IBM 5085 Graphics Processor
Maintenance Information

Federal Communications Commission (FCC) Statement

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

Preface

When an IBM 5085 Graphics Processor has a problem,
this manual guides you in verifying and fixing the
problem, and returning the 5085 to operation as quickly as possible.

Choose The Appropriate Action

1. Verify customer reported failure
2. Identify a failing unit
3. Detect a failure symptom
4. Match failure symptom to
     symptom/fix index
5. Verify that unit works correctly.

Actions

- Display System Customization - Setup Function 1
- Display System Configuration - Setup Function 3
- Display Link Status, - Setup Function 20
- Display Error Panel - Setup Function 21
- Display Subsystem Log - Setup Function 22
- Display FRU Counters - Setup Function 24
- Run Peripheral Tests - Setup Function 30
- Run Video Pixel Plane Test - Setup Function 34
- Run 5085 V.35 Test - Setup Function 37
- Run Basic Assurance Tests
- Power off/on to See if symptom changes
     (Power on reset is more complete than IPL reset)
- Run A/N Keyboard Basic Thread Test
- Run LPF Keyboard Wrap Test
- Run Tablet/CursorPad Test
- Recognize Failure Symptom
     - From Visual Indications
     - From Test Results
- Verify that the unit works correctly by repeating
  the action that produced the failure symptom.

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Chapter 1. Symptom/Fix Index

This information helps isolate problems to a failing Field Replaceable Unit (FRU). The Symptom/Fix Index relates specific fault indications to recommended repair actions. FRUs are identified in the order of probability that corrects the malfunction. Reference is made to additional actions that may aid fault isolation.

Repair physical damage, smoke, and other obvious damage using standard maintenance procedures. Check fans for proper operation on all calls to avoid problems caused by overheating.

Note: POWER OFF/ON IS MORE COMPLETE THAN IPL RESET. FAILURE SYMPTOMS MAY CHANGE.

Although coaxial cabling is a customer responsibility, you may identify coaxial cable problems for the customer. Use a volt/ohm meter to check cable continuity and termination to assure that the conductor and shield are not shorted and that there are no extraneous signals on the conductor or shield. There must be no mix of 75/93 ohm cable. Disconnect the 5085s and 5081s from the power source during continuity tests to open the frame/power ground circuit. See page 2-56.

1.1 Display Image Problems

Ensure that the 5085 video cables are connected to the proper 5081. The symbols beside the connectors on the 60-hertz 5085 indicate that the correct display is a 5081-11 or 12 , which refresh at the rate of 60 hertz. The 50-hertz 5085, with no symbols beside its connectors, connects to either a 5081-1 or 2, which refresh at the rate of 50 hertz.

Verify that the customizing and configuration is correct for this application, by way of Setup Functions 1 and 3. This includes 5080/3250 mode, and features installed and functional, such as pixel/system memory, transformation/clipping, and preselection highlighting.

Faults that result only in an incorrect display image should first be diagnosed from the 5081 Display maintenance information. Display problems can be confirmed by disconnecting the video cable(s), which should cause a dark screen; then pressing the Intensity Override on the 5081, which should cause a white raster. If this happens, the 5081 is probably not at fault. Refer to Figure 1-1. The Video Pixel Plane Test may be helpful in isolating the fault to a single FRU in the 5085.

Note: POWER MUST BE OFF WHEN CHANGING LOGIC CARDS. POWER MUST BE OFF FOR AT LEAST 15 SECONDS BEFORE TURNING POWER BACK ON.

IMAGE CONDITION	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
Unstable Tearing Jittering	VPM/VC card EPM/PM cards DP card (Radiation from other sources may also cause this.)	POR to run BATs. See Video Pixel Plane Test to isolate EPM cards from the VPM card, page 2-33. See DP card T/C feature isolation, page 2-2.
Washed Out	VPM/VC card EPM/PM cards AP card DP card	POR to run BATs. See Video Pixel Plane Test to isolate EPM cards from the VPM card, page 2-33. See DP card T/C feature isolation, page 2-2.
Brightened Background	AP card VPM/VC card EPM/PM cards DP card	Unplug the video cable(s) to the 5081. This should cause the 5081 to go dark. If it does not, there is a problem in the 5081. POR to run BATs. See Video Pixel Plane Test to isolate EPM cards from the VPM card, page 2-33. See DP card T/C feature isolation, page 2-2.
Color Hue Background or Parts of Image Missing	VPM/VC card EPM/PM cards DP card AP card	POR to run BATs. See Video Pixel Plane Test to isolate EPM cards from the VPM card, page 2-33. See DP card T/C feature isolation, page 2-2. Verify Setup Functions 1 and 3.
Other Conditions	VPM/VC card EPM/PM cards AP card DP card	POR to run BATs. See Video Pixel Plane Test to isolate EPM cards from the VPM card, page 2-33. See DP card T/C feature isolation, page 2-2. Verify Setup Functions 1 and 3

Figure 1-1. Display Image Problems

1.2 FRU Counters

This section pertains to FRU counters. Refer to 2.19, "FRU Counter Display and Reset (Setup Function 24)" on page 2-26 for the procedure to display this information. Reference is made to additional actions that may aid fault isolation.

Note: POWER MUST BE OFF WHEN CHANGING LOGIC CARDS. POWER MUST BE OFF AT LEAST 15 SECONDS BEFORE TURNING POWER BACK ON.

COUNTER	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
01	AP card	Check power, page 2-57.
02	1st System Memory Expansion card	Check power, page 2-57.
03	2nd System Memory Expansion card	Check power, page 2-57.
04	AP card	Check power, page 2-57.
05	AP card	Check power, page 2-57.
06	3270/Ports card	Check power, page 2-57. Run 3270 Feature Tests, page 2-3.
07	Diskette media SI/FDC card Diskette drive	Display Link Status, page 2-20. Check power, page 2-57.
08	DP card	Check power, page 2-57. See DP card T/C feature isolation, page 2-2.
09	A/N Keyboard PCC card	Check power, page 2-57. Run A/N Keyboard Basic Thread Test, page 2-45.
10	LPF Keyboard	Check power, page 2-57. Run LPF Keyboard Wrap Test, page 2-55.
11	Dials Feature	Check power, page 2-57.
12	Tablet/CursorPad Cursor Stick	Check power, page 2-57.
13	Digitizer	Check power, page 2-57.
14	Port A Device 3270/Ports card	Check power, page 2-57. Run Ports Feature Wrap Test, page 2-4.
15	Port B Device 3270/Ports card	Check power, page 2-57. Run Ports Feature Wrap Test, page 2-4.
16	Diskette media SI/FDC card Diskette drive	Check power, page 2-57. Run diskette related offline functions, page 2-49.
17	Suspect Microcode or Software	Check power, page 2-57. Call for help.

Figure 1-2. FRU Counters

1.3 Subsystem Log Messages And Error Counters

This section pertains to subsystem log information and error counters. Refer to 2.16, "Error Counter Display (Setup Function 21)" on page 2-24 and 2.17, "Error Log Records (Setup Function 22)" on page 2-25 for the procedure to display this information. Reference is made to additional actions that may aid fault isolation.

Note: POWER MUST BE OFF WHEN CHANGING LOGIC CARDS. POWER MUST BE OFF FOR AT LEAST 15 SECONDS BEFORE TURNING POWER BACK ON.

LOG MESSAGE MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
1001 Diskette CRC Error	Diskette media SI/FDC card Diskette drive	POR to run BATs. Run diskette related offline functions, page 2-49.
1002 Diskette Overrun	Diskette media SI/FDC card Diskette drive	POR to run BATs. Run diskette related offline functions, page 2-49.
1003 Diskette Missing Address Mark	Diskette media SI/FDC card Diskette drive	POR to run BATs. Run diskette related offline functions, page 2-49.
1004 Diskette Equipment Check	Diskette media SI/FDC card Diskette drive	POR to run BATs. Run diskette related offline functions, page 2-49.
1005 Diskette End of Cylinder	Diskette media SI/FDC card Diskette drive	POR to run BATs. Run diskette related offline functions, page 2-49.
1006 Diskette Write Protected	Diskette media Diskette drive SI/FDC card	POR to run BATs. Run diskette related offline functions, page 2-49.
4003 Port A Overrun	Port A Device 3270/Ports card	POR to run BATs. Run Ports Feature Wrap Test, page 2-4.
4103 Port B Overrun	Port B Device 3270/Ports card	POR to run BATs. Run Ports Feature Wrap Test, page 2-4.
5001 Serial Link Unexpected Interrupt from AP	V.35 connection or coaxial cabling, see page 1-31. AP card SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1. if BATs fail. Display Link Status, page 2-20.
5002 Serial Link Invalid Control Block from AP	V.35 connection or coaxial cabling, see page 1-31. AP card SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5003 Serial Link Invalid Speed	V.35 connection or coaxial cabling, see page 1-31. Diskette media SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5004 Serial Link Transmit Complete with Error	V.35 connection or coaxial cabling, see page 1-31. Diskette media SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.

Figure 1-3 (Part 1 of 7). Subsystem Log Messages and Error Counters

LOG MESSAGE MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
5005 Serial Link Receive Complete with Error	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card Host control unit	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5006 Serial Link SDLC Interrupt Error	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5007 Serial Link Address Error	V.35 connection or coaxial cabling, see page 1-31. AP card SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5008 Serial Link Invalid Control Block	V.35 connection or coaxial cabling, see page 1-31. AP card SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5009 Serial Link Transmit Timeout	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card AP card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
500A Serial Link Transmit Sequence Error	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card AP card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
500B Serial Link Receive Sequence Error	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card Host control unit	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
500C Serial Link Transmit Sequence Error	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card AP Card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
500D Serial Link Invalid Control Block From Link	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card Host control unit	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.

Figure   1-3 (Part 2 of 7).   Subsystem Log Messages and Error Counters

LOG MESSAGE MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
500E Serial Link Receive With Extra Data	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card Host control unit	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
500F Serial Link Invalid Control Byte From Link	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card Host control unit	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5010 Serial Link Failed Self Test	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5011 Serial Link Self Test Timeout	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5012 Serial Link Invalid AP Code	V.35 connection or coaxial cabling, see page 1-31. SI/FDC card AP card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. Display Link Status, page 2-20.
5013 External Modem Wrap Failed	Modem V.35 cables SI card	POR to run BATs. Run Setup Function 37, page 2-37.
5014 No Receive Idle detected	Modems Host control unit SI card	POR to run BATs. Run Setup Function 37, page 2-37.
5015 DSR or CD dropped	Modems Modem cables	POR to run BATs. Run Setup Function 37, page 2-37.
5016 Receive time out	Modems Host control unit SI card V.35 cables	POR to run BATs. Run Setup Function 37, page 2-37.
6002 DP Error	DP card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. See DP card T/C feature isolation, page 2-2.
6003 DP Error	DP card AP card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. See DP card T/C feature isolation, page 2-2.

Figure 1-3 (Part 3 of 7). Subsystem Log Messages and Error Counters

LOG MESSAGE MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
6004 Reserved for future use	None	None
6005 DP Parity Error	DP card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail. See DP card T/C feature isolation, page 2-2.
7101 ANK Parity Error	A/N Keyboard PCC card	POR to run BATs. Run A/N Keyboard Basic Thread Test, page 2-45.
7104 ANK Timeout	A/N Keyboard PCC card	POR to run BATs. Run A/N Keyboard Basic Thread Test, page 2-45.
7105 ANK Status, Change	A/N Keyboard PCC card	POR to run BATs. Run A/N Keyboard Basic Thread Test, page 2-45.
7108 ANK Failed Self Test	A/N Keyboard PCC card	POR to run BATs. Run A/N Keyboard Basic Thread Test, page 2-45.
7201 LPFK Parity Error	LPF Keyboard	POR to run BATs. Run LPF Keyboard Wrap Test, page 2-55. Run Setup Function 30, page 2-27.
7204 LPFK Timeout	LPF Keyboard	POR to run BATs. Run LPF Keyboard Wrap Test, page 2-55. Run Setup Function 30, page 2-27.
7205 LPFK Status, Change	LPF Keyboard	POR to run BATs. Run LPF Keyboard Wrap Test, page 2-55. Run Setup Function 30, page 2-27.
7206 LPFK Repeat Transmit	LPF Keyboard	POR to run BATs. Run Setup Function 30, page 2-27.
7207 LPFK Retransmit Failed	LPF Keyboard AP card	POR to run BATs. Run LPF Keyboard Wrap Test, page 2-55. Run Setup Function 30, page 2-27.
7301 Dials Feature Parity Error	Dials Feature	POR to run BATs. Run Setup Function 30, page 2-27.
7304 Dials Feature Timeout	Dials Feature	POR to run BATs. Run Setup Function 30, page 2-27.

Figure   1-3 (Part 4 of 7).   Subsystem Log Messages and Error Counters

LOG MESSAGE MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
7305 Dials Feature Status, Change	Dials Feature	POR to run BATs. Run Setup Function 30, page 2-27.
7306 Dials Feature Sequence Error	Dials Feature	POR to run BATs. Run Setup Function 30, page 2-27.
7401 Tablet Parity Error	Tablet/CursorPad Cursor Stick	POR to run BATs. Run Setup Function 30, page 2-27.
7402 Tablet Coil Error	Stylus/Cursor Tablet/CursorPad	POR to run BATs. Run Setup Function 30, page 2-27.
7404 Tablet Timeout	Tablet/CursorPad Cursor Stick	POR to run BATs. Run Setup Function 30, page 2-27.
7405 Tablet Status, Change	Tablet/CursorPad Cursor Stick	POR to run BATs. Run Setup Function 30, page 2-27.
7406 Tablet Incorrect Length	Tablet/CursorPad Cursor Stick	POR to run BATs. Run Setup Function 30, page 2-27.
7501 Digitizer Parity Error	Digitizer	POR to run BATs. Run Setup Function 30, page 2-27.
7502 Digitizer Coil Error	Stylus/Cursor Digitizer	POR to run BATs. Run Setup Function 30, page 2-27.
7504 Digitizer Timeout	Digitizer	POR to run BATs. Run Setup Function 30, page 2-27.
7505 Digitizer Status, Change	Digitizer	POR to run BATs. Run Setup Function 30, page 2-27.
7506 Digitizer Incorrect Length	Digitizer	POR to run BATs. Run Setup Function 30, page 2-27.
A007 Invalid Device Request	Diskette media AP card	POR to run BATs.
A00A Invalid Tasks Request	Diskette media AP card	POR to run BATs.
A00B Invalid Tasks Restart	Diskette media AP card	POR to run BATs.
A010 Invalid File Tag	Diskette media AP card	POR to run BATs.
A013 Invalid Diskette Sequence	Diskette media SI/FDC card	POR to run BATs.

Figure 1-3 (Part 5 of 7). Subsystem Log Messages and Error Counters

LOG MESSAGE MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
A014 Invalid Control Block	SI/FDC card Host control unit	POR to run BATs.
A015 ANK Invalid Scan Code	A/N Keyboard PCC card AP card	POR to run BATs. Run A/N Keyboard Basic Thread Test, page 2-45.
A017 Stack Overflow	Diskette media AP card	POR to run BATs.
A018 Invalid Index	Diskette media AP card	POR to run BATs.
A019 Diskette Error	Diskette media Diskette drive SI/FDC card	POR to run BATs. Run diskette related offline functions, page 2-49.
A01A Diskette Error	Diskette media Diskette drive SI/FDC card	POR to run BATs. Run diskette related offline functions, page 2-49.
C001 3270 Timeout	Diskette media SI/FDC card 3270/Ports card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.
C002 3270 Microcode	Diskette media SI/FDC card 3270/Ports card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.
C003 3270 Microcode	Diskette media SI/FDC card 3270/Ports card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.
C004 3270 Microcode	Diskette media SI/FDC card 3270/Ports card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.
C005 3270 Queue Overflow	3270/Ports card	POR to run BATs.
C006 3270 Machine Check	3270/Ports card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.
C007 3270 Communications Check	3270/Ports card	POR to run BATs. Run 3270 Wrap Test, page 2-3.
C008 3270 Microcode	Diskette media SI/FDC card 3270/Ports card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.
C009 3270 Internal Error	3270/Ports card SI card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail
C00A Invalid Buffer Address	3270/Ports card SI card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.

Figure 1-3 (Part 6 of 7). Subsystem Log Messages and Error Counters

LOG MESSAGE MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
C00B 3270 Invalid Scan Code Received	3270/Ports card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.
C00C 3270 Buffer Length Error	3270/Ports card SI card	POR to run BATs. Minimum Machine Procedure, page 2-1, if BATs fail.
FF01 Error Overflow	Errors are occurring faster than they can be logged, and are lost. Observe their indications and resolve.	POR to run BATs.

Figure 1-3 (Part 7 of 7). Subsystem Log Messages and Error Counters

1.4 5085 Hex Panel Displays (Operational Mode)

This section pertains to stop conditions displayed after the BATs have completed. The BATs Symptom/Fix index also includes part of the transition from BATs exit to operational status. Before proceeding, verify that the hex panel is operating properly by setting the Mode switch to Test and pressing the IPL/Reset switch to start the count down sequence 00, FF, EA, E9, E8, E7, E6, E5, E4, E3, E2, E1, E0, F0, and F1. Reference is made to additional actions that may aid fault isolation.

Note: EXCESSIVE ERRORS SUCH AS SERIAL LINK NOISE, RETRYS, ETC. CAN CAUSE ALMOST ANY OPERATIONAL MACHINE CHECK.

IPL and observe Setup Functions 21 and 22 during operation for other symptoms before proceeding with this section.

Note: POWER MUST BE OFF WHEN CHANGING LOGIC CARDS. POWER MUST BE OFF FOR AT LEAST 15 SECONDS BEFORE TURNING POWER BACK ON.

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
00 Operational	None	Normal Operation* *If problem exists, enter Setup Task, page 2-4, to: Display FRU Counters Display Subsystem Log Display Error Panel Display Link Status Run Setup Function 30 If unable to enter Setup Task, try a backup diskette or force a dump with offline function DD, page 2-41.
12 Diskette Error	Diskette media SI/FDC card Diskette drive	POR To run BATs Diskette related offline functions, page 2-49.

Figure 1-4 (Part 1 of 4). Operational Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
15 Diskette Error	Diskette media SI/FDC card Diskette drive	POR To run BATs Diskette related offline functions, page 2-49.
51 Link Error	SI/FDC card Host control unit	POR To run BATs Display Link Status, page 2-20.
52 Link Error	SI/FDC card Host control unit	POR To run BATs Display Link Status, page 2-20.
53 Link Error	SI/FDC card Host control unit	POR To run BATs Display Link Status, page 2-20.
57 Link Error	SI/FDC card	POR To run BATs Display Link Status, page 2-20.
5A Link Error	SI/FDC card	POR To run BATs Display Link Status, page 2-20.
5B Link Error	SI/FDC card	POR To run BATs Display Link Status, page 2-20.
5C Link Error	SI/FDC card	POR To run BATs Display Link Status, page 2-20.
62 DP Error	DP card	POR to run BATs. See DP card T/C feature isolation, page 2-2.
63 DP Error	DP card	POR to run BATs. See DP card T/C feature isolation, page 2-2.
64 DP Error	DP card	POR to run BATs. See DP card T/C feature isolation, page 2-2.
77 LPF Keyboard Error	LPF Keyboard AP card	POR to run BATs. Run LPF Keyboard Wrap Test, page 2-55.
78 A/N Keyboard Error	A/N Keyboard PCC card AP card	POR to run BATs. Run A/N Keyboard Basic Thread Test, page 2-45.
A7 Microcode Error	Diskette media	POR to run BATs. Dump if error repeats, page 2-41.
AA Microcode Error	Diskette media	POR to run BATs. Dump if error repeats, page 2-41.
AB Microcode Error	Diskette media	POR to run BATs. Dump if error repeats, page 2-41.

Figure 1-4 (Part 2 of 4). Operational Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
B0 Microcode Error	Diskette media	POR to run BATs. Dump if error repeats, page 2-41.
B3 Microcode Error	Diskette media	POR to run BATs. Dump if error repeats, page 2-41.
B5 Invalid Scan Code	Keyboard in use- A/N Keyboard or LPF Keyboard	POR to run BATs. Run A/N Keyboard Basic Thread Test, page 2-45. or LPF Keyboard Wrap Test, page 2-55. Dump if error repeats, page 2-41.
B7 Microcode Error	Diskette media	POR to run BATs. Dump if error repeats, page 2-41.
B8 Microcode Error	Diskette media	POR to run BATs. Dump if error repeats, page 2-41.
B9 Diskette Error	Diskette media Diskette drive SI/FDC card	POR to run BATs. Diskette related offline functions, page 2-49. Dump if error repeats, page 2-41.
BA Diskette Error	Diskette media Diskette drive SI/FDC card	POR to run BATs. Diskette related offline functions, page 2-49. Dump if error repeats, page 2-41.
C1 3270 Error	Diskette media 3270/Ports card	POR to run BATs. Dump if error repeats, page 2-41.
C2 Microcode Error	Diskette media 3270/Ports card	POR to run BATs. Dump if error repeats, page 2-41.
C3 Microcode Error	Diskette media 3270/Ports card	POR to run BATs. Dump if error repeats, page 2-41.
C4 Microcode Error	Diskette media 3270/Ports card	POR to run BATs. Dump if error repeats, page 2-41.
C8 Microcode Error	Diskette media 3270/Ports card	POR to run BATs. Dump if error repeats, page 2-41.
D0 through DF	None	Refer to Dump Utility, page 2-41.

Figure 1-4 (Part 3 of 4). Operational Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
E0 through E9	None	Refer to Dump Utility, page 2-41.
F0 Address Error	Diskette media AP card SI card DP card 3270/Ports card System Memory Expansion cards	This failure can be caused by IPL or power-off during a diskette operation, see page 2-26. POR to run BATs. See DP card T/C feature isolation, page 2-2.
F1 Bus Error	Diskette media AP card SI card DP card 3270/Ports card System Memory Expansion cards	This failure can be caused by IPL or power-off during a diskette operation, see page 2-26. POR to run BATs. See DP card T/C feature isolation, page 2-2.
F2 Parity Error	Diskette media AP card SI card DP card 3270/Ports card System Memory Expansion cards	This failure can be caused by IPL or power-off during a diskette operation, see page 2-26. POR to run BATs. See DP card T/C feature isolation, page 2-2.
F3 Microcode Error	Diskette media AP card	POR to run BATs. Dump if error repeats, page 2-41.
F4 Microcode Error	Diskette media AP card	POR to run BATs. Dump if error repeats, page 2-41.
F5 Microcode Error	Diskette media AP card	POR to run BATs. Dump if error repeats, page 2-41.
F6 Microcode Error	Diskette media AP card	POR to run BATs. Dump if error repeats, page 2-41.
F7 Microcode Error	Diskette media AP card	POR to run BATs. Dump if error repeats, page 2-41.
F8 Microcode Error	Diskette media AP card	POR to run BATs. Dump if error repeats, page 2-41.
F9 Microcode Error	Diskette media AP card	POR to run BATs. Dump if error repeats, page 2-41.
FA Microcode Error	Diskette media AP card	POR to run BATs. Dump if error repeats, page 2-41.

Figure 1-4 (Part 4 of 4). Operational Hex Panel Displays

1.5 5085 Hex Panel Displays (BATs)

This section pertains to stop conditions indicated on the 5085 two-character hex panel during the Basic Assurance Tests (BATs) and the remainder of the IPL process. Later 5085s only run BATs following a Power On Reset (POR). On machines that do not normally run BATs on IPL, two depressions of the IPL reset switch within 1/2 second cause them to run. This section also includes the transition from IPL to operational status. Before proceeding, verify that the hex panel is operating properly by setting the Mode Switch to Test and pressing the IPL/Reset switch to initiate the count down sequence 00, FF, EA, E9, E8, E7, E6, E5, E4, E3, E2, E1, E0, F0, and F1. **If it doesn't step properly, check the AP card first. Although a probable FRU sequence is listed, the Minimum Machine Procedure 2-1 should be followed to locate the specific failing FRU.**

Note: POWER MUST BE OFF WHEN CHANGING LOGIC CARDS. POWER MUST BE OFF FOR AT LEAST 15 SECONDS BEFORE TURNING POWER BACK ON.

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
Blank Display	Power AP Card VC/VPM Card Hex indicator panel Backplane	Check power, page 2-57. Minimum Machine Procedure, page 2-1.
00 Initialize panel (immediately upon IPL)	AP card SI card	Minimum Machine Procedure, page 2-1.

00 Operational (after IPL sequence)	None	Normal operation*
		*If problem exists, enter Setup Task, page 2-4, to:
		  Display FRU Counters
		  Display Subsystem Log
		  Display Error Panel
		  Display Link Status
		  Run Setup Function 30
		If unable to enter Setup Task, try a backup diskette or force a dump with offline function DD, page 2-41.

01 Basic Instruction	AP card	Minimum Machine Procedure, page 2-1.
02 EPROM Checksum	AP card	Minimum Machine Procedure, page 2-1.
03 AP Register	AP card	Minimum Machine Procedure, page 2-1.
04 Bus Integrity	AP card	Minimum Machine Procedure, page 2-1.
05 Vector Area	AP card SI card 3270/Ports card	Minimum Machine Procedure, page 2-1.

Figure 1-5 (Part 1 of 13). BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
06 Bus Timeout Check	AP card 3270/Ports card SI card Exp Memory cards	Minimum Machine Procedure, page 2-1.
07 Address Check Circuits	AP card	Minimum Machine Procedure, page 2-1.
08 Parity Check Circuits	AP card SI card 3270/Ports card	Minimum Machine Procedure, page 2-1.
09 Extended Instruction	AP card SI card	Minimum Machine Procedure, page 2-1.
0A Vector Area	AP card SI card	Minimum Machine Procedure, page 2-1.
0B Stack Area	AP card	Minimum Machine Procedure, page 2-1.
0C Load Area	SI card AP card	Minimum Machine Procedure, page 2-1.
0D Switch Register	AP card	Minimum Machine Procedure, page 2-1.
0E FDC Access	SI card AP card	Minimum Machine Procedure, page 2-1.
0F Basic Test Complete	SI card 3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
10 Start Disk Routine	SI card AP card 3270/Ports card	Minimum Machine Procedure, page 2-1.
11 Normal Start	Diskette media SI card AP card Diskette drive	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
12 Disk Error	Diskette media SI card AP card Diskette drive	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
13 CRC Error	Diskette media SI card AP card Diskette drive	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
14 Cylinder Error	Diskette media SI card AP card Diskette drive	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
15 Equipment Error	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.

Figure 1-5 (Part 2 of 13). BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
16 Address Error	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
17 Data Overrun	Diskette media SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
18 Missing Interrupt	Diskette media SI card AP card Diskette drive	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
19 Diskette Error	Diskette media Diskette drive jumper or switch setting Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
1A File Not Found	Diskette media SI card Diskette drive AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
1B Seek File	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
1C RAM Test	SI card AP card	Minimum Machine Procedure, page 2-1.
1D Cable Check	Diskette fuse Drive cables - logic & power Diskette drive SI card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
1E Return to AP	AP card SI card	Minimum Machine Procedure, page 2-1.
1F Extra Interrupt	SI card AP card	Minimum Machine Procedure, page 2-1.
20 Base RAM	AP card SI card	Minimum Machine Procedure, page 2-1.
21 1st Memory Expansion	1st System Memory Expansion card AP card	Minimum Machine Procedure, page 2-1.
22 2nd Memory Expansion	2nd System Memory Expansion card AP card	Mimimum Machine Procedure, page 2-1.
23 Address Test	System Memory Expansion cards AP card	Minimum Machine Procedure, page 2-1.

Figure 1-5 (Part 3 of 13). BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
24 Address Test	System Memory Expansion cards AP card	Minimum Machine Procedure, page 2-1.
25 Address Test	System Memory Expansion cards AP card	Minimum Machine Procedure, page 2-1.
26 Address Test	System Memory Expansion cards AP card	Minimum Machine Procedure, page 2-1.
27 Address Test	System Memory Expansion cards AP card	Minimum Machine Procedure, page 2-1.
28 Address Test	System Memory Expansion cards AP card	Minimum Machine Procedure, page 2-1.
2A Data Test	System Memory Expansion cards AP card	Minimum Machine Procedure, page 2-1.
2B Data Test	System Memory Expansion cards AP card	Minimum Machine Procedure, page 2-1.
2F Extra Interrupt	AP card	Minimum Machine Procedure, page 2-1.
30 Parity Circuit Check	AP card	Minimum Machine Procedure, page 2-1.
31 AP Port 1 Wrap	PCC card, unplug PCC cable at AP card (EJ2) for isolation Port Device, unplug for isolation AP card	Minimum Machine Procedure, page 2-1. Note: Do not allow device activity during IPL.
32 AP Port 2 Wrap	PCC card, unplug PCC cable at AP card (EJ2) for isolation Port Device, unplug for isolation AP card	Minimum Machine Procedure, page 2-1. Note: Do not allow device activity during IPL. Do not allow the Tablet stylus or cursor to be in Tablet presence during IPL.
33 AP Port 3 Wrap	PCC card, unplug PCC cable at AP card (EJ2) for isolation Port device, unplug for isolation AP card	Minimum Machine Procedure, page 2-1. Note: Do not allow device activity during IPL. Do not allow the Tablet stylus or cursor to be in Tablet presence during IPL.

Figure 1-5 (Part 4 of 13). BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
34 AP Port 4 Wrap	PCC card, unplug PCC cable at AP card (EJ2) for isolation Port device, unplug for isolation AP card	Minimum Machine Procedure, page 2-1. Note: Do not allow device activity during IPL. Do not allow the Tablet stylus or cursor to be in Tablet presence during IPL.
36 Timer 1 Test	AP card	Minimum Machine Procedure, page 2-1.
37 Timer 2 Test	AP card	Minimum Machine Procedure, page 2-1.
38 Timer 3 Test	AP card	Minimum Machine Procedure, page 2-1.
39 AP Port Level Test	AP card	Minimum Machine Procedure, page 2-1.
3A Baud Rate Test	AP card	Minimum Machine Procedure, page 2-1.
3B Baud Rate Test	AP card	Minimum Machine Procedure, page 2-1.
3C Interrupt Test	AP card	Minimum Machine Procedure, page 2-1.
3F Extra Interrupt	AP card	Minimum Machine Procedure, page 2-1.
40 Ready FDC	SI card AP card	Minimum Machine Procedure, page 2-1.
41 Interrupt Test	SI card AP card	Minimum Machine Procedure, page 2-1.
42 Verify Media Including File Protect	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
43 Seek Diagnostic Track	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
44 Write Diskette	Diskette media AP card Diskette drive SI card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
45 Read Diskette	Diskette media SI card Diskette drive AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.

Figure   1-5   (Part 5 of 13).   BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
46 Verify Write/Read	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
47 Read Diskette	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
48 Timeout Check	SI card AP card Diskette drive	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
49 Read Diskette	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
4D Read All Sectors	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
4E Seek Track 0	Diskette media Diskette drive SI card AP card	Minimum Machine Procedure, page 2-1. Diskette related offline functions, page 2-49.
4F Extra Interrupt	SI card AP card Diskette drive	Minimum Machine Procedure, page 2-1.
50 Start SI Test	SI card 3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
51 Basic SI	SI card 3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
52 ROM Checksum	SI card AP card	Minimum Machine Procedure, page 2-1.
53 Basic RAM Test	SI card AP card	Minimum Machine Procedure, page 2-1.
54 Detail SI Test	SI card AP card	Minimum Machine Procedure, page 2-1.
55 Interrupt Test	SI card AP card	Minimum Machine Procedure, page 2-1.
56 Full RAM Test	SI card AP card	Minimum Machine Procedure, page 2-1.
57 Address Test	SI card AP card	Minimum Machine Procedure, page 2-1.
58 Buffer Test	SI card AP card	Minimum Machine Procedure, page 2-1.

Figure   1-5 (Part 6 of 13).   BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
59 Buffer Address	SI card AP card	Minimum Machine Procedure, page 2-1.
5A Buffer Address	SI card AP card	Minimum Machine Procedure, page 2-1.
5B Buffer Address	SI card AP card	Minimum Machine Procedure, page 2-1.
5C 1Meg Serial Link Wrap	SI card AP card	Minimum Machine Procedure, page 2-1.
5D 2Meg Serial Link Wrap	SI card AP card	Minimum Machine Procedure, page 2-1.
5E Xmit Timeout	SI card AP card	Minimum Machine Procedure, page 2-1.
5F Extra Interrupt	SI card AP card	Minimum Machine Procedure, page 2-1.
60 Register Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
61 Port RAM	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
62 Mode Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
63 Configuration Register	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
64 RAM Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
65 Port RAM	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
66 3270 Wrap	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
67 Status, Register	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
68 Interrupt Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
69 Parity Circuit Check	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
6A Processor Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
6B Port Wrap	3270/Ports card Ports Cables, see page 2-4. AP card	Minimum Machine Procedure, page 2-1. Disconnect Ports Cables and and re-IPL.
6C Port Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
6D Baud Rate Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.

Figure 1-5 (Part 7 of 14). BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
6E Feature Port	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
6F Extra Interrupt	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
70 3270 BAT Test	AP card SI card 3270/Ports card	Minimum Machine Procedure, page 2-1.
71 Processor Test	3270/Ports card AP card SI card	Minimum Machine Procedure, page 2-1.
72 RAM Test	3270/Ports card SI card AP card	Minimum Machine Procedure, page 2-1.
73 Register Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
74 Timer Test	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
75 Port Test	AP card 3270/Ports card	Minimum Machine Procedure, page 2-1.
7D Extra Interrupt	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
7E Extra Interrupt	3270/Ports card SI card AP card	Minimum Machine Procedure, page 2-1.
7F Test Complete	3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
80 PCC Test	PCC card and cables AP card	Minimum Machine Procedure, page 2-1.
81 PCC Wrap	PCC card & cables AP card	Minimum Machine Procedure, page 2-1. Run A/N Keyboard Basic Thread Test, page 2-45.
82 A/N Keyboard Test	A/N Keyboard PCC card AP card Numeric Keypad	Minimum Machine Procedure, page 2-1. Run A/N Keyboard Basic Thread Test, page 2-45.
83 LPF Keyboard Test	LPF Keyboard AP card	Minimum Machine Procedure, page 2-1. Run LPF Keyboard Wrap Test, page 2-55.
84 Tablet, CursorPad, Cursor Stick Test	Tablet/CursorPad/Stick AP card	Minimum Machine Procedure, page 2-1.
85 Stylus/Cursor	Stylus/Cursor Tablet/CursorPad AP card	Minimum Machine Procedure, page 2-1.

