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OFFICE SYSTEMS DIVISION

8000 SERIES DISPLAY/KEYBOARD SERVICE MANUAL
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CHAPTER 1 GENERAL DATA

8000 SERIES DISPLAY/KEYBOARD SERVICE MANUAL

1.1 HOW TO USE THIS MANUAL

This service manual provides information necessary for maintenance of the Large Format Display, the Keyboard/Mouse, and the Server Terminal.

The 8000 Series Reference Manual provides the complete instructions for use of 8000 Series service manuals.

1.2 MODEL CONFIGURATIONS

Various models of 8000 Series products are available. The 8000 Series Reference Manual provides product codes, model configurations, and catalog number information, as well as related explanations.

1.3 CALL MANAGEMENT

The Call Management procedures are to be performed during every service call. The complete Call Management procedures are provided in the 8000 Series Reference Manual.

1.4 CHANGE TAG INDEX

Refer to the 8000 Series Reference Manual for instructions about use of matrix tags.

The Large Format Display has one matrix tag. The matrix tag is located on the rear of the display base assembly. Any important modification of the Large Format Display, or related cables and connectors, must be indicated on the Large Format Display matrix tag.

The Keyboard/Mouse has one matrix tag. The matrix tag is located on the bottom of the keyboard cover. Any important modification of the keyboard, mouse, or related cables and connectors, must be indicated on the Keyboard/Mouse matrix tag.

CHANGE TAG INDEX FOR LARGE FORMAT DISPLAY		
Tag No.	Description	Serial No. Cut-in
1 M	Tag 1 provides common chassis and logic ground to improve component reliability. Related part is the Monitor 128S80045 for the Large Format Display.	D35-013351
2	CANCELLED.	131-
3 Class 3	RX only. Tag 3 eliminates interference between inner shields and covers and improves effectiveness of shields. Related parts are Lower Shield 35S80432, Upper Shield 35S80434, and Brightness Pot Harness Assembly 152S81367.	131-
50	RX only. Tag 50 provides keycaps with matte finish, to retrofit glossy keys currently in keycap kits. Related part is the Keycap Retrofit Kit 73S80551.	131-
225 Class 1	RX only. Tag 225 adds upper and lower shields inside the display and replaces the Display Cable with a shielded cable, in accordance with EEC/VDE requirements. Related parts are the Upper Shield 35S80412, Lower Shield 35S21150, and Display Cable 152S24581.	131-

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CHAPTER 2   INSTALLATION DATA

8000 SERIES DISPLAY/KEYBOARD SERVICE MANUAL

REFER TO 8000 SERIES REFERENCE MANUAL

CHAPTER 3 REPAIR DATA

8000 SERIES DISPLAY/KEYBOARD SERVICE MANUAL

3.1	**DISPLAY COVERS**
	REF PL 4.1

3.1.1	**DISPLAY REAR COVER**
	REF PL 4.1

REMOVAL
1. SWITCH OFF PROCESSOR POWER.
2. REMOVE THE DISPLAY REAR COVER.
   a. Remove acorn nut from the lower rear of cover.
   b. Loosen the two screws securing the top cover to the display.
   c. Remove the display rear cover.
   d. Place rear cover on protected work surface.
   e. If new cover is being installed, remove counterweight and the two screens from inside surface of old cover.

REPLACEMENT
1. REPLACE THE DISPLAY REAR COVER.
   a. Perform removal procedure in reverse order.

3.1.2	**FCC/RX ONLY.** UPPER SHIELD
	REF PL 4.1

REMOVAL
1. SWITCH OFF SYSTEM POWER.
2. REMOVE REAR COVER (3.1.1).
3. REMOVE UPPER SHIELD.
   a. Remove the seven screws securing the upper shield to the lower shield.
   b. Remove upper shield.

REPLACEMENT
1. REPLACE UPPER SHIELD.
   a. Firmly seat the bottom edge of the upper shield into the lower shield.
   b. Rock upper shield forward and down, and gently press shielding gasket into top of the monitor frame.

3.1.3	**FCC/RX ONLY.** LOWER SHIELD
	REF PL 4.1

REMOVAL
1. SWITCH OFF SYSTEM POWER.
2. REMOVE REAR COVER (3.1.1).
3. REMOVE UPPER SHIELD (3.1.2).
4. REMOVE BRIGHTNESS POT HARNESS ASSEMBLY (3.2).

5.   REMOVE THE LOWER SHIELD.
   a.   Disconnect cable connector J1 from the display PWA.

CAUTION

Clear the work surface of tools and parts. Place cloth on work surface to prevent damage to face of the display.

   b.   Carefully place face of the display down on protected work surface.
   c.   Remove screw securing the cable clamp to bottom of base.
   d.   Remove the four screws securing the base to the display frame.
   e.   Move base down the cable, and place it in a safe area.
   f.   Carefully pull harness through hole in the monitor frame.
6.   REMOVE THE DISPLAY CABLE FROM SHIELD (3.1.4).

REPLACEMENT
1   REPLACE THE LOWER SHIELD.
   a.   Perform removal procedure in reverse order.

3.1.4   FCC/RX ONLY. DISPLAY CABLE
REF PL 4.1

REMOVAL
1.   REMOVE THE LOWER SHIELD (3.1.3).
2.   REMOVE THE DISPLAY CABLE.
   a.   Remove ground wire screw from cable plate.
   b.   Remove the four screws securing the cable plate to bottom of the lower shield.
   c.   Carefully feed cable through hole in the lower shield and place shield to one side.
   d.   Pull cable through bottom of base.
   e.   Disconnect cable connector P2 from J2 on processor connector panel.

REPLACEMENT
1.   REPLACE THE DISPLAY CABLE.
   a.   Perform removal procedure in reverse order.

3.1.5   FRONT BEZEL
REF PL 4.1

REMOVAL
1.   REMOVE THE DISPLAY REAR COVER (3.1.1).

CAUTION
Clear the work surface of tools and parts. Place cloth on work surface to prevent damage to bezel.

2. REMOVE FRONT BEZEL.
   a. Carefully place face of the display down on protected work surface.
   b. Remove the four screws securing the front bezel to the monitor frame.
   c. Remove front bezel.

REPLACEMENT
1. REPLACE FRONT BEZEL.
   a. Perform removal procedure in reverse order.

3.2	BRIGHTNESS POT HARNESS ASSEMBLY
	REF PL 4.1

REMOVAL
1. SWITCH OFF PROCESSOR POWER.
2. REMOVE COVERS (3.1).
3. REMOVE BRIGHTNESS POT HARNESS ASSEMBLY.
   a. Disconnect brightness pot harness connector from the display cable.
   b. Remove hardware securing the brightness pot support.
   c. Remove brightness pot harness assembly.

d. If new brightness pot is being installed, remove knob from pot, and install knob on new pot.

REPLACEMENT

NOTE: Brightness pot must be installed with double terminals toward front of the display.

1. REPLACE BRIGHTNESS POT HARNESS ASSEMBLY.
   a. Perform removal procedure in reverse order.

3.3	MONITOR
	REF PL 4.1

REMOVAL
1. REMOVE BRIGHTNESS POT HARNESS ASSEMBLY (3.2).

CAUTION
Clear the work surface of tools and parts. Place cloth on work surface to prevent damage to bezel.

2. REMOVE THE MONITOR.
   a. FCC/RX Only. Remove the lower shield (3.1.3), then proceed to step 2.i.
   b. Carefully place face of the display down on protected work surface.
   c. Disconnect cable connector J1 from the display PWA.

d. Remove screw securing the cable clamp to bottom of base.
e. Remove the four screws securing the base to the monitor frame.
f. Move base down the cable, and place it in a safe area.
g. Remove hardware securing the cable to bottom of the display.
h. Carefully pull harness through hole in the monitor frame.
i. Remove the four screws securing the bezel to the monitor.

CAUTION
Carefully support the monitor during removal, and place it on its face in a safe area to prevent damage.

j. Lift the monitor from front bezel.

REPLACEMENT
1. REPLACE THE MONITOR.
   a. Perform removal procedure in reverse order.
2. PERFORM ADJUSTMENT PROCEDURE.

ADJUSTMENT (FIGURES 3-1 TO 3-7, INCLUSIVE)

Purpose
The purpose of this adjustment is to obtain an image of the correct size and focus in center of the dispay.

Procedure

CAUTION
DO NOT adjust any of the controls other than those included in this procedure.

1. SWITCH OFF PROCESSOR POWER.
2. REMOVE THE COVERS (3.1).

WARNING
Be careful of high-voltage charges on CRT, yoke, and PWAs. Remove all jewelry before performing the display adjustments. When power is applied, use only one hand to make adjustments. Touching the display or processor with both hands can cause a dangerous electrical shock.

3. MARK FACE OF CRT FOR ALIGNMENT.
   a. Using a felt tip pen, mark face of the display as shown in Figure 3-1.
4. SWITCH ON SYSTEM POWER.

NOTE: Two on-line diagnostic patterns contain @ symbols. Darker pattern is called the "bold @ symbol" pattern.

5. PERFORM ON-LINE DIAGNOSTICS FOR THE LARGE FORMAT DISPLAY.
   a. Refer to 8000 Network Systems Diagnostics Handbook for instructions.
   b. Select the bold @ symbol pattern.
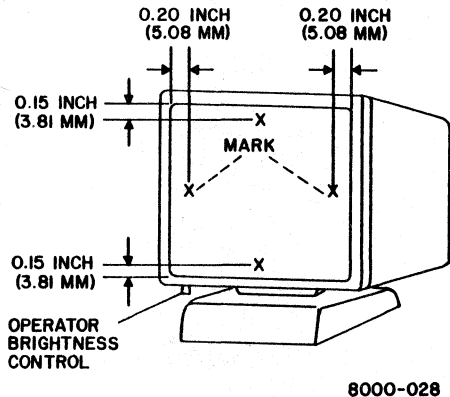
Figure 3-1 Marking Large Format Display

6. IDENTIFY THE MONITOR TYPE (<u>BALL BROS</u> OR <u>PHILIPS</u>).
   a. Locate name label on top of the monitor or on inside surface of bottom frame.

CAUTION
Prior to making the adjustments or checking the alignment, system power must be ON for a warmup time of ten minutes.

NOTE: The operator brightness control will affect size of raster and focus of characters.

