

HP 250

SERVICE HANDBOOK

Manual Part No. 45000-94000
Printed in the Federal Republic of Germany
Nov. 1984

Printing History

Original printing	November 1981
Update #1	February 1982
Update #2	October 1982
Second Edition	April 1983
Third Edition	June 1984

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INTRODUCTION

The HP 250 Service Handbook contains the information that an HP Customer Engineer will need on-site during the repair of the HP 250A, HP 250/2X, HP 250/30, HP 250/35, HP 250/40, and HP 250/50 Computer Systems. While CEs are the primary audience for the handbook, TSEs and SEs will find much of the information useful.

This handbook replaces the Preliminary HP 250 Service Manual, but not the Hard Disc Tests and Commands Supplement to that manual. In addition, the following manuals should be used with this handbook:

- Preparing For Your HP 250 (45260-90040)
- HP 45120A Interface Installation and Reference (45120-90060)
- Installation Procedure HP 45012U (45012-90002)
- All user manuals for the HP 250 (refer to the Configuration Guide for details)
- Handbooks and/or Service Manuals for all peripherals used on the HP 250

The handbook consists of the following chapters:

PRODUCT INFORMATION - general information on the HP 250, including the available options, product safety, firmware and OS history, and data communications

INSTALLATION - procedures related to the installation of the HP 250, including site preparation, system installation, PM, firmware upgrading, OS installation and upgrading, mainframe installation, and data comm installation

CONFIGURATION - procedures, tables, and diagrams related to the configuration of the HP 250, including the OS, date codes, mainframe, and data comm

TROUBLESHOOTING - procedures, tables, and diagrams related to repairing the HP 250, including system diagnosis, tool cross-references, firmware diagnosis, self-test descriptions, OS diagnosis, system errors, memory organization, mainframe diagnosis, HP-IB diagnosis, HP-IB tools, data comm diagnosis, and data comm tools

PERIPHERALS - procedures and diagrams related to the configuration and fault isolation of discs, terminals (and workstations), printers, and plotters used on the HP 250

INTRODUCTION

REPLACEABLE PARTS - lists of support packages, support materials, recommended field inventory, and miscellaneous parts for the HP 250

REFERENCES - terminology unique to the HP 250, and ASCII and base conversion tables

SERVICE NOTES - copies of all in-life service notes for the HP 250

Each of these chapters consists of sections. The following numbering scheme is used for each section:

```
nnn
|||
|||
|||..... used to distinguish sections on the same subsystem
|||      or general topic in the same chapter
|||
|||..... used to identify the subsystem in chapters 1 - 4
|||      0 = general
|||      1 = system level
|||      3 = firmware
|||      4 = operating system
|||      5 = mainframe
|||      6 = HP-IB
|||      7 = data communication
|||      used to identify the general topic in chapters 5 - 7
|||      0 = general
|||      1 = configuration (chapter 5)
|||          = service materials (chapter 6)
|||          = terminology (chapter 7)
|||      2 = diagnosis (chapter 5)
|||          = parts (chapter 6)
|||          = tables (chapter 7)
|||      3 = disc layout (chapter 5)
|||
|||..... used to identify the chapter:
|||      1 = Product Information
|||      2 = Installation
|||      3 = Configuration
|||      4 = Troubleshooting
|||      5 = Peripherals
|||      6 = Replaceable Parts
|||      7 = References
|||      8 = Service Notes
```

For example, section 450 is Mainframe Diagnosis (4nn indicating troubleshooting, n5n indicating mainframe).

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PRODUCT INFORMATION

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Section 101

PRODUCT INFORMATION OVERVIEW

This chapter contains general information on the HP 250, and consists of the following sections:

- 110 SYSTEM PRODUCT OVERVIEW - a summary of the standard hardware in the HP 250 and the division responsible for each part of the system.
- 115 PRODUCT SAFETY - a summary of the safety precautions to follow when servicing the HP 250
- 130 FIRMWARE HISTORY - a summary of the changes in the HP 250 mainframe firmware
- 140 OS REVISION HISTORY - a summary of the changes in each revision of the HP 250 operating system
- 170 DATA COMMUNICATION PRODUCT OVERVIEW - an overview to asynchronous communication, synchronous communication, and the use of modems on the HP 250
- 171 DATA COMMUNICATION FUNCTIONAL OPEARATION - an overview to the operation of asynchronous, synchronous, and RS-232-C communication

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SYSTEM PRODUCT OVERVIEW

Also included as standard are the following items for the models listed:

One floppy: HP 250A (4525xA), HP 250/20 (45260A-022)
One 5 MB Disc: HP 250/20 (45260A-022)
One 10 MB Disc: HP 250/25 (45260A-025)
One 15 MB Disc: HP 250/26 (45260A-026)
One ASI: HP 250/35 (45251B), HP 250/30 (45260A),
HP 250/20 (45260A-022), HP 250/40 (45260A),
HP 250/50 (45260A)
HP 250/25 (45260A-025), HP 250/26 (45260A-026)
Integrated Console: HP 250A (4525xA), HP 250/35 (45251B)

For information on the different parts of the HP 250 systems, contact the appropriate divisions listed below

Greely Division (GLD): 7902A, 9895K, Floppy Controller, 5 MB Disc, 10 MB Disc, 15 MB Disc

Disc Memory Division (DMD): 7910K (disc only), 7906, 7908P, 7911P, 7912P

San Diego Division (SDD): 7220, 7221, 7225, 7470

Boise Division (BSE): 2563, 2608, 2687

Vancouver Division (VCD): 9871, 2631, 2601, 2602, 293x

Data Terminals Division (DTD): 264x, 262x, 2649D (except firmware), 2622D (except firmware)

Grenoble: 307X, 3081

Office Products Division (OPD): 39800

For all other parts of the system (including the 7910 power supply and the firmware for the 2649D and 2622D), contact either

k Computer Systems Division (CSY)

or

Boeblingen Computer Systems Division (BCD)

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PRODUCT SAFETY

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PRODUCT SAFETY

The following general safety precautions must be observed during all phases of operation, service, and repair of this system. Failure to comply with the precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the system. Hewlett-Packard Company assumes no liability for the customer's failure to comply with these requirements.

GROUND THE SYSTEM.

To minimize shock hazard, the system chassis and cabinet must be connected to an electrical ground. The system is equipped with a three-conductor AC power cable. The power cable must be plugged into an approved three-contact electrical outlet with a safety ground.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE.

Do not operate the system in the presence of flammable gases or fumes. Operation of any electrical system in such an environment constitutes a definite safety hazard.

PRODUCT SAFETY

KEEP AWAY FROM LIVE CIRCUITS.

Operating personnel must not remove system covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.

DO NOT SERVICE OR ADJUST ALONE.

Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

DO NOT SUBSTITUTE PARTS OR MODIFY SYSTEM.

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification to the system. Refer the system to a Hewlett-Packard Sales and Service Office for service and repair to ensure that safety features are maintained.

METRIC AND INCH HARDWARE

Both metric and inch threaded hardware is being used in this product. Be sure to use the correct type of hardware during service and repair.

DANGEROUS PROCEDURE WARNINGS.

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

WARNING

Dangerous voltages, capable of causing injury, are present in this system. Use extreme caution when handling, testing, and adjusting.

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FIRMWARE HISTORY

This section summarizes the revisions of the HP 250 Self-Test and Loader firmware. It does not contain a detailed list of all changes.

FIRMWARE HISTORY

Revision A [A1818-2829 (Self-Test) and B1818-2830 (Loader)]

Original firmware

Revision B [C1818-2829 (Self-Test) and D1818-2830 (Loader)]

Moved system parse tables from OS to ROMs
Correct 7910 time-out constants
Correct 7910 self-test secondary command and mask
Eliminate writing zeroes to unused peripheral addresses
Correct HP-IB power-on mask
Change location used to test memory protect hardware
Add an instruction for correct power-on of NEC memory chips
Change "FLOPPY" to "FLEX-DISC" on display
Update revision level displayed to "B"

Revision II [1818-2913 (Self-Test) and 1818-2914 (Loader)]

Thumbwheel assignments redefined
Eliminated signature analysis tests
Added production loop test
Added CS'80 driver and load capability
Added capability to load from 7906
Added boot load capability
Added capability to display self-test messages to ASI
port 1

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Section 140

OS REVISION HISTORY

This section summarizes the revisions of the HP 250 Operating System. It does not contain a detailed list of all changes in each revision.

OS REVISION HISTORY

Revision A

Original operating system

Revision B

Bug fixes

Revision C

Added TIO, LK3000, RFIG, PFORM
Bug fixes

Revision 2.1 (Rev D)

Multi-user capabilities
COMMON Block
Added XCOPY, DEMODS, DBPASS, XREF, IMAGEU, IMAGE2, RIO,
MATRIX, SPOOL, COPY, ALIEN, SYSRR
Additional statements in BASIC (including structured
programming statements), IMAGE, and REPORT WRITER
Enhancements to BASIC, IMAGE, QUERY, ROUTIL, DUPL, INIT,
and CONFIG
Bug fixes

Revision 2.2 (Rev E)

Bug fixes

Revision 2.3 (Rev F)

Bug fixes (primarily for European systems)

Revision 2.8 (European release)

Bug fixes

Revision A.03.01

7910 Support
Synchronous Data Communication
Background Tasks
Support of HP Interchange format and IBM 3740 1/4M Byte
format discs
Added BACKUP, RECOVER, MEDIA, TASK, CS250, CTRACE, RJE/250
Bug fixes

Revision A.03.02 (release for new INP systems only)

Bug fix for Synchronous Data Comm

Revision A.03.04

2608A support (full release)
2631B support on REMOTE/250
Added ACCEPT
Bug fixes

Revision A.03.06

Bug fixes

Revision B.04.00

250/30 support
2601A support
7908P support
2622D support
7220, 7221, and 7225 support
Added GPL, TIMER, and BIT
Enhancements to BASIC, CONFIG
Bug fixes

Revision B.04.01 (Utilities only)

Bug fixes

Revision B.04.02

5 Mb Disc support
SYSRR DROM supports printer on ASI port 5
Bug fixes
7470A support

Revision B.05.00

Support of up to 11 users/background tasks.
Improved system performance with faster a Basic
interpreter and configurable directory cache.
Increased reliability - over 30 serious bugs fixed.
Consistent use of softkeys and DATE feature in
system utilities.
Backup bit configurable.
82905B support

OS REVISION HISTORY

2602A support
ASI diagnostic
TIO II support
DBLOAD/DBUNLOAD modifications for improved data recovery
10 MB Disc support

Revision B.06.00

PERFORM DROM
TASK-II
NETWORK/250
TOOLS DROM
Allow use of pre-certified tapes from CSO
307X Data Capture Terminals support
3081 Data Capture Terminal support
39800A Bar Code Reader support
SHOWTASK statement
15 MB Disc support
293X Printer support
2563A Printer support
2687A Printer support

Revision B.06.01

Bug fixes

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Section 170

DATA COMM PRODUCT OVERVIEW

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1.0 Asynchronous

2.0 Synchronous

Note: For synchronous communications, all products are now prefixed by the term "Distributed Systems Network (DSN)". For simplicity, it is not used in this document.

1.0 ASYNCHRONOUS

The HP 45120A Asynchronous Serial Interface (ASI) is a microprocessor-controlled interface between the HP 250 and up to five remote devices. Any combination of Remote/250 consoles, terminals, printers, and HP 3000 Series computers is permitted. Connections are made via RS-232C/V24, 20mA current-loop, and/or modem. A second ASI may be added to all HP 250 models except the HP 250A. If an Intelligent Network Processor (INP) (Synchronous) is installed, only one ASI may be used. On the HP 250/20, HP 250/30, HP 250/40, and HP 250/50, one of the five ports is required for the Principal Workstation.

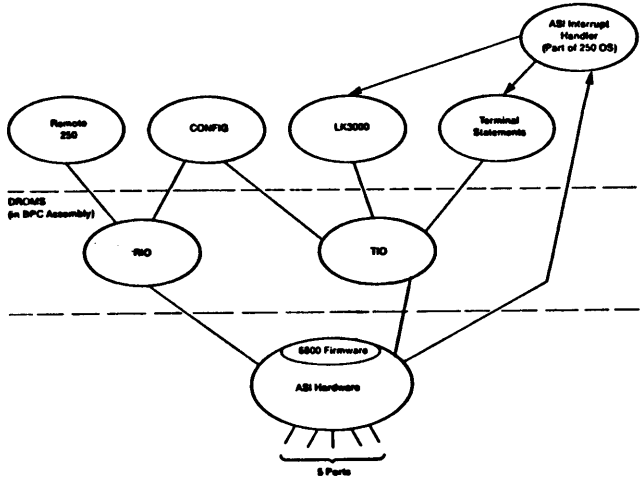
The 45120A consists of the Asynchronous Data Comm Board (45120-66550) which plugs into the HP 250 card cage, the RS-232C Connector Board (45120-66551) or (45120-66566 - switch version) which mounts on the HP 250 rear panel, and an interconnecting cable (45120-61600) or (45000-61648 used with switch version). Each port on the connector board can be configured to run at any of nine speeds from 110 through 9600 baud. The rate is selected with a 10-position baud-rate switch for each port. Each port must also be configured on the RS-232C Connector board via jumpers or switches, for the type of connection desired. Power is obtained from the system backplane for the controller board and supplied to the connector panel through the interconnect cable.

Software Elements

The line protocol and some modem control signals are under software control. The following diagram shows the software configuration.

DATA COMM PRODUCT OVERVIEW - 1.0 - ASYNCHRONOUS

Basic



1. Remote 250/RIO

The Remote 250 - RIO DROM combination permits the user to operate a Remote 250 the same as a system console. No special programming is required.

2. CONFIG

The CONFIG software is an interactive program used to specify certain parameters that define the datacomm configuration. This information is used by the RIO and TIO DROMs when down-loading to the ASI.

3. TIO DROM

The TIO DROM provides a means to connect ten RS-232 asynchronous devices to the HP 250. TIO has a limited programming capability allowing a user to customize an application program.

4. LK3000

The LK3000 utility allows the HP 250 to appear as a log-on terminal to the HP 3000. LK3000 invokes the standard HP 3000 FCOFY utility program to allow the user to initiate data file transfers between the two systems, in either direction.

DATA COMM PRODUCT OVERVIEW - 1.0 - ASYNCHRONOUS

5. NETWORK/250

Network/250 provides asynchronous system-to-system communications for the HP 250. It allows a user on one system to operate as a workstation on another system (virtual workstation mode), as well as copy any type of file from one system to another.

6. TIO-II

The TIO-II DROM, in conjunction with the asynchronous interface (ASI) and its firmware, allow the HP 250 to be connected to a variety of using the RS-232-C data link. TIO-II provides programmatic access to two major device classes, TERMINAL and COMPUTER. A third class, PRINTER, is identical to TERMINAL except that no input operations from the device to the HP 250 are allowed.

DATA COMM PRODUCT OVERVIEW - 1.0 - ASYNCHRONOUS

The following items are packaged with each 45120A/B.

Description	Qty	Part Number
Asynchronous Data Comm. Board*	1	45120-66550
Cover Panel*	1	45000-00214
Blank Plate*	1	45120-00211
TIO Programming Manual*	1	45120-90001
Remote Programming Manual*	1	45120-90020
Installation & Ref. Manual*	1	45120-90060
and		
RS-232C Connector Board	1	45120-66551
Interconnection Cable	1	45120-61600
or		
RS-232C Connector Board* (switch version)	1	45120-66566
Interconnection Cable* (used with switch version)	1	45000-61648
Cover Plate (switch version)*	1	45000-00216
Panel Plate (switch version)*	1	45000-00217

* = Defines the 45120B Product

DATA COMM PRODUCT OVERVIEW - 2.0 - SYNCHRONOUS

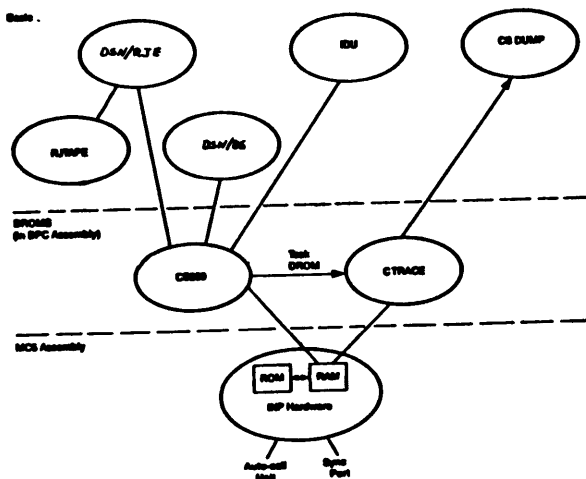
2.0 SYNCHRONOUS

The Intelligent Network Processor (INP) is a synchronous controller for data communications applications. The INP contains a microprocessor, memory, parallel interfaces to the HP250, serial interfaces to the RS-232 communications channels, and parallel interfaces with the RS-366 channel (auto calling channel.)

The INP consists of two boards; the controller board (45122-66560) resides in the HP250 card cage and is connected by cable (45122-61600) to the connector panel board (45122-66561) mounted on the rear of the HP250 cabinet. Power is obtained from the system backplane for the controller board and supplied to the connector panel through the interconnect cable.

Speeds: Externally clocked or internally from 1200 to 19200 including all commonly used rates

The line protocol, modem control signals, and speeds (except when clocked by the modem) are under software control. The following diagram shows the software structure.



Software Elements

1. CSFIG

The CSFIG software is an interactive program used to specify certain parameters that define the link configuration. This information is stored in a one segment configuration file on the Data Comm flexible disc, and is used by the CS250 software when down-loading a control program to the INP.

2. Integrated Diagnostic Utility (IDU)

The Integrated Diagnostic Utility (IDU) is a stand alone program used to test the INP hardware. It consists of three test routines: Continuous Self Test, Connector Loop-Back Test, and Modem Loop-Back Test.

3. CTRACE/CSDUMP

CTRACE is a controller level trace facility for the INP. It monitors the activity on the INP board and writes an entry into a trace file whenever a user selected board level activity has completed. This file is later used as data for the stand alone program CSDUMP, which produces a formatted report from this data. The trace facility is used primarily for system diagnostic purposes.

4. Inter-Task Communication DRUM (TASK)

The Inter-Task Communication DRUM, TASK, allows for processing in background tasks on the HP250. This DRUM is used by CTRACE and hence must be in memory before the trace facility can be used.

5. CS250

CS250 is the software package that serves as the interface between the application software and the controller software. The application software uses CS250 to provide a specific communications capability to the user. The controller software is directly concerned with the mechanics of the communications process. Under normal circumstances, only the application level is visible to the user.

6. Remote Job Entry (RJE)

RJE is a run-only application program that uses the Data Comm capabilities of the HP250 to emulate an IBM 2780 or an IBM 3780. It supports two primary applications: remote batch input to large IBM mainframes, and remote file transfer to or from another HP250 or an HP3000 running RJE. RJE requires the presence of CS250.

7. Distributed Systems (DS)

DATA COMM PRODUCT OVERVIEW - 2.0 - SYNCHRONOUS

DS is an application program that allows file transfer and terminal emulation between an HP250 with synchronous data comm capabilities, and an HP3000, also with synchronous data comm capabilities. DS is a BASIC program that requires the presence of CS250.

The following items are packaged with each product:

45122A (INP)

Description	Qty	Part Number
Synchronous Data Comm. Board	1	45122-66560
Synchronous Connector Board	1	45122-66561
Interconnection Cable	1	45122-61600
Cover Panel	1	45000-00214
Blank Plate	1	45120-00211
Self-Test Hood (ACU)	1	45122-62101
Self-Test Hood (Synchronous)	1	45122-62102
Data Comm. (flexible disc)	1	45122-13000

45122B (INP)

Synchronous Data Comm. Board	1	45122-66560
Synchronous Connector Board	1	45122-66561
Interconnection Cable	1	45122-61600
Cover Panel	1	45000-00214
Blank Plate	1	45120-00211
Self-Test Hood (ACU)	1	45122-62101
Self-Test Hood (Synchronous)	1	45122-62102
INP Manual	1	45122-90010

45123A (RJE)

RJE diskette (option 041 only)	1	45123-18001
RJE Cartridge	1	45123-19001
RJE manual	1	45122-90000

45124A (DS)

DS diskette (option 041 only)	1	45124-18001
DS Cartridge	1	45124-19001
DS manual	1	45124-90000

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Section 171

DATA COMMUNICATION FUNCTIONAL OPERATION

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- 1.0 Asynchronous
- 2.0 Synchronous
- 3.0 RS-232C

(This section has not yet been written.)

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Section 200

INSTALLATION

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200	Table of Contents
201	Installation Overview
210	Site Prep
211	System Installation
212	PM
230	Firmware Upgrade Procedure
240	OS Installation and Upgrade
1.0	Installation
2.0	Minor Revision Upgrade Procedure
3.0	Major Revision Upgrade Procedure
250	Mainframe Installation
1.0	HP 250A and HP 250/35
2.0	HP 250/20, HP250/25, HP 250/26, HP 250/30, HP 250/40, and HP 250/50
270	Data Comm Installation
1.0	Asynchronous
2.0	Synchronous

Section 201

INSTALLATION OVERVIEW

This chapter contains installation procedures for an HP 250 system and consists of the following sections:

- 211 SYSTEM INSTALLATION - an overview to the steps involved to install an HP 250 system and references to the Handbook sections that contain details for each step
- 212 PM - a summary of the preventive maintenance required on the HP 250 system
- 230 FIRMWARE UPGRADE PROCEDURE - the procedure to follow when upgrading firmware on the Processor Board of the HP 250
- 240 OS INSTALLATION AND UPGRADE - the procedures to follow when installing the operating system, or performing a minor or major revision upgrade
- 250 MAINFRAME INSTALLATION - the procedure to follow when installing an HP 250A, HP 250/2X, HP 250/25, HP 250/26, HP 250/30, HP 250/40, or HP250/50 mainframe
- 270 DATA COMM INSTALLATION - the procedures to follow when installing asynchronous or synchronous communication capabilities on the HP 250

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Section 211
SYSTEM INSTALLATION

The following is the list of steps and sources of information required to install an HP 250 system:

1) Prepare the site:

Preparing for your HP 250
HP 250 Service Handbook sections
- Site Prep

2) Install the HP 250 mainframe:

HP 250 Service Handbook sections
- Mainframe Installation
- Mainframe Configuration
- Data Comm Installation
- Data Comm Configuration

3) Install the peripherals:

Service Reference or Installation manuals for the
peripheral
Handbook for the peripheral
HP 250 Service Handbook sections
- Disc Configuration
- Terminal Configuration
- Printer Configuration
- Plotter Configuration

SYSTEM INSTALLATION

4) Install the operating system:

- HP 250 Service Handbook sections
- OS Installation and Upgrade
- OS Configuration

5) Install the applications:

Implementation manuals for the application

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Section 212

PM

There is no preventive maintenance required for the HP 250 mainframe. Normal external care, such as removing dust from the keyboard and CRT (on the HP 250A and HP 250/35), should be performed by the customer.

For preventive maintenance on the peripherals, refer to the appropriate manual from the peripheral division. They will cover the procedures and time frames in which the maintenance is to be performed, including anything the customer should do.

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Section 230

FIRMWARE UPGRADE PROCEDURE

This section contains the procedure to be followed when upgrading the firmware on the processor board (45000-66505/69505). It is important that this procedure be followed exactly.

FIRMWARE UPGRADE PROCEDURE

CAUTION

ROMs can be damaged by electrostatic discharge. Use the following precautions:

AVOID when possible wearing clothing subject to static charge buildup, such as wool or synthetic materials.

DO NOT handle the ROMs in carpeted areas.

DO NOT remove the ROMs from their conductive foam pad until you are ready to install them.

BEFORE touching the ROMs, be sure that you and the ROMs are at the same potential.

AVOID touching the circuit leads. Handle by the plastic package only.

ENSURE that the ROMs, work surface, and Processor Board are all at the same potential. See the procedure below for details.

- 1) Verify that the system is working correctly (i.e. all known hardware problems are fixed).
- 2) Power off the system.
- 3) Remove the anti-static pad (P/N 4342-0036) from the Product Support Package (45250-67807) and place it on the table top on the HP 250. Attach the strap with the clip to the system and place the other strap around your wrist.
- 4) Remove the processor board (45000-66505/69505) from the card cage and place it on the anti-static pad such that the thumbwheel switch is in the lower left corner. The ROMs on the board should be in the lower right corner.
- 5) Insure that the ROM on the left has part number 1818-2829 and the ROM on the right has part number 1818-2830.
- 6) Place the foam pad containing the new ROMs on the anti-static pad. Verify that the ROM part numbers are 1818-2913 and 1818-2914.
- 7) Remove the right ROM (1818-2830) from the processor board and place it on the foam pad.

FIRMWARE UPGRADE PROCEDURE

- 8) Insert ROM 1818-2914 in the right socket, such that the notch for the ROM is in the front and the notch for pin 1 is to the right.
- 9) Remove the left ROM (1818-2829) from the processor board and place it on the foam pad.
- 10) Insert ROM 1818-2913 in the left socket, such that the notch for the ROM is in the front and the notch for pin 1 is to the right.
- 11) Place the label containing the new board number and date code on the board.
- 12) Place the processor board back in the card cage.
- 13) Power-up the system (without changing the thumbwheel switch setting).
- 14) Run "TEST" or "CE" and select MISC TEST. Run the ROM TEST to verify checksums in the ROMs.
- 15) Power-off the system.
- 16) If a different device is to be used for power-up, install the operating system on that device (see section 240 OS Installation and Upgrade for details). Refer to section 351 Mainframe Configuration for details on setting the thumbwheel switch for the new device. Power-up the system.

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Section 240
OS INSTALLATION AND UPGRADE

TABLE OF CONTENTS

- 1.0 Installation
- 2.0 Minor Revision Upgrade Procedure
- 3.0 Major Revision Upgrade Procedure

1.0 INSTALLATION

OS installation procedure:

This procedure is for installing an operating system on a new system. Refer to sections 2.0 and 3.0 if an operating system is already installed on the system (as the upgrade procedure must be used).

- 1) Insert the operating system floppy or tape cartridge into the appropriate drive. Power-up the system.
- 2) If the OS needs to be placed on an uninitialized CS'80 disc, then
 - a) if there is no floppy on the system, then

- 1) If the system was NOT loaded from tape, enter the command

DIRECT NOUPDATE

This is to allow the tape to process without using a buffer on the disc and without trying to first update the tape from a disc buffer. If the system is loaded from tape and the CS'80 disc is uninitialized, the system automatically goes into DIRECT NOUPDATE mode.

- 2) Run "INIT:K". Initialize the CS'80 disc.
 - 3) Enter the command

INDIRECT

This is to allow tape processing to go through the buffer on the disc (the normal mode of operation for the tape).

- 4) Go to step 3 below.
 - b) if there is a floppy on the system, then run "INIT:F" and initialize the CS'80 disc.
- 3) Run "ROUTIL" (on the Utilities disc or System cartridge tape) and copy the System disc or cartridge tape to the media that will be used for normal loading.
- 4) Power off the system. Change the thumbwheel switch on the processor board, if necessary, to indicate the correct load device (refer to the Mainframe Configuration section for details). Power on the system.

- 5) Run "CONFIG". Refer to the following handbook sections for details on DROMs, Memory Configuration, and Remote I/O Configuration:
- OS Configuration
 - Terminal Configuration
 - Printer Configuration
 - Plotter Configuration

Configuration information on Auto Start and Miscellaneous Configuration (Time Slices and Default MSI Device) are application dependent. Refer to the appropriate application manuals for details.

Configure in the proper primary, secondary, and alternate keyboard through Keyboard Edit.

- 6) Power-off the system, then power-up the system (so the new configuration takes affect). Verify there are no error messages displayed indicating configuration errors.

OS INSTALLATION AND UPGRADE - 2.0 - MINOR REVISION UPGRADE

2.0 MINOR REVISION UPGRADE PROCEDURE

A minor revision of the operating system is one where only the final digits change, such as from A.03.01 to A.03.04. If the letter or leading digits change, it is a major revision of the operating system.

Note: Since this is a minor revision upgrade, all binaries that are part of programs will still work. Therefore, the application programs do not need to be upgraded.

EXCEPTION: If there are any bug fixes in a binary used in a program, follow the Major Revision procedure. This will insure that the binaries are upgraded.

The following procedure is for upgrading a minor revision of the operating system:

- 1) Power-up the system using the currently installed version of the operating system.
- 2) Backup all software using the DUPL utility (or a combination of BACKUP and DBSTORE, or FVBACK).
- 3) Run "CONFIG" and produce a printout of the entire system configuration.
 - a) Select SET PRINTER. Specify a printer other than the CRT.
 - b) Select DUMP CONFIGURATION.
- 4) Power-off the system. Change the thumbwheel switch on the processor board to 2 if the new operating system is on floppy, otherwise set it to 5 (the operating system is on tape cartridge).
- 5) Insert the new operating system into the floppy drive or cartridge tape drive. Power-up the system.
- 6) Run "ROUTIL" and copy the operating system to the media used for normal loading of the OS.
- 7) Power off the system. Change the thumbwheel switch on the processor board back to its original setting. (Refer to the Mainframe Configuration section for details.) Power-up the system.

OS INSTALLATION AND UPGRADE - 2.0 - MINOR REVISION UPGRADE

- 8) Run "CONFIG" and configure the system to match the previous configuration (using the printout from step 2).
- 9) Power-off the system, then power-up the system (so the new configuration takes affect). Verify there are no messages displayed indicating configuration errors.

3.0 MAJOR REVISION UPGRADE PROCEDURE

A major revision of the operating system is one where the letter or leading digits change, such as from A.02.3 to A.03.01 or A.03.06 to B.04.00. If just the final digits change, it is a minor revision of the operating system.

The following procedure is for upgrading a major revision of the operating system:

(Note: The first nine steps listed below are the same as for upgrading a minor revision of the operating system.)

- 1) Power-up the system using the currently installed version of the operating system.
- 2) Backup all software using the DUPL utility (or a combination of BACKUP and DBSTORE, or FVBACK).
- 3) Run "CONFIG" and produce a printout of the entire system configuration.
 - a) Select SET PRINTER. Specify a printer other than the CRT.
 - b) Select DUMP CONFIGURATION.
- 4) Power-off the system. Change the thumbwheel switch on the processor board to 2 if the new operating system is on floppy, otherwise set it to 5 (the operating system is on tape cartridge).
- 5) Insert the new operating system into the floppy drive or cartridge tape drive. Power-up the system.
- 6) Run "ROUTIL" and copy the operating system to the media used for normal loading of the OS.
- 7) Power off the system. Change the thumbwheel switch on the processor board back to its original setting. (Refer to the Mainframe Configuration section for details.) Power-up the system.
- 8) Run "CONFIG" and configure the system to match the previous configuration (using the printout from step 2).
- 9) Power-off the system, then power-up the system (so the new configuration takes affect). Verify there are no messages displayed indicating configuration errors.

OS INSTALLATION AND UPGRADE - 3.0 - MAJOR REVISION UPGRADE

Note: If you are upgrading from A.03.xx to B.04.00, the following step can be ignored for any program that contains only the XCOPY, CATBIN, R-ONLY, DBPASS, or DUP binaries. If the program contains the DBSTOR, DBUTIL, ACCEPT, or REVCHK binaries, the following step MUST be performed.

- 10) For each program that uses binaries,
- a) Power-up on the old OS revision (e.g. A.03.06)
 - b) LOAD "program name" | load program into memory
 - c) SAVE "TEMP" | strip off binaries
 - d) Power-up on the new OS revision (e.g. B.04.00)
 - e) For each binary used in the program,
LOADBIN "binary name" | load in the NEW version of
| of the binary from the new
| revision of the OS
 - e) GET "TEMP" | bring in the program
 - f) RE-STORE "program name" | store program with the
| new versions of the
or
STORE "program name" | binaries
 - g) PURGE "TEMP" | purge the temporary file
 - h) SCRATCHP | clear program memory to
| insure all binaries are
| erased before doing
| anything else
 - i) Where possible, RUN the program to verify that the
upgrade was successful

You can use the TOOLS DROM for loading programs. When this DROM is used, perform steps 10a through 10c, and then proceed with step 11.

OS INSTALLATION AND UPGRADE - 3.0 - MAJOR REVISION UPGRADE

11) Loading Programs Using the TOOLS DROM

- a) Load the new version of the operating system (B.06.IX) with the TOOLS DROM loaded.
- b) GET the SAVED source version of your program.
- c) RE-STORE the program under the original name.

Your programs will now run on the version of the operating system.

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Section 250
MAINFRAME INSTALLATION

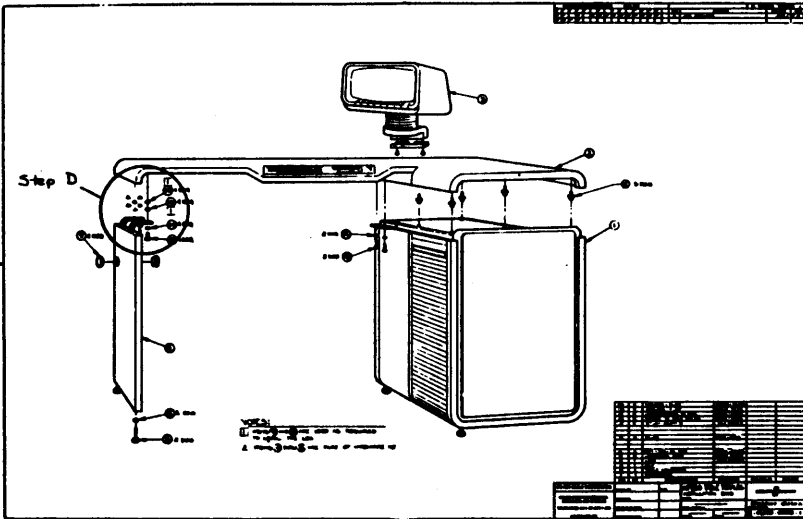
TABLE OF CONTENTS

- 1.0 HP 250A and HP 250/35
- 2.0 HP 250/2X, HP 250/30, HP 250/40, and HP 250/50

MAINFRAME INSTALLATION - 1.0 - HP 250A AND HP 250/35

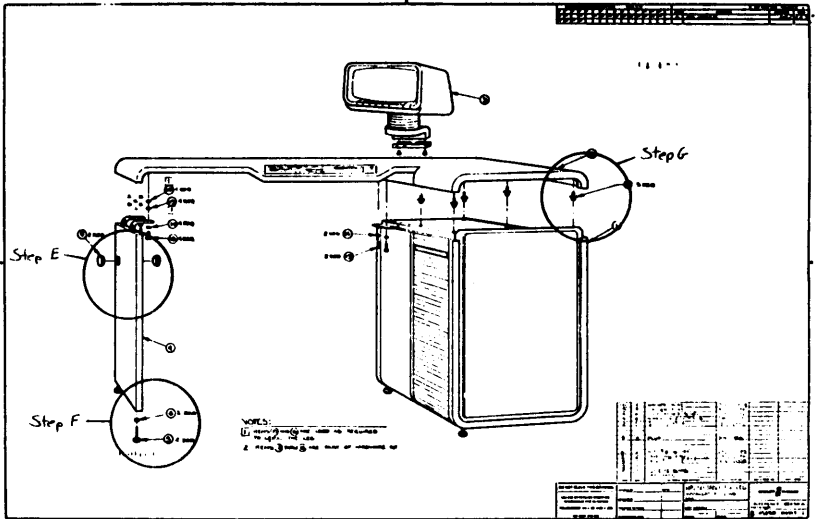
1.0 HP 250A AND HP 250/35

- A) Refer to the Site Preparation Guide for pre-installation details (a copy of the guide is in Section 210). All cartons should be unpacked by the customer before or on the day of the installation.
- B) Verify all components are present and are not damaged.
- C) Turn the desktop/keyboard upside down. Remove the shipping boards.
- D) Attach the leg to the desktop/keyboard using
 - 4 each Screw 1/4 - 20 x .50 LG (2940-0103)
 - 4 each Lockwasher 1/4 HEL (2190-0032)and if required to level the leg,
 - 4 each Washer, flat (3050-0234)
 - 4 each Washer, flat (3060-0204)



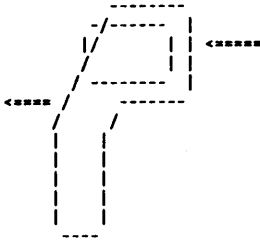
MAINFRAME INSTALLATION - 1.0 - HP 250A AND HP 250/35

- E) Insert the plugs (3041-1456) into the leg.
- F) Attach the leveling pads (0403-0246) to the leg using the Nut 3/8 - 16 HEX (2950-0085).
- G) Screw in the five mounting studs (1390-0445) to the desktop/keyboard.
- H) Position the mainframe, and bring the desktop/keyboard/leg assembly over next to it.
- I) Lift the desktop/keyboard/leg assembly and position it on the mainframe.



MAINFRAME INSTALLATION - 1.0 - HP 250A AND HP 250/35

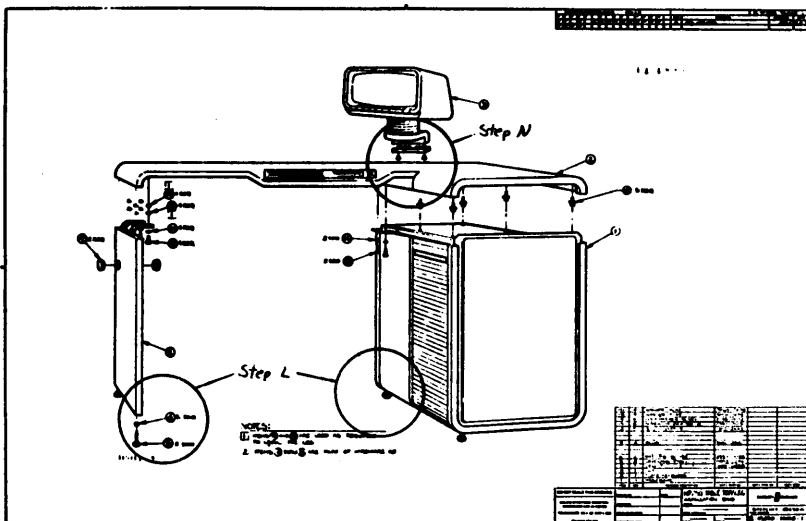
- J) Slide the desktop/keyboard/leg assembly towards the back of the mainframe until it is flush along the front. This locks the top down with the studs.**



- K) Secure the top with the Screw 1/4 - 20 x .50 LG and Lockwasher 1/4 HEL.**

MAINFRAME INSTALLATION - 1.0 - HP 250A AND HP 250/35

- L) Adjust the leg and tub leveling pads so that the desktop/keyboard is level and stable.
- M) Install the accent panel on the side of the mainframe.
- N) Place the CRT in the center of its track. Secure the CRT retainer (45000-04705) with 6-32 machine screws.



MAINFRAME INSTALLATION - 1.0 - HP 250A AND HP 250/35

For the tub manufactured at GSD:

- O) Form the CRT cable into a loop and place it behind the keyboard lower sheet-metal panel. Check that the CRT travels the full limit of the desktop groove.
- P) Remove the mainframe cable cover by loosening the four mounting screws. Connect the CRT and keyboard cables, and secure the the cables under the desktop. Attach the ground wire. Replace the mainframe cable cover. This completes the installation procedure for the tub manufactured at GSD.

For the tub manufactured at BCD:

- O) Connect the cables to the mainframe as follows:
 - a) Open the card cage access door by unscrewing the four retaining screws.
 - b) Install the multi-usage cable: the power supply cable (with the big connector) is plugged onto the power supply board, the primary connector is plugged into the primary box, the connector with two cables is plugged onto the keyboard logic board, and the connector with one cable is plugged onto the display logic board.
 - c) Insert the cables into the slots cut in the mainframe. Clamp the cables securely into these slots with the bracket attached to the inside of the mainframe.
 - d) Connect the ground cable to the power supply chassis using one of the two screws holding the power supply.
- P) When the cables have been connected and clamped, bend the keyboard cable through 180 degrees at the point where it exits the mainframe and pass it through the conduit formed by the table top and the front left-hand corner of the mainframe.
- Q) Open the accessory box and remove the keyboard and the plastic bag containing screws and a clamp.
- R) Assemble and install the keyboard as follows:
 - a) Go to the front of the computer. Unscrew the chassis keyboard from the tabletop.
 - b) Clamp the keyboard cable to the tongue on the right-hand side of the chassis keyboard

MAINFRAME INSTALLATION - 1.0 - HP 250A AND HP 250/35

For the tub manufactured at BCD (continued):

NOTE

The clamp **MUST** make good contact with the earthing shield of the cable. Clamp on the exposed portion of this shield, **NOT** on the cable insulation.

- c) Connect the keyboard cable to the keyboard.
- d) Place the keyboard in the keyboard chassis, making sure all fixing points are aligned.
- e) Attach the keyboard to the chassis with the four screws provided.
- f) Make sure that the keys pass through the slots cut for them in the tabletop, and fix the chassis to the underside of the table using the eight screws provided.
- g) Check all keys to make sure they operate freely.

MAINFRAME INSTALLATION - 2.0 - HP 250/20/25/30/40/50

2.0 HP 250/20, HP 250/25, HP 250/26, HP 250/30, HP 250/40 AND HP250/50

- A) Refer to the Site Preparation Guide for pre-installation details. All cartons should be unpacked by the customer before or on the day of the installation.
- B) Verify all components are present and are not damaged.
- C) Remove the lower front panel of the mainframe pod. The keys and power cord are shipped behind this panel.
- D) Remove the upper front control panel (by removing the two screws on the lower part of the panel; the upper part of the panel is held with ball studs). Remove the four screws that hold the shell (top and sides) to the chassis. Take off the shell and remove the foam that is behind the backplane. (The foam is used for shipping only.)

WARNING

Severe overheating can result if the foam that is placed behind the backplane for shipping purposes is not removed before the system is powered on.

- E) Replace the shell, upper front control panel, and lower front panel.
- F) Adjust the leveling pads on the pod so that it is level and stable.

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SERVICE NOTE

Supersedes: None

45120A (HP 250)

Asynchronous Serial Interface
board (ASI)

45120-66550 or 45120-69550

Date codes through 1843

APPLIES TO:	All Units <input checked="" type="checkbox"/>	Only Units on Agreement <input type="checkbox"/>	
PERFORM:	Immediately <input type="checkbox"/>	At PMA/Normal Call <input type="checkbox"/>	
	On Failure <input checked="" type="checkbox"/>	Information Only <input type="checkbox"/>	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	0.5 hr		
PARTS:	ASI		
TRAVEL:	None		
SERVICE INVENTORY	Return for update <input checked="" type="checkbox"/>	Use as is <input type="checkbox"/>	
	Return for salvage <input type="checkbox"/>	See text <input type="checkbox"/>	
WARRANTY EXTENDED UNTRL:	Oct. 1982		

UNEXPECTED STOP OF HP 250 REMOTE/TERMINAL/SYSTEM OR FAILURE ON BOOT-UP

SYMPTOM: There are three identified possible failure modes:

1. During normal operation, the cursor will stop blinking on a REMOTE 250 or terminal for no apparent reason. The mainframe will still continue normal operation.
2. The system has an unexpected stop and there is no error indicated.
3. The system won't boot. It has an unexpected stop with no error indication.

CAUSE: The U44 (Motorola 6800 Processor) integrated circuit on the ASI board (45120-66550) requires an extremely accurate two-phase clock (constant voltage level and minimum phase jitter) to operate properly. The present oscillator combination (U62, crystal oscillator, and "tank circuit") consists of several discrete components that are spread out on the board. This configuration is extremely susceptible to electrical noise on the board, and to external electrical interference from other boards and from the backplane. This susceptibility causes intermittent operation of the oscillator circuitry and two-phase clock, which, in turn, causes the Motorola 6800 to malfunction.

ACTION: The present oscillator combination is being replaced by one integrated circuit which eliminates several discrete components. The end result is elimination of susceptibility to electrical noise and external electrical interference in that area.

PCO#

cont'd.

All field service inventory (FSI) will be updated to the exchange board number 45120-69555 (updated date code is 2136). Labor is 0.5 hours for analysis and change of the board. Since parts are replaced On Failure Only, no travel is included.

SERVICE NOTE

Supersedes: None

4525xA (HP 250)
All serial numbers

APPLIES TO:		All Units <input checked="" type="checkbox"/>	Only Units on Agreement <input type="checkbox"/>
PERFORM:		Immediately <input type="checkbox"/>	At PM/Normal Call <input type="checkbox"/>
		On Failure <input type="checkbox"/>	Information Only <input checked="" type="checkbox"/>
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			Y
SERVICE INVENTORY:	Return for update <input type="checkbox"/>	Return for salvage <input type="checkbox"/>	Use as is <input type="checkbox"/>
			See text <input checked="" type="checkbox"/>
WARRANTY EXTENDED UNTL: N/A			

MODIFICATIONS TO THE HP 250 NAMEPLATE AND SUBPANEL ASSEMBLIES

SYMPTOM: The HP 250 nameplate (PN 7120-7237) and the subpanel (PN 45000-00203) assemblies located on the main console are used to secure the softkey assembly in place. The threaded studs attached to the nameplate have a high failure rate, they can break off when the softkey assembly is being removed or installed.

The present design has been modified so that the threaded studs are no longer welded to the nameplate, they are now press fitted into the subpanel. Also, the nameplate now has an adhesive backing for securing it to the subpanel.

CAUSE: N/A

ACTION: The old nameplate (PN 7120-7237) and subpanel (PN 45000-00203) are now obsolete. Any remaining stock of the old parts can still be used. All future orders for these parts should reference the following new part numbers:

Nameplate	PN 7121-2155
Subpanel	PN 7101-0616

Note: The new nameplate and subpanel are not interchangeable with the old parts. If it is necessary to replace the old nameplate (PN 7120-7237) and another old nameplate is not available, it will be necessary to replace both the old nameplate and the old subpanel with the new parts (PN 7121-2155 nameplate, and PN 7101-0616 subpanel).

PCO#

SERVICE NOTE

Supersedes: None

4525xA (HP 250)
All serial numbers

New HP 250 Processor Board
(45000-66565/45000-69565)

SYMPTOM: N/A

CAUSE: A new HP 250 Processor Board (45000-66565/45000-69565) is now on the Exchange Program. The new processor board is identical to the current processor board (45000-66505/45000-69505), except that the ROMs are different. The current ROMs (1818-2829 and 1818-2830) have been enhanced to add the following capabilities:

- load the operating system from a 7906 and 7908
- load a bootstrap diagnostic from any disc
- enhanced use of the LED on the processor board during system self-test and load
- display system self-test and load messages to the workstation on port 1 in a 45260A (HP 250/30)

The part numbers for the new ROMs are 1818-2913 and 1818-2914. The processor board part number was changed to aid tracking the boards with the new ROMs.

ACTION: The entire FSI is being upgraded to the new ROMs to eliminate a dual pipeline. A firmware kit (part number 45265-63001) is being sent to each office that has a 45000-69505 to be used to upgrade the board to a 45000-69565. It consists of:

- ROM part no. 1818-2913
- ROM part no. 1818-2914
- Label for new board
- Service Note HP 250-15

APPLIES TO:		All Units <input checked="" type="checkbox"/>	Only Units on Agreement <input type="checkbox"/>
PERFORM:		Immediately <input type="checkbox"/>	At PM/Normal Call <input type="checkbox"/>
		On Failure <input type="checkbox"/>	Information Only <input checked="" type="checkbox"/>
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	See Text		
PARTS:	See Text		
TRAVEL:	See Text		
SERVICE	Return for update <input type="checkbox"/>	Use as is <input type="checkbox"/>	
INVENTORY	Return for salvage <input type="checkbox"/>	See text <input checked="" type="checkbox"/>	
WARRANTY EXTENDED UNTIL: N/A			

A separate kit (product number 45265A) is available for customers who want to upgrade their demo or support units.

To upgrade any 45000-66505 or 45000-69505 board to a 45000-69565, follow the procedure below. (This procedure is also in section 230 of the HP 250 Service Handbook (45000-94000).)

*****CAUTION*****

ROMs can be damaged by electrostatic discharge. Use the following precautions:

AVOID when possible wearing clothing subject to static charge buildup, such as wool or synthetic materials.

DO NOT handle the ROMs in carpeted areas.

DO NOT remove the ROMs from their conductive foam pad until you are ready to install them.

BEFORE touching the ROMs, be sure that you and ROMs are at the same potential.

AVOID touching the circuit leads. Handle by the plastic package only.

ENSURE that the ROMs, work surface, and Processor Board are all at the same potential when installing the ROMs.

1. Verify that the system is working correctly (i.e. all known hardware problems are fixed).
2. Power off the system.
3. Remove the anti-static pad (4342-0036) from the Product Support Package (45250-67807) and place it on the table top on the HP 250. Attach the strap with the clip to the system and place the other strap around your wrist.
4. Remove the processor board (45000-66505/45000-69505) from the card cage and place it on the anti-static pad such that the thumbwheel switch is in the lower left corner. The ROMs on the board should be in the lower right corner.

HP 250-15

NOTE: The thumbwheel setting of the board put into the system must be the same as the setting on the board you are removing.

5. Insure that the ROM on the right has part number 1818-2829 and the ROM on the left has part number 1818-2830.
6. Place the foam pad containing the new ROMs on the anti-static pad. Verify that the ROM part numbers are 1818-2913 and 1818-2914.
7. Remove the left ROM (1818-2830) from the processor board and place it on the foam pad.
8. Insert ROM 1818-2914 in the left socket, such that the notch for the ROM is in the front and the notch for pin 1 is to the right.
9. Remove the right ROM (1818-2829) from the processor board and place it on the foam pad.
10. Insert ROM 1818-2913 in the right socket, such that the notch for the ROM is in the front and the notch for pin 1 is to the right.
11. Place the label containing the new board number and date code on the board.
12. Place the processor board back in the card cage.
13. Power-up the system. Check the note in Step 4.
14. Run "TEST" or "CE" and select MISC TEST. Run the ROM TEST to verify the checksums in the ROMs.
15. Power-off the system.

If you are upgrading an FSI board, then also do the following:

16. Send a COMSYS message to:

HP 250 Online Support
CSY Roseville
8000 Foothills Blvd.
Roseville, CA 95678
USA

The COMSYS locations is 5200. Include the following information:

- Office location code and name (location) of office
- Name of person doing the upgrade
- Serial number of each board upgraded
- Date the board was upgraded
- If additional kits are needed for FSI upgrades
(if so, include board serial numbers requiring upgrades)

It is absolutely mandatory that this information is returned so that CSD can verify that its FSI has been updated. Extended warranty billing will be accepted ONLY if this COMSYS has been received by CSY.

17. In the United States, return the ROMs that were removed from the 45000-69505 board to the address listed in the previous step.
18. In other countries the ROMs are not to be returned.

Billing on FSI upgrades: Charge CSY (Division 47) extended warranty for 0.25 hours labor maximum for each board upgraded. Parts are part of the kit and there is no travel involved. Reference this service note in the billing.

SERVICE NOTE

Supersedes: None

4525xA (HP 250)
All serial numbers

APPLIES TO:	All Units <input checked="" type="checkbox"/>	Only Units on Agreement <input type="checkbox"/>
PERFORM:	Immediately <input type="checkbox"/>	At PM/Normal Call <input type="checkbox"/>
	On Failure <input type="checkbox"/>	Information Only <input checked="" type="checkbox"/>
WARRANTY:	EXTENDED	NORMAL
LABOR:		X
PARTS:		X
TRAVEL:		X
SERVICE	Return for update <input type="checkbox"/>	Use in rt <input type="checkbox"/>
INVENTORY	Return for salvage <input type="checkbox"/>	See text <input checked="" type="checkbox"/>
WARRANTY EXTENDED UNTIL:	N/A	

NEW HP 250 CRT SWEEP BOARD (45000-66562/45000-69562)

SYMPTOM: N/A

CAUSE: A new CRT Sweep Board (45000-66562/45000-69562) is now on the Exchange Program. The new board is functionally equivalent to the current CRT Sweep Board (45000-66501/45000-69501). Changes have been done to reduce manufacturing costs.

ACTION: Overview

Field Service Inventory (FSI) for the current board (45000-69501) should be used until gone in a 4525xA. After the 45000-69501 boards are gone, begin using the 45000-69562 (see the procedure below).

Once a new CRT Sweep Board (45000-69562) is used in a 4525xA, only the new board can be used, since the voltage tripler will no longer be there. Since the new board has been used in that system, it implies that the FSI for the area consists only of the 45000-69562 board.

Procedure

*****WARNING*****

Before doing the following steps, discharge the anode to the CRT ground.

PCO#



If the board in the system is a 45000-66562 or 45000-69562, remove the board and replace it with a 45000-69562.

If the board in the system is a 45000-66501 or 45000-69501, then

- a) Remove the CRT Sweep Board that is in the system.
- b) Remove the voltage tripler (0960-0502), the screws and nuts that hold the voltage tripler, and the cable connecting the voltage tripler to the anode connector on the CRT.
- c) Install the new version of the CRT Sweep Board (45000-69562). Connect the cable on the CRT Sweep Board to the anode connector on the CRT. Do NOT reinstall the voltage tripler. Connect the cables to the CRT Sweep Board using the diagram on the following page.

Billing

This service note is only documenting the change of the CRT Sweep Board in FS1. No warranty charges are involved due to the change of boards in FS1.

SERVICE NOTE

Supersedes: None

4525xA (HP 250)
All serial numbers

APPLIES TO:	All Units <input checked="" type="checkbox"/>	Only Units on Agreement <input type="checkbox"/>	
PERFORM:	Immediately <input type="checkbox"/>	At PMA/Normal Call <input type="checkbox"/>	
	On Failure <input type="checkbox"/>	Information Only <input checked="" type="checkbox"/>	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:			X
PARTS:			X
TRAVEL:			X
SERVICE	Return for update <input type="checkbox"/>		Use as is <input type="checkbox"/>
INVENTORY	Return for salvage <input type="checkbox"/>		See text <input checked="" type="checkbox"/>
WARRANTY EXTENDED UNTIL: N/A			

NEW HP 250 POWER SUPPLY (45000-66552/45000-69552)

SYMPTOM: N/A

CAUSE: A new HP 250 Power Supply (45000-66552/45000-69552) is now on the Exchange Program. The new supply is backwards compatible to the current Power Supply (45000-66511/45000-69561). The changes in the supply include larger current capabilities to better handle system add-ons, changes to reduce manufacturing costs, and a sheet metal change so the supply will fit in a 45260A (HP 250/30).

ACTION: The existing Power Supply (45000-69561) should be used until gone in the 4525xA. At that point, begin using the new Power Supply (45000-69552).

There are no special procedures required to change from the existing supply to the new supply.

The test points and specifications for the new supply are documented in the HP 250 Service Handbook.

This service note is only documenting the change of the Power Supply in FSI. No warranty charges are involved due to the change of boards in FSI.

PCO#

S E R V I C E N O T E

4525XA (HP 250 Model A)
 Applies to all HP 250s with
 7910Ks installed.

Supersedes:

APPLIES TO:	All Units <input checked="" type="checkbox"/>	Only Units on Agreement <input type="checkbox"/>
PERFORM:	Immediately <input type="checkbox"/>	At PM/Normal Call <input type="checkbox"/>
	On Failure <input checked="" type="checkbox"/>	Information Only <input type="checkbox"/>
WARRANTY:	<u>EXTENDED</u>	NORMAL NONE
LABOR:	1 hour	
PARTS:	yes	
TRAVEL:	see text	
SERVICE INVENTORY	Return for update <input type="checkbox"/>	Use as is <input checked="" type="checkbox"/>
	Return for salvage <input type="checkbox"/>	See text <input checked="" type="checkbox"/>
WARRANTY EXTENDED UNTIL:	1 APR '83	

Corrupted Data Using The 7910K

SYMPTOM: Data transmitted between some HP 250s and 7910Ks can be corrupted, and not immediately detected. The corrupt data can cause system crashes/hangs, CHECKREAD errors (Error 89), and corrupt data bases and program/data files.

If the corruption occurs during a write to the disc the failure will be detected only if CHECKREAD is turned on. For Reads the corruption is detected only when the system attempts to use/execute the bad data.

CAUSE: Noise on the HP-IB intermittantly resets pointers in the PHI Chip on the 7910K controller. 1 to 7 data bytes are duplicated during Reads from the disc. 1 to 2 data bytes are dropped on writes to the disc.

ACTION: The problem is jointly solved by modifications to both the 7910K and to the HP 250. See DMD's Service Note 7910K-07 for details on modifying the 7910K.

The modifications for the HP 250 requires adding a Ground Strap from one of the HP-IB cable screws (on the cable connected to the HP 250 HP-IB board) to the HP 250's card cage (see Diagram #1). Also, the HP-IB cable that goes between the HP 250's HP-IB board and the the 7910K must be RFI Shielded (PN 10833A). This type cable was shipped with most HP 250s with 7910Ks and 45012U upgrades.

RB/rb

3/82-67
 GSD



SERVICE NOTE

Supersedes:

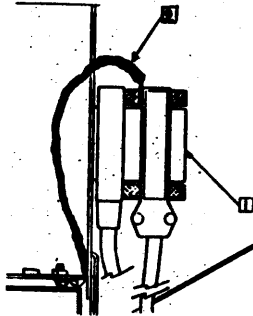


Diagram #1
Side View of The HP 250 Card Cage

Diagram #1 shows a side view of the HP 250 card cage with the Ground Strap attached to the HP-IB connector screw and the other end attached to an unused Pin Nut on the side of the card cage.

| 1 | 10833A RFI Shielded HP-IB Cable.

| 2 | 45000-61663 Ground Strap

SERVICE NOTE

This Service Note and DMD's Service Note 7910K-07 should be performed on failure only. To conclusively verify that a system is exhibiting the above failure the following test program can be run:

If the corruption is occurring the program will generate CHECKREAD errors (error 89s) each time an error is detected. The rate at which the test will fail depends on how intermittant the failures are. Usually most systems that exhibit this problem will fail within 5 to 10 minutes, a few will require running over night. The frequency of the symptom will increase as the number of devices connected to the HP-1B increases.

```

10 MS1":L"
20 CHECKREAD
30 P=0
40 DIM A(511)
50 ON ERROR GOSUB 180
60 ASSIGN #1 TO "E89",Z
70 IF Z=0 THEN GOTO 100
80 CREATE "E89",17
90 ASSIGN #1 TO "E89"
100 FOR I=0 TO 511
110 A(I)=I
120 NEXT I
130 PRINT #1;A(*)
140 ASSIGN #1 TO *
150 P=P+1
160 DISP "# OF PASSES=",P
170 GOTO 90
180 PRINT ERRM$
190 RETURN

```

NOTE: To keep from going on site just to verify that the problem exists, the above program can be read to a customer over the phone.

S E R V I C E N O T E

Once you have verified that the system is corrupting data, order and install the modifications listed on this service note and DMD's Service Note 7910K-07. The parts required for modifying both the HP 250 and the 7910K are listed below:

7910 Controller 07910-69039 or -69139 Date Code of 2137
or greater

Shielded HP-IB Flat Cable 07910-60140

Ground Strap 45000-61663

RFI Shielded HP-IB Cable 10833A (Required only if not
already installed)

The test program listed above can also be used to verify that the modifications were successful.