Figure 1-5 (Part 8 of 13). BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
86 Digitizer	Digitizer AP card	Minimum Machine Procedure, page 2-1.
87 Stylus/Cursor	Stylus/Cursor Digitizer AP card	Minimum Machine Procedure, page 2-1.
88 Dials Feature Test	Dials Feature AP card	Minimum Machine Procedure, page 2-1.
8A AP Port 2	Port 2 Device AP card	Disconnect/interchange devices Minimum Machine Procedure, page 2-1.
8B AP Port 3	Port 3 Device AP card	Disconnect/interchange devices Minimum Machine Procedure, page 2-1.
8C AP Port 4	Port 4 Device AP card	Disconnect/interchange devices Minimum Machine Procedure, page 2-1.
8D PCC Verify	PCC card & cables A/N Keyboard AP card	Minimum Machine Procedure, page 2-1. Run A/N Keyboard Basic Thread Test, page 2-45.
8F Extra Interrupt	AP card SI card	Minimum Machine Procedure, page 2-1.
90 Control RAM	Diskette media(Possible media mismatch to DP card) DP card VPM/VC card AP card	Minimum Machine Procedure, page 2-1. See page 2-2.
91 DP Processor	DP card VPM/VC card EPM/PM cards 3270/Ports card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
92 RAM Load/ Multiplier	DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
93 Timeout/ Shifter	VPM/VC card EPM/PM cards DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
94 Interrupt/ Clipping	DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.

Figure 1-5 (Part 9 of 13). BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
95 AP/DP Access/ PSH	DP card VPM/VC card EPM/PM card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
96 3270 Access/ Vector Generator	DP card AP card VPM/VC card 3270/Ports card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
97 VPM/RAM	VPM/VC card EPM/PM cards DP card AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
98 VPM/VC	VPM/VC card EPM/PM cards DP card AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
99 Line Type/PM	DP card VPM/VC card EPM/PM cards AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
9A Character Generator/PM	DP card EPM/PM cards VPM/VC card AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
9B Pick/ Character Generator	DP card VPM/VC card EPM/PM cards AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
9C VPM/Pick	VPM/VC card EPM/PM cards DP card AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
9D VPM/PM	VPM/VC card EPM/PM cards DP card AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.

Figure   1-5 (Part 10 of 13).   BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
9E VPM/PM	VPM/VC card EPM/PM cards DP card AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
9F Extra Interrupt	DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
A0 Autosizer Start	AP card Diskette media	Minimum Machine Procedure, page 2-1.
A1 Initialize	AP card Diskette media	Minimum Machine Procedure, page 2-1.
A2 Access 3270	AP card Diskette media 3270/Ports card	Minimum Machine Procedure, page 2-1.
A3 Access Ports	AP card Diskette media 3270/Ports card	Minimum Machine Procedure, page 2-1.
A4 Build LRT	AP card Diskette media	Minimum Machine Procedure, page 2-1.
A5 Move LRT	AP card Diskette media	Minimum Machine Procedure, page 2-1.
A6 Autosizer Return	AP card Diskette media	Minimum Machine Procedure, page 2-1.
AA Pixel Sizing	VPM/VC card EPM/PM cards DP card Diskette media AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
AB Pixel Sizing	VPM/VC card EPM/PM cards DP card Diskette media AP card	Minimum Machine Procedure, page 2-1. See Video Pixel Plane Test, page 2-33. See DP card T/C feature isolation, page 2-2.
AC Pixel LRT Entry	AP card Diskette media 3270/Ports Card	Minimum Machine Procedure, page 2-1.
B0 DP Code	Diskette media DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
B1 Setup Record	Diskette media AP card	Minimum Machine Procedure, page 2-1.

Figure 1-5 (Part 11 of 13). BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
B2 3270 Code	Diskette media AP card	Minimum Machine Procedure, page 2-1.
B3 AP Code	Diskette media AP card	Minimum Machine Procedure, page 2-1.
B4 DP Start	Diskette media DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2. delines.
B5 DP Code	Diskette media DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
B6 DP Code	Diskette media DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
B7 DP Initialize	Diskette media DP card AP card	Minimum Machine Procedure, page 2-1. See DP card T/C feature isolation, page 2-2.
B8 3270 Code	Diskette media 3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
B9 3270 Code	Diskette media 3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
BA Hex Display	Diskette media 3270/Ports card AP card	Minimum Machine Procedure, page 2-1.
BB System Code	Diskette media AP card	Minimum Machine Procedure, page 2-1.
BF Serial Link Initialization	SI card	Try a backup diskette or force a dump with offline function DD, page 2-49.
C0 through C9 indicates progress of transition from exit of BATs to operational status.	Diskette media	Enter Setup Task, page 2-4, to: Display FRU Counters Display Subsystem Log Display Error Panel Display Link Status Run Setup Function 30 If unable to enter Setup Task, try a backup diskette or force a dump with offline function DD, page 2-49.

Figure   1-5 (Part 12 of 13).   BATs Hex Panel Displays

5085 HEX PANEL INDICATION/MEANING	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
CA indicates failure to establish communications with the Host control unit. The link status panel is displayed at this time. To ignore this error, press Enter to complete the IPL sequence.	See serial link problems See Setup Task Function 20	Enter Setup Task, page 2-4, to: Display FRU Counters Display Subsystem Log Display Error Panel Run Setup Function 30 If unable to enter Setup Task, try a backup diskette or force a dump with offline function DD, page 2-49.
CB indicates progress of transition from exit of BATs to operational status.	Diskette media	Enter Setup Task, page 2-4, to: Display FRU Counters Display Subsystem Log Display Error Panel Display Link Status Run Setup Function 30 If unable to enter Setup Task, try a backup diskette or force a dump with offline function DD, page 2-49.
DO through DF	None	Refer to 2-41.
FD-FF indicates missing or improper diskette drive jumper assembly or switch position. See Figure 4-2 on page 4-8).	Diskette fuse Diskette drive configuration jumper assembly or switch position Diskette cables - logic & power Diskette drive SI card	Diskette related offline functions, page 2-49.

Figure 1-5 (Part 13 of 13). BATs Hex Panel Displays

1.6 3270 Feature Problems

This section pertains to problems with the 3270 Feature. The 3270 Feature may be connected to a host processor by way of an external modem or by Mode Share Attachment (MSA) to the graphics host processor by way of the coaxial cable. Some of the items below do not apply when the MSA is used. Switching between an external modem and MSA is permitted, using configuration Setup Function 1. Refer to 2-3.

Note: POWER MUST BE OFF WHEN CHANGING LOGIC CARDS. POWER MUST BE OFF FOR AT LEAST 15 SECONDS BEFORE TURNING POWER BACK ON.

PROBLEM	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
3270 Communication Checks	3270/Ports card Feature cables	POR to run BATs. Perform wrap test described on page 2-3.
3270 Test 0, 1, 2, 3, or 4 fails	3270/Ports card	POR to run BATs. If BATs fail, unseat the 3270/Ports card and re-IPL
3270 Test 5 fails	3270/Ports card Internal and External Cables to Modem	Disconnect modem and rerun the test.
3270 Test 6 fails	External cable to modem (switch must be set to Operate). Modem is probably at fault or it does not support this test	None
3270 Test 7, 8, 9, or A fails	3270/Ports card	None
3270 MSA fails	3270/Ports Card SI card	POR to run BATs. Run Setup Function 30, page 2-27, to determine that the problem is only with the 3270 feature. If not, approach the problem as though it is a base machine problem.
Other problems	3270/Ports card	Run Setup Function 30, page 2-27, to determine that the problem is only with the 3270 feature. If not, approach the problem as though it is a base machine problem.

Figure 1-6. 3270 Feature Problems

1.7 Ports Device Problems

This section pertains to problems associated with a device connected to the Ports Feature.

Note: POWER MUST BE OFF WHEN CHANGING LOGIC CARDS. POWER MUST BE OFF FOR AT LEAST 15 SECONDS BEFORE TURNING POWER BACK ON.

PROBLEM	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
Device does not respond	3270/Ports card Device cables	POR to run BATs. Run Ports Feature Wrap Test, page 2-4. Run device test if available. Verify device/setup configuration.

Figure 1-7. Ports Device Problems

1.8 Peripheral Device Problems

This section pertains to problems associated with peripheral devices, which the customer might have solved by referring to the Problem Determination (PD) guide. It provides direction for swapping devices to alternate ports for isolation, suggests tests such as Setup Function 30, LPFK wrap, and Tablet/CursorPad for identification and isolation of faults. You must connect I/O devices before IPL in order to detect and enable them for Setup Function 3. They must be enabled to function on line and in Setup Function 30. Be aware that the application program can send a disable command to a device during operation.

Only one Tablet, CursorPad, Cursor Stick or Light Pen is allowed on a subsystem at a time. They do not function correctly if more than one is connected even though they appear as present in Setup function 3. (Light Pen presence is not indicated in Setup function 3, you must determine by looking at the PCA port 5.)

Note: PCA DEVICE CABLE SPRING CLIPS MUST MAINTAIN FRAME GROUND CONTINUITY TO MAINTAIN DEVICE TOLERANCE TO ELECTRO STATIC DISCHARGE (ESD)!

Serial A/N keyboards are switchable to a local host system and are identified by the presence of 3 LED indicators in the upper right corner. See Figure 2-48 on page 2-48. This switch toggles each time the Alt/SwKbd keys are pressed. Switch to the local host turns on the rightmost LED. This switch also switches the port 2 device at the same time. Currently, only the Tablet/CursorPad are supported by the local host. Disconnect the cable from the PCC to the local host for fault isolation. If the failure is only when connected to the local host, the keyboard may be plugged directly to the local host for fault isolation. For failures that only occur in the local host configuration, the possible 5085 FRUs are the PCC card and the cable to the local host.

PROBLEM	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
Alphanumeric (A/N) keyboard fails	A/N keyboard PCC card Cables to PCC/AP cards AP card	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27. Run Mode Switch functions for A/N keyboard, page 2-45.
Alphanumeric (A/N) keyboard fails only when switched to local host	PCC card Cables to local host from PCC	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27. Run Mode Switch functions for A/N keyboard, page 2-45.
CursorPad fail	CursorPad Cables to AP card from PCC PCC card AP card	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30,page 2-27.
CursorPad fails only when switched to local host	PCC card Cables to local host from PCC	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27. See Tablet/CursorPad Tests, page 2-56.
Cursor Stick fail	Cursor Stick Cables to AP card from PCC PCC card AP card	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27.
Dials fail	Dials Cables to AP card from PCC PCC card AP card	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27.
Light pen fails (Supported on monochrome display only)	Light pen PCC cables to backplane & AP VPM card PCC card (Preselection highlight is required for lightpen operation). See page 4-3.	POR to run BATs. Verify Setup Function 1, page 2-8. Run Setup Function 30, page 2-27. Observe Setup Function 3, page 2-15. Run Setup Function 36, page 2-36.
LPFK fails	Wrap switch in test LPFK Cables to AP card from PCC PCC card AP card	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27. Run LPFK wrap test, page 2-55.

Figure 1-8 (Part 1 of 2). Peripheral Device Problems

PROBLEM	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
Numeric keypad fails	Numeric keypad A/N keyboard	POR to run Bats. Run Setup Function 30, page 2-27. Run Mode Switch functions for keyboards, page 2-45.
Preselection highlight fails	Preselection Highlight Assembly on VPM Card VPM card	POR to run BATs. Verify Setup Function 1, page 2-8. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27.
Tablet/CursorPad fails	Tablet/CursorPad Stylus/Cursor Cables to AP card from PCC PCC card AP card (A light pen failure or light pen in presence blocks out the tablet. Unplug for isolation.)	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27. See Tablet/CursorPad Tests, page 2-56.
Tablet/CursorPad fails only when switched to local host	PCC card Cables to local host from PCC	POR to run BATs. Observe Setup Function 3, page 2-15. Run Setup Function 30, page 2-27. See Tablet/CursorPad Tests, page 2-56.

Figure 1-8 (Part 2 of 2). Peripheral Device Problems

1.9 Serial Link Problems

This section pertains to problems associated with the serial link connection to the host system. The serial link connection may be a coaxial cable or, with the 5085 V.35 Feature, teleprocessing (TP). If it is TP, run Setup Function 37 first to assist with fault isolation [page 2-37.]. If these tests run without error, the setup is incorrect or the problem is external to the 5085. An incorrect setup includes address, speed, and NRZI/non-NRZI. Probable external causes are modems, communication facilities, or the Host control unit. At the end of IPL, the 5085 hex panel displays CA [page 2-20.] if the link connection is not established. At this time, the 5081 displays the link status along with 16 or 32 sets of Poll/SNRM counters.

The serial link connection may also be controlled by a local host to switch between the local host and a channel control unit. The connection request is made by way of the Setup function. Power off of either the local host or channel control unit forces the connection to the powered on unit for the next IPL serial link start up process. Errors are identified by the link status codes.

Although coaxial cabling is a customer responsibility, you may identify coaxial cable problems for the customer. Use a volt/ohm meter to check cable continuity and termination to assure that the conductor and shield are not shorted and that there are no extraneous signals on the conductor or shield. There must be no mix of 75/93 ohm cable. Disconnect the 5085s and 5081s from the power source during continuity tests to open the frame/power ground circuit. See page 2-56.

CONDITION	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
No apparent communication to the host system	See Additional Actions	Display link status panel for directions. Verify that host application is running. Verify that the channel controller is online.
All subsystems on only 1 of the 4 Serial Links fail	Serial Link connections or termination	
All subsystems on this Channel controller fail	Channel controller	Verify that the channel controller is online.
Link Status 0	None. (During IPL, this indicates recovery from an error condition. Press Enter to continue.)	IPL to observe initial link status panel. Verify that host application is running. Verify that the channel controller is online.
Link Status 1	Loose or faulty coaxial cable, external or internal No link termination SI card External causes	Check other units on this channel controller.

Figure 1-9 (Part 1 of 3). Serial Link Problems

CONDITION	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS

Link Status 2	SI card
	External causes
		IPL to observe initial
		  link status panel.
		Check other units on
		  this channel controller.

Link Status 3	Setup problem	See Figure 2-23 on page 2-22 for detail.

Link Status 4, 4.1
(4.1 indicates the
5085 is expected to
be connected to a
3258)
	Setup problem:
	Link speed
	Address-5085 or
	  channel
	  controller
	Open coax cable,
	  external or
	  internal
	Open terminator
	Host controller
	  is off or is
	  failing
	External causes
		IPL to observe initial
		  link status panel.
		Check other units on .
		  this channel controller.

Link Status 4.3	Modem Cables SI card	Run Setup Function 37 page 2-37.
Link Status 5	Channel controller	See 5088 MIM.
Link Status 5.1	Channel controller	See 5088 MIM.
Link Status 5.2	Channel controller	See 5088 MIM.
Link Status 6, 6.1 (6.1 indicates the 5085 is expected to be connected to a 3258)	Setup problem	See Figure 2-23 on page 2-22 for detail.
Link Status 7	Setup problem	See Figure 2-23 on page 2-22 for detail.
Link Status 7.1	Setup problem	See Figure 2-23 on page 2-22 for detail.
Link Status 7.2	Setup problem	See Figure 2-23 on page 2-22 for detail.
Link Status 7.3	Setup problem	See Figure 2-23 on page 2-22 for detail.
Link Status 7.4	Setup problem	See Figure 2-23 on page 2-22 for detail.
Link Status D	None	Enable at least one 5085 address and re-IPL.
Link Status F	None	Re-IPL for valid Link Status,.
Link Status X	None	Verify Setup function 1
Test 37 Return Code % hang	SI card	Re-IPL to observe link status.

Figure 1-9 (Part 2 of 3). Serial Link Problems

CONDITION	PROBABLE FRU SEQUENCE	ADDITIONAL ACTIONS
Test 37 Return Code 8000 on cable wrap option	V.35 cables Wrap connector SI card	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8000 on modem wrap option	Modem SI card V.35 cables	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8300	SI card	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8001	SI card V.35 cables Wrap connector	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8002	SI card V.35 cables Wrap connector	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8003	SI card V.35 cables Wrap connector	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8004	SI card V.35 cables Wrap connector	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8005	SI card V.35 cables Wrap connector	Re-IPL to observe link status See Figure 5-15 on page 5-12.
Test 37 Return Code 8006	SI card V.35 cables Wrap connector	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8007	Modem V.35 cables Wrap connector	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8008	Modem V.35 cables Wrap connector	Re-IPL to observe link status. See Figure 5-15 on page 5-12.
Test 37 Return Code 8009	Modem V.35 cables Wrap connector	Re-IPL to observe link status. See Figure 5-15 on page 5-12.

Figure 1-9 (Part 3 of 3). Serial Link Problems

Chapter 2. Actions

2.1 Maintenance Approach

The subsystem uses Basic Assurance Tests (BATs) to initially show that the equipment is operating correctly. BATs run as a result of initial Power On Reset (POR), or, on some machines, Initial Program Load (IPL). Pressing the IPL reset twice within 1/2 second causes BATs to be run on machines that normally do not run BATs on every IPL. A more thorough test of pixel and system memory may be called by using the offline DE function to set the diagnostic register for the long IPL (2.34.3, "Offline Functions" on page 2-49). This change is in effect for additional offline functions. A normal IPL or POR uses a value from the diskette for the diagnostic register. Some errors are detected by the hardware during customer operation and some errors are detected by customer observation. Field Replaceable Unit (FRU) error counters, a subsystem log, an error display, and device exercisers help to identify faults. This document provides direction for isolation to the faulty FRU.

Most of the faulty FRUs can be isolated by using the Symptom/Fix Index and the additional actions referenced. Other functions that are normally used under Support Center direction are included in this chapter.

Note: It is recommended that you use the IBM ESD handling kit, PN 6428316 or equivalent, when handling logic cards.

Note: A Power On Reset (POR) is a more complete reset than an IPL reset. This may be the cause of symptoms appearing to change.

2.2 Minimum Machine Procedure

The minimum machine procedure is used to isolate a fault to a specific failing logic card. The procedure consists of the following steps:

1. Perform the power check, 2.38, "Power Check" on page 2-57.
2. Turn 5085 power off and set the Mode switch to Normal.
3. Unseat all logic cards except the AP card.
4. Turn the 5085 power on to initiate IPL.
5. Closely observe the hex panel display.
6. If the hex panel display is correct, power off and add the remaining FRUs in the prescribed sequence until a fault is identified by not getting the expected hex panel display.
7. Although the PROBABLE cause is the last FRU added, it COULD be another as identified in the 1.5, "5085 Hex Panel Displays (BATs)" on page 1-14 of the Symptom/Fix Index.

Figure 2-1 on page 2-2 shows the requirements for starting the procedure, the sequence for adding FRUs, and the expected hex panel display/meaning when the unit is operating properly.

Note: POWER MUST BE OFF WHEN SEATING OR UNSEATING LOGIC CARDS. POWER MUST BE OFF FOR AT LEAST 15 SECONDS BEFORE TURNING IT BACK ON.

SEQUENCE	HARDWARE	EXPECTED HEX DISPLAY	MEANING
Required to Start	Power AP card without PCC cable EJ2 connected. Hex display. Backplane	0E	FDC access routine
Reseat	SI/FDC card without diskette drive cable FJ1 connected.	1D or FD	Drive/cable check
Reseat	Diskette drive cable FJ1 and diskette drive with diskette media removed.	11 or 10 18	Awaiting timeout (motor light on), then timeout
Insert	Diskette media (source of remaining tests). For any error occurring at this step, refer to the Symptom/Fix Index for the FRU.	80	PCC Wrap routine
Note 1	Optional system memory may be added at this point with no difference in success indication.	80	
Note 2	The optional 3270/Ports feature may be added at this point with no difference in success indication.	80	
Reseat	PCC cable EJ2 with I/O device cables unseated to the PCC (power connector J6 connected).	82	A/N Keyboard routine
Reseat	A/N Keyboard cable to the PCC.	90	Control storage (DP)
Reseat	Remaining I/O device cables.	90	Control storage (DP)
Reseat	DP card, see 2.3, "DP Card - Transformation/Clipping Feature Isolation."	93	Pixel Memory
Reseat	VPM/EPM or VC/PM card(s)	00	Successful completion
Note 3	See the Video Pixel Plane Test, page 2-3. isolation of VPM/EPM errors.		

Figure   2-1.   Minimum Machine Sequence

2.3 DP Card - Transformation/Clipping Feature Isolation

The DP card may have an optional 68-pin multiplier module (P/N 6245854) installed in a socket. If it does not, disregard this procedure. If it does, remove the module as described in 4.1.3.1, "Display Processor Card" on page 4-2. Repeat the failing procedure. If there is not a failure at this point, obtain a new module and install it as described in 4.1.3.1, "Display Processor Card" on page 4-2. If the failure was repeated, replace the DP card, the original module is probably good.

2.4 3270 Feature Test Procedures

The optional 3270 Feature has test procedures that are available when the workstation is in the 3270 mode. Enter and exit this mode by pressing the Alt/Jump Screen keys. When in the 3270 mode, as identified by the line separating the operator information area, enter the test function by pressing the Alt/Test keys on the parallel keyboard or the Alt/F14 on the serial keyboard. The serial keyboard is identified by the presence of three light emitting diode indicators in its upper right corner. TEST appears below the separator line if the function is accepted. If it is not accepted because another session is in progress, the Minus Function X-F appears. Press the Reset key to clear this condition.

To run a test once, key in the appropriate test number and press the Enter key. To loop a test, key in the test number followed by /L and press the Enter key. To stop looping, press the spacebar. If the test is successful, OK appears. If the test is not successful, an error code appears. To exit the test mode, key in X and press the Enter key. Refer to the 3270 Feature Symptom/Fix Index for actions.

The 3270 feature may be connected to a host processor by way of an external cable and modem, or by Mode Share Attachment (MSA) to the graphics host processor by way of the coax cable. Switching between an external modem and MSA is permitted using configuration Setup Function 1.

Figure 2-2 lists and describes the available tests.

TEST	FUNCTION	COMMENT
0	Test 1-4	Duplicate of BATs
1	MPU	Duplicate of BATs
2	Memory	Duplicate of BATs
3	Control Register	Duplicate of BATs
4	Timer	Duplicate of BATs
5 *	Cable Wrap	Modem wrap cable must be installed and the switch on the modem end set to test
6 *	Modem Wrap (Modem Option)	Set the cable switch to operate and the modem control to wrap-setup function 1, panel 3; and make any other modem-required switch settings
7	Error Log Display	Call for Support Center assistance
8	Error Log Reset	Reset function of Error Log
9 *	NTT Installation	For installation use in Japan
A	CRT Convergence	Additional check of linearity and convergence of 5081 Display

Figure   2-2.   3270 Feature Tests

The asterisk (*) indicates tests that do not apply when only using the 3270 feature in MSA.

2.5 Ports Feature Wrap Test

Install wrap connectors (PN 4173225) on Port A and Port B at the I/O panel. Select the offline function DE to set the diagnostic register to 8400, then respond to EF by keying in a D and pressing the carriage return. Failure of this test is identified by a 6B display. If the normal BATs run but fail this test with a 6B, the problem is probably the 3270/ports card, internal port feature cable, or wrap connector.

2.6 Setup Task

At subsystem installation and IPL, the setup task automatically calls system routines to select and initialize individual devices. Then the setup data pertaining to the subsystem configuration is written to the subsystem diskette. This setup data is used during startup to determine if the system is fully operational. It completes with the IBM logo on the monitor. The setup task also allows entry to a number of functions that can be used to help isolate the cause of problems or determine the status of the subsystem.

Setup task functions currently defined are listed in Figure 2-3, but are microcode dependent. Each level of microcode will have its own menu showing the functions available. Attempted selection of a function or entry of a value that is no longer supported causes an "X" response.

The setup task may be entered at any time by pressing the Alt/Setup keys on the A/N Keyboard. The sequence of events at that point depends upon the level of microcode. There is a 5.25 inch diskette which has the original operator interface and a 3.50 inch diskette which has the new operator interface. Where this causes a difference in an expected display or procedure, it is identified or there is a subheading for each version.

2.6.1 Setup Task For 5.25 Inch Diskette, Original Operator Interface

The Setup Task entry display appears after setup data is loaded from the diskette. Revision level information is displayed at the lower right corner of the setup task entry display in the following format:

    AAAAAAAB
    CCCCDDDD

Where:

    A = Microcode revision level (part number)
    B = Patch level
    C = AP EPROM level
    D = SI EPROM level

Later level microcode also shows an abbreviated revision level at the bottom center of the Setup Task entry display.

The desired task is selected by entering its function identification.

FUNCTION NUMBER	FUNCTION NAME	REFER TO PAGE
00	Menu	2-7
01	Customizing information	2-8
02	Change display comments	2-14
03	System configuration information	2-15
04	3270 Reset, bring online	2-18
05	Kanji File Load	2-18
06	Kanji Dictionary Save	2-19
07	Keyword Setup	2-20
20	Link Status	2-20
21	Error Counter Display	2-24
22	Error Log Records	2-25
23	Error Log Reset	2-26
24	FRU Counter Display and Reset	2-26
30	Peripheral Tests and Character Fonts	2-27
31	Monitor Test Patterns	2-29
32	256-Color Monitor Test Pattern	2-32
33	Stile Monitor Test Pattern	2-33
34	Video Pixel Plane Test	2-33
35	Port Device Test	2-34
36	Light Pen Calibration	2-36
37	V.35 Test	2-37
80	Trace Controls	2-37

Figure 2-3 (Part 1 of 2). Setup Task Functions

FUNCTION NUMBER	FUNCTION NAME	REFER TO PAGE
81	Dump Data Display	2-37
82	Display Keyword	2-39
A0	Patch Diskette Routine	2-39

Figure 2-3 (Part 2 of 2). Setup Task Functions

If the Enter key is pressed without a function number entered, the menu is displayed.

To exit the setup task, press the Alt and Cncl keys.

Figure 2-4 shows the LOGO display and the setup task entry display.
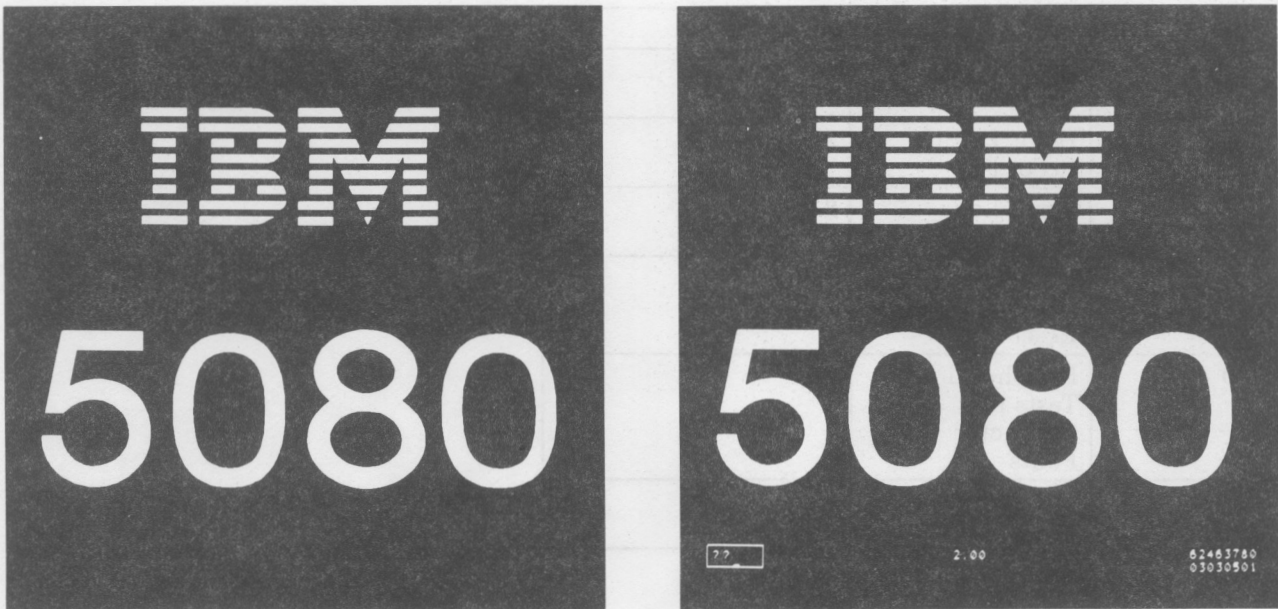
Figure 2-4. LOGO Display and 5.25 Inch Diskette Setup Task Entry Display

When the cursor appears next to the prompt area, the setup task is enabled. To initiate a function, enter the 2-digit function number and press the Enter key. Absence of the cursor indicates an error condition. To re-enter the setup task, press the Alt and Setup keys.

2.6.2 Setup Task For 3.50 Inch Diskette, new Operator Interface

The new operator interface is an attempt to be more "user friendly" while still maintaining the original functions. Because some of the changes are minor and cosmetic in nature, they are self explanatory. Entry of the setup function goes directly to setup function 1, panel 1. Selection of an item or line number causes the cursor to move to the second input area for data entry.

Function keys are used in the following manner during workstation customization:

- F1 = Select the menu screen

- F3 = End the setup function and save changed values on diskette

- F7 = Select the previous function 1 screen - wraps from first to last

- F8 = Select the next function 1 screen - wraps from last to first.

2.7 Menu Screen (Setup Function 00)

The menu screen (setup function 00) depicted in Figure 2-6 on page 2-8 is an example of the functions available on a particular diskette. Additions and deletions are to be expected. Each level of microcode diskette has its own unique menu.

The following figure is a larger list with descriptions of functions that have been available.

FUNCTION	DESCRIPTION
00	Help Screen (Menu)
01	Workstation Customization
02	Change comments in operator displays
03	System Configuration Information
04	Reset 3270 and bring it online
05	Load Kanji characters/dictionary
06	Save Kanji dictionary
07	Keyword Setup
20	Current Link Status Analysis
21	Error Counter Display
22	Error Log Display
23	Clear the error log
24	Display and Reset the FRU Counters
30	Interactive Peripheral Tests
31	Basic Monitor Test Patterns
32	256-Color Test Pattern
33	Stile Test Pattern
34	Interactive Pixel Plane Test
35	Port Device Test
37	5085 V.35 Test

Figure 2-5. Menu Screen (Function 00)

```
                              00-00


          01 :   WORKSTATION CUSTOMIZATION
          02 :   CHANGE COMMENTS IN OPERATOR PANELS
          03 :   SYSTEM CONFIGURATION INFORMATION
          04 :   RESET 3270 AND BRING IT ONLINE
          05 :   LOAD KANJI CHARACTERS/DICTIONARY
          06 :   SAVE KANJI DICTIONARY
          07 :   KEYWORD SETUP
          20 :   LINK STATUS ANALYSIS
          21 :   ERROR COUNTER DISPLAY
          22 :   ERROR LOG DISPLAY
          23 :   CLEAR THE ERROR LOG
          24 :   DISPLAY AND RESET THE FRU COUNTERS
          30 :   INTERACTIVE PERIPHERAL TESTS
          31 :   BASIC MONITOR TEST PATTERNS
          32 :   256 COLOR TEST PATTERN
          33 :   STILE TEST PATTERN
          34 :   INTERACTIVE PIXEL PLANE TEST
          35 :   PORT DEVICE TEST
          37 :   5085-V.35 TEST

     ALT/CNCL EXITS AT ANY TIME, ENTER ALLOWS CONTINUATION
```

Figure 2-6. Example of Menu Screen

2.8 Customizing Information (Setup Function 01)

The customizing function allows file data on the system diskette to be altered to meet individual customer/application requirements.

The customizing function uses three panels. Examples of the three panels are shown in Figure 2-7 on page 2-9 through Figure 2-12 on page 2-12. Each panel displays items that can be altered and the current settings of those items. The value of each item can be changed by using this procedure. The changed value is written back to the diskette at setup task exit for use on the next IPL. Changed items identified on the display panel with an asterisk (*) require the IPL, the others do not.

Select the item to be changed, by entering the appropriate line number in the first prompt area (??_); then press Enter. If the line number is valid, the cursor moves to the second prompt area (> > _). Key in a valid value for the associated item, then press Enter. Later levels of microcode identify the prompt areas with ITEM and VALUE and only require pressing Enter after the VALUE data.

If the field has been keyword protected, the cursor moves that area for keyword entry. (See Setup Functions 7 and 82.)

If the line number or the value is incorrect, an X appears next to the affected line. The X remains visible for approximately 2 seconds; then the field is reset and the cursor is repositioned to allow further input.

Step the panels from 1 to 3 by pressing the Enter key.

Pressing Enter, when on panel 3, exits the customizing function. Pressing the Alt and Cncl keys exits the customizing function immediately and changes are saved on the system diskette.

The ampersands (&) in the first column of Figure 2-7 on page 2-9 and Figure 2-10 on page 2-11 indicate that the items are microcode level dependent.

LINE NO. (1st INPUT)	DEFAULT VALUE	FUNCTION	VALUE (2nd INPUT)
1 &	0	5080/3250 Display Mode	0 = 5080 1 = 3250
2 &	1	Use Tablet as a pick device	0 = Off 1 = On
3	48	Pick window size	4-255 is allowed
4	0	Use ANK PF keys as LPF keys	0 = Off 1 = On
5	1	Keyboard typematic rate	1 = Low Speed 2 = High Speed
6 &	4	Dial interrupts per revolution	2-8 are valid 2 = 4 3 = 8 4 = 16 5 = 32 6 = 64 7 = 128 8 = 256
7 &	50	Tablet sampling rate	1-100 Samples per Second is Valid
8 &	3	Tablet distance between interrupts	1-51. Each digit represents 5 mil (1 = 5 mil, 51 = 255 mil, 3 = 15 mil)
9	1	Tablet size (Only valid for large tablets)	1 = Full, 2 = Quarter (Stylus/cursor switch action in the desired tablet area is required to select the active tablet quarter area.)
A	0	Preselection Highlighting	0 = no 1 = yes
B	0	Alternate pick device	0 = no 1 = yes

Figure 2-7. Original Workstation Customization (Display 01)

LINE NO. (1st INPUT)	DEFAULT VALUE	FUNCTION	VALUE (2nd INPUT)
1	2	Tracking cursor type	Options shown on screen
2	64	Tracking cursor color	1-64 is allowed (Options will display on bottom of panel)
3	0	Line on line (Highlight overlaping portion of lines.)	0 = no 1 = yes
4	48	Pick window size	4-255 is allowed
5	1	Tablet size (Only valid for large tablets)	1 = Full, 2 = Quarter (Stylus/cursor switch action in the desired tablet area is required to select the active tablet quarter area.) Panel 01-11 will appear to assist in selection.
6	0	Preselection highlighting	0 = no 1 = first item in DLB prgm. 2 = last item in DLB prgm. 3 = all items in DLB prgm.
7	Current connection	Attachment Request Attachment Status	1 = 5088 2 = Local host U = Function not supported W = Switch request failed Y = Re-IPL is required Z = No current connection
8	0	Use keyboard F keys as LPF keys	0 = no 1 = yes
9	1	Keyboard cursor speed	1 = low 2 = high
A	0	5080/3250 Image	0 = 5080 1 = 3250
B	0	Alternate pick device	0 = no 1 = yes

Figure 2-8. New Workstation Customization (Display 01)

```
┌─────────────────────────────────────────────────────────────┐
│                        01-01                                 │
│                                                              │
├──────────────────────────────────────────────────┬──────────┤
│  ┌───┐                                             │          │
│  │ 1 │   0      5080/3250 IMAGE, 0=5080 1=3250      │          │
│  ├───┤                                             │          │
│  │ 3 │   48     PICK WINDOW SIZE    4 - 255         │          │
│  ├───┤                                             │          │
│  │ 4 │   0      USE KYBD PF KEYS AS LPF KEYS 0=NO 1=YES       │
│  ├───┤                                             │          │
│  │ 5 │   1      KEYBOARD CURSOR SPEED 1 = LOW  2 = HIGH       │
│  ├───┤                                             │          │
│  │ 9 │   1      TABLET SIZE  1 = FULL  2 = QUARTER  │          │
│  ├───┤                                             │          │
│  │ A │   0      PRE-SELECTION HIGHLIGHTING  0=NO 1=YES        │
│  ├───┤                                             │          │
│  │ B │   0      ALTERNATE PICK DEVICE  0=NO  1=YES  │          │
│  └───┘                                             │          │
│                                                              │
├──────────────────────────────────────────────────┼──────────┤
│                                                    │          │
│   · ??_           ▶▶                               │          │
│                                                    │          │
└──────────────────────────────────────────────────┴──────────┘
```

Figure 2-9. Example of Workstation Customizing Display 01.