7. CHECK/ADJUST BRIGHTNESS.
   a. Move the brightness control to minimum setting.
   b. Observe that the display is almost completely dark, with dim characters visible.
   c. Move the brightness control to maximum setting.
   d. Observe that the display is not too bright, characters are not badly out of focus, and retrace lines are not visible.
   e. If the checks are correct proceed to step 8.
   f. Select the correct alignment tool (600T1605), and adjust as follows:
      <u>Ball Bros Only</u>. Turn **GAIN ADJUST** pot (Figure 3-2) fully counterclockwise.
      <u>Philips Only</u>. Turn **CTRS PRESET** pot (Figure 3-3) fully counterclockwise.
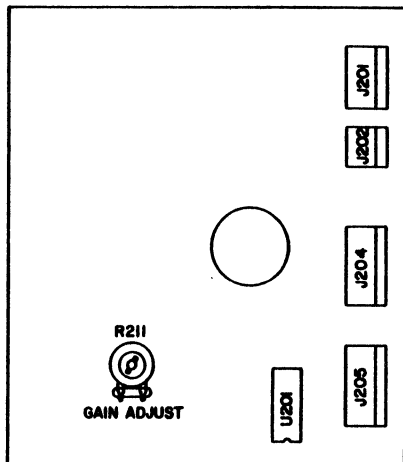
8000-029(1)

Figure 3-2 Ball Bros ELC, Digital Video
PWA Adjustment Location
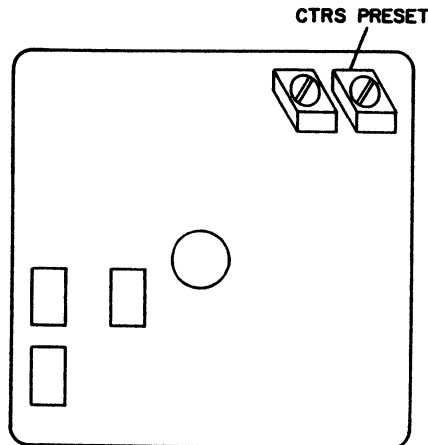
8000-260

Figure 3-3 Phillips Video PWA
Adjustment Location (Rear View)

CAUTION

It is possible to misadjust Ball Bros BRT LIM pot and cause the display to remain dark. If this occurs, switch OFF power and decrease pot adjustment. Switch ON power and continue adjustment procedure.

g. Select the correct alignment tool (600T1605), and adjust as follows:
    Ball Bros Only. Turn **BRT LIM** pot (Figure 3-4) until retrace lines are just visible.
    Philips Only. Turn **CUTOFF PRESET** pot (Figure 3-5) until retrace lines are just visible.

h. Move the brightness control to obtain minimum brightness.

i. Ball Bros Only. Turn **GAIN ADJUST** pot (Figure 3-2) until @ symbols are just visible.
    Philips Only. Turn **CTRS PRESET** pot (Figure 3-3) until @ symbols are just visible.

8. CHECK/ADJUST FOCUS.

a. Move the brightness control to desired setting.

b. Verify that all characters can be identified as @ symbols.

c. If the checks are correct, proceed to step 9.

d. Select the correct alignment tool (600T1605), and adjust pot as follows:
    Ball Bros Only. Turn **DC FOCUS** pot (Figure 3-4) for best overall quality.
    Philips Only. Turn **STATIC FOCUS** pot (Figure 3-5) for best overall quality.
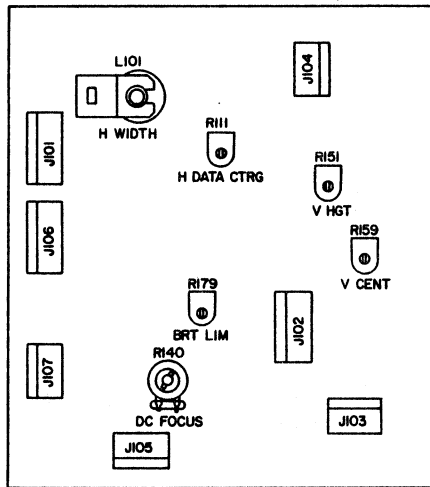
8000-030(1)

Figure 3-4 <u>Ball Bros</u> Horizontal and Vertical PWA Adjustment Locations
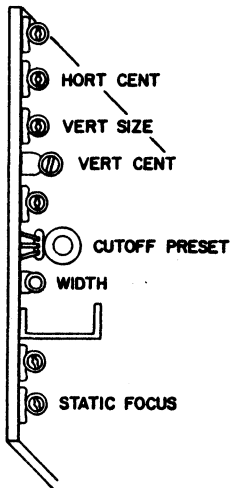
8000-259

Figure 3-5 Phillips Horizontal and Vertical PWA
Adjustment Locations

9. CHECK/ADJUST VERTICAL HEIGHT AND VERTICAL CENTER.
   a. Ensure that the brightness control is at middle setting.
   b. Select cross-hairs alignment pattern.
   c. Check the top and bottom margins of pattern for alignment within ± 0.050 inch (1.27 mm) of top and bottom marks on the display.
   d. If the checks are correct, proceed to step 10.
   e. Select the correct alignment tool (600T1605), and adjust pot as follows:
      Ball Bros Only. Turn **V CENT** and **V HGT** pots (Figure 3-4) to align pattern with top and bottom marks on the display.
      Philips Only. Turn **VERT CENT** and **VERT SIZE** pots (Figure 3-5) to align pattern with top and bottom marks on the display.

10. CHECK/ADJUST HORIZONTAL WIDTH AND HORIZONTAL CENTER.
    a. Ensure that the brightness control is at middle setting.
    b. Select cross-hairs alignment pattern.
    c. Check the left and right margins of pattern for alignment within ± 0.050 inch (1.27 mm) of marks on sides of the display.
    d. If the checks are correct, proceed to step 11.

e. Perform the following:
Ball Bros Only. Make a note of the position of H DATA CTRG pot (Figure 3-4).
Philips Only. Make a note of the position of HORT CENT pot (Figure 3-5).

f. Select the correct alignment tool (600T1605), and adjust pot as follows:
Ball Bros Only. Turn H WIDTH and H DATA CTRG pots (Figure 3-4) to align left and right margins of pattern with marks on sides of the display.
Philips Only. Turn WIDTH and HORT CENT pots (Figure 3-5) to align left and right margins of pattern with marks on sides of the display.

g. If the correct position can be obtained, proceed to step 11.

CAUTION

The Ball Bros H DATA CTRG pot or Philips HORT CENT pot may not accurately adjust horizontal center. If this occurs, continue with adjustment procedure. Centering rings located on yoke are used as an alternate adjustment in the following sub steps.

h. Adjust pot as follows:
Ball Bros Only. Adjust H DATA CTRG pot to the original position.
Philips Only. Adjust HORT CENT pot to the original position.

CRT CONNECTOR
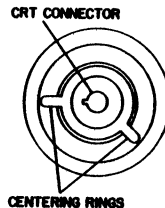
CENTERING RINGS

8000-412

Figure 3-6 Ball Bros Centering Rings

CENTERING RINGS

CRT CONNECTOR
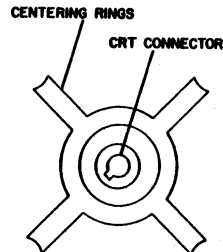
8000-281(1)

Figure 3-7 Philips Centering Rings

WARNING
In this adjustment, reaching over top of the display is required. Be careful of high-voltage charges on CRT, yoke and PWAs.

i. While watching the alignment pattern on the display, reach over top and make adjustments as follows:
Ball Bros Only. Turn H WIDTH pot, and alternately move centering rings (Figure 3-6) left and right to align side margins of pattern with marks on sides of the display.
Philips Only. Turn WIDTH pot, and alternately move centering rings (Figure 3-7) left and right to align side margins of pattern with marks on sides of the display.

11. SWITCH OFF PROCESSOR POWER.
12. REPLACE COVERS (3.1).

3.4	KEYBOARD ASSEMBLY
	REF PL 4.2

REMOVAL
1. SWITCH OFF PROCESSOR POWER.

CAUTION
Clear the work surface of tools and parts. Place cloth on work surface to prevent damage to keyboard and covers.

2. REMOVE KEYBOARD ASSEMBLY.
   a. At rear of keyboard, release the two fasteners securing the top and bottom covers together.
   b. Separate top and bottom covers.
   c. Place face of top cover down on protected work surface.
   d. Disconnect J1 connector from keyboard PWA.
   e. Loosen the two screws securing the keyboard clamps at right side of keyboard.
   f. Move clamps away from keyboard.
   g. Loosen the two nuts on left side of keyboard PWA.
   h. Remove nut securing the ground strap to mounting bracket.
   i. Remove keyboard assembly, with foil safety shield, from cover.
   j. Remove foil safety shield from keyboard assembly.

REPLACEMENT

NOTE: Ensure that the keyboard assembly is correctly placed on locating pins at left side of mounting bracket.

1. REPLACE KEYBOARD ASSEMBLY.
   a. Perform removal procedure in reverse order.

3.5   KEYBOARD CABLE ASSEMBLY
REF PL 4.2

REMOVAL
1. SWITCH OFF PROCESSOR POWER.
2. REMOVE CABLE ASSEMBLY.
   a. Disconnect mouse cable from rear of keyboard assembly.
   b. Disconnect keyboard cable from rear of processor.

CAUTION
Clear the work surface of tools and parts. Place cloth on work surface to prevent damage to keyboard and covers.

   c. At rear of keyboard, release the two fasteners securing the top and bottom covers together.
   d. Separate top and bottom covers.
   e. Place face down on protected work surface.
   f. Disconnect J1 connector from keyboard PWA.
   g. Remove nut securing the ground strap and ground wire to cable mounting bracket.
   h. Press plastic tabs on both sides of cable mounting bracket, to release the bracket from bottom cover.
   i. Remove keyboard cable assembly.

REPLACEMENT
1. REPLACE KEYBOARD CABLE ASSEMBLY.
   a. Perform removal procedure in reverse order.

3.6   SERVER TERMINAL
REF PL 4.3

REMOVAL
1. SWITCH OFF PROCESSOR POWER.
2. SWITCH OFF SERVER TERMINAL POWER.
3. REMOVE SERVER TERMINAL.
   a. Disconnect server terminal AC power cord from wall outlet.
   b. Disconnect interface cable from rear of server terminal.

NOTE: Serial number plate must be moved from failed server terminal to new server terminal.

   c. Remove serial number plate from bottom of server terminal.

REPLACEMENT
1. REMOVE SERVER TERMINAL FROM CARTON.
   a. Open terminal carton.
   b. Remove cushion from top of terminal.
   c. Remove terminal from carton.
   d. Remove polyethylene shroud from terminal.
2. REPLACE SERVER TERMINAL.
   a. Connect interface cable to MODEM connector at rear of server terminal.
   b. Remove protecting paper from pressure sensitive tape on bottom of server terminal.