WARRANTY: The following can be charged to GSD's or BGD's extended warranty. Reference this Service Note number in all billings.

1/2 of the travel time (split with with DMD).

1 hour of labor (for test and update of the HP 250).

Material cost of the Ground Strap.

When necessary the material cost of the 10833A HP-IB cable.

See DMD Service Note 7910K-07 for other Billing information.

SERVICE NOTE

Supersedes: NONE

4525XA (HP 250 Model A)

APPLIES TO:	All Units <input checked="" type="checkbox"/>	Only Units on Agreement <input type="checkbox"/>	
PERFORM:	Immediately <input type="checkbox"/>	At PM/Normal Call <input type="checkbox"/>	
	On Failure <input type="checkbox"/>	Information Only <input checked="" type="checkbox"/>	
WARRANTY:	EXTENDED	NORMAL	NONE
LABOR:	N/A		
PARTS:	N/A		
TRAVEL:	N/A		
SERVICE INVENTORY	Return for update <input type="checkbox"/>	Use as is <input checked="" type="checkbox"/>	
	Return for salvage <input type="checkbox"/>	See text <input type="checkbox"/>	
WARRANTY EXTENDED UNTIL: N/A			

9895K Flexible Disc Self Test Failures

SYMPTOM: Some HP 250s with a 9895K Flexible Drive will give a self test failure indication when the system is powered on and the door of the flexible drive is closed without a disc installed. The system console will indicate a flexible drive subsystem failure and the flexible drive controller's self test LEDs will indicate that test 6 failed (Rotational Timing Test).

CAUSE: A power sequencing problem exists between the old HP 250 power supply (45000-69511/69561) and the 9895K-3 flexible drive. At power on, the preset circuitry on the 9895K's drive board attempts to reset the flexible drive to a known state. However, at the time the drive board triggers the preset circuit, the +5 volt line coming from the HP 250 power supply is usually $\leq +3$ volts, which is less than its nominal level. This prevents the logic on the drive board from being properly reset. Since the logic on the drive board is in an unknown state, the 9895K controller can be fooled into running the Rotational Timing test, which the drive fails unless a disc is installed or the drive's door is open.

SERVICE NOTE

Supersedes: NONE

Only those systems which have both the old HP 250 power supply (45000-69511/69561) and the older 9895K-3 flexible drive will exhibit this problem. Since the 9895K-3 flexible drive is backwards and forwards compatible with the newer 9895K flexible drives the part number did not change (09895-69914). 9895K drives which has serial numbers greater than 2033K0167 will not have this problem.

ACTION: If you have customers which are experiencing this problem have them do one of the following:

- Bootup using the flexible drive
- Install a disc in the drive during bootup
- Leave the flexible drive's door open during bootup

NOTE: For self test to thoroughly test a flexible drive, the drive's door must be closed with a disc installed. Otherwise, sections of self test will be skipped resulting in the drive being partially tested.

Section 270
DATA COMM INSTALLATION

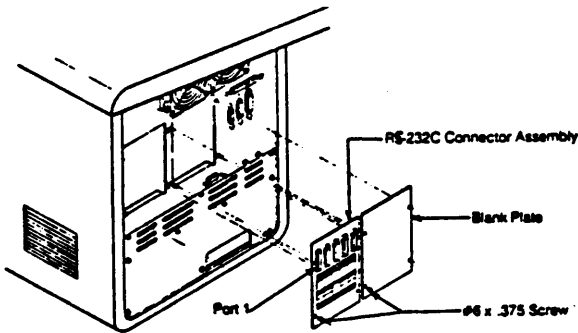
TABLE OF CONTENTS

- 1.0 Asynchronous
- 2.0 Synchronous

1.0 ASYNCHRONOUS

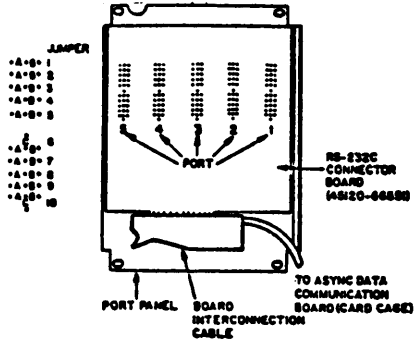
Refer to the next figure while installing the 45120A. When installing 45120B, refer to the HP 250 Basic Diagrams manual where noted with asterisk (*) in the following procedure.

1. Switch the HP 250 power off.
2. Remove both interface cover plates from the back panel.
3. Locate the jumpers on the RS-232C connector board and set the jumpers as indicated for each port (see Asynchronous Configuration section). Switch configurations for 45120B are also shown in the Configuration section.
- 4.* Connect the board interconnection cable to the RS-232C board as shown in the Connector Board figure (rear view).
- 5.* Mount the interface board assembly on the back panel using four locking screws.
- 6.* Route the board interconnection cable along the wire bundle in the card cage and secure it with the re-usable cable ties.



Mounting the RS-232C Connector Assembly

DATA COMM INSTALLATION - 1.0 - ASYNCHRONOUS



RS-232C Connector Board Assembly (rear view)

7. Check that all Asynchronous Serial Interface (ASI) board jumpers are in the "A" position. Plug the board into the card cage. See the Mainframe Configuration section for card cage configuration information.
8. Connect the board interconnection cable to the ASI board.
9. Set the baud-rate switches as required for each port. See Asynchronous Configuration section.
10. Set the peripheral address switch to PA5. This will ensure that the left-most port is port 1 and the right-most port is port 5. If you are installing a 45120B, the top port is 1 and bottom port is 5.
- 10.a If a second 45120A or B is installed, set that peripheral address switch to PA4. Those ports are labelled 6 to 10.
11. Insert an operating system (SYSTEM) disc or cartridge tape in a drive, close the door and switch the HP 250 on. Wait 30 seconds for warm-up and system loading.
12. Run the CONFIG program to reconfigure system disc.
 - Select DROM EDIT and configure the RIO (and TIO) DROMS.
 - For remote consoles; select Memory configuration -- set Common Block and extra user Memory Block.
 - Select REMOTE CONFIGURATION and set the device address, class type, etc., for each port.

DATA COMM INSTALLATION - 1.0 - ASYNCHRONOUS

- Reboot the system (power off, then on).

13. Verify interface operation by running the following appropriate procedure:

HP Terminals

For HP terminals directly connected to the HP 250, enter and run the following program to verify each terminal port.

```
10 INPUT "ENTER PORT NUMBER OF DEVICE UNDER TEST";Port
20 REQUEST Port + 10
30 Pr: PRINTER IS Port + 10
40 PRINT "ENTER DATA AND PRESS RETURN KEY."
50 ON INPUT #Port + 10 GOTO In
60 WAIT
70 In: PRINTER IS 8
80 DISP AREAD$(Port + 10)
90 WAIT 1000
100 GOTO Pr
110 END
```

Press HALT to exit program

This program outputs ENTER DATA AND PRESS RETURN KEY to the terminal. Data entered at the terminal is then transferred to the HP 250 and displayed on the CRT.

HP 2631 PRINTER

1. Using the System Console, select the printer port with the PRINTER IS statement.
2. Execute PRINT "TEST". The printer should print the word "TEST".
3. Repeat the test for each printer port.

HP 3000 Computer

1. Run the LK3000 program. The HP 3000 system prompt (:) should appear.
2. Log on.
3. Log off.
4. Press HALT to terminate the LK3000 program.

REMOTE 250 with 2631B Printer attached

1. Set printer's HP-IB address to 0 (zero).
2. At the Remote Console, type and execute:

PRINT ALL IS 10

3. Type and execute a CAT

(Catalog of the mass storage device will print out at the Remote Console and the local printer)

4. Type and execute:

PRINT ALL IS 8

(Return to Remote Console's screen)

5. Test is complete.

DATA COMM INSTALLATION - 2.0 - SYNCHRONOUS

2.0 SYNCHRONOUS

The Intelligent Network Processor (INP) consists of two boards and an interconnecting cable. One board, the INP Controller board, fits into the card cage in the usual way. The other board, the INP Connector Panel Board, secures onto the back end of the HP 250, next to the ASI connector board. The opening for this board is directly adjacent to the opening provided for the ASI board, and is covered by a square aluminum panel secured with four screws.

When installing the INP in HP 250 Model 2x, 30, 40, or 50, refer to the HP 250 Basic Diagrams manual where noted with asterisk (*) in the following procedure.

1. Power down the HP 250.
2. Near the back edge of the INP Controller board there are four DIP switches. Set these switches as follows:

Switch	Setting	

1	ON	\ > Channel Address (1)
2	ON	
3	ON	
4	OFF	Online/Offline (Online)

3. There are two jumpers on the INP Controller board that are factory installed and must be in place if the INP is to operate. One jumper is located below and to the right of the DIP switch (toward the MC5 chip). The jumper must be installed on the two bottom pins. The other jumper is located by the oscillator in the lower right corner. It must also be installed.
4. Pull out the card cage and install the INP Controller board. On the Models 20, 25, 26 30, 40, and 50, remove the outer shell of the cabinet.
5. Attach either end of the Interconnect Cable to the front edge of the Controller board. The connector should be attached so that the cable comes out of the TOP of the connector.
- 6.* Deposit the other end of the cable into the tub behind the card cage. Keep the card cage out.
7. Remove the square aluminum panel on the back end of the HP 250 cabinet next to the ASI Connector board.

DATA COMM INSTALLATION - 2.0 - SYNCHRONOUS

- 6.* Deposit the other end of the cable into the tub behind the card cage. Keep the card cage out.
7. Remove the square aluminum panel on the back end of the HP 250 cabinet next to the ASI Connector board.
- 8A. For an OLD TUB system: open the back panel of the tub and, if there is room, route the cable through the back cable channel, leaving enough length of cable on the free end of the Interconnect Cable to allow the connector to just reach through the opening. If there is not enough room in the cable channel to accommodate the Interconnect Cable, then firmly secure the INP Interconnect Cable to the ASI interconnect cable at BOTH ends of the cable channel, again leaving sufficient length at the free end. Go to Step 9.
- 8B.* For a NEW TUB system: reach through the opening on the back end of the tub and loop the Interconnect Cable through the cable channel on the inside of the tub, leaving sufficient length of cable at the free end to allow the connector to just reach through the opening.
- 9.* Bundle the Interconnect Cable with the other cables where they leave the cable channel and loop up towards the top of the card cage.
- 10.* If there is room, string the cable through the cable channel on the card cage. If there is not enough room to accommodate the cable, then firmly secure the INP Interconnect Cable to another cable passing through the cable channel. Do so on both sides of the cable channel, and so that the INP Interconnect Cable passes UNDER the cable channel rather than over it.
11. Place the free connector of the Interconnect Cable onto the bottom edge of the connector panel board so that the cable leaves the connector in the direction of the back side panel of the HP 250 cabinet.
- 12.* Secure the connector panel board onto the HP 250 cabinet with the four screws that held the square aluminum panel over the opening. Note that the bottom edge of the opening curves into the cabinet, holding the Interconnect Cable connector firmly onto the connector panel board. There is a small jumper connector on the connector panel board. Be sure that the jumper is placed on the two top pins of the 3-pin connector.
- 13.* Move the card cage in and out several times to be certain that the Interconnect Cable does not bind or get caught between the card cage and the tub.

DATA COMM INSTALLATION - 2.0 - SYNCHRONOUS

14. Power on the HP 250. Make sure all the Self-Tests pass (including the INP Self-Test). Configure the CS250 Drom.
15. If not already done, install the latest version of the HP 250 Operating System.
16. Run the Integrated Diagnostic Utility (IDU) to verify the integrity of the INP hardware. The IDU is on the RJE and DS diskettes.
17. Run the Modem Loop-Back test of the IDU if the link configuration includes a modem which has loopback capability.

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CONFIGURATION -- TABLE OF CONTENTS

Section 300
CONFIGURATION

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1.0	Asynchronous
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Section 301
CONFIGURATION OVERVIEW

This chapter contains configuration procedures for an HP 250 system and consists of the following sections:

- 340 OS CONFIGURATION - how to configure in a primary/secondary task, DROM, and binary
- 350 DATE CODES - the minimum date code that can be in an HP 250 for all exchange assemblies
- 351 MAINFRAME CONFIGURATION - the standard card-cage configuration for the HP 250, along with the configuration procedures for the power supply, processor board, block switch board, memory board, HP-IB board, keyboard subsystem (HP 250A and HP 250/35), and CRT display subsystem (HP 250A and HP 250/35)
- 370 DATA COMM CONFIGURATION - the configuration procedures and diagrams for asynchronous communication, synchronous communication, and modems

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Section 340
OS CONFIGURATION

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- 1.0 Primary/Secondary Task
- 2.0 DROM
- 3.0 Binary

OS CONFIGURATION - 1.0 - PRIMARY/SECONDARY TASK

1.0 PRIMARY/SECONDARY TASK

A primary task is a task that has a workstation attached to it at system power-up. To configure a primary task:

- 1) Install and configure the memory board for the task as described in the Mainframe Installation and Mainframe Configuration sections.
- 2) If the primary task's workstation is not integrated (i.e. if the workstation is connected on the ASI), run CONFIG and select option 2. If the RIO DROM is not yet configured, configure it as described in the next section.
- 3) Run CONFIG and select option 9. Specify the Class, USRID, and Memory size for the task. Press RECORD CONFIG and EXIT.

For operating system revision B.05.xx and B.06.xx, run CONFIG and select option 9 to configure the workstation on the desired port. Press RECORD CONFIG AND EXIT. Next select option 10 (TFIG) to specify USRID and memory size. Press RECORD CONFIG and EXIT.

- 4) Power-off the system, then power-up the system (so the new configuration takes effect.)
- 5) Verify no error messages appear during power-up related to the new task.
- 6) Enter DISP "Hello" on the task's workstation. "Hello" should be displayed.

OS CONFIGURATION - 1.0 - PRIMARY/SECONDARY TASK

A secondary task is a task that does not have a workstation attached to it at system power-up. To configure a secondary task:

- 1) Install and configure the memory board for the task as described in the Mainframe Installation and Mainframe Configuration sections.
- 2) Run CONFIG and select option 2. If the TASK DROM is not yet configured, configure it as described in the next section.
- 3) Select option 9 of CONFIG. Specify the Memory size for the secondary task. Press RECORD CONFIG and EXIT.

For operating system revision B.05.xx and B.06.xx, select option 10 of CONFIG. Specify the Memory size for the secondary task. Press RECORD CONFIG and EXIT.

- 4) Power-off the system. Then power-up the system so the new configuration takes effect.
- 5) Verify that no error messages appear during power-up related to the new task.
- 6) Execute the following commands from a workstation to verify the task is correctly configured:

```
REQUEST #userid of secondary task
ATTACH #userid of secondary task
(workstation now is attached to the secondary task)
DISP "Hello"
("Hello" should be displayed)
DETACH
(workstation now is attached to the primary task)
RELEASE #userid of secondary task
```

OS CONFIGURATION - 2.0 - DROM

2.0 DROM

- 1) Run CONFIG and select option 2. EDIT those DROMs for which you need to change the auto-load status. Press UPDATE, then EXIT. 2) Power-off the system. Then power-on the system so the new configuration takes effect.
- 3) Verify no error messages are displayed during power-up related to DROM LOADER FAILURES.

Notes: If not enough memory is available for loading DROMs, run CONFIG and select option 8. For operating system revision A, DROM OVERFLOW can be set in either the COMMON BLOCK or a user block. For operating system revision B, DROM OVERFLOW can be set in as many blocks as necessary.

Configure only those DROMs that are required.

A DROM is available to all tasks on the system, regardless of where it actually resides.

3.0 BINARY

A binary is available only to the task that has loaded it.

Multiple copies of a binary can be loaded in a task's partition. There is no gain by doing this and it can result in an ERROR 2 (Memory Overflow).

To configure in a binary,

- 1) Enter LOADBIN "binary name".

The binary is now configured in and will remain in memory until a program is LOAded, a different program is RUN, or SCRATCHA, SCRATCHP, or control HALT is entered.

A binary that is part of a program (i.e. was in memory when the program was STOREd) is automatically loaded when the program is LOAded or is RUN (with automatic LOAD).

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Section 350

DATE CODES

The table on the following pages lists the minimum date code for all boards in the HP 250 mainframe. The current PSI and boards in new systems may have date codes greater than those listed in the table.

When checking date codes on boards, be sure all boards are properly seated and the board retainers are properly installed. Loose boards will cause intermittent errors.

DATE CODES

Board P/N	Description	Minimum Date Code in System	Additional Information
07902-66510 07902-69510 07902-69560	Floppy Controller (Z80 version for 9895K drive)		
07902-66520 07902-69520	Floppy Controller (Z80 version for "common" drive)		
45000-66501 45000-69501	CRT Sweep	1837	old version
45000-66505 45000-69505	CPU Board ("old" ROMs)	1825	Systems with 7906 or 7910 require date code 1923 or greater
45000-66506 45000-69506	Display Logic	1813	
45000-66507 45000-69507	HP-IB Board	1816	1816 and 1831 date codes are acceptable ONLY if components U16 and U72 are Texas Instruments SN74157 (1820-1438) or SN74257 (1820-2194) Systems with 7906 or 7910 require date code 1923 or greater
45000-66508 45000-69508	Keyboard Logic	1823	
45000-66509 45000-69812 45000-69813	Keyboard Matrix (US exchange assembly) (German exchange assembly)	1805	1805, A-1829, and B-1829 require insulation tape on chassis under front edge of board

DATE CODES

Board P/N	Description	Minimum Date Code in System	Additional Information
45000-66510 45000-69510	Floppy Controller (MCC version)	1911	1911 date code acceptable ONLY if component U69 (1820-0427) is manufactured by MOTOROLA -- National is not acceptable 2016 or later date code required on a THREE FLOPPY DRIVE system if any drives are "common drives" (45000-6x914)
45000-66511 45000-69511 45000-69561	Power Supply (old version)	1822	1950 or later date code required if system has any "common" floppy drives Exchange part number was changed to control FSI update
45000-66513 45000-69513	64KB Memory	1805	1805 date code NOT acceptable if the delay line (1813-0120) is made by DDU and the delay line date code is 7836 or greater
45000-66514 45000-69514	Block Switch	1825	
45000-66523 45000-69523	32KB Memory	1805	1805 date code NOT acceptable if the delay line (1813-0120) is made by DDU and the delay line date code is 7836 or greater
45000-66533 45000-69533	128KB Memory	2016	
45000-66552 45000-69552	Power Supply		new version
45000-66562 45000-69562	CRT Sweep	2122	new version

DATE CODES

Board P/N	Description	Minimum Date Code in System	Additional Information
45000-66565 45000-69565	Processor Board		has "new" ROMs
45000-66566 45000-69566	ASI Panel		has Dip Switches
45000-66570 45000-69570	512KB Memory Bd.	2218	
45000-66571 45000-69571	256KB Memory Bd.	2218	
45000-68812 45000-69812	US Keyboard Assy		
45000-68813 45000-69813	German Keybd Assy (Europe Exchange only)		
45012-66521 45012-69521	7910 Power Supply	2024	
45120-66550 45120-69550	ASI Board	1843	
45120-66551 45120-69551	ASI Panel	1843	has Jumpers
45122-66560 45122-69560	IMP Board	2025	
45122-66561 45122-69561	IMP Panel	2025	

-hp-

Section 351

MAINFRAME CONFIGURATION

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- 1.0 Card Cage
- 2.0 Power Supply
- 3.0 Processor Board
- 4.0 Block Switch Board
- 5.0 Memory Board
- 6.0 HP-IB Board
- 7.0 Keyboard Subsystem
- 8.0 CRT Display Subsystem

The Card Cage section shows board placement for all boards that are in the Card Cage.

For boards not listed above, see the appropriate section:

Board	See section
-----	-----
ASI	Data Communication Configuration
INP	Data Communication Configuration
Floppy Controller	Disc Configuration

MAINFRAME CONFIGURATION

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1.0 CARD CAGE

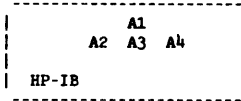
The Card Cage Configuration diagrams that follow show the standard slot position for each board. Also, all cables, switches, and LEDs for each board are indicated.

The following boards shown in the diagrams are optional:

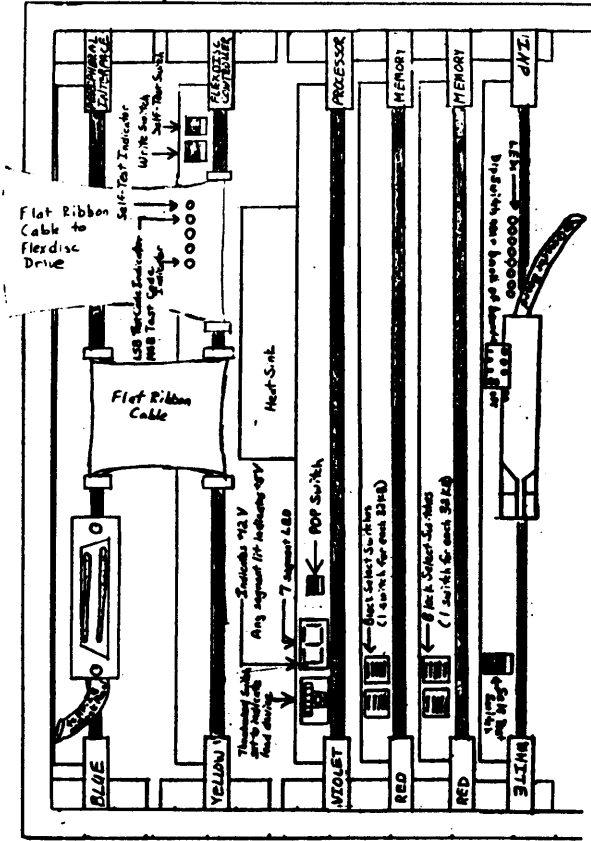
- Flexdisc controller on the HP 250 Models 30, 35, 40, and 50
- INP on all systems
- Second ASI on all systems; first and second ASI on the HP 250A

All memory boards, in addition to those shown on the diagrams, should be installed in blank slots, starting from the left side (on the HP 250A and HP 250/35) or from the top (on the HP 250/20, HP 250/25, HP 250/26, HP 250/30, HP 250/40, and HP 250/50) of the card cage. If necessary, move the INP board (if installed) to the right.

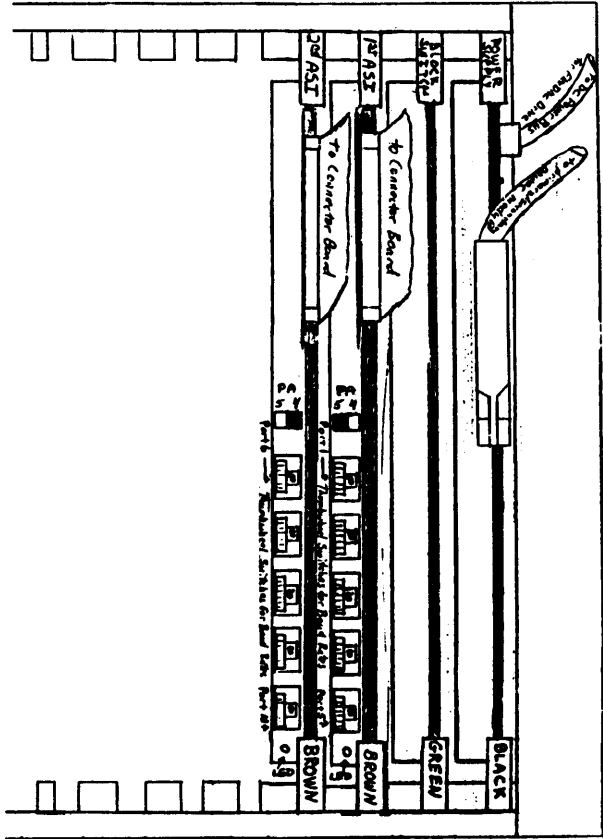
References to connections on the back panel for cables from the Display Logic Board, Keyboard Logic Board, and Power Supply have the following positions (as viewed from the outside):



MAINFRAME CONFIGURATION - 1.0 - CARD CAGE



HP 250/30, HP 250/40, and HP 250/50 Card Cage Configuration



MAINFRAME CONFIGURATION - 2.0 - POWER SUPPLY

2.0 POWER SUPPLY

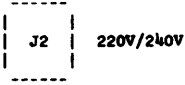
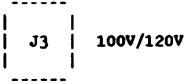
No configuration is necessary for the Power Supply.

The primary/secondary connector board (45259-66504) on the HP 250/20, HP 250/25, HP 250/26 HP 250/30, HP 250/40, and HP 250/50 should be configured as follows:

- 1) Set the sliding switch to the appropriate side



- 2) Place the cable from the transformer in the correct connector



MAINFRAME CONFIGURATION - 3.0 - PROCESSOR BOARD

3.0 PROCESSOR BOARD

Set the thumbwheel switch on the Processor Board based on the following tables. The first table is for old ROMs (1818-2829 and 1818-2830) on Processor Board 45000-69505. The second table is for new ROMs (1818-2913 and 1818-2914) on Processor Board 45000-69565.

Thumbwheel Switch Setting -----	Perform Self-Test Parts -----	Perform Additional Functions -----
0	1 & 2	Report Self-Test results from floppy and 7910; load OS from floppy; if not found, from 7910
1	1 & 2	Load OS from floppy; if not found, from 7910
2	1 & 2	Report Self-Test results from floppy Load OS from floppy
3	1 & 2	Report Self-Test results from 7910 Load OS from 7910
4	1 & 2	Same as for thumbwheel switch setting 0
5	1 & 2	Same as for thumbwheel switch setting 0
6	1	Read/Write Signature Analysis Test
7	1	HP-IB Timing Test
8	1	Memory Diagnostic
9	1	Block Switch Signature Analysis Test
10	1	Nothing implemented
11	1	Nothing implemented
12	1	Display ROM Test
13	1	Display RAM Test
14	1	Keyboard Test
15	1 & 2	Continual Loop-around on Self-Test Parts 1 & 2

Settings for old ROMs, Processor Board 45000-69505

Notes: Refer to the Self-Test Description section for descriptions of the self-test parts.

Refer to the Mainframe Diagnosis section for descriptions of the diagnostics.

MAINFRAME CONFIGURATION - 3.0 - PROCESSOR BOARD

Thumbwheel Switch Setting	Perform Self-Test Parts	Perform Additional Functions
0	1 & 2	Report Self-Test results from floppy and 7910; load OS from floppy; if not found, from 7910
1	1 & 2	Load OS from floppy; if not found, from 7910
2	1 & 2	Report Self-Test results from floppy Load OS from floppy
3	1 & 2	Report Self-Test results from 7910 Load OS from 7910
4	1 & 2	Load OS from CS'80 device ignoring Cartridge Tape Units; start with device address 7
5	1 & 2	Load OS from CS'80 device including Cartridge Tape Units; start with device address 7
6	1 & 2	Load OS from 7906 (cartridge, then fixed platter); start with device address 7
7	1 & 2	Reserved for future OS load devices
8	1 & 2	Load OS from any available device; start with device address 7
9	1 & 2	Load boot file from any available device; start with device address 7
10	1 & 2	Report self-test results from floppy; load boot file
11	1 & 2	Load boot file from CS'80 device including Cartridge Tape Unit; start with device address 7
12	1	Display RAM and ROM Test
13	1	Keyboard Test
14	1 & 2	Run Production Loop Test
15	1 & 2	Start Production Loop Test

Settings for new ROMs, Processor Board 45000-69565

Notes: Refer to the Self-Test Description section for descriptions of the self-test parts.

Refer to the Mainframe Diagnosis section for descriptions of the diagnostics.

Refer to the OS Diagnosis section for a description of loading the boot file (the memory dump utility)

For switch settings 4 through 11, the device must be powered on before powering on the HP 250. The Loader ROM will NOT wait for the device to power-on.

MAINFRAME CONFIGURATION - 4.0 - BLOCK SWITCH BOARD

4.0 BLOCK SWITCH BOARD

No configuration is necessary for the Block Switch Board.

MAINFRAME CONFIGURATION - 5.0 - MEMORY BOARD

The following table shows the position of the switches S0, S1, S2, S3, and IDA1⁴ that correspond to each memory block.

L = Lower half-block (32KB)
 U = Upper half-block (32KB)

S3	S2	S1	S0	IDA1 ⁴	OCTAL BLOCK #	S3	S2	S1	S0	IDA1 ⁴	OCTAL BLOCK #
0	0	0	0	0	reserved	1	0	0	0	0	10L
0	0	0	0	1	reserved	1	0	0	0	1	10U
0	0	0	1	0	1L	1	0	0	1	0	11L
0	0	0	1	1	1U	1	0	0	1	1	11U
0	0	1	0	0	2L	1	0	1	0	0	12L
0	0	1	0	1	2U	1	0	1	0	1	12U
0	0	1	1	0	3L	1	0	1	1	0	13L
0	0	1	1	1	3U	1	0	1	1	1	13U
0	1	0	0	0	4L	1	1	0	0	0	14L
0	1	0	0	1	4U	1	1	0	0	1	14U
0	1	0	1	0	5L	1	1	0	1	0	15L
0	1	0	1	1	5U	1	1	0	1	1	15U
0	1	1	0	0	6L	1	1	1	0	0	16L
0	1	1	0	1	6U	1	1	1	0	1	16U
0	1	1	1	0	7L	1	1	1	1	0	reserved
0	1	1	1	1	7U	1	1	1	1	1	reserved

Block Select Switch Settings
 (for the 32KB, 64KB, & 128KB Boards)

MAINFRAME CONFIGURATION - 5.0 - MEMORY BOARD

5.1 256KB/512KB Memory Boards

Due to the number of switches that would be required to select upper and lower blocks of memory, the 256KB and 512KB boards are configurable in consecutive 64KB (upper & lower) blocks only. See the block selection table below.

	A	B	C	D	Octal Block #s			
512KB	C	C	O	O	1 - 10	Upper	&	Lower
" "	O	C	C	O	11 - 20	"	"	**
256KB	C	C	O	O	1 - 4	"	"	"
" "	C	O	C	O	5 - 10	"	"	"
" "	O	C	C	O	11 - 14	"	"	"
" "	O	O	O	O	15 - 20	"	"	**

Block Select Switch Settings
(for the 256KB & 512KB memory boards)

O= OPEN C= CLOSED

** These settings are not recommended for customer's systems. In these positions there will be 2 unused blocks of memory.

MAINFRAME CONFIGURATION - 6.0 - HP-IB BOARD

6.0 HP-IB BOARD

No configuration is necessary for the HP-IB Board.

MAINFRAME CONFIGURATION - 7.0 - KEYBOARD SUBSYSTEM

7.0 KEYBOARD SUBSYSTEM

- 1) Run CONFIG and select option 6. Edit in the correct keyboard. Press UPDATE and EXIT.
- 2) Power-off the system, then power-on the system (so the new configuration takes affect).

MAINFRAME CONFIGURATION - 8.0 - CRT DISPLAY SUBSYSTEM

8.0 CRT DISPLAY SUBSYSTEM

The only configuration required for the CRT Display Subsystem is adjustments on the CRT Sweep Board and the Display Logic Board. Refer to the Mainframe Diagnosis Section (section 450) for details on the adjustments. (Horizontal position is adjusted on the Display Logic Board; all other adjustments are on the Sweep Board.)

-hp-

Section 370
DATA COMM CONFIGURATION

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- 1.0 Asynchronous
- 2.0 Synchronous
- 3.0 Modems

DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS

1.0 ASYNCHRONOUS

RS-232C Connector Board Jumpers or Switches

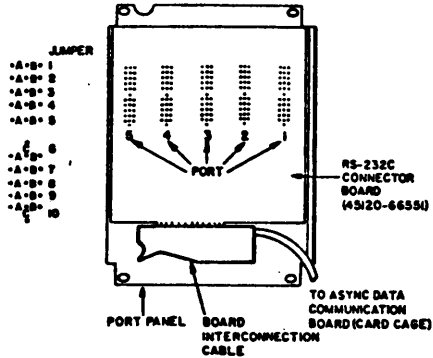
The connector board must be jumpered or switch-configured to accommodate each port assignment. Each port can be configured seven different ways. The following table lists functional definitions for the configurations.

**Functional Definitions
for
RS-232C Connector Panel Configurations**

1. **UNUSED PORT** --- ASI port without an RS-232C device connected (Used only for switch configurations).
2. **DIRECT RS-232C** -- Single cable (15 meters max) connection.
3. **CURRENT LOOP** -- Extended cable (1000 meters max) connection to 20 mA current loop peripheral.
4. **MODEM SWITCHED (U.S.)** -- Switched asynchronous modem connection in which ASI will monitor Clear To Send (CTS).
5. **MODEM SWITCHED (Europe)** -- Switched asynchronous modem connection in which ASI monitors Data Carrier Detect (DCD).
6. **MODEM LEASED (Europe) (DRS=+12V)** -- Private line modem requiring +12V for its Data Rate Select (DRS) line.
7. **MODEM LEASED (Europe) (DRS=-12V)** -- Same as 6, except -12V.

Note: The **UNUSED PORT** configuration (switches only) grounds the receiver line, consequently, the HP 250 mainframe is less susceptible to electro-static discharge (ESD) and damage to the ASI board.

DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS



RS-232C Connector Board Assembly (rear view) (Jumpers)

The jumper/switch configurations and explanations are mechanizations of the seven different functions.

Jumper Configurations

Jumper	Direct Connection		Modem Connection	
	RS-232C	Current Loop	Leased Lines	Switched Lines
1	A	B	A	A
2	A	B	A	A
3	A	B	A	A
4	A	B	A	A
5	A	B	A	A
6	A	A	A/B/C(2)	A
7	A	A	B	B
8	A	A	A	B
9	A/B(1)	A	B	B
10	A	A	C	B/C(3)

Notes:

- 1 A - if DTR is not provided by the remote device.
B - if DTR is provided by the remote device.
- 2 Sets desired Data Rate Select (DRS) (function of the modem used).

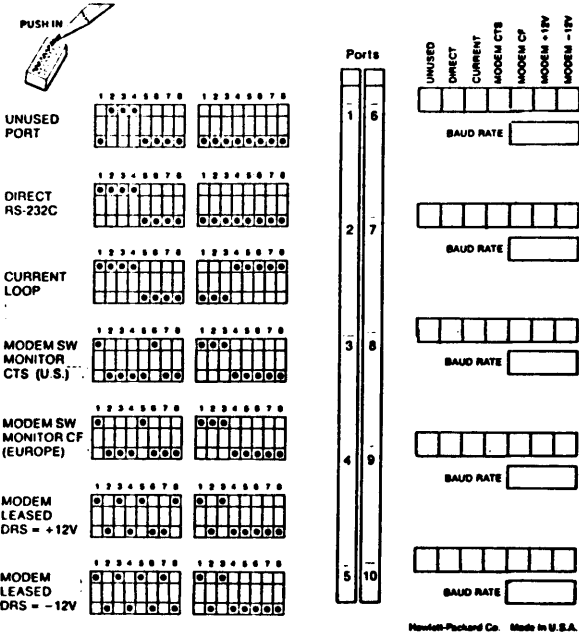
DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS

- 3 B - monitor CTS (US).
- C - monitor DCD (EUR).

Jumper Definitions

Jumper	Definitions
1-5	A RS-232C B 20 mA current loop
6	A DRS not used B DRS wired to +12V C DRS wired to -12V
7	A RTS not used B RTS wired to +12V through 2.7K pull-up
8	A DSR (DTR for modem) wired to +12V thru 2.7K pull-up B DSR (DTR for modem) controlled by UART
9	A DTR (DSR for modem) wired to +12V through 2.7K pull-up B DTR (DSR for modem) monitored
10	A CTS and DCD not monitored: input to UART wired to +12V through 2.7K pull-up B CTS monitored C DCD monitored

DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS



RS-232C Connector Board Assembly (rear view) (Switches)

Switch Configurations

Switch Definitions

1	8	1	8
| SW1 |		| SW2 |	

SW1-1 Controls (opens and closes) Received Data line going to the ASI board through the flat cable.

Note: All of the following switch positions are for Close position.

SW1-2 Sets DTR high (+12V) to ASI board.
 SW1-3 Sets DSR high to remote device.
 SW1-4 Sets CTS (or DCD) high to ASI board.
 SW1-5 Monitor DCD from remote device.
 SW1-6 Monitor CTS from remote device.
 SW1-7 Sets DRS to -12V.
 SW1-8 Sets DRS to +12V.
 SW2-1 Monitor DTR from remote device.
 SW2-2 Control DSR from ASI board.
 SW2-3 Sets RTS high to remote device.
 SW2-4,5,6 Enables current loop circuitry for receiving data.
 SW2-7,8 Enables current loop circuitry for transmitting data.

HP Terminals and Printers

When connecting an HP 262X or 264X series terminal, HP 2635 keyboard/printer, HP 2631 dot matrix printer, HP 2601 or 2602 letter quality printer, HP 293x, HP 2563, or 2687 page printer directly to the HP 250, use direct connection RS-232C with all jumpers set to "A" or DIRECT RS-232C on switches.

HP 3000

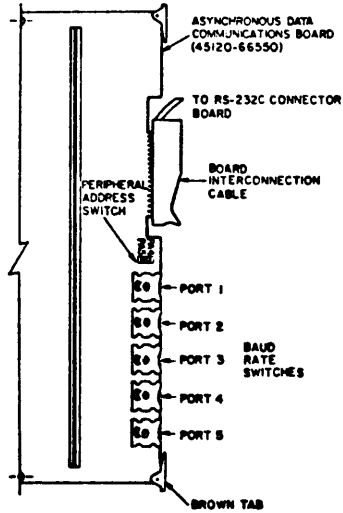
Direct connection of the HP 250 to an HP 3000 requires that all jumpers be set to "A" or DIRECT RS-232C on switches.

DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS

Baud-rate Switch Settings

The baud-rate switches are located on the Asynchronous Data Communications Board, as shown below. Each switch must be set to match the baud rate for the device connected to the corresponding port.

Switch Setting	Baud Rate
0	110
1	200
2	300
3	600
4	1200
5	1800
6	2400
7	4800
8	9600
9	Not used

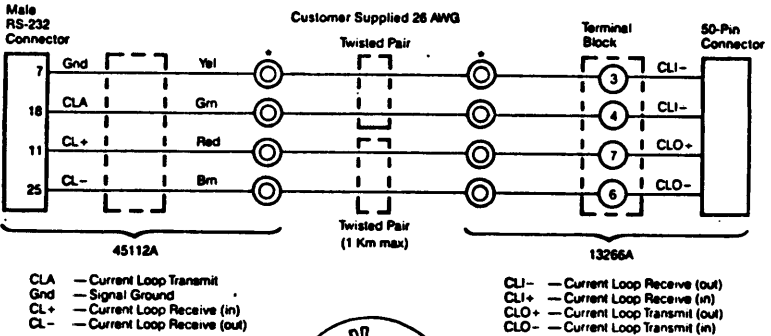


Asynchronous Data Communications Board
(45120-66550)

262X Terminal Connected to ASI with Current Loop Connection

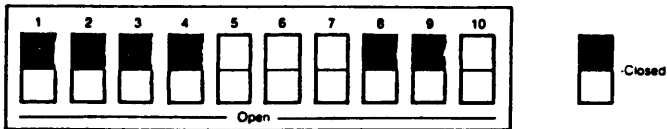


Cable Wiring for Current Loop Connection



*Detail of cable end:

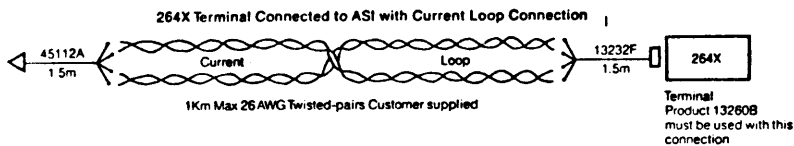
10-Position Rocker Switch Setting: Inside 13266A POD



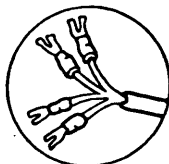
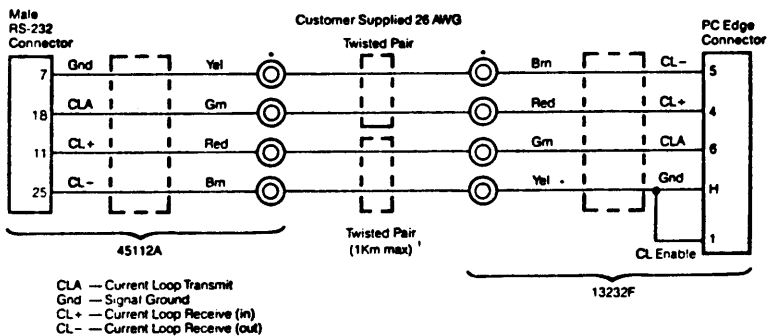
Note: Self-test switch should be in normal position.

ASI Current Loop Connections (262X Terminals)

DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS



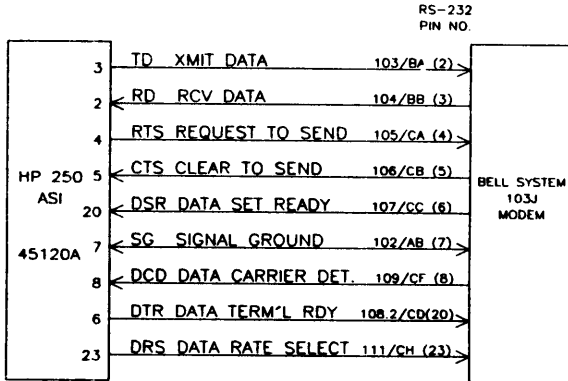
Cable Wiring for Current Loop Connection



*Detail of cable end:

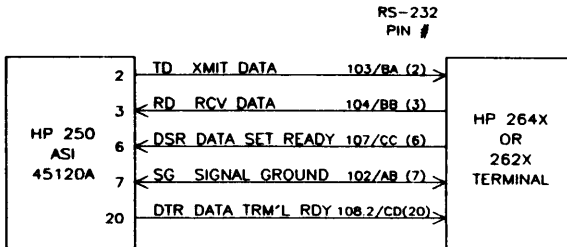
All Current Loop Connections (264X Terminals)

DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS



45111-61601 MODEM CABLE
HP PRODUCT #45111A

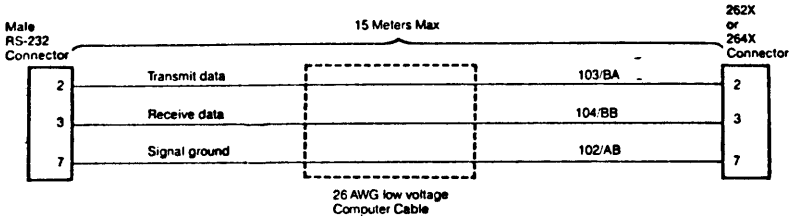
Asynchronous Modem Connection (Leased, private, or switched lines)



45113-61603 DIRECT CONNECT CABLE
HP PRODUCT #45113A

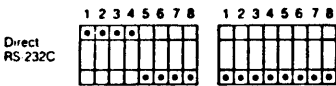
Asynchronous Direct Connection (Hardwired to terminal)

DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS



Item	HP Part No.	Description	Alternate Source
RS-232 Connector Kit	5061-2405	Includes male and female RS-232 Connectors (1 each)	
264X PCA Hood Connector Kit	5061-1340	Includes one 25-pin Connector	
262X Connector Kit	5061-2412	Includes one 50-pin Connector	Amphenol 57-30500
Connector Cable	8120-1950	12 conductor, shielded	U.L. style 2560
	8120-2398	16 conductor, shielded	U.L. style 2560

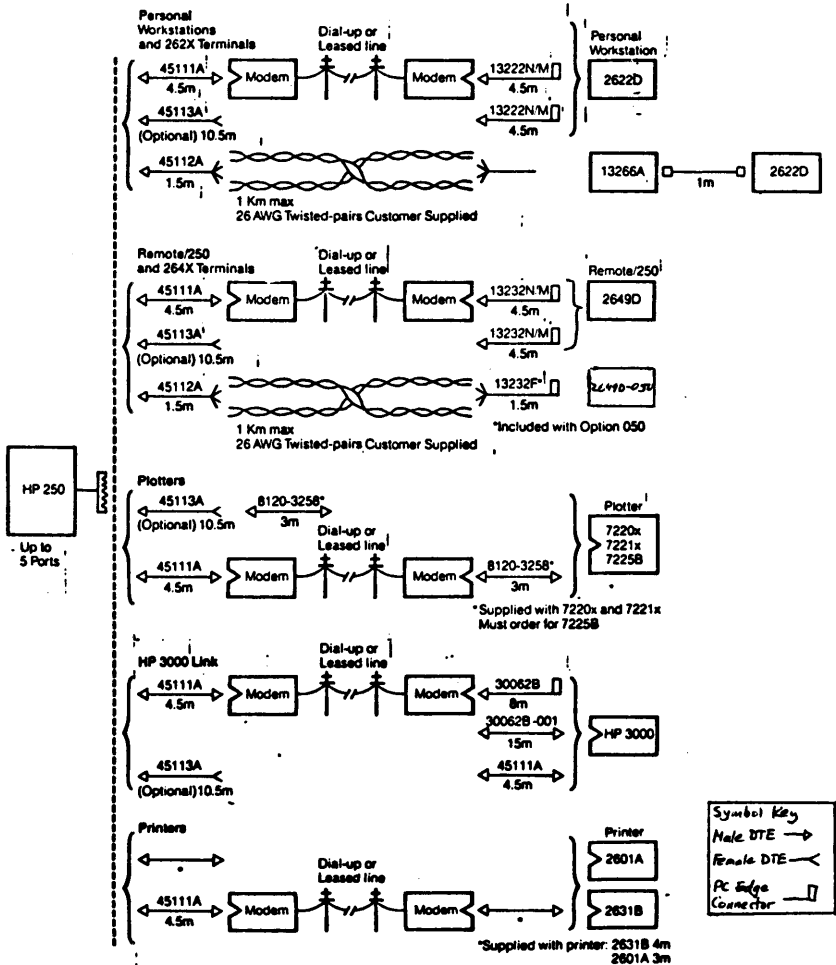
Note to Installer: On HP 250 Computer, port switch configuration is



or jumper configurations 1-10 are A's on RS-232 Connector Board Assembly

Fabricating Asynchronous Data Communications Three-Wire Cable

DATA COMM CONFIGURATION - 1.0 - ASYNCHRONOUS



Asynchronous Serial Interface Connections

DATA COMM CONFIGURATION - 2.0 - SYNCHRONOUS

2.0 SYNCHRONOUS

Four dip switches and a momentary push button (P.B.) switch are located on the Controller board. The P. B. switch is located on the front edge of the board, and is used to initiate the self test. The dip switches are located on the back edge of the board, and determine the board channel address and online/offline mode. Switches 1, 2, and 3 determine the channel address:

		Switches		
		1	2	3
Channel 1		|	|	|

		| ON |	| ON |	| ON |

Switch 4 determines the mode:

Switch 4 OFF: Normal Online Mode
Switch 4 ON: Offline Mode

Offline mode disconnects the INP from the I/O bus, and is used when continuously self testing the INP. During normal operation, dip switch settings are as follows:

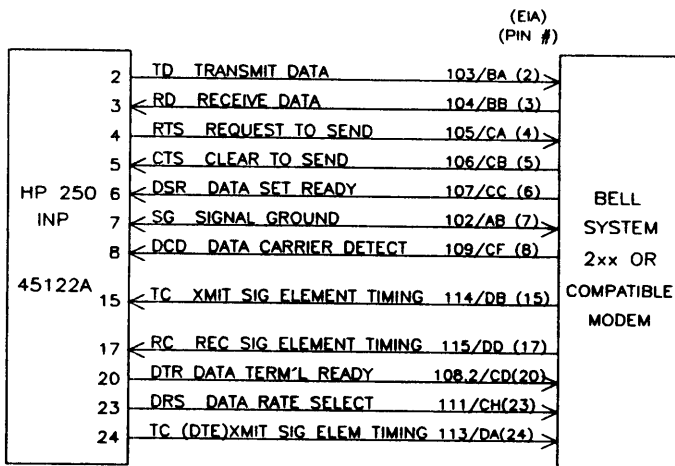
SWITCH	SETTING
1	ON
2	ON
3	ON
4	OFF

The connector panel board is connected to the controller board via the interconnect cable, through which it obtains its power and transfers the necessary control, status, and data signals.

The synchronous port is an RS-232-C interface for either modem connection over a switched/leased line or for direct connection to an HP3000 INP via the direct connect cable.

DATA COMM CONFIGURATION - 2.0 - SYNCHRONOUS

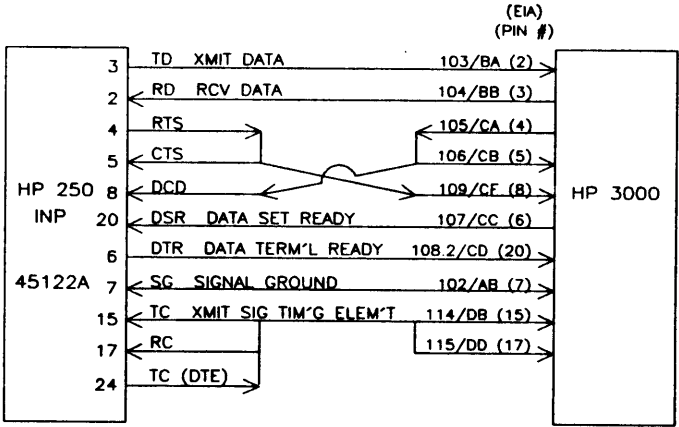
The interface for the synchronous port (modem connection -- leased, private, or switched lines) is shown in the following figure.



45122-61602 MODEM/ACU CABLE
HP PRODUCT #45115A

DATA COMM CONFIGURATION - 2.0 - SYNCHRONOUS

The interface for the synchronous port (direct connection) is shown in the following figure.



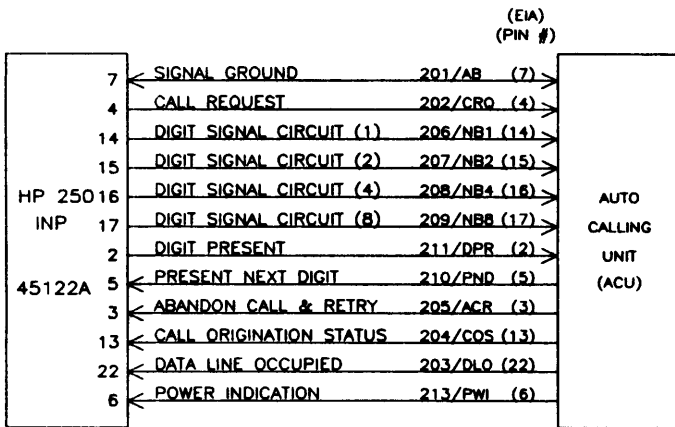
45122-61601 DIRECT CONNECT CABLE
HP PRODUCT #45116A

NOTE:

- RTS REQUEST TO SEND
- CTS CLEAR TO SEND
- DCD DATA CARRIER DETECT
- RC RECEIVE SIGNAL ELEMENT TIMING

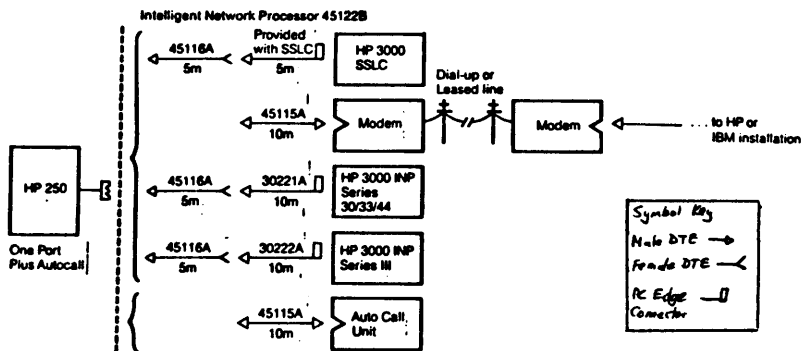
DATA COMM CONFIGURATION - 2.0 - SYNCHRONOUS

The auto-calling interface is RS-366 and is under software control, including response time-outs and telephone numbers. The interface for the RS-366 auto calling port is shown in the following figure.



45122-61602 MODEM/ACU CABLE
HP PRODUCT #45115A

DATA COMM CONFIGURATION - 2.0 - SYNCHRONOUS



INP Cable Connections

DATA COMM CONFIGURATION - 2.0 - SYNCHRONOUS

The Auto-Calling Loop-Back Connector (45122-62101) consists of an RS-232 connector and hood, and fits onto the ACU port during the Connector Loop-Back test in IDU250. When not in use, the connector is stored on one of the two securing positions provided on the bottom half of the Connector Panel Board. The wiring diagram for the Auto-Calling Loop-Back Connector is shown in the following figure.

RS-366	Pin	
DPR	2	>----- |
DLO	22	<----- |
ACR	3	<----- |
NB2	15	>----- |
CRQ	4	>----- |
(TEST)	25	<----- |
PND	5	<----- |
NB1	14	>----- |
PWI	6	<----- |
NB4	16	>----- |
COS	13	<----- |
NB8	17	>----- |

**WIRING DIAGRAM FOR AUTO-CALLING LOOP-BACK
 CONNECTOR**

The Synchronous Modem Diagnostic Loop-Back Connector (45122-62102) consists of an RS-232 connector and hood, and fits onto the synchronous port during the Connector Loop-Back test of the IDU250. When not in use, the connector is stored on one of the two securing positions provided on the bottom half of the connector panel board.

DATA COMM CONFIGURATION - 2.0 - SYNCHRONOUS

The wiring diagram for the Synchronous Modem Diagnostic Loop-Back Connector is shown in the following figure.

RS-232	Pin	
BA	2	>-----|
BB	3	<-----|
CA	4	>-----|
CB	5	<-----|
CC	6	<-----|
CD	20	>-----|
DB	15	<-----|
DD	17	<-----|
DA	24	>-----|
CF	8	<-----|
CE	22	<-----|
CH	23	>-----|
AB	7	-----|
(TEST)	25	-----|

WIRING DIAGRAM FOR SYNCHRONOUS MODEM
DIAGNOSTIC LOOP-BACK CONNECTOR

NOTE:

The INP uses pin 25 to determine whether or not the connector is in place, and whether or not the correct loop-back connector is on the port. Pin 25 of the Auto-Calling Loop-Back Connector is wired to pin 4, while pin 25 of the Synchronous Modem Diagnostic Loop-Back Connector is wired to pin 7. Note that this method of using pin 25 to determine whether or not the correct loop-back connector is in place makes it impossible to use the loop-back connectors and the IDU to verify the integrity of either the modem cable or auto-call cable. These cables do not connect pin 25, as required by most modems.

--hp--

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Section 400

TROUBLESHOOTING

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- 461 HP-IB Tools
 - 1.0 1602

- 470 Data Comm Diagnosis
 - 1.0 Asynchronous
 - 2.0 Synchronous
 - 3.0 Modems

- 471 Data Comm Tools
 - 1.0 RS-232C Monitor (Blue Box)
 - 2.0 1640

TROUBLESHOOTING OVERVIEW

Section 401

TROUBLESHOOTING OVERVIEW

This chapter contains the information necessary to troubleshoot an HP 250 system and consists of the following sections:

- 410 SYSTEM DIAGNOSIS - block diagram of the HP 250 system, block diagrams of the HP 250 mainframe, and a procedure to follow to isolate a problem to a subsystem
- 415 TOOL CROSS-REFERENCE - lists identifying which disc a particular tool (diagnostic, utility, or binary) is on, lists grouping tools by subsystem, and charts showing the dependency each diagnostic has on "working" hardware
- 430 FIRMWARE DIAGNOSIS - the procedure to follow to diagnosis firmware-related problems on the HP 250
- 431 SELF-TEST DESCRIPTION - detailed descriptions of what is performed in each part of the system's self-test
- 440 OS DIAGNOSIS - general information on OS-related errors, detailed descriptions of many hardware-related errors reported by the operating system, and a description of using the Memory Dump tool
- 441 SYSTEM ERROR (G AND M) - detailed information on what SYSTEM ERRORS are, the messages displayed, how to produce SYSRR printouts, and how to interpret the printouts

TROUBLESHOOTING OVERVIEW

- 442 MEMORY ORGANIZATION - diagrams showing how memory is organized at the system level, the module layout of the operating system, and the general layout of memory in Common Block and User Blocks
- 450 MAINFRAME DIAGNOSIS - overview and checklists for mainframe diagnosis, how to interpret the LED on the Processor Board, procedure to check power distribution, the card-cage build-up procedure, block diagrams and diagnosis procedures for the processor board, block switch board, memory board, keyboard subsystem (HP 250A and HP 250/35), and CRT Display subsystem (HP 250A and HP 250/35), and the signal assignments on the backplane
- 460 HP-IB DIAGNOSIS - the procedure and a test program to use for HP-IB-related problems
- 461 HP-IB TOOLS - how to use a 1602 Logic Analyzer to capture HP-IB sequences being sent across the HP-IB
- 470 DATA COMM DIAGNOSIS - procedures and error message interpretation for asynchronous communication, synchronous communication, and communication via modems
- 471 DATA COMM TOOLS - how to use an RS-232C Monitor (Blue Box) and a 1640 Serial Data Analyzer

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Section 410

SYSTEM DIAGNOSIS

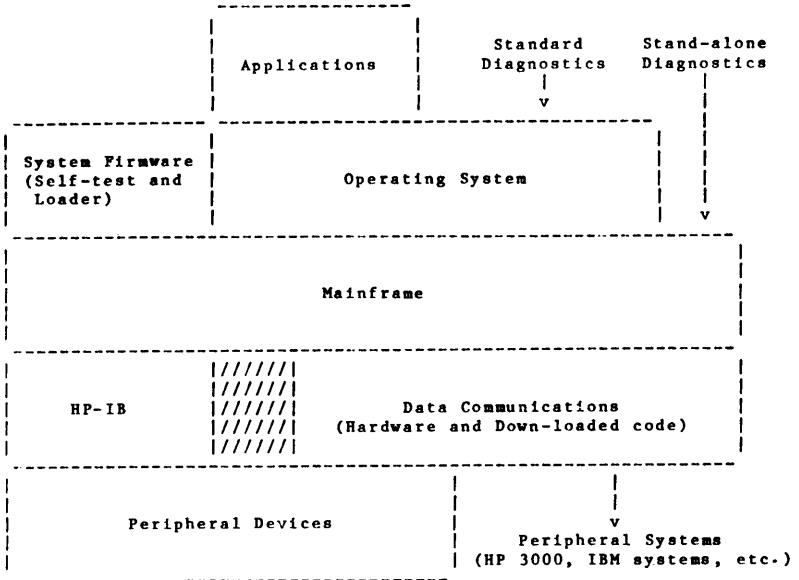
TABLE OF CONTENTS

1.0 System Structure

2.0 Problem Isolation to Subsystem Level

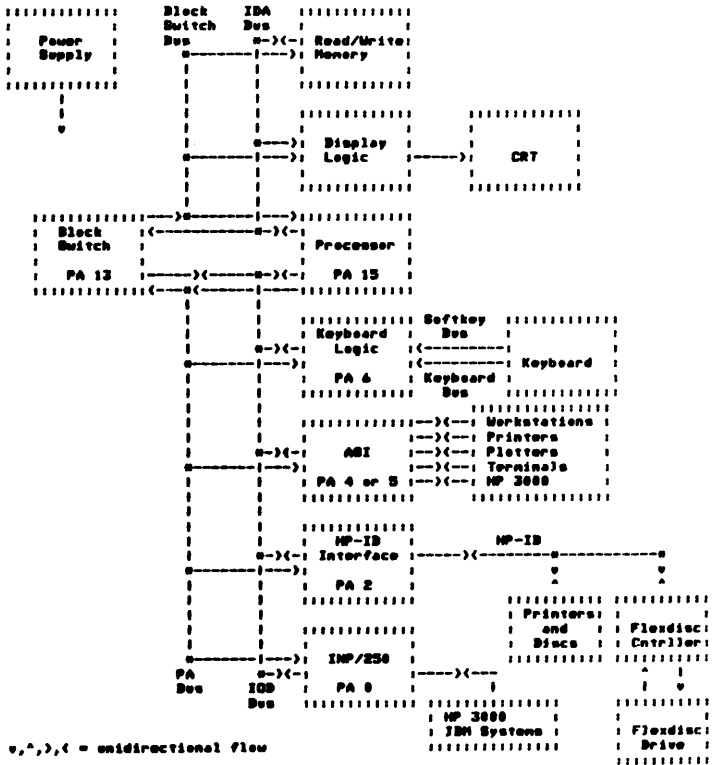
SYSTEM DIAGNOSIS - 1.0 - SYSTEM STRUCTURE

1.0 SYSTEM STRUCTURE



Structure of the HP 250 Computer System

SYSTEM DIAGNOSIS - 1.0 - SYSTEM STRUCTURE



HP 250A and HP 250/35 Block Diagram

2.0 PROBLEM ISOLATION TO SUBSYSTEM LEVEL

This is a general procedure that can be followed to help in isolating a problem. It assumes that "the system is not working". No further assumptions are made. It attempts to help isolate the problem by categorizing the types of problems that can occur and referring you to the appropriate sections in the handbook.