LINE NO. (1st INPUT)	DEFAULT VALUE	FUNCTION	VALUE (2nd INPUT)
* 1	1	Type of controller	1 = 5088 or Local host 2 = 3258
* 2 &	000	Base address for controller	000 through FFF are valid
* 3	1	5088/3258 line rate	1 = 1 megabit (5088 or 3258) 2 = 2 megabit (5088 only)
* 4	000	Graphic device host processor address	000 through FFF are Valid
* 5	0	Graphic host enable/disable	0 = Off 1 = On
* 6	000	Ports Feature port A host processor address	000 through FFF are valid
* 7	0	Ports Feature port A On/Off	0 = Off 1 = On
* 8	000	Ports Feature port B host processor address	000 through FFF are valid
* 9	0	Ports Feature port B On/Off	0 = Off 1 = On

Figure 2-10 (Part 1 of 2). Host/Controller Attachment Customizing (Display 02)

LINE NO. (1st INPUT)	DEFAULT VALUE	FUNCTION	VALUE (2nd INPUT)
* A	1	5085 V.35 encoding type	1 = NRZI 2 = NRZ
* B	3	5085 V.35 line rate	3 = Low speed - less than 256KB or non-zero RTS/CTS delay. 4 = High speed - 256KB or above and zero RTS/CTS delay.
* C	0	5085 V.35 modem wrap	0 = Non-wrappable 1 = Wrap test 1 (expect DSR off) 2 = Wrap test 2 (expect DSR and CD on)

Figure 2-10 (Part 2 of 2). Host/Controller Attachment Customizing (Display 02)

```
                              01-02


    *   1        1       TYPE OF CHANNEL CONTROLLER 1=5088 2=3258
    *   3        1       5088/3258 LINE RATE  1,  2
    *   4        000     GRAPHIC DEVICE ADDRESS
    *   5        0       GRAPHIC DEVICE ONLINE/OFFLINE 1=ON 0=OFF
    *   6        000     PORT A DEVICE ADDRESS
    *   7        0       PORT A DEVICE ONLINE/OFFLINE 1=ON  0=OFF
    *   8        000     PORT B DEVICE ADDRESS
    *   9        0       PORT B DEVICE ONLINE/OFFLINE 1=ON  0=OFF
    *   A        1       5085 V.35 ENCODING TYPE  1=NRZI 2=NRZ
    *   B        3       5085 V.35 LINE RATE  3 = LOW  4 = HIGH
    *   C        0       5085 V.35 MODEM WRAP  0 - 2


        ??_      ►►
```

Figure 2-11. Example of Workstation Customizing Display 02

LINE NO. (1st INPUT)	DEFAULT VALUE	FUNCTION	VALUE (2nd INPUT)
* 1	1	Language	1 = US English 2 = UK English 3 = German 4 = French 5 = Italian 6 = Katakana 7 = Swedish
* 2	0	APL Feature	0 = No 1 = Yes
* 3	1	Display type	1 = Color 2 = Monochrome
* 4	C1	3270 Link address	1-FE is valid
* 5	4	3270 Line attachment	1 = Two wire/NRZ 2 = Four wire/NRZ 3 = Two wire/NRZI 4 = Four wire/NRZI (Two wire = control Request to Send) (Four wire = permanent Request To Send)
* 6	0	3270 Modem wrap	0 = No 1 = Yes
* 7	2	3270 Screen size	1 = 960 2 = 1920 3 = 2560 4 = 3440 5 = Katakana-Japan only
* 8	000	3270 Local MSA device address	000 through FFF are valid
* 9	1	3270 Connection	1 = SNA (TP) 2 = Local/MSA (serial link)
* A	0	3270 Online/Offline	0 = off 1 = On

Figure   2-12.   3270 Host Processor Attachment Customizing (Display 03)

```
                                  01-03


  *   1       1       LANGUAGE    1 - 7
  *   2       0       APL FEATURE   0 = NO   1 = YES


  *   3       1       DISPLAY TYPE   1=COLOR   2=MONOCHROME


  *   4       C1      3270 SNA LINK ADDRESS   01 - FE
  *   5       4       3270 SNA LINE PROTOCOLS   1 - 4
  *   6       0       3270 SNA MODEM WRAP   0 = NO   1 = YES
  *   7       2       3270 SCREEN SIZE   1 - 4
  *   8       000     3270 LOCAL/MSA DEVICE ADDRESS
  *   9       1       3270 CONNECTION   1=SNA   2=LOCAL/MSA
  *   A       0       3270 ONLINE/OFFLINE   1=ON   0=OFF


      ??_      ►►
```

Figure   2-13.   Example of Workstation Customization Display 03

Example of Workstation Customizing Display 03.

2.9 Change Panel Comments (Setup Function 02)

This function allows the customer to write customization information and comments in his own style
and language. An example of the display panel for this function is shown in Figure 2-14 on
page 2-15.

The cursor appears in the first comment field on the first display panel that may be changed. Enter
the comments for this line; then use the Jump Cursor key to move to the next line. The
Forward/Backward Cursor Control keys can be used to make changes within the same line. When
the Enter key is pressed, the current panel is saved on the diskette, and the next panel is shown.
The Alt/Cncl keys exit the panel being displayed without accepting any change.

Comments can be changed for only the menu, customizing, and system configuration panels.

```
                           01-03

  *    1        1      COMMENTS MAY BE CHANGED HERE
  *    2        0      AND HERE

  *    3        1      AND HERE

  *    4        C1     AND HERE
  *    5        4      ETC.
  *    6        0      ETC.
  *    7        2      3270 SCREEN SIZE   1 - 4
  *    8        000    3270 LOCAL/MSA DEVICE ADDRESS
  *    9        1      3270 CONNECTION   1=SNA   2=LOCAL/MSA
  *    A        0      3270 ONLINE/OFFLINE   1=ON   0=OFF


       ??_      ▶▶
```

Figure 2-14. Example of Change Display Comments Display

2.10 System Configuration Information (Setup Function 03)

The system configuration information displayed on the 5081, indicates the specific devices attached to each port and installed features as determined by the subsystem at the completion of BATs.

Press the Cncl key or the Enter key to exit this function.

Figure 2-15 shows the information on the System Configuration Information panel. The second column shows the code identification of the device that is attached to a port, or the presence or absence of the feature. A device or feature that is present, but is not shown as present, is probably faulty. Port 2, 3, and 4 devices may be disconnected/interchanged to isolate connection and port failures. Re-IPL the subsystem to test for faulty devices. If the device works in a different port, the FRU is the AP card or the connection through the PCC to the AP card.

LINE NUMBER	VALUE	DESCRIPTION
1	1	Port 1 Device
2	4	Port 2 Device
3	0	Port 3 Device
4	0	Port 4 Device
5	0	3270/Ports Feature
6	0BFFFF	Highest system memory address
7	0001	IPL sequence number
8	0	Transformation/Clipping Feature (On DP card)
9	2	Number of video pixel planes (2, 4, 6, or 8)
A	0	Preselection Highlighting
B	4 Fields	1 = Diskette part number and revision level 2 = Diskette level reference 3 = AP EPROM revision level 4 = SI EPROM revision level

Figure 2-15. System Configuration Information Description

Possible device types are:

0 = Indicates that a device/feature is nonfunctional or that none is attached.

1 = Parallel A/N Keyboard (Port 1 only).

11 = Serial (switchable) A/N Keyboard (Port 1 only).

3 = LPF Keyboard (Ports 2-4). *The Test switch on the bottom of the LPFK must be in the normal position.*

4 = 5083- 1 Tablet (Ports 2-4).

14 = 5083-12 Tablet (Ports 2-4).

15 = 5083-11 CursorPad (Ports 2-4).

6 = Digitizer (Ports 2-4).

8 = Dials Feature (Ports 2-4).

A = Cursor Stick (Ports 2-4).

Notes:

1. Only one of device types 4, 14, 15, A, or light pen is allowed at a time in a subsystem. If more than one is connected, they appear here but they do not function correctly.

2. Light pen presence is not indicated on this panel.

When port 1 and 2 are switched to the local host by the switch command from the keyboard, only the Tablet/CursorPad is supported on port 2.

The highest system memory address is determined by the operating condition of the subsystem hardware. Physically connected but nonfunctioning hardware causes the display to show a lower address than expected. Figure 2-16 shows the expected addresses for each possible configuration.

ADDRESS	CONFIGURATION
01FFFF	Base 128K AP
03FFFF	Base 128K AP + 3270
07FFFF	Base 512K AP
09FFFF	Base 512K AP + 3270
09FFFF	Base 128K AP + 1 512K ESM
0BFFFF	Base 128K AP + 3270 + 1 512K ESM
11FFFF	Base 128K AP + 2 512K ESMs
13FFFF	Base 128K AP + 3270 + 2 512K ESMs
17FFFF	Base 512K AP + 1 1M ESM
19FFFF	Base 512K AP + 3270 + 1 1M ESM
27FFFF	Base 512K AP + 2 1M ESMs
29FFFF	Base 512K AP + 3270 + 2 1M ESMs

Figure 2-16. Highest System Memory Address

```
                              03-01


      ┌───┐
      │ 1 │     1          1, 11: KEYBOARD ( LINE 1 ONLY )
      │ 2 │     3          LINES 2-4: AVAILABLE DEVICES
      │ 3 │     4          3: LPFK      4,14,15: TABLET
      │ 4 │     8          8: DIALS     A: CURSOR STICK
      │ 5 │     1          3270/RS-232-C ATTACHMENT FEATURE
      │ 6 │     13FFFF     HIGHEST SYSTEM MEMORY ADDRESS
      │ 7 │     0004       IPL SEQUENCE NUMBER
      │ 8 │     1          TRANSFORMATION AND CLIPPING FEATURE
      │ 9 │     8          NUMBER OF BIT PLANES
      │ A │     0          PRE-SELECTION HIGHLIGHTING
      │ B │     62463750  2.08  0303  0604    MACHINE LEVEL
      └───┘
```

Figure 2-17. Example of System Configuration Information Display

2.11 3270 Reset, Bring On-Line (Setup Function 04)

This function resets the 3270, counts down for 20 seconds, and brings the 3270 online. If the 3270 is not present, an X appears next to the box on the setup task entry and exit display, because this is an invalid function for the system configuration.

2.12 Kanji File Load (Setup Function 05)

This function may be provided by the host system.

The instructions and messages for this function are written in Katakana. Before using this function:

1. Change the language in the customizing function to Katakana.
2. Re-IPL.
3. Be able to read Katakana.

Follow the instructions on the screen to mount or dismount the proper diskette. The total process takes approximately two minutes. Any error occurring during this process requires a re-IPL of the subsystem.

The English equivalent of the Katakana instructions and messages are shown in Figure 2-18.

SCREEN	INSTRUCTIONS AND MESSAGES
Screen 1	Dismount system diskette. Mount Kanji font diskette. Press Enter key. (To exit at this point, press the CNCL key.)
Screen 2	Kanji file load in progress
Screen 3	Dismount Kanji font diskette. Mount Kanji dictionary diskette. Press enter key.
Screen 4.	Kanji file load complete. Dismount Kanji dictionary diskette. Mount system diskette. Press enter key.
Error Screen	Function failed, error code: nn

Figure 2-18. Kanji File Load Screens

The error codes which may be displayed are listed in Figure 2-19.

CODE	MEANING	CODE	MEANING
10	ELOG Close	37	Kanji Table File Error
11	CPTRAN Close	38	Bad Kanji File
12	System Volume Close	39	File Length Overflow

Figure 2-19 (Part 1 of 2). Kanji File Load Errors

CODE	MEANING	CODE	MEANING
13	System Dismount	40	Unexpected File End
20	Kanji Mount	41	Unexpected File End
30	Insufficient Memory Space	42	Unexpected File End
31	Kanji File Open	43	Unexpected File End
32	Kanji File Read	50	Kanji Volume Close
33	Kanji File Close	51	Kanji Dismount
34	More Than 48 Font Files	60	System Mount
35	Kanji Font File Error	61	ELOG Open
36	Kanji Logic File Error	62	CPTRAN Open

Figure 2-19 (Part 2 of 2). Kanji File Load Errors

2.13 Kanji Dictionary Save (Setup Function 06)

This function may be provided by the host system.

This function provides the capability to save the updated Kanji dictionary file to the diskette.

The instructions and messages for this function are written in Katakana. Before using this function:

1. Change the language in the customizing function to Katakana (06).
2. Re-IPL.
3. Be able to read Katakana.

The English equivalent of the Katakana instructions and messages are shown in Figure 2-20.

SCREEN	INSTRUCTIONS AND MESSAGES
Screen 1	Dismount system diskette. Mount Kanji dictionary diskette. Press Enter key. (To exit at this point, press the Alt and CNCL keys.)
Screen 2	Kanji dictionary save in progress
Screen 3	Kanji dictionary save complete. Dismount Kanji dictionary diskette. Mount system diskette. Press enter key.

Figure 2-20. Kanji Dictionary Save Screens

The error codes that may be displayed are listed in Figure 2-19 on page 2-18.

2.14 Keyword Protection (Setup Function 07)

This function allows protection of some setup function 1 data. The keyword may be any combination of four displayable characters.

To enable keyword protection or to change an old keyword, enter the new keyword as prompted by the message on the screen, then enter the keyword again to verify the first entry.

If no keyword existed previously, press the Enter key to validate the keyword.

If a previous keyword existed, enter the old keyword to validate the change to the new keyword.

To disable keyword protection, press the Enter key twice in response to the screen messages; then enter the old keyword to validate the change.

You may change the customization features either by disabling the keyword or by validating feature changes with the keyword, line by line.

You may view the keyword at any workstation by invoking Setup Function 82. (For service use only, or at customer request.)

2.15 Link Status (Setup Function 20)

At IPL, this function runs automatically to monitor the link before bringing the subsystem online. If there are no errors, device addresses are established through the SI card. An error causes CA to be displayed on the 5085 hex panel and the link status is displayed on the 5081. At this time, there are 16 pairs of polling (8-Position) and SNRM (4-position) counters displayed at the bottom of the screen, representing the 16 possible graphics controller addresses. If the 3270 Mode Share Attachment feature is installed and enabled, another 16 pairs of counters, above the graphic counters, represent the 16 possible 3270 MSA addresses. Figure 2-21 on page 2-21 may be used for problem determination. To continue loading the subsystem without correcting a problem, press the Enter key or the Alt/Cncl keys. Initialization continues without bringing the subsystem online.

At run time, you may enter this function from setup. If this function is run without some of the addresses enabled, the portion for these addresses is blank. A 5088 or local host normally broadcasts information to all 5085s on the serial link approximately every nine seconds.

```
                    20 - 01                                                    20 - 01

  [1]   1                          [3]  00000          [1]   2                          [3]  00000

  [4]   00      0000    0000000000000000               [4]   00      003F    4033100101010001
                        0000000000000000                                     006030F400400010

  [5]   4       642     00000000   0000                [5]   0       642     00000108   0041

  [6]   4       64F     00000000   0000                [6]   0       64F     00000110   0039

  [7]   4       640     00000000   0000                [7]   0       640     00000120   0043

  [8]   4       633     00000000   0000                [8]   0       633     000000E9   004A

  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
  0000     0000     0000     0000     0000     0000     0000     0000
  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
  0000     0000     0000     0000     0000     0000     0000     0000
  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
  0000     0000     0000     0000     0000     0000     0000     0000
  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
  0000     0000     0000     0000     0000     0000     0000     0000
```

Figure 2-21. Link Status Displays - Link Not Started and Link Started

Figure 2-22 on page 2-22 provides a description of the items displayed on the Link Status Display. Fields are counted left to right, top to bottom.

ITEM	DESCRIPTION
1	Link configuration: $1 = 1$ megabit, $2 = 2$ megabit, $3X = $ low speed, $4X = $ high speed, $X1 = $ NRZI, $X2 = $ non-NRZI from Setup Function 1
2	Base address of channel controller from Setup Function 1 (not on later levels of microcode)
3	Aggregate error count for the serial interface
4	Broadcast frame information (5088/local host only): Field 1 = Host status code (non 00/F0 = 5088 error, F0 = local host) Field 2 = Broadcast frame count Field 3 = 8 Bytes of broadcast information (Figure 2-24) Field 4 = 8 Bytes of broadcast information (Figure 2-24)
5	Graphic device: Field 1 = Status code (Figure 2-23) Field 2 = Device address Field 3 = Polling frame count Field 4 = SNRM frame count
6	Ports Feature Port A device: Field 1 = Status code (Figure 2-23) Field 2 = Device address Field 3 = Polling frame count Field 4 = SNRM frame count

Figure 2-22 (Part 1 of 2). Link Activity Data and Analysis

ITEM	DESCRIPTION
7	Ports Feature Port B device: Field 1 = Status code (Figure 2-23) Field 2 = Device address Field 3 = Polling frame count Field 4 = SNRM frame count
8	3270 MSA Feature Field 1 = Status code (Figure 2-23) Field 2 = Device address Field 3 = Polling frame count Field 4 = SNRM frame count

Figure 2-22 (Part 2 of 2). Link Activity Data and Analysis

Items 6 and 7 are displayed only if they are present. A blank line is displayed if they are not present. Figure 2-23 provides a description of the link status codes.

CODE	DESCRIPTION
0	The link is operational; no problem, but the 5088 switch may be off line. (During IPL, this indicates recovery from an error condition. Press Enter to continue.)
1	The link is changing between ready and not-ready states.
2	There is a 5085 link transmission problem or the 5088/3258/local host has a receive problem.
3	There is a setup problem, a 5088 address switch problem, or the host is stopped.
4, 4.1	There is a link speed setup problem, there is a link communication problem, the 5088/3258/local host is not working, there is a 3258 address switch problem or a 5085 address setup problem. (4.1 indicates the 5085 is expected to be connected to a 3258.)
4.3	The modem failed the automatic wrap test.
5	The 5088 has reported a 5088 (Models 1 and 2) fatal error via the broadcast frame.
5.1	The 5088 has reported a 5088 1R fatal error via the broadcast frame.
5.2	The 5088 has reported a 5088 1R is offline or is detecting errors.
6, 6.1	There is an address conflict, shown only at IPL, indicating that the address has already been used by another 5085 or a 3255. (6.1 indicates the 5085 is expected to be connected to a 3258.)
7	The 5085 address is out of range of the controller addresses.
7.1	The 5085 is not attached to a 3258 as specified in Setup Function 1.
7.2	The 5085 is not attached to a 5088 as specified in Setup Function 1.
7.3	3270 MSA is disabled by the 5088 (Models 1 and 2) switch or the local host does not support MSA.
7.4	Graphics is disabled by the 5088 (Models 1 and 2) switch.
D	No 5085 address was enabled in Setup function 1.

Figure 2-23 (Part 1 of 2). Link Status Codes

CODE	DESCRIPTION
F	Status is invalid because Enter was pressed on IPL in response to the CA stop. Re-IPL for valid status.
X	Indicates an address is enabled that cannot be used. Verify Setup Functions 1 and 3.

Figure 2-23 (Part 2 of 2). Link Status Codes
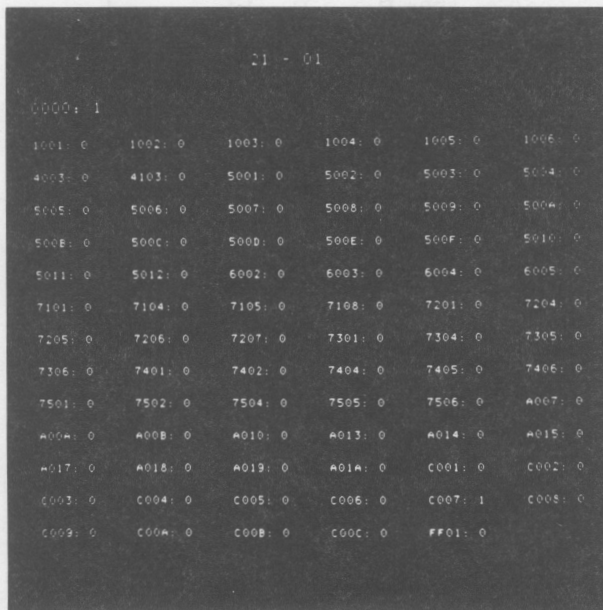
LOCATION	DEFINITION
Item 4, Field 1	Host status code (non 00/F0 = 5088 Error, F0 = local host)
Item 4, Field 3, Byte 1	Graphics base address of Channel Controller from 5088 (Models 1 and 2) switches
Item 4, Field 3, Byte 2	3270 MSA base address of Channel Controller from 5088 (Models 1 and 2) switches
Item 4, Field 3, Byte 3	Total of graphics addresses in hex from 5088 (Models 1 and 2) switches
Item 4, Field 3, Byte 4	Total of 3270 MSA addresses in hex from 5088 (Models 1 and 2) switches
Item 4, Field 3, Byte 5	Enable graphics flag from 5088 (Models 1 and 2) switch (01 = Enabled)
Item 4, Field 3, Byte 6	Enable 3270 MSA flag from 5088 (Models 1 and 2) switch (01 = Enabled)
Item 4, Field 3, Byte 7	Previous 5088 (Models 1 and 2) status (00 or recovered MC)
Item 4, Field 3, Byte 8	5088 1R ID (low-order 7 bits; ignore high-order bit)
Item 4, Field 4, Byte 9	Current 5088 1R status
Item 4, Field 4, Byte 10	Previous 5088 1R status (00 or recovered MC)
Item 4, Field 4, Bytes 11-12	5088 1R remote link error count
Item 4, Field 4, Bytes 13-14	5088 (Models 1 and 2) microcode EC level
Item 4, Field 4, Bytes 15-16	5088 1R Microcode EC level (Only available at remote 5085s) or second half of Models 1 and 2 EC level.

Figure 2-24. Broadcast Information from 5088

2.16 Error Counter Display (Setup Function 21)

This display is a summation of the subsystem error log data, Setup Function 22, in an easier-to-use form. It pertains only to errors occurring during this session and is reset by an IPL. A total of all errors is displayed on the top left of this display.

In addition to the logged errors, temporary errors are counted and displayed here. Refer to 1.3, "Subsystem Log Messages And Error Counters" on page 1-3 in the Symptom/Fix Index for descriptions and actions.


```
                          21 - 01

0000: 1

1001: 0    1002: 0    1003: 0    1004: 0    1005: 0    1006: 0
4003: 0    4103: 0    5001: 0    5002: 0    5003: 0    5004: 0
5005: 0    5006: 0    5007: 0    5008: 0    5009: 0    500A: 0
500B: 0    500C: 0    500D: 0    500E: 0    500F: 0    5010: 0
5011: 0    5012: 0    6002: 0    6003: 0    6004: 0    6005: 0
7101: 0    7104: 0    7105: 0    7108: 0    7201: 0    7204: 0
7205: 0    7206: 0    7207: 0    7301: 0    7304: 0    7305: 0
7306: 0    7401: 0    7402: 0    7404: 0    7405: 0    7406: 0
7501: 0    7502: 0    7504: 0    7505: 0    7506: 0    A007: 0
A00A: 0    A00B: 0    A010: 0    A013: 0    A014: 0    A015: 0
A017: 0    A018: 0    A019: 0    A01A: 0    C001: 0    C002: 0
C003: 0    C004: 0    C005: 0    C006: 0    C007: 1    C008: 0
C009: 0    C00A: 0    C00B: 0    C00C: 0    FF01: 0
```

Figure 2-25. Example of Error Counter Display

2.17 Error Log Records (Setup Function 22)

On this panel you may choose one of the following:

S = Start with the block containing the most recently logged error
F = Forward to the next block
B = Backward to the subsequent block.

The first panel displays the 17 FRU Counters, in hex (Figure 2-26), across the top two rows of the screen (Figure 2-27 on page 2-26), and log records, if any exist.

COUNTER	DESCRIPTION
01	Attachment Processor card
02	Expansion Memory 1
03	Expansion Memory 2
04	Address Expansion
05	Address Expansion
06	3270 & Port card including 192K Memory
07	Disk Controller & SI card
08	Display Processor card
09	A/N Keyboard
10	LPF Keyboard
11	Dials Feature
12	Tablet/CursorPad
13	Digitizer
14	RS232 Port A Device
15	RS232 Port B Device
16	Diskette Drive & Media
17	Microcode & GS Software

Figure 2-26. FRU Counters

The larger number to the right of the FRU Counters is the block number of the block currently displayed. Following the FRU counters is the most recently created block containing the most recent log records. For the error codes and descriptions, see the Symptom/Fix Index. The sequence of the data displayed is error code, IPL sequence number, time elapsed (in hex milliseconds, since the last IPL), and variable data associated with the error. The variable data is provided for Support Center use.

Figure   2-27.   Error Log Display

There are 10 blocks: 1 block for the FRU Counters and 9 for the log records.

Since the first panel shows the most recently created block along with the FRU counter block, you can only go backward from this point to older blocks (B) until you reach the oldest block. Since there is no wrap around, you must go forward from the oldest block (F). Start (S) always brings you back to the most recently created block. If there is an error with this function, a return to the Setup menu is attempted.

2.18 Error Log Reset (Setup Function 23)

Enter 23 on the setup task screen to reset the error log to zero entries. There is no special screen for this function. The reset process takes a few seconds, then exits the setup task. If the log records on the diskette have been corrupted, it may be necessary to IPL without logable errors to use this function. Do this by unseating the 3270/Ports card, disconnecting the serial link, or disconnecting optional peripheral devices as required.

2.19 FRU Counter Display and Reset (Setup Function 24)

This data is a duplication of the FRU counters from Setup Function 22 in an easier-to-use form. The count values are in hex.

To individually reset the counters, key the desired counter in the ??_ input field and press the Enter key. To reset all of the counters, key in an asterisk (*) and press the Enter key.
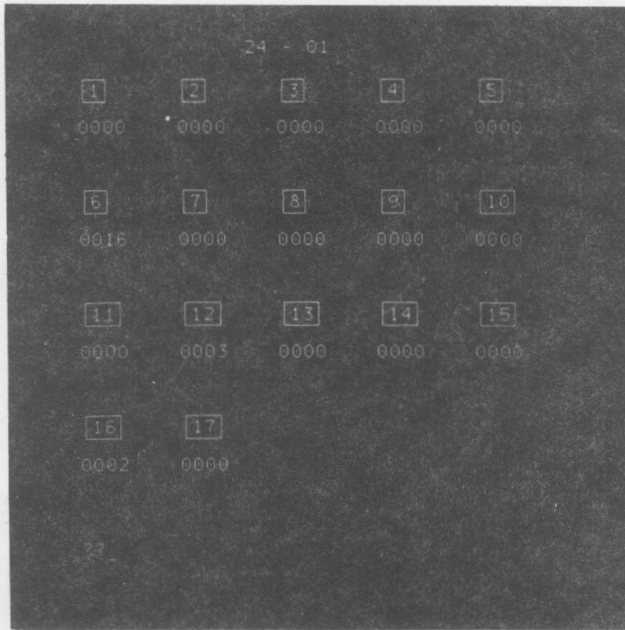
Figure   2-28.   FRU Counter Display

2.20 Peripheral Tests and Character Fonts (Setup Function 30)

This function may be used to isolate faulty peripheral devices by disconnecting/interchanging devices with ports 2 through 4 and then performing a re-IPL. If the device works in a different port, the FRU is the AP card or the connection through the PCC to the AP card.

This panel, Figure 2-29 on page 2-28, provides tests for the LPFK, the data tablet, the Dials Feature, and EBCDIC character fonts in 4 sizes. Pressing any LPFK key causes the corresponding box on the screen to be filled and the key indicator to be turned on. As the Dials Feature dials are turned, Dials Feature output data is displayed below the LPFK layout on the display panel.
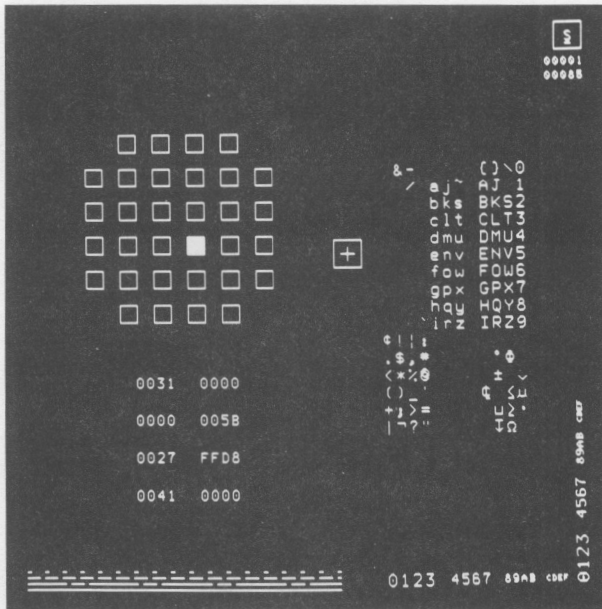
Figure 2-29. Peripheral Tests and Character Fonts

The data tablet screen cursor is a small box with a cross in the center. When one of the four cursor buttons or the stylus tip switch is operated, a number from 1 to 4 is displayed in the lower left corner. The number for the stylus tip switch is 1. The small cross-hair screen cursor is the default LP emulation cursor, which can be altered or removed from within setup. When the preselection highlight feature is installed and enabled, items within the pick window of the tracking symbol brighten.

The desired EBCDIC character font size is displayed by keying in one of the following characters, in either upper or lower case, followed by pressing the Enter key:

    S = Small character size
    B = Basic character size
    M = Medium character size
    L = Large character size.

The default font size is large.

The bottom left corner of the display shows examples of the four 3250 compatible line types: dotted, dashed, dotted/dashed, and solid. The bottom right shows examples of the four character font sizes, displayed in both rotated and not-rotated form.

The counter for all subsystem errors logged since IPL is located in the top right corner of the display below the keyboard input character field. Below the error counter is a display of elapsed time, in seconds, since this function was called from setup. The display of elapsed time confirms that the AP and the DP are operating.

2.21 Monitor Test Patterns (Setup Function 31)

The four Monitor Test Patterns that are used for maintenance and test of the 5081 are shown in Figure 2-30 on page 2-29 through Figure 2-33 on page 2-31. The fourth test pattern was deleted from some levels of microcode. To step from one test pattern to another, press Q and then the Enter key. To exit this function, press the Cncl key.

The color bar pattern used on a color display requires at least four video pixel planes. Left to right, the color bars are green, yellow, red, magenta, blue, cyan, black, and white.

The error counter, the timer, and the box around the input character field are not displayed.