Bit 8-0	6	1	-ON
Parity	5	INH	-OFF
Stop 1	4	2	-ON
Data 7	3	8	-OFF
Par - Odd	2	Even	-ON
LC EN	1	UC	-ON
	On Off		

Auto NL	7	Off	-ON
RS 232	6	CL	-OFF
HDX	5	FDX	-OFF
19200	4		-OFF
9600	3		-ON
4800	2	B	-OFF
2400	1	A	-OFF
	On Off	U	
1800	7	D	-OFF
1200	6		-OFF
600	5	R	-OFF
300	4	A	-OFF
150	3	T	-OFF
110	2	E	-OFF
50	1		-OFF
	On Off		

S4

Space	6	ADV	-ON
UC Disp	5	U/L Disp	-OFF
Disable	4	KB Lock	-OFF
Disable	3	CLR SCRN	-OFF
50Hz	2	60 Hz	-OFF
12 Line	1	24 Line	-OFF
	On Off		

Cur CTL	7		-ON
Local	6		-OFF
103	5		-ON
202	4		-OFF
Code	3		-OFF
ETX	2		-OFF
EOT	1		-OFF
	On Off		

S5

S6 **ON**

Test/Normal Mode

NOTE: Test/Normal Mode Switch S6, located on Server Terminal Motherboard (Grid Marks on Motherboard) at J17, should be in the Normal position (positioned down, toward keyboard).

Switch Orientation: ON � ▣ OFF

RX only. Switch S4-2 should be ON (50Hz).

▌ 8010-005

Figure 3-8 Server Terminal Switch Settings

c.   Apply serial number plate to pressure sensitive tape.
3.   VERIFY SWITCH SETTINGS (FIGURE 3-8).
4.   ENSURE THAT SERVER TERMINAL ON/OFF SWITCH IS IN THE OFF POSITION.
5.   CONNECT AC POWER CORD TO WALL OUTLET.
6.   SWITCH ON SERVER TERMINAL POWER.
7.   PERFORM TERMINAL ON-LINE DIAGNOSTICS TEST.
   a.   Refer to 8000 Network Systems Diagnostics Handbook for instructions.

| 3.7 | MOUSE CLEANING PROCEDURE |

1.   SWITCH OFF SYSTEM POWER.
2.   DISCONNECT MOUSE FROM KEYBOARD.

NOTE: To prevent losing the hardware inside mouse, place lint free cloth on work surface while disassembling or cleaning the mouse.

3.   DISASSEMBLE MOUSE.
   a.   Place lint free cloth on flat surface.
   b.   Place top of mouse down on cloth.
   c.   From bottom of mouse, remove the two screws securing the cover to chassis (Figure 3-9).

CAUTION
Do not allow screwdriver to slip while removing the two screws from PWA. The five brushes on commutators could receive permanent damage.

d.   Remove the two screws securing the PWA (Fgure 3-10).
e.   Remove PWA and place it to one side.
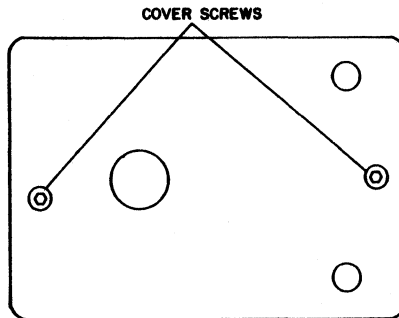
8000-222

Figure 3-9 Removing the Mouse Cover
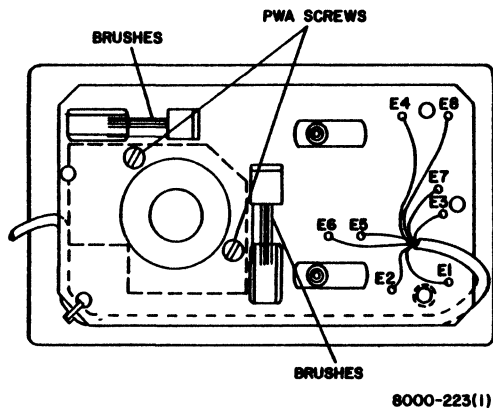
Figure 3-10 Mouse without Cover (Top View)
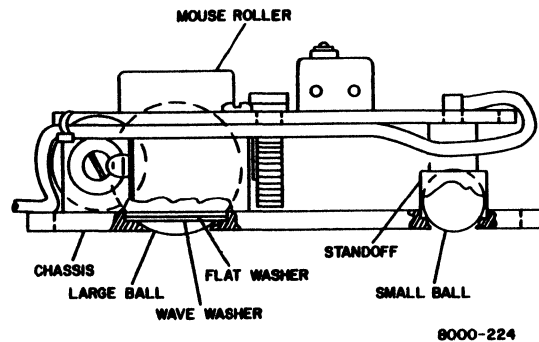
Figure 3-11 Mouse without Cover (Side View)

f. Refer to Figure 3-11 while performing the remaining sub-steps.

g. Remove the two standoffs and small balls from frame.

h. Remove mouse roller from chassis and place it to one side.

i. Remove large ball, flat washer, and wave washer from frame.

NOTE: For removal, press top of roller assembly and bearing.

4 DISASSEMBLE MOUSE ROLLER (Figure 3-12).
   a. Remove bearing assembly.
   b. Remove roller assembly and bearing.
   c. Pull spring from slot in mouse roller.

5. CLEAN THE MOUSE HARDWARE.
   a Using clean-ups or film remover and lint free cloth, clean the chassis.
   b. Clean the washers, balls, spring, roller assembly, bearing assembly, standoffs, and bearing.
   c. Clean the commutators and inside surface of mouse roller.
   d. Remove the commutators and slide the bearing/shaft assemblies out of the castings.
   e. Soak the bearing in film remover or head cleaning solution.
   f. Assemble the commutators.

6. ASSEMBLE MOUSE ROLLER.
   a. Replace bearing and roller assembly.

NOTE: Observe the curved form of spring, for the correct installation (Figure 3-12).

   b. Replace spring.
   c. Replace bearing assembly.
   d. Position the spring so that bearing assembly is located in spring opening.

7. ASSEMBLE MOUSE.
   a. Place wave washer in large hole in chassis.
   b. Place flat washer on top of wave washer.
   c. Place large ball in hole.
   d. Place mouse roller over large ball.
   e. Turn mouse roller until holes in roller align with holes in chassis.
   f. Place the two small balls in the holes in chassis.
   g. Place standoffs over small balls.
   h. Place PWA over mouse roller.
   i. Insert the two screws, but do not tighten.
   j. Ensure that standoffs are placed through holes in PWA, then tighten screws.
   k. Check the five brushes on commutators, and ensure that brush closest to mouse roller is positioned on metal portion of commutator (Figure 3-13).
   l. Replace mouse cover.

8. CONNECT MOUSE TO KEYBOARD.

9. PERFORM KEYBOARD ON-LINE DIAGNOSTICS TO VERIFY THAT MOUSE OPERATES CORRECTLY.
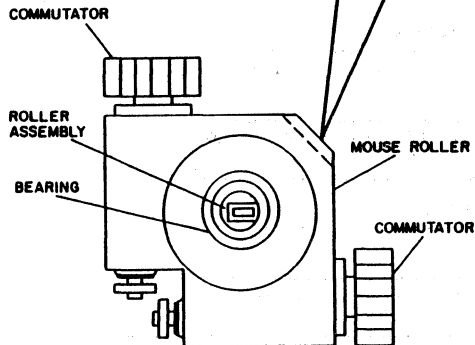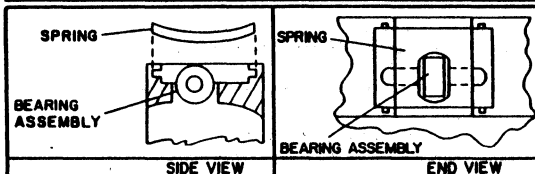
Figure 3-12 Mouse Roller

8000-405
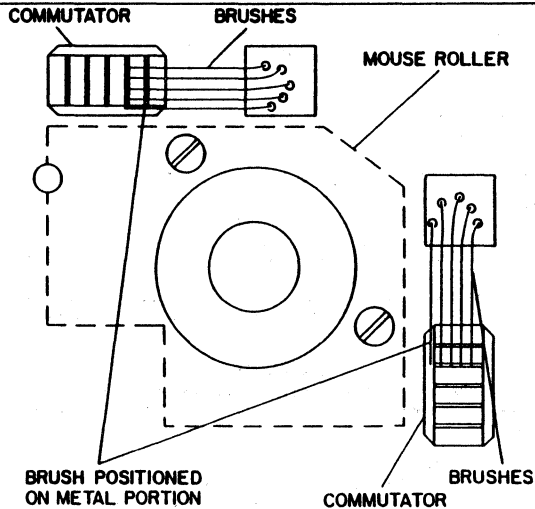
8000-414

Figure 3-13 Brush to Commutator Location

3.8   NON-GLARE LFD DISPLAY COVERS
REF PL 4.4

3.8.1   NON-GLARE LFD DISPLAY REAR COVER
REF PL 4.4

REMOVAL
1. SWITCH OFF PROCESSOR POWER
2. REMOVE THE DISPLAY REAR COVER.
   a. Remove the cover holders on the front upper part of the rear cabinet.
   b. Remove two screws on the front upper part of the rear cover and two self tapping screws on the front lower part.

CAUTION

Do not attempt to turn the display or change the angle with the rear cover removed; the front cover and/or bottom cover may be damaged.

REPLACEMENT
1. REPLACE THE DISPLAY REAR COVER.
   a. Perform removal procedure in reverse order.

3.9   NON-GLARE LFD POWER SUPPLY COVER
REF PL 4.4

REMOVAL
1. REMOVE THE DISPLAY REAR COVER. (3.8.1)
2. REMOVE THE POWER SUPPLY COVER.
   a. Remove two screws and remove power supply cover.

REPLACEMENT
1. REPLACE POWER SUPPLY COVER.
   a. Perform removal procedure in reverse order.

3.10   NON-GLARE LFD KEYBOARD
REF PL 4.5

REMOVAL
1. REPLACE THE ENTIRE KEYBOARD ASSEMBLY.

3.11   NON-GLARE LARGE FORMAT DISPLAY
REF PL 4.4

REMOVAL
1. REPLACE THE ENTIRE LARGE FORMAT DISPLAY.

> 3.12   NON-GLARE LFD IMAGE ADJUSTMENT
>   REF PL 4.4

CAUTION

Do not adjust any control pot other than those indicated in the following adjustment procedure.