- 1) If any error message is displayed, then
 - a) If it is a System Error, refer to the System Error section (section 441);
 - b) If it is an error with an error number, refer to the OS Diagnosis section (section 440) (if it is not covered in that section, refer to the BASIC manual, syntax reference guide, or "Operating the HP 250" for the error message);
 - c) If it is a Self-Test error for the mainframe, refer to the Self-Test Description section (section 431) for details on the test being performed and the Mainframe Diagnosis section (section 450) for diagnosis procedures;
 - d) If it is an error related to data communications, refer to the Data Comm Diagnosis section (section 470);
 - e) If it is a Loader Error or any other message that occurs during power-up, refer to the OS Diagnosis section (section 440);
 - f) If it is an error issued by an application, refer to the manuals for the application.

SYSTEM DIAGNOSIS - 2.0 - PROBLEM ISOLATION TO SUBSYSTEM

- 2) If a cursor never appeared on any workstation (i.e. power-up did not complete), then
 - a) If any error message is displayed or at some point was displayed, refer to the beginning of this part of this section for where to find details on the message.
 - b) If no segment is lit on the LED on the Processor Board, refer to the Power Distribution portion of the Mainframe Diagnosis section (section 450).
 - c) If the system is an HP 250A or HP 250/35, then
 - 1) If there is nothing on the display, and there is power in the system, there is a problem in the Display Logic Board or the main CRT. Refer to the Mainframe Diagnosis section (section 450).
 - 2) If there is a random pattern on the CRT, there is a problem with the Processor Board, the firmware on the Processor Board, or the Display Logic Board. Refer to the Firmware Diagnosis section (section 430) and the Mainframe Diagnosis section (section 450) (the following parts: LED on Processor Board, Processor Board, CRT Display Subsystem).
 - 3) If the last message displayed was "LOADING DROMS", and the system appears to stop at that point, the problem is probably related to the load device or the HP-IB. BE SURE that ALL printers on the HP-IB are ON-LINE. Check that all devices on the HP-IB are on different addresses. Refer to the Disc Diagnosis section (section 520) and HP-IB Diagnosis section (section 460).
 - 4) Check the LED on the Processor Board and refer to the Mainframe Diagnosis section (section 450).
 - 5) Try to load the system from another device. Talk to your TSE.

SYSTEM DIAGNOSIS - 2.0 - PROBLEM ISOLATION TO SUBSYSTEM

- d) If the system is an HP 250/20, HP 250/25, HP 250/26, HP 250/30, HP 250/40, or HP 250/50, then
- 1) Check the entire configuration of the principal workstation and the ASI board. Verify that the principal workstation passes self-test; refer to the Terminal Diagnosis section (section 521).
 - 2) If the LED on the Processor Board has a value from 0 through 9, or the letter A, C, or E displayed steady, refer to the Mainframe Diagnosis section (section 450) for details on interpreting the LED value.
 - 3) If the LED on the Processor Board is displaying the letter "L", power-up stopped while loading the operating system. Check that the load device was completely powered-up before powering-on the HP 250, the thumbwheel switch on the Processor Board is set correctly, and that the load device passed self-test. A LOADER ERROR might have occurred and should be displayed. The displaying of these errors is independent of the load process failing, so a separate problem in the ASI or principal workstation might be occurring if no messages are displayed.
 - 4) If the LED on the Processor Board is displaying only the bottom segment, the Loader was unable to pass control to the Power-Up module of the Operating System. This is probably due to a problem with the Block Switch Board. Refer to the Mainframe Diagnosis section (section 450).
 - 5) If the LED on the Processor Board is flashing the letter "A", the ASI board has failed self-test. Refer to the Data Comm Diagnosis section (section 470).

- 6) The letter "P" should be displayed on the LED on the Processor Board. Check this, and also verify that the LED on the ASI Board is NOT lit. (If it is, this indicates a failure on the ASI Board.)
 - a) If no messages have been displayed throughout the power-up sequence, refer to the Terminal Diagnosis section (section 521) and Data Comm Diagnosis section (section 470).
 - b) If the last message displayed was "LOADING DROMS", and the system appears to stop at that point, the problem is probably related to the load device or the HP-IB. BE SURE that ALL printers on the HP-IB are ON-LINE. Check that all devices on the HP-IB are on different addresses. Refer to the Disc Diagnosis section (section 520) and HP-IB Diagnosis section (section 460).
 - c) Try to load the system from another device. If no messages are being displayed, try using a different workstation on port 1. Talk to your TSE.

SYSTEM DIAGNOSIS - 2.0 - PROBLEM ISOLATION TO SUBSYSTEM

- 3) If one or more workstations appear to be hung, then
 - a) Check the principal workstation to see if a SYSTEM ERROR has occurred. If so, refer to the SYSTEM ERROR (G AND M) section (section 441).
 - b) Check to see if one of the following situations occurred (these could look like a hang, but are not actual hangs):
 - the first access to the tape cartridge will "hang" the workstation doing the access for about 15 seconds
 - the unloading of a tape cartridge using the UNLOAD button on the drive will "hang" the workstation for USRID 1 for about 30 seconds (short tape) to 120 seconds (long tape)
 - a printer offline while output is being sent to it will "hang" the workstation until the printer is brought back on-line (note: SHIFT HALT will stop the attempted print)
 - c) Press keys on the keyboard, including function keys, and on an integral workstation, press the softkeys on the CRT. See if any keys beep (ignore keys such as the RESUME key).
 - If not all keys beep, the operating system is recognizing the keys being pressed and is responding with a beep.
 - If no keys beep, the operating system might have the keyboard in the "disable keyboard" state in which case the firmware for the keyboard is producing the beep. The operating system does not know that keys are being pressed.
 - If only softkeys are beeping, the application might have disabled the softkeys.
 - d) After recording what is on the screen, try to get a cursor back by pressing HALT. If that does not work, try SHIFT HALT, and then CTRL HALT.
 - e) It will be necessary to shut the system off, then power-up to clear the hang situation. BEFORE doing that, be sure that you have checked each workstation to see if it is hung and record what was trying to be done at the time and what is on the screen. Talk to your TSE for assistance in determining the cause of the hang.

SYSTEM DIAGNOSIS - 2.0 - PROBLEM ISOLATION TO SUBSYSTEM

- 4) Some other error or failure has occurred. Use the diagrams in the beginning of this section ("Structure of the HP 250 Computer System" and the appropriate Block Diagram) to identify which subsystems could be involved. List these subsystems in order of most likely to least likely. Refer to the appropriate diagnosis sections in this handbook. Consult with your TSE.

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SECTION 415
TOOL CROSS-REFERENCE

TABLE OF CONTENTS

- 1.0 Tool Name to Source Disc Index
- 2.0 Subsystem/Function to Tool Name Cross-reference
- 3.0 Diagnostic Dependency Tables

TOOL CROSS-REFERENCE - 1.0 - TOOL NAME TO SOURCE DISC INDEX

1.0 TOOL NAME TO SOURCE DISC INDEX

This index is a guide to finding the source for programs and binaries on the Operating System, Utilities, Data Communication, and CE System Support discs and the tests located in ROM.

How to use the Index:

1. In the first column, look up the software or common name of the needed tool.
2. The second column gives the name of the program, binary, or ROM test that must be used in order to access the particular tool.
3. The third column gives the location of the tool, i.e. in ROM or on which disc(s).

Note: References to "Old" ROMs refer to ROMs 1818-2829 and 1818-2830 on the Processor Board.

References to "New" ROMs refer to ROMs 1818-2913 and 1818-2914 on the Processor Board.

TOOL CROSS-REFERENCE - 1.0 - TOOL NAME TO SOURCE DISC INDEX

REFERENCE NAME	SOFTWARE TOOL NAME	OP SYS				
		UTILITIES	DATA COMM	CE SUPPORT	ROM	
-----	-----	v	v	v	v	v
ACCEPT Binary	ACCEPT		X			
AFIG	AFIG, CONFIG	X			X	
ASI Diagnostic	ASITST				X	
Autostart Configuration	AFIG, CONFIG	X			X	
Availability Table Rebuild	HMEDIA, TEST, CE	X			X	
BACKUP	BACKUP		X			
BIT Binary	BIT		X			
Catalog Binary	CATBIN		X			
CATBIN Binary	CATBIN		X			
CE	CE					X
CEINIT	CEINIT, FTEST, DTEST, CE					X
'CE' Initialize	CEINIT, FTEST, DTEST, CE					X
CFORM	CFORM		X			
CONFIG	CONFIG	X			X	
Configuration	CONFIG	X			X	
Create Forms	CFORM		X			
CSDUMP	CSDUMP					X
CSFIG	CSFIG					X
CTRACE	CTRACE					X
Data Base Load	DBLOAD		X			
Data Base Modifications	DEMODS		X			
Data Base Password Binary	DBPASS		X			
Data Base Storage Binary	DBSTOR		X			
Data Base Unload	DBUNLD		X			
Data Base Utility Binary	DBUTIL		X			
DATE Binary	DATE		X			
DBLOAD	DBLOAD		X			
DEMODS	DEMODS		X			
DBPASS Binary	DBPASS		X			
DBSTOR Binary	DBSTOR		X			
DBUNLD	DBUNLD		X			
DBUTIL Binary	DBUTIL		X			
Display RAM Test ("Old" ROMs)	Thumbwheel Setting #13					X
Display ROM Test ("Old" ROMs)	Thumbwheel Setting #12					X
Display RAM/ROM Test ("New" ROMs)	Thumbwheel Setting #12					X
Display Test	DISPLY, TEST, CE	X			X	
DISPLY	DISPLY, TEST, CE	X			X	
DTEST	DTEST, CE					X
DUP Binary	DUP		X			

TOOL CROSS-REFERENCE - 1.0 - TOOL NAME TO SOURCE DISC INDEX

REFERENCE NAME	SOFTWARE TOOL NAME	OP SYS				
		UTILITIES	DATA	COMM	CE SUPPORT	ROM
-----	-----	v	v	v	v	v
DUPL	DUPL	X				
Duplication Binary	DUP	X				
Duplication Utility	DUPL	X				
EDITOR	EDITOR	X				
EXRSIZ	EXRSIZ				X	
EX7910	EX7910				X	
Flexible Disc Drive Tests	FTEST, CE				X	
FORMAT	FORMAT				X	
FRATE	FRATE				X	
FTEST	FTEST, CE				X	
Full Volume Backup	FVBACK	X				
FVBACK	FVBACK	X				
FWEAR	FWEAR					X
GPLCFT	GPLCFT	X				
Hard Disc Diagnostics	DTEST, CE					X
HMEDIA	HMEDIA, TEST, CE	X				X
HP Media Test	HMEDIA, TEST, CE	X				X
IBM Media Test	IMEDIA, TEST	X				X
IDU	IDU				X	
Integrated Diagnostic Util.	IDU				X	
IMEDIA	IMEDIA, TEST	X				X
INIT	INIT, DTEST, CE		X			X
Initialize	INIT, DTEST, CE		X			X
Keyboard Test	MTEST, TEST, CE	X				X
Keyboard Test ("Old" ROMs)	Thumbwheel Setting #14					X
Keyboard Test ("New" ROMs)	Thumbwheel Setting #13					X
LED Test	MTEST, TEST, CE	X				X
Link 3000	LK3000		X			
LK3000	LK3000		X			
Maintenance Word Removal	MISC., CE					X
Mass Memory Commands Binary	MMCMDS					X
Media Test	HMEDIA, TEST, CE	X				X
MEMORY	MEMORY (Boot file)					X
Memory Configuration	MFIG, CONFIG	X				X

TOOL CROSS-REFERENCE - 2.0 - SUBSYSTEM/FUNCTION TO TOOL NAME

2.0 SUBSYSTEM/FUNCTION TO TOOL NAME CROSS-REFERENCE

This cross-reference associates tools (diagnostics, utilities, and binaries) with a subsystem/function of the HP 250. The tools listed are the same as in the index in section 1.0.

How to use the cross-reference:

1. Find the appropriate subsystem/function in the cross-reference:

- Configuration
- Data Communication
- Disc
- File Management
- Firmware
- Hardware
- IMAGE
- Operating System (including BASIC and programming)
- Plotter
- Printer

2. The first column gives the software or common name for the function to perform.
3. The second column gives the actual name of the program, binary, or ROM test that must be used in order to access the particular tool.
4. Refer to the index in section 1.0 to determine where the tool is located (e.g. which disc it is on).

Note: References to "Old" ROMs refer to ROMs 1818-2829 and 1818-2830 on the Processor Board.

References to "New" ROMs refer to ROMs 1818-2913 and 1818-2914 on the Processor Board.

TOOL CROSS-REFERENCE - 2.0 - SUBSYSTEM/FUNCTION TO TOOL NAME

CONFIGURATION

```

-----
AFIG                AFIG, CONFIG
Autostart Configuration  AFIG, CONFIG
CONFIG              CONFIG
Configuration        CONFIG
Memory Configuration  MFIG, CONFIG
Miscellaneous Configuration XFIG, CONFIG
MFIG                MFIG, CONFIG
Remote Configuration  RFIG, CONFIG
RFIG                RFIG, CONFIG
System Configuration  CONFIG
XFIG                XFIG, CONFIG
TFIG                TFIG, CONFIG

```

DATA COMMUNICATION

```

-----
CSDUMP              CSDUMP
ASI Diagnostic      ASITST
CSFIG               CSFIG
CTRACE              CTRACE
IDU                 IDU
Integrated Diagnostic Util. IDU
Link 3000           LK3000
LK3000              LK3000
Synchronous Configuration CSFIG
Synchronous Trace Facility CTRACE & CSDUMP

```

DISC

```

-----
Availability Table Rebuild HMEDIA, TEST, CE
Catalog Binary           CATBIN
CATBIN Binary            CATBIN
CEINIT                   CEINIT, FTEST, DTEST, CE
'CE' Initialize          CEINIT, FTEST, DTEST, CE
DTEST                    DTEST, CE
EXRSIZ                   EXRSIZ
EX7910                   EX7910
TST5MB                   TST5MB, CE
5 Megabyte Disc Test     TST5MB, CE
10 Megabyte Disc Test    TST5MB, CE
15 Megabyte Disc Test    TST5MB, CE
Flexible Disc Drive Tests FTEST, CE
FORMAT                   FORMAT
FRATE                    FRATE
FTEST                    FTEST, CE
FWEAR                    FWEAR
Hard Disc Diagnostics    DTEST, CE
HMEDIA                   HMEDIA, TEST, CE
HP Media Test             HMEDIA, TEST, CE
IBM Media Test            IMEDIA, TEST
IMEDIA                   IMEDIA, TEST
INIT                     INIT, DTEST, CE
Initialize                INIT, DTEST, CE
Mass Memory Commands Binary MMCMS
Media Test               HMEDIA, TEST, CE
MMCMS Binary             MMCMS

```

TOOL CROSS-REFERENCE - 2.0 - SUBSYSTEM/FUNCTION TO TOOL NAME

DISC

Rebuild Availability Table	HMEDIA, TEST, CE
Record 0 Recovery	HMEDIA, TEST, CE
Spare Track Map	CE
Spare Bad Tracks	TSPARE, CE
Track Map	CE
Track Spare	TSPARE, CE
TSPARE	TSPARE, CE
Verify Media	HMEDIA, TEST, CE

FILE

BACKUP	BACKUP
DUP Binary	DUP
DUPL	DUPL
Duplication Binary	DUP
Duplication Utility	DUPL
Full Volume Backup	FVBACK
FVBACK	FVBACK
Recover Utility	RECOVR
RECOVR	RECOVR
R-ONLY Binary	R-ONLY
ROUTIL Utility	ROUTIL
Run-Only Copying Binary	R-ONLY
Run-Only Copying Utility	ROUTIL
Unprotect File	MISC., CE
XCOPY Binary	XCOPY
Repack Utility	REPACK

FIRMWARE

ROM Test	MTEST, TEST, CE
----------	-----------------

GENERAL

CE	CE
TEST	TEST

HARDWARE

Display RAM Test ("Old" ROMs)	Thumbwheel Setting #13
Display ROM Test ("Old" ROMs)	Thumbwheel Setting #12
Display RAM/ROM Test ("New" ROMs)	Thumbwheel Setting #12
Display Test	DISPLY, TEST, CE
DISPLY	DISPLY, TEST, CE
Keyboard Test	MTEST, TEST, CE
Keyboard Test ("Old" ROMs)	Thumbwheel Setting #14
Keyboard Test ("New" ROMs)	Thumbwheel Setting #13
LED Test	MTEST, TEST, CE

TOOL CROSS-REFERENCE - 2.0 - SUBSYSTEM/FUNCTION TO TOOL NAME

HARDWARE

MEMORY	MEMORY (Boot file)
Memory Diagnostic ("Old" ROMs)	Thumbwheel Setting #8
Memory Diagnostic ("New" ROMs)	MEMORY (Boot file)
Memory Dump	MEMORY (Boot file)
MTEST	MTEST, TEST, CE
7 Segment LED Test	MTEST, TEST, CE
Thumbwheel Switch Test	MTEST, TEST, CE
SADUTIL	Copies (Boot file), CE

IMAGE

Data Base Load	DBLOAD
Data Base Modifications	DBMODS
Data Base Password Binary	DBPASS
Data Base Storage Binary	DBSTOR
Data Base Unload	DBUNLD
Data Base Utility Binary	DBUTIL
DBLOAD	DBLOAD
DBMODS	DBMODS
DBPASS Binary	DBPASS
DBSTOR Binary	DBSTOR
DBUNLD	DBUNLD
DBUTIL Binary	DBUTIL
Maintenance Word Removal	MISC., CE
QUERY	QUERY
Remove Maintenance Word	MISC., CE
SCHEMA	SCHEMA
WORK	WORK

OPERATING SYSTEM

ACCEPT Binary	ACCEPT
CFORM	CFORM
Create Forms	CFORM
EDITOR	EDITOR
MEMORY	MEMORY (Boot file)
Memory Dump	MEMORY (Boot file)
MFORM	MFORM
MISC.	MISC., CE
Modify Forms	MFORM
Print Forms	PFORM
PFORM	PFORM
REVCHK Binary	REVCHK
Revision Check Binary	REVCHK
SCAN Binary	SCAN
XREF	XREF

TOOL CROSS-REFERENCE - 2.0 SUBSYSTEM/FUNCTION TO TOOL NAME

PLOTTER

GPLCFT	GPLCFT, TEST
Plotter Confidence Test	GPLCFT, TEST

PRINTER

Printer Test	PRINTR, TEST, CE
PRINTR	PRINTR, TEST, CE

TOOL CROSS-REFERENCE - 3.0 - DIAGNOSTIC DEPENDENCY TABLES

3.0 DIAGNOSTIC DEPENDENCY TABLES

	Power Distribution										2622D or 2649D	9871A or 2631 or 2601 or 2608A on HP-IB	262x or 264x or 7220 or 7221 or 7225				
	HP 250 Firmware	Processor	Block Switch	Memory	HP-IB	7902A or 9895K	7910K or 7906	7908P	INP	ASI							
Note: The "Display" --> refers to the main console/keyboard	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Power Supply Test Points	X																
ROM Test	- X - - - -	1	1	0	0	0	0	0	1								
250 Self-test LED, Thumbwheel Tests	- - X - - -	1	1	0	0	0	0	0	1								
250 Self-test	- - - X																
250 Self-test	- - - - X																
Memory Diag. ("old" ROMs)	- - - - X -																
Memory Diag. ("new" ROMs)	- - - - X - 1 1	0	0	0	0	0	0	0	1								
250 Self-test	- - - - - X																
Display RAM Test	- - - - - X																
Display ROM Test	- - - - - X																
DISPLAY Test	- - - - - X	0	0	0	0	0											
Keyboard Test (ROM-based)	- - - - - X																
KEYBOARD Test (Disc-based)	- - - - - X	0	0	0	0	0											
ASI Self-test (OS A.03)	- - - - - 1 X	0	0														
ASI Self-test (OS B.04)	- - - - - X	0	0	0	0	0											
ASI Failure LED	- - - - - X																

Notes: X = under test
 - = assumed working
 0 = diagnostic must be loaded from some disc/tape
 1 = requires either main console/keyboard, or the ASI and a 2622D/2649D

HP 250A and HP 250/35 Diagnostic Dependency Table

TOOL CROSS-REFERENCE - 3.0 - DIAGNOSTIC DEPENDENCY TABLES

Power Distribution										2622D		262x		
| HP 250 Firmware										or		or		
| | Processor										2649D	2631B	264x		
| | | Block Switch										|	2631B or	7220 |		
| | | | Memory										or	|	or 2601A	or |	
| | | | | HP-IB											|	2608A on	7221 |	
| | | | | | ASI												on	RS232	or |
| | | | | | | IMP												|	|	7225 |
V V V V V V V V										V V	V V	V V	V V	

Workstation													
Self-test													X
DISPLAY Test	-	-	-	-	-	-	0	0	0	0	0		X
Printer Self-test													X X
PRINTER Test	-	-	-	-	-	-	0	0	0	0	-		X X
Plotter Self-test													X
Plotter Confidence													
Test	-	-	-	-	-	-	0	0	0	0	-		X
Terminal Self-test													X

Notes: X = under test
 - = assumed working
 0 = diagnostic must be loaded from some disc/tape

HP 250/2X Diagnostic Dependency Table

TOOL CROSS-REFERENCE - 3.0 - DIAGNOSTIC DEPENDENCY TABLES

Power Distribution	2622D	262x
| HP 250 Firmware	or	or
| Processor	2649D	264x
| | Block Switch	7908P | 2631B	2631B
| | | Memory	or | or	2601A
| | | | HP-IB	9895K 7911P | 2608A	on 7221
| | | | | ASI	| 7906H or |	on RS232
| | | | | | INP	| | 7912P |	HP-IB | 7225
V V V V V V V V V V V V V V V		

Power Supply Test Points	X										
ROM Test	-	X	-	-	-	-	0	0	0	-	
250 Self-test	-	-	X	-	-	-					
LED, Thumbwheel Tests	-	-	X	-	-	-	0	0	0	-	
250 Self-test	-	-	-	X	-	-					
250 Self-test	-	-	-	-	X	-	0	0	0	-	
Memory Diag.	-	-	-	-	X	-					
250 Self-test	-	-	-	-	-	X					
ASI Self-test	-	-	-	-	-	X	0	0	0		
ASI Failure LED	-					X					
INP Self-test	-	-	-	-	-	-	X	0	0	0	
IDU	-	-	-	-	-	-	X	0	0	0	-
9895K Self-test	-						X				
7906H Self-test	-							X			
7908/11/12P Self-test	-								X		
FRATE	-	-	-	-	-	-	X	0	0	-	
FWEAR	-	-	-	-	-	-	X	0	0	-	
VERIFY	-	-	-	-	-	-	X	X	0	-	
MNCDS	-	-	-	-	-	-	X	X	0	-	
Hard Disc Diagnostics	-	-	-	-	-	-	0	X	0	-	
EXRSIZ	-	-	-	-	-	-	0	0	X	-	
HP 85 Exerciser (requires HP 85)	-									X	

Notes: X = under test
 - = assumed working
 0 = diagnostic must be loaded from some disc/tape

HP 250/30, HP 250/40, HP 250/50 Diagnostic Dependency Table

TOOL CROSS-REFERENCE - 3.0 - DIAGNOSTIC DEPENDENCY TABLES

Power Distribution									2622D				262x
| HP 250 Firmware									or				or
| | Processor								2649D		2631B			264x
| | | Block Switch							7908P	|	2631B	or	7220	|	
| | | | Memory								|	or	2601A	or	|	
| | | | | HP-IB						9895K	7911P	|	2608A	on	7221	|	
| | | | | | ASI							7906H	or	|	on	RS232	or	|
| | | | | | | INP							7912P	|	|	HP-IB	|	7225	|
V V V V V V V V								V		V		V	V

Workstation														
Self-test														
DISPLAY Test	-	-	-	-	-	-	0	0	0					X
Printer Self-test														
PRINTER Test	-	-	-	-	-	-	0	0	0	-	X		X	
Plotter Self-test														X
Plotter Confidence														
Test	-	-	-	-	-	-	0	0	0	-			X	
Terminal Self-test														X

Notes: X = under test
 - = assumed working
 0 = diagnostic must be loaded from some disc/tape

HP 250/30, HP 250/40, HP 250/50 Diagnostic Dependency Table

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Section 430

FIRMWARE DIAGNOSIS

CAUTION

ROMs can be damaged by electrostatic discharge. Use the following precautions when handling ROMs:

AVOID when possible wearing clothing subject to static charge buildup, such as wool or synthetic materials.

DO NOT handle the ROMs in carpeted areas.

DO NOT remove the ROMs from their conductive foam pad until you are ready to install them.

BEFORE touching the ROMs, be sure that you and the ROMs are at the same potential.

AVOID touching the circuit leads. Handle by the plastic package only.

ENSURE that the ROMs, work surface, and Processor Board are all at the same potential. Use an anti-static pad when changing ROMs.

FIRMWARE DIAGNOSIS

- 1) Verify the correct ROMs are on the processor board:

For systems using a 7908 or 7906 as a load device,
ROMs 1818-2913 and 1818-2914

For systems using a 7910 as a load device or using
using OS revision B.04,
ROMs 1818-2913 and 1818-2914, or
ROMs C1818-2829 and D1818-2830

For systems using a 7902A/9895K as a load device,
ROMs 1818-2913 and 1818-2914, or
ROMs C1818-2829 and D1818-2830, or
ROMs A1818-2829 and B1818-2830

Note: ROMs A1818-2829 and B1818-2830 will interpret
self-test results from the 7910 incorrectly.
Also, they do not contain the system parse tables
that OS revision B.04 requires in ROM. (OS revision
A.03 allows the parse tables to be either in ROM or
in the OS.)

- 2) Check the seating of the processor board.
- 3) Run "TEST" or "CE" and select MISC TEST. Run the ROM TEST to verify checksums in the ROMs.
- 4) If self-test is not completing for the system, refer to section 431 Self-Test Description for details as to which part of the system was being tested when the failure occurred. If no messages are being displayed, use the LED on the processor board to indicate the status of self-test. Refer to section 450 Mainframe Diagnosis for details on interpreting the LED.
- 5) If self-test is completing, check that the thumbwheel switch is set correctly. Refer to section 351 Mainframe Configuration. Try a different load device and see if the operating system can be loaded.

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SELF-TEST DESCRIPTION

Section 431
SELF-TEST DESCRIPTION

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- 1.0 Overview**
- 2.0 Part 1**
- 3.0 Part 2**

SELF-TEST DESCRIPTION - 1.0 - OVERVIEW

1.0 OVERVIEW

The message displayed on the principal workstation during self-test is as follows:

"Old" ROMs (1818-2029)	Test Performed
<hr/>	
SELF-TEST B	
1 BPC	PASS Binary Processor Chip Self-Test
2 BLKSW	PASS Block Switch Board Register Test
3 RWFIND	PASS Read/Write Memory Find Test
4 IOC	PASS Input/Output Controller Self-Test
5 EMC	PASS Extended Math Chip Self-Test
6 BLKSW2	PASS Block Switch Board Write Protect Test
7 PROC BD	PASS Processor Board Self-Test
8 MEMTABLE	PASS Remaining Memory Test
9 HPIB	
I O	PASS HP-IB Programmed I/O Test
INT	PASS HP-IB Interrupt Logic Test
DMA	PASS HP-IB DMA Logic Test
IO INIT	PASS I/O Initialization
10 FLEX-DISC	PASS Flex-disc Self-Test results
11 LC DISC	PASS 7910K Self-Test results

"New" ROMs (1818-2913)	Test Performed
<hr/>	
ST 2	
1 P	Binary Processor Chip Self-Test
2 P	Block Switch Board Register Test
3 P	Read/Write Memory Find Test
4 P	Input/Output Controller Self-Test
5 P	Extended Math Chip Self-Test
6 P	Block Switch Board Write Protect Test
7 P	Processor Board Self-Test
8 P	Remaining Memory Test
9 P	HP-IB Programmed I/O Test
A P	HP-IB Interrupt Logic Test
C P	HP-IB DMA Logic Test
E P	I/O Initialization

2.0 PART 1

Part 1 of the mainframe self-test is performed for all thumbwheel switch settings anytime the system is powered on or the POP switch on the Processor Board is pressed. The following tests make up Part 1:

- a) Binary Processor Chip (BPC) Self-Test
- b) Block Switch Board Register Test
- c) Read/Write Memory Find Test
- d) Input/Output Controller (IOC) Self-Test
- e) Extended Math Chip (EMC) Self-Test
- f) Block Switch Board Write Protect Test
- g) Processor Board Self-Test

Description of the tests --

a) Binary Processor Chip (BPC) Self-Test

Tests all BPC instructions except

- SFS - Skip if Flag line Set
- SFC - Skip if Flag line Clear
- SDS - Skip if Decimal carry Set
- SDC - Skip if Decimal carry Clear
- SSS - Skip if Status line Set
- SSC - Skip if Status line Clear
- SHS - Skip if Halt line Set
- SHC - Skip if Halt line Clear

Tests all BPC registers

- A - Arithmetic Accumulator
- B - Arithmetic Accumulator
- P - Program Location Counter
- R - Return Stack Pointer

b) Block Switch Board Register Test

Verify Block Switch Registers were initialized to zero on Power-on

- R32 - Upper Data Block and Upper DMA Block Register
- R34 - Upper Instruction Block Register
- R35 - Lower Data Block Register
- R37 - Lower DMA Block Register

Test the Block Switch Registers

Test the Write Protect Registers (R5 and R7)

Test the Instruction Decode Circuitry

- Base page instruction
- Current page instruction
- Current page indirect instruction
- Base page indirect instruction
- Current page indirect instruction in an upper block
- Non-memory reference instruction in a lower block
- Non-memory reference instruction in an upper block

c) Read/Write Memory Find Test

This test attempts to find an upper half block of memory (32KB) that can be used during the rest of self-test. The search starts at block 16 (octal) and proceeds down through block 1 until a block is found that passes the following test. As soon as a block is found, the Read/Write Memory Find Test passes.

For thumbwheel switch settings 9, 10, 11, 14, and 15 on the new ROMs (1818-2913 and 1818-2914), a search is not performed, as it is assumed that block 1 is present. Therefore, only block 1 is tested. If it fails the memory test, the Read/Write Memory Find Test fails.

For thumbwheel switch setting 15 on the new ROMs, there will be a pause before the test occurs. This is to allow the selection via the thumbwheel switch of the number of memory blocks to be tested in the Remaining Memory Test in Part 2. After setting the switch, it must be set back to setting 14 before this test continues.

Memory test:

- Test one word with octal 125252
- Test the right byte with octal 343
- Test the left byte with octal 034
- Test the word with octal 052525

(The rest of this test is not performed for thumbwheel switch settings 9, 10, and 11 on the new ROMs.)

- Fill the entire block with octal 052525
- Read the entire block back
- Fill the entire block with octal 125252
- Read the entire block back

- Fill the entire block with octal 016343
- Read the entire block back checking for parity errors only

d) Input/Output Controller (IOC) Self-Test

Test the following IOC registers

IV - Interrupt Vector Pointer
 PA - Peripheral Address Register
 W - Working Register
 DMAPA - Extensions of the C and D registers (CB, DB) and
 the DMA Peripheral Address Register
 DMAMA - DMA Memory Address Register
 DMAC - DMA Word Count Register
 C - Stack Pointer
 D - Stack Pointer

Tests all IOC instructions except

SDO - Set DMA outwards
 SDI - Set DMA inwards
 DMA - Enable DMA mode
 PCM - Enable Pulse Count Mode
 DDR - Disable Data Request
 EIR - Enable Interrupts
 DIR - Disable Interrupts

e) Extended Math Chip (EMC) Self-Test

Tests all EMC instructions except CDC (Clear Decimal Carry)

f) Block Switch Board Write Protect Test

Protect the upper and lower data blocks

Cause an interrupt by writing into lower data block

Cause an interrupt by writing into upper 1K of lower data block

Cause an interrupt by writing into upper data block (not upper 1K of the block)

Verify no interrupt occurs when writing into upper 1K of upper data block

g) Processor Board Self-Test

Generate a false parity error strobe and check that the interrupt was latched correctly, the correct data was latched, and the parity interrupt service routine was called.

3.0 PART 2

Part 2 of the mainframe self-test is performed for the following thumbwheel switch settings anytime the system is powered on or the POP switch on the Processor Board is pressed:

- for the old ROMs (1818-2829 and 1818-2830)
thumbwheel switch settings 0 through 5, and 15
- for the new ROMs (1818-2913 and 1818-2914)
thumbwheel switch settings 0 through 11, 14, and 15

The following tests make up Part 2:

- a) Remaining Memory Test
- b) HP-IB Programmed I/O Test
- c) HP-IB Interrupt Logic Test
- d) HP-IB DMA Logic Test

In addition, HP-IB Initialization occurs if the thumbwheel switch is set to 0 through 5 on the old ROMs, or 0 through 13 on the new ROMs.

A quick ASI Board Test is performed as the final step for thumbwheel switch setting 14 on the new ROMs (note: setting 15 on the new ROMs is forced into setting 14 in Part 1 of Self-Test).

Description of the tests --

- a) Remaining Memory Test

The basic memory test performed here is the same as that used in Part 1 during the Read/Write Memory Find Test. The differences involve which blocks are tested and how the results are reported.

For thumbwheel switch setting 0 through 5 and 15 on the old ROMs, and for thumbwheel switch settings 0 through 11 on the new ROMs, a table is built recording the results of this test. All blocks are tested using the memory test, indicating whether an upper half block, lower half block, both half blocks, or no memory was found for each possible block number. (If a block fails the test, it is recorded as "no memory found".) This version of the test will always pass since only a table is being built. It is possible that no "good" memory was found, or that not enough was found to be able to load the system.

For thumbwheel switch setting 14 on the new ROMs, the number of blocks to test was indicated in Part 1 during the Read/Write Memory Find Test. That number of blocks are tested, proceeding sequentially from block 2 (block 1 was tested earlier). If a block fails, the error is reported and testing stops.

Memory test:

Test one word with octal 125252
 Test the right byte with octal 343
 Test the left byte with octal 034
 Test the word with octal 052525

(The rest of this test is not performed for thumbwheel switch settings 9, 10, and 11 on the new ROMs.)

Fill the entire block with octal 052525
 Read the entire block back
 Fill the entire block with octal 125252
 Read the entire block back

Fill the entire block with octal 016343
 Read the entire block back checking for parity errors only

b) HP-IB Programmed I/O Test

Set the PA register to 2 (address of the HP-IB) and verify the status line is set (indicating the interface is present)

Write to and read from PHI register 1, 4, 5, 6, and 7

Check status from PHI register 3

Set PHI register 5 for "Talk Always, Listen Always"

Write to PHI register 2 the octal values 000000, 000377, 000055, 000222, 000377, and 000000

Verify inbound bytes are available

Read and verify the inbound bytes

c) HP-IB Interrupt Logic Test

Set the PA register to 2 (address of the HP-IB) and verify the status line is set (indicating the interface is present)

Clear any existing interrupts, mask to enable interrupts, but do not allow any specific HP-IB interrupts (to verify no false interrupts are generated)

Enable all specific interrupts and verify none are generated

Initialize the outbound FIFO and enable the outbound room interrupt; verify an interrupt is generated

d) HP-IB DMA Logic Test

This test is the first place in the Self-Test procedure where a DMA transfer is attempted. Therefore, a failure here may not be due to the HP-IB board, but rather some other part of the system involved in the transfer.

The following tests are performed:

Set the PA register to 2 (address of the HP-IB) and verify the status line is set (indicating the interface is present)

Transfer 8 words from memory

Set the PHI chip for "Talk Always, Listen Always"

Set the processor registers for a DMA read

Execute a DMA read

Verify the DMA read completed

Transfer 8 words to memory

Set the processor registers for a DMA write

Execute a DMA write

Verify the DMA write completed

Verify the data transferred correctly

HP-IB Initialization

Set the PA register to 2 (address of the HP-IB) and verify the status line is set (indicating the interface is present)

Initialize the HP-IB with the HP 250 as the controller-in-charge of the bus and verify

Quick ASI Board Test

Reset the ASI Board

Verify the address register was cleared

Test the address register with the octal values 000377, 007760, 006314, 005252, and 000000

Fill the ASI board RAM with each of the following octal values and verify

000377, 007760, 006314, 005252, and 000000

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Section 440

OS DIAGNOSIS

TABLE OF CONTENTS

- 1.0 General
- 2.0 Error Code Interpretation
- 3.0 Memory Dump

OS DIAGNOSIS - 1.0 - GENERAL

1.0 GENERAL

Errors related to the Operating System fall into two categories:

- 1) Error message or error number displayed - Refer to section 2.0 (Error Code Interpretation) or the System Error section (Section 441) for details.
- 2) No error message or error number displayed -
 - a) If there is a hang (workstation or entire system), refer to the System Diagnosis section (Section 410).
 - b) Improper processing - Isolate the error as much as possible and try to duplicate it (software errors are repeatable given identical circumstances) on the same system and on another system. Be sure to back up any files involved before trying to duplicate the error.

For any OS bug, check the latest copy of the Software Status Bulletin (SSB) to see if the error has already been reported and if there is a workaround. If the bug is new, fill out a Service Request (SR) to report it.

2.0 ERROR CODE INTERPRETATION

This section covers many error messages that can have hardware-related causes. Only the more common errors are listed.

The details of each error are divided into three sections:

- The "detection" section describes how the operating system detects the particular error in relation to the appropriate subsystem(s).
- The "discussion" section expands upon how the error is detected and what some possible problems could be that cause the error.
- The "action" suggests possible things to do or try in order to gain more information or resolve the problem.

The following special terms are used in this section:

Record 0 - the first sector on a disc. It contains information that identifies the volume, including the volume label and pointers to the directory.

Device Table - a table kept in read/write memory that identifies the discs that are currently attached to the HP 250. The table is used by the disc driver during I/O and is updated from the data contained in Record 0 of the volume in each drive.

Handler ROM table - a table of constants in read/write memory containing the characteristics of a disc, such as the number of sectors per track.

When trying to determine the specific cause of an error using information in this section, several things should be kept in mind:

- Refer to the appropriate diagnosis sections in the handbook before making hardware changes.
- Before changing boards, date codes should be checked on all boards to insure they meet the minimum for the configuration.
- For disc-related errors, check for worn media. Even though "media" is not listed as a cause for many of the disc-related errors (not a primary cause for that error), it could contribute to or have caused the error condition.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

128K FOR SYSTEM NOT PRESENT - SYSTEM LOAD FAILURE

- detection - the system checks the memory presence table built during self-test and cannot find two full blocks.
- discussion - the OS requires two full blocks (e.g. block 1 upper and lower, block 2 upper and lower).
- action - check the switch settings on the memory boards and change the addresses as needed.
- if there appears to be two full blocks, a memory board might have failed. Refer to the Mainframe Diagnosis section (section 450) for memory diagnosis procedures.

7910 failed self-test

- detection - for the "new" ROMs on the Processor Board (1818-2913 and 1818-2914), on thumbwheel switch setting 0 or 3, the 7910 failed self-test.
- discussion - the number displayed in octal below the message is the self-test result from the 7910.
- this message does not appear with the "old" ROMs (1818-2829 and 1818-2830).
- action - refer to the 7910 Service Manual for details on interpreting the self-test result.

COMMON BLOCK GIVEN REDUCED MEMORY

- detection - Common Block was configured to get 64KB but during power-up, only 32KB were available.
- action - correct any MEMORY FAILURE errors.
- check the memory configuration through CONFIG.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

CONFIGURED DEFAULT MASS STORAGE DEVICE IS NOT PRESENT

- detection - the device specified for the default MSI was not found during power-up.
- action - run CONFIG and check Miscellaneous Configuration to determine what device is specified for the default MSI.
- check that the specified device is present, powered-on, passed self-test, and is ready.

DROM LOADER FAILURE WITH drom name; reason

- detection - the system was unable to load a DROM for the reason given.
- action - if the failure was due to another DROM not loaded, correct the loading of the other DROM (the other DROM might not be configured).
- if the failure was due to insufficient space, either too many DROMs were configured for available memory or a memory board that would contain DROMs failed. Correct a configuration problem through CONFIG, and a memory failure as described under the MEMORY FAILURE errors.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 2 Memory overflow

- detection** - not enough memory is available for the current task.
- program requires more than 32K bytes of memory and only 32K bytes are available.
 - program requires more than 64K bytes of memory.
- discussion** - only 32K bytes might have been configured for the task.
- 64K bytes could be configured for the task, but during power-up, a memory block did not respond or was not useable (a lower block without a corresponding upper block) so the task was given reduced memory. A message stating this should appear during power-up.
 - the program might begin execution before the error occurs.
 - the available memory might be exceeded while trying to load additional routines from disc that are needed at that point during execution.
- action** - Run "CONFIG" to check memory configuration.
- if this error occurs while running a program, do one of the following:
 - a. reconfigure user memory from 32K bytes to 64K bytes.
 - b. on OS revision A.03.xx, delete all DROMs and then reconfigure 32KB of system memory (normally block 2 lower) to the task so the task will then have 64KB.
Remember to reconfigure the system back to the original configuration after running the program.
 - if the error occurs in an application, make sure that multiple LOADBINs of the same binary are not being done in the application. Issue a SCRATCHA command before loading the application.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 18 Substring out of range or substring too long

- detection** - a substring is being referenced that is outside of the currently defined range for the string.
- the length of the receiving string is less than the length of the string being assigned to it.
- discussion** - it is a software problem if the subscripts on the string are incompatible with respect to the maximum or current length of the string.
- on an assignment to a string from a data file, the string length in the file could be incorrect (data transfer problem when the string was stored or media problem).
 - a data transfer problem could have occurred when reading the string length from the data file.
 - this can be a software problem if the receiving string variable is too small (and the string length in the data file is correct).
 - if too many bad tracks are reported during "INIT" or "FORMAT", this error can also occur (the number of bad tracks exceeds the string length).
- action** - check the dimensions on the string variable in the program.
- if the assignment to the string is from a data file, check the definition of the data record.
 - if the data file is intact, increase the length of the string in the program.

Error 52 Improper volume label or mass storage unit specifier

- detection** - the volume label or mass storage unit specifier is not in a valid format.
- action** - issue a "CAT" command to check the volume label.
- check the format of the mass storage unit specifier.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 53 Improper file name

detection - the file name specified is not in a valid format.

action - check that the file name is not longer than six characters.

Error 54 Duplicate file name

detection - the file name specified already exists on the current mass storage device.

action - check the current MSI device or specify a volume name or unit specifier in the file name reference.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 55 Directory overflow

- detection · the main directory is full and the system is trying to make an additional entry (when creating a file).
- the availability table (part of the directory) is full and the system is trying to make an additional entry (when purging a file).
- discussion - the directory could be full
- the "physical end of directory" entry in Record 0 could be incorrect.
 - the availability table could be full.
 - the "physical end of availability table" entry in Record 0 could be incorrect.
- action - issue a "CAT" command to look at the directory contents.
- run RECORD 0 RECOVERY in MEDIA TEST to see if the values in Record 0 are incorrect.
 - the RECOVER DIRECTORY option should not be selected since this error is related to the physical end of directory, not an invalid logical end of directory.
 - similarly, the CHECK AVT option in MEDIA TEST should not be selected since the error is related to the physical end of the availability table, not the logical end of the availability table.
 - NOTE: On a 7910-based system, the size of the directory should be increased using INIT. Care must be used if this is done on a 7906 since DUPL will not work on dissimilar devices (those where the directories are of different sizes).

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 56 File name is undefined

- detection - the file name specified is not in the directory of the current mass storage device.
- action - check the file name specified is correct and is not present on the current mass storage device. Use a "CAT" command.
- be sure the correct volume is inserted.
 - check to see if the file has been purged by accident.

Error 57 Attempt to use device of unknown type for mass storage

- detection - the current mass storage device cannot be recognized.
- action - be sure that the mass storage unit specifier is correct.
- be sure the correct OS revision is being used with the device.
 - check that the device is powered-on and connected to the system.
 - to isolate a drive or cable causing the error, remove all devices. Then add them one at a time, checking that each drive added can be accessed. The error can be caused by some other device interfering on the HP-IB.

Error 65 Incorrect data type

- detection** - the data type identifier (which is stored automatically as part of the data in a data file) does not match the data type of the receiving variable.
- discussion** - the data type identifier could be incorrect in the file. A data transfer problem or a media problem could have occurred when the data was stored.
 - a data transfer problem could have occurred when reading the data type identifier from the file.
 - this can be a software problem if the receiving data type is incorrect and the type identifier in the file is correct.
- action** - check the definition of the data record and the variables in the program.

Error 78 Possible volume label conflict (unexpected interrupt)

- detection** - an unexpected interrupt from the disc was received and the disc operation was completed, the disc had previously been MSied to by the use of a volume label. The error will also occur if the above MSI was performed and the door of the drive was opened, closed and later accessed.
- discussion** - refer to the discussion for error 97.
- action** - on OS revision B.04.00 or greater, use the disc status command to determine the error condition being reported.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 80 Mass storage device door open or medium has been removed

- detection
- for non-CS'80 devices, a "drive not ready" condition has occurred that does not fall into an error 81, 82, 83, 85, or 90 category.
 - a Status 2 error has occurred (STAT11 = 1) and it is not blank/unknown format on a floppy (STAT2 bit 9 = 0), and it is not surface protected (STAT2 bit 6 = 0), and it is not a seek check (STAT2 bit 2 = 0), and it is not a drive fault (STAT2 BIT 4 = 0) and it is "not ready" and "busy" (STAT2 bits 1,0= 11).
 - for CS'80 devices,
 - the tape is not ready (STAT11 = 20).
 - status bit 35 is set (STAT4 bit 12 = 1) indicating drive not ready.
 - no fault errors are indicated (STAT3 = 0) but an access error is indicated (STAT4 <>0) and it is not an error 81, 83, 85, or 88 condition.
- discussion
- on a 7910, the message is meaningless since there is no door and no removable medium, but an error condition exists that is causing the "drive not ready" condition.
 - on a 7906, the message could be meaningless (if the door is closed and the medium is in place), but an error condition exists that is causing the "drive not ready" condition.
 - on a cartridge tape drive, the tape might not have been completely rewound before trying to access it.
- action
- on a 7906, the door latch might need adjustment or the Run/Stop switch might be faulty.
 - on a 7902/9895, there may not be a flexible disc inserted in the drive or the drive may be faulty.
 - use the DISC STATUS command to see the specific error condition being reported (OS revision B.04.00 or greater).

Error 81 Mass storage device failure

- detection**
- a timeout has occurred (no response within a certain period of time) during a parallel poll (STAT11 = 4).
 - a timeout has occurred while trying to read data from PHI register 2 (STAT11 = 2).
 - a timeout has occurred while trying to write data to PHI register 2 (STAT11 = 3).
 - for non-CS'80 devices, a Status 2 error has occurred (STAT11 = 1) and a "drive fault" condition (STAT2 bit 4 = 1) is indicated.
 - for CS'80 devices,
 - an invalid QSTAT was received (STAT11 = 7).
 - status word bit 19 is set, indicating a controller fault (STAT3 bit 12).
 - status word bit 22 is set, indicating a unit fault (STAT3 bit 9).
 - status word bit 30 is set, indicating a power failure (STAT3 bit 1).
 - status word bit 34 is set, indicating no spares are available (STAT4 bit 13).
- discussion**
- the error can be caused by HP-IB cable length problems, disc controller problems, and PHI chip problems
- action**
- use the DISC STATUS command to see the specific error condition being reported (OS revision B.04.00 or greater)
 - be sure that all printers are on-line. Reset all printers on the HP-IB and try the access again.
 - be sure that the disc drive is READY.
 - disconnect the drive causing the error and try accessing another disc. If this results in an error 81, replace the HP-IB board in the HP 250 or the HP-IB cable inside the HP 250. If no errors occur, the problem is probably in the original drive.
 - on a new installation, check cable lengths and try moving cables around to see if the problem moves with a cable. The error can be caused by ANY device on the HP-IB.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 82 Mass storage device not present

- detection - the drive was present at power-up of the HP 250 (an entry was made in the device table), but the device is not present now.
- for non-CS'80 devices, a Status 2 error has occurred (STAT11 = 1) and a "not ready, not busy" condition (STAT2 bit 1,0 = 10) is indicated.
- discussion - this can be caused by bad HP-IB cables or poor controller/drive connections.
- make sure the HP-IB cables are attached to the drive and that the drive is powered on. Then power up the system again.

Error 83 Mass storage device is write-protected

- detection - for non-CS'80 devices, a Status 2 error has occurred (STAT3 = 1), it is not a drive error (STAT2 bit 15 = 0), and the surface is protected (STAT2 bit 6 = 1).
- for CS'80 devices, status word bit 36 is set indicating a write protect error (STAT4 bit 11).
- discussion - on a floppy, the write tab is not on the diskette.
- on a 7906, the Write Protect switch is set.
 - on a 7910, this should not occur unless the P-bit is set in the sector's preamble.
 - on a cartridge tape drive, the protect peg is in the SAFE position.
- action - unprotect the device before attempting to write to it.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 84 Record not found

- detection - desired record not on the medium (overflow) while computing head, track, sector from physical record number.
- on a 7906, the last record on the medium is less than the last record in the requested transfer.
 - the computed number of records on a 7906 exceeds 65535.
 - number of records computed as the number of tracks on the medium (from the device table) times the number of sectors per track (from the handler ROM table)
 - on OS revision A.03.06 or earlier, STAT11 = 6 indicating that the DMA transfer did not complete. The interrupt for DMA completion was received but the word count was not correct in register DMAC.
- discussion - in IMAGE, if the data base becomes corrupt but is not flagged as corrupt, record pointers could be invalid, resulting in addressing the disc beyond the end of the medium.
- OS revision A.03.04 corrected a software error resulting in false error 84s.
- action - if the IMAGE situation above is encountered, perform a DBUNLD followed by a DBLOAD. (Note: if the number of entries in the root file is less than the actual number of entries, the remaining entries are lost by DBUNLD.) BE SURE to do a DBSTORE before attempting the DBUNLD.
- this error is usually NOT due to a problem in the disc drive.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 85 Mass storage medium not initialized

- detection - for non-CS'80 devices, a Status 2 error (STAT11 = 1) occurred, it is not a drive error (STAT2 bit 15 = 0), it is a flexible disc, and it is a blank or unknown format (STAT2 bit 9 = 1).
- for CS'80 devices, status word bit 33 is set indicating the media is uninitialized (STAT4 bit = 14).
- any disc error while trying to read Record 0 while updating a device table entry.
- initializer code (word 0) in Record 0 not recognized while updating a device table entry.
- volume label length (word 15) in Record 0 is less than 0 while updating a device table entry.
- "number of records per track" in handler ROM table does not match the value (word 1) in Record 0 while updating a device table entry. - "first sector of directory" = 0 in the device table entry while preparing to read the directory or availability table from disc.
- discussion - on a 7906H, any error trying to read Record 0 will give a self-test 3 failure.
- action - if the medium is thought to have already been initialized, run the RECORD 0 RECOVERY option of MEDIA TEST in program CE (do not select the RECOVERY DIRECTORY option).
- make sure the MEDIA DROM is configured in the system if HP Interchange format or IEM format is being used.
- backup the software on the media causing the error, then run FRATE (for floppies), Hard disc diagnostics (for 7906 and 7910), or EKRSIZ (for 7908) to check out the drive and/or media.

Error 86 Access not allowed to specified device

- detection - device needed by the currently active task is dedicated to some other task.
- action - if INIT or FORMAT is being used, be sure that no one else is trying to access the drive.

Error 87 Record address error

- detection - for non-CS'80 devices, a head/sector compare error occurred (S1 of STAT1 = 11 octal).
- action - on a 7902/9895, check for worn media.
- on a 7906 or 7910, run VERIFY MEDIA in the program CE to determine the number of the bad tracks. Do NOT use the WITH RECOVERY option to determine the number of the bad tracks.
 - if multiple bad tracks occur on one surface, there could be media problems or read errors from the drive:
 - on a scratch disc, run FORMAT and/or INIT. If errors occur, there is probably a problem in the drive, otherwise there are media problems.
 - if it appears to be a media problem, attempt to recover the data, backup the data, then FORMAT and/or INITIALIZE the media.
 - if only one bad track is found, try to recover the data using TSPARE (7906 or 7910) or VERIFY WITH RECOVERY (floppy). If the media is floppy, backup the disc and then reinitialize it.

NOTE: When VERIFY or TSPARE is used to recover data, if the data cannot be fully recovered, a "best attempt" is made to read and restore the data. This could lead to system crashes or various other errors or hangs when files containing the affected data are accessed.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 88 Read data error

- detection - for non-CS'80 devices, an uncorrectable data read error (S1 of STAT1 = 10 octal) or possibly correctable data error (S1 of STAT1 = 17 octal) occurred.
- for CS'80 devices, status word bit 40 was set indicating an unrecoverable data overflow (STAT⁴ bit 7) or status word bit 41 was set indicating an unrecoverable data error (STAT⁴ bit 6).
- discussion - the CRC computed when the data was written does not match the CRC computed when the data was read.
- the CRC check is performed during all read operations and, if CHECKREAD is ON, during all write operations (as the data is read back in before the buffer comparison).
 - causes include worn media, faulty drive analog electronics, 7910 head crashes, and faulty 7906 pre-amp boards.
- action - refer to the action section for Error 87.

Error 89 Checkread error

- detection - during a Write operation with CHECKREAD or during the STORE or RESTORE of a program (with automatic checkread), the data read back into the second buffer does not match the data in the original buffer. discussion - during a CHECKREAD operation, if the disc cannot read the data back in (status words indicate an error), the appropriate error is issued (such as error 87 or error 88).
- on a 1.2 megabyte floppy, if a data read error occurs on the first read with reduced margins, the message "WARNING: POSSIBLE DATA RECOVERY ERROR" is displayed. If the error occurs again on the second read using normal margins, either error 87 or error 88 is issued.
 - causes include data transfer problems, bad HP-IB controller, bad HP-IB cables, disc interface problems, CPU problems, and memory problems.
 - the data might have been changed before the CRC was computed, so no error would have been reported on the initial write. However, the data will miscompare with the original data when CHECKREAD is on.
 - try to isolate the problem as to a single drive or multiple drives (indicating a mainframe problem).
 - STORE a program on a drive for a quick check.
 - for more extensive checking, run the program on the next page.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

```
5 ! Program to exercise two discs for Error 89
10 ON ERROR GOSUB 300
20 DIM A(511),C$(12)
30 P = 0
35 CHECKREAD
40 FOR I=0 TO 511
50   A(I)=I
60 NEXT I
65 ! in the next few lines, ?2,?,? is the device
66 ! specifier of the drive(s) under test
70 FCREATE "E89:??,?,?",1,4098 ! first drive
80 FCREATE "E89:??,?,?",1,4098 ! second drive
90 MSI ":?2,?,?" ! first drive
95 C$="First drive"
100 ASSIGN #1 TO "E89"
110 PRINT #1;A(*)
120 ASSIGN #1 TO *
130 MSI ":?2,?,?" ! second drive
140 C$="Second drive"
150 ASSIGN #1 TO "E89"
160 PRINT #1;A(*)
170 ASSIGN #1 TO *
175 P=P+1
180 PRINT "Pass = ",P
190 GOTO 90
300 DISP ERRM$,C$
310 RETURN
320 END
```

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 90 Mass storage system error

- detection - unexpected EOI in READ BYTES routine (STAT11 = 5)
- the routine is to read in "x" bytes of data from the addressed talker on the HP-IB, but an EOI is received before the "x" bytes are read.
 - DMA transfer did not complete (STAT11 = 6) (the interrupt for DMA completion was received, but the incorrect word count was in register DMAC).
 - for non-CS'80 devices:
 - a Status 2 error (STAT11 = 1) and a seek check (STAT2 bit 2 = 1)
 - a disc subsystem error (STAT3 = 0); look at STAT1 and STAT2 to determine the specific error condition.
 - for CS'80 devices:
 - STAT2 bit 0 is set
 - a fault error has occurred (STAT3 <> 0) that is not an error 81 or error 165
 - an error occurred, but it is not a fault error (STAT3 = 0) and it is not an access error (STAT4 = 0).
- discussion - on OS revision A.03.xx or earlier, when an error 90 occurs, four words are displayed:
- LOC refers to a location in the operating system (ignore this value)
 - STAT1 needs to be decoded
 - STAT2 needs to be decoded
 - STAT3 needs to be decoded
- causes include HP-IB cables being too long, bad HP-IB controller and worn media, along with drive problems.
- action - on OS revision B.04.00 or greater, use the DISC STATUS command to determine the specific error condition being reported.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 97 Door opened (unexpected interrupt) - data files closed

- detection - unexpected interrupt from the disc was received and the disc has been updated (there is no data in memory that has not yet been written out to disc).
- discussion - the operating system was not expecting an interrupt from the disc at that time.
- after receiving the interrupt, the operating system branches to invalidate the device table entry and sets a flag indicating that the door might have been opened.
 - all tasks are notified that the door might have been opened.
- if the interrupt from the disc was not due to the door being opened, the message is meaningless but some condition existed where the disc needed to request processing.
- this error differs from error 98 in that there is no data currently in the buffer in memory that needs to be written out to disc (the data on the disc is current).
- action - on OS revision B.04.00 or greater, use the DISC STATUS command to determine the error condition being reported by the disc.