Four to Eight Video Pixel Planes
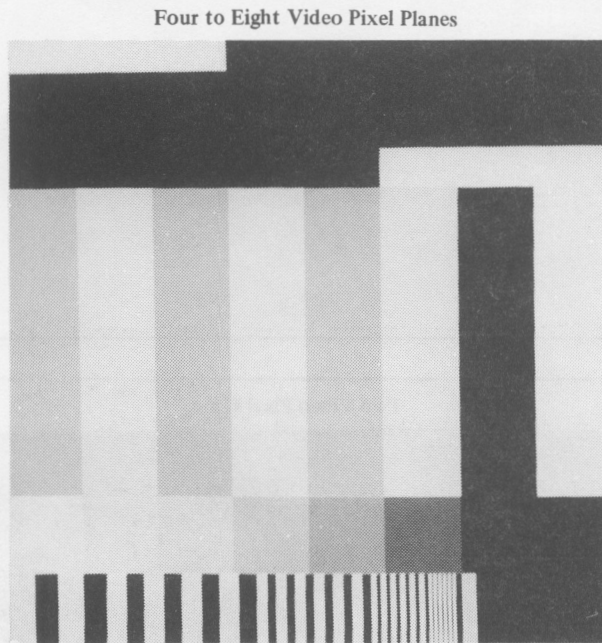
Figure 2-30. Display 1, Combination Color Bar Pattern
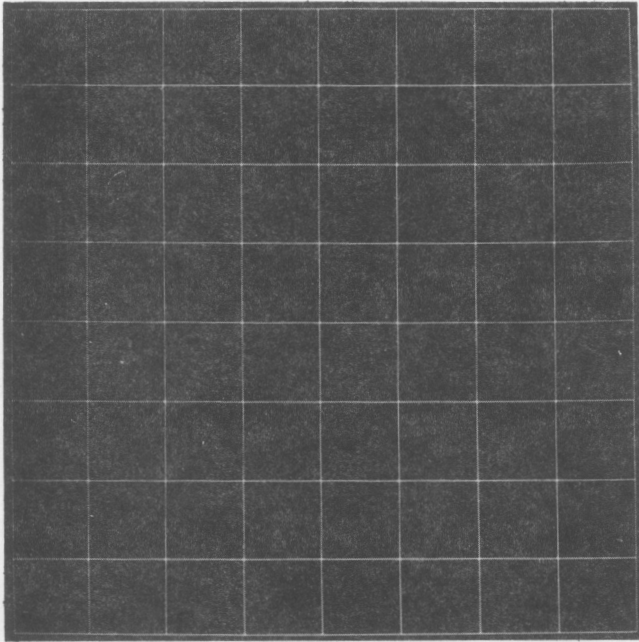
Figure   2-31.   Display 2, Crosshatch (Grid) Pattern

Eight Video Pixel Planes
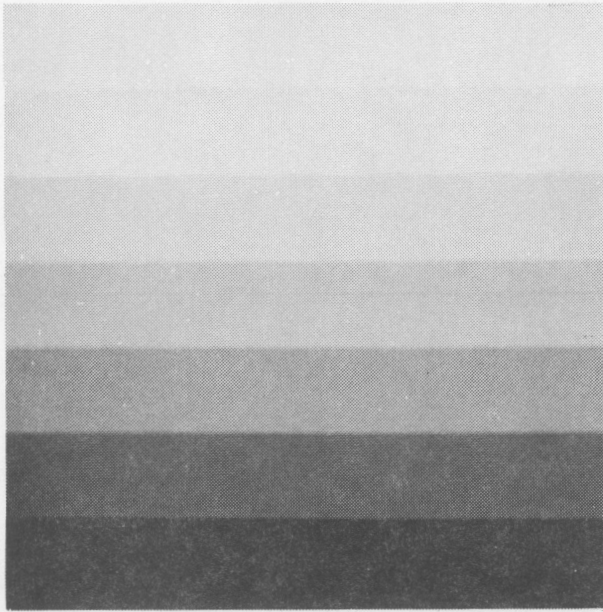
Two Video Pixel Planes
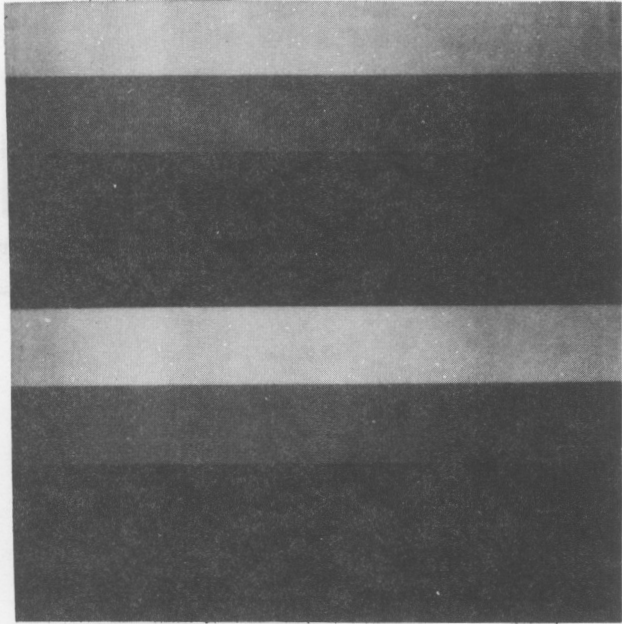
Figure   2-32.   Display 3, Gray Scale Pattern
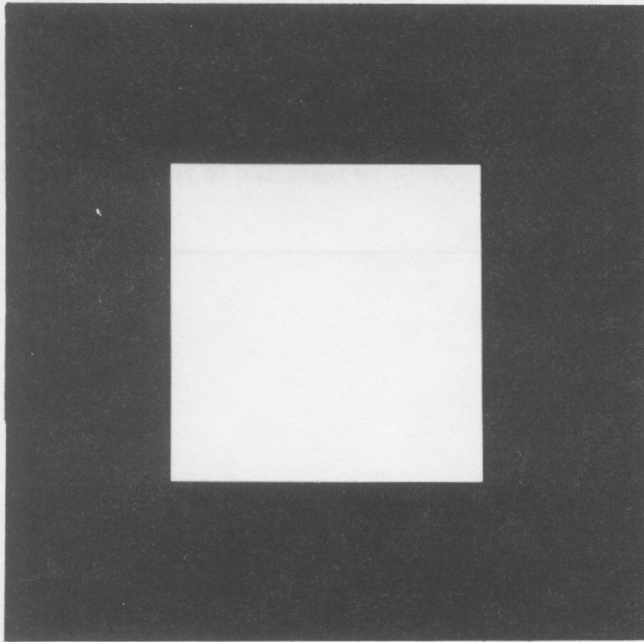
Figure 2-33.   Display 4, White Square Pattern

2.22 256-Color Monitor Test Pattern (Setup Function 32)

This test pattern is intended for use only on an 8-plane system to maintain and test the 5081 and to demonstrate the ability of the Video Pixel Memory (VPM) card or Video Controller (VC) card to properly drive the 5081 Display. This test pattern was deleted from some levels of microcode. After this function has been invoked, the application program may have to be restarted to reload the video look-up table, which restores the correct application colors.
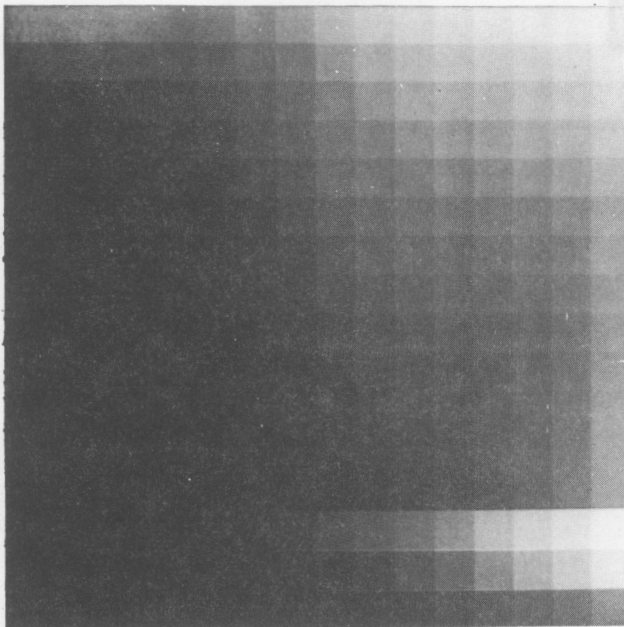
Figure   2-34.   256-Color Monitor Test Pattern

2.23 Stile Monitor Test Pattern (Setup Function 33)

This test is provided for maintaining and testing the 5081 and to demonstrate the ability of the Video Pixel Memory (VPM) card or Video Controller (VC) card to properly drive the 5081 Display. This test pattern was deleted from some levels of microcode. To freeze the current panel in a single half of the frame buffer, type S and press the Enter key twice. Color for the test pattern is selected by typing R, G, B, or W and then pressing Enter. The respective selections are red, green, blue or white.

2.24 Video Pixel Plane Test (Setup Function 34)

This test provides a visual check for defective pixels and pixel plane memory. It also verifies the number of pixel planes in the system. There are two configurations of Pixel Memory. One is a base Video Pixel Memory (VPM) card containing the control and 2 pixel planes with the option of 3 Expansion Pixel Memory (EPM) "piggyback" cards of 2 planes each. The second version is a base Video Controller (VC) card with 1 Pixel Memory (PM) "piggyback" card containing all 8 planes.

When a BATs pixel memory error stop has been encountered, BATs may be bypassed, using the Mode switch and offline function 1, for a hot IPL (see 2.34.3, "Offline Functions" on page 2-49) to load the system, to access this test for FRU isolation. After each power off/on, you probably need to run BATs to the error to clear the machine, then bypass the BATs. Some machine only run BATs on POR and bypass BATs on a normal IPL.

When this test panel (Figure 2-35 on page 2-34) is first displayed, all pixels in plane one are set to full intensity red. Repeatedly pressing Q followed by the Enter key causes the colors (all full intensity except black) to cycle from red to green, to blue, to black, to white, etc. However, the 'Q' key does not change the current pixel plane; this is done with keys 1 (for plane one) through 8 (for plane eight). The plane input keys change only the plane number and not the color. After this function has been invoked, the application program may have to be restarted to reload the video look-up table, which restores the correct application colors.
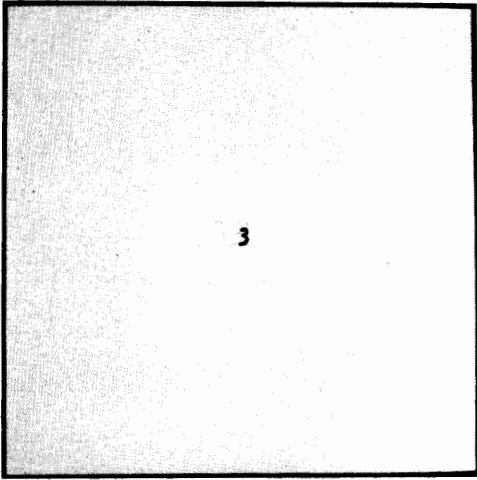
Figure 2-35. Video Pixel Plane Test Display

Whenever a valid input key is pressed, the current plane number is displayed for one second in the center of the screen. On 4-plane subsystems, for example, the only valid inputs are 1, 2, 3, 4, and Q. On monochrome systems, red, green, and blue are seen as shades of gray.

If this test fails, any Expansion Pixel Memory cards present may be removed to isolate the problem further. See 4.1.3.2, "Pixel Memory and Expansion Pixel Memory Cards" on page 4-3.

Press the Alt/Cncl keys to exit this function.

2.25 Port Device Test (Setup Function 35)

This test may be run with any standalone device tests to ensure proper device and 5085 port operation. Selection of Setup Function 35 allows configuration of the test to agree with the device operation options specific to the particular device connected to the 5085 port. Refer to Figure 2-36 on page 2-35 for line definitions and to Figure 2-37 on page 2-35 for descriptions of the completion status codes. Selecting the line number moves the cursor to the entry area for the value desired. Select the option on line 6 to save this data on the diskette for future use or select the option to start the test. The completion status code appears on line 5 of the selection list.

The ports are independent of each other. One port can send while the other receives. Each port can operate only in 1/2 duplex. It can accept a read or a write from the host at any one time. The port looks like a modem to the device that is connected to the port.

The 5085 drives the following signals to the device:

'data set ready' (DSR), 5085 EIA I/O pin 6
'clear to send' (CTS),5085 EIA I/O pin 5
'receive data' (RD), 5085 EIA I/O pin 3
'carrier detect' (CD), 5085 EIA I/O pin 8
'transmit signal element timing' (TC), 5085 EIA I/O pin 15
'receive signal element timing' (RC), 5085 EIA I/O pin 17.

The 5085 expects the following signals from the device:

'data terminal ready' (DTR), 5085 EIA I/O pin 20
'request to send' (RTS), 5085 EIA I/O pin 4
'transmit data' (TD), 5085 EIA I/O pin 2.

LINE NO.	VALUE	OPTIONS
1	ABCDEFG-HIIST	A = Communications Port, A = Port A, B = Port B. B = Baud Rate, 1 = 150, 2 = 300, 3 = 600, 4 = 1200, 5 = 2400, 6 = 4800, 7 = 9600. C = Parity Checking, 1 = Odd, 2 = Even, 3 = None. D = Number of stop bits, 1 = 1, 2 = 2. E = Data Terminal Ready, 1 = Ignore, 2 = Use. F = Clear To Send, 1 = Always on, 2 = Only on with Request to Send. G = Character Length, 7 = 7 Bits, 8 = 8 Bits. H = Zero High Order, 1 = 0, 2 = Do not zero. I = Auto Terminate, XX = Terminate character, 00 = No Auto Terminate S = Parity Bit Suppression, 0 = Include parity in and out, 1 = Include parity out, 2 = Include parity in, 3 = No parity in or out. T = DTR timeout, 0 = Report 5 second timeout, 1 = Ignore timeout.
2	JK--K	J = Operation 1 requested, 1 = Write, 2 = Read, 0 = No operation K = Up to 40 HEX characters to be written or read data count to be replaced with the data read on execution.
3	LM--M	L = Operation 2 requested, 1 = Write, 2 = Read, 0 = No operation M = Up to 40 HEX characters to be written or read data count to be replaced with the data read on execution.
4	NNN	N = Repetition count for operations 1 & 2 or 0 to loop, Cancel to stop looping
5	OOPPQ--Q	O = Operation, 01 = Write, 02 = Read, 03 = No Operation 43 = Set OCC, 83 = Set ICC, C3 = Set TC. P = Completion Status Code, see Figure 2-37 on page 2-36. Q = Extended status information for failing operation, (see Figure 2-37 on page 2-36).
6	R	R = Execution Mode, 1 = Execute Test, 2 = Save parameters and data.

Figure 2-36. Port Device Test Option Selection Display

STATUS CODE	MEANING	ACTION
FF	Successful completion of the device test	None
01	The device test failed	a) Perform Ports Feature WRAP Test, page 2-4. b) Verify that the device switch settings are correct c) Verify that the correct interface cable is being used and that it is securely connected d) The bits of the first extended status byte have the following meaning: 0123 4567 0-3 = Support Center Use 4 = Input data overrun 5 = Wrong length record 6 = Timeout 7 = Read parity error The remaining bytes are for Support Center use
10	No response from device	a) Verify that the device is receiving electrical power b) Verify that the device switch settings are correct c) Verify that the correct interface cable is being used and that it is securely connected d) Perform Ports Feature WRAP Test, page 2-4.
11	The communications port is not available	a) Determine why the port is in use or unavailable, then retry b) Perform Ports Feature Wrap Test, page 2-4.
12	The Ports Feature is not installed	a) Verify configuration with Setup Function 3

Figure 2-37. Completion Status Code Descriptions

2.26 Light Pen Calibration (Setup Function 36)

This function allows fine tuning of the light pen to the pick window. The light pen is supported on the monochrome display only. Use the vertical line in the center of the screen to position the light pen for a detection. A counter to the right of the line counts the number of picks that are used to calculate the average delay value. This average is displayed under the pick counter. An entry box is at the upper right of the screen, with the current delay value from the diskette below the box. When the pick count reaches at least 800, key in S, then press the Enter key. This saves the new value and allows calculation of another. Repeated calculations should be less than ± 10 from each other. To reset the value to a starting point, key in R, then press the Enter key. To exit from this function, press the ALT and CNCL keys. To save the last calculation on the diskette and exit, press the Enter key only.

2.27 5085 V.35 Test (Setup Function 37)

This function is provided to test the V.35 teleprocessing (TP) connection to the channel controller and to set up conditions for installation verification in Japan. Item 1 in Figure 2-38 on page 2-37 allows test selection, and item 2 indicates the status or completion code. An IPL is required to continue operation after this test. Refer to 1.9, "Serial Link Problems" on page 1-31 in the Symptom/Fix Index for problem resolution.

LINE NO.	VALUE	OPTIONS
1	Test number	1 = Modem wrap test 1 - (Expects DSR off) 2 = Modem wrap test 2 - (Expects DSR & CD) 3 = Cable wrap test - (Requires wrap plug) 4 = Toggle transmit data line (Japan) 5 = Turn off DTR (Japan) 6 = Turn on DTR (Japan)
2	Status/return code	% = Test has been requested (Japan) & = Wrap test in progress - press Enter to stop 0 = Successful completion 8000 = Wrap failed (data did not compare) 8300 = V.35 feature failed or is not installed 8001 = Cable wrap failed (DTR to DSR) 8002 = Cable wrap failed to generate interrupt 8003 = Cable wrap failed (DSR failed to drop) 8004 = Cable wrap failed (CTS failed to drop) 8005 = Cable wrap failed (RI failed to drop) 8006 = Cable wrap failed (TEST to RI) 8007 = Modem wrap test 1 failed (DSR was on) 8008 = Modem wrap test 2 failed (DSR was off) 8009 = Modem wrap test 2 failed (CD was off)

Figure 2-38. 5085 V.35 Test

2.28 Trace Controls (Setup Function 80)

The system trace facility allows events in the system to be dynamically recorded for problem analysis.

The trace controls function is normally used at the request of, and under the direction of, the Support Center with additional information and instructions provided by the Support Center.

2.29 Dump Data Display (Setup Function 81)

The dump display function allows the examination of information previously saved on dump diskettes by the dump utility (in EPROM), in order to determine the status of system memory at the point at which the dump was taken. This function has been deleted from current microcode.

The dump data display function is normally used at the request of, and under the direction of, the Support Center with additional information and instructions provided by the Support Center.

This function allows the display of particular memory areas by using a few simple commands. Data may be displayed on the screen in byte, word, or longword format.

The dump display utility divides the screen into three areas:

- The command line, one line above the bottom, echoes commands currently being entered on the keyboard.
- The message line, at the bottom of the screen, displays English text messages to inform the operator of errors or procedures.
- The display area, from the top of the screen to the command line, displays the results of commands given to the utility.

The operator interacts with the dump display utility by entering commands on the A/N Keyboard (which are echoed on the command line), then by pressing the Enter key. The commands are listed in Figure 2-39.

COMMAND	FUNCTION
< Enter >	Just pressing Enter with no other command characters causes the message line to be cleared.
addr < Enter >	A hexadecimal address causes a single line of dump information to be displayed. The line will contain the contents of the specified address.
addr1 addr2 < Enter >	Two addresses separated by a space cause the dumped data between those two addresses (inclusive) to be displayed.
addr:len < Enter >	An address, colon, and length displays dump information starting at the specified address for the specified number of bytes.
addr;len < Enter >	Address, semicolon, length is the same function as addr, colon, length.
nS < Enter >	A number (n) followed by the "S" character causes that number of blank lines to be drawn for separation.

Figure 2-39. Dump Display Commands

Any numeric argument to the above commands may be followed by a length specification, which is a period and one of the characters: B for byte, W for word, or L for longword. The length specification controls the blocking of the displayed data. This specification is remembered until the next time it is explicitly given.

2.29.1 Displayed Information

The displayed dumped data is formatted into lines of 16 (for byte-mode display) or 32 (word and longword) bytes per line. Each line begins with the address of the first byte displayed on that line, and a slash to separate the address from the data. The data is formatted so that the column number always represents the last four (byte mode) or five (word or longword) bits of the address. That is, all data for addresses ending in 10 is in the same column. Although this column alignment is convenient for viewing blocks of data, it may not always be desirable, especially for examining a single location where the operator would usually want to see the location at the left of the screen. In this case, a command to toggle and/or set the type of alignment may be introduced.

2.29.2 Operation Notes

This operation displays data from diskettes ONLY. A single dump may comprise several diskettes; the diskettes are numbered on the diskette and, hopefully, on the diskette label, starting with the number 1. At times, when the program needs to get information from the diskette, a different dump volume may need to be inserted into the diskette drive. This is indicated by a message to the operator on the message line and may happen at any time during the processing of a command. Sometimes the program can tell exactly which dump volume it needs; other times it can tell only what range of numbers the diskette it needs is on. In either case, when prompted to insert a diskette, the operator should insert the appropriate diskette and press Enter to allow the program to proceed.

Note: The dump display program attempts to use all of system memory as a diskette cache, so that the same data does not have to be read more than once. To resume normal operation, IPL the system diskette.

2.30 Keyword Display (Setup Function 82)

Keyword protection is provided on later level microcode to allow protection of some customization data. The current keyword, if any, may be displayed with this function. You may need this keyword to alter customization parameters for problem isolation or to use a diskette that has been copied from another 5085 subsystem. See Setup Function 07. (For service use only, or at customer request.)

2.31 Patch Diskette Routine (Setup Function A0)

This is a tool normally used at the request of, and under the direction of, the Support Center. This function allows any portion of any file on the system diskette to be examined and altered.

Patch is to be used to implement emergency fixes before a new microcode EC is shipped. Any portion of the system diskette may be displayed or altered in up to 128 byte blocks at a time.

Patch number validation is a built-in protection mechanism. A patch number on the diskette, known only to Development, allows this tool to be used only with their knowledge and consent.

Patch utility parameters are shown in Figure 2-40 on page 2-40.

LINE NUMBER	INPUT	COMMENTS
1	File name and file type to be displayed or altered.	File name is a maximum of 8 characters. File type is a maximum of 3 characters. File name and type are separated by a space. Valid characters are upper case A-Z and 0-9.
2	Displacement into file where reading or writing data begins.	This is a hex value of 0-FFFF. A-F must be entered in upper case.

Figure 2-40 (Part 1 of 2). Patch Utility Parameters

LINE NUMBER	INPUT	COMMENTS
3	Length of data to be displayed or altered.	This is a hex value of 1 through 80.
4	Patch number (the protection/audit mechanism).	If a file is to be altered, a valid patch number must be entered first (hex value 1-FFFF). A-F must be upper case. The value entered is compared with the current patch level in the SVR. It is valid if it is one greater than the patch level in the SVR. Microcode Development must be contacted to receive the current patch level.
5	Function-Display (0) or Alter (1).	The default function is displayed. Before attempting to alter the displayed data and patch a diskette, the user must enter a valid patch number in addition to the file name/type, displacement, and length. When the alter function is entered, the cursor is positioned into the displayed data and the user may make changes. These changes are put in the file specified when the Enter key is pressed. Multiple lines of data are accessed using the Jump Cursor key. Valid input data are hex digits 0-9 and upper case A-F. When the file alteration is complete, the SVR patch number is updated. A new patch number must be entered for future updates.

Figure   2-40 (Part 2 of 2).   Patch Utility Parameters

2.31.1 Error Handling

The patch facility provides feedback to the user in the case of erroneous input or hardware/microcode problems. Whenever the alarm is sounded as a response to user input, an error return code is displayed in the lower right-hand corner of the screen. Patch function error return codes are listed in Figure 2-41.

RETURN CODE	REASON	FIX
0	Improper user input	Read instructions
1-E	Microcode bug	Call Support Center
F	I/O error	Use a new diskette and/or run diskette drive checkout procedures, page 2-49.

Figure   2-41.   Patch Function Error Return Codes

2.32 Dump Utility

The dump utility is normally used at the request and under the direction of the Support Center.

The dump utility may be requested automatically (D1 displayed), requested when any other error code is displayed with machine check (key in 007 to get the D1 diskette request), or requested by the offline function DD.

If the dump was called for automatically, the cause of the error should be displayed on the hex panel, along with the Machine Check indicator, just before the D1. For fault isolation, refer to the Symptom/Fix Index for that display.

D1 should appear on the hex panel indicating a request for a diskette. The diskette can be any diskette other than a system diskette. Insert the diskette and key in 007. DB should appear on the hex panel indicating that the diskette is being formatted. Then a DD appears, indicating that data is being dumped to the diskette. When DF appears with Machine Check, the dump is finished. If D2 through D9 appears, insert another diskette and key in 007 to continue the dump. Figure 2-42 shows the hex panel displays that are related to dump status.

CODE	MEANING
D0	Dump request
D1	Insert diskette #1
D2	Insert diskette #2
D3	Insert diskette #3
D4	Insert diskette #4
D5	Insert diskette #5
D6	Insert diskette #6
D7	Insert diskette #7
D8	Insert diskette #8
D9	Insert diskette #9
DA	Dump normal
DB	Formatting diskette
DC	Writing header sector
DD	Writing data sector
DE	Diskette is file protected, is a system diskette, or is not formated
DF/MC	Dump complete

Figure   2-42.   Dump Status Hex Codes

Figure 2-43 shows the hex panel displays related to Dump errors.

CODE	MEANING
E1	Diskette #1 error
E2	Diskette #2 error
E3	Diskette #3 error
E4	Diskette #4 error
E5	Diskette #5 error
E6	Diskette #6 error
E7	Diskette #7 error
E8	Diskette #8 error
E9	Diskette #9 error

Figure 2-43. Dump Error Hex Codes

2.33 Hex Panel Debugger

The hex panel debugger is normally used at the request and under the direction of the Support Center, and is entered from the offline functions "0" or "DB".

This function provides the ability to control the 5085 with microcode located in an EPROM on the AP card.

COMMANDS PROVIDED:

1. Open Memory
2. Open a Data Register
3. Open an Address Register
4. Open the User Program Counter
5. Open the User Status Register
6. Start Execution at an Address
7. Continue Execution
8. Breakpoint Set
9. Breakpoint Clear
10. Trace Instruction
11. Exit and Return.

REQUIREMENTS FOR OPERATION: A functional set of hardware which includes a maintenance panel, an A/N Keyboard (or a teletype), and the AP card and its RAM.

RULES/CONSTRAINTS: Manual input is received through the ANK that is assumed to be attached to serial port 1 (or a teletype assumed to be attached to serial port 4).

Audiovisual response is given through the two-digit hex display on the maintenance panel and the audible alarm.

The visual limitations of display require the user to be aware of the function being performed and its corresponding command level.

A LIMITATION IMPOSED BY THE HEX LIGHTS: Only one byte can be shown at a time for memory, address registers and data register (left justified, i.e., BYTE 0).

OPERATION: Upon entry, the prompt "EC" is displayed on the hex panel. If the entry was caused by the execution of a breakpoint, "EB" is displayed or, if the entry was caused by an instruction trace, "ED" is displayed.

At this level the user can give a command by pressing a valid command key. At any occurrence of an invalid input, the audible alarm is sounded. Pressing the Reset key aborts the command at any level and returns to this level.

ANK KEY	COMMAND
M	Open Memory
D	Open a Data Register
A	Open an Address Register
P	Open User Program Counter
S	Open User Status Register
G	Start Execution at an Address
C	Continue Execution
B	Breakpoint Set
R	Breakpoint Clear
T	Trace Instruction
X	Exit

Figure 2-44. Hex Panel Debugger Key Commands

OPEN MEMORY: The prompt "EA" is displayed on the hex panel (after M is keyed in), awaiting the input of the address to open. The Delete key can be used to correct an error. The address is terminated by a carriage return. When the address is opened, the contents are displayed on the hex panel. Data can be entered to alter the contents. Again the Delete key can be used. A carriage return ends the command and returns. The Alt key closes the location and opens the next. The Enter key closes the location and opens the previous. Alt and Enter work for all of the open type of commands.

> Example:
> M addr < CR >

OPEN A DATA REGISTER: The prompt "E9" is displayed on the hex panel (after D is keyed in), awaiting the input of the register number (0-7) to open. Upon entry of a valid number, the register is opened and the contents of its highest byte are displayed. Further operation is similar to the open memory command, except that only the four bytes of the register are available to access.

> Example:
> D5 < NO CR >

OPEN AN ADDRESS REGISTER: The prompt "E8" is displayed on the hex panel (after A is keyed in), awaiting the input of the register number (0-7) to open. Upon entry of a valid number, the register is opened and the contents of its highest byte are displayed. Further operation is similar to the open memory command, except that only the four bytes of the register are available to access.

> Example:
> A4 < NO CR >

OPEN USER PC: The contents of the highest byte of the user program counter are immediately displayed on the hex panel. Further operation is similar to the open memory command, except that only the four bytes of the register are available to access.

    Example:
    P < NO CR >

OPEN USER SR: The contents of the highest byte of the user status register are immediately displayed on the hex panel. Further operation is similar to the open memory command, except that only the two bytes of the register are available to access.

    Example:
    S < NO CR >

GO EXECUTE: The prompt "EA" is displayed on the hex panel (after G is keyed in), awaiting the input of the address to start executing. When the address is terminated with a carriage return, the debugger is exited and execution begins at the specified address.

    Example:
    G addr < CR >

CONTINUE: The debugger is exited and execution begins at the address stored as the user program counter.

    Example:
    C < NO CR >

BREAKPOINT SET: The prompt "EA" is displayed on the hex panel awaiting the input of the address for the breakpoint. When the address is terminated with a carriage return, a breakpoint is set up to be inserted at that address upon user execution.

    Example:
    B addr < CR > ; breakpoint set

Upon user execution at a breakpoint, the debugger is re-entered with the user program counter at that address and "EB" is displayed on the hex panel.

BREAKPOINT CLEAR: Any previously set breakpoints are cleared.

    Example:
    R < NO CR >

TRACE: The input of a "T" causes the execution of an instruction trace. Execution is initiated at the current user program counter and, following the completion of that instruction, the debugger is reentered and "ED" is displayed on the hex panel.

    Example:
    T < NO CR >

ANK/TTY: The determination of the input device is made by examination of the diagnostic executive switch register.

THEORY OF OPERATION: User interface assumes that operation is deliberate and that the user can maintain awareness of where he is and what he is doing. However, the Reset key allows you to start over.

The program relies on user input to do anything; that is, the display of a word of memory requires the opening of an address that displays the first byte, and pressing the Enter key is required to then display the second byte.

The commands C (Continue Execution) and T (Trace Instruction) assume that the user program counter has been set up. If not, the debugger re-enters at the command level.

Setting breakpoints enables the user to stop execution at a particular point. If the user specifies a breakpoint somewhere other than the start of an instruction, disastrous results are likely to occur.

The largest number of active breakpoints allowed to be set is sixteen. An attempt to set more is treated as invalid input (audible alarm) and return to the command level.

The audible alarm is used throughout to notify any occurrence of invalid input.

Start of user execution causes breakpoints to be inserted at the addresses that were set by: (1) saving the op-code word at that address, (2) storing a Trap $E instruction in its place, and (3) setting up the Trap $E user vector to debugger interrupt routine. Upon user execution of a breakpoint (i.e., Trap $E), the user's instruction is restored and the user's state is stored. If execution is continued, the tracebit (T) is then set into the user status register and the user is started. A trace trap occurs following execution of one instruction. At this point, breakpoints are reinserted and user execution is initiated.

The Attention key is pressed to view the current value of memory address pointer. This key is useful while an open command is performed and, after traversing numerous locations, it can display the address currently open. Also, following a trace trap, this key displays the current program counter.

2.34 Mode Switch Functions

Mode switch functions activate the 5085 without the need for a functioning diskette mechanism, because the microcode is located in an EPROM on the AP card. They are entered by setting the Mode switch to Test and pressing the IPL Reset switch. On some levels of AP microcode, entry to the offline functions requires an SI card and a properly configured diskette drive.

2.34.1 A/N Keyboard Basic Thread Test

This function pertains to problems associated with the keyboard data path. Failures are to be isolated considering the logical items being tested and the sequence of the test.

When the Mode switch is set to Test and the IPL Reset switch is pressed, a basic test is initiated, whereby the hex panel indicates the following countdown sequence: 00, FF, EA, E9, E8, E7, E6, E5, E4, E3, E2, E1, E0, F0, and F1. The only hardware required to perform this test is the power supply, the hex display panel, the AP card and the backplane; the remaining hardware, including the optional numeric keypad, may be removed or isolated to eliminate interference and isolate faults.

Note: POWER MUST BE REMOVED WHEN REMOVING OR CHANGING LOGIC CARDS.

When F1 is in the display, setting the Mode switch to Normal causes the A/N Keyboard adapter on the AP card to loop on a wrap operation. The hex panel indicates F2 for a successful wrap or E2 for a wrap error. Once an error has been detected, the Machine Check LED is turned on. The hex display indicates the current result, changing on an intermittent failure.

Setting the Mode switch to Test (requiring the PCC and its cable) causes an advance and loop wrap test of the PCC. The hex panel indicates F3 for a successful wrap or E3 for a wrap error. Once an error has been detected, the error LED lights. The display shows the current result, changing on an intermittent failure.

Setting the Mode switch to Normal (requiring the keyboard) causes the test to advance and test the A/N Keyboard. The hex panel shows F4 for success and E4 for an error. When an error has been detected, the error LED lights. The display shows the current result, changing on an intermittent failure.

Setting the Mode switch to Test causes a test of the hex panel. Setting the Mode switch to Normal causes a further test of the hex panel and turns on the Machine Check indicator. The display alternates between blank and Machine Check/FF. The test now loops until the IPL process is invoked, power is turned off, or the Mode switch is set to Test to repeat the thread test.

2.34.2 A/N Keyboard Scan Code Test

There are two types of A/N keyboards. One has a parallel interface, no indicators in the upper right corner, and is referred to as the parallel keyboard. The second has a serial interface, three indicators in the upper right corner, and is referred to as the serial keyboard. The parallel keyboard uses the Clear key while the serial keyboard uses the Escape key for the following discussion.

This test is initiated by setting the Mode switch to Test, pressing the IPL Reset switch, and pressing any key on the A/N keyboard (except the Clear/Escape key), before the countdown reaches F1. The scan code for that key is displayed on the hex panel. New key depressions update the display to the new scan code. This process continues until the Clear/Escape key is pressed or the IPL process is invoked.

The following figures show the correct scan codes for each keyboard type and also the optional numeric keypad. If failures occur when the keypad is attached, test the base A/N Keyboard without the keypad attached for isolation. Make/break keys on the parallel keyboards have two scan codes shown. Make/break keys on the serial keyboard have F0 which appears on the HEX panel a short time on the release of a key followed by the make scan code again. Unplugging and plugging the serial keyboard without a 5085 reset causes all keys to become make/break.

03	04	05	O6	07
0A	0B	1C	1E	1F
2A	2B	2C	2D	2E
19	2F	39	3A	3B
3C	3	F	5A	5B

Figure 2-45. Numeric keypad scan codes
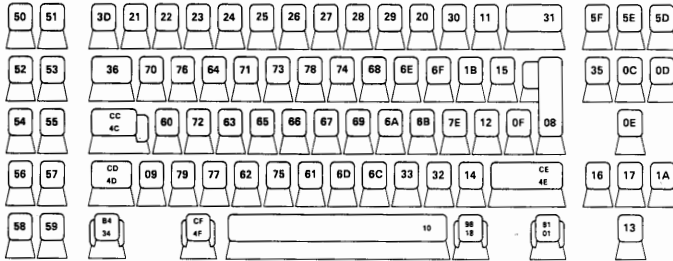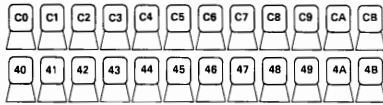
Figure 2-46. 104 Character parallel keyboard scan codes
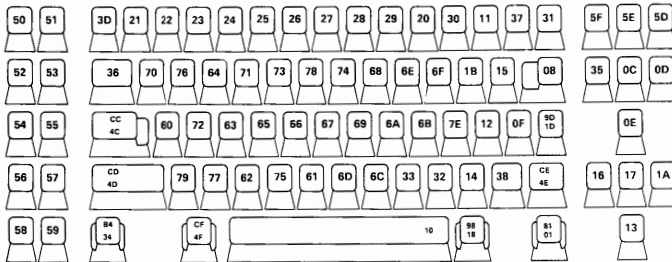
Figure 2-47. 106 Character parallel keyboard scan codes
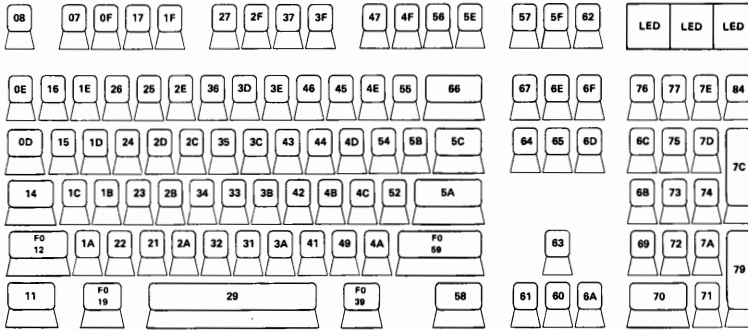
Figure   2-48.   101 Character serial keyboard scan codes
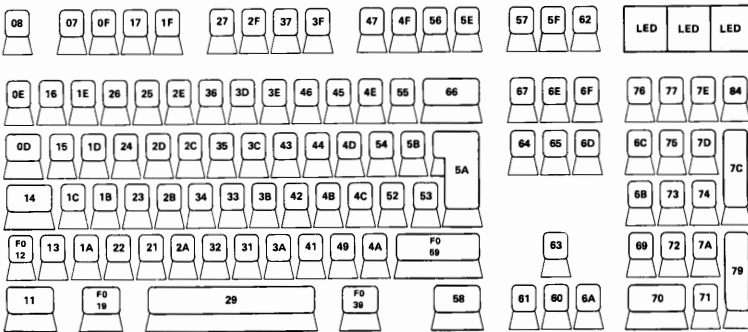
Figure   2-49.   102 Character serial keyboard scan codes
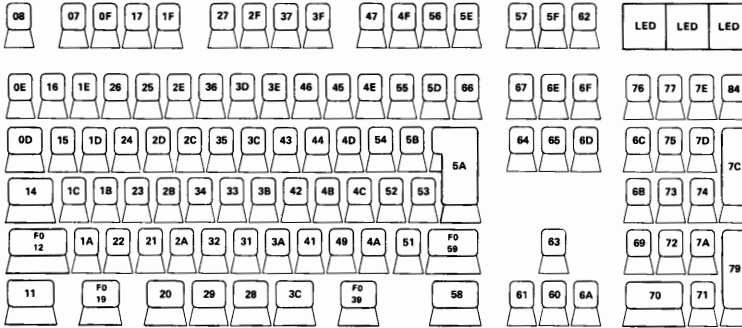
Figure 2-50. 106 Character serial keyboard scan codes

2.34.3 Offline Functions

These functions are for use under Support Center direction unless otherwise directed by other sections of this manual.