1. SWITCH OFF PROCESSOR POWER.
2. REMOVE THE DISPLAY REAR COVER (3.8.1)

WARNING

Be careful of high-voltage charges on CRT, yoke and PWAs. Remove all jewelry before performing the display adjustments. When power is applied, use only one hand to make adjustments. Touching the display or processor with both hands can cause a dangerous electrical shock.

3. MARK FACE OF CRT FOR ALIGNMENT.
   a. Using a felt tip pen, mark face of the display as shown in Figure 3-1.
4. SWITCH ON PROCESSOR POWER.

NOTE: Two on-line diagnostic patterns contain @ symbols. The darker pattern is called the "bold @ symbol" pattern.

5. PERFORM ON-LINE DIAGNOSTICS FOR THE LARGE FORMAT DISPLAY.
   a. Refer to 8000 Network Systems Diagnostics Handbook for instructions.

   b. Select the bold @ symbol pattern.

CAUTION

When checking for adjustment or alignment, the display must be turned on in advance for a 10-minute warm-up period.

6. CHECK THE DISPLAY FOR BRIGHTNESS.
   a. Set the brightness control to the minimum brightness.
   b. Check to ensure that the display is almost completely dark, with no character visible.
   c. Set the brightness control to the maximum.
   d. Check that the display is not too bright, with no character badly out of focus. Retrace lines may be visible.
   e. If all is correct, proceed to step 7.
   f. With the brightness control knob set to the minimum brightness, adjust the SUB BRIGHT POT (VR69) to make the characters almost invisible. (Figure 3-14).
7. CHECK FOR FOCUS.
   a. Move the brightness control to any desired setting.
   b. Check that all characters can be identified as symbols "@".
   c. If correct, proceed to step 8.
   d. Adjust the FOCUS pot (VR 64) for the optimum condition.
8. CHECK FOR VERTICAL HEIGHT AND CENTERING.
   a. Ensure that the brightness control is at the middle setting.

MAIN PWA ASSY

L406

L403

VR32 VR31 VR33 VR41   VR69   VR64   VR47

HEIGHT   V.LIN   (H.LIN)   WIDTH   (EHT AVR)
V.HOLD   H.HOLD   SUB BRIGHT   FOCUS

K-013
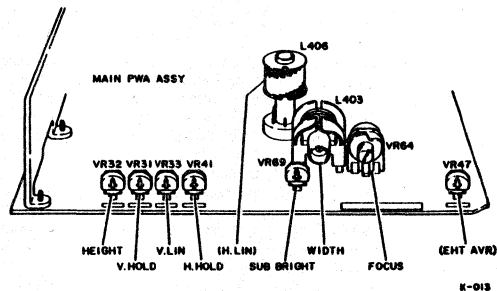
Figure 3-14 Non-Glare LFD Image Adjustment Locations

b. Press the **SPACE** bar until the cross - hairs alignment pattern appears.
c. Check that the top margin of the pattern is within 0.050 inch (1.27mm) of the mark on the display.
d. If correct, proceed to step 9.
e. Adjust **HEIGHT, V.HOLD,** and **V. LIN** adjusting pots (VR32, VR31, and VR33, respectively) to align the pattern with upper and lower marks on the CRT and for best centering.

9. CHECK FOR HORIZONTAL WIDTH AND CENTERING.
a. Ensure that brightness control is at middle setting.
b. Select the cross - hairs pattern.
c. Check that the right and left margins of the pattern are within 0.050 inch (1.27mm) of the marks on both sides of the CRT screen.
d. If correct, proceed to step 10.
e. Make a note of the positions of the following controls: H HOLD (VR41), and WIDTH (L403).
f. Adjust the image center with the **H. HOLD** adjusting pot (VR41).
g. Adjust the **WIDTH** (L403) with the core adjustment tool (600T1605) to align the right and left pattern margins with the marks on both sides of the CRT.

10. SWITCH OFF PROCESSOR POWER.
11. REPLACE THE DISPLAY REAR COVER. (3.8.1)

CHAPTER 4 PARTS IDENTIFICATION

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USO/XC ONLY

PL 4.1 LARGE FORMAT DISPLAY (NON FCC) (PAGE 1 OF 4)

ITEM	PART NO.	DESCRIPTION
1	2P82141	Cover, Rear
2	128S80044	Monitor (Note 1)
3	56S80139	Bezel, Front
4	NSC: 91P81325	Label, Logo
5	152S81212	Harness Assembly W31, Brightness Pot
6	3P80664	Knob
7	30S84054	Support, Pot
8	152S24580	Cable W30, Display
9	27P509	Nut, Acorn
A	112W40710	Screw (8-32 x 1-3/4)
B	112W36610	Sems Screw (8-32 x 3/8)
C	112W24510	Sems Screw (6-32 x 5/16)
D	419W01601	Cable Clamp
E	259W10902	Lockwasher (No. 8)

NSC: Call the Network Support Center to obtain parts.

NOTE 1: Monitor is made by either Ball Bros or Philips. Differences in physical characteristics are included in appropriate procedures.

☐ Removal and Replacement 3.1, 3.2

■ Adjustment 3.3

To retain FCC compliance, the following must be performed: When replacing parts, determine whether the machine is FCC compliant or non-compliant by checking for the FCC Compliant label. If the machine is FCC compliant, <u>ONLY</u> FCC compliant parts must be used on the machine.

8000-011(1)

Figure 4-1 Large Format Display (Page 2 of 4)

PL 4.1 LARGE FORMAT DISPLAY (FCC) (PAGE 3 OF 4)

ITEM	PART NO.	DESCRIPTION
1	2P82157	Cover, Rear
2	35S80434	Shield, Upper
3	128S80048	Monitor (Note 1)
4	- -	Label, Logo (ref only)
5	56S80139	Bezel, Front
6	- -	Support, Pot
7	35S80432	Shield, Lower
8	152S81367	Harness Assembly W31, Brightness Pot
9	3P80664	Knob
10	- -	Support, Housing
11	- -	Base, Display (ref only)
12	152S24581	Cable W30, Display
13	35P80411	Gasket, Shield (0.168 x 0.38 tabs)
	35P80415	Gasket, Shield (0.25 x 0.51 tabs)
	35P80423	Gasket, Shield (0.343 x 0.76 tabs)
14	27P509	Nut, Acorn
A	112W40710	Screw (8-32 x 1-3/4)
B	112W36610	Sems Screw (8-32 x 3/8)
C	112W24510	Sems Screw (6-32 x 5/16)
D	419W01601	Cable Clamp
E	259W10902	Lockwasher (No. 8)

NSC: Call the Network Support Center to obtain parts.

NOTE 1: Monitor is made by either Ball Bros or Philips. Differences in physical characteristics are included in appropriate procedures.
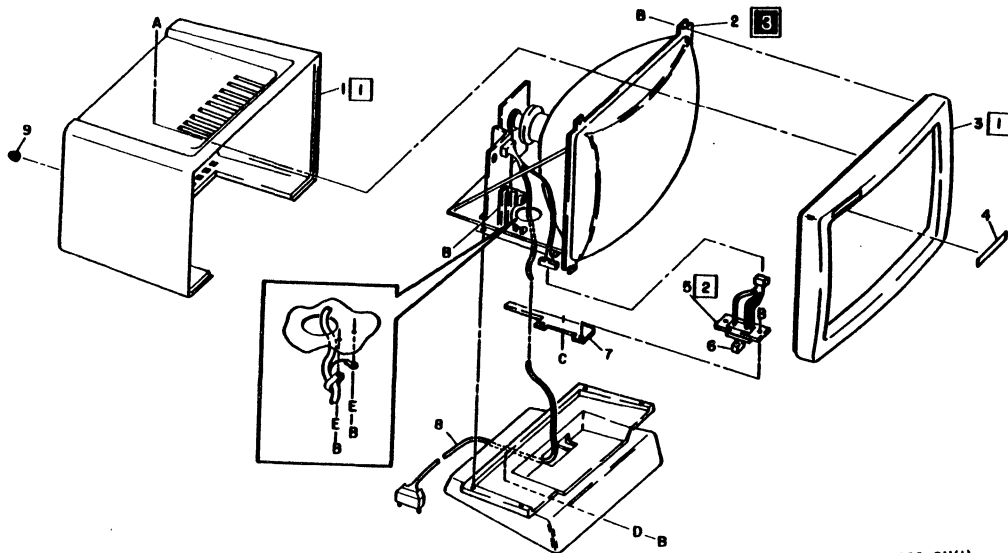
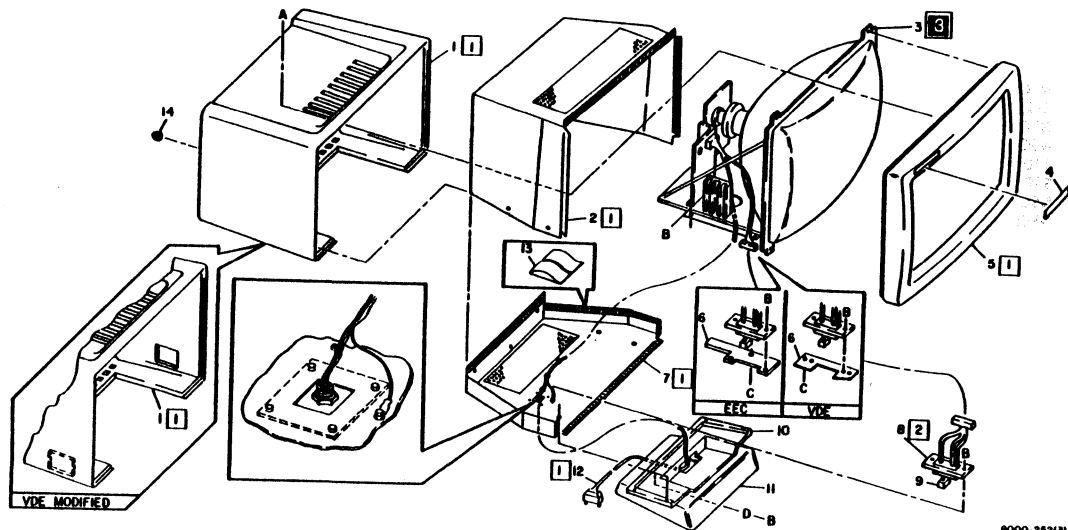☐ Removal and Replacement 3.1, 3.2

■ Adjustment 3.3

To retain FCC compliance, the following must be performed: When replacing parts, determine whether the machine is FCC compliant or non-compliant by checking for the FCC Compliant label. If the machine is FCC compliant, <u>ONLY</u> FCC compliant parts must be used on the machine.

