-8-9		303
129	201	81		041	0-1-9	a	141
130	202	82		042	0-2-9	b	142
131	203	83		043	0-3-9	c	143
132	204	84		044	0-4-9	d	144
133	205	85		025	11-5-9	e	145
134	206	86		006	12-6-9	f	146
135	207	87		027	11-7-9	g	147
136	210	88		050	0-8-9	h	150
137	211	89		051	0-1-8-9	i	151
138	212	8A		052	0-2-8-9		304
139	213	8B		053	0-3-8-9		305
140	214	8C		054	0-4-8-9		306
141	215	8D		011	12-1-8-9		307
142	216	8E		012	12-2-8-9		310
143	217	8F		033	11-3-8-9		311
144	220	90		050	12-11-0-1-8-9		312
145	221	91		061	1-9	j	152
146	222	92		032	11-2-8-9	k	153
147	223	93		063	3-9	l	154
148	224	94		064	4-9	m	155
149	225	95		065	5-9	n	156
150	226	96		066	6-9	o	157
151	227	97		010	12-8-9	p	160
152	230	98		070	8-9	q	161
153	231	99		071	1-9	r	162
154	232	9A		072	2-8-9		313
155	233	9B		073	3-8-9		314
156	234	9C		004	12-4-9		315
157	235	9D		024	11-4-9		316
158	236	9E		076	6-8-9		317
159	237	9F		341	11-0-1-9		320
160	240	A0		101	12-0-1-9		321
161	241	A1		132	12-0-2-9	~	176
162	242	A2		103	12-0-3-9	s	163
163	243	A3		104	12-0-4-9	t	164
164	244	A4		105	12-0-5-9	u	165
165	245	A5		106	12-0-6-9	v	166
166	246	A6		107	12-0-7-9	w	167
167	247	A7		110	12-0-8-9	x	170
168	250	A8		111	12-1-8	y	171
169	251	A9		121	12-11-1-9	z	172
170	252	AA		122	12-11-2-9		322
171	253	AB		123	12-11-3-9		323
172	254	AC		124	12-11-4-9		324
173	255	AD		125	12-11-5-9		325
174	256	AE		126	12-11-6-9		326
175	257	AF		127	12-11-7-9		327

Dec	Oct	Hex	Cntl/Gph	to EBCDIC (Oct)	Hollerith	Cntl/Gph	to ASCII (Oct)
176	260	B0		130	12-11-8-9		330
177	261	B1		131	11-1-8		331
178	262	B2		142	11-0-2-9		332
179	263	B3		143	11-0-3-9		333
180	264	B4		144	11-0-4-9		334
181	265	B5		145	11-0-5-9		335
182	266	B6		146	11-0-6-9		336
183	267	B7		147	11-0-7-9		337
184	270	B8		150	11-0-8-9		340
185	271	B9		151	0-1-8		341
186	272	BA		160	12-11-0		342
187	273	BB		161	12-11-0-1-9		343
188	274	BC		162	12-11-0-2-9		344
189	275	BD		163	12-11-0-3-9		345
190	276	BE		164	12-11-0-4-9		346
191	277	BF		165	12-11-0-5-9		347
192	300	C0		166	12-11-0-6-9	{	173
193	301	C1		167	12-11-0-7-9	A	101
194	302	C2		170	12-11-0-8-9	B	102
195	303	C3		200	12-0-1-8	C	103
196	304	C4		212	12-0-2-8	D	104
197	305	C5		213	12-0-3-8	E	105
198	306	C6		214	12-0-4-8	F	106
199	307	C7		215	12-0-5-8	G	107
200	310	C8		216	12-0-6-8	H	110
201	311	C9		217	12-0-7-8	I	111
202	312	CA		220	12-11-1-8		350
203	313	CB		232	12-11-2-8		351
204	314	CC		233	12-11-3-8	ſ	352
205	315	CD		234	12-11-4-8		353
206	316	CE		235	12-11-5-8	--	354
207	317	CF		236	12-11-6-8		355
208	320	D0		237	12-11-7-8	;	175
209	321	D1		240	11-0-1-8	J	112
210	322	D2		252	11-0-2-8	K	113
211	323	D3		253	11-0-3-8	L	114
212	324	D4		254	11-0-4-8	M	115
213	325	D5		255	11-0-5-8	N	116
214	326	D6		256	11-0-6-8	O	117
215	327	D7		257	11-0-7-8	P	120
216	330	D8		260	12-11-0-1-8	Q	121
217	331	D9		261	12-11-0-1	R	122
218	332	DA		262	12-11-0-2		356
219	333	DB		263	12-11-0-3		357
220	334	DC		264	12-11-0-4		360
221	335	DD		265	12-11-0-5		361
222	336	DE		266	12-11-0-6		362
223	337	DF		267	12-11-0-7		363
224	340	E0		270	12-11-0-8	\	134
225	341	E1		271	12-11-0-9		237
226	342	E2		272	12-11-0-2-8	S	123
227	343	E3		273	12-11-0-3-8	T	124
228	344	E4		274	12-11-0-4-8	U	125
229	345	E5		275	12-11-0-5-8	V	126
230	346	E6		276	12-11-0-6-8	W	127
231	347	E7		277	12-11-0-7-8	X	130
232	350	E8		312	12-0-2-8-9	Y	131
233	351	E9		313	12-0-3-8-9	Z	132
234	352	EA		314	12-0-4-8-9		364
235	353	EB		315	12-0-5-8-9		365
236	354	EC		316	12-0-6-8-9	н	366
237	355	ED		317	12-0-7-8-9		367
238	356	EE		332	12-11-2-8-9		370
239	357	EF		333	12-11-3-8-9		371
240	360	F0		334	12-11-4-8-9	0	060
241	361	F1		335	12-11-5-8-9	1	061
242	362	F2		336	12-11-6-8-9	2	062
243	363	F3		337	12-11-7-8-9	3	063
244	364	F4		352	11-0-2-8-9	4	064
245	365	F5		353	11-0-3-8-9	5	065
246	366	F6		354	11-0-4-8-9	6	066
247	367	F7		355	11-0-5-8-9	7	067
248	370	F8		356	11-0-6-8-9	8	070
249	371	F9		357	11-0-7-8-9	9	071
250	372	FA		372	12-11-0-2-8-9		372
251	373	FB		373	12-11-0-3-8-9		373
252	374	FC		374	12-11-0-4-8-9		374
253	375	FD		375	12-11-0-5-8-9		375
254	376	FE		376	12-11-0-6-8-9		376
255	377	FF		377	12-11-0-7-8-9	EO	377