There are two types of A/N keyboards. One has a parallel interface, no indicators in the upper right corner, and is referred to as the parallel keyboard. The second has a serial interface, three indicators in the upper right corner, and is referred to as the serial keyboard. The parallel keyboard uses the Clear key while the serial keyboard uses the Escape key for the following discussion.

Enter this procedure by setting the Mode switch to Test, operating the IPL Reset switch, and pressing any key on the A/N keyboard before the countdown reaches F1. On some levels of AP microcode, entry to the offline functions requires an SI card and a properly configured diskette drive, in which case BATs error codes FD-FF are potential errors. The scan code for that key or "EF" for the Clear/Escape key is displayed on the hex panel. To select this function, press the Clear/Escape key during countdown, or press any other key to stop the countdown and then press the Clear/Escape key. "EF" in response to the Clear/Escape key is the request for selection of individual functions. They are called by keying the desired entry code, setting the Mode switch back to Normal and pressing the carriage return key. Looping functions may be halted by pressing IPL Reset.

*The functions that require a system diskette for execution are identified in Figure 2-51 with an asterisk.

ENTRY CODE	FUNCTION NAME	FUNCTION DESCRIPTION
0	HEX PANEL DEBUGGER	Call to Hex Panel Debugger (2.33, "Hex Panel Debugger" on page 2-42)
1	HOT IPL *	This function bypasses the BATs. Therefore, it does NOT totally clear the system.
A	AUTO IPL *	This function bypasses the BATs. Therefore, it does NOT totally clear the system.
B	LOAD SYSTEM *	Start IPL with BATs.
D	LOAD DIAGNOSTICS ONLY *	Loads and executes all BATs.
E	LOAD DIAGNOSTICS ONLY - LOOPING *	Loads and executes all BATs repeatedly.
F	TRANSFER TO UPPER EPROM SET (For use with Support Center assistance)	
A1	SEEK TRACK 1 *	Press Reset key on ANK to exit, any other key to repeat.
A2	SEEK TRACK 16 *	Press Reset key on ANK to exit, any other key to repeat.
A3	SEEK TRACK 0 - SEEK TRACK 4 *	Process repeats until Reset key on ANK is pressed.
A4	SEEK TRACK 1 FORWARD AND BACKWARD *	Press Reset key on ANK to exit, any other key to repeat.
A5	SEEK TRACK 3 FORWARD AND BACKWARD *	Press Reset key on ANK to exit, any other key to repeat.
A6	SEEK TRACK 0 *	Press Reset key on ANK to exit, any other key to repeat.
A7	SEEK TRACK 0 TRACK 39 *	Process repeats until Reset key on ANK is pressed.
A8	MOTOR ON/OFF *	Process repeats until Reset key on ANK is pressed.
B0	LOAD SYSTEM *	Start IPL with BATs
B1	AUTOMATIC IPL *	This function bypasses the BATs. Therefore, it does NOT totally clear the system.
BB	HOT IPL *	This function bypasses the BATs. Therefore, it does NOT totally clear the system.
BD	BASIC DIAGNOSTICS *	Loads and executes all BATs.

Figure 2-51 (Part 1 of 5). Offline Functions

ENTRY CODE	FUNCTION NAME	FUNCTION DESCRIPTION
CO	HEX PANEL TEST	The hex panel is blanked for one second. Then, starting at "00", it counts up to "FF". It then counts down to "00" with the Machine Check light on.
C1	HEX PANEL ROUTINE TEST	The hex panel is set to "00". Enter data to pass to hex routine in the format: bit 15 set for machine check, bit 14 set for blank, bits 0-7 two digit data. Enter "FFFF"and carriage return to exit.
C2	MEMORY BLOCK ROUTINE TEST	The hex panel prompts for the beginning address with "BA", then prompts for the ending address with "EA". It then prompts for a 32-bit data pattern with "DA." The error response is sounded if there was an error. See EE.
C3	PARITY CHECKING ROUTINE TEST	The hex panel prompts for the address to use for checking the parity error logic with "EA". The error response is sounded if there was an error. See EE.
CA	ANK SCAN CODE TEST	The scan code of any key input is displayed on the hex panel. Press the Clear/Escape key to exit.
CB	STORE MEMORY PATTERN	The hex panel prompts for the beginning address with "BA", then prompts for the ending address with "EA". It then prompts for a 32-bit data pattern with a "DA". The data pattern is stored through the memory range.
CC	A/N KEYBOARD BASIC THREAD TEST	Transfers to Mode switch function Start.
CD	MOVE DATA	The hex panel prompts for the current address with "CA", then prompts for the new address with "EA". It then prompts for the number of bytes to move with "CB". The data is then moved to its new address.
D0	LOAD DIAGNOSTICS *	Loads and executes all BATs.
D1	LOAD DIAGNOSTICS - LOOPING *	Loads and executes all BATs repeatedly.
D2	LOAD DIAGNOSTIC *	The hex panel prompts for the diagnostic group with "DE". See 2.34.3.2, "DA Responses to DE Command" on page 2-55.
D3	LOAD DIAGNOSTIC AND RUN *	The hex panel prompts for the diagnostic group with "DE". See 2.34.3.2, "DA Responses to DE Command" on page 2-55.

Figure 2-51 (Part 2 of 5). Offline Functions

ENTRY CODE	FUNCTION NAME	FUNCTION DESCRIPTION
D4	LOAD DIAGNOSTIC AND LOOP *	The hex panel prompts for the diagnostic group with "DE". See 2.34.3.2, "DA Responses to DE Command" on page 2-55.
D5	RUN DIAGNOSTIC	It is assumed that a diagnostic has been loaded.
D6	LOOP DIAGNOSTIC	It is assumed that a diagnostic has been loaded.
D7	LOAD DIAGNOSTIC AND RUN INDIVIDUAL TEST *	The hex panel prompts for the diagnostic group with "DE". See 2.34.3.2, "DA Responses to DE Command" on page 2-55.
D8	LOAD DIAGNOSTIC AND LOOP INDIVIDUAL TEST *	The hex panel prompts for the diagnostic group with "DE". See 2.34.3.2, "DA Responses to DE Command" on page 2-55.
D9	RUN DIAGNOSTIC	It is assumed that a diagnostic has been loaded.
DB	HEX PANEL DEBUGGER	Call to Hex Panel Debugger (2.33, "Hex Panel Debugger" on page 2-42)
DC	HEX PANEL DEBUGGER RESTART	Call Hex Panel Debugger to restart (2.33, "Hex Panel Debugger" on page 2-42)
DD	DUMP REQUEST	See Dump Utility, 2.32, "Dump Utility" on page 2-41.
DE	SET DIAGNOSTIC SWITCH REGISTER	The hex panel prompts for data with "DA". This function is normally used only under Support Center direction. 2.34.3.2, "DA Responses to DE Command" on page 2-55.
EE	DEMONSTRATE ERROR RESPONSE	Sounds the audible alarm and sets the hex panel to "EE" to demonstrate what happens when certain errors occur.
EF	ENTER FUNCTION	Restarts prompt for offline function selection.
F0	DISKETTE MOTOR ON *	Turns on diskette drive motor. On some 5085s, the motor remains on; others will time out.
F1	DISKETTE MOTOR OFF *	Turns off diskette drive motor.
F2	DISKETTE SEEK SECTOR *	The hex panel prompts for sector number (1-2D0) with "FB". Causes a seek to the track that contains that sector.
F3	DISKETTE READ SECTOR *	The hex panel prompts for the sector number with "FB", then prompts for the address to store the data with "FA". It then executes a read of the sector.

Figure 2-51 (Part 3 of 5). Offline Functions

ENTRY CODE	FUNCTION NAME	FUNCTION DESCRIPTION
F4	DISKETTE WRITE SECTOR *	The hex panel prompts for the sector number with "FB", then prompts for the address where the data is with "FA". It then executes a write of the sector. F1 displays during the write.
F5	DISKETTE SEEK TRACK *	The hex panel prompts for the cylinder number with "FC", then prompts for the side with "FD". This causes a seek to the track.
F6	DISKETTE READ TRACK *	The hex panel prompts for the cylinder number with "FC", prompts for the side with "FD", then prompts for the address to store the data with "FA". This causes a read of all the sectors on the track.
F7	DISKETTE WRITE TRACK *	The hex panel prompts for the cylinder number with "FC", prompts for the side with "FD", then prompts for the address where the data is with "FA". This causes a write to all the sectors on the track. F1 displays during the write.
F8	DISKETTE READ N SECTORS *	The hex panel prompts for the sector number to start with "FB", prompts for the sector number to end with "FB", then prompts for the address to store the data with "FA". This causes a read of the sectors.
F9	DISKETTE WRITE N SECTORS *	The hex panel prompts for the sector number to start with "FB", prompts for the sector number to end with "FB". then prompts for the address where the data is with "FA". This causes a write to the sectors. F1 displays during the write.
FA	DISKETTE READ TRACK *	The hex panel prompts for the cylinder number with "FC", prompts for the side with "FD", then prompts for the address to store the data with "FA". This causes a read of all the sectors on the track.
FB	DISKETTE FORMAT A TRACK *	The hex panel prompts for the cylinder number with "FC", then prompts for the side with "FD". This causes a format of the track.
FC	DISKETTE FORMAT DISK *	Waits for a second carriage return, then causes a format of the diskette. This function assumes a "perfect" diskette. It does NOT relocate bad sectors. FC displays while formatting, FO displays during a readback check, and EF displays when complete. If an error occurs, the error response is sounded, and the sector number where the error occurred displays in the hex panel.

Figure 2-51 (Part 4 of 5). Offline Functions

ENTRY CODE	FUNCTION NAME	FUNCTION DESCRIPTION
FD	DISKETTE DUPLICATE DISK *	The hex panel displays "D0" and waits for a carriage return to read diskette 0 into RAM. Diskette 0 is read until: (1) all the data on the diskette has been read, or (2) all available RAM is used. Then the drive is turned off and "D1" is displayed on the hex panel. Diskette 0 should be removed and diskette 1, the diskette to be copied on, inserted in the drive. The carriage return input starts the drive, and the data read from diskette 0 is written on diskette 1. Diskette 1 is written on until: (1) all the data to be duplicated is written, or (2) all the data stored is written. If the process is not complete, the sequence is repeated. If an error occurs, the error alarm is sounded and the sector number where the error occurred is scrolled in the hex panel. A carriage return continues the process. This function assumes "perfect" diskettes. It does NOT relocate bad sectors. F0 and F1 displays while the read/write is in process. Successful completion is indicated by another request for diskette 1 (D1) while a diskette 1 is already in the 5085. (Some 5085s request new diskettes with D1, then D2, then D3, etc., for making multiple copies.)
FE	DISKETTE VERIFY DISK *	Reads all sectors on the diskette to verify the CRCs.
FF	RESTART	Restarts the control program.

Figure 2-51 (Part 5 of 5). Offline Functions

2.34.3.1 DE Responses

The following sections of Basic Assurance Tests (BATs) may be selected so that intermittent problems may be pursued.

20 System Memory BATs
30 Attachment Processor BATs
40 Diskette Controller BATS
50 Serial Interface BATs
60 3270/Ports Feature BATs
70 3270/Ports Feature BATs
80 AP Ports/Device Tests
90 Display Processor an Pixel Memory BATs.

BATs normally run in sequence in a building block fashion and are reflected in the FRU sequence listed in the BATs Symptom/Fix Index. You must keep this in mind when selecting BATs sections for fault isolation. Intermittent problems may be aggravated by techniques such as vibration, heating by blocking airflow or applying external heat, or cooling with additional airflow or Freon. Pressurized cans of Freon are normally available at the branch office or may be purchased locally. Freon is routinely used as a degreasing agent for electronic assemblies and also produces a cooling effect by rapid evaporation.

CAUTION SHOULD BE EXERCISED IN HANDLING AND STORAGE OF FREON BECAUSE OF THE PRESSURIZED CONTAINER AND THE FREEZING EFFECT. READ THE LABEL!

When an error has been detected, the error LED lights.

2.34.3.2 DA Responses to DE Command

Figure 2-52 lists the temporary options (4 hex digits) to be used with further offline functions. Bits 0-3 are the first, 4-7 are the second, 8-11 are the third, and 12-15 are the fourth hex digits. A normal IPL uses the value originally on the diskette (8000) for the diagnostic register.

BIT NUMBER	MEANING
0	1 = Halt on error
1	1 = Pause on error
2	Reserved
3	Reserved
4	1 = LONG IPL, include long tests; BATs 2A, 2B, 9E
5	1 = Manual, include manual input tests; ports feature wrap
6	1 = Interactive loop on tests
7	1 = Loop on end of pass
8	1 = TTY present
9-11	Mask to select which I/O port the TTY is connected to
12	1 = Exit when switched to offline
13	1 = Re-initialize I/O ports
14	1 = Trace hex codes on TTY
15	1 = ANK present

Figure 2-52. Diagnostic Switch Register Settings

2.35 LPF Keyboard Wrap Test

Set the Operate/Wrap Test switch, located under the lighted program function (LPF) keyboard, to Wrap. Pressing keys should cause the key data to be serialized and de-serialized through the processor, causing that key indicator LED to light. If any key fails this test, replace the lighted program function keyboard (LPFK).

THE LPFK MUST BE ENABLED TO FUNCTION ON LINE.

The LPFK is normally enabled at the end of the IPL sequence if it responds to the read configuration command. This can be verified with Setup Function 3. Setup function 30 can be used for functional testing of the LPFK. Be aware that an application program can send a disable command to a device during operation.

2.36 Tablet/CursorPad Tests

Some tablets have 2 indicators in their upper right corner to assist in problem identification. On these tablets, the indicator to the left indicates a transmission of data to the AP card in the 5085. The other indicates button or tip switch action and in presence of the test area. During normal in or out of presence, this indicator comes on with switch closure. When the stylus or cursor is in presence of the test area (to the right of the indicators) this indicator comes on; switch closure turns this indicator off.

THE TABLET MUST BE ENABLED FOR THE TRANSMIT INDICATOR TO FUNCTION.

The tablet is normally enabled at the end of the IPL sequence if it responds to the read configuration command. This can be verified with Setup Function 3. Setup function 30 can be used for functional testing of the tablet. Be aware that an application program can send a disable command to a device during operation.
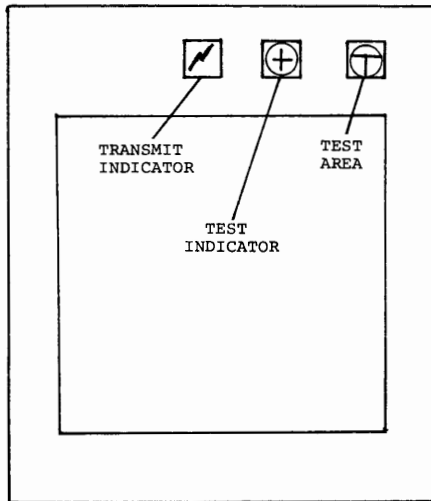
Figure 2-53. Tablet/CursorPad Indicators

2.37 Serial Link Cabling Test Procedure

Serial link coax links may be checked using a volt/ohm meter at the 5088 end. The 5085s and 5081s must be unpluged from the customer power sockets to eliminate the possibility of resistance readings through the power ground circuit. Disconnect the coax at the 5088 end. Measure the AC and DC potential between the center conductor and shield. There should be no readings. Measure from the center conductor and then the shield to the 5088 frame ground. There should be no readings. If any readings are present, isolate the source by disconnecting segments of the link. Usually these problems are caused by faulty customer installation of the coaxial cable, such as the cable contacting signal sources or transformer coupling to signal sources like high current power distribution systems.

Measure the resistance from the center conductor to shield at the 5088 end. It should be approximately 50 ohms for every 1000 feet of cable plus 75 ohms for the terminator. Compare to other links on this and other 5088s, if possible. Disconnect the terminator at the 5085 on the end of the link. Measure the resistance between the center conductor and shield. It should indicate an open circuit at this time. If either of the tests indicate a problem, isolate by disconnecting segments of the link or by moving the terminator and repeating the test.

2.38 Power Check

This procedure helps isolate the cause of a suspected power problem in the 5085. The most likely causes of power problems are:

- Incorrect site power.
- The 5085 power cord.
- The Power On/Power Off switch (circuit breaker).
- The 5085 power supply.
- A faulty logic card loading the power supply.
- The power supply out of adjustment.
- Power supply configuration jumper (J6). New install or relocation.

Thoroughly check all likely causes before attempting to fix the problem. If a thorough visual inspection does not show the cause of the problem, continue with the rest of this procedure.

The 5085 is capable of operating with anyone of five AC input source voltages (100V, 115V, 200V, 220V, or 240V). The only power feature supported in the United States is 115V. The other input voltage features are available for World Trade only.

If a power-up or operating problem has been encountered during installation or relocation, ensure that the power configuration jumper assembly (J6) is jumpered correctly. Use the J6 configuration chart that is printed on the power supply for the proper jumpering. Figure 2-54 below is an example of what the chart looks like. If the jumpers need to be changed, use the AMP Pin Extractor P/N 2108398.

J6 LINE VOLTAGE CONFIGURATION		
VOLTAGE	JUMPER PINS	
	SUPPLY	FAN POWER
100	3 – 4	1 – 10
115		1 – 9
200	4 – 5	1 – 8
220		1 – 7
240		1 – 6

Figure 2-54. Example of a J6 configuration chart

Observe the LEDs at the lower rear panel of the 5085 (Figure 2-55 on page 2-58).
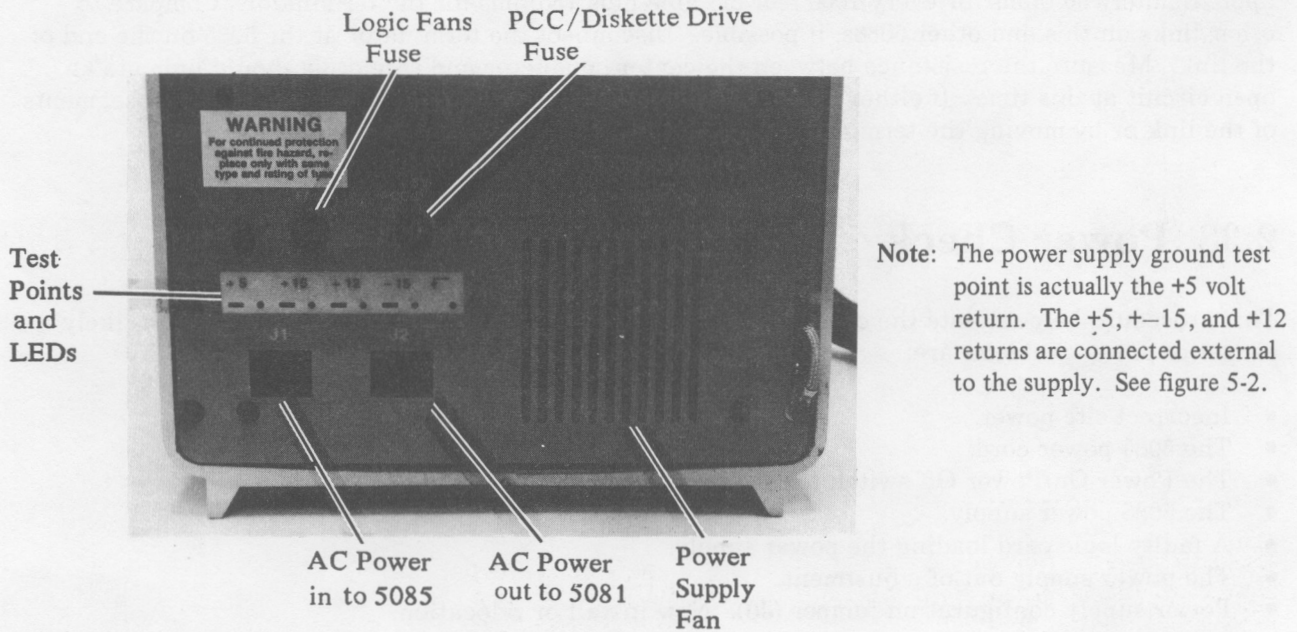
Figure 2-55. Rear Power Panel

If all of the LEDs are not lit, perform the procedure below. If all of the LEDs are lit, start with step 6 below.

2.38.1 All LEDs Not Lit

1. Check for correct voltage at the wall outlet. If voltage is not correct, have site wiring, fuses, and circuit breakers checked. Then check for correct voltage at the 5085 end of the power cord. If the voltage is not correct, the power cord is defective; replace it.

2. Ensure that the 5085 front panel switches are set properly. The Power On/Power Off switch is a circuit breaker. Set it to Power Off, then to Power On to ensure that it is reset.

3. Check the circuit breaker and its interconnections. If the circuit breaker is defective, replace it. If any interconnection is defective, make the necessary repair.

4. Turn the 5085 power off and then unseat all logic cards except the AP card from the card cage. Refer to 4.1, "Logic Cards" on page 4-1.

5. Apply power to the 5085 and measure the voltages at the test points on the rear panel of the 5085. Refer to Figure 2-55. Measure the +5 volt test point first. If the measurement is not between 5.1 and 5.3 volts, turn the power off, seat the DP card, and unseat the AP card. Disconnect the power connectors from the diskette drive and PCA. Check the +5 volts again. If it is correct, isolate the problem and make the necessary repair/replacement. Install the logic cards one at a time and check the +5 volt test point after seating each logic card. If installing a logic card causes the voltage to drop, replace that card. Replug the diskette drive and PCA power connectors.

6. Measure the +5 volt test point on the power supply. If it is not between 5.1 and 5.3, adjust the power supply using R38 +5 ADJ potentiometer (Figure 2-56 on page 2-59) for 5.2 volts at the +5

volt stud. If the power supply cannot be properly adjusted, replace it if you have completed step (4); otherwise, go to step (4). If the 5-volt level is correct, measure the other test points as follows:

- +15 measures from 14 to 16 volts
- +12 measures from 11 to 13 volts
- -15 measures from 14 to 16 volts.

Note: The power supply ground test point is the +5 volt return. The +5, +-15, and +12 returns are connected external to the supply. See Figure 5-2 on page 5-3.

If any of the above measurements are not correct, replace the power supply if you have completed step (4); otherwise, go to step (4), but monitor the incorrect voltage during the isolation procedure.

7. Verify the fix or return to symptom fix.

Detailed View
of +5v Stud
Connection
to Logic
Board

Closeup of
+5v Adjustment
Potentiometer

*This adjustment may
be on the other end
of the power supply
on some machines.*
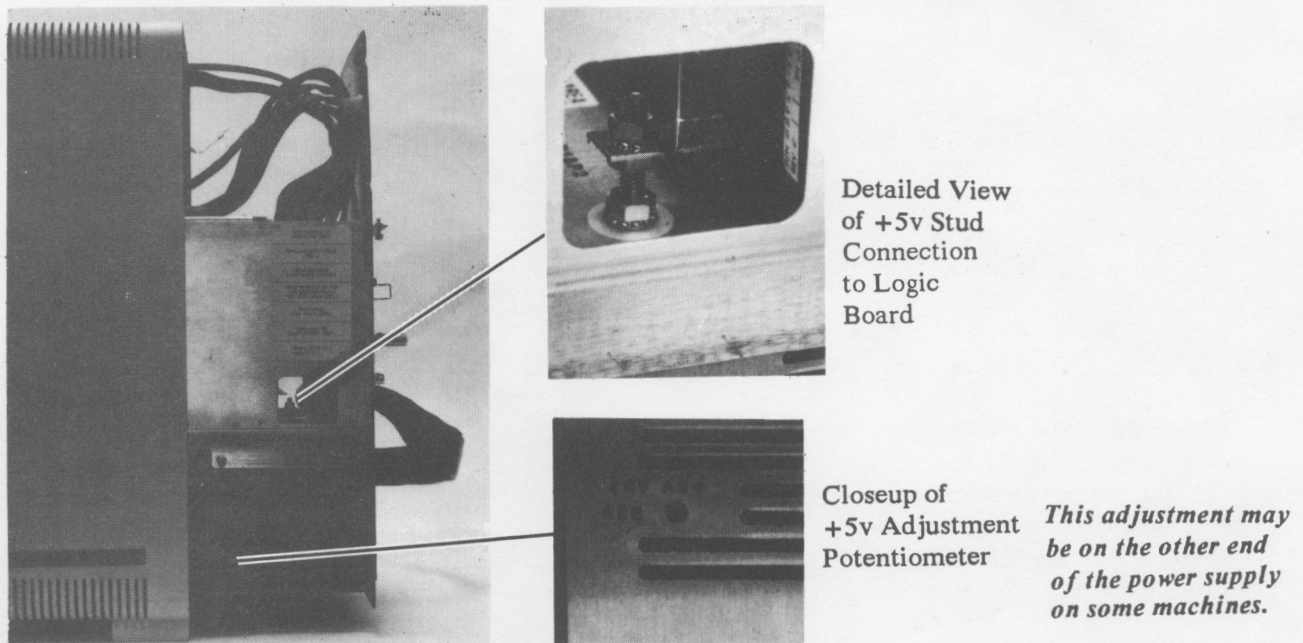
Figure 2-56. Power Supply Adjustment and +5-Volt Stud

Chapter 3. Location Information

3.1 Logic Card Locations

Figure 3-1 shows the logic card FRU locations in the card cage.

* = Piggyback on card in location A   **B** = Base Unit   **O** = Optional Feature

Figure 3-1. Logic Card Locations

3.2 Logic Card Configuration Requirements

Figure 3-2 shows the configuration requirements for the logic card FRU locations in the card cage.

LOCATION (Figure 3-1)	LOGIC CARD	REQUIREMENT
*	EPM	A 16-pin jumper routes pixels to the VPM card. A 24-pin jumper routes the Data Mask and the X-Position Counter.
*	PM	None
A	VPM	A Preselection Highlighting assembly is an optional feature.
A	VC	Preselection Highlighting is standard
D	DP Card	A Multiplier Module is an optional feature on early cards, standard on later cards
E	AP Card	None
F	SI/FDC	None. Address and speed selections are made via software.
G	3270/Ports Feature	None. Address and speed selections are made via software.
L,M	Expansion System Memory	The board location assigns address range configuration.

Figure 3-2. Configuration Requirements

* = Piggyback on card in location A

Location A and piggyback on location A will have either a EPM/VPM or PM/VC combination.

Customization jumpers for the diskette drive are shown in Figure 4-2 on page 4-8.

3.3 Switches and Indicators

Correct Position for
Diskette Insertion

Diskette
Drive
Door

Diskette
Storage

5.25 Inch
Diskette

Correct Position for
Diskette Insertion

Diskette
Drive
Door

Diskette
Storage

3.50 Inch
Diskette
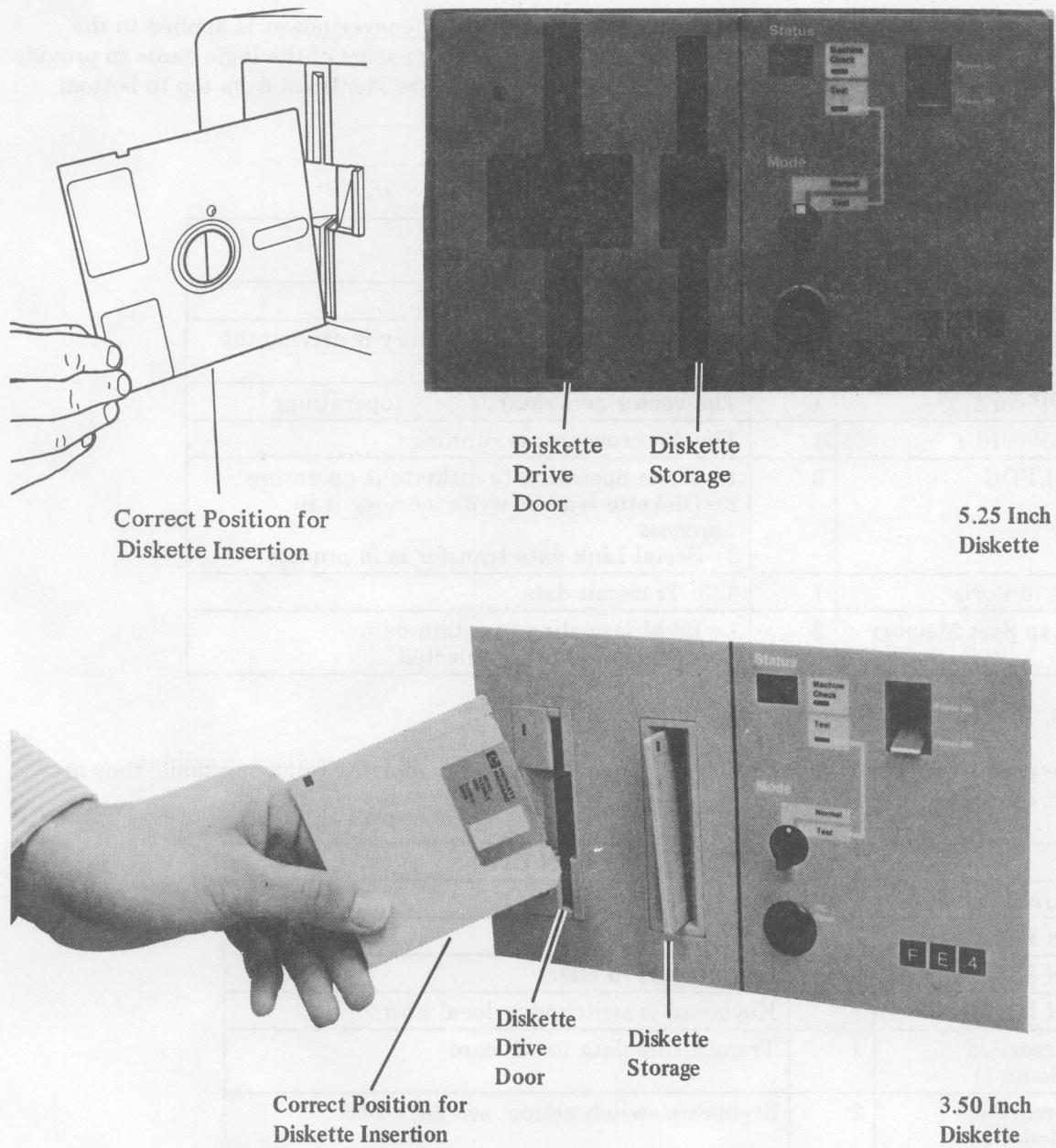
Figure 3-3. Operator Panel

The following switches and indicators are located on the 5085 Operator Panel (Figure 3-3):

- Power On/Power Off switch.
- Status indicator (a two-character hex display that shows BATs and IPL progress and error
  conditions).

- IPL Reset switch.
- Mode Switch (normal position is Online; test position is Offline).
- Test Indicator (On when the Mode Switch is in the Test position).
- Machine Check indicator (On if the Attachment Processor has detected a condition it considers to be an error. This indicator is turned on by a microprogram).

There is an unlabeled indicator on the diskette drive that is on whenever power is applied to the diskette drive motor. Light emitting diodes (LEDs) are mounted on some of the logic cards to provide visual indication of the activities described in Figure 3-4. LEDs are identified from top to bottom when more than one LED is on a card.

* Means that these cards are mounted on the card in location A.

CARD SLOT	CARD	LED	FUNCTION WHEN LIT
*	EPM/PM	None	N/A
A	VPM/VC	1	The A half of the pixel memory is driving the 5081
D	DP card	1	The vector generator is busy (operating)
E	AP card	1	The AP processor is running
F	SI/FDC	3	1 = Write operation to diskette is operating 2 = Diskette read or write memory is in process 3 = Serial Link data transfer is in process
G	3270/Ports	1	3270 Transmit data
L,M	Exp Syst Memory	2	1 = RAM is cycling to retain data 2 = This card is being selected

Figure 3-4. Logic Card LED Functions

Some of the peripheral devices have LEDs for signaling the user. For the following table, they are counted left to right.

DEVICE	LED	FUNCTION WHEN LIT
Parallel A/N Keyboard	None	N/A
Serial A/N Keyboard	1	Num lock is in effect
Serial A/N Keyboard	2	Caps lock is in effect
Serial A/N Keyboard	3	Keyboard is switched to local host
Tablet/CursorPad (Not on Model 1)	1	Transmiting data to AP card
Tablet/CursorPad (Not on Model 1)	2	Stylus/tip switch action, see page 2-56.
LPFK	All	Programmed by customer
Dials	None	N/A

Figure 3-5. Peripheral Device LED Functions

Chapter 4. Removal/Replacement

Follow the appropriate replacement procedure for field installation of feature logic cards. Refer to Figure 5-1 on page 5-2 for 3270/Ports cable installation.