8000-252(3)

Figure 4-2 Large Format Display (Page 4 of 4)

| PL 4.2 KEYBOARD/MOUSE |

ITEM	PART NO.	DESCRIPTION
1	NSC: 91P81375	Label, Logo
2	2P29831	Cover, Top
3	NSC: 19P80512	Clamp, Keyboard
4	NSC: 26P80441	Screw, Self-threading, No. 8
5	110S80545	Keyboard (US only)
	110S80534	**Keyboard (US/Japanese)**
6	NSC: 55S80589	Shield Assembly
7	NSC: 30S84000	Bracket, Keyboard Mounting
8	- -	Keycap Kits (RX only)
9	- -	Foot, Rubber (ref only)
10	601S60061	Kit, Connector Mounting Conversion (Note 1)
11	- -	Screw (P/O item 10)
12	- -	Flat Washer (P/O item 10)
13	- -	Lockwasher (P/O item 10)
14	- -	Flat Washer (P/O item 10)
15	- -	Nut (P/O item 10)
16	152S81091	Cable W40, Keyboard
17	NSC: 117P80625	Wire, Flat Ground
18	18S80032	Mechanical Mouse
	18S87004	Optical Mouse
19	- -	Roller, Mechanical Mouse
20	- -	PWA, Fuse (RX only)
21	19P80529	Pad, Mechanical Mouse
	18P87005	Pad, Optical Mouse
22	601S01316	Kit, Optical Mouse (Optical Mouse with two pads)
A	259W10902	Lockwasher (No. 8)
B	215W10902	Hex Nut (8-32)

NSC: Call the Network Support Center to obtain parts.

NOTE 1: Connector Mounting Conversion Kit includes three slide-lock mounting kits and three screw-lock mounting kits.

☐   Removal and Replacement 3.4, 3.5

22 { INCLUDES 18 AND 21

10 { INCLUDES 11 TO 15

20 RX ONLY

8000 010(5)
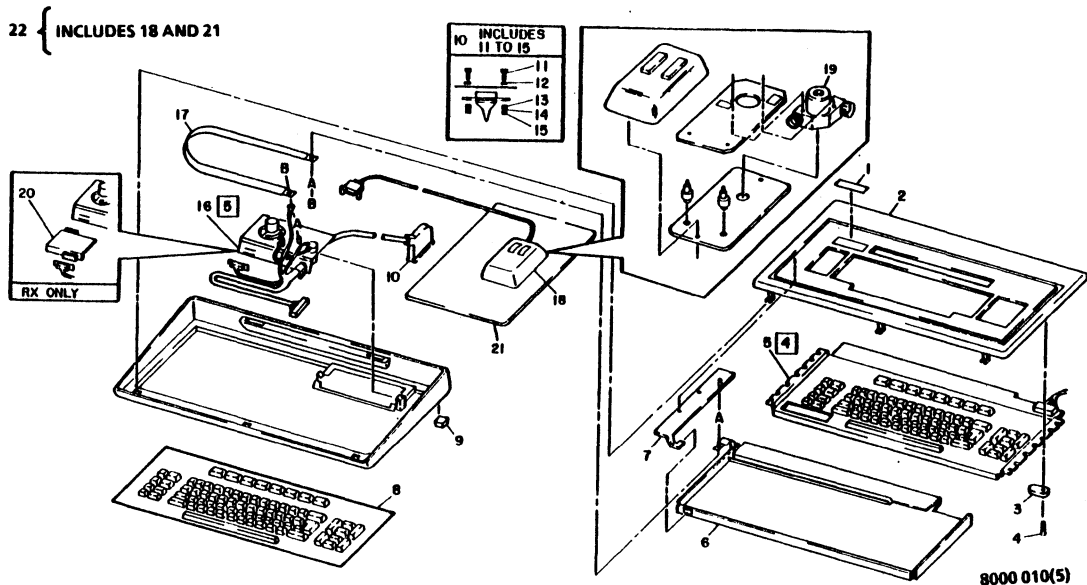
Figure 4-3 Keyboard/Mouse

| PL 4.3 SERVER TERMINAL |

ITEM	PART NO.	DESCRIPTION
1	Table 4-2	Server Terminal (Note 1)
2	152S24802	Cable W50, Terminal Interface
3	- -	Language Conversion Kits (RX only)

NOTE 1: Removal/Replacement Procedure 3.6 is **REQUIRED** for replacement of Server Terminal.

☐ Removal and Replacement 3.6

	Table 4-2 Non-FCC/FCC Compliant Parts			
Item	FCC Compliant		Non-FCC Compliant	
	Part Number	TAG	Part Number	TAG
1	123P80118		123P80102	

To retain FCC compliance, the following must be performed: When replacing parts, determine whether the machine is FCC compliant or non-compliant by checking for the FCC Compliant label. If the machine is FCC compliant, <u>ONLY</u> FCC compliant parts must be used on the machine. However, FCC compliant parts can be used on a non-compliant machine.
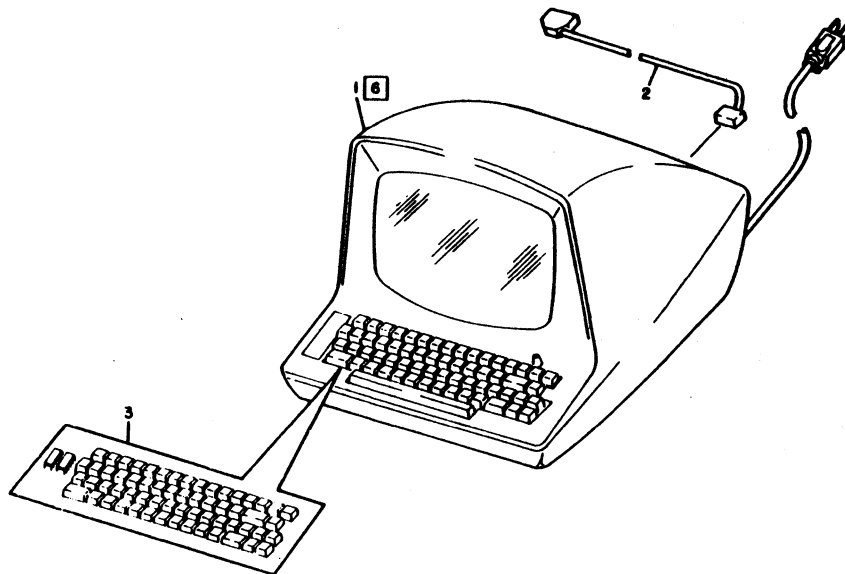
8000-012(2)

Figure 4-4 Server Terminal

| PL 4.4 NON-GLARE LARGE FORMAT DISPLAY (FCC) |

ITEM	PART NO.	DESCRIPTION
1	601S1434	Large Format Display Kit
2	- -	Power Supply Assembly (ref only)
3	- -	Horz. Output Trace Assembly (ref only)
4	- -	CRT (ref only)
5	- -	Yoke (ref only)
6	- -	Front Cover (ref only)
7	- -	Brightness V R Assembly(ref only)
8	- -	Signal Cable (ref only)
9	708W09601	Fuse, 1.6A Fast Blow
10	708W04801	Fuse, 3A Slow Blow
11	- -	Main PWA Assembly (ref only)
12	- -	Back Cover (ref only)
13	- -	Bottom Cover (ref only)
14	- -	Cover Holder (ref only)

Removal and Replacement 3.8.1

1 { INCLUDES ITEMS 2 - 14
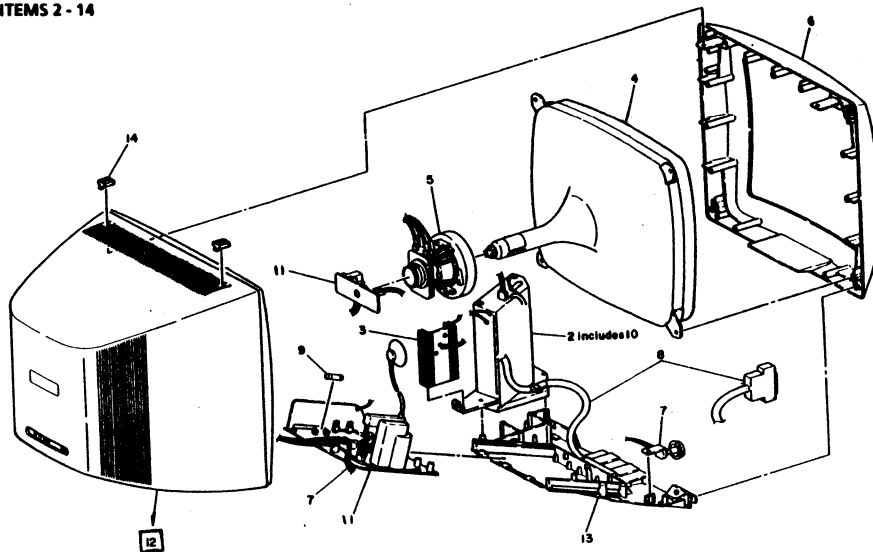
PL 4.5 LOW PROFILE KEYBOARD/MOUSE

ITEM	PART NO.	DESCRIPTION
1	601S1435	Keyboard Assembly Kit
2	- -	Keyboard PWA (ref only)
3	- -	Keyboard Signal Cable (ref only)
4	- -	Top Cover (ref only)
5	- -	Bottom Cover Assembly (ref only)
6	- -	Keyboard Assembly
7	18S87004	Optical Mouse
8	18P87005	Pad, Optical Mouse
9	601S01316	Kit, Optical Mouse (Optical Mouse with two pads)

1 { INCLUDES ITEMS 2 - 6

9 { INCLUDES ITEMS 7 AND 8

CHAPTER 5 DISPLAY QUALITY

8000 SERIES DISPLAY/KEYBOARD SERVICE MANUAL

5

This chapter is designed to provide information for use in maintaining the Large Format Display quality at a level satisfactory to the customer. The display quality defects described here are generally only checked visually and will not cause a fault code during DIAGNOSTICS checkout. In the Display Problems section of this chapter, the Corrective Action column indicates repair procedures in Chapter 3, troubleshooting procedures in Chapter 6, or the required corrective action.

DISPLAY QUALITY DEFINITIONS

Black Screen
No illumination; no picture visible on screen.

Digital Defect
Processor problem (not detected by Diagnostics) that causes information on screen to be displayed incorrectly.

Expanded Raster
Top, bottom, and sides of picture extend out beyond edges of screen.

Flicker
Picture blinks off and on.

Foldover
Picture compressed, with portions of picture overlapping.