Error 98 Door opened (unexpected interrupt) - data lost

- detection - unexpected interrupt from the disc was received and there is data in memory that had not yet been written out to disc.
- discussion - refer to the discussion above for error 97. - this error differs from error 97 in that there is data in the buffer in memory that has not yet been written out to disc so the data is now lost and the disc file is not current.
- action - on OS revision B.04.00 or greater, use the DISC STATUS command to determine the error condition that the disc is reporting.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 99 Locked door opened

detection - unexpected interrupt from the disc was received and a DOOR LOCK command had previously been issued for that disc.

discussion - refer to the discussion above for error 97.

- this error differs from error 97 and error 98 in that the door has been locked on the disc.

action - on OS revision B.04.00 or greater, use the DISC STATUS command to determine the error condition that the disc is reporting.

Error 160 Tape operation pending

detection - an attempt to access the tape cartridge is made and it is detected that the tape has not been updated from the last operation performed on another drive (STAT11 = 26).

discussion - the tape cartridge was removed prematurely from the drive that it was in or during the unload of the tape the disc detected a tape subsystem error, so the HP 250 did not reset the tape's dirty bit.

action - put the tape cartridge back in the drive it was previously in so that it can be updated, then it can be unloaded and placed in the new drive.

- if you suspect the error was caused by a disc error, use the DISC STATUS command to determine the cause of the error. If the disc status is no longer valid, use the CS80 Exerciser to read the fault log. - refer to the Disc Diagnosis section (section 520) for information how to clear this error condition if the tape cannot be located.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 161 Disc buffer pending

- detection - an attempt is made to use the buffer on the disc when it contains data for a different tape cartridge (STAT11 = 30).
- discussion - the tape cartridge was removed prematurely from the drive or during the unload of the tape the disc detected a disc error so the HP 250 did not clear the dirty bit.
- action - locate the tape cartridge that was previously in this drive so that it can be updated and the buffer cleared.
 - if you suspect the error was caused by a disc error, use the DISC STATUS command to determine the cause of the error. If the disc status is no longer valid, use the CS80 Exerciser to read the fault log.
 - refer to the Disc Diagnosis section (section 520) for information how to clear this error condition if the tape cannot be located.

Error 162 Buffer disc not ready

- detection - any error condition for the disc (STAT11 = 22).
- discussion - the disc holding the buffer for this tape is not ready for use.
- action - use the DISC STATUS command to find the specific error condition being reported.

Error 163 Tape door locked

- detection - the cartridge tape door has been locked and a DIRECT, DIRECT NOUPDATE, or INDIRECT command has been issued (STAT11 = 163). discussion - the cartridge tape door must be unlocked before these commands can be issued.
- action - unlock the cartridge tape door.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

Error 164 Writing not allowed to tape until it is initialized

- detection - an attempt is made to write to a tape that has not been initialized (STAT11 = 164).
- discussion - tapes from the factory containing software can only be read on the HP 250 (i.e. the tape has not been certified). The tape must be initialized (which includes certification) before any writing is allowed.
- action - copy all files on the tape to another tape or to a disc, then initialize the tape. Note that initializing the tape will erase all files on the tape.

Error 165 Self-test failure on disc

- detection - status word bit 24 is set indicating that self-test has failed on the CS'80 device while it was idle (STAT3 bit 7).
- discussion - self-test is continually performed on the disc whenever it is not doing processing. If there is any failure, the status bit is set.
- action - interpret the LED on the processor board on the 7908 to determine the error condition being reported.

Error 226 Corrupt data base - must recreate it (IMAGE).

- detection - IMAGE found the data base marked as corrupt while trying to process it.
- discussion - some disc-related error had occurred earlier which caused the data base to become corrupt.
- action - after this error occurs, do a DBPURGE followed by a DBRESTORE (from a previous DBSTORE copy). Transactions entered since the previous DBSTORE are lost.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

- Error 227 Corrupt data base - must erase it in its entirety (IMAGE)
- detection - IMAGE found the data base marked as corrupt while trying to process it.
 - discussion - some disc-related error had occurred earlier which caused the data base to become corrupt, but the corruption is more severe than for an error 226.
 - action - after this error occurs, do a DBPURGE followed by a DBRESTORE (from a previous DBSTORE copy). Transactions entered since the previous DBSTORE are lost.
- Error 240 Program lost due to disc failure (SORT)
- detection - a disc-related error occurred while trying to re-load user memory from the workfile after completing a SORT BY.
 - discussion - SORT executes a SCRATCHA when this occurs, thereby clearing the program from memory.
- Error 1003 Cannot get exclusive access to device
- detection - the current disc operation requires exclusive access to the device and the system tables indicate some other task currently has access to the device.
 - action - be sure no other tasks are trying to access the devices selected for use in the DUPL utility or DUP binary, and that there are no open data bases on either device.
- Error 1004 Keyword not recognized by this operating system
- revision detection - a keyword in a BASIC line in the program in memory is not available in the operating system that was used to power-up the system.
 - action - check the OS revision (REVISION command) and verify that the program is intended for use under that revision (binaries updated, for example).

Error 1005 Memory overflow in common block

- detection - not enough room is available in common block for the shared data base control blocks that need to be currently active.
- action - determine from the bottom of the SCHEMA listing for each data base how much room is needed for the shared data base control blocks for ALL data bases open at the same time. Be sure that this much space has been allocated for common block through CONFIG.

Error 1010 Memory parity error

- detection - the parity generated for a byte read from memory does not match the parity calculated when the byte was written into memory.
- action - refer to the Mainframe Diagnosis section (section 450, Memory Board) for details on interpreting the two parity words displayed with the error message.

FLEXIBLE DISC FAILED SELF-TEST

- detection - for the "new" ROMs on the Processor Board (1818-2913 and 1818-2914), on thumbwheel switch setting 0 or 2, the flexible disc failed self-test.
- discussion - the number displayed in octal below the message is the self-test result from the flexible disc.
 - this message does not appear with the "old" ROMs (1818-2829 and 1818-2830).
- action - refer to the appropriate flexible disc service manual for details on interpreting the self-test result.

HPIB HANDSHAKE ABORT - LOAD FAILURE

- detection - a handshake abort (timeout) occurred on the HP-IB during system load.
- action - refer to the HP-IB Diagnosis section (section 460) of this handbook.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

I nn

- detection - an invalid interrupt was received from an undefined peripheral address (PA) or from a PA that should not be interrupting during self-test or load.
- discussion - this message is displayed in the lower left corner of the display, where "nn" is the offending PA.
- action - try powering up again. If the error occurs again and it is from a valid PA, refer to the appropriate diagnosis section in this handbook.
 - if the error is not from a valid PA, refer to the card-cage build-up procedure to isolate the problem.

IMAGE DROM NOT LOADED TO MAKE ROOM FOR RIO DROM

- detection - not enough room was found to load the RIO DROM which was required for the configuration (no integral workstation present), so the IMAGE DROM was removed to make room.
- action - if the error was due to too many DROMs configured, correct the situation through CONFIG.
 - the error could be caused by a failure in a memory board that was to be used for DROMs. Correct the failure by following the procedure listed under the MEMORY FAILURE error.

INP CHANNEL #1 -- FAILED INTERNAL SELF-TEST

- detection - self-test failed on the INP board on PA 0.
- action - refer to the Data Comm Diagnosis section (section 470) for details on interpreting the LED on the INP board.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

INTEGRAL WORKSTATION CONFIGURED BUT NOT PRESENT

- detection - the configuration indicates that there is an integral workstation, but there was no response on PA 6 (from the Keyboard Logic Board).
- action - if the configuration was wrong, correct it through CONFIG.
 - if the integral workstation is present, refer to the Mainframe Diagnosis section (section 450) for the procedure to follow for the keyboard.

INTEGRAL WORKSTATION NOT CONFIGURED

- detection - the configuration does not include an integral workstation, but there was a response on PA 6 (from the Keyboard Logic Board) indicating that there is an integral workstation.
- action - run CONFIG and configure in the integral workstation.

INTEGRAL WORKSTATION NOT PRESENT - RIO DROM CHANGED TO AUTO-LOAD.

- detection - the integral workstation is not present (no response on PA 6 from the Keyboard Logic Board) and the RIO DROM was not configured in, but the DROM is needed for the principal workstation on port 1.
- action - if the Keyboard Logic Board is present, refer to the Mainframe Diagnosis section (section 450) for the procedure to follow for the keyboard.
 - if the Keyboard Logic Board is not present, run CONFIG and configure in the RIO DROM.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

INTEGRAL WORKSTATION REVIVED; NO CONSOLES WERE UP

- detection - the integral workstation was not configured, but since the system was unable to bring up the console on port 1, it was necessary to use the integral workstation as the primary workstation.
- action - correct any MEMORY FAILURE errors.
- check the configuration through CONFIG
 - if a console on port 1 was configured and is present, refer to the Data Comm Diagnosis section.
 - if the configuration is supposed to include an integral workstation, update the configuration.

LOADER ERROR A Checksum error

- detection - the checksum computed when loading part of the operating system does not match the checksum stored as part of the operating system.

LOADER ERROR B Disc read error

- detection - a disc error occurred while trying to read in the operating system or bootload file.
- discussion - for the "new" ROMs (1818-2913 and 1818-2914), 12 octal numbers are also displayed after the message. These numbers are, (in order):
- the device address
 - the unit number
 - for the 7902/9895, 7906, and 7910: status words STAT1 and STAT2 followed by 8 words of zero
 - for CS'80 devices (e.g. 7908): status words STAT1 through STAT10
- action - refer to the Disc Diagnosis section for details on the status words.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

LOADER ERROR C Checkread error

detection - a checkread error occurred while reading a directory record, Record 0, or the first record of the system file.

LOADER ERROR D Insufficient memory

detection - not enough memory is available to load the operating system.

discussion - a memory board failure might have occurred.

- a memory block address is set as a lower block and no corresponding upper block is found.
- the lower block will not be used by the system without a corresponding upper block.
- the upper block is not present or failed to respond.

LOADER ERROR E Interface error

detection - any problem related to the HP-IB.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

LOADER ERROR F Disc or system error

- detection - various internal error conditions.
 - PHI chip timeout
 - attempt to perform an opcode that should not be used during a load (eg. Write).
- discussion - for the "new" ROMs (1818-2913 and 1818-2914), an octal number appears on the line following the message giving the specific error.
- action - for error 000002, the 7902/9895, 7906, or 7910 did not respond to a status request after a Seek. Refer to the Disc Diagnosis section (section 520).
 - for error 000004, the 7902/9895, 7906, or 7910 did not respond to a request status command. Refer to the Disc Diagnosis section (section 520).
 - for error 000005, the CS'80 device did not respond to a request status command with a parallel poll within two seconds. Refer to the Disc Diagnosis section (section 520).
 - for error 000006, the CS'80 device did not return 20 status bytes in response to a request status command. Refer to the Disc Diagnosis section (section 520).
 - for error 000007, the device did not respond to a DSJ (Device-Specified Jump) request. Refer to the Disc Diagnosis section (section 520).
 - for error 000010, an invalid interrupt was received from the PHI chip on the HP-IB Board. Refer to the HP-IB Diagnosis section (section 460).
 - for error 000011, the head/track/sector calculation for a disc resulted in a value out of range. This could be due to a bad directory entry for the system file or a bad address for the bootstrap file. Refer to the Logical Disc Layout section (section 531).
 - for error 000012, division by zero was attempted in the head/track/sector calculation. Refer to the action above for error 000011.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

- for error 000013, numeric overflow occurred in the head/track/sector calculation. Refer to the action above for error 000011.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

MEMORY FAILURE - BLOCK n, upper/lower HALF

- detection - the specified block was configured in the system, but was not found in the memory presence table built during self-test, indicating the board failed during testing.
- action - check the switch settings on the memory boards
- if the specified block is present, refer to the Mainframe Diagnosis section (section 450) for the procedure for memory boards.
 - if the specified block is not present, run CONFIG and update the configuration.

NO INP CONTROLLERS INSTALLED

- detection - the CS250 DROM is configured and loaded, but there was no response on PA 0 from the INP controller board.
- discussion - if the CS250 DROM is configured and loaded, it is assumed that an INP controller is present.
- action - if the INP controller is not present (and not supposed to be present), run CONFIG and remove the CS250 DROM from the system configuration.
- if the INP controller is not present and it is supposed to be, install the controller.
 - if the INP controller is present, refer to the Data Comm Diagnosis section (section 470).

NO MEMORY AVAILABLE FOR COMMON BLOCK

- detection - the system was unable to find an upper block in the memory presence table built during self-test after allocating memory for the operating system.
- action - correct any MEMORY FAILURE errors.
- check the switch settings on the memory board.
 - the following upper blocks must be present: 2 blocks for the OS, 1 block for Common, 1 block for the principal workstation.
 - if there are not enough upper blocks, change a lower block into an upper or add additional memory.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

PORT 1 HAS BEEN CONVERTED TO A WORKSTATION

- detection - the integral workstation is not present (no response on PA 6 from the Keyboard Logic Board) so the workstation on port 1 has become the principal workstation.
- action - if the Keyboard Logic Board is present, refer to the Mainframe Diagnosis section (section 450) for the procedure to follow for the keyboard.
- if the Keyboard Logic Board is not present, run CONFIG and update the configuration.

SECONDARY TASK n DOWN; NO MEMORY AVAILABLE

- detection - not enough upper memory blocks were found in the memory presence table built during self-test to allow bringing up the secondary task.
- action - correct any MEMORY FAILURE errors first.
- if there are not enough upper blocks, change a lower block into an upper block or add additional memory.

SECONDARY TASK n GIVEN EXTRA MEMORY

- detection - after assigning all memory to configured tasks, extra memory was found in the memory presence table built during self-test so it was given to this secondary task.
- action - correct any failures to bring up any workstation.
- run CONFIG and specify that the additional memory is for the task.

SECONDARY TASK n GIVEN REDUCED MEMORY

- detection - the task was configured to get 64KB, but during power-up only 32KB were available.
- action - correct any MEMORY FAILURE errors.
- check the memory configuration through CONFIG.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

SYSTEM LOAD FAILURE

- detection - the system is unable to bring up any workstation or Common Block was not able to be set up.
- action - correct all other error messages displayed during power-up.

SYSTEM LOAD FAILURE - UNABLE TO LOAD RIO DROM

- detection - the system is unable to load the RIO DROM and there is no integral workstation present.
- action - correct all other error messages displayed during power-up related to memory failures and ports or workstations down.

TASK 1 RE-ASSIGNED TO INTEGRAL WORKSTATION

- detection - not enough memory was present to bring up the integral workstation in TASK ID order.
- discussion - since only the principal workstation receives power-up and SYSTEM ERROR messages, it is necessary to always bring up this workstation.
 - the task that was assigned to TASK ID 1 has been given the TASK ID that was assigned to the integral workstation. That task will not be "up" since not enough memory was found present.
- action - correct any MEMORY FAILURE errors first.
 - if there are not enough upper blocks, change a lower block into an upper block or add additional memory.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

TASK 1 RE-ASSIGNED TO WORKSTATION ON PORT 1

- detection - not enough memory was present to bring up the workstation on port 1 in TASK ID order.
- discussion - since only the principal workstation receives power-up and SYSTEM ERROR messages, it is necessary to always bring up this workstation.
 - the task that was assigned to TASK ID 1 has been given the TASK ID that was assigned to the workstation on port 1. That task will not be "up" since not enough memory was found present.
- action - correct any MEMORY FAILURE errors first.
 - if there are not enough upper blocks, change a lower block into an upper block or add additional memory.

TASK ASSIGNED TO PORT 1 CHANGED TO INTEGRAL WORKSTATION

- detection - the system was unable to bring up any workstations on the ports, but found an integral workstation present, so the task assigned to port 1 was assigned to the integral workstation.
- action - run CONFIG and configure in the integral workstation.

The "SYSTEM" file was not found.

- detection - the Loader searched all load devices based on the thumbwheel switch setting on the Processor Board and was unable to find the SYSTEM file.
- action - be sure that the appropriate load device is connected and powered on. Note that for thumbwheel switch settings 4 through 11 on the "new" ROMs (1818-2913 and 1818-2914), the device must be fully powered up (including passing self-test) before the device will be recognized by the Loader, and that the Loader will not wait for the device.
 - be sure that the correct floppy, 7906 cartridge, or tape cartridge is inserted in the drive if it is the load medium.
 - use another load device or another copy of the operating system for loading. After powering up, do a CAtalog of the media thought to contain the SYSTEM file.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

UNEXPECTED MEMORY PRESENT - BLOCK n, LOWER HALF

- detection - the system found a block in the memory presence table built during self-test that was not in the system configuration.
- action - run CONFIG and configure in the additional memory.

UNEXPECTED MEMORY PRESENT - BLOCK n, UPPER HALF

- detection - the system found a block in the memory presence table built during self-test that was not in the system configuration. action - run CONFIG and configure in the additional memory.

WORKSTATION ON PORT n DOWN; NO MEMORY AVAILABLE

- detection - not enough upper memory blocks were found in the memory presence table built during self-test to allow bringing up the workstation.
- action - correct any MEMORY FAILURE errors first.
 - if there are not enough upper blocks, change a lower block into an upper block or add additional memory.

WORKSTATION ON PORT n GIVEN EXTRA MEMORY

- detection - after assigning all memory to configured tasks, extra memory was found in the memory presence table built during self-test so it was given to this workstation.
- action - correct any failures to bring up any workstation.
 - run CONFIG and specify that the additional memory is for the workstation.

WORKSTATION ON PORT n GIVEN REDUCED MEMORY

- detection - the workstation was configured to get 64KB but during power-up, only 32KB were available.
- action - correct any MEMORY FAILURE errors.
 - check the memory configuration through CONFIG.

OS DIAGNOSIS - 2.0 - ERROR CODE INTERPRETATION

WORKSTATIONS DOWN; RIO DROM NOT LOADED

- detection - the DROM Loader was unable to load the RIO DROM
and there were workstations configured on ASI
ports.
- action - correct the error related to the failure to load
the RIO DROM.

OS DIAGNOSIS - 3.0 - MEMORY DUMP

3.0 MEMORY DUMP

The new ROMs (1818-2913 and 1818-2914) on the processor board (45000-66565/69565) allow the capability to load in a boot file instead of the operating system. A memory dump program can be loaded that will dump all of RAM memory to the mass storage device containing the boot file.

The dump program can be initiated in two ways:

- 1) through the SYSRR DROM on operating system revision B.04.00 or greater
- 2) by setting the thumbwheel switch on the processor board to 9, 10, or 11 and pressing the POP switch

The dump program will be loaded in and will perform the actual memory dump. This can then be sent to the factory for analysis.

How to invoke the dump:

- 1) Through SYSRR: refer to section 441 (System Error)
- 2) Through the thumbwheel switch:
 - a) LEAVE THE SYSTEM POWERED ON! (Shutting off the system will result in loss of all of memory.)
 - b) Change the thumbwheel switch to one of the following settings, based on the device containing the boot file
 - 9 = from any available device, starting the search at device address 7
 - 10 = from first available floppy
 - 11 = from first available CS'80 device (including cartridge tape drives), starting the search at device address 7
 - c) Insert the Stand-alone Diagnostic disc or System or Support disc (OS revision B.04.00 or greater) containing the dump program into the desired device.
 - d) Press the POP switch on the processor board. Note that memory will not be cleared during self-test when the thumbwheel is set as described above. The dump program will be loaded in.
 - e) The menu screen will appear on the principal workstation. Select option 1 (Memory Dump).

Note: The dump program contains the free space into which memory will be dumped. Therefore, there is no danger of losing customer data by performing this dump to a mass storage device. (That is, if the dump program can be found, the needed space is automatically there.)

Status of the dump:

When the dump is selected from the menu, the screen is cleared and the message "MEMORY DUMP IN PROGRESS" is displayed.

Blocks are dumped starting with block 1, then proceeding to the highest numbered block and continuing down to the lowest. Non-existent blocks are not dumped, and dumping of a given block is stopped if a parity error occurs.

As a block *i* is dumped, the message "DUMPING BLOCK *n*" is displayed, and the LED on the processor board is set as shown in the table below:

LED Character	Block # (in octal)
-----	-----
1	1
2	2
3	3
4	4
5	5
6	6
7	7
A	10
B	11
C	12
D	13
E	14
F	15
G	16

Note: There is not enough space in the memory file to dump a full 11-user system.

OS DIAGNOSIS - 3.0 - MEMORY DUMP

When the dump is finished, the message "MEMORY DUMP COMPLETED" is displayed.

The following error messages can occur:

ATTEMPT TO WRITE PAST END OF FILE - system trying to dump more than 640KB
DISC ERROR DURING WRITE - disc status indicates an error on a write operation
FATAL ERROR 1 - no response to a seek command
FATAL ERROR 2 - seek error reported after a status check
FATAL ERROR 3 - no response to a read command
FATAL ERROR 4 - no response from non-CS'80 device
FATAL ERROR 5 - no response from CS'80 device
FATAL ERROR 6 - CS'80 status failed to return 20 bytes
FATAL ERROR 7 - an error occurred when requesting a DSJ or QSTAT
FATAL ERROR 8 - an error occurred during HP-IB interrupt servicing
FATAL ERROR 9 - the absolute sector number exceeded 65535 in FRECL
FATAL ERROR 10 - quotient was greater than 16 bits during a Head-Track-Sector calculation
FATAL ERROR 11 - divisor = 0 during an integer divide
FATAL ERROR 12 - overflow during an integer divide
FATAL ERROR 13 - no response to a write command
NO DEVICE FOUND - unable to find the load device in the system identifier table

When the dump finishes:

- 1) Power off the system to insure that no more disc processing can take place.
- 2) Remove the disc or tape cartridge containing the dump program.
- 3) Set the thumbwheel switch on the processor board back to the normal setting. (Refer to the Mainframe Configuration section for details.)
- 4) Power up the system.

Factory policy on memory dumps:

Please check with the on-line support group before sending in a memory dump on disc or tape cartridge. The utility was developed as an aid when other diagnostic procedures do not supply enough information. The support group and the lab do not have the necessary resources to examine every dump that could be taken at every customer's site, nor is it necessary to perform the dump for every operating system-related problem. The support group will be able to make a recommendation as to when a dump is needed, and can also be sure the appropriate people will be available to examine the dump.

To copy the dump file:

A utility called SADUTL (file type PROG) is on the CE System Support Disc (OS revision B.04). This file allows copying the MEMORY (file type SYST) file by itself to another disc. Therefore, if you need to send a memory dump to the factory, run this utility and copy the MEMORY file from the CE System Support Disc that you used onto a floppy. When making copies of the MEMORY file, be sure to use SADUTL to set the bit in Record 0 on the disc indicating the presence of the file.

To copy the memory boot file:

A utility called SADUTL is on the Stand-alone CE Diagnostic. This utility allows you to copy the Memory boot file to another volume.

-hp-

Section 441
SYSTEM ERROR (G AND M)

TABLE OF CONTENTS

- 1.0 Overview
- 2.0 Sequence of Events
- 3.0 Message and Printouts
 - 3.1 Formats
 - 3.2 Explanations
- 4.0 Printout Interpretation

SYSTEM ERROR (G AND M) - 1.0 - OVERVIEW

1.0 OVERVIEW

System Error G and System Error M (both in OS revision A.03.xx) and System Error (in OS revision B.04.xx) are all non-recoverable errors.

Note: The letters "G" and "M" have been eliminated from the error message in OS revision B.04.xx. In the rest of this section, "System Error" will be used to mean the error in OS revisions A.03.xx, B.04.xx, B.05.xx and B.06.xx unless otherwise noted.

System Errors are a general error that are detected by the operating system. They can be caused by both the software and hardware, and are detected as an inconsistency in pointers or addresses, unexpected values, illegal interrupts, timeouts by the HP-IB, and an attempt to write to a protected memory block. (System Error M is an attempt to write to a protected memory block; System Error G is used for all other cases.)

2.0 SEQUENCE OF EVENTS

- 1) System Error message is displayed on principal workstation
 - for the HP 250/20/25/26/30/40/50, the workstation on port 1 (if the ASI board on PA 5 does not respond, the letter "A" will be displayed on the LED on the processor board and processing will stop here)
 - for the HP 250/35 and HP 250A, the integral workstation
- 2) SYSRR printout can then be produced
 - a) The SYSRR DROM must have been configured.
 - b) For OS revision A.03.xx, a 2631A or 2631B printer is attached to the HP-IB and is on device address 0. For OS revision B.04.xx, a 2631A, 2631B, or 2608A printer is attached to the HP-IB and is on device address 0, or, for OS revision B.04.02 or greater, a 2631B is attached to ASI port 5 at a baud rate no greater than 2400. For OS revision B.05.xx, a 2602A is attached to port 4 at 2400 baud or an 82905B to port 5 at 4800 baud. For OS revision B.06.xx, a 293x, a 2563A, or 2687A printer is attached to any available ASI port at 9600 baud and the port is configured for 9600 baud. Also, the 293x and 2563A printers may be connected to the HP-IB.
 - c) The large ENTER key on the far right is pressed to produce a printout to the HP-IB printer as described above. The EXECUTE key is pressed (OS revision B.04.02 or greater) to produce a printout to the 2631B printer on ASI port 5. To produce additional copies, press the key again after the printout is complete.
- 3) To produce a memory dump to disc or tape cartridge (refer to section 440 OS Diagnosis for details)
 - a) Insert a CE Support Disc containing the dump program in the desired drive. (See next step)
 - b) Press one of the following keys to initiate the dump
 - CTRL D for the first available device
 - CTRL F for the first available floppy
 - CTRL K for the first available CS'80 device (disc/tape)

Note: Once the dump is initiated, no more printouts can be produced.

 - c) When the dump is finished, remove the CE Support Disc.
- 4) Power off the system, then power it back up.

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

3.0 MESSAGE AND PRINTOUTS

3.1 Formats

```
SYSTEM ERROR a      a - G or M
xxxxxx             contents of register A
xxxxxx             contents of register B
xxxxxx             contents of register C
xxxxxx             contents of register D
xxxxxx             contents of register DMAPA
xxxxxx             contents of register PA
xxxxxx             contents of register R
xxxxxx             contents of register R32 (upper data)
xxxxxx             contents of register R34 (upper instructio..)
xxxxxx             contents of register R35 (lower data)
xxxxxx             current BASIC program line number (SYSLN)
xxxxxx             parity error memory location
xxxxxx             execution address where parity error occurred

xxxxxx             top of return stack value (pointed to by register R)
xxxxxx             2nd return stack value
xxxxxx             3rd return stack value
xxxxxx             4th return stack value
xxxxxx             5th return stack value
xxxxxx             6th return stack value
xxxxxx             7th return stack value
xxxxxx             8th return stack value
xxxxxx             9th return stack value

xxxxxx - octal number
```

System Error Message for OS Revision A.03.xx

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

SYSTEM STATUS (REV 3.x)

USER #	BLOCK #	STATUS	STACK	DROM TABLE	
1	xxxxxx	d	TOS xxxxxx	0 xxxxxx 16 xxxxxx	
2	xxxxxx	d	xxxxxx	1 xxxxxx 17 xxxxxx	
3	xxxxxx	d	xxxxxx	2 xxxxxx 18 xxxxxx	
4	xxxxxx	d	xxxxxx	3 xxxxxx 19 xxxxxx	
5	xxxxxx	d	xxxxxx	4 xxxxxx 20 xxxxxx	
6	xxxxxx	d	xxxxxx	5 xxxxxx 21 xxxxxx	
				6 xxxxxx 22 xxxxxx	
NTASK	d	FDQHEADS	FDQ	DVOWN	7 xxxxxx 23 xxxxxx
TIC	d				8 xxxxxx 24 xxxxxx
		xxxxxx	xxxxxx	xxxxxx	9 xxxxxx 25 xxxxxx
SYSBK	xxxxxx	xxxxxx	xxxxxx	xxxxxx	10 xxxxxx 26 xxxxxx
COMBK	xxxxxx	xxxxxx	xxxxxx	xxxxxx	11 xxxxxx 27 xxxxxx
UI3	xxxxxx	xxxxxx	xxxxxx	xxxxxx	12 xxxxxx 28 xxxxxx
		xxxxxx	xxxxxx	xxxxxx	13 xxxxxx 29 xxxxxx
		xxxxxx	xxxxxx	xxxxxx	14 xxxxxx 30 xxxxxx
			xxxxxx	xxxxxx	15 xxxxxx 31 xxxxxx
			xxxxxx		
				TOP DROM	d

xxxxxx = octal number
d = decimal number

System Status Printout for OS Revision A.03.xx

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

```
SYSTEM ERROR  xxxxxx  contents of register A
                xxxxxx  contents of register B
                xxxxxx  contents of register C
                xxxxxx  contents of register D
                xxxxxx  contents of register DHAPA
                xxxxxx  contents of register PA
                xxxxxx  contents of register R
                xxxxxx  contents of register R32 (upper data)
                xxxxxx  contents of register R34 (upper instruction)
                xxxxxx  contents of register R35 (lower data)
                xxxxxx  current BASIC program line number (SYSLN)
                xxxxxx  current Task in Control (TIC)
                xxxxxx  parity error memory location
                xxxxxx  execution address where parity error occurred

                xxxxxx  top of return stack value (pointed to by register R)
                xxxxxx  2nd return stack value
                xxxxxx  3rd return stack value
                xxxxxx  4th return stack value
                xxxxxx  5th return stack value
                xxxxxx  6th return stack value
                xxxxxx  7th return stack value
                xxxxxx  8th return stack value
                xxxxxx  9th return stack value
```

xxxxxx = octal number

System Error Message for OS Revisions B.04.xx, B.05.xx & B.06.xx

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

SYSTEM STATUS (REV B.nn.nn)

USER #	BLOCK #	STATUS	STACK (nn)	DROM TABLE	
1	xxxxxx	xxxxxx	TOS xxxxxx	# OFFSET	BLK # OFFSET
2	xxxxxx	xxxxxx	xxxxxx	0 xxxxxx	xx 16 xxxxxx
3	xxxxxx	xxxxxx	xxxxxx	1 xxxxxx	xx 17 xxxxxx
4	xxxxxx	xxxxxx	xxxxxx	2 xxxxxx	xx 18 xxxxxx
5	xxxxxx	xxxxxx	xxxxxx	3 xxxxxx	xx 19 xxxxxx
6	xxxxxx	xxxxxx	xxxxxx	4 xxxxxx	xx 20 xxxxxx
NTASK	nn	FDQHEADS	FDQ DVOWN	5 xxxxxx	xx 21 xxxxxx
TIC	nnnnnn	xxxxxx	xxxxxx	6 xxxxxx	xx 22 xxxxxx
		xxxxxx	xxxxxx	7 xxxxxx	xx 23 xxxxxx
SYSBK	xxxxxx	xxxxxx	xxxxxx	8 xxxxxx	xx 24 xxxxxx
COMBK	xxxxxx	xxxxxx	xxxxxx	9 xxxxxx	xx 25 xxxxxx
		xxxxxx	xxxxxx	10 xxxxxx	xx 26 xxxxxx
		xxxxxx	xxxxxx	11 xxxxxx	xx 27 xxxxxx
		xxxxxx	xxxxxx	12 xxxxxx	xx 28 xxxxxx
PARITY ERROR:		xxxxxx	xxxxxx	13 xxxxxx	xx 29 xxxxxx
LOCATION	xxxxxx	xxxxxx	xxxxxx	14 xxxxxx	xx 30 xxxxxx
ADDRESS	xxxxxx		xxxxxx	15 xxxxxx	xx 31 xxxxxx

DISC STATUS SET nn

EUSP	xxxxxx	STAT1	xxxxxx	STAT6	xxxxxx
OPCD	xxxxxx	STAT2	xxxxxx	STAT7	xxxxxx
FREC1	xxxxxx	STAT3	xxxxxx	STAT8	xxxxxx
FREC2	xxxxxx	STAT4	xxxxxx	STAT9	xxxxxx
STAT11	xxxxxx	STAT5	xxxxxx	STAT10	xxxxxx

DISC STATUS SET nn

EUSP	xxxxxx	STAT1	xxxxxx	STAT6	xxxxxx
OPCD	xxxxxx	STAT2	xxxxxx	STAT7	xxxxxx
FREC1	xxxxxx	STAT3	xxxxxx	STAT8	xxxxxx
FREC2	xxxxxx	STAT4	xxxxxx	STAT9	xxxxxx
STAT11	xxxxxx	STAT5	xxxxxx	STAT10	xxxxxx

System Status Printout for OS Revision B.04.xx

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

SYSTEM STATUS (REV B.0X.xx)

TASK #	BLOCK #	STATUS	STACK (00)	DROM TABLE	
1	XXXXXX	XXXXXX	TOS XXXXXX	# OFFSET	BLK # OFFSET BLK
2	XXXXXX	XXXXXX	XXXXXX	0 XXXXXX	xx 16 XXXXXX xx
3	XXXXXX	XXXXXX	XXXXXX	1 XXXXXX	xx 17 XXXXXX xx
4	XXXXXX	XXXXXX	XXXXXX	2 XXXXXX	xx 18 XXXXXX xx
5	XXXXXX	XXXXXX	XXXXXX	3 XXXXXX	xx 19 XXXXXX xx
6	XXXXXX	XXXXXX	XXXXXX	4 XXXXXX	xx 20 XXXXXX xx
7	XXXXXX	XXXXXX	XXXXXX	5 XXXXXX	xx 21 XXXXXX xx
8	XXXXXX	XXXXXX	XXXXXX	6 XXXXXX	xx 22 XXXXXX xx
9	XXXXXX	XXXXXX	XXXXXX	7 XXXXXX	xx 23 XXXXXX xx
10	XXXXXX	XXXXXX	XXXXXX	8 XXXXXX	xx 24 XXXXXX xx
11	XXXXXX	XXXXXX	XXXXXX	9 XXXXXX	xx 25 XXXXXX xx
				10 XXXXXX	xx 26 XXXXXX xx
NTASK	xx	SYBK	XXXXXX	11 XXXXXX	xx 27 XXXXXX xx
TIC	XXXXXX	COMBK	XXXXXX	12 XXXXXX	xx 28 XXXXXX xx
				13 XXXXXX	xx 29 XXXXXX xx
PARITY ERROR:	LOCATION	XXXXXX	XXXXXX	14 XXXXXX	xx 30 XXXXXX xx
	ADDRESS	XXXXXX	XXXXXX	15 XXXXXX	xx 31 XXXXXX xx

DISC STATUS SET 01

EUSP	XXXXXX	STAT1	XXXXXX	STAT6	XXXXXX
OPCD	XXXXXX	STAT2	XXXXXX	STAT7	XXXXXX
FREC1	XXXXXX	STAT3	XXXXXX	STAT8	XXXXXX
FREC2	XXXXXX	STAT4	XXXXXX	STAT9	XXXXXX
STAT11	XXXXXX	STAT5	XXXXXX	STAT10	XXXXXX

DISC STATUS SET 02

EUSP	XXXXXX	STAT1	XXXXXX	STAT6	XXXXXX
OPCD	XXXXXX	STAT2	XXXXXX	STAT7	XXXXXX
FREC1	XXXXXX	STAT3	XXXXXX	STAT8	XXXXXX
FREC2	XXXXXX	STAT4	XXXXXX	STAT9	XXXXXX
STAT11	XXXXXX	STAT5	XXXXXX	STAT10	XXXXXX

System Status Print out for OS Revision B.05.xx & B.06.xx

SYSTEM ERROR (G AND H) - 3.0 - MESSAGE AND PRINTOUTS

Notes on User Status Printout:

1) MASS MEM table:

EUSP, FREC1, FREC2, OPCD - refer to the Disc Diagnosis (Disc Driver Status Words) section for details

MMBFR - pointer to the mass memory data buffer in user memory

DMAC1 - number of 16 bit words in the DMA transfer

OPCODE - the disc driver operation code that was last requested. The least significant five bits have the following meaning:

- octal 00 = request unit status
- 01 = seek only
- 02 = read a single sector
- 03 = write a single sector
- 04 = verify
- 05 = initialize the medium
- 06 = read multiple sectors
- 07 = write multiple sectors
- 10 = add new file name to directory
- 11 = delete file name from directory
- 12 = write main and spare directory
- 13 = checkread operation
- 14 = directory record read
- 15 = POP (Power On Preset)
- 16 = record 0 read into checkread buffer
- 17 = determine available space on media
- 20 = lock/unlock door

2) DB TABLES:

These tables are for the data bases that are open. DB04 is for the first data base that is opened. DB00 is for the fifth data base that is opened.

MODE - mode in which the data base was opened

FREC2 - low 16 bits of the disc address for the root file

EUSP - Encoded Unit Specifier for the root file (see the Disc Diagnosis section for details)

SHARE. or SHARED - offset from the beginning of the shared data base dynamic buffer to the shared data base control block

LOCAL. or LOCAL - offset from the beginning of the local data base dynamic buffer to the local data base control block

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

3) STACK:

The STACK refers to the return stack pointed to by register R. The table printed contains ten addresses, starting with the top of stack (TOS) and proceeding backwards. The bottom values in the table may not belong to the stack if the stack did not contain ten entries at the time of the system error. An entry of 000000 in the STACK listing indicates the bottom of the stack.

4) REGISTERS:

PA (peripheral address) register has the following values:

octal	0	= IMP (standard)
	1	= IMP
	2	= HP-IB
	4	= ASI (ports 6 - 10)
	5	= ASI (ports 1 - 5)
	6	= keyboard on integral workstation
	10	= time slice timer on Keyboard Logic board
	13	= memory protection violation
	15	= parity error detection

5) SYSLN - Current BASIC line number

6) DBB - pointer to Data Base Buffer

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

Notes on System Status Printout

- 1) BLOCK # - memory block number assigned to the user
- 2) STATUS - status of the user at the time of the system error
 - For OS revision A.03.xx,
 - 0 = user was active
 - 65535 = user was not active
 - For OS revision B.04.xx, B.05.xx & B.06.xx
 - 000000 = user was active
 - 177777 = user was not active
- 3) NTASK - number of tasks configured in the system
- 4) TIC - Task In Control at the time of the system error, normally 1 <= TIC <= NTASK
 - A value of 65535 (OS revision A.03.xx) or 177777 (OS revisions B.04.xx, B.05.xx & B.06.xx) indicates that the system was switching between tasks at the time of the system error
- 5) SYSBK - memory block number assigned to the upper part of OS
- 6) COMBK - memory block number assigned to the Common Block
- 7) UI3 (OS revision A.03.xx only) - memory block number assigned to DROM overflow
- 8) PARITY LOCATION (OS revision B.04.xx/B.05.xx/B.06.xx) - refer to the Mainframe Diagnosis (Memory Board) section for details
- 9) FDQHEADS - File/Device queue head pointer addresses
- 10) FDQ - File/Device queue
- 11) DVOWN - Device Ownership queue
- 12) STACK - return stack used by the system when no task is in control; on OS revision B.04.xx, the value by the title "STACK" indicates the number of valid entries in the stack

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

- 13) DROM TABLE - table listing the offset from the beginning of the memory block to the start of each loaded DROM
- the DROM number (0 to 31) is the internal DROM number, which might differ from the DROM number shown in CONFIG (see the table on the next page)
 - an offset of 000000 indicates the DROM is not loaded
 - for operating system revision A.03.xx:
 - DROMs with internal DROM numbers less than or equal to TOP DROM are loaded in the primary DROM area (in memory block SYSBK)
 - DROMs with internal DROM numbers greater than TOP DROM are loaded in the DROM overflow block (in memory block UI3)
 - for operating system revisions B.04.xx/B.05.xx/B.06.xx:
 - the memory block in which the DROM is loaded is given in the column BLK (due to multiple DROM overflow blocks)
- (the DROM number/name table is on the next page)

SYSTEM ERROR (G AND M) - 3.0 - MESSAGE AND PRINTOUTS

Internal DROM #	External DROM #				Name of DROM
	A.03	B.04	B.05	B.06	
0	1	1	1	1	EUROPE
1	2	2	2	2	PACK
2	3	3	3	3	IMAGE
3	4	4	4	4	SORT
4	5	5	5	5	REPORT
5	6	6	6	6	FORMS
6	7	7	7	7	EUR71
7	* --	* --	* --		TOOLS
8	8	8	8	9	RIO
9	9	9	9	10	TIO
10	10	10	10	11	TRACE
11	11	11	11	12	P2608
12	12	12	12	13	TRIG
13	13	13	13	14	MATRIX
14	14	14	14	15	SPOOL
15	15	15	15	16	CS250
16	16	16	16	17	MEDIA
17	17	17	17	18	IMAGE2
18	18	18	18	19	TASK
19	19	19	19	20	COPY
20	20	20	20	21	IMAGEU
21	* --	21	21	22	TIMER
22	* --	* --	* --	23	PERFM
23	21	22	22	24	CTRACE
25	* --	23	23	25	P2601
28	* --	* --	* --	26	NET250
29	22	24	24	27	SYSRR
31	* --	* --	25	28	DCACHE

* not supported on that revision OS

14) DISC STATUS SET - refer to the Disc Diagnosis section (Controller Status Words) for details

SYSTEM ERROR (G AND M) - 4.0 - PRINTOUT INTERPRETATION

4.0 PRINTOUT INTERPRETATION

- 1) Identify the Task In Control (TIC) from the SYSTEM STATUS printout. If the TIC = 65535 (OS revision A.03.xx) or TIC = 177777 (OS revision B.04.xx, B.05.xx & B.06.xx), the system was switching between tasks, so examine all tasks and the system stack in the rest of the steps below.
- 2) Identify the operating system revision from the SYSTEM STATUS printout. 3) Identify the BASIC line (if any) for the Task In Control.
- 4) A parity error has occurred if
 - for OS revision A.03.xx, the parity words are present in the message on the principal workstation
 - for OS revision B.04.xx, B.05.xx & B.06.xx, the parity words are present in the message on the principal workstation or are present in the SYSTEM STATUS printout

Refer to the Mainframe Diagnosis section (Memory Board). Ignore the rest of the printouts, as the SYSTEM ERROR was the result of the parity error.

- 5) An attempt to write into protected memory has occurred if
 - for OS revision A.03.xx, "SYSTEM ERROR M" was on the CRT and/or the value on the top of the user or system return stack is 047531
 - for OS revision B.04.xx, the value on the top of the user or system return stack is 053077
 - for OS revision B.05.xx, the value on the top of the user or system return stack is 053117
 - for OS revision B.06.xx, the value of the top of the user or system return stack is 052757

To determine where the protection violation occurred, use the next value down in the stack and continue with this procedure at step 8.

- 6) An illegal interrupt was received if
 - for OS revision A.03.xx, the value on the top of the user or system return stack is 047527
 - for OS revision B.04.xx, the value on the top of the user or system return stack is 053075
 - for OS revision B.05.xx, the value on the top of the user or system return stack is 053115

SYSTEM ERROR (G AND M) - 4.0 - PRINTOUT INTERPRETATION

- for OS revision B.06.xx, the value on the top of the user or system return stack is 052755

The contents of the PA register gives the peripheral address where the interrupt was being generated. The operating system was not expecting to receive interrupts from this address. Contact your TSE or the factory for more information.

- 7) A timeout (handshake abort) has occurred on the HP-IB if
- for OS revision A.03.xx, the value on the top of the user or system return stack is 053240
 - for OS revision B.04.xx, the value on the top of the user or system return stack is 057043
 - for OS revision B.05.xx, the value on the top of the user or system return stack is 057061
 - for OS revision B.06.xx, the value on the top of the user or system return stack is 057027

Refer to the HP-IB Diagnosis section for information on how to isolate the problem.

- 8) The SYSTEM ERROR is due to an inconsistency in pointers or addresses, or by unexpected values. The cause could be hardware or software (not due to an error in application code, though.)

Follow the procedure below to determine where the error occurred, then call your TSE or the factory for assistance.

- Use the value on the top of the return stack for the Task In Control (TIC) (exception: if a memory protection error has occurred as described in step 5 above, use the next value down in the stack). Call this the "stack value".
- If the leading digit in the stack value is 0, the error occurred in the lower part of the operating system. Determine which OS module it occurred in by using the Operating System Layout in the Memory Organization section. (Be sure to use the layout for the appropriate operating system revision.) Call your TSE or the factory.
- The leading digit in the stack value should be a 1.

If the value for register R34 is the same as the value for SYSEK, and

- for OS revision A.03.xx, the stack value is greater than 144000

SYSTEM ERROR (G AND M) - 4.0 - PRINTOUT INTERPRETATION

- for OS revision B.04.xx, the stack value is greater than 131470
- for OS revision B.05.xx & B.06.xx, the stack value is greater than 130477

then the error occurred in the upper part of the operating system. Determine which OS module it occurred in by using the Operating System Layout in the Memory Organization section. (Be sure to use the layout for the appropriate operating system revision.) Call your TSE or the factory.

- d) If the value for register R34 is the same as the value for the memory block assigned to the Task In Control, and
 - for OS A.03, is DIFFERENT from the value for UI3,
 - for OS B.04.xx, B.05.xx & B.06.xx, are DIFFERENT from the block any DROM is in,

then the error occurred in a binary. Find out from the application code or OEM which binaries were being used by the task in control at the time of the error (use the BASIC line that was printed out also), and call your TSE or the factory.

- e) If the value for register R34 is the same as the value for the memory block assigned to the Task In Control, and
 - for OS A.03, is the SAME as the value for UI3,
 - for OS B.04, B.05 & B.06, are the SAME as the block some DROM is in,

the error occurred in either a DROM or a binary. Contact your TSE for assistance.

- f) If one of the two following situations does NOT occur, check to make sure you followed this procedure correctly, then call your TSE or the factory.

- 1) For OS revision A.03.xx,

if the value for register R34 is the same as the value for SYSBK and the stack value is less than 144000, the error occurred in a DROM whose internal DROM number is less than or equal to TOP DROM. Go to "OS revision A.03.xx DROM Error" below.

if the value for register R34 is the same as the value for UI3, the error occurred in a DROM whose internal DROM number is greater than TOP DROM. Go to "OS revision A.03.xx DROM Error" below.

SYSTEM ERROR (G AND M) - 4.0 - PRINTOUT INTERPRETATION

- 2) For OS revision B.04.xx, B.05.xx & B.06.xx, the value for register R34 is the same as that for a block (BLK listed in the DROM TABLE. Go to "OS revision B.04.xx B.05.xx or B.06.xx DROM Error" below.

OS revision A.03.xx DROM Error:

- a) Use the entries in the DROM table (either those less than or equal to TOP DROM, or greater than TOP DROM) based on step e, ignoring entries of 000000. Call these the "DROM TABLE entries".
- b) Ignore the leading digit on the stack value. Locate the last entry in the DROM TABLE entries where the offset is less than or equal to this stack value. The error occurred in this DROM. Using the table of DROM numbers and names in section 3.2, determine which DROM this is. Call your TSE or the factory.

SYSTEM ERROR (G AND M) - 4.0 - PRINTOUT INTERPRETATION

OS revision B.04.xx, B.05.xx or B.06.xx DROM error:

- a) Use the entries in the DROM table where the block number is the same as that in R34, ignoring entries of 000000. Call these the "DROM TABLE entries".
- b) Ignore the leading digit on the stack value. Locate the entry in the DROM TABLE entries whose offset is the greatest while still being less than or equal to the stack value. The error occurred in this DROM. The table of DROM numbers and names in section 3.2 determine which DROM this is. Call your TSE or the factory.

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Section 442

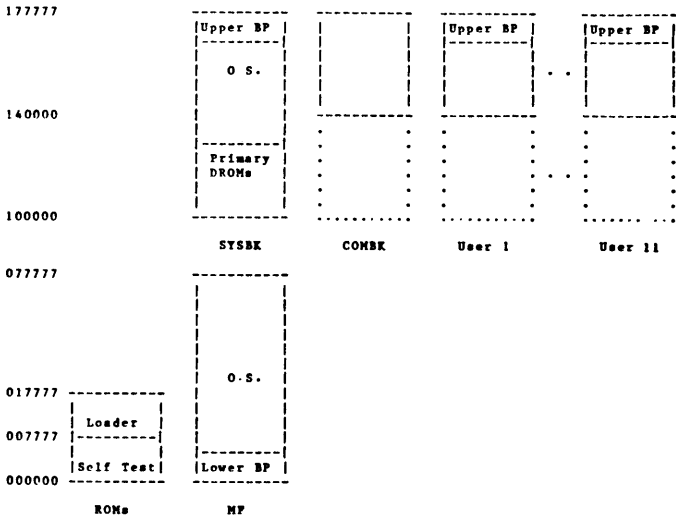
MEMORY ORGANIZATION

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MEMORY ORGANIZATION - 1.0 - OVERALL LAYOUT

1.0 OVERALL LAYOUT



MEMORY ORGANIZATION - 2.0 - OPERATING SYSTEM LAYOUT

2.0 OPERATING SYSTEM LAYOUT

2.1 Revision A.03.06 Layout

Module	Starting Address	Ending Address
-----	-----	-----
KEY	001002	005524
STMT	005525	006526
COMM	006527	010610
INPUT	010611	012340
SYNTAX	012341	017206
PROGINT	017207	021176
DISPLAY	021177	023675
CHAR	023676	025551
LINE	025552	027615
CRTHAND	027616	031245
CURSOR	031246	034511
OUTHND	034512	036753
UTIL2	036754	037551
DISC	037552	044641
SUPER	044642	047311
CONTROL	047312	051243
SYSRR	051244	051514
IOSUP	051515	055211
LISTS	055212	056627
QMATH	056630	062770
UPPER	062771	064275
LOMEM	064276	067317
HIMEM	067320	076432
MESSAGE	076433	076622
REDIM	076623	
STRUCT	144341	145627
STMT2	145630	146117
REFIX	146120	146673
HMTYP	146674	147256
SUBPG	147257	153163
MASSMEM	153164	157430
MMSAVE	157431	163402
MASSMEM2	163403	170676
PRINT	170677	175317
SPOOL	175320	

MEMORY ORGANIZATION - 2.0 - OPERATING SYSTEM LAYOUT

2.2 Revision B.04.00 Layout

Module	Starting Address	Ending Address
KEY	001002	005654
STMT	005655	006664
COMM1	006665	010024
NEWS1	010025	012174
SYNTAX	012175	017064
PROGINT	017065	021174
DISPLAY	021175	024141
CHAR	024142	026051
LINE	026052	030205
CRTHAND	030206	031665
CURSOR	031666	031717
OUTHND	031720	032467
OSUTIL	032470	033277
LDISC	033300	040122
PDISC	040123	043731
LINUS	043732	050131
SUPER	050132	052657
CONTROL	052660	054727
SYSRR	054730	055407
IOSUP	055410	061134
LISTS	061135	062572
QMATH	062573	066754
UPPER	066755	067054
LONEM	067055	072116
HIMEM	072117	076256
MESSAGE	076257	076446
REDIM	076447	
STRUCT	131553	133052
INPUT	133053	134622
OSUTIL2	134623	135102
COMM2	135103	135662
OUTHND2	135663	137525
STMT2	137526	140325
CURSOR2	140326	143605
HIMEM2	143606	144245
NEWS2	144246	145325
UPPER2	145326	146555
MMTYP	146556	147152
SUBPG	147153	153067
MASSMEM	153070	157374
MMSAVE	157375	163407
MASSMEM2	163410	170727
PRINT	170730	175744

MEMORY ORGANIZATION - 2.0 - OPERATING SYSTEM LAYOUT

2.3 Revision B.05.xx

Module	Starting Address	Ending Address
	-----	-----
KEYWRD	001002	005644
SIMT	005655	006624
COMM	006625	007764
NEWST	007765	012134
SYNTAX	012135	017014
PRGINT	017015	021114
DISPLY	021115	024051
CHAR	024052	025751
LINE	025752	030065
CRTHND	030066	031545
CURSOR	031546	031577
OUTHND	031600	032347
OSUTIL	032350	033217
LDISC	033220	040012
FDISC	040013	043701
LINUS	043702	050151
SUPER	050152	052701
CONTRL	052702	054751
SYSRRM	054752	055431
IOSUP	055432	061156
LISTER	061157	062614
QMATH	062615	066776
UPPER	066777	067056
LOMEM	067057	072120
HIMEM	072121	076260
MESSAGE	076261	076450
REDIM	076451	076667
OBP2	076670	077171
KEYTBLS	077172	077675
OBP	077676	
SAVEAREA	130477	130560
STRUCT	130561	132060
INPUT	132061	133630
OSUTIL2	133631	134110
COMM2	134111	134670
OUTHND2	134671	136633
SIMT2	136634	137433
CURSOR2	137434	142713
HIMEM2	142714	143353
NEWST2	143354	144413
UPPER2	144414	145663
MNTP	145664	146260
SUBPG	146261	152175
MMPRT	152176	156542
MMSAVE	156543	162555
BOTH	162556	170115
PRINT	170116	175152

MEMORY ORGANIZATION - 2.0 - OPERATING SYSTEM LAYOUT

ENDCODE	175153	175235
PRINT2	175166	175235
UNUSED	175236	175507
SYS STRGE	175510	

MEMORY ORGANIZATION - 2.0 - OPERATING SYSTEM LAYOUT

2.4 Revision B.06.xx

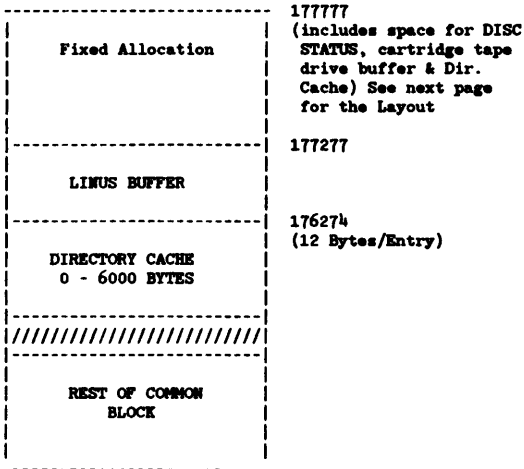
Module	Starting Address	Ending Address
KEYWRD	001002	005645
STMT	005646	006615
COMMD	006616	007747
NEWST	007750	012113
SYNTAX	012114	016773
PRGINT	016774	021060
DISPLY	021061	023775
CHAR	023776	025661
LINE	025662	027762
CRTHND	027663	031425
CURSOR	031426	031457
OUTHND	031460	032215
OSUTIL	032216	033057
LDISC	033060	037652
PDISC	037653	043541
LINUS	043542	050011
SUPER	050012	052541
CONTRL	052542	054564
SYSRRM	054565	055244
IOSUP	055245	061221
LISTER	061222	062657
QMATH	062660	067041
UPPER	067042	067121
LOMEM	067122	072153
HIMEM	072154	076300
MESSAGE	076301	076470
REDIM	076471	076707
OBP2	076710	077171
KEYTBLS	077172	077675
OBP	077676	
SAVEAREA	130477	130560
STRUCT	130561	132060
INPUT	132061	133630
OSUTIL2	133631	134110
COMMD2	134111	134670
OUTHND2	134671	136633
STMT2	136634	137433
CURSOR2	137434	142713
HIMEM2	142714	143353
NEWST2	143354	144413
UPPER2	144414	145663
MMTYP	145664	146260
SUBPG	146261	152175
MMPRNT	152176	156542
MMSAVE	156543	162555
BOTH	162556	170115
PRINT	170116	175152

MEMORY ORGANIZATION - 2.0 - OPERATING SYSTEM LAYOUT

ENDCODE	175153	175235
UNUSED	175236	175507
SYS STRGE	175510	

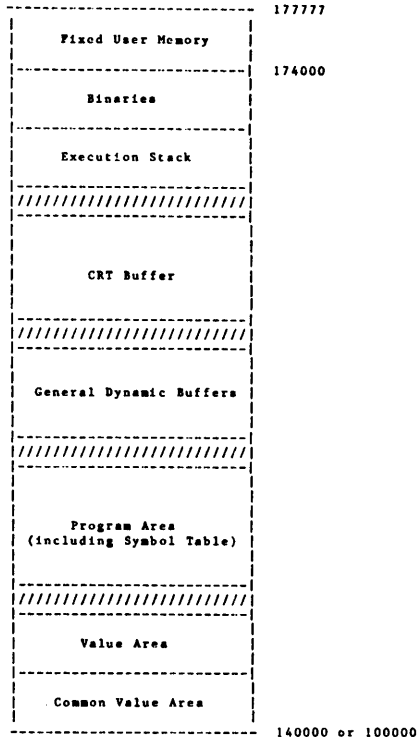
MEMORY ORGANIZATION - 3.0 - COMMON BLOCK LAYOUT

3.1 COMMON BLOCK FIXED ALLOCATION LAYOUT



MEMORY ORGANIZATION - 4.0 - USER BLOCK LAYOUT

4.0 USER BLOCK LAYOUT



-hp-

Section 450
MAINFRAME DIAGNOSIS

TABLE OF CONTENTS

- 1.0 Overview
- 2.0 Checklist
- 3.0 LED on Processor Board
- 4.0 Power Distribution
- 5.0 Card-Cage Build-up Procedure
- 6.0 Processor Board
- 7.0 Block Switch Board
- 8.0 Memory Board
- 9.0 Keyboard Subsystem
- 10.0 CRT Display Subsystem
- 11.0 Backplane Signals

MAINFRAME DIAGNOSIS - 1.0 - OVERVIEW

1.0 OVERVIEW

This section contains information related to diagnosis problems in the mainframe of the HP 250. Unless it is known that the problem is in the mainframe, the System Diagnosis section (section 410) should be used before this section.

The section is organized as follows:

Checklist - general steps to follow in isolating the problem and verifying its resolution

LED on Processor Board - how to interpret the different LED values during power-up and all normal processing

Power Distribution - power consumption of the mainframe PCAs, test points for the power supply, and power diagnosis

Card-Cage Build-up Procedure - a procedure to add boards one at a time to isolate a faulty board

Processor Board - block diagrams and diagnosis procedure for the board

Block Switch Board - block diagram and diagnosis procedure for the board

Memory Board - block diagram, physical diagram, diagnosis procedure for the board, parity error interpretation, and how to run the memory diagnostic

Keyboard Subsystem - block diagram, diagnosis procedure, and how to run the ROM Keyboard test (note: this section is for the integrated workstation only; refer to section 521 Terminal Diagnosis for information on the other workstations)

CRT Display Subsystem - block diagram, physical diagram, physical mapping, diagnosis procedure, how to run the ROM Display tests, and adjustments of the Sweep Board (note: this section is for the integrated workstation only; refer to section 521 Terminal Diagnosis for information on the other workstations)

Backplane Signals - signal usage on the backplane by PCA, and signal definitions

2.0 CHECKLIST

- 1) Check date codes on all boards (see section 350).
- 2) Check all cables, switch settings, and strapping.
- 3) Check the seating of all boards.
- 4) Check power distribution.
- 5) Determine which boards could be involved in the problem (refer to the system block diagrams in section 410 System Diagnosis). List in priority order the boards, from most likely to least likely. Refer to the individual diagnosis sections for each of those boards.
- 6) Do not shotgun. Know what you want to accomplish with each step, before you perform the step. After you perform the step, verify the results. If there is no change, undo the step before doing the next step. This is to make sure new problems are not introduced.

MAINFRAME DIAGNOSIS - 3.0 - LED ON PROCESSOR BOARD

3.0 LED ON PROCESSOR BOARD

This section describes how to interpret the LED on the processor board during power-up. Refer to section 441 (SYSTEM ERROR) and section 440 (OS DIAGNOSIS) for the use of the LED during SYSRR and the memory dump program, respectively.