4.1 Logic Cards

It is recommended that the IBM ESD handling kit, PN 6428316 or equivalent, be used when logic cards are handled.

4.1.1 Removal

Note: Power must be Off when logic cards are changed.

To remove any card:

1. Open the front door.

2. Remove the card cage cover by unscrewing three captive screws. Swing the cover downward to unhook the lower edge.

3. Disconnect any cables from the front edge of the card(s) to be removed.

   Note: Disconnecting the coaxial cable from the serial interface card disconnects other users (workstations) and removes termination of this 5088 coaxial leg. This may affect other legs.

   Coaxial cable adapter PN 5252643 ("barrel" connector) may be used to maintain the link for extended service.

4. Unseat the card by operating the two toggle levers on the top and bottom of the front of the card. Apply pressure equally to both toggles.

5. Carefully withdraw the card from its guides.

4.1.2 Replacement

Notes:

1. *Before installing a new card, check the special instructions for the pixel memory and DP cards. Special instructions follow this section.*

2. *Power must be removed when replacing logic cards.*

To replace any logic card:

1. Position the card in the guides at the proper card location.

2. Carefully push the card in until it contacts the backplane connector.

3. Seat the card by gently pushing against the toggle levers on the top and bottom of the front edge of the card until the card is fully seated.

4. Reconnect necessary cables.

5. Replace card cage cover.

4.1.3 Special Card Installation Instructions

4.1.3.1 Display Processor Card

The 5085 model 1 Display Processor (DP) card may have an have an optional, 68 pin, multiplier module (PN 6245854) installed in a pluggable socket, for the Transformation/Clipping Feature. This is standard on the model 1A. The model 2 has a different module as a standard feature, soldered to the card without a socket. If the feature is present, use Setup Function 3 to ensure that it is functional on completion of service. If available, use a new module when replacing this card. If none is available or if you wish to attempt further fault isolation, you may remove and replace the old module. When replacing the module place the pin 1 identifier dot or notch on the module toward the front of the card (away from the backplane connector). It may be necessary to form the module pins to align with the socket connections. This may be done by pressing the pins on one side at a time on a flat surface.

The current production DP card has an improved module socket. The original socket was a "zero removal force" design; the improved socket is "zero removal and insertion force" design. The new socket can be identified by the presence of "OPEN" and "ACT" on its ends. This socket can be operated to the OPEN position with a prying action of a screwdriver inserted in the end marked OPEN (with directional arrows). This removes tension in the socket for ease of removal or insertion of the module. After insertion, prying in the opposite end, labeled ACT (with directional arrows), activates the socket connections on the module pins.

Removal of the module from the original design socket:

1. Insert a screwdriver in the rear edge of the socket (backplane connector end of the card).

2. Depress the tab.

3. With a prying action, shift the alignment hole guide to the front of the card.

This action frees the pins from their contact surfaces in the socket for ease of removal. On some cards, the socket may be installed backwards. When replacing the module in this style socket, be sure that the hole guide is in its rearward position to align the module pins to their contact surfaces under the guide. Apply even pressure (considerable), using any firm object to avoid cracking the module as it is inserted.

4.1.3.2 Pixel Memory and Expansion Pixel Memory Cards

Note: Refer to the exploded view of the video pixel memory card (Figure 4-1 on page 4-4). There are two configurations of pixel memory. One is a base video pixel memory (VPM) card containing the control and 2 pixel planes with the option of 3 "piggyback" Expansion Pixel Memory (EPM) cards of 2 planes each. The second version is a base Video Controller (VC) card with 1 "piggyback" Pixel Memory (PM) card containing all 8 pixel planes. The assembly for the second version is similar to the one shown except that the PM card has three connectors and is larger.

The Expansion Pixel Memory (EPM) or Pixel Memory (PM) cards are secured to the base Video Pixel Memory (VPM) or Video Controller (VC) card with standoff hardware and spacers. This hardware is also part of the ground circuit and MUST be replaced before power on. Removal, replacement or field installation of a EPM or PM card should be done with care in separating and joining the large connectors on these cards. The following jumper assemblies are on the front of the EPMs:

    EPM 1: PN 6246100 and PN 6246101 (planes 3 and 4)
    EPM 2: PN 6246102 and PN 6246103 (planes 5 and 6)
    EPM 3: PN 6246104 and PN 6246105 (planes 7 and 8).

The individual parts are not available; the part numbers are for identification only. PN 6246300 contains all of the above jumpers and the standoff mounting hardware. There are no jumpers for the VC/PM version. The pin 1 identifier dot or notch should be placed toward the top of the card as it is plugged into the 5085.

Physical placement in the EPM stack does not affect plane assignment. The base VPM is fixed at planes 1 and 2. Using Setup Function 3, ensure that all installed planes are functional on completion of service.

The base VPM card may have the Preselection Highlighting feature as identified by the preselection highlighting assembly, plugged into the VPM card, toward the backplane end. This feature is standard on the VC card and is used to highlight pickable items displayed in the pick window of the Light Pen or the Tablet/CusrorPad tracking symbol.

The two parts of the Preselection Highlighting feature are ordered separately: the VPM and the pluggable assembly each have a part number. Because the two parts are ordered separately, and because the fault cannot be isolated by the diagnostics, you may try to isolate the fault by substituting each part, or you may replace both parts. The base VPM must have the appropriate modules removed to plug in the assembly for the Preselection Highlight feature. Proper function of this feature can be verified with Setup Functions 3 and 30. Applications must set the video lookup table properly in order to handle this feature and it must be enabled with Setup Function 1.

Note: Changing the base VPM or VC card may require attached video reproduction devices to have their setup procedures repeated to center the video image on them.
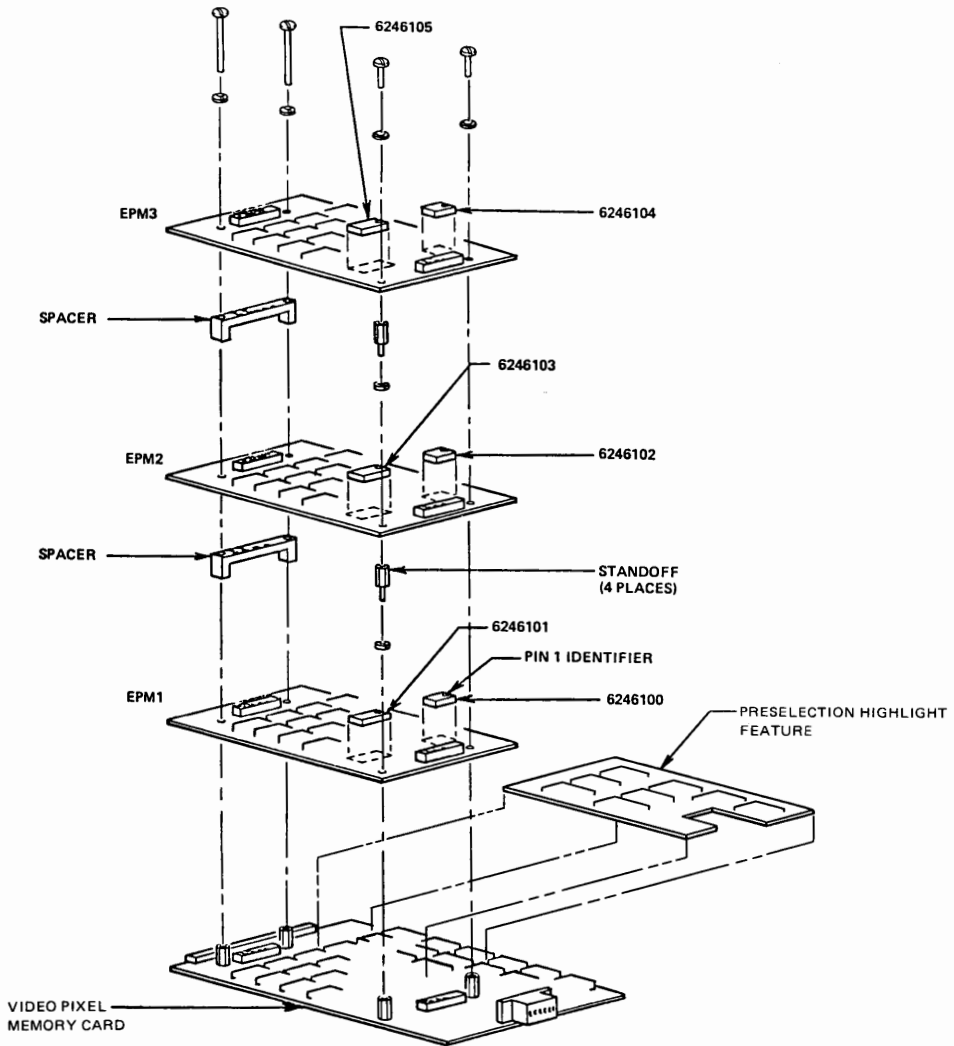
Figure 4-1. Video Pixel Memory

4.2 Rear Cover Removal

1. Loosen the three holding screws on the upper edge of the cable opening.

2. Slide the cover down the cables or, if required, remove the cables that pass through the cable opening. This includes the PCC cable being disconnected from the PCC or passing the PCC assembly through the cable opening.

Replace the rear cover in reverse order.

4.3 Main Unit

Note: Power must be disconnected when the main unit is removed from its housing, or replaced into its housing.

To remove the main unit from the housing:

1. Remove rear cover. See 4.2, "Rear Cover Removal."

2. Remove four screws from the outside edge of the upper rear panel.

3. Remove four screws from the outside edge of the power supply panel.

4. Open the front door of the housing.

5. Slide the main unit toward the rear of the housing until it is completely removed.

Replace the main unit in reverse order.

4.4 Backplane

To remove the backplane:

1. Remove rear cover. See 4.2, "Rear Cover Removal."

2. Remove the main unit from the housing. See 4.3, "Main Unit."

3. Unseat all logic cards.

4. Remove four screws holding the I/O panel to the main unit and position the panel out of the way.

5. Remove the nut/lockwasher from the +5-volt bus stud on the power supply. See Figure 2-56 on page 2-59.

6. Disconnect the logic cable plug and remove the six screws securing the backplane to the main unit.

To replace the backplane, use reverse order but do not tighten the mounting screws until all cards are seated. This achieves the proper card-to-socket alignment.

4.5 Hex Display and Power Panel

To remove the hex display and power panel:

1. Remove rear cover. See 4.2, "Rear Cover Removal."

2. Remove the main unit from the housing. See 4.3, "Main Unit."

3. Loosen the cable clamp securing the hex panel logic cable.

4. Remove five screws holding the panel assembly to the main unit.

5. Remove cable connector from the LED panel.

To remove the LED panel, remove four screws.

To remove the power switch, remove two screws and the power wires.

To replace any of the above items, use reverse order.

4.6 Power Supply

Note: The power supply ground test point is actually the +5 volt return. The +5, +-15, and +12 returns are connected external to the supply. See Figure 5-2 on page 5-3. Insure that this is not mis-leading you to replace the supply.

Note: It is possible to remove the power supply with the I/O panel in place. However, for ease of access it is recommended that the I/O panel be removed for this procedure.

To remove the power supply:

1. Remove rear cover. See 4.2, "Rear Cover Removal" on page 4-5.

2. Slide the main unit half way out of the housing. See 4.3, "Main Unit" on page 4-5.

3. Remove four screws holding the I/O panel to the main unit and position the panel out of the way.

4. Disconnect, from the power supply, the AC cable connector and the ground wires, if present that are connected to the fan units. If the replacement supply does not have a ground stud, reconnect the ground wires to any convenient chassis mounting bolt to make the ground connection to the metal chassis. This may require moving the wires to other bolts on the fans..

5. Disconnect five cable connectors from the top of the power supply.

6. Remove the nut/lockwasher from the +5-volt bus stud on the power supply. See Figure 2-56 on page 2-59.

7. Disconnect the power connector at the diskette unit.

8. Remove four screws holding the right and left sides of the power supply to the main unit.

9. Remove the power supply.

10. Remove configuration jumper assembly P6 from J6 on the power supply for use on the replacement.

To replace the power supply, use reverse order. Before you completely replace the 5085 in its covers, adjust R38 for +5.2 volts measured at the +5 volt stud (located on the end of the power supply. See Figure 2-56 on page 2-59. Measure the following voltages at their test points on the power supply.

Voltage	Range
+15V	+14V to +16V
+12V	+11V to +13V
-15V	-14V to -16V

The power supply ground test point is actually the +5 volt return. The +5, +-15, and +12 returns are connected external to the supply See Figure 5-2 on page 5-3.

If the voltages are not within range, perform the power check. See 2.38, "Power Check" on page 2-57.

4.7 Diskette Drive Unit

To remove the diskette drive unit:

1. Remove the rear cover. See 4.2, "Rear Cover Removal" on page 4-5.

2. Remove the main unit from the housing. See 4.3, "Main Unit" on page 4-5.

3. Open the front door of the diskette unit and remove the diskette media if one is installed.

4. At the rear of the diskette drive unit, disconnect the power cable and the logic cable.

5. There are two ways to gain access to the two diskette drive mounting screws: one is to remove the video pixel memory logic card, and the other is to detach the mounting bracket to allow it to be tilted forward far enough to remove the mounting screws. Before removing the four bracket mounting screws, scribe its location on the card cage. The scribe marks are used to properly align the mounting bracket on the card cage for reassembly.

6. With a 5.25 inch diskette drive, remove the two screws from the underside of the diskette drive unit and lift it from the mounting bracket.

7. With a 3.5 inch diskette drive, remove the upper support bracket, loosen the two screws from the underside of the diskette drive unit, disconnect the ground jumper at the diskette drive unit and slide it free of the mounting bracket.

Replace the diskette drive unit in reverse order after reading the following information particular to the drive that you are replacing.

On the 5.25 inch drive, make sure that the diskette drive has the 12-pin configuration jumper module (Figure 4-2 on page 4-8) with only the two end pins connected. The jumper must be plugged into the rearmost positions of the 14-pin socket located near the signal cable connection.

There are two versions of the 3.5 inch drive. The locator on the ribbon cable connector must face away from the drive logic board on both versions which means the cable has a twist on some units.

On the Mitsubishi 3.5 inch drive, insure that the terminator and configuration jumpers (Figure 4-2) are as shown. The ground wire must be connected to the recessed, threaded hole on the bottom rear of the drive. R/W errors are possible if the "floating" frame of the drive is not grounded to the 5085 frame ground.

On the Sony 3.5 inch drive, insure that the selector switch on the rear of the drive logic board near the power connector is in (Figure 4-2) the position as shown. The ground wire should be connected to the threaded tab at the bottom center rear of the drive. Access can be made by removal of the "snap on" cover prior to securing the drive to the 5085. The ground wire is retained on the Sony drive to be consistent with the Mitsubishi drive.
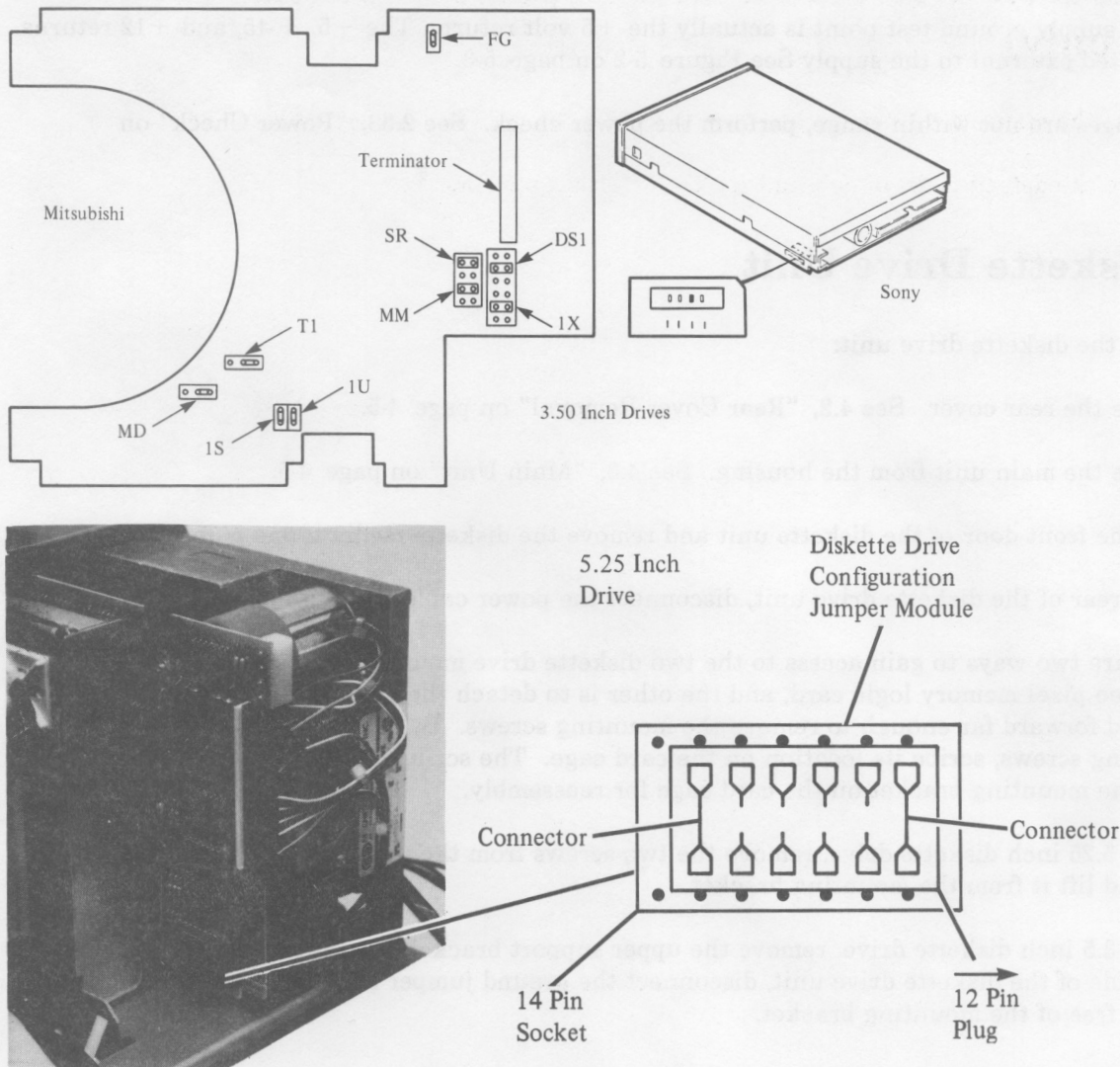
Figure 4-2. Diskette Drive Configuration

Note: Before tightening the two mounting screws completely, make sure that the front of the diskette unit aligns properly with the cutout in the front panel.

4.8 Diskette Drive Unit Strobe Speed Check (5.25 Inch Drive Only)

The diskette drive unit speed may be checked if fluorescent lighting is available. This check may require that the two diskette drive unit mounting screws be removed to position the unit so that you can observe the strobe marks on the outside of the flywheel. In a 60-cycle area, the outer markings should appear stationary. In a 50-cycle area, the inner markings should appear stationary. IPL may have to be repeated several times to observe these effects. Improper speed causes the markings to appear as a blur or to appear to revolve. The most probable causes of improper speed are a defective diskette, a defective drive belt, or a defective drive unit. Take appropriate action.

4.9 Diskette Drive Unit Belt Replacement (5.25 Inch Drive only)

1. Remove the main unit from the housing. See 4.3, "Main Unit" on page 4-5.

2. Remove the defective drive belt and replace it with a new one.

Chapter 5. Interconnection Information

5.1 Interconnection Diagram

Figure 5-1 on page 5-2 shows the interconnection of the workstation. Included are 3270/Ports, Expansion Pixel Memory, Expansion System Memory, Lighted Programmed Function Keyboard, Tablet, Dials Feature, and Displays, all of which are optional.

Note: The power supply ground test point is actually the $+5$ return. The $+5$, $+$-15, and $+12$ returns are connected external to the supply.
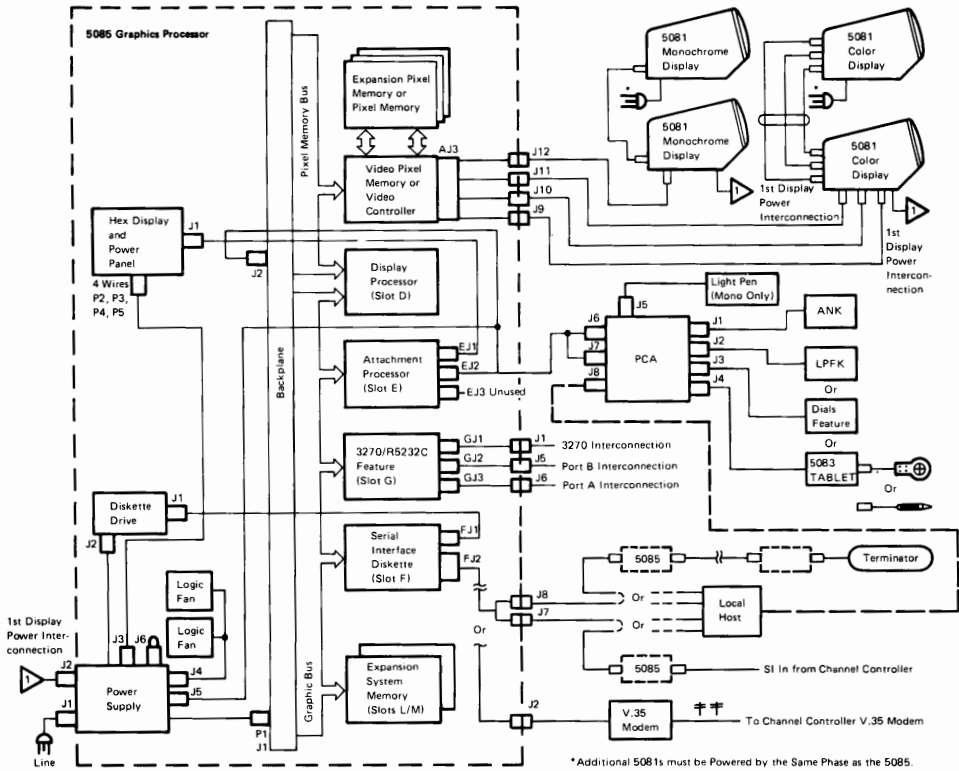
Figure 5-1. Interconnection Diagram

5.2 Power Distribution

Figure 5-2 shows the power distribution from the power supply. Power distribution for devices connected to the PCC is shown in 5.3, "Connector Pin Assignments" on page 5-4.

5085 Graphics Processor

Backplane Voltage Distribution	
Volts	Locations
+5	A-P 55, 56 91, 92
−15	A-P 93, 94
+15	A-P 95, 96
Return	A-P 29, 30 53, 54 97, 98 A-C 77, 78 E-P 77, 78

Note: The power supply ground test point is actually the +5 volt return. The +5, +−15, and +12 returns are connected external to the supply.
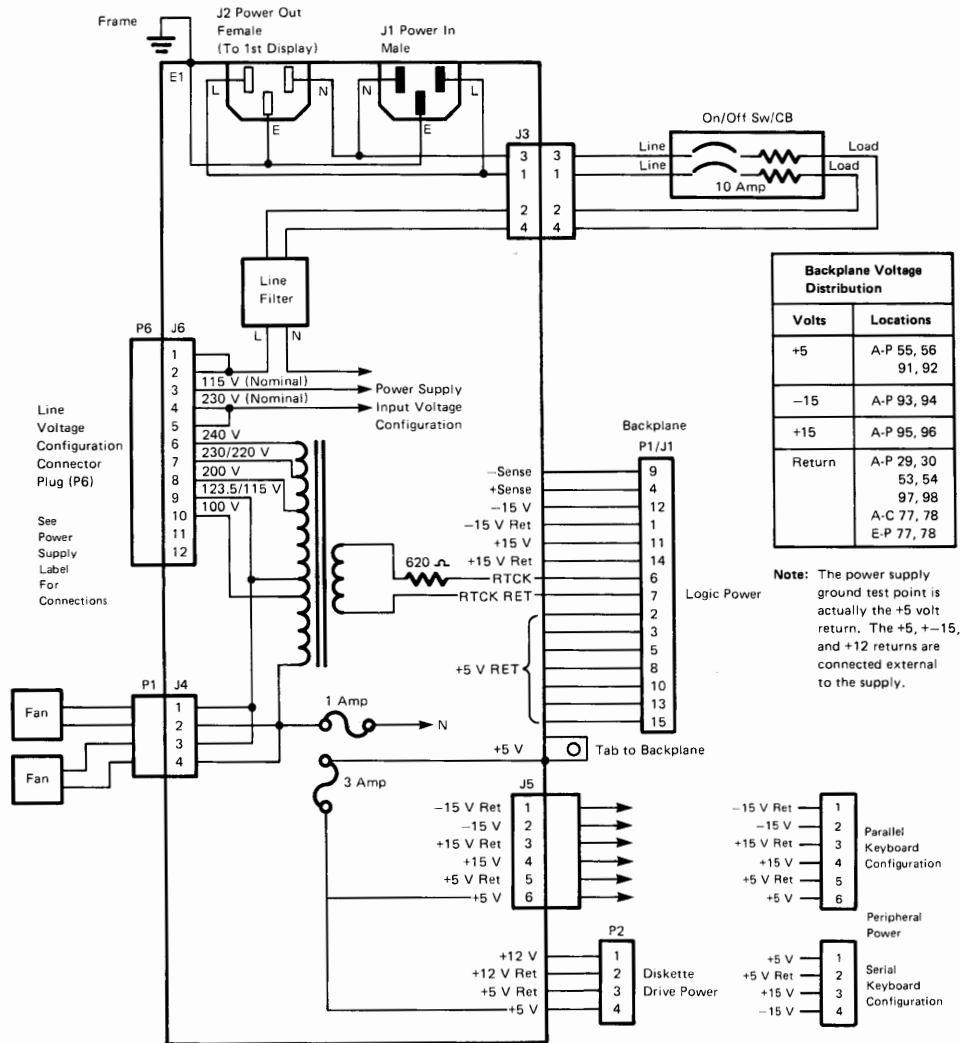
Figure 5-2. Power Supply Power Distribution

5.3 Connector Pin Assignments

There are two types of A/N keyboards. One has a parallel interface, no indicators in the upper right corner, and is refered to as the parallel keyboard. The second has a serial interface, three indicators in the upper right corner, and is refered to as the serial keyboard.

The following figures show the connector pin assignments as an aid for troubleshooting problems.

5.3.1 5085 to PCC

BACKPLANE J2 PIN	AP EJ2 PIN	LINE NAME	PCC J7 PIN P KYBD	PCC J7 PIN S KYBD
	1	Unused	1	
	2	Transmit Data 2	2	1
	3	Transmit Return 2	3	2
	4	Unused	4	
	5	Receive Data 2	5	3
	6	Receive Return 2	6	4
	7	Unused	7	
	8	Transmit Data 3	8	5
	9	Transmit Return 3	9	6
	10	Unused	10	
	11	Receive Data 3	11	7
	12	Receive Return 3	12	8
	13	Unused	13	
	14	Transmit Data 4	14	9
	15	Transmit Return 4	15	10
	16	Unused	16	
	17	Receive Data 4	17	11
	18	Receive Return 4	18	12
	19	Unused	19	
	20	Power On Reset	20	13
	21	Transmit Data 1	21	15
	22	Transmit Return 1	22	14
	23	Unused	23	
	24	Receive Data 1	24	17
	25	Return Data 1	25	16
	26	Reset Return	26	18

Figure 5-3 (Part 1 of 2). 5085 to PCC

BACKPLANE J2 PIN	AP EJ2 PIN	LINE NAME	PCC J7 PIN P KYBD	PCC J7 PIN S KYBD
1		DC Ground	27	
2		DC Ground	28	
3		DC Ground	29	19
4		DC Ground	30	20
5		DC Ground	31	22
6		DC Ground	32	23
7		LP Switch	33	21
8		LP Pulse	34	24
9		DC Ground	None	25
10		DC Ground	None	26

Figure   5-3 (Part 2 of 2).   5085 to PCC

5.3.2 PCC to A/N Keyboard

PCC J1 PIN	LINE NAME	ANK CON PIN
1	Cable Check	4
2	Scan Code 7	24
3	Scan Code 3	19
4	Keyboard Acknowledge	1
5	Click Gate	10
6	Break Code	16
7	Unused	7
8	Scan Code 2	11
9	Data Available	18
10	Scan Code 4	20
11	PCC Frame	7
12	Scan Code 6	25
13	Unused	13
14	Scan Code 5	21
15	Typematic	22
16	+5 Volts	2
17	Unused	17
18	Unused	18

Figure   5-4 (Part 1 of 2).   PCC to Parallel A/N Keyboard

PCC J1 PIN	LINE NAME	ANK CON PIN
19	Reserved	19
20	Reserved	20
21	Power On Reset	6
22	Unused	22
23	Scan Code 1	5
24	Unused	24
25	Cable Check	14

Figure   5-4 (Part 2 of 2).   PCC to Parallel A/N Keyboard

LINE NAME	PCC J2 PIN
+5Volts	1
Keyboard Data	2
Speaker 1	3
Speaker 2	4
DC Return	5
Keyboard Clock	6
Frame Ground	Sheild

Figure   5-5.   PCC to Serial A/N Keyboard

5.3.3 PCC Port 2

Pin 5 is unused in the parallel keyboard configuration but is Selective Reset in the serial keyboard configuration.

LINE NAME	PCC J1 PIN
-15Volts	1
DC Return	2
+5 Volts	3
Ground	4
Unused/Sel Reset	5
Transmit Data	6

Figure   5-6 (Part 1 of 2).   PCC Port 2

LINE NAME	PCC J1 PIN
Transmit Return Receive Return	7
Receive Data	8
+15 Volts	9

Figure 5-6 (Part 2 of 2). PCC Port 2

5.3.4 PCC Port 3

Pin 5 is unused in the parallel keyboard configuration but is Selective Reset in the serial keyboard configuration.

LINE NAME	PCC J3 PIN
-15Volts	1
DC Return	2
+5 Volts	3
Ground	4
Unused/Sel Reset	5
Transmit Data	6
Transmit Return Receive Return	7
Receive Data	8
+15 Volts	9

Figure 5-7. PCC Port 3

5.3.5 PCC Port 4

Pin 5 is unused in the parallel keyboard configuration but is Selective Reset in the serial keyboard configuration.

LINE NAME	PCC J4 PIN
-15 Volts	1
DC Return	2
+5 Volts	3
Ground	4
Unused/Sel Reset	5
Transmit Data	6
Transmit Return Receive Return	7
Receive Data	8
+15 Volts	9

Figure 5-8. PCC Port 4

5.3.6 PCC Port 5

The light pen is supported on a monochrome display only.

LINE NAME	PCC J5 PIN
+5 Volts	1
Video Pulse	2
Unused	3
Tip Switch	4
Ground	5
Unused	6
Unused	7
Unused	8
Unused	9

Figure 5-9. PCC to Light Pen

5.3.7 PCC to Local Host (A/N Keyboard and Port 2)

PCC PIN	LINE NAME	KYBD CONN	PORT CONN
1	Port 2 Transmit Data		6
2	Keyboard Data	2	
3	+5 Volts	1	
4	Keyboard Clock	6	
5	DC Ground	5	
6	Port 2 Receive Data		2
7	DC Ground		1
8	Speaker 1	3	
9	Speaker 2	4	

Figure 5-10. PCC to Local Host Connectors

5.3.8 Tablet to Stylus or Cursor Connector

PIN	STYLUS LINE NAME	CURSOR LINE NAME
1	Unused	Unused
2	Ground	Button 4
3	Unused	Button 3
4	Unused	Button 2
5	Ground	Ground
6	+Stylus Coil	+Cursor Coil
7	-Stylus Coil	-Cursor Coil
8	+Stylus Mode	-Cursor Mode
9	Tip Switch	Button 1

Figure 5-11. Tablet to Stylus or Cursor Connector

5.3.9 SI/FDC Card to Diskette Drive Unit

SI/FDC CARD FJ1 PIN	5.25 INCH DISKETTE LINE NAME	3.50 INCH DISKETTE LINE NAME	DISKETTE DRIVE J1 PIN
All Odd Pins 1-33	Ground	Ground	All Odd Pins 1-33
2	Unused	Unused	2
4	In Use	In Use	4
6	Unused	Select 3	6
8	Index	Index	8
10	Select 1	Select 0	10

Figure 5-12 (Part 1 of 2). SI/FDC to Diskette Drive

SI/FDC CARD FJ1 PIN	5.25 INCH DISKETTE LINE NAME	3.50 INCH DISKETTE LINE NAME	DISKETTE DRIVE J1 PIN
12	Select 2	Select 1	12
14	Unused	Select 2	14
16	Motor On	Motor On	16
18	Direction	Direction	18
20	Step	Step	20
22	Write Data	Write Data	22
24	Write Gate	Write Gate	24
26	Track 00	Track 00	26
28	Write Protect	Write Protect	28
30	Read Data	Read Data	30
32	Select Side 1	Select Side 1	32
34	Unused	Ready	34

Figure   5-12 (Part 2 of 2).   SI/FDC to Diskette Drive

5.3.10 3270/Ports

GJn PIN	LINE NAME	I/O Jn PIN
1	Frame Ground	1
2	Transmit Data	2
3	Receive Data	3
4	Request to Send	4
5	Clear to Send	5
6	Data Set Ready	6
7	Signal Ground	7
8	Carrier Detect	8
9-14	Unused	9-14
15	Transmit Timing	15
16	Unused	16
17	Receive Timing	17
18	Test (Wrap) 3270 Only	18
19	Unused	19
20	Data Terminal Ready	20
21-24	Unused	21-24
25	Test Indicator 3270 Only	25
26	Unused	None

Figure 5-13. EIA Connections

	3270	PORT A	PORT B
GJn	GJ1	GJ3	GJ2
I/O Jn	J1	J6	J5
Locator	12	25	18

Figure 5-14. Jn Identification

The locator is a plug in the GJn connector to prevent misplugging on the 3270/Ports Card. The card connector has the matching pin cut off.