Horizontal Foldover
Picture compressed horizontally (toward center, from both sides), dark screen border at sides; portions of picture overlapping.

Vertical Foldover
Picture compressed vertically (toward center, from top and bottom), dark screen border at top and bottom; portions of picture overlapping.

Horizontal Centering
Picture centered between left and right edges of screen.

Horizontal Centering, Too Far Left
Picture shifted toward left edge of screen; dark screen border at right edge.

Horizontal Centering, Too Far Right
Picture shifted toward right edge of screen; dark screen border at left edge.

Horizontal Deflection
Moves the CRT electron beam horizontally by displacing the beam from its straight line path by means of an electromagnetic field.

No Horizontal Deflection
Dark screen with straight thin vertical line of illumination.

Horizontal Sync
Signal generated in the processor which controls the timing of the horizontal deflection.

No Horizontal Sync
Condensed horizontal or diagonal lines over entire screen.

Horizontal Width
Both sides of picture correctly positioned at left and right edges of screen.

Horizontal Width, Too Narrow
Both sides of picture positioned too far in toward center of screen; dark screen border at sides.

Horizontal Width, Too Wide
Both sides of picture extend out beyond side edges of screen.

Jitter
Characters on screen jittery or broken up; offset interlace.

Pin Cushion
Distortion in which one or more sides of the picture are curved inward or outward; curved, dark screen borders.

Raster
The bright white glow which covers the screen.

Retrace Lines
The pattern left by the CRT beam when returning from the end of one line to the start of the next. Can be observed as white diagonal lines over the screen when the brightness control is set at maximum.

Ripple
Small, thin stripes moving up or down through the picture.

Shrunken Raster
Top, bottom and sides of picture positioned too far in toward center of screen; dark screen border on all sides.

Skew
Picture tilted to one side or the other.

Unblanked Raster
Entire screen is white with visible retrace lines, and sides of raster wider than normal (blanked) raster.

Vertical Centering
Picture centered between top and bottom edges of screen.

Vertical Centering, Too Low
Picture shifted toward bottom of screen; dark screen border at top.

Vertical Centering, Too High
Picture shifted toward top of screen; dark screen border at bottom.

Vertical Deflection
Moves the CRT electron beam vertically by displacing the beam from its straight line path by means of an electromagnetic field.

No Vertical Deflection
Dark screen with straight thin horizontal line of illumination.

Vertical Height
Top and bottom of picture correctly positioned at top and bottom edges of screen.

Vertical Height, Too Short
Top and bottom of picture positioned too far in toward center of screen; dark screen border at top and bottom.

Vertical Height, Too Tall
Top and bottom of picture extend out beyond top and bottom edges of screen.

Vertical Sync
Signal generated in the processor which controls the timing of the vertical deflection.

No Vertical Sync
Picture rolls vertically.

Video
The visual information displayed on the screen.

Video Signal
Signal generated in the controller that turns the CRT electron beam on and off to form characters on the screen.

Video Smear
Display defect in which characters or text appear to be extended horizontally beyond normal boundaries (or normal character shape).

White Screen
Illuminated screen with no information displayed.

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Black Screen All The Time	o Defective Monitor, Large Format Display	o See Level 2 Check Chart 6.03 o Non-Glare LFD - See Level 2 Check Chart 6.10
	o Defective HSIO PWA	
	o -5.2 VDC missing at Display.	
Faded/Dim Screen	o Brightness control misadjusted	o Adjust Operator Brightness Control (3.3), Non-Glare LFD (3.12)
	o Defective Brightness Control	o See Level 2 Check Chart 6.06 o Non-Glare LFD - Replace Large Format Display (3.11)
	o Defective Monitor,Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)
Expanded Raster (Cross-Hairs Pattern)		
Picture oversize	o Adjustment pots or centering misadjusted	o See Level 2 Check Chart 6.06 o Non-Glare LFD - See Level 2 Check Chart 6.14
	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Focus (Bold "@" Symbol Pattern)		
Characters out of focus or blurred.	o **FOCUS** pot misadjusted	o Adjust **FOCUS** pot for proper focus (3.3), Non-Glare LFD (3.12)
	o Brightness control misadjusted	o Adjust Operator Brightness Control (3.3), Non-Glare LFD (3.12)
	o Defective Brightness Control	o See Level 2 Check Chart 6.06
		o Non-Glare LFD - Replace Large Format Display (3.11)
Horizontal Centering (Cross-Hairs Pattern)		
Picture shifted horizontally.	o Centering misadjusted	o Adjust centering (3.3), Non-Glare LFD (3.12)
	o <u>Ball Bros.</u> **H DATA CTRG** pot , <u>Philips</u> **HORT CENT** pot, or <u>Non-Glare LFD</u> **H. HOLD** or **WIDTH** misadjusted	o See Level 2 Check Chart 6.06
		o Non-Glare LFD - See Level 2 Check Chart 6.14
	o Defective Monitor,Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
No Horizontal Deflection		
Straight thin vertical line.	o Defective Monitor, Large Format Display	o See Level 2 Check Chart 6.01
		o Non-Glare LFD - Replace Large Format Display (3.11)
Horizontal Foldover		
Picture compressed horizontally with portions of picture overlapping.	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)
No Horizontal Sync		
Condensed horizontal or diagonal lines.	o Defective Monitor, Large Format Display	o See Level 2 Check Chart 6.01
		o Non-Glare LFD - See Level 2 Check Chart 6.09
	o Defective HSIO PWA	
	o Defective Display Cable	
	o Horizontal hold misadjusted	o Adjust H HOLD pot (3.3), Non-Glare LFD (3.12)

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Horizontal Width (Cross-Hairs Pattern)		
Sides of picture in too far	o Horizontal width pot misadjusted.	o Adjust H WIDTH pot (3.3), Non-Glare LFD (3.12)
toward center or out beyond edge of screen.		o See Level 2 Check Chart 6.06
		o Non-Glare LFD - See Level 2 Check Chart 6.14
	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)
Jitter		
Characters broken up.	o Intermittent video	o See Level 2 Check Chart 6.03
		o Non-Glare LFD - See Level 2 Check Chart 6.10
	o Outside interference	o Separate from other electrical equipment
Pin Cushion (Cross-Hairs Pattern)		
When display is properly aligned per procedure (3.3), CARNATION (3.12), no portion of the Cross-Hairs pattern outer margins shall deviate from marks described in Figure 3-1 by more than +/- 0.150 inch (3.81 mm).	o Yoke slipped back on CRT	o Adjust Yoke position
	o Centering misadjusted	o Adjust centering (3.3), Non-Glare LFD (3.12)
	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.12)

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Ripple		
Small stripes moving up or down through picture.	o Loose ground wire connection	o Correct loose wiring
	o Outside interference	o Separate from other electrical equipment
Shrunken Raster (Cross-Hairs Pattern)		
Picture undersize.	o Pots misadjusted	o See Level 2 Check Chart 6.14
	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)
Skew (Cross-Hairs Pattern)		
Picture tilted to one side.	o Yoke slipped on CRT	o Adjust yoke position
	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)
Unblanked Raster		
Entire screen white with visible retrace lines.	o Defective HSIO PWA	o See Level 2 Check Chart 6.01
		o Non-Glare LFD - See Level 2 Check Chart 6.09
	o Defective Monitor, Large Format Display	

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Vertical Centering (Cross-Hairs Pattern)		
Picture shifted vertically up or down.	o Vertical centering pot misadjusted	o Adjust **V CENT** pot (3.3), Non-Glare LFD (3.12)
		o See Level 2 Check Chart 6.06
		o Non-Glare LFD - See Level 2 Check Chart 6.14
	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)
No Vertical Deflection		
Straight thin horizontal line.	o Defective Monitor, Large Format Display	o See Level 2 Check Chart 6.01
		o Non-Glare LFD - See Level 2 Check Chart 6.09
		o Replace Monitor (3.3), Non-Glare LFD (3.11)
Vertical Foldover		
Picture compressed vertically with portions of picture overlapping.	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Vertical Height (Cross-Hairs Pattern)		
Top and bottom of picture in too far toward center, or out beyond edge of screen.	o Vertical height pot misadjusted	o Adjust <u>Ball Bros.</u> **V HGT** pot, <u>Philips</u> **VERT SIZE** pot (3.3), or <u>Non-Glare LFD</u> **HEIGHT** (3.12)
		o See Level 2 Check Chart 6.06
		o Non-Glare LFD - See Level 2 Check Chart 6.14
	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)
No Vertical Sync		
Picture rolls.	o Defective Monitor, Large Format Display	o See Level 2 Check Chart 6.01
		o Non-Glare LFD - See Level 2 Check Chart 6.09
	o Defective HSIO PWA	
	o Defective Display Cable	
Video Smear (On-Line Diagnostics)		
Characters appear to be extended horizontally beyond normal limits; shadowing on right of horizontal bars in test pattern.	o Defective Monitor, Large Format Display	o Replace Monitor (3.3), Non-Glare LFD (3.11)

PROBLEM	POSSIBLE CAUSES	CORRECTIVE ACTION
Digital Defects (On-Line Diagnostics)		
Characters missing, or incorrect characters displayed.	o Defective HSIO PWA, or MCC PWA	o Replace HSIO PWA, or MCC PWA

TEST PATTERN	DESCRIPTION
CROSS-HAIRS PATTERN	This cross-hairs pattern used for checking and aligning the Large Format Display.
"H" PATTERN	This pattern used to check and adjust focus, but not recommended
"@" SYMBOL PATTERN (Bold)	This pattern recommended for checking and adjusting focus.
"@" SYMBOL PATTERN (Narrow, one-bit-width)	This pattern was also designed for checking and adjusting focus, but not recommended.
16 PARALLEL LINES PATTERN	This pattern used for checking display memory failures. When a chip is bad it will appear as a set of short parallel lines on display.
BLANK SCREEN PATTERN	This pattern used for checking missing bits from display (digital defects). It is also to aid in checking display brightness in a manufacturing environment.