Refer to section 431 (SELF-TEST DESCRIPTION) for details on the specific self-tests mentioned below.

Old ROMs (1818-2829 and 1818-2830):

LED value	Meaning
-----	-----
0	After "SELF TEST B" displayed and before BPC Self-test
2	After "PASS" displayed for Block Switch Register Test and before Read/Write Memory Find Test
3	After "PASS" displayed for Read/Write Memory Find Test and before Input/Output Controller Self-test
7	After "PASS" displayed for Processor Board Self-test and before performing a ROM diagnostic or part 2 of self-test
8	Power-on value of the LED before "SELF TEST B" displayed and the self tests begin 9 After "SELF TEST COMPLETE" displayed and before calling the Loader ROM
P	After the operating system receives control from the Loader ROM (OS Revision B.04 only)

MAINFRAME DIAGNOSIS - 3.0 - LED ON PROCESSOR BOARD

New ROMs (1818-2913 and 1818-2914):

LED value	Meaning
-----	-----
0	After "ST2" displayed and before any tests
1	After "1" displayed and before BPC Self-test
2	After "P" displayed for BPC Self-test and before "2" displayed for Block Switch Board Register Test
3	After "P" displayed for Block Switch Board Register Test and before "3" displayed for Read/Write Memory Find Test
4	After "P" displayed for Read/Write Memory Find Test and before "4" displayed for Input/Output Controller Self-test
5	After "P" displayed for Input/Output Controller Self-test and before "5" displayed for Extended Math Chip Self-test
6	After "P" displayed for Extended Math Chip Self-test and before "6" displayed for Block Switch Board Write Protect Test
7	After "P" displayed for Block Switch Board Write Protect Test and before "7" displayed for Processor Board Self-test
8	Power on value of the LED before "ST2" displayed and the self tests begin
8	After "P" displayed for Processor Board Self-test and before "8" displayed for Remaining Memory Test
9	After "P" displayed for Remaining Memory Test and before "9" displayed for HP-IB Programmed I/O Test
A	(if display steady) After "P" displayed for HP-IB Programmed I/O Test and before "10" displayed for HP-IB Interrupt Logic Test (if flashing) The ASI board failed self-test during power-up or was not present (HP 250/20/25/26/30/40/50 only)
C	After "P" displayed for HP-IB Interrupt Logic Test and before "11" displayed for HP-IB DMA Logic Test

MAINFRAME DIAGNOSIS - 3.0 - LED ON PROCESSOR BOARD

LED value	Meaning
-----	-----
E	After "P" displayed for HP-IB DMA Logic Test and before I/O Initialization takes place
F	(if displayed steady) Before beginning quick ASI test on PA 4 in Production Loopback Test
H	(if displayed steady) Before beginning quick ASI test on PA 5 in Production Loopback Test
L	Just after the Loader receives control
" "	(bottom segment only) After system load and before control is passed from the Loader ROM to the OS
P	After the operating system receives control from the Loader ROM (OS Revision B.04, B.05, B.06 only)

MAINFRAME DIAGNOSIS - 3.0 - LED ON PROCESSOR BOARD

In the Production Loopback Test on the new ROMs:

LED: "0" and "F" alternating at a 1 second rate for 10 seconds
 Meaning: No ASI board found on PA 4

LED: "0" and "H" alternating at a 1 second rate for 10 seconds
 Meaning: No ASI board found on PA 5

LED: alternating "0" and "8" followed by a value in the table below
 Meaning: The memory block indicated by the steady value failed

LED value	Memory Block # (in octal)
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	10
9	11
A	12
C	13
E	14
F	15
H	16

LED: " - " and " - " alternating in the Read/Write Memory
 Find Test
 | |
 | |
 -
 | |
 | |
 -

Meaning: Change the thumbwheel switch to indicate the number of memory blocks to test in the Remaining Memory Test

LED: " - " and " " alternating in the Read/Write Memory
 Find Test
 | | | |
 | | | |
 -

Meaning: Change the thumbwheel switch to setting 14

MAINFRAME DIAGNOSIS - 4.0 - POWER DISTRIBUTION

4.0 POWER DISTRIBUTION

Power Supply (45000-66511/45000-69561) rating:

- +5V -- 20 amps max rated; 17 amps actual
- +12V -- 6 amps
- +24V -- 4.1 amps with output shorted
- 12V -- 0.6 amps
- 5V -- 0.6 amps

Power Supply (45000-66552/45000-69552) rating:

- +5V -- 22amps max rated
- +12v -- 5 amps
- +24V -- 2.5 amps (unregulated; nominal at 120V line,
23V at max load)
- 12V -- 0.5 amps
- 5V -- 0.5 amps

Assy. ----- +5V ----- +12V ----- -12V ----- +24V -----
 calc. typical calc. typical calc. typical calc. typical

	+5V		+12V		-12V		+24V	
	calc.	typical	calc.	typical	calc.	typical	calc.	typical
Proc.	0.9	0.75	0.45	0.46	--	--	--	--
HP-IB Bd	2.4	2.00	0.04	0.04	--	--	--	--
Block SW	1.1	0.70	--	--	--	--	--	--
128KB Mem.	1.17	1.16	0.37	0.11	--	--	--	--
64KB Mem.	0.72	0.72	0.59	0.03	--	--	--	--
32KB Mem.	0.72	na	0.59	na	--	--	--	--
ASI	1.8	1.80	0.2	0.20	0.1	0.10	--	--
256KB Mem.	1.6	1.3	--	--	--	--	--	--
512KB Mem.	1.8	1.5	--	--	--	--	--	--
INP Bd/Pnl	2.5	2.50	0.63	0.60	0.2	0.20	--	--
Floppy Ctrl	1.98	2.00	0.13	0.09	na	0.02	--	--
Floppy Dr.	0.60	0.54	--	--	--	--	2.0	1.5
Display Bd	2.5	na	0.1	na	--	--	--	--
Keyboard	0.5	na	--	--	0.05	na	--	--
CRT Assy	0.04	na	0.30	na	--	--	--	--

Notes: na = not available

MAINFRAME DIAGNOSIS - 4.0 - POWER DISTRIBUTION

Test Points on the Power Supply Board:

45000-66511/45000-69561

GND --> *	* <-- -POP	|	<=== bottom right corner board
+12V --> *	* <-- +5V		
-5V --> *	* <-- +7V		
-VSENSE --> *	* <-- -12V		
+24V --> *	* <-- -VREG		

Voltage ranges for 45000-66511/45000-69561:

+12V: 11.64V to 12.36V
-5V: -4.75V to -5.25V
-VSENSE: -12V to -28V depending on width
adjustment on CRT Sweep Board
+24V: unregulated
-12V: -11.4V to -12.6V
+7V: 6.65V to 7.35V
+5V: 4.85V to 5.15V

45000-66552/45000-69552

+5V --> *	* <-- -12V	|	<=== front of board behind cable
+7V --> *	* <-- +12V		
-5V --> *	* <-- -VREG		
-POP --> *	* <-- GND		

Voltage ranges for 45000-66552/45000-69552:

+5V: 4.85V to 5.15V
+7V: 6.58V to 7.42V
-5V: -4.75V to -5.25V
-12V: -11.4V to -12.6V
+12V: 11.64V to 12.36V

MAINFRAME DIAGNOSIS - 4.0 - POWER DISTRIBUTION

Maximum noise specifications:

<u>Voltage (Vdc)</u>	<u>Allowable Ringing (mV p-p)</u>
+/- 12	120
+5	75
-5	50
+7	70

Power Distribution Diagnosis:

Verify that AC Power is present by turning the key switch to the "ON" position and verify that the system fans are turning. If the fans ARE NOT turning:

- 1) Verify the AC power is present at the AC receptacle. If it is not, unplug the system and check the circuit breaker for the receptacle.
 - a) If the circuit breaker has been tripped, reset it and attempt to re-apply power to the HP 250.
 - b) If the circuit breaker trips again, check the rating of the breaker. Then, unplug the system (including peripherals) and with a clip-on AC Amp meter, verify that nothing else is connected to the circuit.
 - 1) If something else is connected, remove it and repeat the procedure.
 - 2) If nothing else is connected, then remove the cable bringing AC power to the power supply and re-apply the procedure. If the power stays up, the power supply is probably bad. If the power goes down again, then the problem is in the power module. Use a circuit tester (beeper light) and the power distribution diagram in the Diagrams Manual to check the circuit.

If the fans ARE turning:

- 1) If there is no apparent DC power (i.e. no LEDs lit on the Processor Board, Floppy Controller Board, or INP Board, then measure the DC voltages and compare the readings with the tables in this section.
 - a) If one or more voltages are missing, turn the power off and remove all of the boards from the card-cage, then re-apply power.
 - 1) If there are no results, remove the floppy DC power cable from the power supply (if present) and repeat.
 - 2) If there are no results, on the HP 250A and HP 250/35, remove the CRT cables from the back of the system.
 - 3) If there are still no results, replace the power supply.

MAINFRAME DIAGNOSIS - 5.0 - CARD CAGE BUILD-UP

5.0 CARD CAGE BUILD-UP PROCEDURE

The procedure that follows allows for isolation of board failures in the mainframe by using the system self-test.

LED values depend on the ROMs on the Processor Board. "Old" ROMs are P/N 1818-2829 and 1818-2830. "New" ROMs are P/N 1818-2913 and 1818-2914.

WARNING

Power the system off before removing or adding any boards in the cardcage.

- 1) Check voltages on the Power Supply.
- 2) Remove all boards (except the Display Logic, if in the system), and disconnect all peripherals from the mainframe.
- 3) Add boards as indicated:

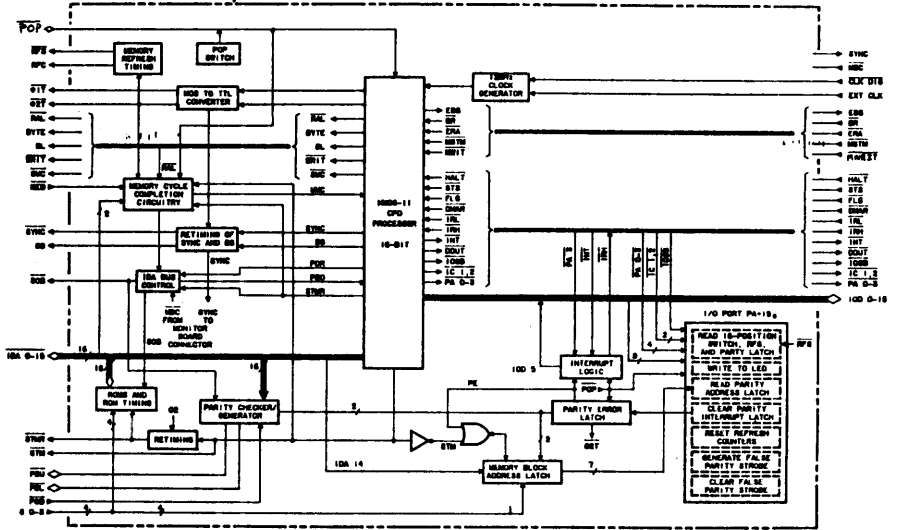
Board	LED value after board added		Comments
	Old ROMs	New ROMs	
a) Processor	0	2	
b) Block Switch	2	3	
c) Memory Bd	7	9	Add 32KB only
d) HP-IB Board	7	L	Add cable also

MAINFRAME DIAGNOSIS - 5.0 - CARD CAGE BUILD-UP

- 4) For an HP 250A or HP 250/35,
 - a) Add the appropriate load device -- Self-test should pass, the LED for Old ROMs change to 9, and LOADER ERROR D should occur
 - b) Add the remaining memory boards -- the operating system should load, data comm and configuration errors might be displayed, but the keyboard will not respond
 - c) Add the Keyboard Logic Board -- same as above, but the integrated workstation should now work
 - d) Add data comm boards and peripherals, one at a time -- the corresponding error messages should no longer be displayed (data comm errors that remain could indicate a problem in the ASI or INP panel, cables, or workstation/peripheral, in addition to or instead of a problem in the data comm board) e) Any remaining error messages should be strictly related to configuration discrepancies

- 5) For an HP 250/20, HP 250/25, HP 250/26, HP 250/30, HP 250/40, or HP250/50,
 - a) Add the appropriate load device for the operating system.
 - b) Add the ASI Board and cable -- LOADER ERROR D should occur (no display could indicate a problem in the ASI panel, cables, or the workstation, in addition to or instead of a problem in the ASI Board)
 - c) Add the remaining memory boards -- data comm and configuration errors might be displayed
 - d) Add any remaining data comm boards and peripherals, one at a time -- the corresponding error messages should no longer be displayed (data comm errors that remain could indicate a problem in the ASI or INP panel, cables, or workstation/peripheral, in addition to or instead of a problem in the data comm board)
 - e) Any remaining error messages should be strictly related to configuration discrepancies

MAINFRAME DIAGNOSIS - 6.0 - PROCESSOR BOARD



Processor Board Block Diagram

MAINFRAME DIAGNOSIS - 6.0 - PROCESSOR BOARD

1) To interpret the LED on the Processor Board, refer to section 3.0. 2) If the System Self-Test fails on the BPC, IOC, EMC, or Processor Board Self-Tests, check the seating of the board. Then change the board.

3) To exercise the Processor Board, loop on self-test:

For the "Old" ROMs (1818-2829 and 1818-2830), use setting 15. This invokes a loop on self-test parts 1 and 2.

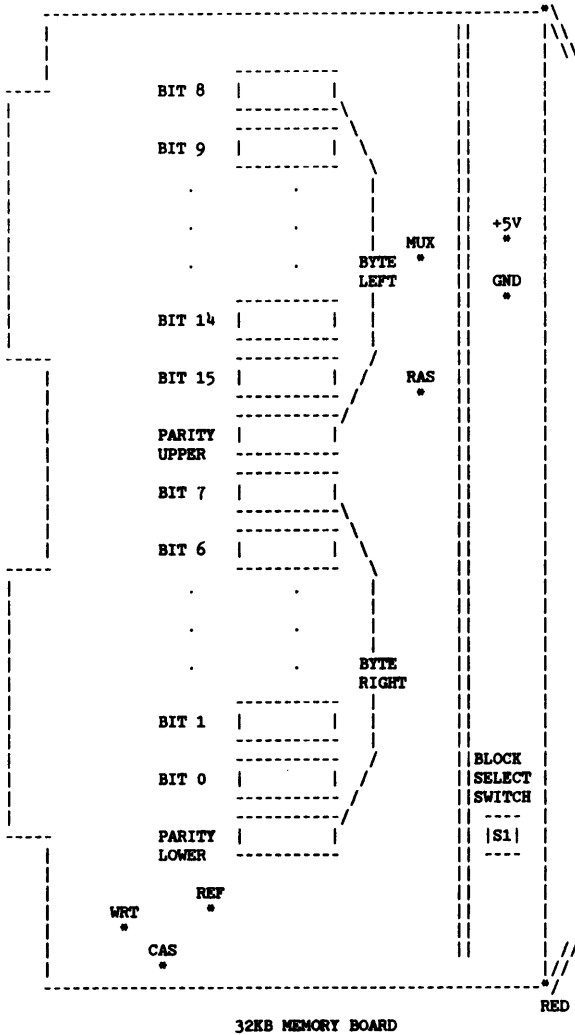
For the "New" ROMs (1818-2913 and 1818-2914), use setting 14. This will invoke the Production Loop Test. On the first pass, change the thumbwheel switch to 1 after the Block Switch Board Register Test (to indicate to test 1 additional memory block beyond block 1). When the LED pattern changes (the system is acknowledging the setting), change the thumbwheel switch to 14 to begin the loop test.

4) Intermittent errors on the Processor Board will cause undefined and unexpected results, such as hangs, System Errors, incorrect data processing, etc. It is difficult, however, to attribute these errors in general to the Processor Board, even though it could be the cause. Therefore, eliminate other causes for the problem before changing the Processor Board. If the problem remains after changing the board, it is probably not the cause so the original board should be put back in. (Note: It is possible that a multiple failure has occurred on the system. Talk to your TSE for more information.)

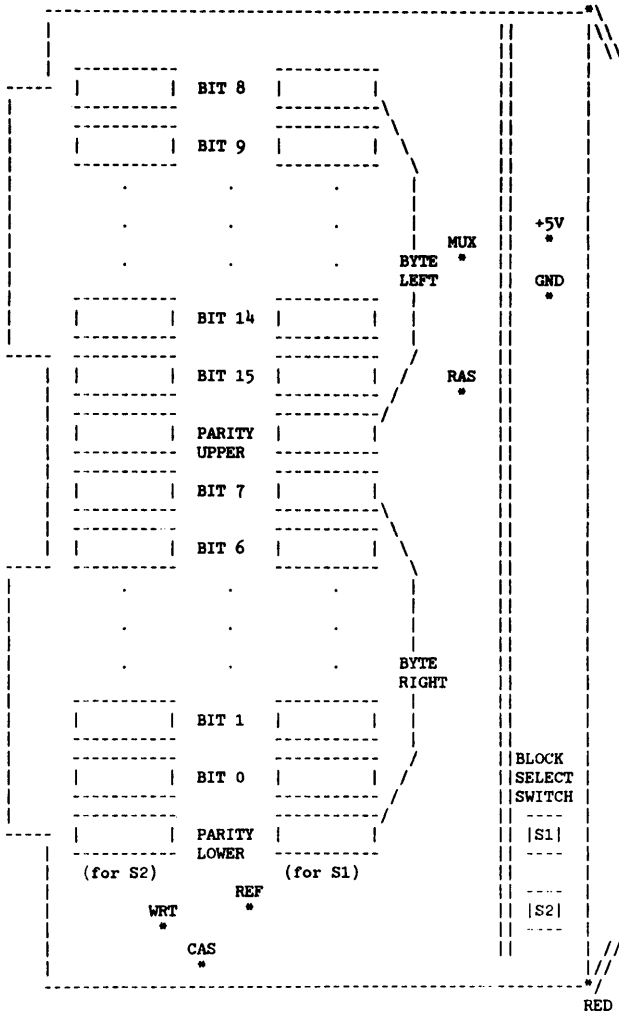
MAINFRAME DIAGNOSIS - 7.0 - BLOCK SWITCH BOARD

- 1) Check the seating of the Block Switch board and all memory.
- 2) Check the block switch settings on memory boards to verify no two settings are the same.
- 3) If there are indications of memory parity errors, see section 8.0 (Memory Board).
- 4) Intermittent errors on the Block Switch Board will cause an incorrect memory block reference (for an instruction or data) on a memory cycle. This will lead to undefined and unexpected results (system hangs, System Errors, incorrect data processing, etc.). It is difficult, however, to attribute these errors in general to the Block Switch board, even though it could be the cause. Therefore, change the Block Switch board only if other causes for those errors have been eliminated.
- 5) If the System Self-Test fails on the Block Switch board tests, check the seating of the processor board and check system power. Then change the Block Switch board.

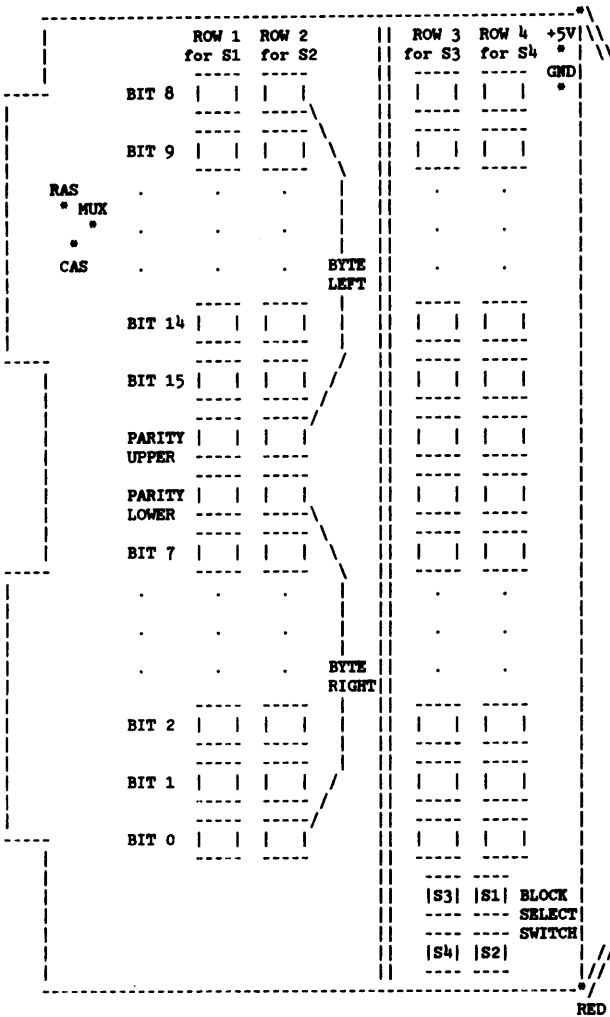
MAINFRAME DIAGNOSIS - 8.0 - MEMORY BOARD



MAINFRAME DIAGNOSIS - 8.0 - MEMORY BOARD



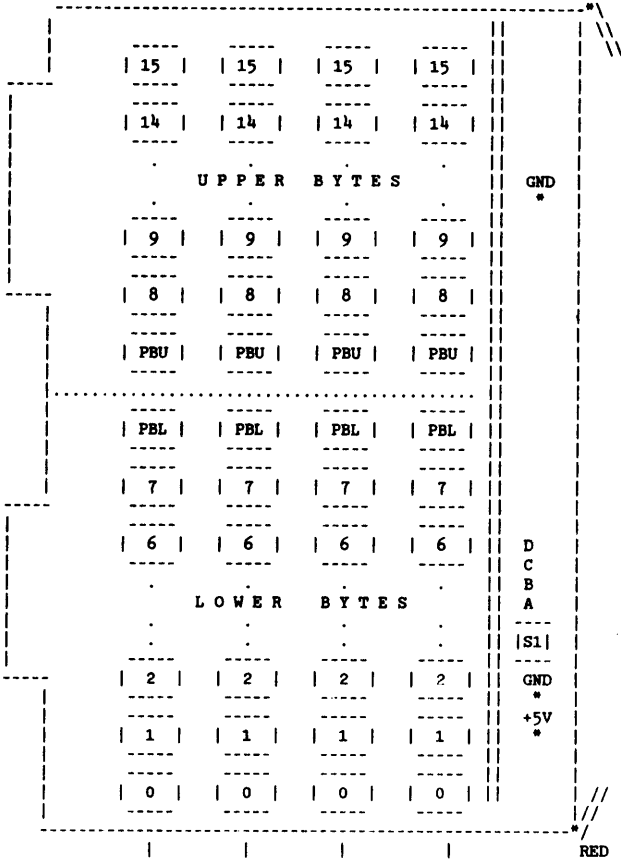
MAINFRAME DIAGNOSIS - 8.0 - MEMORY BOARD



128KB MEMORY BOARD

RED

MAINFRAME DIAGNOSIS - 8.0 - MEMORY BOARD



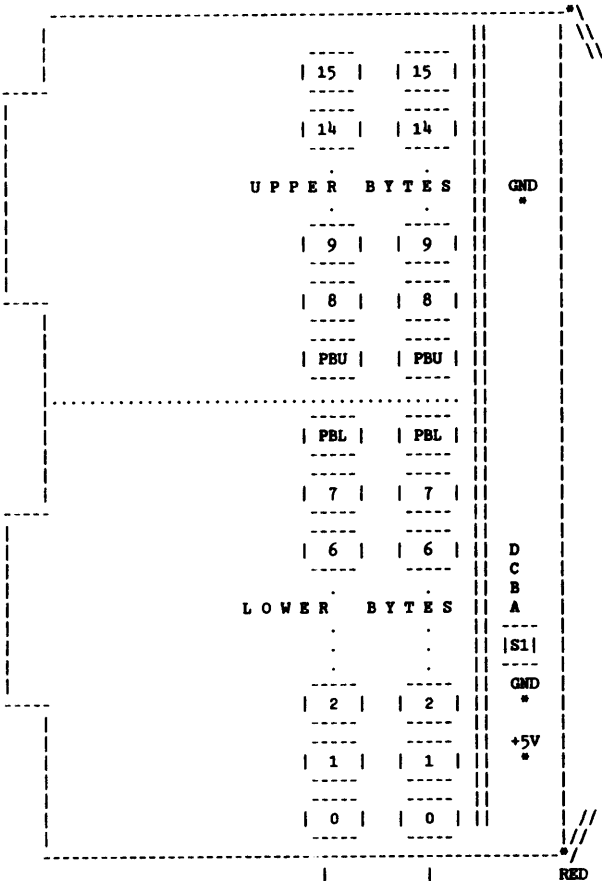
BLOCK LOCATION N+7 & N+10 N+5 & N+6 N+3 & N+4 N+1 & N+2**

** See Block Select Switch Settings for the value of N.

PBL= Parity Bit Lower; PBU= Parity Bit Upper

512KB MEMORY BOARD

MAINFRAME DIAGNOSIS - 8.0 - MEMORY BOARD



BLOCK LOCATION **N+3 & N+4 N+1 & N+2
 PBL= Parity Bit Lower; PBU= Parity Bit Upper

** See Block Select Switch Settings for the value of N.
 256KB MEMORY BOARD

MAINFRAME DIAGNOSIS - 8.0 - MEMORY BOARD

	A	B	C	D	Octal Block #s	
512KB	C	C	O	O	1 - 10	N= 0
" "	O	C	C	O	11 - 20	N= 10 **
256KB	C	C	O	O	1 - 4	N= 0
" "	C	O	C	O	5 - 10	N= 4
" "	O	C	C	O	11 - 14	N= 10
" "	O	O	O	O	15 - 20	N= 14 **

C= CLOSED
O= OPEN

** These settings are not recommended for customer's systems. In these positions there will be two unused blocks of memory.

Block Select Switch Settings
(for the 256KB & 512KB memory boards)

To run the memory diagnostic:

A) If the system has the "old" ROMs (1818-2829 and 1818-2830), use the following procedure:

- 1) For the short test (approximately 2 minutes per 32KB)
 - a) Set all Block Select switches for Memory Boards to be tested to an upper block in sequence starting from block 1 (i.e. 1, 2, 3, etc.).
 - b) Set the thumbwheel switch on the Processor Board to 8.
 - c) Power-on the system.
 - d) Set the thumbwheel switch on the Processor Board to the quantity of upper blocks to test.

The test will then begin. The error log will indicate a failure in a chip by displaying an "X" for the appropriate board.

When finished, change the memory boards and thumbwheel switch back to their original configuration.

- 2) For the long test (approximately 1 hour per 32KB)
 - a) Set all Block Select switches for Memory Boards to be tested to an upper block in sequence starting from block 1 (i.e. 1, 2, 3, etc.).
 - b) Set the thumbwheel switch on the Processor Board to 8.
 - c) Power-on the system.
 - d) Set the thumbwheel switch on the Processor Board to 15.
 - e) When the diagnostic asks for the number of blocks to be tested, set the thumbwheel switch on the Processor Board to the quantity of upper blocks to test.

The test will then begin. The error log will indicate a failure in a chip by displaying an "X" for the appropriate board.

When finished, change the memory boards and thumbwheel switch back to their original configuration.

MAINFRAME DIAGNOSIS - 8.0 - MEMORY BOARD

- B) If the system has the "new" ROMs (1818-2913 and 1818-2914), use the following procedure:

Note: It is NOT necessary to reconfigure memory to use the diagnostic with the "new" ROMs (unless block 1 needs to be tested).

Block 1 (upper and lower) must be present when running this diagnostic, and cannot be tested.

- 1) Set the thumbwheel switch to one of the following:
 - 9 if the CE Support System disc is on a 7906 or 7910
 - 10 if the CE Support System disc is on floppy
 - 11 if the CE Support System disc is on tape cartridge or the 7908/11/12 disc
- 2) Insert the CE System Support disc/tape (Revision B.04.00 or greater) containing the file MEMORY (file type is SYST).
- 3) Power-up the system. If the system is already on, press the POP switch on the processor board. If the system is not on, turn the key (note: If error "I 15" is displayed during power-up, a parity error is occurring since memory is not initialized on thumbwheel switch settings 9, 10, and 11. Set the switch back to a setting where the operating system can be loaded in, power-up, change the switch back to 9, 10, or 11, and then press the POP switch.)
- 4) Select option 2 on the main screen (Memory Diagnostic).
- 5) On the next screen, the blocks the system detected are displayed. Any block that indicates a hard error during the detection process will not be displayed, to test such a block enter the block number as indicated below:

Enter the blocks you want to test (e.g. 2U) or "ALL" to test all blocks that were detected. Note that block 1 cannot be tested since the diagnostic resides in that block. Enter "S" after all blocks to be tested have been entered.

- 6) On the next screen, enter the test you want performed. The "Standard" test (option 1) takes about 2 minutes per 32KB. The "Gallopig" test (option 2) takes about 1 hour per 32KB.
- 7) The test will then begin. The error log will indicate a failure in a chip by displaying an "X" for the appropriate board.
- 8) When the test finishes, change the thumbwheel switch back to the normal setting for loading the OS, then power-up the system.

C) Special considerations for diagnosing RAM failures on the 256KB and 512KB memory boards:

- 1) NOTE: Since both the 256KB and the 512KB boards are configurable in 64KB (upper & lower) blocks only, they cannot be fully tested by the ROM based version of the memory diagnostic. Therefore, these boards are only supported in systems which have the new CPU ROMs installed (1818-2913 & 1818-2914).
- 2) The RAMs on these boards are socketed, allowing defective ones to be replaced in the field. The procedure listed above can be used to identify the bad RAMs. Note the following considerations:

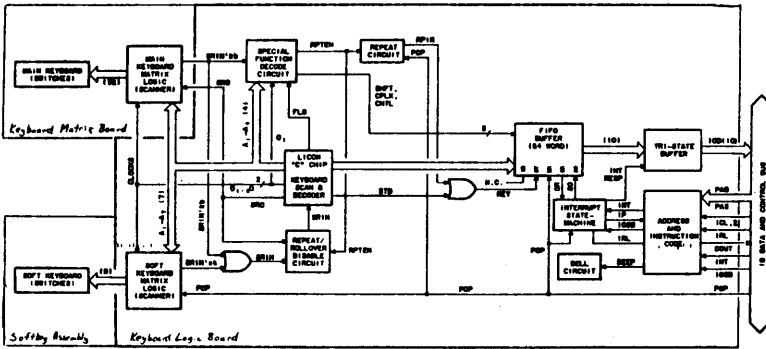
-To fully test a 512KB board you must first test blocks 2 thru 10, then restrap the board for blocks 11 thru 20 and add 64KB of memory at block one. The memory diagnostic can now be run on the beginning block (11). This procedure will need to be followed for 256KB boards if they are configured to begin at block one.

-On the detection of a defective RAM the diagnostic will indicate the suspected component as well as the parity RAM for that byte of memory. The replacement /checkout procedure is as follows:

1. Replace the suspected RAM.
2. Rerun the diagnostic on that block of memory. If there are no other failures the repair is complete. However, if the parity RAM shows up as being bad again without an associated data RAM failure, the parity RAM should also be replaced and the block retested.

MAINFRAME DIAGNOSIS - 9.0 - KEYBOARD SUBSYSTEM

9.0 KEYBOARD SUBSYSTEM



Keyboard Subsystem Block Diagram

MAINFRAME DIAGNOSIS - 9.0 - KEYBOARD SUBSYSTEM

To test all characters on the integrated keyboard, run "TEST" or "CE" and select MISC TESTS. Run the KEYBOARD TEST to check the response to each key. (Arrows are used to indicate keys that that have been pressed.)

An alternate keyboard test is available in the ROMs. To run this test, set the thumbwheel as follows:

"Old" ROMs (1818-2829 and 1818-2830): setting 14
"New" ROMs (1818-2913 and 1818-2914): setting 13

Then power-on the system. When a key is pressed, the US ASCII character for it is displayed. ("Halt" is displayed as HT and user-defined keys as K#, where #=1 to 24.) When finished, set the thumbwheel switch back to its original setting.

The following symptoms may be due to a bad Keyboard Logic Board or a bad Keyboard Matrix Board. Unless you are sure it is one board or the other, change the Keyboard Logic Board first (because it is easier to replace).

- double characters printing
- no characters printing
- cursor does not move
- characters that were not pressed are printing
- repeat key does not work properly
- shift key does not work properly

Sticky keys are usually caused by a bad Keyboard Matrix Board

- the entire Keyboard Matrix Board must be changed; the only replaceable parts are the key caps (there are key cap kits for all foreign character sets)
- an exchange Keyboard Matrix Board from the U.S. comes with U.S. keycaps
- an exchange Keyboard Matrix Board from Europe comes with German keycaps
- for all other countries, the necessary keycaps must be changed
- the Keyboard Matrix Board may then be sent back for repair with any loose keycaps in a bag

CAUTION

When changing the keycaps, always have the Keyboard Matrix Board in the sheet metal casing so the leads on the keys are not bent.

When changing the space bar or halt switch, insert leads with long nose pliers so the leads are not bent.

Softkeys that do not work properly could be caused by hardware or software. Run the following program to see if all 24 softkeys are working properly:

```
10 FOR I=1 TO 24
20   ON KEY #I: "KEY "&VAL$(I) GOTO Displaykey
30 NEXT I
40 WAIT
50 Displaykey: DISP "KEY ";CURKEY
60 WAIT
70 END
```

Press all 24 softkeys:

If the hardware is working correctly, as each key is pressed, "KEY key no." will be printed.

If only the eight softkeys on the CRT work and the other 16 softkeys on the keyboard do not work, the Keyboard Matrix Board is probably bad.

If the 16 softkeys on the keyboard work and the eight softkeys on the CRT do not work, the Keyboard Logic Board or softkey assembly is probably bad.

If none of the softkeys work (and the program was entered correctly), the Keyboard Logic Board is probably bad.

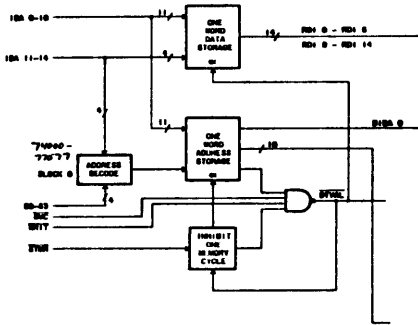
If the program runs properly, there may be a software problem:

- softkeys may be disabled (by the DISABLE command)
- softkeys may be nested in a subroutine with a low priority
- softkeys may not be defined

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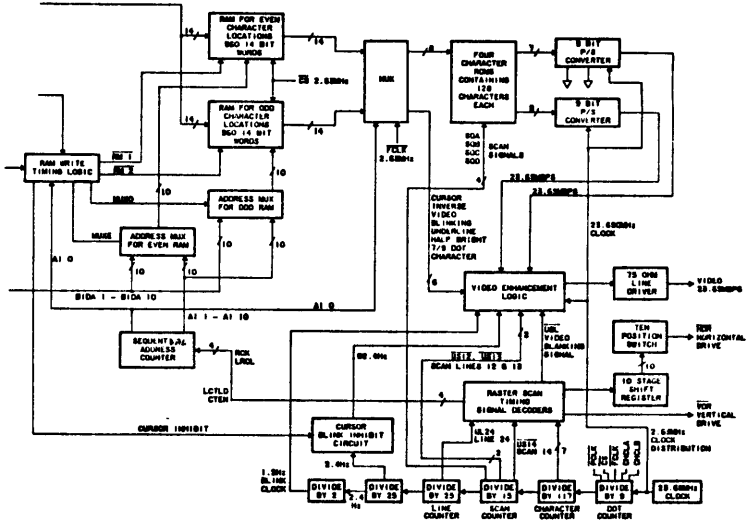
MAINFRAME DIAGNOSIS - 10.0 - CRT DISPLAY SUBSYSTEM

10.0 CRT DISPLAY SUBSYSTEM



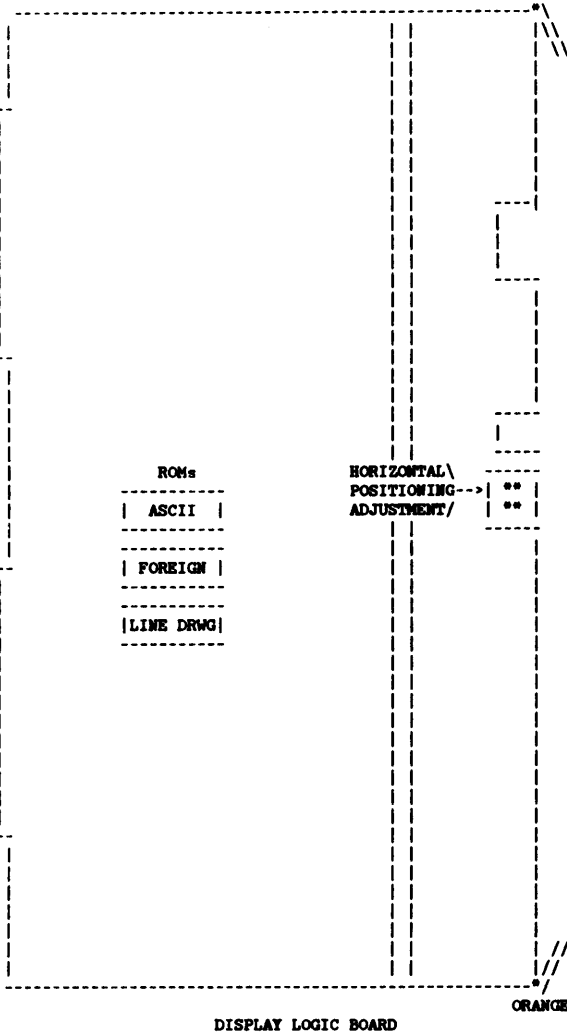
Display Logic Board Block Diagram

MAINFRAME DIAGNOSIS - 10.0 - CRT DISPLAY SUBSYSTEM

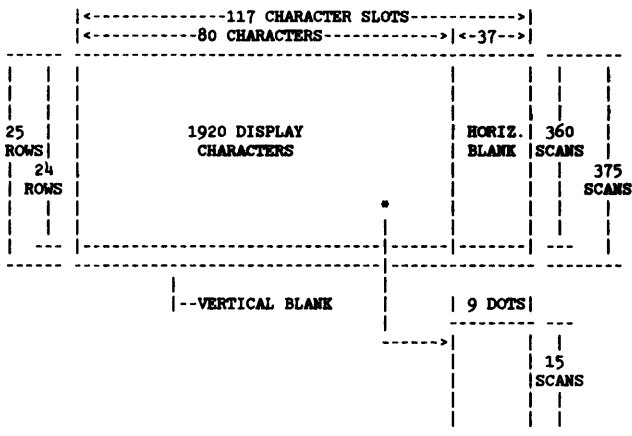


Display Logic Board Block Diagram

MAINFRAME DIAGNOSIS - 10.0 - CRT DISPLAY SUBSYSTEM

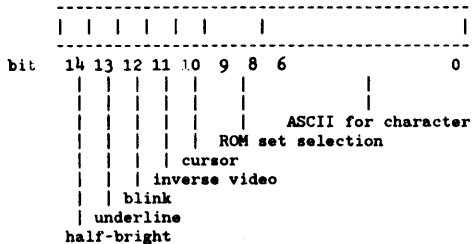


MAINFRAME DIAGNOSIS - 10.0 - CRT DISPLAY SUBSYSTEM



Data storage in RAM (addresses 074000 through 077577 in block 0):

14 bit word used in RAM on Display Logic Board



MAINFRAME DIAGNOSIS - 10.0 - CRT DISPLAY SUBSYSTEM

To test the CRT Display system, run the Display ROM and Display RAM tests that are in ROM by setting the thumbwheel switch on the processor board as follows:

For the "Old" ROMs (1818-2829 and 1818-2830),
Display ROM Test: setting 12
Display RAM Test: setting 13

For the "New" ROMs (1818-2913 and 1818-2914),

Combined Display ROM and RAM Test: setting 12

Then power-on the system. When finished with the test, set the thumbwheel switch back to its original setting. Some of the symptoms of a bad Display Logic Board are:

- characters that were not expected
- no video enhancements (inverse video, half-bright, etc.)
- every other character is bad
- nothing on the screen
- line drawing set or ASCII set is missing - horizontal or vertical drive is bad (also check the cable)

If foreign characters are not being displayed:

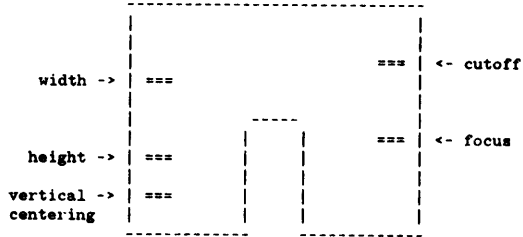
- check that the foreign character ROM (1818-0476) is on the Display Logic Board
- check that the EUROPE DRAM is configured in the system (through CONFIG)
- check that the appropriate keyboard is configured in the system (through CONFIG)

Before changing the Display Logic Board:

- check the seating of the board
- make sure the cable is connected properly

MAINFRAME DIAGNOSIS - 10.0 - CRT DISPLAY SUBSYSTEM

Adjustments on the CRT Sweep Board:



Notes: Vertical adjustments should be made before height adjustments.

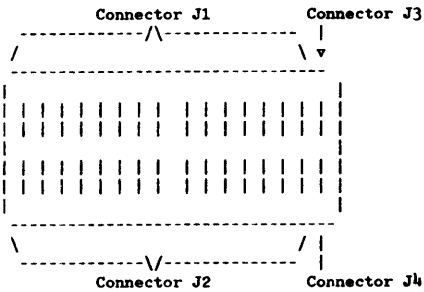
The cutoff adjustment must be made on a cold CRT.

The focus adjustment should be performed after all other adjustments.

MAINFRAME DIAGNOSIS - 11.0 - BACKPLANE SIGNALS

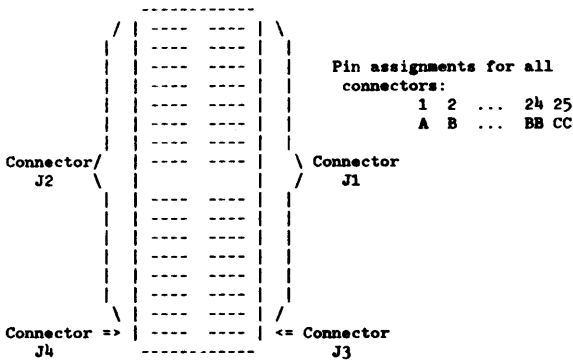
11.0 BACKPLANE SIGNALS

Backplane on HP 250A and HP 250/35:



Pin assignments for all connectors: 1 A
 2 B
 :
 :
 24 BB
 25 CC

Backplane on HP 250/20, HP 250/25, HP 250/26, HP 250/30, HP 250/40, and HP 250/50:



MAINFRAME DIAGNOSIS - 11.0 - BACKPLANE SIGNALS

Connector J1 Signals

Boards: P Processor
H HP-IB
F Floppy Controller
M Memory
A ASI
I INP
D Display Logic
K Keyboard Logic
B Block Switch

Connector J1 Pin	Signal	Board:	P	H	F	M	A	I	D	K	B
A	+7V		X								
1	+7V		X								
B	Ground		X	X	X	X	X	X		X	X
2	Ground		X	X	X	X	X	X		X	X
C	Ground		X	X	X	X	X	X		X	X
3	Ground		X	X	X	X	X	X		X	X
D	~IDA 8		X			X			X		
4	~IDA 9		X			X			X		
E	~IDA 10		X			X			X		
5	~IDA 11		X			X			X		X
F	~IDA 12		X			X			X		X
6	~IDA 13		X			X			X		X
H	~IDA 14		X			X			X		X
7	~IDA 15		X			X			X		X
J	~IDA 7		X			X			X		X
8	~IDA 6		X			X			X		X
K	~IDA 5		X			X			X		X
9	~IDA 4		X			X			X		X
L	~IDA 3		X			X			X		X
10	~IDA 2		X			X			X		X
M	~IDA 1		X			X			X		X
11	~IDA 0		X			X			X		X
N	~IOD 7		X	X			X	X			
12	~IOD 6		X	X			X	X		X	
P	~IOD 5		X	X			X	X		X	
13	~IOD 4		X	X			X	X		X	
R	~IOD 3		X	X			X	X		X	X
14	~IOD 2		X	X			X	X		X	X
S	~IOD 1		X	X			X	X		X	X
15	~IOD 0		X	X			X	X		X	X
T	~IOD 15		X	X			X	X		X	X
16	~IOD 14		X	X			X	X		X	X
U	~IOD 13		X	X			X	X		X	X
17	~IOD 12		X	X			X	X		X	X
V	~IOD 11		X	X			X	X		X	X
18	~IOD 10		X	X			X	X		X	X
W	~IOD 9		X	X			X	X		X	X
19	~IOD 8		X	X			X	X		X	X
X	BC		X				X				X
20	~SYNC		X								X
Y	~SMC		X						X		X
21	~MBS		X			X					X
Z	Not used					X					
22	~STN		X			X					
AA	Ground		X			X	X				
23	Ground		X			X	X				
BB	-5V		X		X	X		X	X		
24	-5V		X		X	X		X	X		
CC	+12V		X	X	X	X		X	X	X	
25	+12V		X	X	X	X		X	X	X	

MAINFRAME DIAGNOSIS - 11.0 - BACKPLANE SIGNALS

Connector J2 Signals

Boards: P Processor
 H HP-IB
 F Floppy Controller
 M Memory
 A ASI
 I INP
 D Display Logic
 K Keyboard Logic
 B Block Switch

Connector J2 Pin	Signal	Board:	P	H	F	M	A	I	D	K	B
A	+12V		X	X	X	X	X	X	X	X	
1	+12V		X	X	X	X	X	X	X	X	
B	-12V						X	X		X	
2	-12V						X	X		X	
C	Ground		X			X		X			X
3	Ground		X			X		X			X
D	S0		X			X			X		X
4	IRH		X							X	X
E	IRL		X	X			X	X		X	X
5	S1		X			X			X		X
F	S2		X			X			X		X
6	DMAR		X	X			X	X			
N	PLC		X	X			X	X			
7	S3		X			X			X		X
J	RLI		X								
8	STS		X	X			X	X			
K	BL		X			X					
9	BYTE		X			X					
L	RFS		X			X					
10	RFC		X			X				X	
M	SOB		X			X					
11	Phase 1		X			X		X			
N	PA2		X	X			X	X		X	X
12	WRIT		X			X			X		X
P	PA0		X	X			X	X		X	X
13	PSB		X			X				X	X
R	IOSB		X	X			X	X		X	X
14	PA1		X	X			X	X		X	X
S	RAL		X			X					X
15	STMR		X			X			X		X
T	IC2		X	X			X	X		X	X
16	DOUT		X	X			X	X		X	X
U	Phase 2		X			X					
17	IC1		X	X			X	X		X	X
V	PBU		X			X					
18	PBL		X			X					
W	TWT		X	X			X	X		X	X
19	PA3		X	X			X	X		X	X
X	Not used										
20	Not used										
Y	POP		X	X	X		X	X		X	X
21	BSI		X							X	X
Z	Ground		X	X	X	X	X	X		X	X
22	Ground		X	X	X	X	X	X		X	X
AA	Ground			X	X	X	X	X		X	X
23	Ground			X	X	X	X	X		X	X
BB	+5V		X	X	X	X	X	X	X	X	X
24	+5V		X	X	X	X	X	X	X	X	X
CC	+5V		X	X	X	X	X	X	X	X	X
25	+5V		X	X	X	X	X	X	X	X	X

MAINFRAME DIAGNOSIS - 11.0 - BACKPLANE SIGNALS

Connector J3 and J4 Signals (Power Supply)

Connector J3		Connector J4	
Pin	Signal	Pin	Signal
---	-----	---	-----
A	+5V	A	+12V
1	+5V	1	+12V
B	+5V	B	+12V
2	+5V	2	+12V
C	+5V	C	+12V
3	+5V	3	+12V
D	+5V	D	+12V
4	+5V	4	+12V
E	+5V	E	+12V
5	+5V	5	+12V
F	+5V	F	+12V
6	+5V	6	+12V
B	+5V	H	+12V
7	+5V	7	+12V
J	+5V	J	-5V
8	+5V	8	-5V
K	+5V	K	-5V
9	+5V	9	-5V
L	+5V	L	-5V
10	+5V	10	-5V
M	+5V	M	Ground
11	+5V	11	Ground
N	+5V	N	Ground
12	+5V	12	Ground
P	~POP	P	Ground
13	Ground	13	Ground
R	Ground	R	Ground
14	Ground	14	Ground
S	Ground	S	Ground
15	Ground	15	Ground
T	Ground	T	Ground
16	Ground	16	Ground
U	Ground	U	Ground
17	Ground	17	Ground
V	Ground	V	Ground
18	Ground	18	Ground
W	Ground	W	Ground
19	Ground	19	Ground
X	Ground	X	Ground
20	Ground	20	Ground
Y	Ground	Y	Ground
21	Ground	21	Ground
Z	Ground	Z	Ground
22	Ground	22	Ground
AA	-12V	AA	+7V
23	-12V	23	+7V
BB	-12V	BB	+7V
24	-12V	24	+7V
CC	-12V	CC	+7V
25	-12V	25	+7V

MAINFRAME DIAGNOSIS - 11.0 - BACKPLANE SIGNALS

Backplane Signal Definitions

- BG - Bus Grant
- BL - Byte Left
- BSI - Block Switch Installed
- BYTE - Byte Operation
- DMAR - DMA Request
- DOUT - Data Out
- FLG - Flag Peripheral Ready
- HLT - Halt
- IC 1-2 - Interface Control
- IDA 0-15 - Instruction/Data/Address Bus
- INT - Interrupt
- IOD 0-15 - Input/Output Data Bus
- IOSB - I/O Strobe
- IRH - Interrupt High
- IRL - Interrupt Low
- MEB - Memory Busy
- PA 0-3 - Peripheral Address Bus
- PBL - Parity Bit Lower
- PBU - Parity Bit Upper
- POP - Power On Preset
- PSB - Parity Strobe
- Phase 1-2 - Clocks
- RAL - Register Access Line
- RFC - Refresh Clock
- RFS - Refresh Strobe
- S 0-3 - Block Switch Bus
- SMC - Synchronized Memory Complete
- SOB - Stay of Bus
- STM - Start Memory
- STMR - Start Memory RAM Timing
- STS - Status
- SYNC - Synchronize (used to indicate next memory cycle will be an instruction fetch)
- WRIT - Write

-hp-

Section 460

HP-IB DIAGNOSIS

(This section has not yet been written.)

-hp-

Section 461

HP-IB TOOLS

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1.0 1602

(This section has not yet been written.)

-hp-

Section 470
DATA COMM DIAGNOSIS

TABLE OF CONTENTS

- 1.0 Datacomm
- 2.0 Asynchronous
- 3.0 Synchronous

DATA COMM DIAGNOSIS - 1.0 - DATACOMM

1.0 DATACOMM

A good general diagnostic procedure to follow is to always check that the boards are properly seated and that datacomm cables are solidly connected. Datacomm diagnosis should be approached through the following steps:

Inside the HP 250 mainframe

1. Check the ASI or INP boards for successful completion of self-test.
2. If the LED on the ASI board is On, change the board.
3. Run the IDU if you have an INP board.

External to the HP 250 mainframe

4. Check the cabling for correct part numbers. Visual or Blue Box.
5. Check strapping on board and modem. Strapping for boards is in the Configuration section. Modem options are stated in the HP 250 Site Preparation Guide, part no. 45251-90040, printed December 1980.
6. Wrong control lines may be connected. Use Blue Box.
7. Protocol or handshaking problem. Use HP 1640 Datacomm Analyzer.
8. Noisy lines. HP 250 Site Preparation Guide, part no. 45251-90040, printed December 1980, for types of line conditioning. Use HP 1640 Datacomm Analyzer.

2.0 ASYNCHRONOUS

The following table is Asynchronous Data Comm Self-Test Errors. Wherever appropriate in the table, if a second ASI board is installed, the Peripheral Address (PA) is 4 for board #2.

Error Levels

Level	Description
W	Warning message. An error condition exists which should be rectified, and which may result in unpredictable results if not corrected.
F	Fatal error. The port(s) or entire ADCB will not be accessible due to self-test failures.
C	Catastrophic error. Will cause system load failure.

* On back of RS-232C connector panel.

Message	Level	Description	Corrective Action(s)
ASYNC DATA COMM BOARD ON PA x IS CONFIGURED BUT NOT THERE.	W	1. A remote device is configured and no Async board is present. 2. Jumper 7 on Async board in B position. 3. Async board failure-status line not on.	Verify that peripheral address switch on Async board is set to PA 5. Verify that Async board is present and seated properly in mother board. Verify that all jumpers on Async board are in "A" position (not to be confused with jumpers on RS232C Connector Board). Jumpers on Async board are factory set and must not be changed.
SYSTEM LOAD FAILURE - INT ERR ON PA 5.	C	Async board unable to clear data comm interrupt.	Replace Async board.
ASYNC DATA COMM. BOARD ON PA x IS DOWN.	F	1. Async board failed a test of one of the board's functions common to all ports. 2. All ports failed self-test (see below).	Replace Async board.
PORT x IS DOWN	F	Async board failed one of port dependent tests (i.e., UART, RS232C, etc).	Replace Async board.

DATA COMM DIAGNOSIS - 2.0 - ASYNCHRONOUS

<p>CONSOLE ON PORT x IS DOWN</p>	<p>W REMOTE/250 console (2649D) failed its self-test.</p>	<p>Replace or repair REMOTE/250.</p>

<p>DEVICE ON PORT x IS DISCONNECTED OR TURNED OFF. (Unless the RS232 Receiver is bad, this message will be displayed only if jumper #9 is in the "B" position indicating that the Async board is to monitor the data terminal ready for modem signal from the REMOTE device.)</p>	<p>W 1. Hardwired or limited distance modem (leased service): Jumper #9* is in "B" position and data terminal ready (DTR) is not provided by REMOTE device. 2. Switched service modem: As long as jumper #9* is in "B" position this message will always appear for switched network modem.</p>	<p>1. Verify that REMOTE device is powered up. 2. Check cable(s). 3. Verify that REMOTE device is designed to provide DTR. 4. Replace Async board. 5. REMOTE device failure (i.e., not providing DTR). 6. In general, any reason DTR is not provided to HP 250. 7. If using switched-service modems, power-up system, establish data comm. connection and check the operation of the REMOTE device.</p>

<p>NO RESPONSE TO SYSTEM SELFTEST</p>	<p>W No response or invalid response from self-test of REMOTE/250 console (2649D). If jumper #9 is in the "A" position, the data comm connection must exist and the 2649D must be powered up. Otherwise, this self-test always fails. It's recommended that jumper #9 remain in the "B" position for RS-232 REMOTE connections.</p>	<p>1. Check that 2649D is powered up. 2. Check cables 3. Check parity, baud rate and duplex settings on 2649D. Must be full duplex, odd parity. Baud rate must be consistent with Baud rate setting on HP250 Async board. 4. Transmission error: retry power up. 5. Port x on Async board is bad: replace Async brd. 6. 2649D failure: run local self-tests; then repair or replace.</p>
<p>PORTS DOWN: TIO DROM NOT LOADED.</p>	<p>F Async board is present but TIO DROM is not loaded.</p>	<p>Run "CONFIG" program and specify TIO DROM to be auto loaded. (See BASIC/250 Programming manual for details on running the CONFIG program.)</p>

ASYNCHRONOUS INTERFACE TEST (ASITST)

The asynchronous interface test (ASITST) tests a single port to determine whether or not the interface port is defective. This test performs the following functional tests on configured ports:

- o REQUEST
- o ON CONNECT
- o ON DISCONNECT
- o ON INPUT #Port
- o ON OUTPUT #Port
- o AOVFL

The INPUT and OUTPUT functions pass a buffer of 256 characters which is initialized with data pattern starting at 0 and incrementing to 255.

NOTE: For proper execution of this test, the C.E. DISC must contain the PIO-II driver.

Invoke the ASI diagnostic by running the program ASITST. You can now select the test port by pressing the softkey SELECT PORT. The ASI test will read the RSTAT memory table and print out any ports configured as class GENERAL. If no GENERAL class ports are found, the following error message is printed:

ERROR: COULD NOT FIND A PORT CONFIGURED AS 'GENERAL'

When this occurs, reconfigure the port to class GENERAL and reboot.

A loopback connector (45120-68801) must be placed on the desired test port before executing the loopback test.

After successfully selecting a port, you have an option of running multiple or single loopback tests. Multiple tests are run by pressing the CYCLE softkey (CYCLE=ON). If CYCLE is OFF, a single pass will be run. When CYCLE is ON, the test loops indefinitely, until the CYCLE softkey is pressed.

DATA COMM DIAGNOSIS - 2.0 - ASYNCHRONOUS

Error Messages

The following error messages are displayed when a hardware or system error condition exists. Possible causes of these errors are also given.

Message	Possible Cause
-----	-----
Port XX CONNECT interrupt failed.	DTR/DSR
Port XX buffer transmit did not complete	SD/RD
Port XX buffer receive did not complete	SD/RD
Port XX xmit/rcv buffer compare failed	UART
Port XX receive buffer overflow failed	UART
Port XX SYSTEM ERROR MESSAGE	SYSTEM PROBLEM
Port XX DISCONNECTED	DTR/DSR
COULD NOT FIND A PORT CONFIGURED AS 'GENERAL' NO GENERAL CLASS	
UNEXPECTED ERROR	UNKNOWN

Softkey Displays

The following displays illustrate the three possible softkey scripts for the ASI diagnostic:

HP250.5.00.A

ASI PORT TEST
SELECT FUNCTION

ASI PORT TEST - Tests the currently selected ASI Port. The Port must be configured as class GENERAL, loopback hood installed on the test port, and Baud rate set greater than 200 (switch positions 2-8).

SELECT MODE - Specifies the ASI port to be tested.

CYCLE MODE - Toggles the cycle mode. If the cycle mode is ON, the ASI PORT TEST will repeat forever.

ASI Port is not defined
CYCLE MODE: OFF

Please select function

| ASI | | | | SELECT | | CYCLE | EXIT |
| PORT | | | | PORT | | MODE | |

DATA COMM DIAGNOSIS - 2.0 - ASYNCHRONOUS

HP250.5 00.A

ASI TEST PORT
SELECT ASI PORT

SELECT PORT	DEVICE
12	GENERAL RS-232
13	GENERAL RS-232

ASI Port is not defined
CYCLE MODE: OFF

Please select port.

| PORT12 | PORT13 | | | | | | EXIT |
| | | | | | | | |

HP250.5.00.A

ASI TEST PORT
ASI PORT FUNCTION TEST

ASI Port is 12
CYCLE MODE: OFF

System busy

| | | | | | | CYCLE | EXIT |
| | | | | | | MODE | |

DATA COMM DIAGNOSIS - 3.0 - SYNCHRONOUS

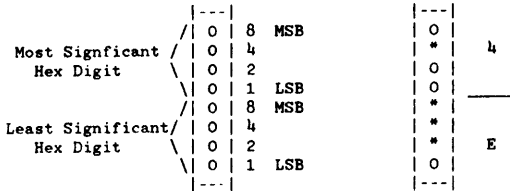
3.0 SYNCHRONOUS

When diagnosing synchronous problems, the LEDs on the INP board should ALWAYS be checked for a possible solution.

There are two LED readouts that mean the board has passed self-test on bootup:

- 3E Passed power-on with interface test.
- 3F Passed power-on self-test.
- 7F Self-test completed with no errors.