Table 10-2. RS-232-C Signal Descriptions

PIN NO.	CIRCUIT	SIGNAL DESCRIPTION	GND	DATA		CONTROL		TIMING	
				FROM DCE	TO DCE	FROM DCE	TO DCE	FROM DCE	TO DCE
1	AA	Protective Ground	X						
7	AB	Signal Ground/Common Return	X						
2	BA	Transmitted Data			X				
3	BB	Received Data		X					
4	CA	Request to Send					X		
5	CB	Clear to Send				X			
6	CC	Data Set Ready				X			
20	CD	Data Terminal Ready					X		
22	CE	Ring Indicator				X			
8	CF	Carrier Detect				X			
21	CG	Signal Quality Director				X			
23	CH	Data Signal Rate Selector (DTE)					X		
23	CI	Data Signal Rate Selector (DCE)				X			
24	DA	Transmitter Signal Element Timing (DTE)							X
15	DB	Transmitter Signal Element Timing (DCE)						X	
17	DD	Recover Signal Element Timing (DCE)						X	
14	SBA	Secondary Transmitted Data			X				
16	SBB	Secondary Received Data		X					
19	SCA	Secondary Request to Send					X		
13	SCB	Secondary Clear to Send				X			
12	SCF	Secondary Carrier Detect				X			
9	—	(Reserved for Data Set Timing)							
10	—	(Reserved for Data Set Timing)							
11	—	Unassigned							
18	—	Unassigned							
25	—	Unassigned							

DTE (Data Terminal Equipment)
DCE (Data Communications Equipment)

Table 10-3. 25-Pin Modem Port (DCE) Signals

Connector Pin Number	CCITT V. 24	Function	EIA	Connector Pin Function	Utility
1	101	Frame Ground FG	AA	PROTECTIVE GROUND	Used
2	103	Transmit Data TD	BA	INPUT	Used
3	104	Receive Data RD	BB	OUTPUT	Used
4	105	Request to Send RTS	CA	INPUT	Used
5	106	Clear to Send CTS	CB	OUTPUT	Not Used
6	107	Data Set Ready DSR	CC	OUTPUT	Used
7	102	Signal Ground SG	AB	SIGNAL GROUND	Used
8	109	Data Carrier Detect DCD	CF	OUTPUT	Used
9	-	-	-	INPUT	Not Used
10-19	-	-	-	NOT CONNECTED	Not Used
20	108.2	Data Terminal Ready DTR	CD	INPUT	Used
21	-	-	-	NOT CONNECTED	Not Used
22	125	Ring Indicator RI	CE	INPUT	Not Used
23	112	Data Rate Select	CH	OUTPUT	Not Used
24/25	-	-	-	NOT CONNECTED	Not Used

Reference

Table 10-4. 25-Pin Direct Connect Port (DCE) Signals

Connector Pin Number	CCITT V. 24	Function		EIA	Connector Function
1	101	Frame Ground FG		AA	PROTECTIVE GROUND
2	103	Transmit Data TD		BA	INPUT
3	104	Receive Data RD		BB	OUTPUT
4-6	-	Not Connected			-
7	102	Signal Ground SG		AB	SIGNAL GROUND
8/25	-	Not Connected			-

Table 10-5. 5-Pin Direct Connect Port (DCE) Signals

Connector Pin Number	Function	Connector Pin Function
1	Frame Ground FG	PROTECTIVE GROUND
2	Transmit Data (A) TD	INPUT
3	Receive Data (A) RD	OUTPUT
4	Transmit Data (B) TD	INPUT
5	Receive Data (B) RD	OUTPUT

Table 10-6. 3-Pin Direct Connect Port (DCE) Signals

Connector Pin Number	Function	Connector Pin Function
1	Signal Ground SG	PROTECTIVE GROUND
2	Transmit Data TD	INPUT
3	Receive Data RD	OUTPUT

NOTES

NOTES

NOTES

NOTES