CHAPTER 6 TROUBLESHOOTING

8000 SERIES DISPLAY/KEYBOARD SERVICE MANUAL

6

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT

| 6.01 MOVING DANDELION NOT DISPLAYED |

WARNING

High voltage exists on CRT, Yoke, and PWA's. Remove all jewelry before working on the display. Use only one hand while working on the equipment with power applied. Touching the display or Processor with both hands can result in a hazardous electrical shock.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Picture quality is good in applications mode but incorrect data is displayed (Digital Defects).	Visual	Replace in order: HSIO PWA MCC PWA	Step 2

NOTE: When using the meter probes to check a voltage or signal on a Plug/Jack assembly, spreading of the Female pins may occur. This could result in failure of the P/J connection.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
2.	Large Format Display has a non-glare screen	Visual	Check Chart 6.09	Step 3
3.	Disconnect J1/P1 from Large Format Display Monitor. Check the following voltages at the Display Cable: a. 70 to 90 <u>VAC</u> b. 35 to 45 <u>VAC</u>	J1/P1 Pins 16 to 22 Pins 19 to 23	Step 4	Check Chart 6.05

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
4.	Connect J1/P1 and switch ON power. Arcing is not present.	Visual	Step 5	Check Chart 6.02

NOTE: If problem exists with software on Rigid Disk, run ALAG from Floppy Disk (alternate boot 0005) and type L when MP = *0319*. Refer to Chapter 5 for Display Quality definitions.

STEP	PROCEDURE	TEST POINT	INDICATION	
5.	Press B RESET Switch. When MP displays *0319*, type L. With Operator Brightness Control set at mid-range, screen has video (displays other than black).	Visual	Step 6	Check Chart 6.03
6.	Screen displays condensed horizontal or diagonal lines (loss of horizontal sync).	Visual	Check Chart 6.04	Step 6
7.	Picture does not roll.	Visual	Step 8	Check Chart 6.07
8.	Picture size and position are correct.	Visual	Step 9	Check Chart 6.06
9.	With Operator Brightness Control set at correct brightness, picture is not blurred or out of focus.	Visual	Return to Level 1	Check Chart 6.06

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT

6.02 ARCING CHECK

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Switch OFF power. There is no dust around Large Format Display Monitor PWA.	Visual	Step 2	Clean with brush
2.	There is no dust around rear of CRT and high voltage lead.	Visual	Replace Large Format Display	Discharge CRT, then clean with yellow towel

6.03 NO VIDEO (BLACK SCREEN)

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Disconnect Display Cable from rear of processor. Voltage at rear of Processor Connector Panel is: 600T860 meter is -4.8V to -5.6V 600T1616 meter is -5.02V to -5.38V	Processor Connector Panel J2-11 to 12	Step 3	Step 2
2.	Disconnect J41 from HSIO PWA. Measure voltage at HSIO PWA. Voltage: 600T860 meter is -4.8V to -5.6V 600T1616 meter is -5.02V to -5.38V	P41 pins 8 to 7	Replace WS/Server Signal Harness **W9**	Replace HSIO PWA

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	**INCORRECT**
3.	Connect Display Cable to rear of Processor. Voltage at Large Format Display Monitor is: 600T860 Meter = -4.8V to -5.6V. 600T1616 Meter = -5.02V to -5.38V.	J1/P1 pins 11 to 12	Step 4	Replace Display Cable **W30**
4.	Disconnect J41 from HSIO PWA. With Operator Brightness Control at maximum, check for unblanked raster (white screen with retrace lines).	Visual	Replace HSIO PWA	Step 5
5.	Connect J41 to HSIO PWA. Verify Ball Bros. **BRT LIM** pot or Philips **CUTOFF PRESET** pot is set to midrange or less. Switch ON power. Screen is an unblanked raster (white screen with retrace lines).	Visual	Perform Monitor Alignment Procedure (3.3). If alignment cannot be performed, replace monitor.	Step 6
6.	Disconnect Brightness Control in-line connector. Resistance is 0 to 50K Ohms while adjusting Operator Brightness Control minimum to maximum.	P1/J10 pins 1 to 2	Replace Large Format Display Monitor	Replace Brightness Pot Harness Assembly

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT

| 6.04 | HORIZONTAL SYNC CHECK |

NOTE: When using logic probe for checking signals at the Large Format Display Monitor, be careful not to get too close to high voltage leads. This may result in a false indication. Use the 5V RTN and + 5V DC terminals on the Processor power supply for a 5V source. If problem exists with software on Rigid Disk, run ALAG from Floppy Disk (alternate boot 0005) and type L when MP = *0319*. Refer to Chapter 5 for Display Quality definitions.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Connect J41 on HSIO PWA. Disconnect display cable from rear of Processor. Switch ON power. When MP displays *0319*, type L. Logic probe indicates pulsing signal (both lamps lit).	Processor Connector Panel J2-1	Step 2	Step 3
2.	Connect Display Cable to rear of Processor. Disconnect display cable at J1/P1 inside of Large Format Display. Switch ON power. When MP displays *0319*, type L. Logic probe indicates pulsing signal (both lamps lit).	Display Cable J1-1	Replace Large Format Display Monitor	Replace Display Cable W30
3.	Disconnect J41 connector from HSIO PWA. Switch ON power. When MP displays *0319*, type L. Logic probe indicates pulsing signal (both lamps lit).	HSIO PWA P41-1	Replace WS/Server Signal Harness W9	Replace HSIO PWA

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT

6.05 78 OR 39 VAC OUT OF TOLERANCE (Figure 6-1)

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Disconnect AC power cord. Check the following fuses at the AC Distribution PWA (Figure 6-1). a. **Tag 1:** F8, F9, and F10 **Tag 9:** F4, F5 **RX Only:** F6, F7, F8 b. Fuses are good, not open.	Visual	Step 2	Replace fuse. If fuse opens again, refer to Chain 1.1 BSD and 8000 Processor Service Manual Chain 1.1 BSD to isolate problem.
2.	Display Cable is securely connected to rear of Processor Connector Panel.	Visual	Step 3	Connect Display Cable **W30** properly
3.	Disconnect Display Cable from rear of Processor. Voltages at rear of Processor are: a. 70 to 90 VAC b. 35 to 45 VAC	Processor Connector Panel J2-16 to 23 J2-19 to 23	Replace Large Format Display Monitor	Step 4
4.	Voltage at P5/J10 on AC Distribution PWA are: a. 70 to 90 VAC b. 35 to 45 VAC	AC Distribution PWA P5/J10-2 to 1 P5/J10-3 to 1	Replace WS/Server Signal Harness **W9**	Step 5
5.	Voltage at P4/P2 on AC Distribution PWA are: a. 70 to 90 VAC b. 35 to 45 VAC	AC Distribution PWA P4/P2-2 to 3 P4/P2-1 to 3	Replace AC Distribution PWA	Replace Processor T1 Transformer

Figure 6-1 AC Distribution PWA

8010-002

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	**INCORRECT**

6.06 PICTURE QUALITY INCORRECT

NOTE: Refer to Chapter 5 for the Display Quality definitions.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Picture does not roll.	Visual	Step 2	Check Chart 6.07
2.	Picture quality problem is incorrect brightness.	Visual	Step 3	Step 5
3.	Perform Monitor brightness adjustment (Procedure 3.3). Brightness adjustments were successful.	Visual	Step 5	Step 4
4.	Switch OFF power. Disconnect brightness control in-line connector. Resistance is 0 to 50K Ohms while adjusting Operator Brightness Control minimum to maximum.	P1/J10 pins 1 to 2	Replace Large Format Display Monitor	Replace Brightness Pot Harness Assembly W31
5.	Picture quality problem is incorrect focus.	Visual	Step 6	Step 7

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT
6.	Perform Monitor Focus Adjustment (Procedure 3.3). Focus adjustments were successful.	Visual	Step 7	Replace Large Format Display Monitor
7.	Picture quality is incorrect vertical height or centering.	Visual	Step 8	Step 9
8.	Perform Monitor Vertical Height and Centering adjustments (Procedure 3.3). Vertical Height and Centering adjustments were successful.	Visual	Step 9	Replace Large Format Display Monitor
9.	Picture quality is incorrect horizontal width or centering.	Visual	Step 10	Return to Level 1
10.	Perform monitor horizontal width and Centering adjustments (Procedure 3.3). Horizontal width and centering adjustments were successful.	Visual	- - -	Replace Large Format Display Monitor

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT

6.07 VERTICAL SYNC CHECK

NOTE: When using logic probe for checking signals at the Large Format Display Monitor, be careful not to get too close to voltage leads. This may result in a false indication. Use the 5V RTN and + 5V DC terminals on the Processor power supply for a 5V source.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Disconnect Display Cable from rear of processor panel. Switch ON power. When MP displays *0319* type L. Using logic probe, check for pulsing signal at rear of Processor Connector panel.	Processor Connector Panel J2-3	Step 3	Step 2
2.	Disconnect J41 connector from HSIO PWA. Switch ON power. When MP displays *0319* type L. Using logic probe, check for pulsing signal at HSIO PWA.	HSIO PWA J2-3	Replace WS/Server Signal Harness **W9**	Replace HSIO PWA
3.	Connect Display Cable to rear of Processor. Using logic probe, check for pulsing signal at Large Format Display Monitor.	Display Monitor J1/P1 pin 3	Replace Large Format Display Monitor	Replace Display Cable

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT

| 6.08 EXTENDED STAR KEYBOARD FAULT ISOLATION |

NOTE: Before beginning diagnostic test, check and adjust Tone Control Pot for proper setting.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Keyboard On-Line Diagnostics can be started.	Visual	Step 2	Replace in order: Keyboard IOP PWA
2	Run Keyboard On-Line Diagnostics. Beeper sounds.	Audible	Step 3	Replace in order: Keyboard Cable W40 IOP PWA
3	All Keys are operational.	Visual	Return to Level 1 Checkout	Replace in order: Keyboard IOP PWA

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT

6.09   NON-GLARE LFD MOVING DANDELION NOT DISPLAYED

WARNING

High voltage exists on CRT, Yoke, and PWA's. Remove all jewelry before working on the display. Use only one hand while working on the equipment with power applied. Touching the display or processor with both hands can result in a hazardous electrical shock.