Top edge of board >>-----



Example=4E (hex)

Bottom edge of board >>-----

Note: Rotate figure 90 degrees clockwise for HP 250 Model 30 mainframe.

- a) General Failure Codes (part of display message when running IDU diagnostic - COMMANDED SELF-TEST) where:

(xx|yy|)

and

xx is General Failure Code
 yy is decimal readout of Specific Failure Code

DATA COMM DIAGNOSIS - 3.0 - SYNCHRONOUS

Code	Message
2	ROM failure.
3	RAM failure.
4	Panel failure.
5	Timer failure.
6	Interface failure.
7	Serial I/O (SIO) failure.
8	Interrupt failure.
10	Microprocessor failure.

b) Specific Failure Codes and Messages (LED display on board).

The following columns are the LED hex readout, possible fix, and meaning (message) of the readout.

The fix code is as follows:

B	INP board
P	Connector panel
Prc	Processor board
Mem	Memory board
C	Interconnecting cable between INP and panel

Code (hex)	Fix	Message
01	B	First 1K of ROM failed checksum test.
02	B	Second 1K of ROM failed checksum test.
03	B	RAM failed zeros and ones test.
04	B	RAM failed address test.
05	B	RAM failed refresh test.
06	B	Test point interrupt is on.
07	B	External interrupt is on.
08	B	Memory time-out interrupt failed to clear.
09	B/P	Panel interrupt will not clear.
0A	B	Timer interrupt will not clear.

DATA COMM DIAGNOSIS - 3.0 - SYNCHRONOUS

0B	B	HP250 interrupt will not clear.
0C	B	SIO interrupt will not clear.
0D	B	Direct Memory Access (DMA) interrupt will not clear.
0E	B	Interrupt structure failed self test.
0F	B	EREND interrupt will not set.
10	B	New value was never received in the state register.
11	B	An incorrect value was received in the state register.
12	B/Prc	HP250 interrupt request to controller was never seen.
13	B	HP250 interrupt request to controller was never cleared.
14	B	In flip-flop was never set to receive data from the HP250.
15	B/Mem	Incorrect data received with program receive.
16	B/Prc/ Mem	Characters never received with DMA through interface.
17	B	Incorrect data received with DMA receive.
18	B/Prc/ Mem	Character never sent through interface with DMA.
19	B	Passed extended self test, then illegal state value.
40	B	Bad error codes. Microprocessor problems.
41	B	First 1K of ROM failed checksum test.
42	B	Second 1K of ROM failed checksum test.
43	B	RAM failed zeros and ones test.
44	B	RAM failed address test.
45	B	RAM failed refresh test.
46	B	Test point interrupt is on.
47	B	External interrupt is on.

DATA COMM DIAGNOSIS - 3.0 - SYNCHRONOUS

48	B	Memory timeout interrupt failed to clear.
49	B/P	Panel interrupt will not clear.
4A	B	Timer interrupt will not clear.
4B	B	HP250 interrupt will not clear.
4C	B/P	SIO interrupt will not clear.
4D	B	DMA interrupt will not clear.
4E	B	The out register flip-flop failed to clear.
4F	C/P	The connector panel is not in place (Check cable connection.)
50	P	The Universal Asynchronous Receiver Transmitter (UART) chip failed to reset.
51	B/P	The Auto Calling Unit (ACU) signature was not read properly.
52	B/P	The DTRA signal failed to wiggle.
53	P	The UART will not send and/or receive.
54	B/P	The UART will not send and/or receive correctly.
55	B/P	The UART has a parity problem.
56	B/P	The UART has overrun error problems.
57	P	Panel transmit interrupt problems.
58	P	Panel receive interrupt problems.
59	B	Timer channel 0 failed self test, INT never sent.
5A	B	Timer channel 0 failed accuracy test.
5B	B	Timer channel 1 failed self test.
5C	B	Timer channel 2 failed self test.
5D	B	The SIO failed to reset.
5E	B	The SIO failed to write and read the interrupt vector.
5F	B	The SIO will not send and/or receive.
60	B/P	Channel B transmit interrupt problems.

DATA COMM DIAGNOSIS - 3.0 - SYNCHRONOUS

- 61 B/P Channel B external/status interrupt problems.
- 62 B/P Channel B receive interrupt problems.
- 63 B/P Channel B special receive interrupt problems.
- 64 B/P Channel A transmit interrupt problems.
- 65 B/P Channel A external/status interrupt problems.
- 66 B/P Channel A receive interrupt problems.
- 67 B/P Channel A special receive interrupt problems.
- 68 B/P The SIO has frame error problems.
- 69 B/P The SIO has CRC/framing error problems.
- 6A B/P The SIO has overrun error problems.
- 6B B/P The SIO has parity error problems.
- 6C B/P SIO special receive-internal conflict (or no interrupt on.)
- 6D B/P Incorrect character sent and/or received.
- 6E B/P Receive bit in channel B did not set.
- 6F B/P Break generation/detection and/or external/status interrupt error.
- 70 B/P Break bit in SIO was not set properly.
- 71 B External/status interrupt cannot be reset and/or turned off.
- 72 B "Status affects vector" internal problems.
- 73 B/P Nulls never seen in record FIFO after break.
- 74 B The DMA controller failed to reset.
- 75 B The DMA interrupt set at the wrong time (channel 2.)
- 76 B The DMA interrupt never set. Neither did the TC bit.
- 77 B The DMA interrupt never set, but the internal TC bit did.
- 78 B Wrong data was transferred to memory (channel 2.)

DATA COMM DIAGNOSIS - 3.0 - SYNCHRONOUS

79	B	The DMA interrupt was set, but the internal TC bit(s) did not.
7A	B/P	Character was never received through SIO (channel 1.)
7B	B/Mem	Wrong character sent through DMA to SIO.
7C	B	DMA interrupt never set. Neither did TC bit (channel 1.)
7D	B/P	Time-out on full DMA block transfer through SIO.
7E	B	Bad data in block transfer.

Software Diagnostic Tools

Integrated Diagnostic Utility (IDU)

The IDU is a stand-alone diagnostic used to test the INP hardware. It does so through a series of three separate tests, each of which can be allowed to run for an indefinite amount of time: Commanded Self-Test, Connector Loop-Back, and Modem Loop-Back. Each test down-loads a control program onto the INP controller board, which then tests some portion of the hardware. IDU requires exclusive use of the INP. This utility is fully documented in the RJE and DS/250 manuals.

CTRACE/CSDUMP

CTRACE is the trace facility for the INP. It consists of a program that runs in the background while the INP is in use, accepting and storing to disc trace records sent to it from the INP (actually from the CS250 software.) These trace records are generated whenever certain board activities complete. The contents of this trace file can be formatted into report form by CSDUMP. The trace facility is used for diagnostic purposes, and resides in a separate DROM. This DROM must be resident in memory before the link can be used if the TRACE option is specified in the configuration file. This utility is fully documented in the RJE and DS/250 manuals.

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Section 471

DATA COMM TOOLS

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2.0 1640

(This section has not yet been written.)

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Section 500

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 - 3.0 IBM 3740 1/4M Byte Format
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 - 3.2 Sector 5 (Error Map Sector)
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 - 3.4 Data Set Headers

Section 501

PERIPHERALS OVERVIEW

This chapter contains the information necessary to configure and isolate faults in the peripherals supported on the HP 250:

- 510 DISC CONFIGURATION - how to configure a 7902A/9895K, 7906H/7906M/7906S, 7910K, 7908P, 7911P, 7912P, or 5/10/15 MB Disc for an HP 250, and how to prepare media (format and/or initialize) for each drive
- 511 TERMINAL CONFIGURATION - how to configure a 2649D, 2622D, 264x, or 262x for an HP 250
- 512 PRINTER CONFIGURATION - how to configure a 9871A, 2631A/2631B, 2608A, 2601A, 2602A, 82905B, 293xA, 2563A or 2687A for an HP 250
- 513 PLOTTER CONFIGURATION - how to configure a 7220, 7221, 7225 , or 7470 for an HP 250
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PERIPHERALS OVERVIEW

- 522 PRINTER DIAGNOSIS - how to isolate faults on the printers supported on the HP 250
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DISC CONFIGURATION

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DISC CONFIGURATION - 1.0 - 7902A/9895K

1.0 7902A/9895K

Four sets of drive assemblies/controllers have been used on the HP 250 with the final set currently being used on new systems.

Oldest Configuration

7902A (old drive)
 |

(Shugart
Tricompliant with
HP 250 drive board)
45000-68811

 HP 250 MCC
 Controller
 45000-66510

Present Configurations

7902A (common drive)
 |

(Shugart Tricompliant
with HP drive board)
45000-67914

 | | | |

 | | | |

 HP 250 MCC HP 250 Z80
 Controller Controller
 45000-66510 07902-66520

9895K
 |

(CDC or Shugart
Bi-compliant
with industry
standard drive
board)
09895-67914

 Z80 Controller
 07902-66510

The following combinations of drives on the HP 250 are valid:

Unit 0	Unit 1	Unit 2	Comments
-----	-----	-----	-----
old			Old drives only
old	old		"
old	old	old	"
old	common		One old, one common
common	old		"
old	old	common	Two old, one common
common	old	old	"
old	common	common	One old, two common
common	common	old	"
common	common		Common drives only
common	common		"
common	common	common	"
new			New drives only

DISC CONFIGURATION - 1.0 - 7902A/9895K

The following configuration procedure is for the 7902A/9895K:

- 1) Power off the HP 250.
- 2) Verify that the drive configuration is one of those shown in the table on the previous page. Refer to Service Note 01 and the HP 250 Diagrams Book for details on cables.

WARNING

Using a 9895K drive and a 7902A drive ("old" or "common") together on a system can cause component damage. Only use those configurations shown on the previous page.

- 3) a) For a 7902A, set the unit number to the appropriate value (0, 1, or 2). On a "Common" drive, set the system select switch to "250" (not to "7902").
- b) For a 9895K, set the drive select switch as follows:

(always unit 0 on the HP 250)

switch	1	2	3	4	5	6	7	8
	off	off	off	on	off	off	off	on

Note: Slide DIP switches are set by positioning the lever to the desired side.

Rocker DIP switches are set by PRESSING DOWN ON THE DESIRED SIDE, so the depression is on the desired side.

The HP-IB address of the floppy has been hardwired in the controller to be 6.

- 4) Connect the Floppy Controller Cable, then the flat ribbon cable between the Controller Board and the HP-IB Board.
- 5) Power-on the HP 250.
- 6) Insert the CE System Support Disc. Enter the command CAT for each drive to verify the configuration.

2.0 7906H/7906M/7906S

The following configuration procedure is for the 7906:

- 1) Power off the HP 250.
- 2) a) On a 7906H, set the HP-IB address on the front panel to the desired address between 0 and 5 (be sure it is not the same as that of any other device on the HP-IB).
b) On a 7906M, set the unit select switch on the front panel to unit 0. Set the CPU number on the HP-IB Interface board to 0. Set the HP-IB address on the HP-IB Interface board to the desired address between 0 and 5 (be sure it is not the same as that of any other device on the HP-IB).
c) On a 7906S, set the unit select switch on the front panel to unit 1. Connect an HP-IB cable between the 7906S and 7906M.
- 3) Connect the HP-IB cable to the 7906 and the HP 250.
- 4) Power-on the HP 250.
- 5) Insert a cartridge into the drive and set the RUN/STOP switch to RUN. Run the program on the following page to verify the configuration.

DISC CONFIGURATION - 2.0 - 7906H/7906M/7906S

The following program creates a file "TEMP" containing 2000 records on the fixed platter of the 7906. All records are written with CHECK READ on. All records are then read and the data is compared to verify successful reads. The file is then purged. (The purpose of this program is to check out the disc configuration.)

```
10 DIM A$[256],B$[256]
20 DISP "CREATING FILE TEMP:D"
30 FCREATE "TEMP:D",2000,256
40 DISP "ASSIGNING FILE TEMP:D AS #1"
50 ASSIGN "TEMP:D" TO #1
60 CHECK READ
70 A$=RPT$("U",256)
80 DISP "WRITING TO FILE"
90 FOR I=1 TO 2000
100 PRINT #1,I;A$
110 NEXT I
120 DISP "READING FROM FILE"
130 FOR I=1 TO 2000
140 B$=""
150 READ #1,I;B$
160 IF A$<>B$ THEN
170 DISP "VALUES DID NOT COMPARE IN RECORD ";I
180 DISP A$,B$
190 DISP "BE SURE TO PURGE FILE TEMP:D"
200 STOP
210 ENDIF
220 NEXT I
230 DISP "SUCCESSFUL WRITING AND READING"
240 ASSIGN * TO #1
250 PURGE "TEMP:D"
260 DISP "FILE TEMP:D IS NOW PURGED"
270 END
```

3.0 7910K

The following configuration procedure is for the 7910K:

- 1) Power off the HP 250.
- 2) Set the Device Address switch on the DSU Control Board (directly above the 7910 mechanism) to setting 7. (It must be set to this address in order to be able to load the operating system from the 7910.)
- 3) Connect the HP-IB cable to the 7910K and the HP 250.
- 4) Power-on the HP 250 (use the on/off key; the POP switch will not initiate self-test on the 7910).
- 5) Run "EX7910" from the CE System Support disc or tape cartridge to verify the configuration of the 7910K. (This program creates 2000 records in a workfile on the disc, puts the record number into each record, then reads back the entire file. The work file is then purged.)

DISC CONFIGURATION - 4.0 - 7908P, 7911P, 7912P

4.0 7908P, 7911P, 7912P

The following configuration procedure is for the 7908P, 7911P, and 7912P:

- 1) Power off the HP 250.
- 2) Set the switches on the back of the 7908P, 7911P, or 7912P to the desired device address between 0 and 5 (be sure it is not the same address as that of any other peripheral on the HP-IB):

Device Address	7908P Switch				7911P or 7912P Switch		
	1	2	3	4	1	2	3
0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	1
2	0	0	1	0	0	1	0
3	0	0	1	1	0	1	1
4	0	1	0	0	1	0	0
5	0	1	0	1	1	0	1

- 3) Connect the HP-IB cable to the disc and the HP 250. On the 7911P and 7912P, the LOWER HP-IB connector (labeled DISC) is to be used (the upper connector labeled TAPE is not used on the single controller version of the discs supported on the HP 250).
- 4) Plug in and power on the 7908P, 7911P, or 7912P. Verify that the value shown on the LED on the disc is "P".
- 5) Power on the HP 250.
- 6) Run "EXRSIZ" from the CE System Support disc or tape cartridge to verify the configuration of the disc. (This program is identical to the External Exerciser that has been implemented on the HP-85. Refer to the External Exerciser Reference Manual published by Disc Memory Division for details on running the exerciser and error code interpretation. A summary of the commands is given in the Disc Diagnosis Section [section 520].)

DISC CONFIGURATION - 5.0 - 5/10/15 MB DISC

5.0 5/10/15 MB DISCS

There are several different versions of the intergrated winchester disc drive and disc controllers which are supported by the HP 250. Unfortunately not all of the disc controllers are compatible with all of the different drives. The tables listed below will help clarify the compatibility between the drives and controllers:

Drive #	Controllers			Comments
	88134-69910	09133-66504	09133-66508	
506	X	X	N/A	Original dual platter 4.7 Mb drive when used with the MSC controller, the controller must have L code (single 4.7 Mb volume) & hardware modification (unique part # assigned to controllers used in HP 250s).
406	N/A	X	X	Single platter 4.7 Mb drive.
412	N/A	X	X	Dual platter 9.7 Mb drive.
419	N/A	N/A	X	Triple platter 14.7 Mb drive.

Device Identifier Jumper Settings

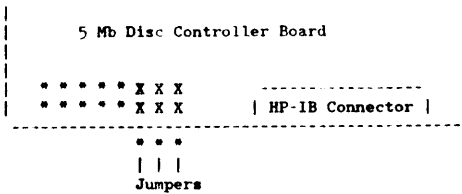
Disc Drive	Controller					
	09133-66504			09133-66508		
	3	2	1	A	B	C
4.7 Mb (St 506) 88134DT		X		-	-	-
4.7 Mb (St 406) 88234DT #005		X	X	X	X	
9.7 Mb (St 412) 88234DT #010	X	X	X	X	X	X
14.7 Mb (St 419) 88234DT #015	-	-	-	X		X

NOTE: "X" = Jumper in place.
 "-" = Not Applicable.

DISC CONFIGURATION - 5.0 - 5/10/15 MB DISC

The following configuration procedure is for the 5 Mb Disc:

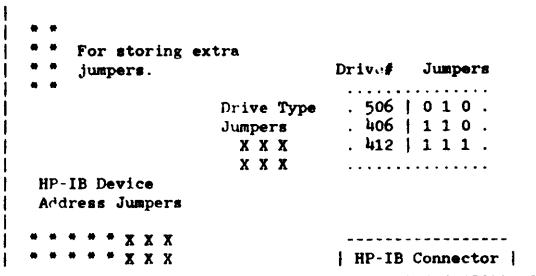
- 1) Power off the HP 250.
- 2) Place jumpers on the controller board of the 5 Mb Disc as shown below. This will set the address for the disc to 7 which is required by the HP 250.



- 3) Connect the HP-IB cable to the 5 Mb Disc and the HP 250.
- 4) Power-on the HP 250.

The following configuration procedure is for the 5/10 Mb Discs using the 09133-66504 controller:

- 1) Power off the HP 250.
- 2) Place jumpers on the controller board as required, the jumpers for configuring the HP-IB device address should be set as shown (address 7).



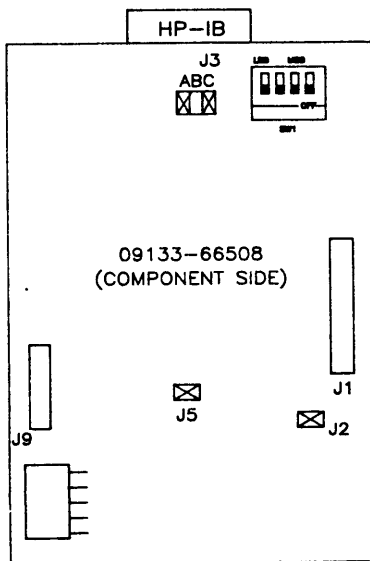
X=Jumpers installed

DISC CONFIGURATION - 5.0 - 5/10/15 MB DISC

- 3) Connect the HP-IB cable to the controller and the HP 250.
- 4) Power-on the HP 250.

The following configuration procedure is for the 5/10/15 Mb discs, using the 09133-66508 controller:

- 1) Power off the HP 250.
- 2) Place the A,B, and C jumpers on the controller board as required, using the Device Identifier Jumper Settings table.
- 3) Connect the HP-IB cable to the controller and to the HP 250.
- 4) Power-on the HP 250.



Controller Board, Part No. 09133-66508

DISC CONFIGURATION - 6.0 - MEDIA PREPARATION

6.0 MEDIA PREPARATION

There are 5 utilities on the HP 250 related to media preparation:

- FORMAT** - Used on a 7906 and 7910
- Rewrites the disc address, SPD bits, and the data fields on all tracks
 - Tracks (including those marked defective or spare) are rewritten with known patterns
 - Each track is verified (with VERIFY)
 - Test patterns are written and verified
 - in the short format, one pattern used
 - in the normal format, three patterns are used
 - Following pattern tests, any track giving errors are marked as defective
 - Note: no sparing is performed
- CE INIT** - Used on a 7902, 9895, 7906, 7910, 5/10/15 Mb Disc
- Writes a know pattern to all tracks on the media
 - Writes a CE disc identifier in Record 0
 - Note: Flex discs must be initialized before using CE INIT.
 - Note: If **FORMAT** has marked a track as defective, it must be spared or the disc must be HP initialized (using **INIT**) before running **CE INIT** since **CE INIT** does not spare tracks.
 - Note: A disc that has been **CE INIT**ialized cannot be used for standard I/O (except through the Mass Memory Commands) until is it re-initialized with **INIT**.
- TRACK MAP** - Used on a 7906 and 7910
- Builds a map of defective, spare, and abnormal tracks
 - Results can be displayed or printed
- TSPARE** - (Track Sparing)
- Used on a 7906 and 7910
 - Allows for sparing of tracks that are NOT marked defective
 - Head and track number is entered into the program, and the program attempts to read data from the track
 - If the data can be recovered, a spare track is located and the data is copied into the spare. The bad track is marked defective and points to the spare.
 - If the data cannot be recovered, all files are checked
 - If the track is within a file, the file must be purged before the track can be spared.
 - If the track is not within a file, dummy data is written to the spare and the bad track is marked defective and points to the spare

DISC CONFIGURATION - 6.0 - MEDIA PREPARATION

- INIT - On a 7906 and 7910,
- Performs a verification on all tracks
 - Tracks marked as spare or protected rewritten with SFD bits = 0
 - Tracks marked as defective reinitialized as defective with the address of a corresponding spare track, and the corresponding spare track is initialized
 - After verification and sparing is complete, Record 0, the directory, and availability table are written to the disc
- On a 7902 and 9895,
- Perform a long format with interleave of 1
 - Write and verify 4 data patterns
 - Flag any defective tracks (sparing occurs automatically)
 - Perform a short format with the desired interleave
 - Write and verify 1 data pattern
 - Flag any defective tracks (sparing occurs automatically)
 - Write out Record 0, the directory, and availability table
- On a 7908, 7911, or 7912 disc,
- Run internal diagnostics
 - Read the run-time error log
 - Spare any blocks that have more than 1 occurrence of errors or have had any uncorrectable data errors
 - Before actual sparing on a block, perform the sector and track error rate testing
 - Format the disc using the appropriate interleave
 - Clear all error rate logs
 - Perform 8 pattern error rate tests
 - Spare any blocks found defective (and perform the sector and track error rate tests)
 - Write out Record 0, the directory, and availability table
- On a CS'80 tape cartridge,
- Run internal diagnostics
 - Read the run-time error log
 - If the tape has not been certified, run the error rate test with automatic sparing
 - If the tape has been certified, spare any blocks shown as defective in the error log, and convert "jump spares" (sparing through a look-up table) into skip spares" (use the next available block, similar to the floppy sparing)
 - Write out Record 0, the directory, and availability table

DISC CONFIGURATION - 6.0 - MEDIA PREPARATION

INIT - On a 5/10/15 Mb Disc.

- Perform a format
- Write and verify 1 data pattern (sparing of a sector will be performed automatically by the controller)
- Write out Record 0, the directory, and availability table

Procedure to Prepare Media

To prepare a 7902A or 9895K:

- 1) Run INIT

To prepare a 7910K:

- 1) Run TRACK MAP
- 2) Run FORMAT
- 3) Run INIT (and increase the size of the directory)
- 4) Run TSPARE and spare out any tracks shown as defective from TRACK MAP that were not marked as defective by FORMAT and were not spared by INIT

To prepare a 7906 (H, M, or S)

- 1) Run TRACK MAP
- 2) Run FORMAT
- 3) Run INIT
- 4) Run TSPARE and spare out any tracks shown as defective from TRACK MAP that were not marked as defective by FORMAT and were not spared by INIT

To prepare a 7908P, 7911P, or 7912P (disc and cartridge tape)

- 1) Run INIT

To prepare a 5 Mb Disc

- 1) Run INIT

-hp-

TERMINAL CONFIGURATION

Section 511

TERMINAL CONFIGURATION

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1.C	2649D
2.C	2622D
3.C	264x
4.C	262x

TERMINAL CONFIGURATION - 1.0 - 2649D

1 0 2649D

The following configuration procedure is for the 2649D:

- 1) Power off the HP 250.
- 2) Connect the 2649D to the desired port on the ASI (refer to the Data Comm Configuration section for details on cables and port configuration).
- 3) Strap the Keyboard Interface Board (02640-60123) as follows:

A-H closed
J-N closed
P-X closed
Y open
Z closed
all others closed

- 4) Strap the I/O Interface Board (one of the following three) as follows:

- a) Standard asynchronous communication interface (02640-60086)

No strapping required

- b) General purpose asynchronous communication interface (02640-60089)

A9 closed
A10 closed
A11 closed
CBE closed
NOSB closed
all others open

- c) Extended asynchronous communication interface (02640-60143)

A9 closed
A10 closed
A11 closed
CBE closed
NOSB closed
all others open

d) Display Enhancement Board (02640-60024)

Jumper	W1	W2	W3-W6
Setting	closed	open	closed

e) Display Memory Access Board (02640-60124)

Jumper	MSBI
Setting	closed

f) Display Control Board (02640-60112)

There is only one jumper, it must be closed for the 2649D.

g) Processor Board (02640-60209)

Jumper	CLR	all others
Setting	open	closed

h) 8k Display RAM Board (02640-60101)

Jumper	8K	16K	32K
Setting	open	open	open

i) Universal Memory Board (02640-60171)

Jumper	SW1-2,3,4 & SW2-5,8	
Setting	closed	all others are open

j) New Extended Async Interface (02640-60239)

All switches are closed

TERMINAL CONFIGURATION - 1.0 - 2649D

- 5) Under the keyboard overlay, verify the following settings:

DUPLEX: FULL
PARITY: ODD
BAUD RATE: as needed (factory set to 9600)

- 6) Set the baud rate select switch on the ASI Board in the Card Cage for the appropriate port to the position corresponding to the baud rate set on the 2649D in step 4. (See the Data Comm Configuration section for details.)
- 7) Plug in and power on the 2649D.
- 8) Power on the HP 250.
- 9) Run "CONFIG".

- a) Select REMOTE I/O and configure the 2649D on the appropriate port as

Class: Workstn
Type: 2649
TSKID: as needed
Memory: as needed

- b) Select DROM EDIT and configure in the following DROM:

RIO

- 10) Power off the HP 250, then power it back on. This is necessary for the new configuration to take effect.
- 11) Run "TEST" or "CE" and select DISPLAY TEST to verify the configuration of the 2649D and the associated task.

For configuration of a remote printer on the 2649D, refer to the Printer Configuration section (section 512).

2.0 2622D

The following configuration procedure is for the 2622D:

- 1) Power off the HP 250.
- 2) Connect the 2622D to the desired port on the ASI (refer to the Data Comm Configuration section for details on cables and port configuration).
- 3) Plug in and power on the 2622D.
- 4) Press SHIFT F1 (function key 1) to obtain the configuration menu. Set the parameters as follows:

Baud Rate: as needed (9600 is default)
Hz: 60 or 50 (60 is default)
Minus Key: MINUS or TAB (MINUS is default)
(used to indicate function of the minus key
on the data entry pad)
Modem Key: ACTIVE or INACTIVE (INACTIVE is default)
(if set as ACTIVE, pressing the PHONE key
will disconnect/connect from/to a modem)
CHARS/LINE: 80 or 132 (80 is default) (appears only
if the 2622D has the optional thermal
printer)

- 5) Set the baud rate select switch on the ASI Board in the Card Cage for the appropriate port to the position corresponding to the baud rate set on the 2622D in step 4. (See the Data Comm Configuration section for details.)
- 6) Power on the HP 250.
- 7) Run "CONFIG".
 - a) Select REMOTE I/O and configure the 2622D on the appropriate port as

Class: Workstn
Type: 2622
TSKID: as needed
Memory: as needed

- ol style="list-style-type: none;">- b) Select DROM EDIT and configure in the following DROM:

RIO

TERMINAL CONFIGURATION - 2.0 - 2622D

- 8) Power off the HP 250, then power it back on. This is necessary for the new configuration to take effect.
- 9) Run "TEST" or "CE" and select DISPLAY TEST to verify the configuration of the 2622D and the associated task.

3.0 264x

The following configuration procedure is for the 264x (refer to section 1.0 for the 2649D):

- 1) Power off the HP 250.
- 2) Connect the 264x to the desired port on the ASI (refer to the Data Comm Configuration section for details on cables and port configuration).
- 3) Strap the Keyboard Interface Board (02640-60123) as follows:

A-H closed
J-N closed
P-X closed
Y open
Z closed
all others closed

- 4) Strap the I/O Interface Board (one of the following three) as follows:

- a) Standard asynchronous communication interface (02640-60086)

No strapping required

- b) General purpose asynchronous communication interface (02640-60089)

A9 closed
A10 closed
A11 closed
CBE closed
NOSB closed
all others open

- c) Extended asynchronous communication interface (02640-60143)

A9 closed
A10 closed
A11 closed
CBE closed
NOSB closed
all others open

TERMINAL CONFIGURATION - 3.0 - 264x

d) Display Enhancement Board (02640-60024)

Jumper	W1	W2	W3-W6
-----	-----	-----	-----
Setting	closed	open	closed

e) Display Memory Access Board (02640-60124)

Jumper	MSBI
-----	-----
Setting	closed

f) Processor Board (02640-60209)

Jumper	CLR	all others
-----	-----	-----
Setting	open	closed

g) 8k Display RAM Board (02640-60101)

Jumper	8K	16K	32K
-----	-----	-----	-----
Setting	open	open	open

h) Universal Memory Board (02640-60171)

Jumper	SW1-2,3,4 & SW2-5,8	
-----	-----	
Setting	closed	all others are open

i) New Extended Async Interface (02640-60239)

All switches are closed

- 5) On the keyboard, set the DUPLEX, PARITY, and BAUD RATE as follows:

```
DUPLEX: FULL
PARITY: NONE
BAUD RATE: as needed
```

- 6) Set the baud rate select switch on the ASI Board in the Card Cage for the appropriate port to the position corresponding to the baud rate set on the 264x in step 5. (See the Data Comm Configuration section for details.)
- 7) Plug in and power on the 264x.
- 8) Power on the HP 250.
- 9) Run "CONFIG".

- a) Select REMOTE I/O and configure the 264x on the appropriate port as

```
Class: Terminal
Type: 264x
Format: 8N1
```

- b) Select DROM EDIT and configure in the following DROM:

TIO

- 10) Power off the HP 250, then power it back on. This is necessary for the new configuration to take effect.

- 11) Enter and run the following program to check the configuration:

```
10 INPUT "ENTER PORT NUMBER OF DEVICE UNDER TEST";Port
20 P=Port + 10
30 REQUEST P
40 Pr: PRINTER IS P
50 PRINT "ENTER DATA AND PRESS RETURN KEY."
60 ON INPUT #P GOTO In
70 WAIT
80 In: PRINTER IS 8
90 DISP AREAD$(P)
100 WAIT 1000
110 GOTO Pr
120 END
```

This program outputs ENTER DATA AND PRESS RETURN KEY to the terminal. Data entered at the terminal is then transferred to the HP 250 and displayed on the CRT.

Press HALT to stop the program.

TERMINAL CONFIGURATION - 3.0 - 264x

Note: When using a modem with the 264x, you must cause the HP 250 to present "DTR" by executing a request port command before attempting to dial (e.g. for port 2, issue "REQUEST 12"; note that the device address used is the port number plus 10).

4.0 262x

The following configuration procedure is for the 262x (refer to section 2.0 for the 2622D):

- 1) Power off the HP 250.
- 2) Connect the 262x to the desired port on the ASI (refer to the Data Comm Configuration section for details on cables and port configuration).
- 3) Plug in and power on the 262x.
- 4) Configure the terminal through the menu obtainable from the keyboard. Refer to the service manual for the terminal for details. Set PARITY as desired.
- 5) Set the baud rate select switch on the ASI Board in the Card Cage for the appropriate port to the position corresponding to the baud rate set on the 262x in step 4. (See the Data Comm Configuration section for details.)
- 6) Power on the HP 250.
- 7) Run "CONFIG".
 - a) Select REMOTE I/O and configure the 262x on the appropriate port as
 - Class: Terminal
 - Type: 264x
 - Format: 8x1 (x = N, E, or O depending on the parity set in step 4)
 - b) Select DROM EDIT and configure in the following DROM:

TIO
- 8) Power off the HP 250, then power it back on. This is necessary for the new configuration to take effect.

TERMINAL CONFIGURATION - 4.0 - 262x

- 9) Enter and run the following program to verify the configuration:

```
10     INPUT "ENTER PORT NUMBER OF DEVICE UNDER TEST";Port
20     P=Port + 10
30     REQUEST P
40 Pr:  PRINT "ENTER DATA AND PRESS RETURN KEY."
50     ON INPUT #P GOTO In
60     WAIT
70     In:  PRINT IS 8
90     DISP AREAD$(P)
100    WAIT 1000
110    GOTO Pr
120    END
```

This program outputs ENTER DATA AND PRESS RETURN KEY to the terminal. Data entered at the terminal is then transferred to the HP 250 and displayed on the CRT.

Press HALT to stop the program.

- Note: When using a modem with the 262x, you must cause the HP 250 to present "DTR" by executing a request port command before attempting to dial (e.g. for port 2, issue "REQUEST 12"; note that the device address used is the port number plus 10).

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Section 512
PRINTER CONFIGURATION

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PRINTER CONFIGURATION - 1.0 - 9871A

1.0 9871A

The following configuration procedure is for the 9871A:

- 1) Power off the HP 250.
- 2) Open the HP-IB Interface access door on the 9871A to gain access to the switches.
- 3) Set the address switches to a device address between 1 and 7, using the following table (be sure it is not the same address as that of any other peripheral on the HP-IB):

Device Address	Switch 1	2	3	4	5
1	1	0	0	0	0
2	0	1	0	0	0
3	1	1	0	0	0
4	0	0	1	0	0
5	1	0	1	0	0
6	0	1	1	0	0
7	1	1	1	0	0

Note: The ON position on a switch corresponds to the value 0, and OFF to a value of 1.

- 4) Set the Parallel Poll Message Switch as follows:
 - a) For printers without Identify, set to the same value as the device address
 - b) For printers with Identify, set to the device address value plus one (1)
- 5) For printers without Identify
 - a) Set the Mode Switch to ON (addressable mode)
 - b) Set the Parallel Poll Sense Switch to positive (+)
- 6) Close the HP-IB Interface access door.
- 7) Connect the HP-IB cable to 9871A and the HP 250.

PRINTER CONFIGURATION - 1.0 - 9871A

- 8) Plug in and power on the 9871A.
- 9) Power on the HP 250.
- 10) Run "CONFIG"
 - a) Select DROM EDIT and configure in the following DROM if required:

EUR71

- 11) Power off the HP 250, then power it back on (this is necessary for the new configuration to take effect).
- 12) Run "TEST" or "CE" and select PRINTER TEST to verify the configuration of the 9871A.

PRINTER CONFIGURATION - 2.0 - 2631A/2631B

2.0 2631A/2631B

The following procedures are for the three possible configurations of a 2631A or 2631B printer on the HP 250.

For all procedures, first strap the printer logic board as follows:

a) For a 2631A,

S1 closed (11" paper)
S2 closed = only one character set present
 open = alternate character set present
S3 open (Shift In/Shift Out used)
S4 don't care (not connected)

b) For a 2631B,

S1 open (11" paper)
S2 open (disable speed test)
S3 open (escape sequence mode)
S4 open (escape sequence mode)

The procedures for the three different configurations begin on the next page.

PRINTER CONFIGURATION - 2.0 - 2631A/2631B

I. Procedure for 2631A or 2631B as a system printer on the HP-IB:

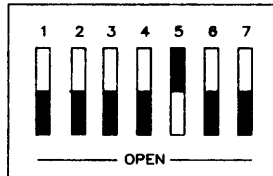
- 1) Power off the HP 250.
- 2) Set the switches on the back of the printer to the desired device address. Be sure it is not the same address as that of any other peripheral on the HP-IB.

Device Address	Switch 1	2	3	4	5	6(LA)	7(SRQ)
0	0	0	0	0	0	0	0
1	0	0	0	0	1	0	0
2	0	0	0	1	0	0	0
3	0	0	0	1	1	0	0
4	0	0	1	0	0	0	0
5	0	0	1	0	1	0	0
6	0	0	1	1	0	0	0
7	0	0	1	1	1	0	0

where OPEN on the printer corresponds to 0 in the table

Note: Switches 1 through 5 are for the device address. Switch 6 (LA) and switch 7 (SRQ) must be set to OPEN.

The switch shown below is set to device address 1.



- 3) Connect the HP-IB cable to the printer and the HP 250.
- 4) Plug in and power on the printer.
- 5) Power on the HP 250.
- 6) Run "TEST" or "OE" and select PRINTER TEST to verify the configuration of the printer.

PRINTER CONFIGURATION - 2.0 - 2631A/2631B

II. Procedure for 2631A or 2631B as a local printer to a 2649D:

- 1) Power off the HP 250 and 2649D.
- 2) Set the switches on the back of the printer to the OPEN position (this corresponds to HP-IB device address 0, and the LA and SRQ switches at 0).
- 3) Connect the HP-IB cable to the printer and 2649D.
- 4) Plug in and power on the printer.
- 5) Power on the 2649D.
- 6) Turn the printer on-line.
- 7) Power on the HP 250.
- 8) Run "TEST" or "CE" and select PRINTER TEST to verify the configuration of the printer.

Note: When using a 2631B as a local printer on a 2649D, the ROM P/N 1818-1551 must be installed in socket #8 on the Control Memory PCA in the 2649D. ROM P/N 1818-0768 will not work correctly.

To access the printer, the command PRINTER IS 10, PRINT ALL IS 10, or SYSTEM PRINTER IS 10 must be issued.

PRINTER CONFIGURATION - 2.0 - 2631A/2631B

III. Procedure for 2631A or 2631B as a system printer on RS-232.

- 1) Power off the HP 250.
- 2) Connect the printer to the desired port on the ASI (refer to the Data Comm Configuration section for details on cables and port configuration).
- 3) Set the baud rate select switch on the ASI board in the Card Cage for the appropriate port to the position corresponding to the baud rate set on the printer. (See the Data Comm Configuration section for details.)
- 4) Set the switches on the RS-232 connector on the printer as follows:

switch 1	closed	(disable XON/XOFF)
2	open	(enable ENQ/ACK)
3	closed	(normal SCA line operation)
4	closed	(normal SCA line operation)
5	closed	(normal CD line operation)
6	closed	(normal CD line operation)
7	open	(external CB signal not required)
8	closed	(disable auto modem disconnect)
- 5) Ensure that Jumper W9 is in place on the RS 232 Maximum Interface PCA (part no. 02631-60009).
- 6) Plug in and power on the printer.
- 7) Power on the HP 250.
- 8) Run "CONFIG".
 - a) Select REMOTE I/O and configure the printer on the appropriate port as

Class:	Printer
Type:	264x
Format:	8N1
 - b) Select DROM EDIT and configure in the following DROM:

TIO

- 9) Power off the HP 250, then power it back on. This is necessary for the new configuration to take effect.
- 10) Run "TEST" or "CE" and select PRINTER TEST to verify the configuration of the printer.

PRINTER CONFIGURATION - 3.0 - 2608A

3.0 2608A

The following configuration procedure is for the 2608A:

- 1) Power off the HP 250.
- 2) Set the switches on the back of the 2608A to the desired device address. Be sure it is not the same address as that of any other peripheral on the HP-IB.

Device Address	Switch	5	4	3	2	1
0		0	0	0	0	0
1		0	0	0	0	1
2		0	0	0	1	0
3		0	0	0	1	1
4		0	0	1	0	0
5		0	0	1	0	1
6		0	0	1	1	0
7		0	0	1	1	1

where ON at the printer corresponds to 1 in the table.

Note: On the 2608A's HP-IB interface, make sure that jumper W11 - W12 is installed. This disables HP-IB command Parity Error checking.

- 3) Set the primary and secondary language switches on the front panel of the 2608A as follows:

Character Set	Binary	Character Set	Binary
USASCII	0000	German	1001
Arabic	0001	Swedish/Finnish	1010
Cyrillic	0010	Danish/Norwegian	1011
Katakana	0011	Spanish	1100
Draw	0100	British	1101
French	1000	Roman Extension	1111

- 4) Connect the HP-IB cable to the printer and the HP 250.
- 5) Plug in and power on the printer.
- 6) Power on the HP 250.

- 7) Run "CONFIG"
 - a) Select DROM EDIT and configure in the following DROM:
P2608
 - b) Select PERIPHERAL EDIT and edit the select code for the printer as follows:
Driver Number: 1 (P2608)
Form length: the number of lines per page
Lines per inch: 6 or 8
- 8) Power off the HP 250, then power it back on. This is necessary for the new configuration to take effect.
- 9) Run "TEST" and "CE" and select PRINTER TEST to verify the configuration of the printer.

PRINTER CONFIGURATION - 4.0 - 2601A

4.0 2601A

The following configuration procedure is for the 2601A:

- 1) Power off the HP 250.
- 2) Connect the 2601A to the desired port on the ASI (refer to the Data Comm Configuration section for details on cables and port configuration).
- 3) Open the 2601A to gain access to PCA HPRO5 in the back of the printer.
 - a) Set the control switches as follows:

switch 1:	X	(don't care)	
switch 2:	on	(enables XON/XOFF)	
switch 3:	see	baud rate table below	
switch 4:	see	baud rate table below	
switch 5:	see	baud rate table below	
switch 6	7	8	meaning
---	---	---	-----
off	off	off	default (typewriter paired)
on	off	off	typewriter paired
off	on	off	logical bit paired
on	on	off	APL
off	off	on	French AZERTY
on	off	on	German
off	on	on	Scandinavian
on	on	on	Norsk

- 4) On the operator control panel, set the Printwheel Select rotary switch to the setting corresponding to the type of printwheel used.
- 5) On the operator control panel, set the spacing/self-test rotary switch to a setting from 0 through 3, corresponding to the desired spacing.
- 6) Set the left set of DIP switches on the operator control panel to the off position (to the front of the 2601A).

PRINTER CONFIGURATION - 4.0 - 2601A

- 7) Set the right set of DIP switches on the operator control panel as follows ("off" position is to the front of the 2601A).
- Full Duplex: on
 - Parity Enable: on for even or odd parity, off for no parity
 - Baud 30: as needed
 - Switch 4: off (switch is unused)
 - Baud 120: as needed
 - Even Parity: on for even parity, off for odd or no parity
 - Paper Out Defeat: off (allows detecting paper out condition)
 - Switch 8: off (switch is unused)

Summary of baud rates:

On operator control panel Rate	On operator control panel		On PCA HPR05 inside the 2601		
	Baud 30	Baud 120	Switch 3	Switch 4	Switch 5
110	On	On	--	--	--
300	On	Off	--	--	--
600	Off	Off	On	Off	Off
1200	Off	On	--	--	--
1800	Off	Off	Off	On	Off
2400	Off	Off	Off	Off	On
4800	Off	Off	On	Off	On
9600	Off	Off	On	On	On

- 8) Set the baud rate select switch on the ASI board in the Card Cage for the appropriate port to the position corresponding to the baud rate set on the 2601A in step 6. (See the Data Comm Configuration section for details.)
- 9) Plug in and power on the 2601A.
- 10) Power on the HP 250.

PRINTER CONFIGURATION - 4.0 - 2601A

11) Run "CONFIG"

- a) Select REMOTE I/O and configure the 2601A on the appropriate port as

- Class: Printer
 - Type: 2601
 - Format: 8N1 (if no parity)
 - 7E1 (if even parity)
 - 7O1 (if odd parity)

- b) Select DROM EDIT and configure in the following DROMS:

- TIO
 - P2601

- 12) Power off the HP 250, then power it back on. This is necessary for the new configuration to take effect.
- 13) Run "TEST" or "CE" and select PRINTER TEST to verify the configuration of the 2601A.

The following configuration procedure is for the 82905B:

- 1) Power off the HP 250.
- 2) Connect the 82905B to the desired port on the ASI (refer to the Data Comm Configuration section for details on cables and port configuration).
- 3) There are no configuration switches which need to be set in the field. The product is shipped from the factory with the baud rate set to 4800. There is no line protocol. Data overruns are prevented by a hardware handshake. When there are fewer than 2031 characters in the printer buffer, DTR (Data Terminal Ready) is set on. If there are more than 2031 characters in the buffer, DTR is set off and the HP 250 stops sending data. Because of this hardware handshaking, the 82905B can not be supported over a modem nor is it supported by current loop.
- 4) Configure the ASI connector panels as follows:

Old panel (PN 45120-66551)	all jumpers in the "A" position
-69551)	except for jumper 9 which is in the "B" position (monitor DTR).
New panel (PN 45000-66566)	switches 1-1,1-3,1-4 and 2-1 are set ON. All others are set OFF.
- 5) On the ASI board set the appropriate port's baud rate switch to 4800 (position 7).
- 6) Run "CONFIG"
 - a) Select REMOTE I/O and configure the 82905B on the appropriate port as:


```
Class: Printer
Type: 905B
Format: (automatically set to 8N1; Null = 0)
```
 - b) Select DROM EDIT and configure in the following DROMS:


```
TIO
```
- 7) Reboot the HP 250. This is necessary for the new configuration to take effect.
- 8) Run "TEST" or "CE" and select PRINTER TEST to verify the configuration.
- 9) To run self test on the 82905B cycle the power on the printer and hold the Linefeed button. Release the button and self test executes.

PRINTER CONFIGURATION - 5.0 - 82905B

10) Printer general:

Buffer size in printer= 2048

Handshake = DTR

PRINTER CONFIGURATION - 6.0 - 2602A

The following configuration procedure is for the 2602A:

- 1) Power off the HP 250.
- 2) Connect the 2602A to the desired port on the ASI. Refer to the Data Comm Configuration section for details on cables and port configuration. For the Model 20 or 25, port 4 must be used if the customer is to install the printer (port 4 is preset to 1200 baud).
- 3) Open the printer access panel and set the printer configuration switches as follows:

	ON	8	see below	Single-Strike Ribbon
	12"	7	see below	11" Page Length
	ON	6	----->	Self Test
Printer	RDY	5	----->	DC1/DC3 (XON/XOFF)
	ON	4	see below	Parity
	Odd	3	see below	Even
	110	2	see below	300
	110/300	1	see below	1200

ON <-----

Switches on The 2602A's Front Panel

Notes on the Front Panel Switches

Switch 8:	ON -- single strike ribbon OFF-- Multi-strike ribbon
Switch 7:	ON -- 12" page length OFF-- 11" page length
Switch 4:	ON -- even or odd parity OFF-- no parity
Switch 3:	ON -- odd parity OFF-- even parity Don't Care-- no parity
Switch 2:	ON -- 110 baud OFF-- 300 baud Don't Care-- 1200 baud
Switch 1:	ON -- 110 or 300 baud OFF-- 1200 baud

PRINTER CONFIGURATION - 6.0 - 2602A

- 4) Set the Baud Rate Select switch on the ASI board in the card cage for the appropriate port to the position corresponding to the baud rate set on the 2602A (See the Data Comm Configuration section for details).
- 5) Plug in and power on the 2602A.
- 6) Power on the HP 250.
- 7) Run "Config"
 - a) Select Remote I/O (RFIG) and configure in the 2602A on the appropriate port as:

Class: Printer
Type: 2602
Format: 8N1, 8N2, 7E1, 7E2, 7O1, or 7O2
 - b) Select DROM EDIT and configure in the following DROMs:

TIO
P2601
- 8) Power off the HP 250, then power it back on. This is necessary for the new configuration to take effect.
- 9) Run "TEST" or "CE" and select PRINTER TEST to verify the configuration on the 2602A.

-hp-

The following procedures are for the 2932A:

SERIAL INTERFACE (RS-232)

- 1) Power off the HP 250.
- 2) Connect the 2932A to Port 5 of the HP 250. (The printer only has to be on Port 5 if it is either the system printer or a customer installable system.)
- 3) Configuration consists of printer settings and interface settings. There are required settings and optional settings.

Printer Settings (required):

PRIMARY CHARACTER SET - Roman8
DISPLAY FUNCTIONS - off
HP TERMINAL MODE - off
RESTRICTED SEQUENCES - none
CR AUTO LF - off
LF, VT & FF AUTO CR - off
SUPPORT MODE - 2932A

Printer Settings (optional):

PRIMARY PRINT PITCH - 10
SECONDARY PRINT PITCH - 10
PRIMARY STYLE - Cubic
SECONDARY STYLE - Cubic
SECONDARY CHARACTER SET - Line Draw
LINES PER INCH - 6
INCHES PER PAGE - 11
PERFORATION SKIP - off
TEXT LINES PER PAGE - 60
LEFT MARGIN - 0
RIGHT MARGIN - 135

Interface Settings (required):

BAUD RATE - 9600
DATA BITS - 8
PARITY - none
PARITY CHECK - off
STRIP NULL/DEL - off
XON/XOFF - off
NQ/ACK - on
BINARY ENQ/ACK - off
DTR/CD - high
(S)RTS/SCA - Low
CTS/CB - ignore
RS/CH - Low

PRINTER CONFIGURATION - 7.0 - 2932A/2933A/2934A

Interface Settings (optional): none

- 4) Power on the HP 250 and:
 - a) Select Remote I/O Configuration screen and configure the 2932A to the PORT 5 CLASS field as (Port 5 is used when the 2932A is the system printer or part of a customer installable system):
Class: Printer
Type: 293X
Format: 8N1
 - b) Select DROM EDIT and configure the TIO DROM.
 - c) Press RECORD CONFIG
- 5) Power the HP 250 off and on to use the new configuration.

HP-IB INTERFACE

- 1) Power off the HP 250.
- 2) Connect the 2932A to the HP 250 with the HP-IB cable.
- 3) Configuration consists of printer settings and interface settings. There are required settings and optional settings.

Printer Settings (required):

PRIMARY CHARACTER SET - Roman8
DISPLAY FUNCTIONS - off
HP TERMINAL MODE - off
RESTRICTED SEQUENCES - none
CR AUTO LF - off
LF, VT & FF AUTO CR - off
SUPPORT MODE - 2932A

Printer Settings (Optional):

PRIMARY PRINT PITCH - 10
SECONDARY PRINT PITCH - 10
PRIMARY STYLE - Cubic
SECONDARY STYLE - Cubic
SECONDARY CHARACTER SET - Line Draw
LINES PER INCH - 6
INCHES PER PAGE - 11
PERFORATION SKIP - off
TEXT LINES PER PAGE - 60
LEFT MARGIN - 0
RIGHT MARGIN - 135

PRINTER CONFIGURATION - 7.0 - 2932A/2933A/2934A

HP-IB Interface Settings:

SECONDARY COMMANDS - on
LISTEN ALWAYS - off
SERVICE REQUEST - off
ADDRESS - 0 or 1
SET DEFAULTS n/a

- 4) Power the HP 250 off and on to use the new configuration.

-hp-

PRINTER CONFIGURATION - 7.0 - 2932A/2933A/2934A

The following procedures are for the 2933A and 2934A:

SERIAL INTERFACE (RS-232)

- 1) Power of the HP 250.
- 2) Connect the 2933A or 2934A to Port 5 of the HP 250. (The printer only has to be connected to Port 5 if it is either the system printer or part of a customer installable system.)
- 3) Configuration consists of printer settings and interface settings. There are required settings and optional settings.

Printer Settings (required):

PRIMARY CHARACTER SET - Roman8
DISPLAY FUNCTIONS - off
HP TERMINAL MODE - off
RESTRICTED SEQUENCES - none
CR AUTO LF - off
LF, VT & FF AUTO CR - off
SUPPORT MODE - 2934A

Printer Settings (optional):

PRIMARY PRINT PITCH - 10
SECONDARY PRINT PITCH - 10
PRIMARY STYLE - Cubic
SECONDARY STYLE - Cubic
SECONDARY CHARACTER SET - Math
LINES PER INCH - 6
INCHES PER PAGE - 11
PERFORATION SKIP - off
TEXT LINES PER PAGE - 60
LEFT MARGIN - 0
RIGHT MARGIN - 135

Interface Settings (required):

BAUD RATE - 9600
DATA BITS - 8
PARITY - none
PARITY CHECK - off
STRIP NULL/DEL - off
XON/XOFF - off
ENQ/ACK - on
BINARY ENQ/ACK - off
DTR/CD - high
(S)RTS/SCA - Low
CTS/CB - ignore
RS/CH - Low

Interface Settings (optional): none

PRINTER CONFIGURATION - 7.0 - 2932A/2933A/2934A

- 4) Power on the HP 250 and:
 - a) Select Remote I/O Configuration screen and configure the 2933A or 2934A to the PORT 5 CLASS field as (the printer has to be on Port 5 only if it is the system print or part of a customer installable system):

Class: Printer
Type: 293X
Format: 8M1
 - b) Select DROM EDIT and configure the TIO DROM.
 - c) Press RECORD CONFIG
- 5) Power the HP 250 off and on to use the new configuration.

HP-IB INTERFACE

- 1) Power off the HP 250.
- 2) Connect the 2933A or 2934A to the HP 250 with the HP-IB cable.
- 3) Configuration consists of printer settings and interface settings. There are required settings and optional settings.

Printer Settings (required):

PRIMARY CHARACTER SET - Roman8
DISPLAY FUNCTIONS - off
HP TERMINAL MODE - off
RESTRICTED SEQUENCES - none
CR AUTO LF - off
LF, VT & FF AUTO CR - off
SUPPORT MODE - 2932A

Printer Settings (optional):

PRIMARY PRINT PITCH - 10
SECONDARY PRINT PITCH - 10
PRIMARY STYLE - Cubic
SECONDARY STYLE - Cubic
SECONDARY CHARACTER SET - Line Draw
LINES PER INCH - 6
INCHES PER PAGE - 11
PERFORATION SKIP - off
TEXT LINES PER PAGE - 60
LEFT MARGIN - 0
RIGHT MARGIN - 135

PRINTER CONFIGURATION - 7.0 - 2932A/2933A/2934A

HP-IB Interface Settings:

SECONDARY COMMANDS - on
LISTEN ALWAYS - off
SERVICE REQUEST - off
ADDRESS - 0 or 1
SET DEFAULTS n/a

- 4) Power the HP 250 off and on to use the new configuration.

-hp-

The following configuration procedure is for the 2563A:

SERIAL INTERFACE (RS-232)

- 1) Power off the HP 250.
- 2) Connect the printer to Port 5 of the HP 250. (The printer has to be on Port 5 only if it is the system printer or is part of a customer installable system.)
- 3) Set the function umbers on the printer to the associated values:

Function Number	Parameter Value
20	01
21	00
22	51
23	00

- 4) Press the ON LINE key.
- 5) Press the CONFIG key, and at the same time press either FINE ADJUST keys until desired function number is displayed.
- 6) Release the CONFIG key to display the associated parameter value.
- 7) Using the FINE ADJUST keys select the parameter value for the associated function number.
- 8) After selecting each parameter value, press the ENTER key.
- 9) Power on the HP 250 and:
 - a) Select Remote I/O configuration screen and confiure the 2563A to the PORT 5 CLASS field as:


```
Class: Printer
Type: 2563
Format: 8N1
```
 - b) Select DROM EDIT and configure the TIO DROM.
 - c) Press RECORD CONFIG
- 10) Power the HP 250 off and on to use the new configuration.

-hp-

PRINTER CONFIGURATION - 8.0 - 2563A

HP-IB INTERFACE

There are the non-CE and CE modes of HP-IB configuration for the 2563A. The CE mode is used only if the printer is not in the "Non-Ciper" mode. Check to be sure which mode the printer is in before proceeding with the configuration. To configure in the non-CE mode, proceed as follows:

- 1) Press the ON LINE key to take the printer off-line.
- 2) Press and hold the CONFIG. key. The function number will be displayed on the Operator Control Panel.
- 3) Select function number 20, using the FINE ADJ. keys to increment or decrement the number.
- 3) Release the CONFIG. key. The HP-IB address (parameter) number is then displayed.
- 4) Select address 0 or 1, using the FINE ADJ. keys.
- 5) Press the ENTER key to finalize the configuration.
- 6) Press the ON LINE key to return the configured printer to normal operation.

To configure the printer in the CE mode, proceed as follows:

- 1) Set the printer ON/OFF switch to OFF(0).
- 2) Remove the protective covers on the printer to gain access to the interface PCA.
- 3) On the Control PCA, install a jumper from the CE MODE test point to the ground test point.
- 4) Set the ON/OFF switch to ON (1).
- 5) Press and hold the CONFIG. key to display the function number
- 6) Select function number 25, using the FINE ADJ. keys.
- 7) Release the CONFIG. key to display the configuration value.
- 8) Select configuration value 1, using the FINE ADJ. keys.
- 9) Press ENTER.
- 10) Remove the jumper from the Control PCA.
- 11) Replace protective covers on the printer.
- 12) Press the ON LINE key to place the printer in normal operation.

The following configuration is for the 2687A:

- 1) Power off the HP 250.
- 2) Connect the HP 250 to port 5 of the HP 250.
- 3) Power on the HP 250 and:
 - a) Select Remote I/O configuration screen and configure the 2687A to the POP↑ 5 CLASS field as:

Class:	Printer
Type:	2687
Format:	8N1
 - b) Select DROM EDIT and configure the TIO DROM.
 - c) Press RECORD CONFIG
- 4) Power the HP 250 off and on to use the new configuration.

-hp-

Section 513
PLOTTER CONFIGURATION

TABLE OF CONTENTS

1.0 7220, 7221, 7225, and 7470

PLOTTER CONFIGURATION - 1.0 - 7220, 7221, 7225, AND 7470

1.0 7220, 7221, 7225, AND 7470

The following configuration procedure is for the 7220, 7221, 7225, and 7470 plotters:

- 1) Power off the HP 250.
- 2) Connect the plotter to the desired port on the ASI (refer to the Data Comm Configuration section for details on cables and port configuration). Note that the cable plugs into the 7220, 7221, and 7225 (with 17604A Personality Module) into the MODEM connector, NOT the TERMINAL connector.
- 3) Set the switches on the back panel of the plotter as follows:

- a) For direct connect of a 7225 option 17603A:

Baud rate: 2400
Parity: NONE

- b) For direct connect of a 7470A:

S2: 1 (odd parity if parity enabled)
S1: 0 (no parity)
(Y/D): D (Direct connect vs. Y connect)
(US/A4): US (for English DIN A4 paper)
A4 (for Metric ISO A4 paper)

B4, B3, B2, B1: see table below for baud rate

Baud rate	B4	B3	B2	B1	Can use on HP 250
Ext	0	0	0	0	NO
75	0	0	0	1	NO
110	0	0	1	0	Yes
150	0	0	1	1	NO
200	0	1	0	0	Yes
300	0	1	0	1	Yes
600	0	1	1	0	Yes
1200	0	1	1	1	Yes
2400	1	0	0	0	Yes
4800	1	0	0	1	Yes
9600	1	0	1	0	Yes

PLOTTER CONFIGURATION - 1.0 - 7220, 7221, 7225, AND 7470

- c) For direct connect of all other plotters (not all settings are used on all plotters):

Baud rate: 2400
Parity: OFF or NONE
ODD
Duplex: FULL
Control line: NORMAL (not DTR BYPASS)
(Modem/Hardwire): HARDWIRE
Conf Test: OFF
Online/Local: ONLINE

- d) For modem connection (not supported on 7470): (Not all settings supported on all plotters)

Baud rate: baud rate of the modem
Parity: OFF or NONE
ODD
Duplex: FULL
Control line: NORMAL (not DTR BYPASS)
(Modem/Hardwire): MODEM
Conf Test: OFF
Online/Local: ONLINE

- 4) For chart advance plotters, set the paper advance switch to METRIC or ENGLISH, depending on the paper roll that is installed.
- 5) Set the baud rate select switch on the ASI Board in the Card Cage for the appropriate port to the position corresponding to the baud rate set on the plotter in step 3. (See the Data Comm Configuration section for details.)
- 6) Plug in and power on the plotter.
- 7) Power on the HP 250 using Operating System revision B.04.00 or greater.