5.3.11 5085 V.35 Cable Wiring Diagram
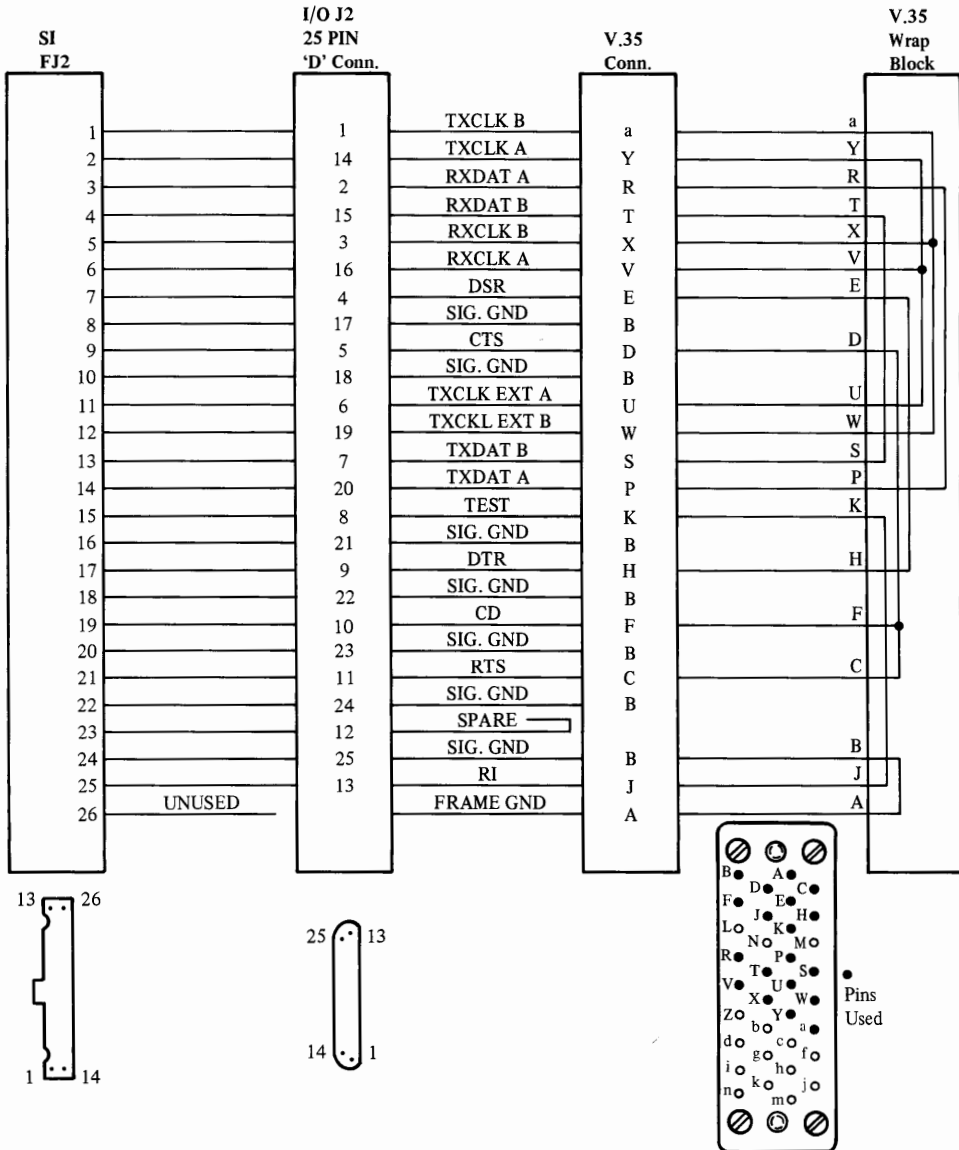
Figure 5-15. 5085 V.35 Cable Wiring Diagram

Chapter 6. Graphics System Description

6.1 General

The IBM 5080 Graphics System is a combination of units that enable the user to interact with a graphics application program running in a host system. The units include color and monochrome displays.

This chapter is only intended to provide a comprehensive description of the 5080 Graphic System. Specification and ordering information is provided by the IBM sales representative. Such things as ordering procedures, designations, optional features, and standard features do change from time to time.

The 5080 supports a wide range of I/O devices available from IBM. Industry compatible interfaces are also available to support user-provided I/O devices. A feature is available that allows the 5080 to act as a 3270 terminal. This feature has its own connection to its own host system and application program. It may also communicate with the graphics host system, by way of the serial link, with Mode Shared Attachment (MSA).

The following are individual parts of the 5080:

- IBM 5088 Graphics Channel Controller

- IBM 5085 Graphics Processor

- IBM 5083 Tablet/CursorPad

- IBM 5081 Display

- Various peripheral devices.

6.2 IBM 5088 Graphics Channel Controller

The 5088 provides the channel interface needed for the host system and the serial interface for the attached 5085(s).

The primary functions of the 5088 are:

- To accept data from, and to pass data to, the I/O channel interface

- To accept data from, and to pass data to, the serial link between the 5088 and an attached 5085/3255.

6.2.1 Channel Interface

The format of data and the sequence of control signals on the I/O channel interface conform to the requirements of an IBM System/370 channel to the controller I/O interface. The interface is defined in *IBM System/360 and System/370 I/O Interface Channel to Control Unit, Original Equipment Manufacturers' Information*, GA22-6974.

6.2.2 Serial Interface

The serial link consists of a serial interface in the 5085 and a coaxial cable, or a teleprocessing (TP) connection (for the 5085 V.35 Feature), between the 5085 and its host. This link transfers data between the 5085 and its host. All data transfers over the serial link are controlled by the host. This host may also be a dedicated local host.

The serial link connection may also be controlled by a switch in a local host to switch between the local host and a channel control unit. The switch request is made in the Setup entry panel. An entry of 8 requests the switch to the channel control unit. An entry of 9 requests the switch to the local host. The end result of the switch is shown as an 8 or 9 under the IBM logo. Power off of either the local host or channel control unit forces the switch to the powered on unit during the IPL serial link start up. Errors are identified by the link status codes.

The base 5088 has four high-speed serial ports with a combined total of 16 available addresses. Up to sixteen 5085s may be attached to these ports in any combination. A serial link can be up to 5000 meters in length for a coaxial cable, or can be unlimited in length for a TP connection. The data rate of these links is either 2,000,000 bits/second or 1,000,000 bits/second, depending on the 5080 configuration; for TP the data rate is 9600 to 2,000,000 bits/second. One or more 3255/3251s (processing/display units of the 3250 system similar to the 5085/5081) can be attached to a 5088; however, this would limit the 5088 to 1,000,000 bits/second.

The RS232C Ports Feature, used to attach a plotter, digitizer, or other I/O devices (maximum of two), is assigned two device addresses that may be disabled. When disabled, they are not part of the maximum allowable address count and are not seen by the 5088.

A 3255 may have more than one 3251 display attached. The 3255 does not use a device address; however, each 3251 display that attaches to the 3255 requires a device address.

In the 5088, the 5085 requires a device address, but the attachable 5081s do not require addresses.

A feature can be added to the base 5088 Model 1 to provide four additional links. This featured 5088 is referred to as a 5088 Model 2 and allows an additional sixteen 5085s, 3255/3251s, and/or RS232C Ports Feature (a total of 32 addresses) to be attached.

The IBM 5088 Graphics Channel Controller is plug compatible with the IBM 3258 channel controller used in a 3250 system.

The 5088 attaches to an I/O channel of the host system. All graphics data, including control and interrupt signals, that is transferred between the host system and the 5080 passes through the 5088. The 5088 attaches to a standard IBM System/370 block multiplexer, byte multiplexer (burst mode), or selector channel interface. It sustains a burst-mode data rate of at least 1,000,000 bytes/second when the rate is not limited by the channel transfer rate. It may also operate at 1,250,000 or 2,500,000 bytes/second in the data streaming mode.

6.3 Local Host Configuration

The 5085 Graphics Processor can be connected to a local host processor by way of the serial link coaxial cable interface. The local host can also be coaxial cabled to a 5088. In the second configuration the local host has the capability of switching the coaxial connection of the 5085 between the local host and the 5088. This allows some applications to run to the 5085 from the 5088 host computer complex in addition to the applications designed to run to the 5085 from the local host. The local host provides similar function as the 5088 and its host. The 5085 operation is the same regardless of which host is providing serial interface data to it. The 5085 can also control the peripheral connector assembly to switch the A/N keyboard between the local host and the 5085. This switch also controls the device on the PCA port 2.

6.4 IBM 5085 Graphics Processor

The 5085 Graphics Processor provides the data buffering and control for the 5080. The following functions are available in this unit:

Attachment Processor

A microprocessor that controls communications on the host-5085 link by way of the serial interface processor, controls the keyboards and other attached I/O devices, manages the display list buffer and interfaces to the display processor.

System Memory   The AP provides a base of system memory including 64K bytes of display list buffer. This and all Expansion System Memory are contiguous and are shared by the 5085 Processors. System memory is not associated with, or restricted to, any particular function.

Serial Interface   A high-speed serial link connects the 5085 to the Channel Controller (3258 or 5088) or a local host. The serial link operates at 1,000,000 or 2,000,000 bits/second with a coaxial cable, or at 9600 to 2,000,000 bits/second for TP with the 5085 V.35 Feature attached.

Communication is by way of SDLC protocols. Attachment can be up to 5,000 meters from the Channel Controller for coaxial cable or can be unlimited for TP.

Display Processor   Consists of four microprocessors, working storage, and control storage. It executes the display list orders which drive the following:

- Vector-to-raster converter
- Pixel (individual display "dots") array handler
- General area fill process
- Character generator
- Programmable vector character generator
- Transformations which use a high-speed multiplier
- Circle generator.

Video Pixel Memory

A pair of memories alternate. One memory provides video data to the red/blue/green coaxial outputs for color display, while the other memory is being updated with a new image. The red/blue/green signals also drive a composite coaxial output for use by monochrome displays. The synchronization

signal is sent on every video coaxial cable. The memory data is 2, 4, 6, or 8 bits deep, depending on the addition of Expansion Pixel Memory features that extend the color and shading capability of the subsystem. Later 5085s have 8 planes standard.

Diskette   A diskette drive is provided for IPL and dump of the attachment processor, display processor, 3270 feature microcode, and system memory. Configuration setup input and error data are retained on the diskette for use on subsequent IPLs. The diskette is used for distribution and application of engineering changes to microcode.

3270 Mode Feature   With the 3270 feature installed, an operator at the 5081 can access 3270 applications.

Initially, after power on, the 5085 is in the graphic mode.

The switch from graphic mode to 3270 mode is accomplished by pressing the Jump Screen key on the alphanumeric keyboard. This causes the keyboard to take on the characteristics of a 3270 keyboard and the display monitor to take on the characteristics of a 3270 display. The user can now access any 3270 host application. Conversely, the 5080 can be restored to graphic mode by pressing the Jump Screen key. The user remains actively connected to both the 3270 and the graphics applications, regardless of the currently active screen/keyboard mode.

A separate interface communicates with the 3270 host from this feature. This host is not required to be the same as the host containing the graphics application. This connection may be by way of a TP link to an IBM 3704/3705 or Integrated Communication Adapter (ICA). Mode Shared Attachment (MSA) allows 3270 communication, by way of the serial link, to the graphics host system. This feature is on the same logic card as the RS232C Ports feature.

RS232C Port Feature
This feature provides a general purpose RS232C interface capable of supporting asynchronous and synchronous protocols. This permits attachment of digitizers, plotters, or other devices. The host is responsible for the protocol processing and formatting. The 5085 provides the attachment buffering. This feature is on the same logic card as the 3270 feature.

Audible Alarm   An audible alarm can be programmed to signal the operator in both graphics and 3270 modes of operation.

6.5 IBM 5081 Graphics Display

The 5081 Graphics Display is a raster (TV-type scan) CRT display. The color version has a horizonal in-line gun that simplifies the convergence adjustments.

6.5.1 Input/Output Devices

Alphanumeric Keyboard

A 101-key to 106-key keyboard with customer specified language is a required feature. Audible indication of character input is provided.

There are two types of A/N keyboards. One has a parallel interface, no indicators in the upper right corner, and is refered to as the the parallel keyboard. The second has a serial interface, three indicators in the upper right corner, and is refered to as the serial keyboard. The serial keyboard is switchable to a local host by pressing the Alt/Sw Kbd keys. Each depression toggles the connection. The rightmost LED turns on to indicate the switch to the local host. Keys identified in green are for local host operation and blue are for 3270 operation. Black identifies keys that operate in all modes.

Numeric Keypad
An optional 24-key keypad extends the flexibility of the workstation by placing the numeric function on a separate device. The keypad plugs into the base A/N Keyboard and transmits unique scan codes to the 5085.

Lighted Programmed Function Keyboard

This 32-key keyboard accepts a removable overlay on which the user may write information regarding the particular function(s) that he has programmed.

IBM 5083 Tablet/CursorPad

The Tablet or CursorPad, with its associated stylus or cursor, generates coordinate data. The stylus and the cursor emit signals that allow the device to calculate their location on the device surface. The tip switch on the stylus or the 4 function keys on the cursor help the programmer in defining this data to the system.

Cursor Stick
The Cursor Stick generates data that is used by the 5085 to move the cursor on the 5081 screen similar to the Tablet operation. The speed and direction are controlled by pressure on the control stick. Release of the stick stops the cursor movement. Four function keys are provided to help the programmer in defining data to the system.

Light Pen
An optional light pen is available for interaction with the image displayed on the 5081. It is supported for use only with the monochrome display. It has a tip switch to help the programmer in defining, to the system, the data that is selected by the light pen.

Preselection Highlighting

This feature causes pickable items, identified in the pick window of the Light Pen or Tablet tracking symbol, to highlight as defined by the user. Application programs must have the video look-up table set to handle this feature; this is also a prerequisite of the Light Pen feature.

Dials (8 dials)
This device inputs scalar values by converting the dial positions to digital data. The eight dials are numbered to assist the user regarding the functions that he has programmed.

Chapter 7. Tools and Test Equipment

Metric tool B/M #1749235 is required to service the 5080 Subsystem.

7.1 Shipping Group Tools

The following tools are shipped with the:

5081

> CRT Alignment Mask PN 6246502
> CRT Alignment Tool PN 6246501

5085   Serial Link Terminator PN 6246330

5085 V.35 Feature V.35 Wrap Block Connector PN 6246728

7.2 On-Site Tools and Test Equipment

Door Key PN 6834390.

7.3 Branch Office Tools

Field support tools that may be used by the CE and Product Engineering personnel for debugging and problem determination purposes are:

PT-2 Tester and Channel Interface Monitor (CHIM)

Oscilloscope

Fluke Voltmeter

Breakout Box

Amp Pin Extractor PN 2108398

RS232C Wrap Plug PN 4173225

Coaxial Cable Adapter PN 5252643 ("barrel" connector).

7.4 Region Tools

None required.

7.5 New Tools

The following tools are available and required for CE use to service the 5080 subsystem. They are now included in the base CE tool case.

Supadriver #1-PN 4760541 (WT PN 4056724)

Supadriver #2-PN 4760542 (WT PN 4056725).

Chapter 8. Parts Catalog

8.1 This catalog contains:

- A visual index, showing units, assemblies, and peripheral devices

- Figures showing locations of parts, cross indexed to the part numbers and descriptions on adjacent pages

- A numerical list of part numbers, cross referenced to the figure index lists.

8.2 How to Use this Catalog:

1. Turn to the visual index on page 8-5 to locate the unit, assembly, or device that contains the part.

2. Turn to the page number shown on the visual index. This page references a figure index number.

3. Identify the number on the figure and refer to this number on the adjacent figure index list to find the part number and description.

Note: List 3 contains peripheral devices, which are each ordered by one part number only. These items do not have figure index numbers.

PART NUMBER CROSS REFERENCE

PART NUMBER	FIGURE-INDEX NUMBER	UNITS PER ASM.	DESCRIPTION
NO PN	8-1-22	1	CHASSIS ASM
1106027	8-2-16	2	CLIP, PUSH – ON
1621151	8-2-53	8	SCREW, PAN HD M3 X 60 LG
1621161	8-1-3	6	SCREW, PAN HD M2.5 X 6 LG
1621170	8-2-10	2	SCREW, PAN HD M3 X 6 LG
1621172	8-2-9	4	SCREW, PAN HD M3 X 10 LG
1621185	8-2-23	2	SCREW, PAN HD M3.5 X 16 (MDL 1 ONLY)
1621191	8-1-8	8	SCREW, PAN HD M4 X 10 LG
1621191	8-1-11	3	SCREW, PAN HD M4 X 10 LG
1621191	8-1-16	8	SCREW
1621191	8-1-20	2	SCREW, PAN HD M4 X 10 LG
1621191	8-2-4	4	SCREW, PAN HD M4 X 10 LG
1621191	8-2-29	4	SCREW, PAN HD M4 X 10 LG
1621191	8-2-37	4	SCREW, PAN HD M4 X 10 LG
1621191	8-2-40	8	SCREW, PAN HD M4 X 10 LG
1621191	8-2-44	6	SCREW, PAN HD M4 X 10 LG
1621193	8-2-60	2	SCREW, PAN HD M4 X 16 LG
1621202	8-2-34	6	SCREW, PAN HD M4 X 18 LG
1621309	8-2-69	1	SCREW
1622301	8-1-5	6	WASHER, FLAT M2.5
1622302	8-2-12	6	WASHER, FLAT M3
1622302	8-2-54	8	WASHER, FLAT M3
1622303	8-2-25	2	WASHER, FLAT M3.5 (MDL 1 ONLY)
1622304	8-1-13	3	WASHER, FLAT M4
1622304	8-1-18	8	WASHER, FLAT M4
1622304	8-2-5	4	WASHER, LOCK M4
1622304	8-2-30	4	WASHER, LOCK M4
1622304	8-2-35	6	WASHER, FLAT M4
1622304	8-2-39	4	WASHER, FLAT M4
1622304	8-2-42	8	WASHER, FLAT M4
1622304	8-2-46	6	WASHER, FLAT M4
1622304	8-2-62	2	WASHER, FLAT M4
1622316	8-2-11	6	WASHER, LOCK M3
1622317	8-2-24	2	WASHER, LOCK M3.5 (MDL 1 ONLY)
1622318	8-1-9	8	WASHER, LOCK M4
1622318	8-1-12	3	WASHER, LOCK M4
1622318	8-1-17	8	WASHER, LOCK M4
1622318	8-1-21	2	WASHER, LOCK M4
1622318	8-2-6	4	WASHER, FLAT M4
1622318	8-2-31	4	WASHER, FLAT M4
1622318	8-2-38	4	WASHER, LOCK M4
1622318	8-2-41	8	WASHER, LOCK M4
1622318	8-2-45	6	WASHER, LOCK M4
1622318	8-2-61	2	WASHER, LOCK M4
1622343	8-1-4	6	WASHER, LOCK M2.5
1622344	8-2-55	2	WASHER, LOCK EXT TOOTH M3
4173225	TOOL		RS-232 TEST WRAP CONNECTOR
6018100	REF		KEYPAD ASM – U.S. (ENGLISH)
6018102	REF		KEYPAD ASM – GERMANY/AUSTRIA
6018103	REF		KEYPAD ASM – ITALY
6018104	REF		KEYPAD ASM – SWEDEN

PART NUMBER	FIGURE-INDEX NUMBER	UNITS PER ASM.	DESCRIPTION
6018105	REF		KEYPAD ASM — JAPAN, U.K., ETC.
6018106	REF		KEYPAD ASM — FRENCH
6245867	8-2-13	1	SWITCH, ROTARY (TEST)
6245886	8-2-7	1	MAINTENANCE PANEL CARD
6245935	8-1-19	2	CABLE ASM — GND
6245950	REF	1	CABLE ASM — SERIAL INTF
6245974	8-1-7	2	HINGE
6245975	8-2-28	1	FRONT PANEL (MDL 1 ONLY)
6245976	8-1-15	1	ENCLOSURE
6245977	8-1-6	1	DOOR, FRONT
6245979	8-1-10	1	COVER, REAR
6245985	8-2-58	1	PLENUM, FAN
6245986	8-2-47	1	CARD CAGE
6245987	8-1-1	1	LATCH KIT, FRONT
6245989	8-2-22	1	DRIVE, FLOPPY DISK (MDL 1 ONLY)
6245990	8-2-2	1	BEZEL, RESET SWITCH
6245991	8-2-3	1	KNOB, TEST SWITCH
6245994	8-2-43	1	CCA, BACKPLANE
6245997	8-2-17	1	BEZEL, POWER SWITCH
6246001	REF	1	CABLE ASM — PERIPHERAL CONN ASM (MDL 1 ONLY)
6246003	REF	1	CABLE ASM — VIDEO PIXEL MEM
6246004	REF	2	CABLE ASM — RS-232 PORTS
6246006	REF	1	CABLE ASM — 3270 (MDL 1 ONLY)
6246009	REF	1	CABLE ASM — AP/MAINT PANEL
6246010	REF	1	CABLE ASM — PWR ON/OFF
6246011	REF	1	CABLE ASM — DISK DRIVE/SERIAL INTF (MDL 1 ONLY)
6246021	8-2-57	2	JUMPER
6246026	8-2-50	1	CABLE ASM — FAN
6246032	8-1-1	1	STRIKER, LATCH
6246039	REF		PERIPHERAL CONN ASM (5085-1 ONLY)
6246082	8-2-49	1	BRACKET, SUPPORT CHASSIS
6246084	8-2-51	1	LABEL — GND
6246087	8-2-15	1	PLATE, COMPONENT
6246124	8-2-59	1	CLAMP, PCC CABLE (MDL 1 ONLY)
6246132	8-2-8	1	CIRCUIT BREAKER, 2 POLE
6246225	REF	1	CABLE ASM — 3270/MODEM (MDL 1 ONLY)
6246226	REF	1	CABLE ASM — 3270/MODEM METRIC (MDL 1 ONLY)
6246240	8-2-48	1	POWER SUPPLY
6246241	REF	1	CABLE ASM — VIDEO
6246242	8-2-65	1	PANEL, REAR — W/O OVERLAYS
6246249	REF		KEYBOARD CABLE — COMMON
6246250	8-2-32	1	COVER, CARD CAGE AND MTG HDWR
6246264	8-2-66	1	LINE CORD — LOW VOLTAGE 8 FT U.S.
6246265	8-2-66	1	LINE CORD — LOW VOLTAGE 6 FT U.S.
6246270	8-2-66	1	LINE CORD — EMEA
6246271	8-2-66	1	LINE CORD — DENMARK
6246272	8-2-66	1	LINE CORD — S. AFRICA
6246273	8-2-66	1	LINE CORD — U.K.
6246274	8-2-66	1	LINE CORD — SWITZERLAND
6246276	8-2-66	1	LINE CORD — ISRAEL
6246300	KIT		EXP PIXEL MEMORY CARD MTG HDWR (MECH PARTS — NO CARDS INCL)

PART NUMBER CROSS REFERENCE

PART NUMBER	FIGURE-INDEX NUMBER	UNITS PER ASM.	DESCRIPTION
6246324	8-2-52	2	FAN
6246329	KIT		3270 CBL MTG HDWR (MECH PARTS ONLY — NO CARD/CABLES INCL)
6246330	8-2-21	1	TERMINATOR, SERIAL INTERFACE
6246275	8-2-66	1	LINE CORD — ITALY
6246616	8-2-67	1	BRACKET
6246617	8-2-66	1	LINE CORD — ARGENTINA
6246618	8-2-66	1	LINE CORD — AUSTRALIA/NEW ZEALAND
6246626	REF	1	CABLE ASM — V.35 (TP)
6246675	8-2-14	1	SWITCH, SPDT (IPL)
6246676	8-2-1	1	BUTTON, SWITCH (IPL)
6246677	8-2-56	8	INSERT, METRIC M3
6246678	8-2-36	6	INSERT, METRIC M4
6246679	8-2-18	5	CABLE LMOUNT — SELF ADHESIVE
6246680	8-2-20	4	CLIP, FLAT WIRE
6246681	8-2-68	1	CLAMP
6246682	8-1-14	4	BALL STUD
6246683	8-2-33	1	NUT, KNURL — 3270 GND (MDL 1 ONLY)
6246690	REF	1	CABLE ASM — TP ATTACH
6246728	TOOL		TP TEST WRAP CONNECTOR
6246795	KIT		POWER SUPPLY VOLTAGE CONFIGURATION PLUG
			FOR REPLACEMENT USE ONLY: NOT TO BE USED
			FOR CONVERSIONS
6246799	REF		LIGHTED PGM FUNC KYBD
6246833	REF		PERIPHERAL CONN ASM
6246850	REF	1	CABLE ASM — PERIPHERAL CONN ASM (MDL 1A,2,and RT PC Attach.)
6246857	8-2-59	1	CLAMP, PCC CABLE (MDL 1A,2,and RT PC Attach.)
6246874	8-2-22	1	DRIVE, FLOPPY DISK (MDL 1A,2,and RT PC Attach.)
6246873	8-2-70	1	GND STRAP, DISK DRIVE
6246875	REF	1	CABLE ASM — DISK DRIVE/SERIAL INTF (MDL 1A,2,and RT PC Attach.)
6246880	8-2-28	1	FRONT PANEL (MDL 1A,2,and RT PC Attach.)
			OVERLAYS — LANGUAGE SENSITIVE, MUST BE FACTORY ORDERED
6246881	8-2-26	1	SUPPORT BRACKET DISK DRIVE (MDL 1A,2,and RT PC Attach.)
6248412	REF		KEYBOARD ASM — U.S. (ENGLISH)
6248413	REF		KEYBOARD ASM — U.S. (ENGLISH) APL
6248414	REF		KEYBOARD ASM — JAPAN (KATAKANA)
6248415	REF		KEYBOARD ASM — JAPAN (KATAKANA) APL
6248416	REF		KEYBOARD ASM — GERMANY
6248417	REF		KEYBOARD ASM — GERMANY APL
6248418	REF		KEYBOARD ASM — FRANCE (QWERTY)
6248419	REF		KEYBOARD ASM — FRANCE (QWERTY) APL
6248420	REF		KEYBOARD ASM — ITALY
6248421	REF		KEYBOARD ASM — ITALY APL
6248422	REF		KEYBOARD ASM — UNITED KINGDOM
6248423	REF		KEYBOARD ASM — UNITED KINGDOM APL
6248425	REF		LIGHTED PGM FUNC KYBD (5085-1 ONLY)
6248426	REF		5083-1 TABLET (MUST BE ORDERED AS MACHINE TYPE)
6248427	REF		STYLUS (FOR USE WITH 5083-1 ONLY)
6248428	REF		CURSOR (FOR USE WITH 5083-1 ONLY)
6248429	REF		LIGHTPEN (RPQ)
6248430	REF		DIALS (MDL 1 ONLY)
6248431	REF		KEYBOARD ASM — SWEDEN
6248432	REF		KEYBOARD ASM — SWEDEN
6248436	REF		DIALS

PART NUMBER CROSS REFERENCE

PART NUMBER	FIGURE-INDEX NUMBER	UNITS PER ASM.	DESCRIPTION
6248513	REF		5083-12 TABLET (MUST BE ORDERED AS MACHINE TYPE)
6248514	REF		5083-11 TABLET (MUST BE ORDERED AS MACHINE TYPE)
6248522	REF		STYLUS (FOR USE WITH 5083-11/12)
6248523	REF		CURSOR (FOR USE WITH 5083-11/12)
6487683	REF		KEYBOARD ASM – U.S. (ENGLISH)
60X5726	REF		KEYBOARD ASM – JAPAN (KATAKANA)
59X1088	REF		KEYBOARD ASM – GERMANY
6487686	REF		KEYBOARD ASM – FRANCE
6487687	REF		KEYBOARD ASM – ITALY
6487685	REF		KEYBOARD ASM – UNITED KINGDOM
59X1089	REF		KEYBOARD ASM – SWEDEN
844252	8-2-64	1	FUSE, PCC/DISK, TYPE 3 AG
855253	8-2-63	1	FUSE, FAN, TYPE 3 AG
1339716	8-2-23	2	SCREW, M3 X 8 LG (MDL 1A,2,and RT PC Attach.)

VISUAL INDEX

5085 CHASSIS
FIGURE 8-2
PAGE 8-8

5085 ENCLOSURE
FIGURE 8-1
PAGE 8-6

KEYPAD
PAGE 8-15

LIGHTPEN (RPQ)
PAGE 8-15

KEYBOARD
PAGE 8-15

PERIPHERAL CONNECTOR
PAGE 8-15

DIALS
PAGE 8-15

LIGHTED PROGRAM
FUNCTION KEYBOARD
PAGE 8-15

5083 TABLET
WITH CURSOR/STYLUS
PAGE 8-15
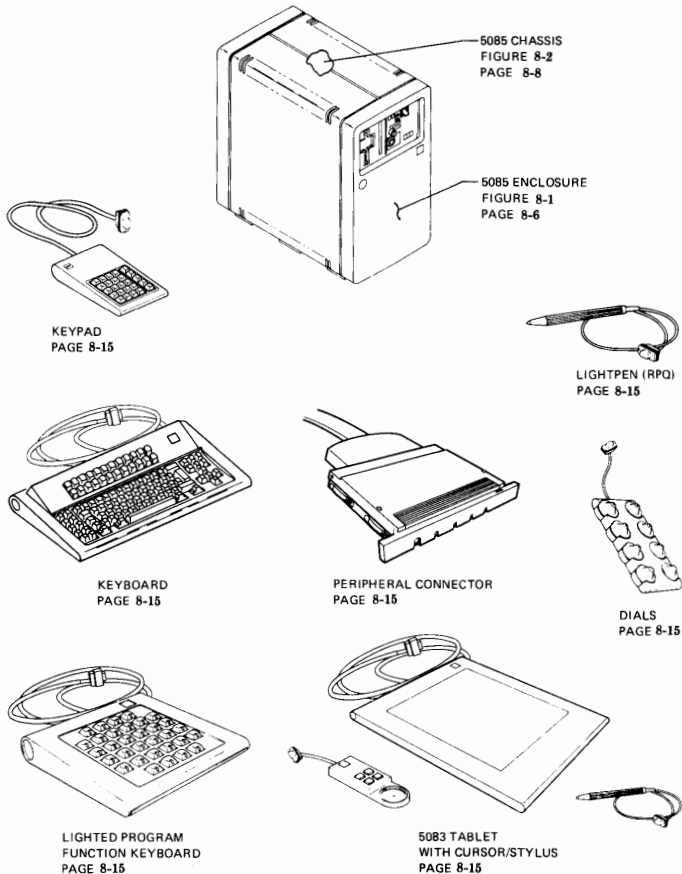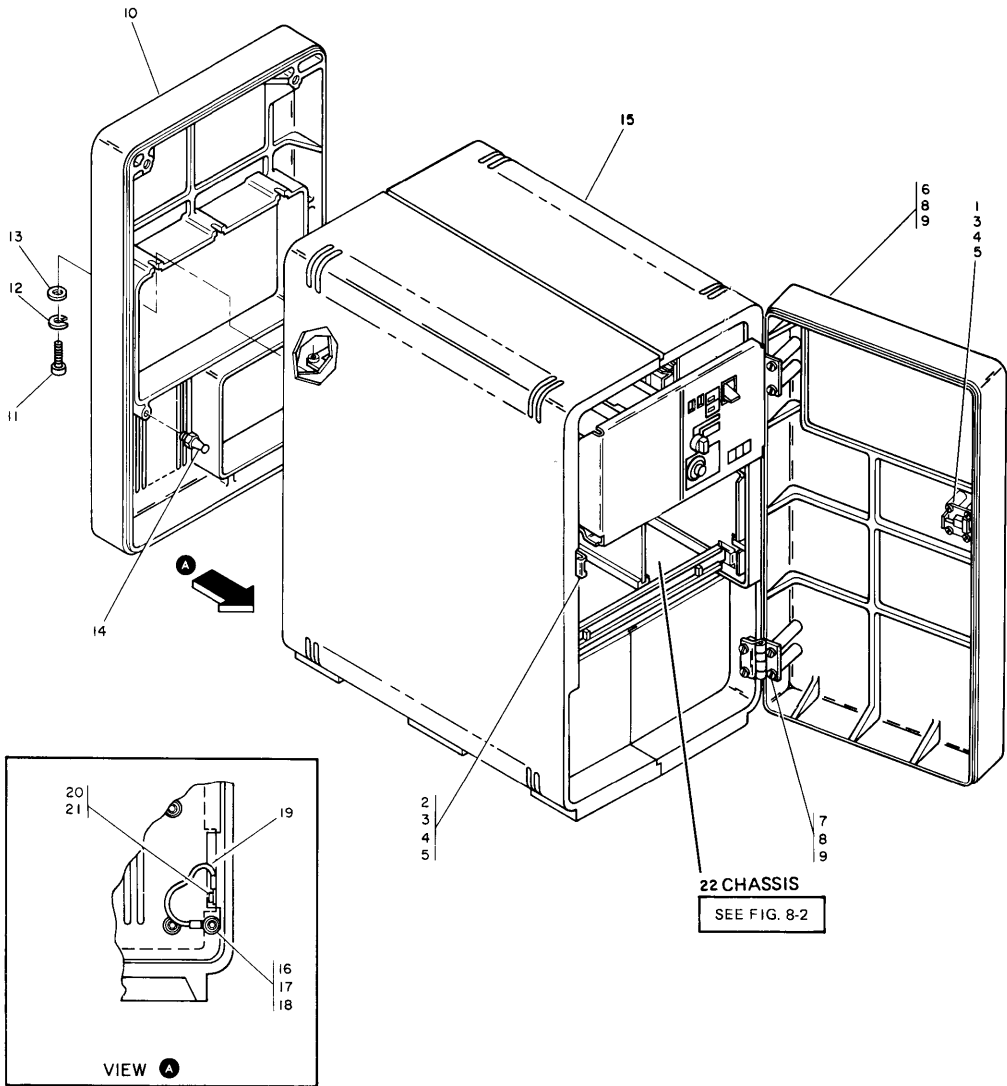
Figure 8-1. 5085 Graphics Processor