PLOTTER CONFIGURATION - 1.0 - 7220, 7221, 7225, AND 7470

- 8) Run "CONFIG".
 - a) Select REMOTE I/O and configure the plotter on the appropriate port as
 - Class: Terminal
 - Type: 264X
 - Format: 8M1
 - b) Select DROM EDIT and configure in the following DROMs:
 - PACK
 - TIO
- 9) Power off the HP 250, then power it back on (this is necessary for the new configuration to take affect).
- 10) Run "TEST" and select PLOTTER TEST to perform the confidence plot. The plotter configuration file "GPL/ACP" is also built through this test.

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DATA CAPTURE TERMINAL CONFIGURATION

Section 514

DATA CAPTURE TERMINAL CONFIGURATION

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- 1.0 3075A, 3076A, and 3077A
- 2.0 3081A

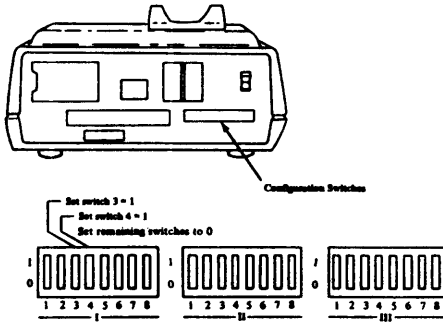
DATA CAPTURE TERMINAL CONFIGURATION - 1.0 - 307X

1.0 3075A/3076A/3077A

The following configuration is for the 3075A, 3076A, and 3077A:

- 1) Power off the HP 250.
- 2) Connect the data capture terminal to any available port on the HP 250.
- 3) Using the switches shown below, set the Baud rate to the same as the port to which the terminal is connected:

Switches			Baud
I6	I7	I8	
0	0	0	9600
0	0	1	4800
0	1	0	2400
0	1	0	1200



DATA CAPTURE TERMINAL CONFIGURATION - 1.0 - 307X

- 4) Power on the HP 250 and run CONFIG.
 - a) Select Remote I/O Configuration screen and configure the data capture terminal to PORT x CLASS field as (where x = port no.):

Class:	Terminal
Type:	26XX
Format:	701
 - b) Select DROM EDIT and configure the TIO DROM.
 - c) Press RECORD CONFIG.
- 5) Power the HP 250 off and on to use the new configuration.

DATA CAPTURE TERMINAL CONFIGURATION - 2.0 - 3081A

2.0 3081A

The following configuration procedure is for the 3081A:

NOTE

The 3081A must be connected to a 92922A, which in turn is connected to the HP 250.

- 1) Power off the HP 250.
- 2) Connect the 92922A to any available port on the HP 250, and then set the baud rate of that port to 2400.
- 3) Power on the HP 250 and:
 - a) Select Remote I/O Configuration screen and configure the data capture terminal to PORT x CLASS field as (where x = port no.):

Class:	Printer
Type:	26XX
Format:	701
 - b) Select DROM EDIT and configure the TIO DROM
 - c) Press RECORD CONFIG
- 4) Power the HP 250 off and on to use the new configuration.

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Section 515

BAR CODE READER CONFIGURATION

TABLE OF CONTENTS

1.0 39800A

BAR CODE READER CONFIGURATION - 1.0 - 39800A

1.0 39800A

The following configuration procedure is for the 39800A:

- 1) Power off the HP 250.
- 2) Connect the bar code reader to any available port on the HP 250, and set the Baud rate on the HP 250 to 9600.
- 3) On the back of the reader, set the switches as follows:

Baud Rate: 9600 baud	Switch 0: 0
	1: 1
	2: 1
Parity: Odd	Switch 3: 1
	4: 1
Stop Bits: 1	Switch 5: 0
Character Delay: Disable	Switch 6: 0
Software Handshake:	Switch 7: 1
Standalone mode ENQ/ACK	Switch 8: 1
Mode: Character	Switch 9: 0
Local Echo: Disable	Switch 10: 0
Terminator: CR	Switch 11: 0
	12: 0
Block Mode Terminator: None	Switch 13: 0

- 4) Power on the HP 250 and:
 - a) Select the Remote I/O Configuration screen and configure the reader to PORT x CLASS field as (where x = port no.):

Class:	Terminal
Type:	26XX
Format:	701
 - b) Select DROM EDIT and configure the TIO DROM.
 - c) Press RECORD CONFIG.
- 5) Power the HP 250 off and on to use the new configuration.

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Section 520
DISC DIAGNOSIS

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- 1.0 DISC STATUS Command
- 2.0 Controller Status Words
 - 2.1 Overview
 - 2.2 STAT1 (Status Word One) for non-CS'80 Discs
 - 2.3 STAT2 (Status Word Two) for non-CS'80 Discs
 - 2.4 CS'80 Status Words
- 3.0 Disc Driver Status Words
- 4.0 Summary of Mass Memory Commands Binary (MMCMDS)
- 5.0 7902A/9895K
- 6.0 7906H/7906M/7906S
- 7.0 7910K
- 8.0 7908P, 7911P, 7912P
- 9.0 5/10/15 Mb Disc
- 10.0 Logical Layout

DISC DIAGNOSIS - 1.0 - DISC STATUS COMMAND

1.0 DISC STATUS COMMAND

The DISC STATUS command is available on operating system 8.04.00 and later. The command returns the error status for the last two disc errors that have occurred since the system was powered on.

The syntax is

```
DISC STATUS [array identifier]
```

where the array, if used, is dimensioned for at least 31 elements

```
e.g. 10 DIM A(31)
      20 DISC STATUS A(*)
      30 PRINT A(*)
      40 END
```

If the array is not specified, the data is displayed.

The status information is in the following order:

LAST

```
EUSP  OPCD  FREC1  FREC2  STAT11
STAT1  STAT2  STAT3  STAT4  STAT5
STAT6  STAT7  STAT8  STAT9  STAT10
```

```
EUSP  OPCD  FREC1  FREC2  STAT11
STAT1  STAT2  STAT3  STAT4  STAT5
STAT6  STAT7  STAT8  STAT9  STAT10
```

How to interpret the status information:

LAST - a value of 000001 indicates the first set of words is for the most recent error. A value of 000020 (decimal 16) indicates the second set of words is for the most recent error.

EUSP, OPCD, FREC1, FREC2, STAT11 - refer to section 3.0 (Disc Driver Status Words) for details

STAT1 through STAT10 - refer to section 2.0 (Controller Status Words) for details

- for the 7902/9895, 7910, 7906, and 5/10/15 Mb, only the first two status words (STAT1 and STAT2) are valid
- for CS'80 devices, all ten status words (STAT1 through STAT10) can be valid, depending on the specific error

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

2.0 CONTROLLER STATUS WORDS

2.1 Overview

7902/9895, 7906, 7910, 5/10/15 Mb Disc:

- two status words (STAT1 = Status Word One in bytes 1 and 2, and STAT2 = Status Word Two in bytes 3 and 4) returned by the disc controller after a REQUEST STATUS command from the operating system
- observable on the HP-IB using a 1602 logic analyzer
- on Operating System A
 - displayed on CRT automatically on an Error 90
 - use MMCNDS binary to request or display the words in diagnostics
- on Operating System B
 - use DISC STATUS command/statement to display the words
 - use MMCNDS binary to request or display the words in diagnostics

CS'80 devices:

- ten status words (CS'80 Status Words STAT1 through STAT10) returned by the disc controller after a REQUEST STATUS command from the operating system
- observable on the HP-IB using a 1602 logic analyzer
- peripherals not supported on Operating System A
- on Operating System B
 - use DISC STATUS command/statement to display the words
 - use LXRSIZ program to request or display the words during diagnosis

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

2.2 STAT1 (Status Word One) for non-CS⁸⁰ Discs
 Layout for Status Word One

STAT1 Bytes 1 and 2 -- Last Operation Performed:

```

----- First Byte ----- Second Byte -----
/          \          \          /
HP-IB Bit
8 7 6 5 4 3 2 1 8 7 6 5 4 3 2 1
-----
| S P D | S1 Field | Unit No. |
|-----|-----|-----|
|-----|-----|-----|
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
* * *
| | Track is defective
| | Track is protected (7902/9895, 5/10/15 Mb Disc: always 0)
Track is spared (7902/9895, 5/10/15 Mb Disc: always 0)
  
```

(hex) (octal)	(binary)	TSTAT	Definition	Used on the 7906M				
				7910	7902/9895	7906H	15/10/ 15 Mb	
00	00	00000	Normal Completion (no errors)	X	X	X	X	X
01	01	00001	Illegal Opcode	X	X	X	X	X
02	02	00010	Unit Available	X				
03	03	00011	Illegal Drive Type					X
07	07	00111	Cylinder Compare Error	X	X	X	X	X
08	10	01000	Uncorrectable Data Error	X	X	X	X	X
09	11	01001	Head-Sector Compare Error	X	X	X	X	X
0A	12	01010	I/O Program Error	X	X	X	X	X
0B	13	01011	Sync Bit Not Received in Time					X
0C	14	01100	End of Cylinder	X				X
0E	16	01110	Data Overrun	X	X			X
0F	17	01111	Possibly-Correctable Data Error	X				
10	20	10000	Illegal Access to Spare Track	X	X			X
11	21	10001	Defective Track	X	X	X	X	X
12	22	10010	Access Not Ready During Data Xsfer	X		X	X	
13	23	10011	Status-Word-Two Error	X	X	X	X	X
16	26	10110	Attempt to Write on Protected Trk	X	X			X
17	27	10111	Unit Unavailable	X		X		X
1F	37	11111	Drive Attention	X	X	X	X	X

Details for Status Word One

The various encoded termination status values in the TSTAT field follow: (note: nnH ==> value in hex; nnB ==> value in octal)

00H 00B - Normal Completion

7906M: One of two situations:

- a. Command has been fully executed without error.
- b. At completion of a Request Status command whenever the command immediately follows another Request Status command or when it is the first command issued after interface is connected to controller during a polling sequence. For the latter case, the Unit field will be zero.

7910: Command completed without error.

7902/9895: Command completed without error, or the controller has just been cleared or powered up.

7906H: One of two situations:

- a. Normal completion of the previous command. The DSJ byte = 0.
- b. Condition at power-on or following self-test. The DSJ byte = 2.

5/10/15 Mb Disc: Same as 7902/9895

01H 01B - Illegal Opcode

7906M: Command word has been received by the controller of which bits 12-8 contain a command code which is not one of controller's command set.

7910: Same

7902/9895: Same

7906H: Same

5/10/15 Mb Disc: Same

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

02H 02B - Unit Available

7906M: Controller transmits this status after interface has put out a Wakeup command for a specific drive and that drive has become available.

7910: Not used

7902/9895: Not used

7906H: Not used

5/10/15 Mb Disc: Not used

03H 03B - Illegal Drive Type

7906M: Not used

7910: Not used

7902/9895: Not used

7906H: An unknown (unsupported) disc drive type has been set in the drive type field on the disc drive. The Drive Type field of Byte 3 (Status word 2) may be examined for the illegal drive type.

5/10/15 Mb Disc: Not used

07H 07B - Cylinder Compare Error

7906M: During verification of address of sector previous to first sector to be read from or written to, the contents of cylinder address field of that sector do not match contents of controller's cylinder address register. This status is transmitted only after the sequence of events listed below. When this status is received, the system should issue a Recalibrate command and then retry data transfer sequence.

- a. Addresses do not compare as described above.
- b. Controller generates a seek to address in its cylinder address register and head sector address register.
- c. Controller again attempts to verify a sector.
- d. Addresses still do not compare.
- e. The S bit is not set at new track address.

7910: The verification of a sector address did not compare to controller's target address.

7902/9895: The target cylinder was not found.

7906H: Generated only during address verification when the cylinder address in the controller register fails to match that in the cylinder address field of the disc sector after two comparisons. The system should issue a Recalibrate command, then retry the data transfer.

5/10/15 Mb Disc: The target cylinder has one or more sectors in which the track number does not correspond with the track number of the remainder of the sectors. The controller will automatically retry the read/write operation once if this is encountered.

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

08H 10B - Uncorrectable Data Error.

7906M: Generated by the error correction circuits and is transmitted in one of three cases:

- a. Immediately following a data transfer (or Verify) command if error is uncorrectable.
- b. In response to a Request Syndrome command whenever a Possibly Correctable Data Error has proved uncorrectable. Unit field will be zero.
- c. During verification of address of sector previous to first sector to be read from or written to, controller is unable to read (verify) any of 16 consecutive sectors without error.

7910: Controller is unable to read any of the 32 sectors on a track. Can occur immediately after a data transfer or a verify command.

7902/9895: Read or verify operation was terminated because a data error was detected.

7906H: One of two situations:

- a. The error detection hardware has detected a CRC error while executing a Read, Cold Load Read, Read with Offset, or Verify command. A Request Disc Address command will return the address in which the error occurred.
- b. During address verification it is impossible to read (verify) any sector on the track without a CRC error. A Reqad command will return the address of the target sector.

5/10/15 Mb Disc: This disc read or verify operation was terminated because a hard error was detected in the data field. The data is still transmitted for the bad sector.

09H 11B - Head-Sector Compare Error

7906M: Similar to Cylinder Compare Error, including controller's recovery attempt sequence described for that status, except that head and/or sector address field of disc sector does not compare with corresponding field in controller's head sector address register. The system need not issue a Recalibrate command when this status is received.

7910: The head address field of a sector does not compare to the controller's target head and cylinder address, or the sector address just read is greater than 31.

7902/9895: The target sector cannot be found in the current track. Up to two passes of the track are made before this status is set.

7906H: Similar to Cylinder Compare Error, generated during address verification when the head or sector address in the controller registers fails to match that in the head or sector address field of the disc sector after two comparisons.

5/10/15 Mb Disc: The target sector cannot be found in the current track. Up to two passes of the track are made before this status is set. In this case, an ECC error exists in the preamble of the requested sector, the sector preamble is missing an address mark, or the subsequent data field cannot be found.

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

OAH 12B - I/O Program Error

7906M: Systems containing a programmable data channel separate from CPU may have their interface detect abnormal channel operations and notify controller. At that time, the controller will interrupt the CPU with this status. An example of such an error might be an inconsistent direction of data transfer (a Read command has been transmitted to controller, but channel has been programmed to write).

7910: An improper HP-IB sequence has been received.

7902/9895: An illegal HP-IB secondary or sequence has been received. This status can only be set if the previous S1 was zero.

7906H: One of three situations: a. An HP-IB byte tagged with ATN (that is, a primary or secondary) was received with incorrect (even) parity. This error will take precedence over all other controller status errors.

- b. An unknown (unsupported) secondary was received by the controller.
- c. An incorrect HP-IB sequence was detected. For example, during a Seek command, the controller expects to see one Secondary (get command), exactly five data bytes not tagged with EOI, and one data byte tagged with EOI, in that order. For a Request Status command, the controller expects to see (in order) the secondary get command, two data bytes (the second only tagged with EOI), and a secondary send status. Any deviation from the expected order of an HP-IB sequence results in this error status.

5/10/15 Mb Disc: This error is defined when an illegal secondary is received, an improper number of data bytes are received, or an unknown command is received. This status can only be set if the previous STAT1 was zero.

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

OBH 13B - Sync Bit Not Received in Time

7906M: Not used

7910: Not used

7902/9895: Not used

7906H: Generated during a verify or during any data transfer which performs verification if the sync bit is not found within an appropriate amount of time after the SECTOR COMPARE becomes true.

5/10/15 Mb Disc: Not used

OCH 14B - End of Cylinder

7906M: A multiple-sector data transfer must continue beyond end-of-logical-cylinder, but file mask will not allow controller to automatically seek to next logical cylinder and continue.

7910: Not used

7902/9895: Not used

7906H: One of two situations:

- a. A multiple-sector data transfer/Verify (or a new transfer/ Verify without an intervening Seek, Address Record or Cold Load Read command) must continue beyond the end of logical cylinder but the file mask will not allow the controller to automatically seek to the next logical cylinder.
- b. The file mask allows automatic seeking, but the required seek would move the heads beyond the limits of the physical disc.

5/10/15 Mb Disc: Not used

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

OEH 16B - Overrun

7906M: Detected by interface (read) or controller (write) whenever instantaneous data rate of controller exceeds that of CPU-interface combination. The overrun is reported at end of sector in which it occurred. The contents of that sector, either on disc (write) or in I/O buffer (read) should be considered invalid.

The controller always transfers complete sectors. If CPU or data channel wishes to transfer less than a complete sector, it must notify interface (or controller) when transfer is complete so that subsequent controller requests for data transfer do not cause an Overrun error.

7910: The instantaneous data rate of the controller exceeds that of the channel. Any data transmitted should be considered invalid.

7902/9895: Not used

7906H: The burst data rate of the controller has exceeded that of the HP-IB causing data to be lost. The overrun is reported at the end of the sector in which it occurred. Data transferred during previous sectors is valid. This error is not reported for normal end of read transfers, although such end of transfers are detected via the controller overrun hardware. A Request Disc Address command following a data overrun error will return the address in which the error occurred.

5/10/15 Mb Disc: Not used

0FH 17B - Possibly Correctable Data Error

7906M: Generated by the error correction circuits and is transmitted in one of two cases:

- a. Immediately following a data transfer (or Verify) command if error is possibly correctable.
- b. In response to Request Syndrome command if error is in fact correctable. The Unit field will be zero. In this case, proceed as described in Request Syndrome command.

7910: Not used

7902/9895: Not used

7906H: Not used

5/10/15 Mb Disc: Not used

10H 20B - Illegal Access to Spare Track

7906M: The same conditions and sequence of events described for a Cylinder Compare Error or Head-Sector Compare Error have occurred, except that S bit is set at new track address. This error usually results from trying to directly access (via a Seek command) a spare track in active use. The addresses will not compare because of the way in which spare tracks are set up and this status merely differentiates between this situation and other address errors.

7910: During address verification, an address miscompare (cylinder or head/sector) has occurred and the S bit is set in the sector. This usually indicates a direct seek by the user to a spare track in active use, which is forbidden for all commands which use address verification.

7902/9895: Not used

7906H: Same as for 7910

5/10/15 Mb Disc: Not used

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

11H 21B - Defective Track

7906M: During verification of track status of a sector previous to the first sector to be read from or written to, the D bit is found to be set but the File Mask will not allow automatic seeking to a spare track.

7910: This status is set if the D bit is set but the cylinder and head address of the spare track is the same as that of the defective track. This condition usually results from flagging (initializing) the track defective without assigning a spare track address. The disc controller would loop endlessly searching for a spare track if this condition was not tested.

7902/9895: Defective Track or Sector. During an HP write, read, read verify, or verify a set D Bit was encountered.

7906H: One of two situations:

- a. During address verification the track has been found to be flagged defective (D bit set), but the file mask will not allow the controller to seek to an associated spare track.
- b. The D bit is set, the file mask will allow the automatic seek, but the cylinder and head address of the spare track is the same as that of the defective track. This condition usually results from flagging (initializing) the track defective without assigning a spare track address. The controller would loop endlessly searching for a spare track if this condition was not tested.

5/10/15 Mb Disc: Not used

12H 22B - Access Not Ready During Data Operation

7906M: Access Not Ready During Data Operation. While in process of transferring data to or from the disc, the track center detector in the drive detected head motion. The transfer should be retried.

7910: Not used

7902/9895: Retryable Hardware Error. An internal hardware timing error occurred during a data transfer or seek. The operation should be retried once.

7906H: While in the process of transferring data to or from the disc (including the Verify command), the track center detector in the disc drive detected head motion. If this occurs during a write type command, the drive will fault. The transfer should be retried.

5/10/15 Mb Disc: Not used

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

13H 23B - Status-2 Error

7906M: The controller is unable to complete a command due to some condition in disc drive. The Status-2 word may be examined for the cause. Examples of Status-2 errors are:

- a. An Initialize command, but Format switch is off or Protected switch is on.
- b. A command is issued to a drive which is Not Ready (heads unloaded) or for which a Drive Fault has occurred.

7910: The disc controller is unable to complete a command due to some condition in the disc drive. The drive status byte may be examined for the reason. Status-2 errors are indicated by Drive Status bits 0, 1, 2, and 4. (See Status-Word-Two.)

7902/9895: Some condition in Status-2 prevented the drive related operation from completing normally. These conditions include:

- a. Specified unit is between 0 and 3 but that drive is not connected to the controller.
- b. There is no disc in the drive.
- c. A hardware problem is detected in the drive.
- d. The disc is unformatted or has an unknown format.
- e. The disc is write protected (error only during a disc write operation).
- f. The selected drives First Status Bit is set.

7906H: same as the 7906M

5/10/15 Mb Disc: Some condition in Status-2 prevented the drive related operation from completing normally. These conditions include:

- a. Specified unit is within range, but that drive is not connected to the controller.
- b. A hardware problem is detected in the drive.
- c. The disc is unformatted or has an unknown format.
- d. The selected drive's First Status Bit is set.

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

16H 26B - Attempt to Write on Protected Track

7906M: During verification of track status of sector previous to first sector to be written on using a Write command, the P bit is found to be set and the Format switch is off.

7910: A Write or Buffered Write command has been attempted on a track which has been flagged protected (P bit set). No writing occurs. The check for P bit is not made for the Initialize, Write Full Sector, or Buffered Write Full Sector command.

7902/9895: Not Used

7906H: A Write command has been attempted on a track which has been flagged protected (P bit set) and the Format switch is off. No writing occurs. The check for the P bit is not made for the Initialize or Write Full Sector command.

5/10/15 Mb Disc: Not used

17H 27B - Unit Unavailable

7906M: This status is returned in two cases:

- a. An interface has requested a drive whose hold bit has been set by another interface.
- b. The Unit field of the command word is greater than 12 (octal)

Note: The interface busy bit is false whenever this status is returned. This status is not set for Request Sector Address command whether drive is held by another interface or not. This is because the command only accesses the "current sector" counter in disc drive without changing any operating parameter of drive or controller.

7910: Not Used

7902/9895: A command included a request for a unit number less than 0 or greater than 3.

7906H: Not used

5/10/15 Mb Disc: A command included a request for a unit number out of range. In this case, the unit number byte will contain the unit number sent with the command at fault.

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

1FH 37B - Drive Attention

7906M: Controller generates an interrupt (issues STINT) to interface which last accessed drive which is requesting attention (or interface 0 if this is first attention after power-on or hard clear) whenever:

- a. Drive is requesting attention.
- b. Interface does not have a subsequent command pending in its command buffer except Wakeup, which is ignored here.
- c. Interface flag INTOK (Interrupt O.K.) is set, thereby allowing attention interrupts.

Briefly, conditions causing a drive to request attention are:

- a. Seek completion.
- b. Drive becomes ready (heads load).
- c. Drive becomes not ready (heads unload).
- d. Seek check.
- e. Drive Fault

7910: Generated whenever a normal Seek command completes (DSJ byte = 0).

7902/9895: The indicated drive is requesting attention because:

- a. A seek completed normally.
- b. A seek command failed due to:
 - i. Drive fault,
 - ii. Out of bounds target cylinder or sector,
 - iii. The controller cannot find the target address
- c. Following an End Command, a change in drive status was detected, including:
 - i. Inserting a disc
 - ii. Removing a disc
 - iii. Connecting a drive
 - iv. Disconnecting a drive

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

7906H: One of two situations:

- a. A normal SEEK or RECALIBRATE command completes (DSJ byte = 0)
- b. The drive unloads and the controller is in Idle State 2 or 3

5/10/15 Mb Disc: The indicated drive is requesting attention because:

- a. A seek completed normally.
- b. A seek command failed due to:
 - i. Drive fault
 - ii. Out of bounds target cylinder, head, or sector
 - iii. The controller cannot find the target address

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

Details for Status Word Two

```

bits
E 15      Status 2 Error:
          7906, 7910, 9895/7902: true if any bit marked "*"
                                is true
          5/10/15 Mb Disc: true if any bit marked "*" is true

9->14     7906M: DRTYPE encoded drive type
          7910: not used
          7902/9895: Flexible Disc Format
          7906H: DRTYPE encoded drive type
          5/10/15 Mb Disc: Disc Format

8         Not Used

A 7       Attention:
          disc drive is requesting attention.

P 6       Protected:
          7910: not used
          5/10/15 Mb Disc: not used

F 5       Format:
          7910: not used
          5/10/15 Mb Disc: not used

DF* 4     Drive Fault:
**        7910: seek did not complete
          5/10/15 Mb Disc: controller detected a fault
                                condition in the drive during a command
    
```


DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

Parameter Field (words 6 - 10)

	(P1)	(P2)	(P3)	(P4)	(P5)	(P6)	(P7)	(P8)	(P9)	(P10)	
	-----\-/-----					/	\-----\-/-----				
For Error Bit	Meaning						After spare block command:				
*****	*****						length of affected field				
No error	new Target Address										
After spare	address of affected										
block cmd	area						All other times: fault log				
17	encoded value of each						consisting of device				
	unit which has						specific information				
	experienced an error										
24	results of internal										
	diagnostic										
41	address of bad block										
58	address of block										
	which should be spared										
59	address of recoverable										
	block										

Details for CS'80 Status Words

Reject Errors Field

bit 2 = Channel Parity Error

- A channel command was received without odd parity

bit 5 = Illegal Opcode

- An unrecognizable opcode was received

bit 6 = Module Addressing

- An illegal volume or unit number was specified for this device

bit 7 = Address Bounds

- The target address has exceeded the bounds for this device

bit 8 = Parameter Bounds

- A parameter exceeded maximum value for this drive

bit 9 = Illegal Parameter - A parameter field was the wrong length for the opcode preceding it

bit 10 = Message Sequence

- The message sequence has been violated (error suppressed if any reject or fault errors have occurred prior to sequence error)

bit 12 = Message Length

- The total length of the execution message differs from the current default value

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

Fault Errors Field

bit 17 = Cross-Unit

- An error has occurred during a Copy Data operation (Parameter = 6 bytes)

bit 19 = Controller Fault

- A hardware fault occurred in the controller

bit 22 = Unit Fault

- A hardware fault has occurred in the unit addressed

bit 24 = Diagnostic Result

- The hardware failed the diagnostic indicated in the parameter field (Parameter = 6 bytes)

bits 26 - 28 = Release Required

- This command cannot be executed until after release is granted to the device
- Device requires release for indicated reason (see appropriate bit)

bit 26 = Operator Request

- Release required for operator request (e.g. load/unload)

bit 27 = Diagnostic Request

- Release required for diagnostics initiated from control panel (e.g. self-test)

bit 28 = Internal Maintenance - Release required for internal maintenance (e.g. head alignment)

bit 30 = Power Fail

- The power to the unit failed, a diagnostic destroyed the configuration, or a pack was loaded
- Device should be reconfigured

bit 31 = Release Completed

- Automatic release has taken place

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

Access Errors Field

bit 32 = Illegal Parallel Operation

- The requested operation cannot be executed in parallel with some other operation(s) in progress

bit 33 = Uninitialized Media

- The host attempted to access unformatted media, or unusable media has been loaded

bit 34 = No Spares Available

- Spare block cannot be executed due to lack of spare media

bit 35 = Not Ready

- The selected unit is not ready for access at this time (e.g. heads or media not yet fully loaded)

bit 36 = Write Protect

- The selected volume is write protected

bit 37 = No Data Found

- A block accessed during a read has not been written

bit 40 = Unrecoverable Data Overflow - The previous transaction generated more than 1 unrecoverable error

41 = Unrecoverable Data

- The entire transaction should be considered in error

- Unrecoverable data at indicated block(s) (Parameter = 6 bytes containing address of bad block)

bit 43 = End of File

- End of file encountered on file structured device

bit 44 = End of Volume

- The host attempted to access across a volume boundary

DISC DIAGNOSIS - 2.0 - CONTROLLER STATUS WORDS

Information Errors Field

bits 48 - 50 = Request Release

- Device requests release for indicated reason (see appropriate bit)

bit 48 = Operator Request

- Release requested for operator request (e.g. load/unload)

bit 49 = Diagnostic Request

- Release request initiated from diagnostic control panel (e.g. self-test)

bit 50 = Internal Maintenance

- Release requested for internal maintenance (e.g. head alignment)

bit 52 = Data Overrun

- A latency was induced during the transfer due to slow transfer rate or seek retry

bit 55 = Auto Sparing Invoked

- A defective block has been automatically spared by the device

bit 57 = Recoverable Data Overflow

- The previous transaction generated more than 1 recoverable data error

bit 58 = Marginal Data

- Data was recovered, but with difficulty (Parameter = 6 bytes containing address of block)

bit 59 = Recoverable Data

- A latency was introduced in order to correct a data error (Parameter = 6 bytes containing address of recovered block)

bit 61 = Maintenance Track Overflow

- Error and fault log area is full

Parameter Field

For no error bits set

- P1 through P6 indicate new Target Address

P7 through P10 contain fault log consisting of device specific information, except after Spare Block command

After Spare Block command, P1 through P6 contain address of the affected area, and P7 through P10 indicate the length of the affected field.

For error bit 17 (Cross Unit)

- P1 through P6 contain the encoded value of each unit which has experienced an error (-1 indicates no additional units)

For error bit 24 (Diagnostic Fault)

- P1 through P6 indicate results of internal diagnostic (format is device dependent)

For error bit 41 (Unrecoverable Data)

- P1 through P6 indicate address of bad block

For error bit 58 (Marginal Data)

- P1 through P6 indicate address of block which should be spared

For error bit 59 (Recoverable Data)

- P1 through P6 indicate address of recoverable block

DISC DIAGNOSIS - 3.0 - DISC DRIVER STATUS WORDS

FREC1 - contains the high 11 bits of the disc address

FREC2 - contains the low 16 bits of the disc address

OPCD - The OPCD contains the disc driver operation code that was last performed. The codes have the following definition: (four least significant bits)

octal 00 = request status only
01 = seek only; for Cartridge Tape
Unit, a write protect check
02 = read desired sector
03 = write to disc
04 = verify given records
05 = initialize given sectors
06 = read multiple sectors
07 = write multiple sectors
10 = initialize given track (w/o seek)
11 = request disc sector address
12 = special operation after seek
13 = "END"
14 = transmit requested disc command
sequence; for CS'80 devices, no
execution message
15 = transmit arbitrary bus data
sequence
16 = read data from bus; for CS'80 devices,
read execution message
17 = (CS'80 devices only) copy data

DISC DIAGNOSIS - 3.0 - DISC DRIVER STATUS WORDS

STAT11 - Disc Driver Error Code used during error interpretation

- Code values: (bits 0 - 8)

octal	0 = disc subsystem error (error 90)
	1 = status 2 error
	2 = time out on read from PHI register 2 (error 81)
	3 = time out on write to PHI register 2 (error 81)
	4 = time out on parallel poll (error 81)
	5 = unexpected EOI in Read Byte routine (error 90)
	6 = DMA transfer did not complete (error 90)
	7 = invalid QSTAT
	20 = tape not ready
	22 = buffer disc not ready
	26 = tape operation pending
	30 = disc buffer pending
	31 = tape door locked
	32 = tape not certified
	127 = record preamble read error (error 87)
	130 = record data read error (error 88)

DISC DIAGNOSIS - 4.0 - SUMMARY OF MASS MEMORY COMMANDS

4.0 SUMMARY OF MASS MEMORY COMMANDS BINARY (MMCMDS)

Command	Floppy	7906M	7906H	7910K	5/10/15 MB
REQUEST DSJ	X	X	X	X	X
INITIATE SELF-TEST	X		X	X	X
INITIATE WRITE TEST	X				
READ SELF-TEST	X		X	X	X
IDENTIFY	X	X	X	X	X
HARD CLEAR	X	X	X	X	X
READ LOOPBACK	X		X	X	X
WRITE LOOPBACK	X		X	X	X
DOWNLOAD	X				
COLD LOAD READ	X	X	X	X	
RECALIBRATE		X	X		
SEEK	X	X	X	X	X
REQUEST STATUS	X	X	X	X	X
REQUEST SECTOR ADDRESS		X	X		
READ DATA	X	X	X	X	X
READ FULL		X	X	X	
VERIFY	X	X	X	X	X
WRITE DATA	X	X	X	X	X
WRITE FULL		X	X	X	
DISC CLEAR	X	X	X	X	
INITIALIZE		X	X	X	
ADDRESS RECORD	X	X	X	X	X
REQUEST SYNDROME		X			
READ WITH OFFSET		X	X		
SET FILE MASK		X	X		X
READ WITHOUT VERIFY		X	X		
REQUEST DISC ADDRESS	X	X	X	X	X
DISC END	X	X	X	X	X
WAKEUP		X			
READ VERIFY	X				
ID TRIGGERED READ	X				
FORMAT	X				
REQUEST PHYSICAL ADDRESS	X				

DISC DIAGNOSIS - 5.0 - 7902A/9895K

5.0 7902A/9895K

General procedure to use for errors on the 7902A/9895K:

- 1) If the operating system has reported any errors, refer to the OS Diagnosis section (section 440) for information on interpreting the error codes.
- 2) If the operating system revision is B.04.00 or greater, use the DISC STATUS command to find out the specific hardware and software status values being returned on an error. See section 1.0 (DISC STATUS Command) for details.
- 3) Check the entire configuration of the floppy (refer to the Disc Configuration section). This includes all cables, and unit numbers.
- 4) Run self-test on the Floppy Controller Board. Refer to the appropriate Service Manual for details. Correct any error conditions reported.
- 5) Use the following diagnostics/exercisers to aid in isolating the error:

FCLEAN - control program for cleaning the heads on a floppy
FRATE - error rate test (for errors 84, 87, 88, and 89)
FWEAR - tests for hard read errors on 1 to 3 floppy drives
MMCMSD - binary that allows mass memory commands at the disc driver level (refer to the supplement to the Preliminary On-Site Service Manual for details)
VERIFY - tests that all sectors on a piece of media can be read and allows for limited data recovery

6.0 7906H/7906M/7906S

General procedure to use for errors on the 7906H/7906M/7906S:

- 1) If the operating system has reported any errors, refer to the OS Diagnosis section (section 440) for information on interpreting the error codes.
- 2) If the operating system revision is B.04.00 or greater, use the DISC STATUS command to find out the specific hardware and software status values being returned on an error. See section 1.0 (DISC STATUS Command) for details.
- 3) Check the entire configuration of the 7906 (refer to the Disc Configuration section). This includes all cables, unit numbers, and HP-IB addresses.
- 4) Run self-test on the 7906. Refer to the appropriate Service Manual for details. Correct any error conditions reported.
- 5) Use the following diagnostics/exercisers to aid in isolating the error:

Hard Disc Diagnostics - group of four tests that exercise the 7906

MMCMDS - binary that allows mass memory commands at the disc driver level (refer to the supplement to the Preliminary On-Site Service Manual for details)

Track Map - produces a map of all defective/spare tracks

TSPARE - allows for sparing a defective track with limited data recovery

VERIFY - tests that all sectors on a piece of media can be read and allows for limited data recovery

DISC DIAGNOSIS - 7.0 - 7910K

7 0 7910K

General procedure to use for errors on the 7910K

- 1) Be sure the operating system revision is A.03.01 or greater, or is B.04.00 or greater.
- 2) If the operating system has reported any errors, refer to the OS Diagnosis section (section 440) for information on interpreting the error codes.
- 3) If the operating system revision is B.04.00 or greater, use the DISC STATUS command to find out the specific hardware and software status values being returned on an error. See section 1.0 (DISC STATUS Command) for details.
- 4) Check the entire configuration of the 7910K (refer to the Disc Configuration section). This includes all cables and the HP-IB address. 4) Run self-test on the 7910K. Refer to the 7910K Service Manual for details. Correct any error conditions reported.
- 5) Use the following diagnostics/exercisers to aid in isolating the error:

EX7910 - creates a file of 2000 records and verify each record is read correctly

Hard Disc Diagnostics - group of four tests that exercise the 7910K

MMCMDS - binary that allows mass memory commands at the disc driver level (refer to the supplement to the Preliminary On-Site Service Manual for details)

Track Map - produces a map of all defective/spare tracks

TSPARE - allows for sparing a defective track with limited data recovery

VERIFY - tests that all sectors on a piece of media can be read and allows for limited data recovery

8.0 7908P, 7911P, 7912P

Procedure for clearing error 160 (Tape operation pending) and error 161 (Disc buffer pending):

Note: This procedure should be used only if the correct tape cannot be located or the disc buffer cannot be read. It can result in the loss of data.

a) If the Cartridge Tape Maintenance Utility must be run from tape:

- 1) Enter the command

DIRECT NOUUPDATE

to bypass dumping and using a disc buffer.

- 2) Run "TAPFIX". Clear the appropriate condition.
- 3) Enter the command

INDIRECT

to return to using the disc buffer. b) If the Cartridge Tape Maintenance Utility can be run from disc:

- 1) Run "TAPFIX". Clear the appropriate condition.

Commands that can be used when the disc is not working: DIRECT - dumps all pending data in the tape buffer on disc out to tape and sets up a tape buffer in memory to be used for all subsequent tape operations

DIRECT NOUUPDATE - sets up a tape buffer in memory to be used for all subsequent tape operations. The tape buffer on disc is NOT dumped out to tape, so some data may be lost. This should be used only when necessary.

INDIRECT - dumps out the tape buffer in memory and returns to using the tape buffer on disc

DISC DIAGNOSIS - 8.0 - 7908P, 7911P, 7912P

General procedure to use for errors on the 7908P, 7911P, 7912P:

- 1) Verify the Operating System revision is B.04.00 or greater.
- 2) If the operating system has reported any errors, refer to the OS Diagnosis section (section 440) for information on interpreting the error codes.
- 3) Use the DISC STATUS command to find out the specific hardware and software status values being returned on an error. See section 1.0 (DISC STATUS Command) for details.
- 4) Check the entire configuration of the disc (refer to the Disc Configuration section). This includes all cables and the HP-IB address switch.
- 5) Run self-test and the built in diagnostics on the disc. Refer to the disc Service Manual for details. Correct any error conditions reported.
- 6) Run "EXRSIZ" from the CE System Support disc or tape cartridge. This program is identical to the External Exerciser that has been implemented on the HP-85. Refer to the External Exerciser Reference Manual (published by Disc Memory Division) for details on running the exerciser and on error code interpretation.

Note: Some tests in the External Exerciser are destructive to customer files. Be sure that the customer data is backed up before running any of these tests.

Note: The HP 250 version of the exerciser requires the HPIB DROM. This DROM is only on the B.04 CE System Support Disc and/or Tape Cartridge. It is NOT on the customer OS disc. Therefore, before running the exerciser, power up the system using the CE System Support Disc and/or Tape Cartridge. (The HPIB DROM is NOT supported for customers; it is only supported for use with EXRSIZ.)

A summary of the exerciser commands is on the next page.

Summary of exerciser commands:

Command	Description	Exerciser modules			
		EXRSIZ	EXRSI2	TAPE	OPER
CANCEL	cancel previous command	X	X	X	
CERT	certify tape cartridge			X	
CHANNEL	HP-IB channel test utility		X		
CICLEAR	channel independent clear	X	X	X	
CLEAR LOGS	clear drive logs utility	X		X	
CLR	channel independent clear				X
CMPR	write-then-read and compare				X
COMP	complementary command				X
DIAG	execute internal diagnostic		X		
EDIT	replace an OPER program step				X
ENDLP	end loop				X
ERRSUM	read error summary utility	X		X	
ERT LOG	read error rate log utility	X		X	
EXEC	execute OPER program steps				X
EXIT	exit the current program	X	X	X	X
FAULT LOG	read fault log utility	X			
HELP	print list of commands	X	X	X	X
INIT MEDIA	initialize disc or tape		X	X	
INSK	incremental seek				X
LCRD	locate and read				X
LCWR	locate and write				X
LIST	list OPER program steps				X
LOOP	loop				X
NEW	clear current OPER program				X
NULL	delete OPER program step				X
PRESET	preset drive utility	X	X	X	
RELS	release device				X
REQSTAT	request status	X	X	X	
REV	read firmware revision		X		
RF SECTOR	read full sector		X		
RO ERT	read only error rate test	X		X	
RQST	request status				X
RUN LOG	read run time log utility	X		X	
SDCLEAR	selected device clear	X	X	X	
SENSE	read sensors utility		X		
SPARE	spare block utility	X	X	X	
TABLES	read drive tables utility		X	X	
STOP	exit OPER program				X
UNIT	set unit number utility	X	X	X	
UNLOAD	unload the tape			X	
USE LOG	display tape use log			X	
WRITE FM	write filemark on tape			X	
WTR ERT	write then read ERT	X		X	

DISC DIAGNOSIS - 9.0 - 5/10/15 MB DISC

9.0 5/10/15 MB DISC

General procedure to use for errors on the 5/10/15 Mb Disc

- 1) Be sure the operating system revision is B.04.02 or greater (B.05.00 or greater for the 10 Mb disc, and B.06.01 for the 15 Mb disc).
- 2) If the operating system has reported any errors, refer to the OS Diagnosis section (section 440) for information on interpreting the error codes.
- 3) Use the DISC STATUS command to find out the specific hardware and software status values being returned on an error. See section 1.0 (DISC STATUS Command) for details.
- 4) Check the entire configuration of the disc (refer to the Disc Configuration section). This includes all cables and the jumpers used to set the HP-IB address.
- 5) Run self-test on the 5/10/15 Mb Disc. Refer to the 9134/9135 Service Manual for details. Correct any error conditions reported.
- 6) Use the following diagnostics/exercisers to aid in isolating the error:

Hard Disc Diagnostics - (5/10/15 Mb Disc tests) group of three tests that exercise the 5/10/15 Mb Disc. See the next page for details.

MMCMDS - binary that allows mass memory commands at the disc driver level (see section 4.0 for a list of commands; refer to the supplement to the Preliminary On-Site Service Manual for full details of the commands)

VERIFY - tests that all sectors on the disc can be read and allows for limited data recovery

Summary of the 5/10/15 MB Disc Test in the Hard Disc Diagnostics

- To run:
- 1) RUN "CE" and select Hard Disc Diagnostics
 - 2) Select the device to be ":G2,7,0" (5 Mb), or select the device to be ":H2,7,0" (10 Mb); or select the device to be ":I2,7,0" (15 Mb); the option for "5MB DISC TEST", "10 MB DISC TEST", or "15 MB DISC TEST" will appear
 - 3) Set the necessary parameters (select printer, head table, etc.)
 - 4) Select 5/10/15 MB DISC TEST
 - 5) Select EXERCISER, ERR RATE TEST, RANDOM RD/WRITE, or DISC AUTO TEST (the auto test combines the 3 previous tests)

Description of tests:

EXERCISER - consists of 13 tests

- 1) initiate self-test and read results (refer to the 9134/9135 Service Manual for details on interpreting the self test results)
- 2) issue IDENTIFY command
- 3) perform write then read loopback of 12 bytes (maximum drive supports)
- 4) issue a HARD CLEAR command
- 5) issue an END command
- 6) issue a DSG
- 7) issue a REQUEST DISC ADDRESS command
- 8) select a random head, track, and sector; seek to that sector and verify it
- 9) perform a random seek then issue a READ DATA command
- 10) issue an illegal opcode (a WAKEUP command which is not supported) and be sure the drive responds with the correct error status value
- 11) attempt to seek past allowable track (head 3, track 157, sector 5)
- 12) attempt to seek past allowable sector (head 0, track 5, sector 32)
- 13) issue an illegal secondary with the ID TRIGGER READ command and be sure the drive responds with the correct error status value

DISC DIAGNOSIS - 9.0 - 5/10/15 MB DISC

- ERR RATE TEST - performs a sequential write then verify of the entire disc (all writing done before any verifying)
 - the short test uses the rotating patterns of 155555, 133333, 066666
 - the long test uses the rotating patterns of 155555, 133333, 066666, 125252, 055555

- RANDOM RD/WRITE - performs random writes then reads of a string of data of random length
 - a random string of data between 1 and 4096 characters is formed
 - using the head and cylinder table, a random location is selected and the string is written to then read from that location
 - 1 pass of the test is made up of 1024 iterations of the write then read

10.0 LOGICAL LAYOUT

If Error 85 (media not initialized) occurs on media thought to be initialized

- Standard HP format
 - Run "HMEDIA" (see Section 620, Tools -- Utilities, on how to run the program)
 - select "Record 0 Recovery" to try and recover any information that may have been lost in record 0
 - if this completes successfully, try to access the disc again
- HP Interchange format
 - make sure the MEDIA DROM is configured
 - try to access the media on another system that uses HP Interchange format
- IBM format
 - make sure the MEDIA DROM is configured
 - use the commands "IBMDUMP" and "IBMWREC" to examine and recover the information that has been destroyed (refer to MEDIA/250 Programming Manual P/N 45251-90025 for instructions on how to use these commands). Note that these commands will read sectors that have CRC errors. For other occurrences of Error 85, refer to the OS Diagnosis section (section 440).

DISC DIAGNOSIS - 10.0 - LOGICAL LAYOUT

If you are getting file names that have been purged, losing file names, getting any bad file information, available space that is definitely wrong, bad lengths of files, or any other unusual file information

- Standard HP format
 - Enter "CAT"
 - If the information is incorrect, run "HMEDIA"
 - Select "Recover Directory" to try and recover the directory by using the spare directory
 - if this completes successfully, select "Check AVT" to rebuild your availability table
 - if this does not complete successfully, your disc will have to be recovered from a backup
- HP Interchange and IBM formats
 - Use the same procedures as for an Error 85

Refer to the Logical Disc Layout section (section 531) for diagrams.

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Section 521
TERMINAL DIAGNOSIS

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1.0	2649D
2.0	2622D
3.0	264x
4.0	262x

TERMINAL DIAGNOSIS - 1.0 - 2649D

1.0 2649D

- 1) Check the entire configuration of the 2649D (refer to the Terminal Configuration section). This includes all cables, switch settings for the port, the baud rate setting on the ASI board, strappings on the 2649D, and that the RIO DROM is configured.
- 2) Run self-test on the 2649D:
 - a) Press the TEST key for a single pass of self-test.
 - b) To perform the Data Communications self-test, press the SHIFT and TEST keys. Note that either the RS232C/CCIT V.24 test connector assembly (P/N 02645-60002) or the Current Loop test connector assembly (P/N 02645-60035) must be attached to the Data Comm PCA.
 - c) To perform the extended self-tests, press the CTRL and TEST keys. Enter one of the following test numbers:
 - 1 = Continuous self-test
 - 2 = Keyboard matrix test
 - 3 = Data communications switch setting test
 - 4 = Keyboard LED indicator test

Press the SPACE bar to exit.

Refer to the 2649D Service Manual Supplement for more details on self-test.

Correct any problems indicated through these tests.

- 3) Run "TEST" or "CE" and select DISPLAY TEST to check the communication link.
- 4) If errors are still occurring, the problem could be related to the ASI. Configure the 2649D on a different port and then repeat the previous step.
- 5) Refer to the Data Comm Diagnosis section.

2.0 2622D

- 1) Check the entire configuration of the 2622D (refer to the Terminal Configuration section). This includes all cables, switch settings for the port, the baud rate setting on the ASI board, the configuration menu on the 2622D, and that the RIO DROM is configured.
- 2) Run self-test on the 2622D:
 - a) Press the TEST key for a single pass of self-test. This invokes the standard 2622A self-test, followed by the 2622A power-on test.
 - b) To perform the self-test continuously, press the SHIFT and TEST keys. Press the RESUME key to stop the test.
 - c) To perform the continuous Data Communications self-test, press the CTRL and TEST keys. This invokes the 2622A data comm test. Note that either the RS232C/CCIT V.24 test connector assembly (P/N 02620-60056) or the HP 13266A Current Loop Converter must be attached to the Data Comm PCA. Press the RESUME key to stop the test.
 - d) To perform a test of the keyboard in local mode, press the CTRL, SHIFT, and TEST keys. Pressing any key will result in the ASCII code for the key to be displayed in the upper left corner. Press the RESUME key to stop the test.

Refer to the 2622 Service Manual for details on self-test and error interpretation.

Correct any problems indicated through these tests.

- 3) Run "TEST" or "CE" and select DISPLAY TEST to check the communication link.
- 4) If errors are still occurring, the problem could be related to the ASI. Configure the 2622D on a different port and then repeat the previous step.
- 5) Refer to the Data Comm Diagnosis section.

TERMINAL DIAGNOSIS - 3.0 - 264x

3.0 264x

- 1) Check the entire configuration of the 264x (refer to the Terminal Configuration section). This includes all cables, switch settings for the port, the baud rate setting on the ASI board, strappings on the 264x, and that the TIO DROM is configured.
- 2) Run self-test on the 264x. Refer to the service manual for the terminal for more details.

Correct any problems indicated through these tests.

- 3) Enter and run the following program:

```
10      INPUT "ENTER DEVICE ADDRESS OF PORT UNDER TEST
          (Port # + 10)";P
20      REQUEST P
30 Pr:   PRINTER IS P
40      PRINT "ENTER DATA AND PRESS RETURN KEY."
50      ON INPUT #P GOTO In
60      WAIT
70 In:   PRINTER IS 8
80      DISP AREAD$(P)
90      WAIT 1000
100     GOTO Pr
110     END
```

This program outputs ENTER DATA AND PRESS RETURN KEY to the terminal. Data entered at the terminal is then transferred to the HP 250 and displayed on the CRT.

Press HALT to stop the program.

- 4) If errors are still occurring, the problem could be related to the ASI. Configure the 264x on a different port and then repeat the previous step.
- 5) Refer to the Data Comm Diagnosis section.

Note: When using a modem with the 264x, you must cause the HP 250 to present "DTR" by executing a request port command before attempting to dial (e.g. if the terminal is on port 2, issue REQUEST 12; note that the device address used is the port number plus 10).

4.0 262x

- 1) Check the entire configuration of the 262x (refer to the Terminal Configuration section). This includes all cables, switch settings for the port, the baud rate setting on the ASI board, the configuration menu on the 262x, and that the TIO DROM is configured.
- 2) Run self-test on the 262x. Refer to the service manual for the terminal for more details.

Correct any problems indicated through these tests.

- 3) Enter and run the following program:

```

10      INPUT "ENTER DEVICE ADDRESS OF PORT UNDER TEST
          (Port # + 10)";P
20      REQUEST P
30      Pr:  PRINTER IS P
40      PRINT "ENTER DATA AND PRESS RETURN KEY."
50      ON INPUT #P GOTO In
60      WAIT
70      In:  PRINTER IS 8
80      DISP AREAD$(P)
90      WAIT 1000
100     GOTO Pr
110     END
    
```

This program outputs ENTER DATA AND PRESS RETURN KEY to the terminal. Data entered at the terminal is then transferred to the HP 250 and displayed on the CRT.

Press HALT to stop the program.

- 4) If errors are still occurring, the problem could be related to the ASI. Configure the 264x on a different port and then repeat the previous step.
- 5) Refer to the Data Comm Diagnosis section.

Note: When using a modem with the 262x, you must cause the HP 250 to present "DTR" by executing a request port command before attempting to dial (e.g. if the terminal is on port 2, issue REQUEST 12; note that the device address used is the port number plus 10).

Section 522
PRINTER DIAGNOSIS

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3.0	2608A
4.0	2601A
5.0	82905B
6.0	2602A
7.0	2932A/2933A/2934A
8.0	2563A
9.0	2687A

PRINTER DIAGNOSIS - 1.0 - 9871A

1.0 9871A

- 1) Check the entire configuration of the 9871A (refer to the Printer Configuration section). This includes all cables, switch settings on the printer, and that the EUR71 DROM is configured if needed.

Be sure the printer's address is not the same as that of any other peripheral on the HP-IB.

- 2) Run self-test on the 9871A. Refer to the service manual for the printer for more details.

Correct any problems indicated through these tests.

- 3) Run "TEST" or "CE" and select PRINTER TEST to check the communication link.
- 4) Refer to the HP-IB Diagnosis section.

2.0 2631A/2631B

- 1) Check the entire configuration of the printer (refer to the Printer Configuration section). This includes all cables, switch settings on the printer, and, if applicable, the baud rate setting on the ASI board and the switch settings on the port.

If the printer is connected via HP-IB, check that its address is not the same as that of any other peripheral on the HP-IB.

- 2) Run self-test on the printer. Refer to the service manual for the printer for more details.

Correct any problems indicated through these tests.

- 3) Run "TEST" or "CE" and select PRINTER TEST to check the communication link.

- 4) If the printer is connected via HP-IB:

- a) Refer to the HP-IB Diagnosis section.

If the printer is connected via RS-232:

- a) Configure the printer on a different port and repeat step 3.

- b) Refer to the Data Comm Diagnosis section.

PRINTER DIAGNOSIS - 3.0 - 2608A

3.0 2608A

- 1) Check the entire configuration of the 2608A (refer to the Printer Configuration section). This include all cables, switch settings on the printer, and that the P2608 DROM is configured.

Be sure the printer's address is not the same as that of any other peripheral on the HP-IB.

- 2) Run self-test on the 2608A. Refer to the service manual for the printer for more details.

Correct any problems indicated through these tests.

- 3) Run "TEST" or "CE" and select PRINTER TEST to check the communication link.
- 4) Refer to the HP-IB Diagnosis section.

4.0 2601A

- 1) Verify the operating system revision is E.04.00 or greater.
- 2) Check the entire configuration of the 2601A (refer to the Printer Configuration section). This includes all cables, switch settings on the port, the baud rate setting on the ASI board, the switch settings on the operator control panel on the 2601A, and that the TIO and P2601 DROMs are configured.
- 3) Run self-test on the 2601A. Refer to the service manual for the printer for more details.

Correct any problems indicated through these tests.

- 4) Run "TEST" or "CE" and select PRINTER TEST to check the communication link.
- 5) If errors are still occurring, the problem could be related to the ASI. Configure the 2601A on a different port and then repeat the previous step.
- 6) Refer to the Data Comm Diagnosis section.

Note: The following conditions are due to the design of the 2601A driver:

- 1) If the P2601 DROM is not loaded, printing is still allowed but some characters will print wrong (special characters and many non-USASCII characters). The DROM must be loaded for all characters to print correctly.
- 2) When SHIFT HALT or CONTROL HALT is pressed, the following will occur:
 - a) If "REQUEST id" has been issued previously for the 2601A, both the HP 250 and 2601A buffers are cleared and printing stops immediately.
 - b) If "REQUEST id" has NOT been issued previously for the 2601A, only the HP 250 buffer is cleared. Since the buffer size of the 2601A is large (about 2700 bytes), printing can continue for over 1 minute.

PRINTER DIAGNOSIS - 5.0 - 82905B

5.0 82905B

- 1) Verify the operating system revision is B.05.00 or greater.
- 2) Check the entire configuration of the 82905B (refer to the Printer Configuration section). This includes all cables and switch settings on the printer.
- 3) Run self-test on the 82905B. Refer to the printer service manual for more details.

Correct any problems indicated through these tests.

- 4) Run "TEST" or "CE" and select PRINTER TEST to check the communications link.
- 5) Refer to the Data Comm Diagnosis section.

6.0 2602A

- 1) Verify the operating system revision is B.05.00 or greater.
- 2) Check the entire configuration of the 2602A (refer to the Printer Configuration section). This includes all cables and switch settings on the printer.
- 3) Run self-test on the 2602A. Refer to the printer service manual for more details.
- 4) Run "TEST" or "CE" and select PRINTER TEST to check the communications link.
- 5) Refer to the Data Comm Diagnosis section.

7.0 2932A/2933A/2934A

- 1) Verify the operating system revision is B.06.00 or greater.
- 2) Check the entire configuration of the 293X printer (refer to the Printer Configuration section). This includes all cables, switch settings on the printer, and and switch settings on the port.

If the printer is connected via HP-IB, check that its address is not the same as that of any other peripheral on the HP-IB.

- 3) Run self-test on the 293X printer. Refer to the printer service manual for more details.

Correct any problems indicated through these tests.

- 4) Run "TEST" or "CE" and select printer test to check the communication link.
- 5) If the printer is connected via RS-232, configure the printer on a different port and repeat step 4.

8.0 2563A

- 1) Verify the operating system revision is B.06.00 or greater.
- 2) Check the entire configuration of the 2563A (refer to the Printer Configuration section). This includes all cables and switch settings on the printer.

If the printer is connected via HP-IB, check that its address is not the same as that of any other peripheral on the HP-IB.

- 3) Run self-test on the printer. Refer to the printer service manual for more details.

Correct any problems indicated through these tests.

- 4) Run "TEST" or "CE" and select PRINTER TEST to check the communication link.
- 5) If the printer is connected via RS-232, configure the printer on a different port and repeat step 4.

PRINTER DIAGNOSIS - 9.0 - 2687A

9.0 2687A

- 1) Verify the operating system revision is B.06.00 or greater.
- 2) Check the entire configuration of the 2687A (refer to the Printer Configuration section). This includes all cables and switch settings on the printer.
- 3) Run self-test on the printer and its controller. Refer to the printer service manual for more details.

Correct any problems indicated through these tests.

- 4) Run "TEST" or "CE" and select printer test to check the communications link.

Section 523

PLOTTER DIAGNOSIS

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1.0 7220, 7221, 7225, and 7470

PLOTTER DIAGNOSIS - 1.0 - 7220, 7221, 7225, AND 7470

1.0 7220, 7221, 7225, AND 7470

- 1) Verify the Operating System revision is B.04.00 or greater.
- 2) Turn the plotter off, then back on. This will insure the plotter is not in some unusual state.
- 3) Check that
 - a) the "chart load" light is off
 - b) the "enter" light is not on or blinking
 - c) for the 7220 and 7221,
 - the "on line" light is blinking
 - the "standby" and "local" lights are off
 - the "data set" light is on
- 4) Check the entire configuration of the plotter (refer to the Plotter Configuration section). This includes all cables, switch settings on the plotter, switch settings for the port, and the baud rate setting on the ASI Board.
- 5) Run "TEST" and select PLOTTER TEST to perform the confidence plot.
- 6) To run the self-test or confidence test built in the plotter, refer to the appropriate Service Manual. If these tests pass, continue with this procedure.
- 7) The problem could be related to the ASI. Configure the plotter on a different port and then perform the confidence plot in "TEST".
- 8) Refer to the Data Comm Diagnosis section.

GPLCFT - GRAPHICS DEVICE/SYSTEM CONFIDENCE TEST

28 SEPT 82
Run# 1
7470A
Device address=17
Buffer size=255 bytes

Slowest velocity test

NINE LINSTYLES	TWO PENS
0	
1	1
2	2
3	
4	
5	
6	
7	
8	
9	

TEXT ROTATION=3

TEXT ROTATION=1

TEXT ROTATION=2

TEST
COMPLETED

!"#\$%&'()*+,-./:;<=>?@ABCDEFGHIJKLMNO
 PQRSTUVWXYZ[\]^_`abcde fghijklmno
 pqrstuvwxyz{|}~f

Revision HP250. 4. 02

PLOTTER DIAGNOSIS - 1.0 - 7220, 7221, 7225, AND 7470

DATA CAPTURE TERMINAL DIAGNOSIS

Section 524

DATA CAPTURE TERMINAL DIAGNOSIS

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- 1.0 3075A/3076A/3077A
- 2.0 3081A

DATA CAPTURE TERMINAL DIAGNOSIS - 1.0 - 3075A/3076A/3077A

1.0 3075A/3076A/3077A

- 1) Verify the operating system revision is B.06.00 or greater.
- 2) Check the entire configuration of the 307x terminal (refer to the Data Capture Terminal Configuration section). This includes cabling, switch settings, baud rate, the system and the terminal is configured the same, and that the TIO DROM is configured.
- 3) Run self-test on the 307x. Refer to the Data Capture Terminal service manual for more details.

Correct any problems indicated through these tests.

- 4) Run "TEST" or "CE" and select DISPLAY TEST to check the communication link.

2.0 3081A

- 1) Verify the operating system revision is B.06.00 or greater.
- 2) Check the entire configuration of the 3081A terminal (refer to the Data Capture Terminal Configuration section). This includes cabling, switch settings, baud rate, the system and the terminal configuration is the same, and that the TIO DROM is configured. Also, ensure that cabling on the 92922A 4-Channel Adapter is correct.
- 3) Run self-test on the 3081A. Refer to the Data Capture Terminal service manual for more details.

Correct any problems indicated through these tests.

- 4) Run "TEST" or "CE" and select DISPLAY TEST to check the communication link.

Section 525

BAR CODE READER DIAGNOSIS

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1.0 39800A

BAR CODE READER DIAGNOSIS - 1.0 - 39800A

1.0 39800A

- 1) Verify the operating system revision is B.06.00 or greater.
- 2) Check the entire configuration of the reader (refer to the Bar Code Reader Configuration section). This includes cabling, switch settings, baud rate, the configuration of the system and the reader are the same, and that the TIO DROM is configured.
- 3) Run self-test on the reader and the wand test, using the bar code on the bottom of the reader. Refer to the reader service manual.

Correct any problems indicated through these tests.

- 4) Run "TEST" or "CE" and select DISPLAY TEST to check the communication link.

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Section 530
PHYSICAL DISC LAYOUT

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- 1.0 7902A/9895K
- 2.0 7906H/7906M/7906S
- 3.0 7910K
- 4.0 7908P
- 5.0 7911P
- 6.0 7912P
- 7.0 Tape Cartridge for 7908P/7911P/7912P

PHYSICAL DISC LAYOUT - 1.0 - 7902A/9895K

IBM 3740 Standard Data Interchange Format

Index Hole										Index Hole																																							
| 1 |										| 1 |																																							
| Gap |			| Gap |			| Sector |			| Gap |			| Sector |			| Sector |			| Gap |			| Sector |			| Gap |																									
| 3 |			| 0 |			| 1 |			| 2 |			| 2 |			| 25 |			| 2 |			| 26 |			| 3 |																									
v										v																																							
00										Index Address Marker										ID Field										Gap 1										Data Field									
(6)										(1)										v (13)										v (11)										v (137)									
v										v										v										v										v									
| Sync-up |			| ID Address |			| Track |			| 00 |			| Sector |			| 00 |			| CRC |			|			|			|																						
| Bytes* |			| Marker |			| # |			| # |			| # |			| # |			| # |			| # |			| # |			| # |																						
(6)			(1)			(1)			(1)			(1)			(1)			(2)			v			v			v																						
v										v										v										v																			
| Gap |			| Length |			| Hex |			|			| Sync-up |			| Data Address |			| Data |			| CRC |			|																									
| |			| (bytes) |			| Value |			|			| Bytes* |			| Marker |			|			|			|																									
0 |			26 |			FF |			|			(6)			(1)			(128)			(2)			|																									
1 |			11 |			FF |			|			|			|			|			|			|																									
2 |			26 |			FF |			|			|			|			|			|			|																									
3 |			313** |			FF |			|			|			|			|			|			|																									

* sync-up bytes value are hex 00 00 00 00 00 00

** length is approximate since it depends on exact recording speed

(n) = number of bytes

Sector Layout for 7902A/9895K (IBM Format)

Data bytes per sector: 128
 Sectors per track: 26
 Cylinders (tracks per surface): 77 (including 2 spares)
 Heads: 1
 Mode: Surface

PHYSICAL DISC LAYOUT - 2.0 - 7906H/7906M/7906S

2.0 7906H/7906M/7906S

| ISG |	Sector n				| ISG |	Sector n+1				| ISG |
v	(300)				v					v
| Sync Field |	Preamble		Data			Postamble				
(24)	v	(6)	v	(256)			v	(14)	v	
v	v		v			v		v		
| Sync |	CYLAD	| S |	P	| D |	Head #	| Sector # |	| CRC |	ECC	|	
(2)	(2)	\	(1)			(1)	(2)	(12)		

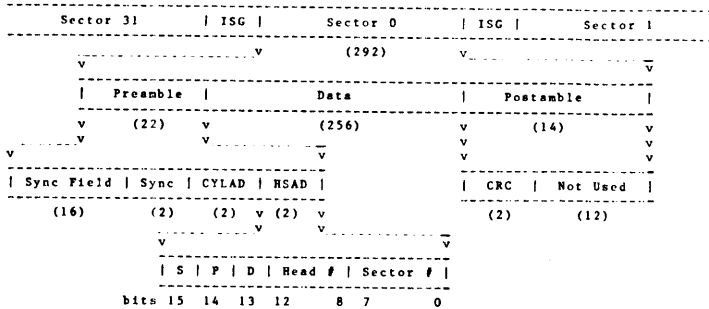
Notes:

- (n) = number of bytes
- ISG = Intersector Gap
- Sync Field = 24 bytes (192 bits) of 0's
- Sync = Sync word containing (octal) 100376 if ECC field is valid, otherwise (octal) 100377
- CYLAD = Cylinder Address
- S = Spare bit (1 = spare track in active use)
- P = Protect bit (1 = protected track)
- D = Defective bit (1 = defective track)
- CRC = Cyclic Redundancy Check
- ECC = Error Correcting Code (not written or read by 7906H)

Sector Layout for 7906H/7906M/7906S

Data bytes per sector: 256
 Sectors per track: 48
 Cylinders (tracks per surface): 411 (including 11 spare)
 Heads: 4
 Mode: Surface

3.0 7910K



Notes:

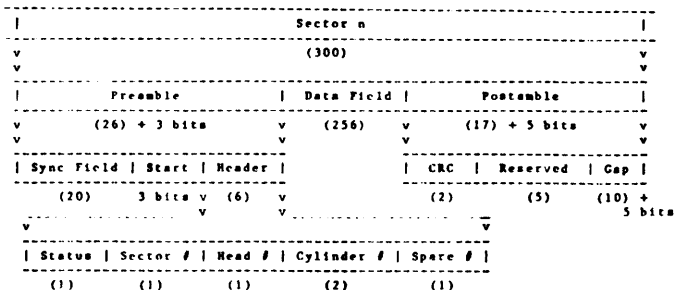
- (n) = number of bytes
- ISG = Intersector Gap
- Sync Field = 16 bytes (128 bits) of 0's
- Sync = Sync word containing (octal) 100377
- CYLAD = Cylinder Address
- RSAD = Head Sector Address
- S = Spare bit (1 = spare track in active use)
- P = Protect bit (1 = protected track)
- D = Defective bit (1 = defective track)
- CRC = Cyclic Redundancy Check

Sector Layout for 7910K

Data bytes per sector: 256
 Sectors per track: 32
 Cylinders (tracks per surface): 748 (including 3 spare and 10 for landing area)
 Heads: 2
 Mode: Cylinder

PHYSICAL DISC LAYOUT - 4.0 - 7908P

4.0 7908P



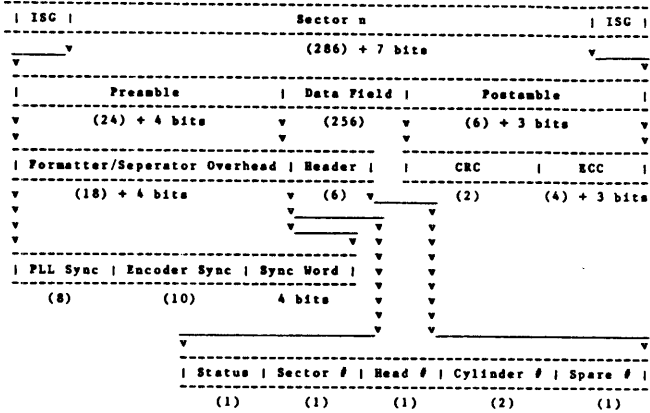
Notes:

- (n) = number of bytes
- Start = signals the start of the information to follow
- CRC = Cyclic Redundancy Check
- Status = type of track (logical, spare, defective, or maintenance)
- Spare # = logical number of the spare sector when the spare is needed, or when the spare sector is not being used, the number of physical sectors per track

Sector Layout for 7908 Disc

Data bytes per sector: 256
 Sectors per track: 36 (including 1 spare)
 Cylinders (tracks per surface): 380 (including 6 spares and 4 for maintenance)
 Heads: 5
 Mode: Absolute logical sector

5.0 7911P



Notes:

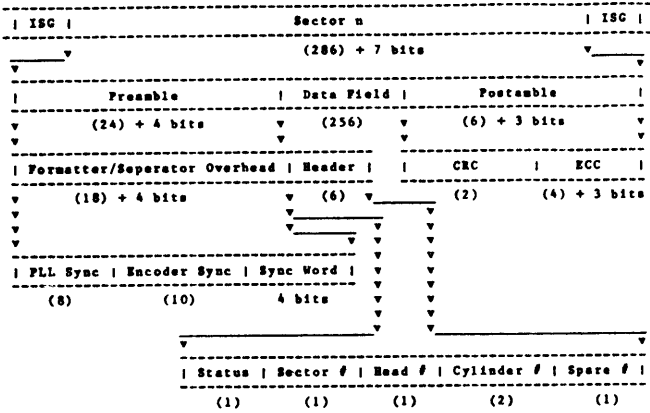
- (n) = number of bytes
- ISG = Intersector Gap
- CRC = Cyclic Redundancy Check
- ECC = Error Correction Code
- Status = type of track (logical, spare, defective, or maintenance)
- Spare # = spared sector address

Sector Layout for 7911 Disc

Data bytes per sector: 256
 Sectors per track: 65 (including 1 spare)
 Cylinders (tracks per surface): 582 (including 8 spares and
 2 for maintenance)
 Data heads: 3
 Mode: Absolute logical sector

PHYSICAL DISC LAYOUT - 6.0 - 7912P

6.0 7912P



Notes:

- (n) = number of bytes
- ISG = Intersector Gap
- CRC = Cyclic Redundancy Check
- ECC = Error Correction Code
- Status = type of track (logical, spare, defective, or maintenance)
- Spare # = spared sector address

Sector Layout for 7912 Disc

Data bytes per sector: 256
 Sectors per track: 65 (including 1 spare)
 Cylinders (tracks per surface): 582 (including 8 spares and 2 for maintenance)
 Data heads: 5
 Mode: Absolute logical sector

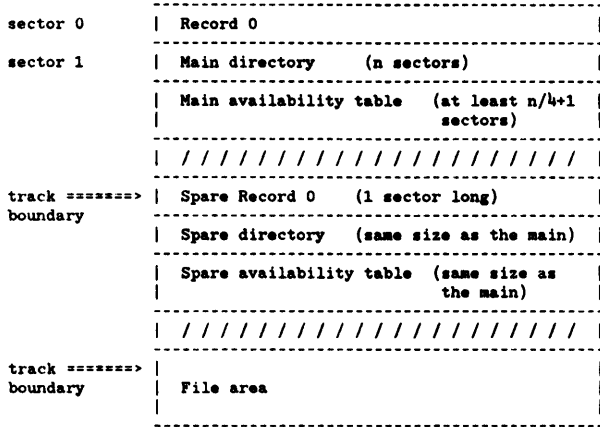
Section 531

LOGICAL DISC LAYOUT

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- 1.0 HP 250 Format
 - 1.1 Overall Disc Layout
 - 1.2 Record 0
 - 1.3 File Directory
 - 1.4 Availability Table
- 2.0 HP Interchange Format
 - 2.1 Overall Disc Layout
 - 2.2 Volume Label
 - 2.3 File Directory
- 3.0 IBM 3740 1/4M Byte Format
 - 3.1 Overall Disc Layout
 - 3.2 Sector 5 (Error Map Sector)
 - 3.3 Sector 7 (Volume Identification Sector)
 - 3.4 Data Set Headers

LOGICAL DISC LAYOUT - 1.0 - HP 250 FORMAT



Logical Layout for 5, 10 and 15 Mb Discs

LOGICAL DISC LAYOUT - 1.0 - HP 250 FORMAT

sector 0	| Record 0	|
sector 1	| Main directory (255 sectors)	|
sector 256	| Main availability table (128 sectors)	|
sector 384	| Spare Record 0 (1 sector)	|
sector 385	| Spare directory (255 sectors)	|
sector 640	| Spare availability table (128 sectors)	|
sector 768	| File area	|

Logical layout for Cartridge Tape Unit

LOGICAL DISC LAYOUT - 1.0 - HP 250 FORMAT

1.2 Record 0

	bit				
	15	14	2	1	0
word 0	-----|				
	| System ID code (see notes) |				

1	| number of records per track |				

2	| total number of good tracks |				

3	| track number of spare directory |				

4	| first record number of main directory |				

5	| first record number of main availability table |				

6	| first record number after main avail table |				

7	| first user track number |				

8	| number of user tracks |				

9	| interleave factor (177777 if not important) |				

10	|SY |	not used			|PR |RD |

11	| (see notes) |				

12	| (see notes) |				

13	| not used				|DA |

14	| string ID code for the volume label (see notes)|				

15	| volume label character count (see notes) |				

16	| volume label (2 characters per word) |				

17	| volume label (2 characters per word) |				

18	| volume label (2 characters per word) |				

19	| volume label (2 characters per word) |				

LOGICAL DISC LAYOUT - 1.0 - HP 250 FORMAT

RECORD 0 NOTES

- word 0 - System ID codes are 003000 for HP 250
 002400 for HP 9835 and HP 9845
 001000 for HP 9831
 000000 for HP 9825
- word 10 - HP 250 flag word
 SY (bit 15) ==> HP 250 system file present
 PR (bit 1) ==> privileged DROM permit flag
 HD (bit 0) ==> hardware diagnostic present
 (bit 0 set overrides bit 15)
- words 11 and 12 - disc address of the start of a hardware
 diagnostic program if bit 0 of word 10 is
 set and bit 15 of word 10 is clear
- word 13 - bit 0 0=Double word AVT used
 1=4 word AVT used (for CS80 discs)
- word 14 - value is 000074 for HP 250
- word 15 - maximum value of 000010 for HP 250

DEFAULT RECORD 0 VALUES

Word	7902/ 9895 (:F)	7906 (:C,:D)	7910 (:L)	7908 disc (:Q)	7911 disc (:R)	7912 disc (:S)	150 ft tape (:K)	600 ft tape (:K)
0	003000	003000	003000	003000	003000	003000	003000	003000
1	000036	000060	000040	000043	000100	000100	000100	000100
2	000226	001440	002676	003472	003264	007644	001776	007770
3	000001	000002	000002	000004	000003	000005	000006	000006
4	000001	000001	000001	000001	000001	000001	000001	000001
5	000027	000114	000063	000135	000200	000325	000400	000400
6	000035	000137	000100	000214	000300	000500	000600	000600
7	000002	000004	000004	000044	000025	000031	000014	000014
8	000224	001434	002672	003426	003237	007613	001762	007754
9	000004	177777	177777	000001	000001	000001	000001	000001

(all default values listed are in octal)

LOGICAL DISC LAYOUT - 1.0 - HP 250 FORMAT

DEFAULT RECORD 0 VALUES CONTINUED

Word	5 Mb disc (:G)	10 Mb disc (:H)	15 Mb disc (:I)
0	003000	003000	003000
1	000037	000037	000037
2	001144	002304	003446
3	000002	000002	000002
4	000001	000001	000001
5	000061	000061	000061
6	000076	000076	000076
7	000004	000004	000004
8	001140	002300	003442
9	177777	177777	177777

1.3 File Directory

	bit															
	15	13	12		9	8	7	6								0
word 0	| file name (2 characters per word) |															
1	| file name (2 characters per word) |															
2	| file name (2 characters per word) |															
3	| file starting address (least significant bytes) |															
4	| file length in logical records |															
5	| logical record length (words per record) |															
6	| sys flags |				| file type |				| NU |		| BU |		| addr (MSB) |			
7	| protect code |															

Each directory entry consists of the 8 words shown above.

There are 16 directory entries per sector in the directory.

The logical end of the directory is denoted by

word 0 = 000000

word 1 = 177777

Any directory entries that are not used are zeroed out.

LOGICAL DISC LAYOUT - 1.0 - HP 250 FORMAT

FILE DIRECTORY NOTES

word 6 - sys flags (bits 15 - 13)

000 ==> unused
001 ==> written by HP 9835
010 ==> written by HP 9831
011 ==> written by HP 250 <---
100 ==> written by HP 9845
101 ==> unused
110 ==> written by GALLEON
111 ==> unused

file type (bits 12 - 9)

0000 ==> BKUP file
0001 ==> CHAR file
0010 ==> DATA file
0011 ==> reserved
0100 ==> PROG file
0101 ==> unused
0110 ==> KEYS file
0111 ==> COMM file
1000 ==> unused
1001 ==> SYST file
1010 ==> unused
1011 ==> DROM file
1100 ==> BPRG file
1101 ==> FORM file
1110 ==> DSET file
1111 ==> ROOT file

NU (bit 8) ==> not used

BU (bit 7) ==> backed up if bit is set

addr (MSB) (bits 6 - 0) ==> file starting address
(most significant bits)

1.4 Availability Table

Non-CS'80 devices:

word 0	starting location of the available space
1	size of the available space (in sectors)

Each availability table entry consists of the two words shown above.

There are 64 availability table entries per sector in the availability table.

The logical end of the availability table is indicated by word 0 = 177777

Any availability table entries that are not used are zeroed out.

CS'80 devices:

words 0-1	starting location of the available space
2-3	size of the available space (in sectors)

Each availability table entry consists of the four words shown above.

There are 32 availability table entries per sector in the availability table.

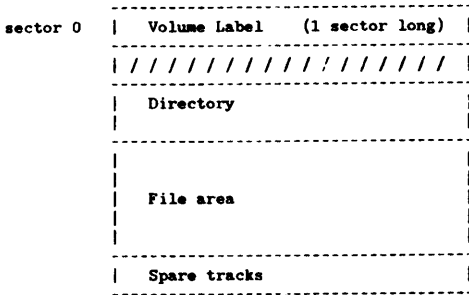
The logical end of the availability table is denoted by word 0 = 177777

Any availability table entries that are not used are zeroed out.

LOGICAL DISC LAYOUT - 2.0 - HP INTERCHANGE FORMAT

2.0 HP INTERCHANGE FORMAT

2.1 Overall Disc Layout



Each part of the layout begins at a sector boundary.

LOGICAL DISC LAYOUT - 2.0 - HP INTERCHANGE FORMAT

2.2 Volume Label

	bit		0
	15		
word 0		100000 octal (Disc ID)	
1		Volume Label (2 characters per word)	
2			
3			
4		Directory Start Address (Sector number)	
5			
6		010000 octal (Needed by HP 3000)	
7		Dummy (Set to zero)	
8		Length of Directory (Fixed at Initialization)	
9			
10-127		Not defined (Set to zero)	

LOGICAL DISC LAYOUT - 2.0 - HP INTERCHANGE FORMAT

VOLUME LABEL NOTES

Location

- the location of the Volume Label is defined to be Track 0, Sector 0, and Surface 0. All words in Track 0, Sector 1, and Surface 0 will be initialized to 0 for compatibility with the HP 3000.

words 1, 2, and 3

- characters will be packed with the first character of a pair in the high-order byte
- trailing characters will be spaces
- characters must be upper case letters (A-Z) or digits (0-9)
- first character must be a letter
- default volume label is six spaces

words 4 and 5

- double word integer showing the sector number of the start of the directory
- first word contains the high-order bits
- second word contains low-order bits

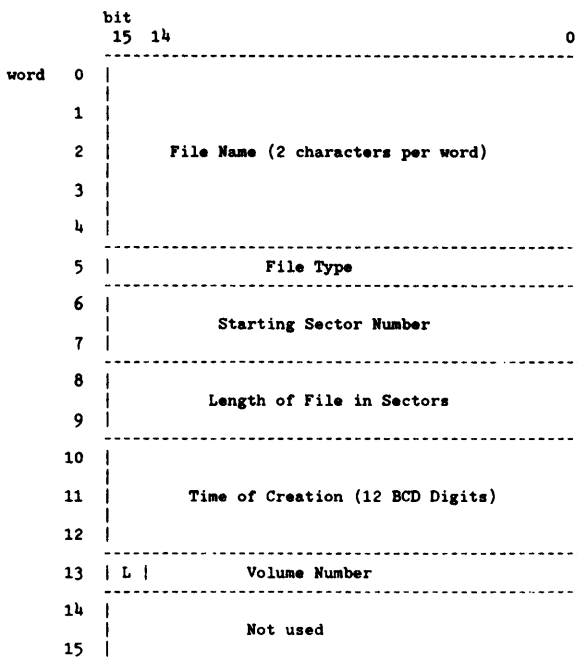
word 6

- eliminates console messages on the HP 3000 (must be written as shown)

words 8 and 9

- double word integer that stops the directory from overwriting user storage space
- directory size fixed at initialization
- contains the maximum allowable length of the directory in sectors.

2.3 File Directory



End of logical directory indicated by file type of 177777

Purged file indicated by file type of 000000. This standard makes no statement on directory names of purged files.

ASCII data file indicated by file type of 000001. This is the interchange file type. The associated file consists of eight-bit ASCII data records.

LOGICAL DISC LAYOUT - 2.0 - HP INTERCHANGE FORMAT

FILE DIRECTORY NOTES

words 0 to 4

- characters are packed with first byte of a pair in the most significant byte of the word
- characters must be upper case letters (A-Z) and digits (0-9)
- the first character must be a letter
- all non-purged files must have at least one character in their file name

word 5

- negative file types reserved for system dependent applications. They are broken into the following groups:

RANGE	APPLICATION
100000 to 155777	Not defined
156000 to 157777	CSD
160000 to 161777	CVD
162000 to 163777	DTD
164000 to 165777	9845/9835
166000 to 167777	HP 250
170000 to 171777	HP 1000
172000 to 173777	HP 3000
174000 to 175777	HP 300
176000 to 177776	Special interdivisional file types commonly used for interchange.

Three general negative file types are presently defined.

- 177776 binary data file (data types are undefined and must be known in detail before exchange can take place)
- 177775 keyed data file
- 177774 interchange numeric format

FILE DIRECTORY NOTES (Continued)

words 6 and 7

- starting sector number for a file is a double word integer
- most significant bits are in word 6
- least significant bits are in word 7

words 8 and 9

- double word integer showing the allocated space for the file (not current length) on this volume
- most significant bits are in word 8
- least significant bits are in word 9
- lengths less than zero are not allowed
- the length and start address fields of a purged file are not guaranteed to be accurate
- free space will be computed from the start address and length fields of the two nearest valid files that surround the free space

words 10, 11, and 12

- 12 BCD digits of the form YYMMDDHHMMSS
- first digit in most significant bits of word 10
- last digit in least significant bits of word 12
- field may also be used for version numbers on systems with no real time clock
- if the year and month are zero, the other fields the volume number
- if a file spans several volumes, directory entries must have the same time stamp or version number

LOGICAL DISC LAYOUT - 2.0 - HP INTERCHANGE FORMAT

FILE DIRECTORY NOTES (Continued)

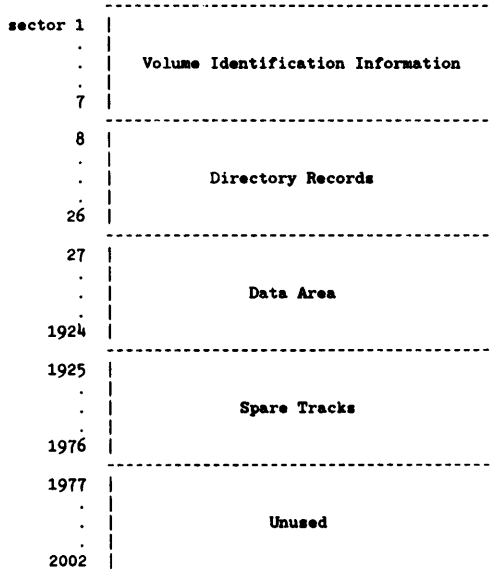
word 13

- L=last volume flag. If L=0 this is not the last volume of the file. If L=1, this is the last volume of the file.
- 14-bit unsigned integer containing the volume number of this file
- volume number = 0 is not a valid condition
- volumes begin with 1 and are incremented by one for each subsequent volume

LOGICAL DISC LAYOUT - 3.0 - IBM 3740 1/4M BYTE FORMAT

3.0 IBM 3740 1/4M BYTE FORMAT

3.1 Overall Disc Layout



OVERALL DISC LAYOUT NOTES

- IBM media consists of a single-sided flexible disc with 77 accessible tracks
 - 73 data tracks
 - 1 index track
 - 2 spare tracks
 - 1 track unused
- each track contains 26 128-byte sectors

LOGICAL DISC LAYOUT - 3.0 - IBM 3740 1/4M BYTE FORMAT

3.2 Sector 5 (Error Map Sector)

start byte	0	ERMAP
	5	Blank
	6	If any bad tracks on disc, this contains the first bad track number. Otherwise, blank
	8	Binary zero
	9	Blank
	10	If there are two bad tracks, this contains the second bad track number. Otherwise, blank
	12	Binary zero
	13	Blanks
	80	Binary zeros (48 bytes long)

3.3 Sector 7 (Volume Identification Sector)

start byte	0	Volume Label Identifier VOL
	3	Volume Label number 1
	4	Volume Label
	10	Accessibility indicator (blank indicates accessible)
	11	Reserved
	37	Owner identification field
	51	Reserved
	75	Physical record length indicator blank = 128-byte sector
	76	Physical sector sequence code (interleave) blank or 01 to 13
	78	Reserved
	79	Label standard version (must be a W)
	80	Padding (binary zeros) 48 bytes in length

LOGICAL DISC LAYOUT - 3.0 - IBM 3740 1/4M BYTE FORMAT

3.4 Data Set Headers

start byte	0	Label identifier HDR (DDR for deleted data set)
	3	Label number, always 1
	4	Not used by MEDIA DROM
	5	Data Set Name
	13	Not used by MEDIA DROM
	22	Record Length
	27	Not used by MEDIA DROM
	28	Beginning of extent (CCHSS) CC=cylinder, H=head(always 0) SS=Sector
	33	Not used by MEDIA DROM
	34	End of extent (CCHSS)
	39	Not used by MEDIA DROM
	74	End of data (CCHSS)
	79	Not used by MEDIA DROM (49 bytes in length)

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Section 600

REPLACEABLE PARTS

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- 600 Table of Contents
- 601 Replaceable Parts Overview
- 610 Service Materials
 - 1.0 Support Packages
 - 1.1 HP 250 Tool PSP
 - 2.0 Support Materials
 - 2.1 Account CE Support Materials
 - 2.2 TSE Support Materials
 - 3.0 Recommended Field Inventory
 - 3.1 HP 250 Exchange Assemblies
 - 3.2 Recommended Non-Exchange Assemblies
 - 3.3 Non-Exchange Assemblies for Remote Sites
 - 3.4 45260A Non-Exchange Assemblies for Cosmetic Repairs
- 620 Parts

Section 601

REPLACEABLE PARTS OVERVIEW

This chapter contains lists of replaceable parts for the HP 250:

- 610 SERVICE MATERIALS - contents of the support packages, support materials, and recommended field inventory, including exchange and non-exchange items
- 620 PARTS - lists of various parts that can be order in the field (this is not a complete list; refer to the diagrams book for more complete lists of parts)

-hp-

Section 610
SERVICE MATERIALS

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- 1.0 Support Packages
 - 1.1 HP 250 Tool PSP
- 2.0 Support Materials
 - 2.1 Account CE Support Materials
 - 2.2 TSE Support Materials
- 3.0 Recommended Field Inventory
 - 3.1 HP 250 Exchange Assemblies
 - 3.2 Recommended Non-Exchange Assemblies
 - 3.3 Non-Exchange Assemblies for Remote Sites
 - 3.4 45260A Non-Exchange Assemblies for Cosmetic Repairs

This section is used in both the HP 250 Service Handbook and in IOSM HP 250-09. As the information in this section changes, both the Service Handbook section and the IOSM will be re-issued.

This document covers service parts for all three HP 250 models: 4525xA, 45251B, and 45260A. Parts are used for only those models indicated in the tables. If a table is for the 45260A (e.g., 45260A Parts PSP), all the parts are used on the 45260A, and there are marks if those parts are used also on the 4525xA or 45251B. If the title of the table does not specify a model (e.g., HP 250 Exchange Assemblies), the parts are used on a specific model only if marked for the model.

For differences in parts related to the German Tub manufactured in Boeblingen, contact the HP 250 Product Support Group in Boeblingen.

SERVICE MATERIALS - 1.0 - SUPPORT PACKAGES

1.0 SUPPORT PACKAGES

1.1 HP 250 Tool PSP

This is the current Tool PSP for the 4525xA, which will be used also for the 45251B and 45260A. It will be modified to add the items necessary for the 45260A, as described on the next page.

45250-67807 HP 250 Tool Product Support Package

Part #	Description
-----	-----

(MAINFRAME)

1390-0575	Master On/Off Key for 4525xA
1540-0514	Adjustable Parts Container
1540-0591	Media Box
4342-0036	Anti-Static Pad
7120-7597	Overlay, Soft Key
31000-60070	Keycap Removal Tool
45000-68809	Hardware Installation Kit (nuts & bolts)

(ASI)

45120-68801	RS232 Test Hood (Qty 3)
02645-60002	RS232 Test Connector
02645-60035	Current Loop Test Connector

(INP)

45122-62101	Autodial Loopback Connector
45122-62102	Sync Loopback Connector

(9895K/7902A - Common to both drives)

09895-87900	Cleaner Kit for Floppy Drive
45099-25009	250 Floppy Cleaning Program
45251-10100	Diskettes, init, double-sided (order 10)

(7902A)

1150-1310	Cartridge Guide Adjustment Tool
-----------	---------------------------------

SERVICE MATERIALS - 1.0 - SUPPORT PACKAGES

The Tool PSP requirements for the 45260A are a superset of the Tool PSP requirements for the 4525xA and 45251B. Therefore, a separate Tool PSP for the 45260A is not needed. The following items will be added by a PCO to the HP 250 Tool PSP at the introduction of the 45260A:

Part # -----	Description -----
9164-0156	Tape Cartridge (order 5 each)
8710-0688	Pin Removal Tool
1251-3818	Connector pin, male (order 10 each)
1251-3911	Connector pin, female (order 10 each)
1390-0578	On/Off key for 45260A

SERVICE MATERIALS - 2.0 - SUPPORT MATERIALS

2.0 SUPPORT MATERIALS

2.1 Account CE Support Materials

Account CEs must have the following tools to support the HP 250:

1150-1097 IDS Model 60 "Blue Box" RS-232 Monitor
45250-67807 HP 250 Tool PSP

2.2 TSE Support Materials

TSEs should have all of the CE items listed above, plus the following additional tools:

1602A	Logic State Analyzer
1602A-Opt. 001	HP-IB Interface Control for 1602A
10050A	HP-IB Adapter for 1602A
10051A	HP-IB Test Probe for 1602A
5061-1254	1602A Probe Test Connector
HP 85A	Personal Computer (CSD standard configuration)
1640A	Data Comm Analyzer
HP 250 System	including 128K-Byte Memory Board, INP and ASI boards, 7910 Disc Drive, 2531B Printer
	or
	25K-Byte Memory Board, 5, 10, or 15 K-Byte Disc Drive and Flexible Disc Drive, INP and ASI boards, 2631B or 293X Printer
Model 3600	Portable Power Line Disturbance Monitor, capable of measuring impulse energy or impulse width

SERVICE MATERIALS - 3.0 - RECOMMENDED FIELD INVENTORY

3.0 RECOMMENDED FIELD INVENTORY

3.1 HP 250 Exchange Assemblies

Used on	New Board Part Number	Exchange Part Number	Board Description
--4525xA			
| --45251B			
v | --45260A			
X v |	45000-66501	45000-69501	CRT Sweep (a)
X v	45000-66505	45000-69505	Processor Board (b)
X X	45000-66506	45000-69506	Display Logic
X X X	45000-66507	45000-69507	HP-IB Board
X X	45000-66508	45000-69508	Kybd Logic
X X	45000-66509		Kybd Matrix (c)
X	45000-66511	45000-69561	Power Supply (d)
X X X	45000-66513	45000-69513	64KB Memory
X X X	45000-66514	45000-69514	Block Switch
X	45000-66523	45000-69523	32KB Memory
X X X	45000-66533	45000-69533	128KB Memory
X X X	45000-66552	45000-69552	Low Cost Pwr Supply (d)
X X	45000-66562	45000-69562	CRT Sweep (a)
X X X	45000-66565	45000-69565	Processor-II Board (b)
X X X	45000-66570	45000-69570	512KB Memory Board (e)
X X X	45000-66571	45000-69571	256KB Memory Board (e)
X X (U.S.)	45000-68812	45000-69812	Kybd Assy (U.S.) (c)
X X (German)	45000-68813	45000-69813	Kybd Assy (German) (c)
X X X	07902-66520	07902-69520	Floppy Controller (for "common" drives)
X X X	45000-67914	45000-69914	7902A Common Drive & Drive Electronics
X X X	07902-66510	07902-69560	Floppy Controller (for 9895K drives)
X X X	09895-67914	09895-69914	9895K Drive & Elec.

-- continued

Notes:

- (a) The 45000-66501/69501 board will be obsoleted and replaced by the 45000-66562/69562 board for FSI and all new shipments.
- (b) The 45000-66505/69505 board will be updated with new ROMs to become the 45000-66565/69565 board.
- (c) The exchange assembly for the 45000-66509 is the 45000-69812 (U.S. keycaps) or 45000-69813 (German keycaps).
- (d) The 45000-66511/69561 Power Supply will be phased out and replaced by the 45000-66552/69552 Power Supply. The 45000-69552 may be used when a 45000-69561 is not available.

SERVICE MATERIALS - 3.0 - RECOMMENDED FIELD INVENTORY

(e) These boards are not supported in the 4525XA unless the CPU
 ucode is updated to B1818-2913 & B1818-2914.
 HP 250 Exchange Assemblies -- continued

Used on	New Board Part Number	Exchange Part Number	Board Description
--4525xA			
| --45251B			
v | --45260A			
X v |	45012-66521	45000-69521	7910 Power Supply
X X X	45120-66550	45120-69555	ASI Board **
X X	45120-66551	45120-69551	ASI Panel
X X X	45122-66560	45122-69560	INP Board
X X X	45122-66561	45122-69561	INP Panel
X	88134-66910	88134-69910	Contl Bd (ST506) —
X	09135-67600	09135-69600	5 Mb Disc (ST506) —
X	09135-66502	09135-69502	Dr. Bd (ST506) —
X	09133-66504	09133-69504	Contl Bd ##
X	09133-67102	09133-69102	9.7 Mb Disc (ST412) —
X	09133-67101	09133-69101	Dr. Bd (ST412) —
X	09133-67100	09133-69100	4.7 Mb Disc (ST406) —
X	09133-67103	09133-69103	Dr. Bd (ST406) —
X	09133-66508	09133-69508	14.7 Mb Disc Cntl
X	09133-67104	09133-69104	14.7 Mb Drive Mech.
X	09133-67105	09133-69105	14.7 Mb Drive Board
X	45285-66501	45285-66501	DC Power Board

** the 45120-69550 exchange assembly was upgraded to the
 45120-69555 exchange assembly by Service Note 250-13

the 09133-69504 controller board is only compatible with
 the 4.7 Mb and 9.7 Mb intergated winchester drives.

SERVICE MATERIALS - 3.0 - RECOMMENDED FIELD INVENTORY

3.2 Recommended Non-Exchange Assemblies

Used on	Part No.	Description
--4525xA		
| --45251B		
v | --45260A		
v |		MAINFRAME/MISCELLANEOUS
v		-----
	X	0403-0412 Leveler Legs
X X	1390-0449	Lock with Key
X X	1390-0575	Key only 4525xA, 45251B (fits all locks)
	X	1390-0578 Key only for 45260A
	X	2110-0010 Fuse, 5A (order 2 each)
X X	2110-0012	Fuse, 0.5A 250V
X	2110-0030	Fuse, 5A
X X	2110-0054	Fuse, 15A (order 2 each)
X	2110-0459	Fuse, 20A
	X	3101-2420 Contact Block for Key Switch
X X	3105-0092	Circuit Breaker
	X	3105-0152 Circuit Breaker 10A, 110-120V
	X	3105-0153 Circuit Breaker 5A, 220-240V
	X	3101-2555 Key Lockable Switch
	X	3160-0311 Fan, 115V
X X	3160-0262	Fan, 115V
X X	X	6010-0694 Paint, Touch-up Cocoa Brown
X X	X	6010-0695 Paint, Touch-up Pearl Grey
X X	X	8120-1833 Cable, Internal HP-IB
X X	X	8120-2720 Cable, External 3M HP-IB
X X	45000-61607	Cable and CRT Speaker
X X	45000-66512	Softkey Board, new
X	45000-66518	Filter Board, new
		ASI

X X	1258-0141	Blue Jumper/Straps (Order 10 ea) (a)
	X	45000-61649 Cable, 5.5 Ft. ASI Ribbon (Service) (b)
X X	45120-61600	Cable, ASI Interconnect (a)
X X	X	45111-61601 Cable, ASI RS-232C Modem
X X	X	45112-61602 Cable, ASI 20 Milliamp Current Loop
X X	X	45113-61603 Cable, ASI RS-232C Direct Connect

--- continued

Notes:

- (a) Used with the 45120-66551/69551 ASI Panel
- (b) Used with the 45000-66566/69566 ASI Panel

SERVICE MATERIALS - 3.0 - RECOMMENDED FIELD INVENTORY

Recommended Non-Exchange Assemblies -- continued

Used On	Part No.	Description
--4525xA		
| --45251B		
v | --45260A	INP	
X v |	---	
	v	
	X	45122-00201 External INP Box
	X	45122-00202 Grounding Clamp Bracket (Ext. INP)
	X	45122-00203 INP Dress Plate (Ext. INP)
X X	X	45122-61600 Cable, Interconnect
X X	X	45122-61601 Cable, INP/250 to HP 3000
X X	X	45122-61602 Cable, INP/250 Modem/Auto Call Unit
	X	45122-61604 Cable, Interconnect (Reg. or Ext. INP)

256KB & 512KB Memory Boards

X X X	5180-0133	64K RAM
-------	-----------	---------

7910K

X	10833A	Cable, 7910 to HP-IB Board
X	45012-61600	DC Power Cable

7902A (Old Drive)

X	8120-2737	Cable, HP-IB/Controller Ribbon
X	45000-61602	Cable, Controller
X	45000-61610	Cable, AC Power (old tub)
X	45000-61611	Cable, DC Power (old tub)
X	45000-61633	Cable, DC Power (new tub)

7902A (Common Drive)

X	8120-2737	Cable, HP-IB/Controller Ribbon
X	45000-61620	Cable, Floppy Jumper (for mixed multi-drives)
X	45000-61625	Cable, LED
X	45000-61626	Cable, AC Power (power module to power panel)
X	45000-61630	Cable, AC Power (power panel to drive)
X	45000-61631	Cable, DC Power
X	45000-61640	Cable, Controller
X	45000-68830	Cable, Floppy Jumper (Kit, old-to-new drive)

SERVICE MATERIALS - 3.0 - RECOMMENDED FIELD INVENTORY

Recommended Non-Exchange Assemblies -- continued

Used on	Part No.	Description
--4525xA		
| --45251B		
v | --45260A		
v |	9895K	
v	-----	
X X X	8120-2737	Cable, HP-IB/Controller Ribbon
X X	45000-61630	Cable, AC Power
X X	45000-61641	Cable, DC Power
X X	45000-61642	Cable, Controller
	X 45259-61606	Cable, DC Power
	X 45259-61607	Cable, Controller
	X 45259-61608	Cable, AC Power
	X 45259-61609	Cable, Fan

5/10 Mb Disc

X	0380-0358	Round Spacer
X	0380-0643	HP-IB Screw (for 09133-66504 Contlr)
X	0380-1533	Hex Spacer
X	1390-0360	HP-IB Screw (for 09133-66504 Contlr)
X	1520-0227	Shock Mount
X	2190-0003	Flat Washer (for 09133-66504 Contlr)
X	3050-1099	Flat Washer
X	8120-3619	Cable, Controller
X	8120-3620	Cable, Data
X	8120-3621	Cable, DC Power
X	8120-3622	Ground Strap
X	45285-62001	Bracket, Drive Mount
X	45285-66500	DC Power Board

10 Mb Disc

X	2190-0003	Flat Washer
X	0380-0643	HP-IB Screw
X	1390-0360	HP-IB Screw
X	09133-66504	Controller
X	09133-67102	9.7 Mb Drive Mechanism
X	09133-67101	9.7 Mb Drive Board
X	09133-67100	4.7 Mb Drive Mechanism (new)
X	09133-67103	4.7 Mb Drive Board (new)

SERVICE MATERIALS - 3.0 - RECOMMENDED FIELD INVENTORY

Recommended Non-Exchange Assemblies -- continued

Used on Part No. Description

```
--4525xA
|  --45251B
v  |  --45260A
   v  |
     v
```

15 Mb Disc

```
X  45259-61615  DC Power Cable Assembly
X  45259-61616  250 Controller Cable Assembly
X  45259-61617  250 DS Cable Assembly
X  45285-60002  Drive Mount Bracket Assembly
X  45285-00004  Card Cage Mounting Bracket
```

SERVICE MATERIALS - 3.0 - RECOMMENDED FIELD INVENTORY

3.3 Non-Exchange Assemblies for Remote Sites

The following spares are recommended for remote locations.

Used on	Part No.	Description
--4525xA		
| --45251B		
v | --45260A		
X v |		
		v
X	0960-0502	Tripler, Voltage
	X 1600-1116	Card Cage Assembly (no backplane)
	X 9100-4149	Transformer, Main Power
X X X	5180-0133	64K RAM (256KB & 512KB Mem. Bds.)
X X	45000-60101	Frame, Card Cage Assembly
X X	45000-60109	Assembly, Keyboard
X X	45000-61601	Cable, Keyboard
X X	45000-61605	Cable, CRT Assembly
X X	45000-61608	Cable, CRT Intensity
X X	45000-61612	Cable, AC Power Distribution
X X	45000-61614	Cable, On/Off
X X	45000-68835	Cable, Keyboard Matrix
X X	45000-61616	Cable, Display
X	45000-61617	Cable, 24 VDC Internal
X	45000-61618	Cable, 24 VDC External
X X	45000-61632	Cable, Fan AC Power
X X	45000-66504	Assembly, Motherboard
	X 45000-66566	ASI Panel (with Dip Switches)
X X	45000-68816	Transformer, Main Power Kit
X X	45012-67902	Transformer, 7910
	X 45259-61600	Cable, Fan
	X 45259-61601	Cable, Filter Connector
	X 45259-61602	Cable, Power Supply
	X 45259-61604	Cable, On/Off
	X 45259-66502	PCA, Motherboard
	X 45259-66504	Primary/Secondary Connector Board
		Cable, AC Power (select one):
X X X	8120-2371	US, Canada, Japan, Mexico, Philippines,
		Taiwan - 125V
X X X	8120-0698	US, Canada - 250V
X X X	8120-1369	Australia, New Zealand - 250V
X X X	8120-2857	Belgium, Italy, France, Spain, Greece, Austria, Finland, Germany, Netherlands,
		Norway, Sweden, Saudi Arabia, United Arab Republic - 250V
X X X	8120-2104	Switzerland - 250V
X X X	8120-2956	Denmark - 250V
X X X	31000-60057	Great Britain, Cyprus, Nigeria, Rhodesia, Singapore - 250V

SERVICE MATERIALS - 3.0 - RECOMMENDED FIELD INVENTORY

3.4 45260A Non-Exchange Assemblies for Cosmetic Repairs

Part # -----	Description -----
4040-1882	Blank Control Panel, Floppy-less Option
4040-1883	Floppy Control Panel
7101-0607	Rear Panel on Pod
07908-00002	Lower Front Panel on Pod
07908-00003	Top Panel on Pod
07908-00004	Left Side Panel on Pod
07908-00005	Right Side Panel on Pod
07908-00006	L-frame Assembly for Pod Panels

-hp-

Section 620

PARTS

(This section has not yet been written.)

-hp-

Section 700

REFERENCES

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	1.0 ASCII
	2.0 Base Conversion

REFERENCES OVERVIEW

Section 701

REFERFNES OVERVIEW

This chapter contains various reference material:

- 710 TERMINOLOGY - various terms that are unique to the HP 250
- 720 TABLES - ASCII table and decimal/octal/hexadecimal conversion tables

-hp-

Section 710

TERMINOLOGY

- 45251B - product number for HP 250/35
- 4525xA - product number for HP 250A, where x is used to indicate the language option
- 45260A - product number for HP 250/20, 250/25, 250/26, 250/30, 250/40, and 250/50.
- Binaries - extensions of the operating software that reside in a primary or secondary task's memory.
- CS'80 (Command Set '80) - the instruction set used with the 7908P, 7911P, and 7912P.
- CTD - Cartridge Tape Drive in the 7908P, 7911P, and 7912P.
- DROMs - Discrete Relocatable Option Modules that are extensions of the operating software and reside in system memory (primary DROM areas or DROM overflow areas).
- HP 250/20 - HP 250 Model 20, the pod version of the HP 250 with the 5 MB Disc.
- HP 250/25 - HP 250 Model 25, the pod version of the HP 250 with the 10 MB Disc.
- HP 250/26 - HP 250 Model 26, the pod version of the HP 250 with the 15 MB Disc.
- HP 250/30 - HP 250 Model 30, the pod version of the HP 250 that is 7908-based.
- HP 250/35 - HP 250 Model 35, the desktop version of the HP 250 that is 7908/11/12-based.

TERMINOLOGY

HP 250/40 - HP 250 Model 40, the pod version of the HP 250 that is 7911-based.

HP 250/50 - HP 250 Model 50, the pod version of the HP 250 that is 7912-based.

HP 250A - the original desktop version of the HP 250

Integral Workstation - the CRT and keyboard that is built into the HP 250A and HP 250/35

New ROMs - the self-test and loader firmware (1818-2913 and 1818-2914) that provides the ability to load the operating software from all supported discs except the 5/10/15 MB Discs.

Old ROMs - the self-test and loader firmware (1818-2829 and 1818-2830) that provides the ability to load the operating system from only the 7902A/9895K or 7910K (the original firmware used only on the HP 250A)

Operating System A (Op Sys A) - revision A.0x.xx of the operating system used on the HP 250A

Operating System B (Op Sys B) - revision B.04.00 or greater of the operating system used on the HP 250/2x, HP 250/30, HP 250/35, HP 250/40, HP 250/50, and upgraded versions of the HP 250A.

Primary Task - a task that has a workstation attached to it when the HP 250 is powered up; it can request ownership of one or more secondary tasks and does not require the configuration of the TASK DROM.

Principal Workstation - the integral workstation on the HP 250A and HP 250/35 or the workstation on ASI port #1 on the HP 250/2x, HP 250/30, HP 250/40, or HP 250/50 which must be left powered on when using OS B.04 to receive power-up and SYSTEM ERROR messages.

Secondary Task - a task that does not have a workstation attached to it when the HP 250 is powered up; it cannot request ownership of any other task, but it can be owned by a primary task and does require the configuration of the TASK DROM.

Task - the actual or potential activity of HP 250 program/command execution consisting of primary tasks and secondary tasks (the term "user" is no longer being used in this context; user will refer to a person).

Workstation - the integrated keyboard/console on the HP 250A and HP 250/35, or either a 2622D or 2649D on any other HP 250.

Section 720

TABLES

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1.0 ASCII

2.0 Base Conversion

TABLES - 1.0 - ASCII

1.0 ASCII

---		EQUIVALENT	FORMS	---		---		EQUIVALENT	FORMS	---		---		EQUIVALENT	FORMS	---			
ASCII	DEC	BINARY	OCT	HEX	ASCII	DEC	BINARY	OCT	HEX	ASCII	DEC	BINARY	OCT	HEX	ASCII	DEC	BINARY	OCT	HEX
NUL	0	00000000	000	00	+	43	00101011	053	2B	V	86	01010110	126	56					
SOH	1	00000001	001	01	.	44	00101100	054	2C	W	87	01010111	127	57					
STX	2	00000010	002	02	-	45	00101101	055	2D	X	88	01011000	130	58					
ETX	3	00000011	003	03	,	46	00101110	056	2E	Y	89	01011001	131	59					
END	4	00000100	004	04	/	47	00101111	057	2F	Z	90	01101010	132	5A					
ENO	5	00000101	005	05	0	48	00110000	060	30	[	91	01011011	133	5B					
ACK	6	00000110	006	06	1	49	00110001	061	31	\	92	01011100	134	5C					
BELL	7	00000111	007	07	2	50	00110010	062	32	]	93	01011101	135	5D					
BS	8	00001000	010	08	3	51	00110011	063	33	^	94	01011110	136	5E					
HT	9	00001001	011	09	4	52	00110100	064	34	_	95	01011111	137	5F					
LF	10	00001010	012	0A	5	53	00110101	065	35	`	96	01100000	140	60					
VT	11	00001011	013	0B	6	54	00110110	066	36	a	97	01100001	141	61					
FF	12	00001100	014	0C	7	55	00110111	067	37	b	98	01100010	142	62					
CR	13	00001101	015	0D	8	56	00111000	070	38	c	99	01100011	143	63					
SO	14	00001110	016	0E	9	57	00111001	071	39	d	100	01100100	144	64					
SI	15	00001111	017	0F	:	58	00111010	072	3A	e	101	01100101	145	65					
DEL	16	00010000	020	10	;	59	00111011	073	3B	f	102	01100110	146	66					
DC1	17	00010001	021	11	<	60	00111100	074	3C	g	103	01100111	147	67					
DC2	18	00010010	022	12	=	61	00111101	075	3D	h	104	01101000	150	68					
DC3	19	00010011	023	13	>	62	00111110	076	3E	i	105	01101001	151	69					
DC4	20	00010100	024	14	?	63	00111111	077	3F	j	106	01101010	152	6A					
NAK	21	00010101	025	15	@	64	01000000	100	40	k	107	01101011	153	6B					
SYNC	22	00010110	026	16	A	65	01000001	101	41	l	108	01101100	154	6C					
ETB	23	00010111	027	17	B	66	01000010	102	42	m	109	01101101	155	6D					
CAN	24	00011000	030	18	C	67	01000011	103	43	n	110	01101110	156	6E					
EM	25	00011001	031	19	D	68	01000100	104	44	o	111	01101111	157	6F					
SUB	26	00011010	032	1A	E	69	01000101	105	45	p	112	01110000	160	70					
ESC	27	00011011	033	1B	F	70	01000110	106	46	q	113	01110001	161	71					
FS	28	00011100	034	1C	G	71	01000111	107	47	r	114	01110010	162	72					
GS	29	00011101	035	1D	H	72	01001000	110	48	s	115	01110011	163	73					
RS	30	00011110	036	1E	I	73	01001001	111	49	t	116	01110100	164	74					
US	31	00011111	037	1F	J	74	01001010	112	4A	u	117	01110101	165	75					
SPACE	32	00100000	040	20	K	75	01001011	113	4B	v	118	01110110	166	76					
"	34	00100010	042	22	M	77	01001101	115	4D	x	120	01111000	170	78					
#	35	00100011	043	23	N	78	01001110	116	4E	y	121	01111001	171	79					
\$	36	00100100	044	24	O	79	01001111	117	4F	z	122	01111010	172	7A					
%	37	00100101	045	25	P	80	01010000	120	50	{	123	01111011	173	7B					
&	38	00100110	046	26	Q	81	01010001	121	51	|	124	01111100	174	7C					
'	39	00100111	047	27	R	82	01010010	122	52	}	125	01111101	175	7D					
(	40	00101000	050	28	S	83	01010011	123	53	~	126	01111110	176	7E					
)	41	00101001	051	29	T	84	01010100	124	54	DEL	127	01111111	177	7F					
*	42	00101010	052	2A	U	85	01010101	125	55										

ASCII Character Codes

TABLES - 2.0 - BASE CONVERSION

2.0 BASE CONVERSION

DEC	OCT	HEX	DEC	OCT	HEX	DEC	OCT	HEX	DEC	OCT	HEX	DEC	OCT	HEX	DEC	OCT	HEX
0	000	00	43	053	2B	86	126	56	129	201	81	172	254	AC	215	327	D7
1	001	01	44	054	2C	87	127	57	130	202	82	173	255	AD	216	330	D8
2	002	02	45	055	2D	88	130	58	131	203	83	174	256	AE	217	331	D9
3	003	03	46	056	2E	89	131	59	132	204	84	175	257	AF	218	332	DA
4	004	04	47	057	2F	90	132	5A	133	205	85	176	260	B0	219	333	DB
5	005	05	48	060	30	91	133	5B	134	206	86	177	261	B1	220	334	DC
6	006	06	49	061	31	92	134	5C	135	207	87	178	262	B2	221	335	DD
7	007	07	50	062	32	93	135	5D	136	210	88	179	263	B3	222	336	DE
8	010	08	51	063	33	94	136	5E	137	211	89	180	264	B4	223	337	DF
9	011	09	52	064	34	95	137	5F	138	212	9A	181	265	B5	224	340	00
10	012	0A	53	065	35	96	140	60	139	213	9B	182	266	B6	225	341	E1
11	013	0B	54	066	36	97	141	61	140	214	9C	183	267	B7	226	342	E2
12	014	0C	55	067	37	98	142	62	141	215	9D	184	270	B8	227	343	E3
13	015	0D	56	070	38	99	143	63	142	216	9E	185	271	B9	228	344	E4
14	016	0E	57	071	39	100	144	64	143	217	9F	186	272	BA	229	345	E5
15	017	0F	58	072	3A	101	145	65	144	220	90	187	273	BB	230	346	E6
16	020	10	59	073	3B	102	146	66	145	221	91	188	274	BC	231	347	E7
17	021	11	60	074	3C	103	147	67	146	222	92	189	275	BD	232	350	F8
18	022	12	61	075	3D	104	150	68	147	223	93	190	276	BE	233	351	E9
19	023	13	62	076	3E	105	151	69	148	224	94	191	277	BF	234	352	EA
20	024	14	63	077	3F	106	152	6A	149	225	95	192	300	C0	235	353	EB
21	025	15	64	100	40	107	153	6B	150	226	96	193	301	C1	236	354	EC
22	026	16	65	101	41	108	154	6C	151	227	97	194	302	C2	237	355	ED
23	027	17	66	102	42	109	155	6D	152	230	98	195	303	C3	238	356	EE
24	030	18	67	103	43	110	156	6E	153	231	99	196	304	C4	239	357	EF
25	031	19	68	104	44	111	157	6F	154	232	9A	197	305	C5	240	360	F0
26	032	1A	69	105	45	112	160	70	155	233	9B	198	306	C6	241	361	F1
27	033	1B	70	106	46	113	161	71	156	234	9C	199	307	C7	242	362	F2
28	034	1C	71	107	47	114	162	72	157	235	9D	200	310	C8	243	363	F3
29	035	1D	72	110	48	115	163	73	158	236	9E	201	311	C9	244	364	F4
30	036	1E	73	111	49	116	164	74	159	237	9F	202	312	CA	245	365	F5
31	037	1F	74	112	4A	117	165	75	160	240	AO	203	313	CB	246	366	F6
32	040	20	75	113	4B	118	166	76	161	241	A1	204	314	CC	247	367	F7
33	041	21	76	114	4C	119	167	77	162	242	A2	205	315	CD	248	370	F8
34	042	22	77	115	4D	120	170	78	163	243	A3	206	316	CE	249	371	F9
35	043	23	78	116	4E	121	171	79	164	244	A4	207	317	CF	250	372	FA
36	044	24	79	117	4F	122	172	7A	165	245	A5	208	320	D0	251	373	FB
37	045	25	80	120	50	123	173	7B	166	246	A6	209	321	D1	252	374	FC
38	046	26	81	121	51	124	174	7C	167	247	A7	210	322	D2	253	375	FD
39	047	27	82	122	52	125	175	7D	168	250	A8	211	323	D3	254	376	FE
40	050	28	83	123	53	126	176	7E	169	251	A9	212	324	D4	255	377	FF
41	051	29	84	124	54	127	177	7F	170	252	AA	213	325	D5			
42	052	2A	85	125	55	128	200	80	171	253	AB	214	326	D6			

Decimal - Octal - Hexadecimal Equivalents

TABLES - 2.0 - BASE CONVERSION

Octal and Decimal Conversions

From octal:

- 1) Locate each octal digit in its corresponding column.
- 2) Add together the decimal equivalent for each digit.

From decimal:

- 1) Locate the greatest decimal number in the table that is less than or equal to the number being converted.
- 2) Write down the corresponding octal digit and octal column position.
- 3) Subtract the decimal table entry from the number being converted.
- 4) Using the remainder from this calculation, repeat these steps with the remainder now being the number to convert.

		OCTAL COLUMN											
		6		5		4		3		2		1	
OCT	DEC	OCT	DEC	OCT	DEC	OCT	DEC	OCT	DEC	OCT	DEC	OCT	DEC
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	32768	1	4096	1	512	1	64	1	8	1	1	1	1
		2	8192	2	1024	2	128	2	16	2	2	2	2
		3	12288	3	1536	3	192	3	24	3	3	3	3
		4	16384	4	2048	4	256	4	32	4	4	4	4
		5	20480	5	2560	5	320	5	40	5	5	5	5
		6	24576	6	3072	6	384	6	48	6	6	6	6
		7	28672	7	3584	7	448	7	56	7	7	7	7

TABLES - 2.0 - BASE CONVERSION

Hexadecimal and Decimal Conversions

From hexadecimal:

- 1) Locate each hexadecimal digit in its corresponding column.
- 2) Add together the decimal equivalent for each digit.

From decimal:

- 1) Locate the greatest decimal number in the table that is less than or equal to the number being converted.
- 2) Write down the corresponding hexadecimal digit and hexadecimal column position.
- 3) Subtract the decimal table entry from the number being converted.
- 4) Using the remainder from this calculation, repeat these steps with the remainder now being the number to convert.

----- HEXADECEMAL COLUMN -----							
4		3		2		1	
HEX	DEC	HEX	DEC	HEX	DEC	HEX	DEC
C	0	0	0	0	0	0	0
1	4096	1	256	1	16	1	1
2	8192	2	512	2	32	2	2
3	12288	3	768	3	48	3	3
4	16384	4	1024	4	64	4	4
5	20480	5	1280	5	80	5	5
6	24576	6	1536	6	96	6	6
7	28672	7	1792	7	112	7	7
8	32768	8	2048	8	128	8	8
9	36864	9	2304	9	144	9	9
A	40960	A	2560	A	160	A	10
B	45056	B	2816	B	176	B	11
C	49152	C	3072	C	192	C	12
D	53248	D	3328	D	208	D	13
E	57344	E	3584	E	224	E	14
F	61440	F	3840	F	240	F	15

Section 800

SERVICE NOTES

This section contains copies of all "in-life" service notes for the HP 250. As new service notes are published in "Support Update", add them to this section. As service notes expire, remove them from this section.

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