LIST 1. 5085 GRAPHICS PROCESSOR

FIGURE-INDEX NUMBER	PART NUMBER	UNITS PER ASM.	DESCRIPTION 1 2 3 4
8-1—	NO PN	REF	5085 GRAPHICS PROCESSOR — ENCLOSURE
			FOR ILLUSTRATION, SEE FIGURE 8-1
— 1	6245987	1	• LATCH KIT, FRONT
— 2	6246032	1	• STRIKER, LATCH
— 3	1621161	6	• SCREW, PAN HD M2.5 X 6 LG
— 4	1622343	6	• WASHER, LOCK M2.5
— 5	1622301	6	• WASHER, FLAT M2.5
— 6	6245977	1	• DOOR, FRONT
— 7	6245974	2	• HINGE
— 8	1621191	8	• SCREW, PAN HD M4 X 10 LG
— 9	1622318	8	• WASHER, LOCK M4
— 10	6245979	1	• COVER, REAR
— 11	1621191	3	• SCREW, PAN HD M4 X 10 LG
— 12	1622318	3	• WASHER, LOCK M4
— 13	1622304	3	• WASHER, FLAT M4
— 14	6246682	4	• BALL STUD
— 15	6245976	1	• ENCLOSURE
— 16	1621191	8	• SCREW
— 17	1622318	8	• WASHER, LOCK M4
— 18	1622304	8	• WASHER, FLAT M4
— 19	6245935	2	• CABLE ASM— GND
— 20	1621191	2	• SCREW, PAN HD M4 X 10 LG
— 21	1622318	2	• WASHER, LOCK M4
— 22	NO PN	1	• CHASSIS ASM
			FOR DETAIL BREAKDOWN, SEE FIGURE 8-2
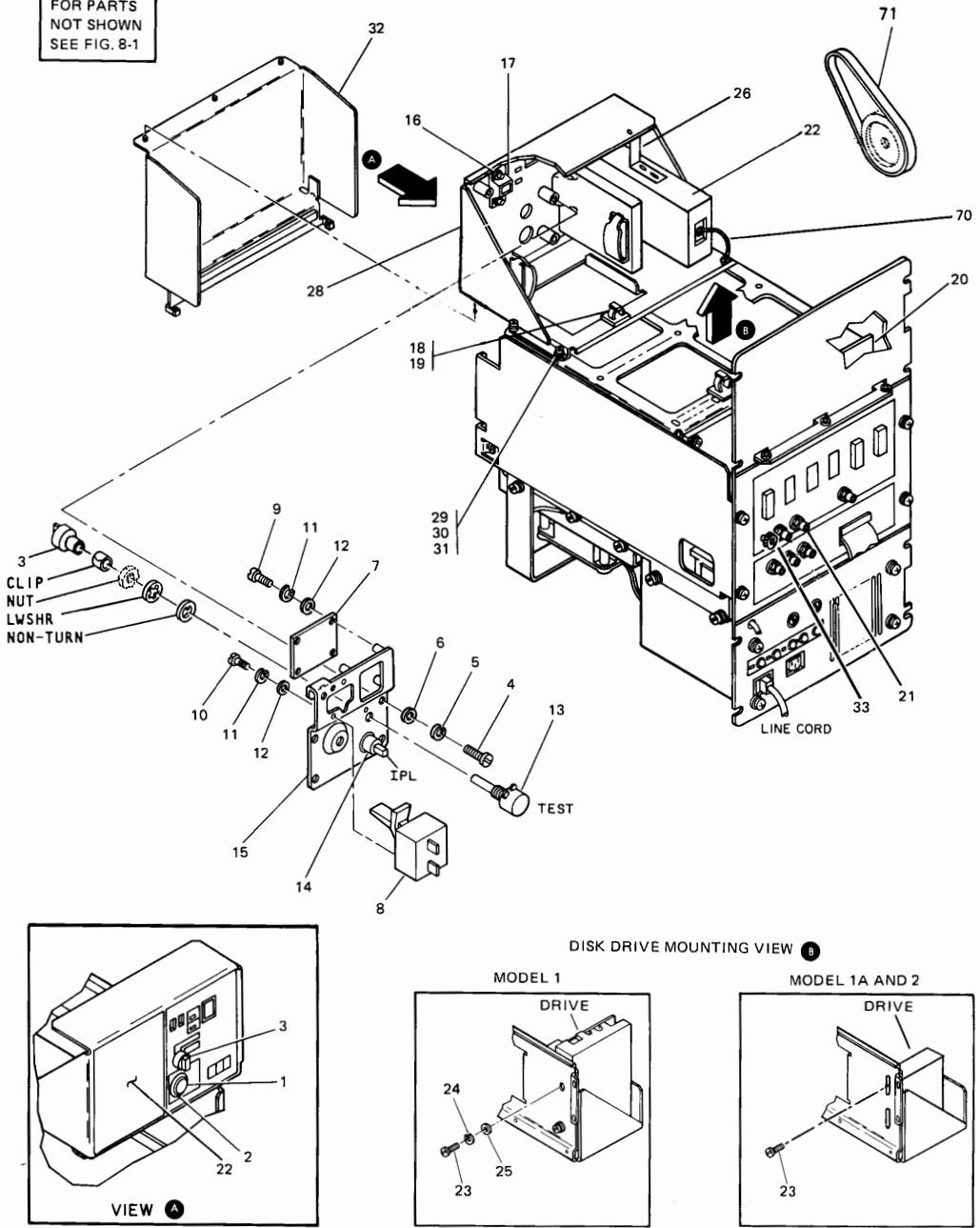
Figure 8-2. Chassis Assembly (Sheet 1 of 2, Index Nos. 1-33)

FIGURE-INDEX NUMBER	PART NUMBER	UNITS PER ASM.	DESCRIPTION 1 2 3 4
8-2—	NO PN	REF	CHASSIS ASM— 5085
			FOR NEXT HIGHER ASM, SEE FIGURE 8-1
— 1	6246676	1	• BUTTON, SWITCH (IPL)
— 2	6245990	1	• BEZEL, RESET SWITCH
— 3	6245991	1	• KNOB, TEST SWITCH
— 4	1621191	4	• SCREW, PAN HD M4 X 10 LG
— 5	1622304	4	• WASHER, LOCK M4
— 6	1622318	4	• WASHER, FLAT M4
— 7	6245886	1	• MAINTENANCE PANEL CARD
— 8	6246132	1	• CIRCUIT BREAKER, 2 POLE
— 9	1621172	4	• SCREW, PAN HD M3 X 10 LG
— 10	1621170	2	• SCREW, PAN HD M3 X 6 LG
— 11	1622316	6	• WASHER, LOCK M3
— 12	1622302	6	• WASHER, FLAT M3
— 13	6245867	1	• SWITCH, ROTARY (TEST)
— 14	6246675	1	• SWITCH, SPDT (IPL)
— 15	6246087	1	• PLATE, COMPONENT
— 16	1106027	2	• CUP, PUSH-ON
— 17	6245997	1	• BEZEL, POWER SWITCH
— 18	6246679	5	• CABLE MOUNT – SELF ADHESIVE
— 19	AS REQ'D		• CABLE TIE, NYLON
— 20	6246680	4	• CLIP, FLAT WIRE
— 21	6246330	1	• TERMINATOR, SERIAL INTERFACE
— 22	6245989	1	• DRIVE, FLOPPY DISK (MDL 1 ONLY)
— 22	6246874	1	• DRIVE, FLOPPY DISK (MDL 1A,2,and RT PC Attach.)
— 23	1621185	2	• SCREW, PAN HD M3.5 X 16 (MDL 1 ONLY)
— 23	1339716	2	• SCREW, M3 X 8 LG (MDL 1A,2,and RT PC Attach.)
— 24	1622317	2	• WASHER, LOCK M3.5 (MDL 1 ONLY)
— 25	1622303	2	• WASHER, FLAT M3.5 (MDL 1 ONLY)
— 26	6246881	1	• SUPPORT BRACKET DISK DRIVE (MDL 1A,2,and RT PC Attach.)
— 28	6245975	1	• FRONT PANEL (MDL 1 ONLY)
— 28	6246880	1	• FRONT PANEL (MDL 1A,2,and RT PC Attach.)
			OVERLAYS—LANGUAGE SENSITIVE, MUST BE FACTORY ORDERED
— 29	1621191	4	• SCREW, PAN HD M4 X 10 LG
— 30	1622304	4	• WASHER, LOCK M4
— 31	1622318	4	• WASHER, FLAT M4
— 32	6246250	1	• COVER, CARD CAGE AND MTG HDWR
— 33	6246683	1	• NUT, KNURL—3270 GND (MDL 1 ONLY)
— 70	6246873	1	• GND STRAP, DISK DRIVE
— 71	8529154	1	• DISK DRIVE BELT (MDL 1 ONLY)
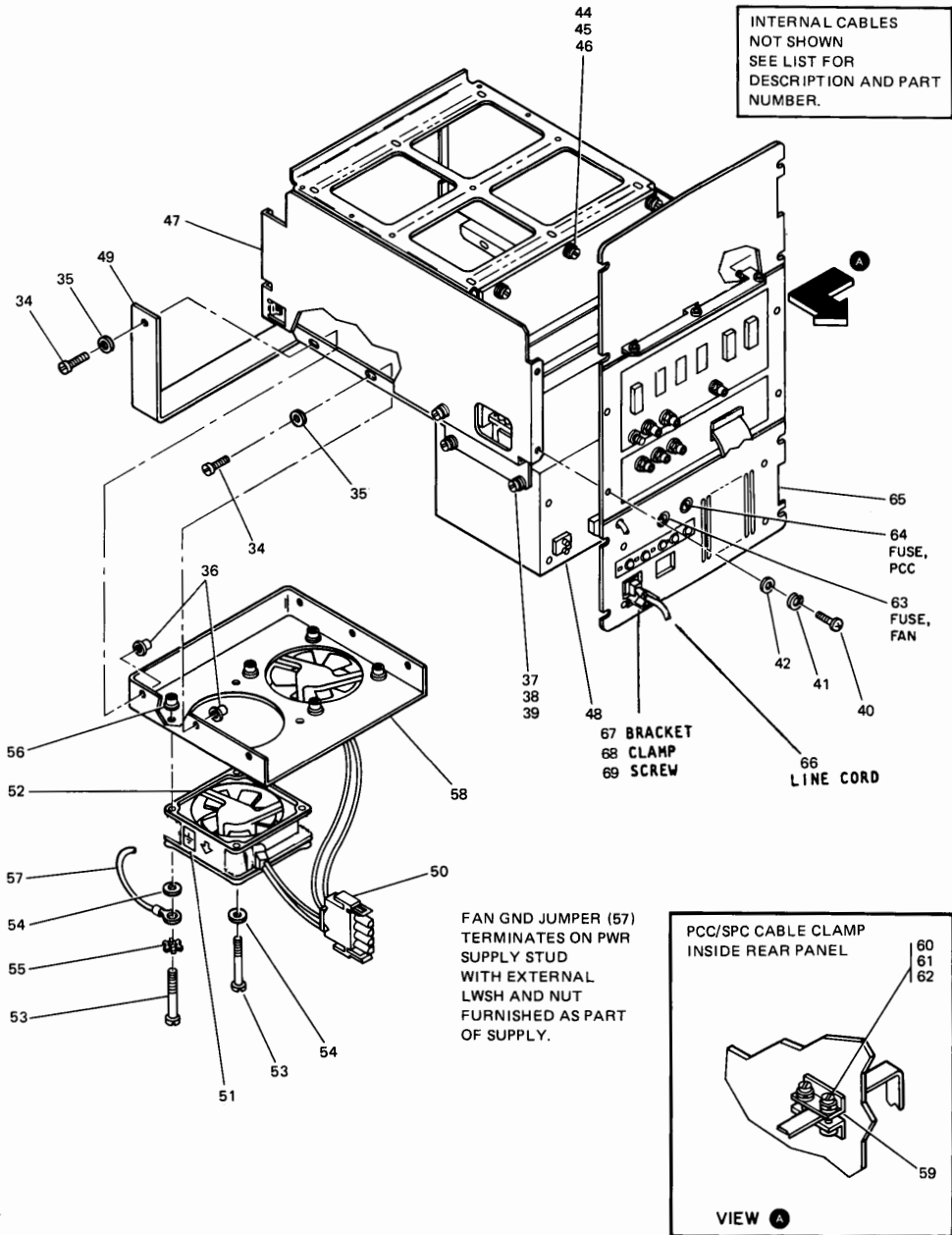
INTERNAL CABLES
NOT SHOWN
SEE LIST FOR
DESCRIPTION AND PART
NUMBER.

44
45
46

47

49
35
34

35

34

36

37
38
39

48

56

52

58

57

54

55

53

50

51

53

54

65

64
FUSE,
PCC

63
FUSE,
FAN

42

41

40

67 **BRACKET**
68 **CLAMP**
69 **SCREW**

66
LINE CORD

FAN GND JUMPER (57)
TERMINATES ON PWR
SUPPLY STUD
WITH EXTERNAL
LWSH AND NUT
FURNISHED AS PART
OF SUPPLY.

PCC/SPC CABLE CLAMP
INSIDE REAR PANEL

60
61
62

59

VIEW Ⓐ

Figure 8-2. Chassis Assembly (Sheet 2 of 2, Index Nos. 34-69)

FIGURE-INDEX NUMBER	PART NUMBER	UNITS PER ASM.	DESCRIPTION 1 2 3 4
8-2— 34	1621202	6	• SCREW, PAN HD M4 X 18 LG
— 35	1622304	6	• WASHER, FLAT M4
— 36	6246678	6	• INSERT, METRIC M4
— 37	1621191	4	• SCREW, PAN HD M4 X 10 LG
— 38	1622318	4	• WASHER, LOCK M4
— 39	1622304	4	• WASHER, FLAT M4
— 40	1621191	8	• SCREW, PAN HD M4 X 10 LG
— 41	1622318	8	• WASHER, LOCK M4
— 42	1622304	8	• WASHER, FLAT M4
— 43			
— 44	1621191	6	• SCREW, PAN HD M4 X 10 LG
— 45	1622318	6	• WASHER, LOCK M4
— 46	1622304	6	• WASHER, FLAT M4
— 47	6245986	1	• CARD CAGE
— 48	6246240	1	• POWER SUPPLY
— 49	6246082	1	• BRACKET, SUPPORT CHASSIS
— 50	6246026	1	• CABLE ASM — FAN
— 51	6246084	1	• LABEL— GND
— 52	6246324	2	• FAN
— 53	1621151	8	• SCREW, PAN HD M3 X 60 LG
— 54	1622302	8	• WASHER, FLAT M3
— 55	1622344	2	• WASHER, LOCK EXT TOOTH M3
— 56	6246677	8	• INSERT, METRIC M3
— 57	6246021	2	• JUMPER
— 58	6245985	1	• PLENUM, FAN
— 59	6246124	1	• CLAMP, PCC CABLE (MDL 1 ONLY)
— 59	6246857	1	• CLAMP, PCC CABLE (MDL 1A,2,and RT PC Attach.)
— 60	1621193	2	• SCREW, PAN HD M4 X 16 LG
— 61	1622318	2	• WASHER, LOCK M4
— 62	1622304	2	• WASHER, FLAT M4
— 63	855253	1	• FUSE, FAN, TYPE 3 AG
— 64	855252	1	• FUSE, PCC/DISK, TYPE 3 AG
— 65	6246242	1	• PANEL, REAR — W/O OVERLAYS
			INTERNAL CABLES
	6245950	1	• CABLE ASM — SERIAL INTF
	6246003	1	• CABLE ASM — VIDEO PIXEL MEM
	6246009	1	• CABLE ASM — AP/MAINT PANEL
	6246010	1	• CABLE ASM — PWR ON/OFF
	6246011	1	• CABLE ASM — DISK DRIVE/SERIAL INTF (MDL 1 ONLY)
	6246875	1	• CABLE ASM — DISK DRIVE/SERIAL INTF (MDL 1A,2,and RT PC Attach.)
	6246001	1	• CABLE ASM — PERIPHERAL CONN ASM (MDL 1 ONLY)
	6246850	1	• CABLE ASM — PERIPHERAL CONN ASM (MDL 1A,2,and RT PC Attach.)
	6246006	1	• CABLE ASM — 3270 (MDL 1 ONLY)
	6246004	2	• CABLE ASM — RS-232 PORTS
	6246626	1	• CABLE ASM — V.35 TP
			EXTERNAL CABLES
	6246225	1	• CABLE ASM — 3270/MODEM (MDL 1 ONLY)
	6246226	1	• CABLE ASM — 3270/MODEM METRIC (MDL 1 ONLY)
	6246690	1	• CABLE ASM — TP ATTACH
	6246241	1	• CABLE ASM — VIDEO

INTERNAL CABLES
NOT SHOWN
SEE LIST FOR
DESCRIPTION AND PART
NUMBER.

65

64
FUSE,
PCC

63
FUSE,
FAN

67 BRACKET
68 CLAMP
69 SCREW

66
LINE CORD

FAN GND JUMPER (57)
TERMINATES ON PWR
SUPPLY STUD
WITH EXTERNAL
LWSH AND NUT
FURNISHED AS PART
OF SUPPLY.

PCC/SPC CABLE CLAMP
INSIDE REAR PANEL

60
61
62

59

VIEW **A**

Figure 8-2. Chassis Assembly (Sheet 2 of 2, Index Nos. 34-69)

FIGURE INDEX NUMBER	PART NUMBER	UNITS PER ASM.	DESCRIPTION 1 2 3 4
			LINE CORDS
8-2 — 66	6246264	1	• LINE CORD — LOW VOLTAGE 8 FT U.S.
— 66	6246265	1	• LINE CORD — LOW VOTAGE 6 FT U.S.
— 66	6246270	1	• LINE CORD — E/ME/A
— 66	6246271	1	• LINE CORD — DENMARK
— 66	6246272	1	• LINE CORD — S. AFRICA
— 66	6246273	1	• LINE CORD — U. K.
— 66	6246274	1	• LINE CORD — SWITZERLAND
— 66	6246275	1	• LINE CORD — ITALY
— 66	6246276	1	• LINE CORD — ISRAEL
— 66	6246617	1	• LINE CORD — ARGENTINA
— 66	6246618	1	• LINE CORD — AUSTRALIA/NEW ZEALAND
— 67	6246616	1	• BRACKET
— 68	6246681	1	• CLAMP
— 69	1621309	1	• SCREW
			KITS
	6246300		EXP PIXEL MEMORY CARD MTG HWRE (MECH PARTS ONLY — NO CARDS INCLUDED)
	6246329		3270 CBL MTG HWRE (MECH PARTS ONLY — NO CARDS OR CABLES INCLUDED)
	6246795		POWER SUPPLY VOLTAGE CONFIGURATION PLUG
			*FOR REPLACEMENT USE ONLY; NOT TO BE USED FOR CONVERSIONS.
			TOOLS
	4173225		RS-232 TEST WRAP CONNECTOR
	6246728		TP TEST WRAP CONNECTOR
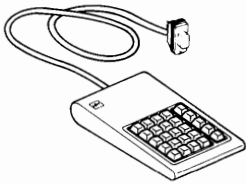
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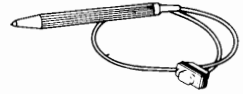
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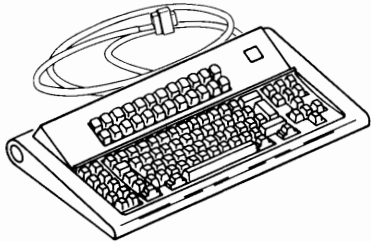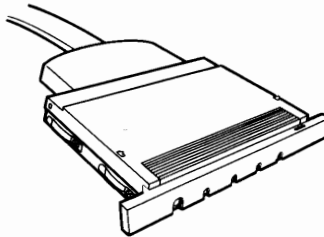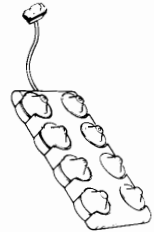
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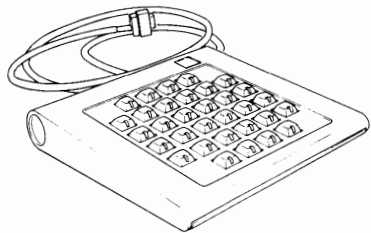
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FUNCTION KEYBOARD
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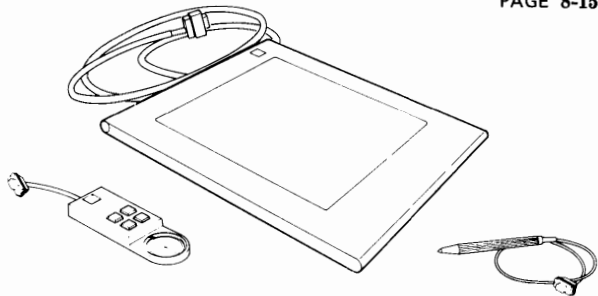
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WITH CURSOR/STYLUS
PAGE 8-15

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LIST 3. PERIPHERAL DEVICES

FIGURE-INDEX NUMBER	PART NUMBER	UNITS PER ASM.	DESCRIPTION 1 2 3 4
			STANDARD KEYBOARD ASSEMBLIES (MDL 1 ONLY)
	6248412	REF	KEYBOARD ASM — U. S. (ENGLISH)
	6248414	REF	KEYBOARD ASM — JAPAN (KATAKANA)
	6248416	REF	KEYBOARD ASM — GERMANY
	6248418	REF	KEYBOARD ASM — FRANCE (QWERTY)
	6248420	REF	KEYBOARD ASM — ITALY
	6248422	REF	KEYBOARD ASM — UNITED KINGDOM
	6248431	REF	KEYBOARD ASM — SWEDEN
			APL STYLE KEYBOARD ASSEMBLIES (MDL 1 ONLY)
	6248413	REF	KEYBOARD ASM — U. S. (ENGLISH)
	6248415	REF	KEYBOARD ASM — JAPAN (KATAKANA)
	6248417	REF	KEYBOARD ASM — GERMANY
	6248419	REF	KEYBOARD ASM — FRANCE (QWERTY)
	6248421	REF	KEYBOARD ASM — ITALY
	6248423	REF	KEYBOARD ASM — UNITED KINGDOM
	6248432	REF	KEYBOARD ASM — SWEDEN
	6246249	REF	KEYBOARD CABLE — COMMON
			STANDARD KEYBOARD ASSEMBLIES (MDL 1A, 2, and RT PC Attachment)
	6487683	REF	KEYBOARD ASM — U. S. (ENGLISH)
	60X5726	REF	KEYBOARD ASM — JAPAN (KATAKANA)
	59X1088	REF	KEYBOARD ASM — GERMANY
	6487686	REF	KEYBOARD ASM — FRANCE
	6487687	REF	KEYBOARD ASM — ITALY
	6487685	REF	KEYBOARD ASM — UNITED KINGDOM
	59X1089	REF	KEYBOARD ASM — SWEDEN
			NUMERIC KEYPAD ASSEMBLIES (MDL 1 ONLY)
	6018100	REF	KEYPAD ASM — U. S. (ENGLISH)
	6018102	REF	KEYPAD ASM — GERMANY/AUSTRIA
	6018103	REF	KEYPAD ASM — ITALY
	6018104	REF	KEYPAD ASM — SWEDEN
	6018105	REF	KEYPAD ASM — JAPAN, U. K., ETC.
	6018106	REF	KEYPAD ASM — FRENCH
			PERIPHERALS
	6246039	REF	PERIPHERAL CONN ASM (5085-1 ONLY)
	6246833	REF	PERIPHERAL CONN ASM
	6248425	REF	LIGHTED PGM FUNC KYBD (5085-1 ONLY)
	6246799	REF	LIGHTED PGM FUNC KYBD
	6248436	REF	DIALS
	6248426	REF	5083-1 TABLET (MUST BE ORDERED AS MACHINE TYPE)
	6248514	REF	5083-11 TABLET (MUST BE ORDERED AS MACHINE TYPE)
	6248513	REF	5083-12 TABLET (MUST BE ORDERED AS MACHINE TYPE)
	6248427	REF	STYLUS (FOR USE WITH 5083-1 ONLY)
	6248428	REF	CURSOR (FOR USE WITH 5083-1 ONLY)
	6248522	REF	STYLUS
	6248523	REF	CURSOR
	6248429	REF	LIGHTPEN (RPQ)
	6248612	REF	CURSOR STICK (RPQ)

Appendix A. Safety Inspection Guide

A.1 Introduction

This inspection guide helps trained service personnel to identify potentially unsafe conditions on an IBM 5085 Graphics Processor. Each 5085 is manufactured with required safety items installed, to protect the owner, operators, and service personnel from injury. These items are addressed under A.3, "Safety Inspection Checklist" on page A-2. Use good judgment in order to identify any other potentially dangerous conditions.

Start the checklist items without turning the 5085 power on, and follow the steps in sequence. If an unsafe condition is apparent, determine the seriousness of the hazard and whether you can continue without first correcting the problem.

Consider the following conditions and the safety hazards they could present:

Electrical areas *Especially primary power.* For example, a hot frame can cause serious or fatal electrical shock.

Mechanical areas Hazards, such as missing covers and hardware with sharp edges, can cause bodily injury.

Chemicals Cleaning solutions and solvents, other than those specified by IBM, can be hazardous.

A.2 Preparation

Complete the "Electrical Safety Training Course for IBM Customer Engineers" (self-study course 77170 or current level). This is required before the steps under A.3, "Safety Inspection Checklist" on page A-2 can be followed.

If a 5085 contains RPQs or special features that are not described in this checklist, for additional information refer to the installation instructions for the RPQ or feature. Otherwise, use this guide and good judgment to maintain a safe 5085.

Begin the checklist with the 5085 power turned off and the electrical power disconnected by removing the power cord.

A.2.1 Reference Material

- Customer Engineering Memorandums (CEMs), which contain Engineering Change Announcements (ECAs) and Service Aids (SAs) for this machine type.

- *Safety* section in the front material of this manual.

- *IBM 5080 Graphics System Site Planning (GA23-0129).*

- *Electrical Safety for IBM Customer Engineers (S229-8124).*

A.3 Safety Inspection Checklist

Perform all of the following steps in sequence and check off each item after it has been completed:

1.__   Be sure the 5085 power is turned off and the main power cord is disconnected.

2.__   Is the power cord frayed or damaged?

3.__   Does the power cord have a ground pin? If the pin is missing, replace the power cord.

4.__   Are door hinges secure to the door and to the cabinet?

5.__   Is the door latching operative?

A.3.1 Inside the 5085

6.__   Remove the chassis assembly from the 5081 cabinet.

7.__   If there are any non-IBM alterations, has the *R009, Non-IBM Alteration/Attachment Survey* been completed?

8.__   Are there any broken or loose parts or assemblies, such as:

   __Fans

   __Power supply

   __Cable clamps

   __Chassis support leg.

9.__   Check for any loose, frayed, or broken wires.

10.__   Verify that all labels are present, as shown in Figures 1 and 2.

11.__   Check for the presence of the configuration plug and its firm attachment. See Figure A-1 on page A-4.

12.___   Check to ensure that the wires used on all open back type power connectors are bundled together with a tie, close to the connector.

13.___   Verify that the logic fan ground wire (green and yellow) is installed and properly attached to the fan and sheet metal chassis (frame).

14.___   Ensure that finger guards are present on the logic fan and the power supply fan.

15.___   Ensure that the proper fuses are installed in the rear access panel. See Figure A-2 on page A-5. The ratings are on the panel.

16.___   The voltage appearing on the power rating plate must be the same as the voltage appearing on *MACHINE WIRED FOR* label. See Figure A-1 on page A-4.

17.___   With a CE meter, check the continuity between the ground pin on the power cord plug and the 5085 frame. The reading should be less than 0.1 ohms.

A.3.2 Prepare 5085 for Customer Use

18.___   Re-install the chassis assembly to the 5085 cabinet. Close the covers and doors and latch them securely.

19.___   Plug the power cord into the outlet.

20.___   Power up the 5085 and ensure that the power sequence is complete.
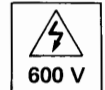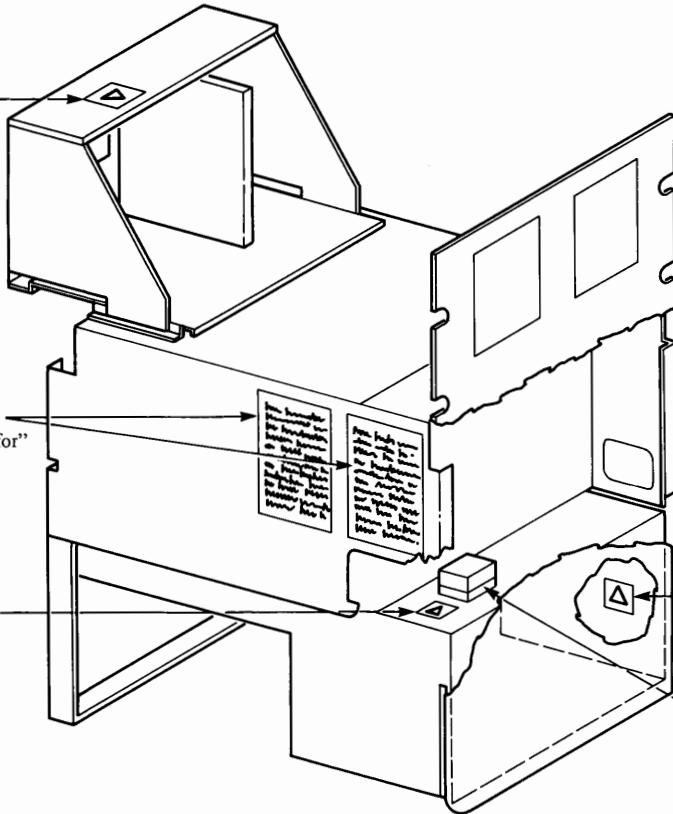
Figure A-1. 5085 Safety Labels - Frame
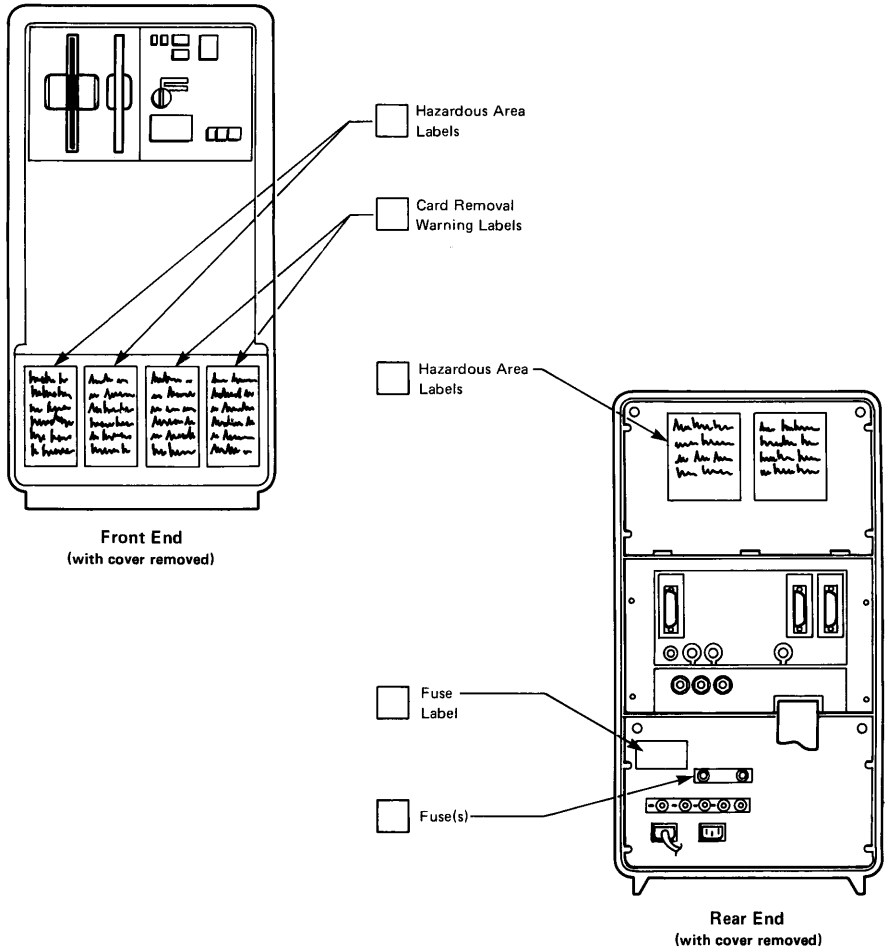
Figure A-2. 5085 Safety Labels - Front and Rear

Glossary

Glossary terms and abbreviations are defined as they are used in this book.

ANK. Alphanumeric keyboard

AP. Attachment Processor

APL. A Programming Language

APL feature. Keyboard with APL keytops

Autosizer. A program that determines the devices/functions in a subsystem.

Backplane. The board that the logic cards plug into.

BATS. Basic assurance tests

CE. Customer engineer

Checksum. A method of verifying memory by adding all locations and comparing to a predetermined total.

CHIM. Channel Interface Monitor device

CPTRAN. A program module

CRC. Cyclic redundancy check - a data transmission checking scheme where serial data is totaled and compared to a predetermed value.

CRT. Cathode ray tube

CursorPad. Another name for a IBM 5083 Tablet.

Cursor Stick. A device that performs a function similar to the IBM 5083 Tablet.

Deserialized. Transposing data from serial to parallel format.

DLB. Display list buffer - commands that generate data for the pixel memory.

DP. Display Processor

EBCDIC. A data representation convention

EC. Engineering change

EIA. Electronic Industries Association

ELOG. A program module

EPM. Expansion Pixel Memory

EPROM. Eraseable programmmable read only memory

ESM. Expansion System Memory

FDC. File Diskette Controller

FRU. Field replaceable unit

GS. Graphic System

GSPOS. A programming command

ICA. Integrated communications adapter

IPL. Initial program load

Jittering. Display appears to be moving slightly, either horizontally or vertically.

Kanji. A Japanese written language

Katakana. A Japanese written language

LED. Light emitting diode

Local host. A host computer system in the immediate area of the workstation, either in addition to or substituting for the 5088/3258 connected host.

LP. Light Pen

LPF. Lighted program function

LPFK. Lighted program function keyboard

LRT. A program module table

Megabit. 1,000,000 bits

MIM.   Maintenance information manual

MPU.   Multiprocessing Unit

NTT.   Nippon Telephone & Telegraph

NRZ.   Non-return to zero - data format convention

NRZI.   Non return to zero inverted - data format convention

Op-code.   Operation code - a program command

Parallel Keyboard.   Parallel interface A/N keyboard as identified by the lack of three LED indicators in the upper rightmost corner.

PCA.   Peripheral connector assembly

PCC.   Peripheral connector card

PF.   Programmed function

Pixel.   The smallest addressable "spot" on a CRT display.

PM.   Pixel memory

POR.   Power on reset

RAM.   Random Access Memory

Raster.   The scanning lines of some CRT displays.

ROM.   Read-only memory

Scalar.   Linear data

Serial Keyboard.   Serial interface A/N keyboard as identified by the presence of three LED

indicators in the upper rightmost corner. This keyboard is switchable to a local host.

SDLC.   Synchronous data link control - a data transmission convention

SI.   Serial Interface

SNRM.   Set normal response mode - a data transmission command

SVR.   A program module

Sync.   Synchronize

T/C.   Transformation/Clipping

Tearing.   Either all or portions of the display appears to be shifting horizontally.

TP.   Teleprocessing - usually refers to data transmission over telephone facilities.

Tracebit.   A program module

TTY.   Teletype

Typematic.   A function that repeats a keyboard entry when the key is held down for a longer than normal time.

UK.   United Kingdom - Great Britian

Unstable.   Display appears to be out of syncronization.

VC.   Video Controller

VPM.   Video Pixel Memory

Washed out.   Display appears faded or lacks contrast.

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| Numerics |

IBM 5080 Graphic System
5085 Graphics Processor
Maintenance Information

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