NOTE: If problem exists with software on Rigid Disk, run ALAG from Floppy Disk (alternate boot 0005) and type L when MP = *0319*. Refer to Chapter 5 for Display Quality definitions.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Disconnect AC IN In-line connector from Large Format Display Power Supply. Check the following voltage at the Display Cable: a. 70 to 90 <u>VAC</u>	AC IN In-line Connector Pins 1 to 3	Step 2	Check Chart 6.12
2.	Display Power Supply DC output voltage is approximately 70VDC.	Between DC OUT (red lead) and top of Power Supply (black lead)	Step 4	Step 3
3.	Check through hole on top of Display Power Supply that Fuse (125V/3A) is not blown.	Visual	Replace Large Format Display (3.11)	Remove Power Supply Cover to replace Fuse (3.9)

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
4.	Check that Fuse (125V/1.6A) on Main PWA Deflection Board is not blown.	Visual or tester	Step 5	Replace Fuse
5.	Reconnect In-Line connector and power ON. Type L when MP = *0319*. Moving Dandelion displayed (regardless of quality).	Visual	Check Chart 6.14	Step 6
6.	Arcing is not present.	Visual	Step 7	Check Chart 6.02
7.	With Operator Brightness Control set at mid-range, screen has video (displays other than black).	Visual	Check Chart 6.11	Check Chart 6.10

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT

	6.10 NON-GLARE LFD - NO VIDEO (BLACK SCREEN)			

NOTE: Set Operator Brightness Control to mid-range.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Measure voltage at Large Format Display Monitor. Voltage: 600T860 Meter = -4.8V to -5.6V. 600T1616 Meter = -5.02V to -5.38V.	Between Deflection Board connector CN2 pins 5 and 4	Step 2	Check Chart 6.15
2.	Disconnect J41 from HSIO PWA. With Operator Brightness Control at maximum, check for unblanked raster (white screen with retrace lines).	Visual	Replace HSIO PWA	Step 3
3.	Reconnect J41 Power ON. Perform Adjustment Procedure 3.12 to achieve proper brightness.	Visual	--	If adjustment cannot be performed, replace Large Format Display

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INDICATION INCORRECT

| | | | **INDICATION** | |
STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT

6.11 NON-GLARE LFD HORIZONTAL SYNC CHECK

NOTE: When using logic probe for checking signals at the Large Format Display Monitor, be careful not to get too close to high voltage leads. This may result in a false indication. Use the 5V RTN and + 5V DC terminals on the Processor power supply for a 5V source.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Performing procedure 3.12 (Image Adjustment) provides normal horizontal synchronization.	Visual	- -	Step 2
2.	Using logic probe, check for pulsing signal at Large Format Display Monitor.	Deflection Board Connector CN2 pin 6	Replace Large Format Display	Step 3
3.	Disconnect J41 connector from HSIO PWA. Power ON. Wait until MP = *0319* and type L. Using logic probe, check for pulsing signal at HSIO PWA (both lamps lit).	P41-1	Step 4	Replace HSIO PWA
4.	Reconnect J41 on HSIO PWA. Disconnect display cable from rear of processor connector panel. Power ON. Wait until MP = *0319* and type L. Using logic probe, check for pulsing at rear of Processor (both lamps lit).	J2-1	Replace Large Format Display	Replace Processor Signal Harness

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
	6.12 NON-GLARE LFD AC INPUT VOLTAGE OUT OF TOLERANCE (Figure 6-1)			
1.	With Processor Large Format Display Connector disconnected, check processor for the following voltage: 70 to 90 VAC	Between P2 pins 16 and 22	Check Display Signal Cable for break. If broken, replace Large Format Display	Step 2
2.	Disconnect AC power cord. Check the following fuses on the Distribution PWA (Fig. 6-1): a. (Tag 1) F8, F9, and F10 (Tag 9) F4, F5 (RX) F6, F7, F8 b. All are good (not blown)	Visual	Step 5	Step 3
3.	Replace blown fuse. Reconnect power cord. Power ON. Fuses do not blow.	Visual	Step 4	Step 8
4.	Check that Display Cable is connected at rear of Processor Connector Panel. Reconnect J1/P1 to Large Format Display Monitor. Power ON. Fuses do not blow.	Visual	- -	Replace Large Format Display

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INDICATION INCORRECT
5.	Check for the following voltage on AC Distribution PWA: a. 70 to 90 VAC b. Check was successful.	J10 between pins 2 and 1	Step 6	Step 7
6.	Pull out Display Cable from rear of Processor. Power ON. Check for the following voltage at rear of Processor Connector Panel: a. 70 to 90 VAC b. Check was successful.	J2 between pins 16 and 22	Replace Large Format Display	Replace processor Signal Harness

NOTE: Input voltage is passing through Harness. When checking for voltage, never disconnect P2/P4 from AC Distribution PWA.

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INDICATION INCORRECT
7.	See NOTE above. Check for the following voltage on AC Distribution PWA: a. 70 to 90 VAC b. Check was successful.	P2/P4 between pins 2 and 3	Replace AC Distribution PWA	Replace T1 Transformer
8.	Disconnect J10 from AC Distribution PWA. Replace blown fuse. Power ON. Fuses do not blow.	Visual	Step 9	Replace AC Distribution PWA.
9.	Reconnect J10 to AC Distribution PWA. Pull out Display Cable from rear of processor. Replace blown Fuse. Fuse does not blow.	Visual	Replace Large Format Display	Replace Processor Signal Harness

STEP	PROCEDURE	TEST POINT	INDICATION	
			CORRECT	INCORRECT

| 6.13 NON-GLARE LFD VERTICAL SYNC CHECK |

NOTE: When using logic probe for checking signals at the Large Format Display Monitor, be careful not to get too close to voltage leads. This may result in a false indication. Use the 5V RTN and + 5V DC terminals on the processor power supply for a 5V source.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Performing procedure 3.12 (image adjustment) provides normal vertical sync.	Visual	--	Step 2
2.	Using logic probe, check for pulse signals at Large Format Display Monitor.	Deflection Board CN2 pin 8	Replace Large Format Display	Step 3
3.	Disconnect J41 connector from HSIO PWA. Power ON. Wait until MP = *0319* and type L. Using logic probe, check for pulsing signal at HSIO PWA.	P41 - 3	Step 4	Replace HSIO PWA
4.	Connect J41 to HSIO PWA. Disconnect Display Cable from rear of processor panel. Power ON. Wait until MP = *0319* and type L. Using logic probe, check for pulsing signal at rear of processor connector panel.	J2-3	Replace Large Format Display	Replace Processor Signal Harness

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INDICATION INCORRECT

6.14 NON-GLARE LFD - PICTURE SIZE AND/OR POSITION INCORRECT (Figure 6-2)				

NOTE: Before making any adjustments to H HOLD or WIDTH, make a note of original position of pots.

STEP	PROCEDURE	TEST POINT	CORRECT	INCORRECT
1.	Perform the following: a. Run the Large Format Display On-Line Diagnostics. b. Select the bold "**@**" symbol pattern. c. Move Operator Brightness Control to maximum brightness. d. Check was successful.	Visual	Step 2	Check Chart 6.09
2.	Perform the following: a. Move Operator Brightness Control to minimum brightness. b. Adjust **SUB BRIGHT** until all characters disappear (3.12). c. Check was successful.	Visual	Step 3	Replace Large Format Display
3.	With Operator Brightness Control set for correct customer brightness, focus is correct.	Visual	Step 5	Step 4
4.	Perform the following: a. Adjust **FOCUS** pot for best overall quality. b. Focus adjustment successful.	Visual	Step 5	Replace Large Format Display

MAIN PWA ASSY

L406

L403

VR32 VR31 VR53 VR41

VR69

VR64

VR47

HEIGHT   V.LIN   (H.LIN)   WIDTH   (EHT AVR)

V.HOLD   H.HOLD   SUB BRIGHT   FOCUS

K-013

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INCORRECT
5.	Perform the following: a. Run Large Format Display On-Line diagnostics. b. Select cross-hairs pattern. c. Move Operator Brightness Control to mid-range. d. Vertical height and centering are correct.	Visual	Step 7	Step 6
6.	Adjust **HEIGHT**, **V HOLD**, and **V LIN** pots, for correct vertical height and position (3.12).	Visual	Step 7	Replace Large Format Display
7.	With Operator Brightness Control at midrange, horizontal width and centering are correct.	Visual	--	Step 8
8.	Refer to note at beginning of this check chart. Adjust **H HOLD** and **WIDTH** to obtain proper horizontal width and centering.	Visual	--	Replace Large Format Display

STEP	PROCEDURE	TEST POINT	INDICATION CORRECT	INDICATION INCORRECT
	6.15 NON-GLARE LFD -5.2V MISSING			
1.	Disconnect J41 from HSIO PWA. Power ON. Measure voltage at HSIO PWA. Voltage: 600T860 meter = -4.8V to -5.6V 600T1616 meter = -5.02V to -5.38V	P41 pins 8 to 7	Step 2	Perform Processor Service Manual Level 2 Check Chart Procedure 6.05
2.	Connect J41 to HSIO PWA. Disconnect Display Cable from rear of processor. Power ON. Measure voltage at rear of Processor Connector Panel. Voltage: 600T860 meter = -4.8V to -5.6V 600T1616 meter = -5.02V to -5.38V	J2 pins 11 to 12	Replace Large Format Display	Replace Processor Signal Harness

Figure 6-3   Large Format Display AC/DC Power Distribution Chain 1.1
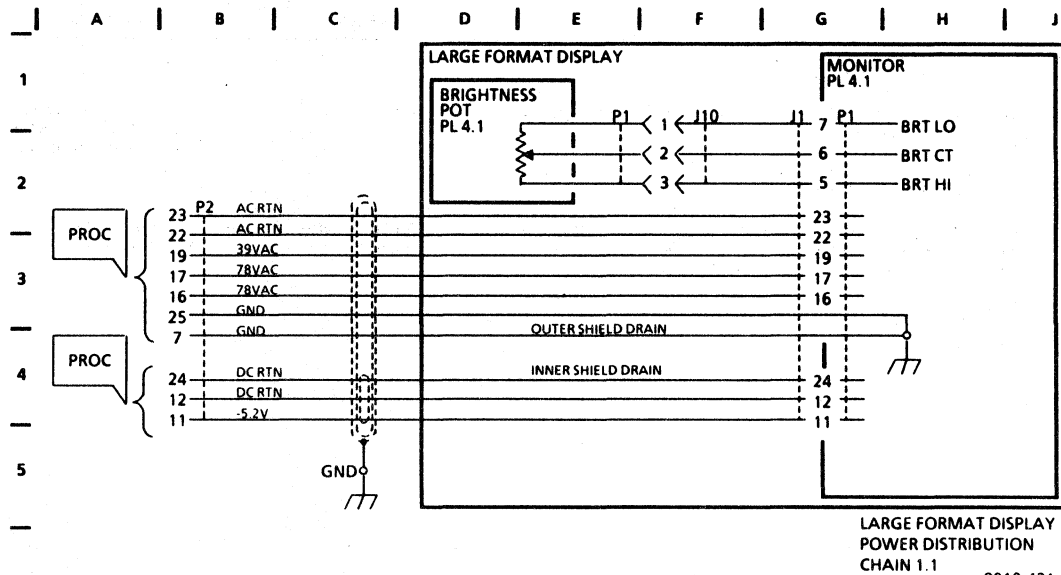
8010-431
REVISION B

KEYBOARD/MOUSE
POWER DISTRIBUTION
CHAIN 1.2

8010-432
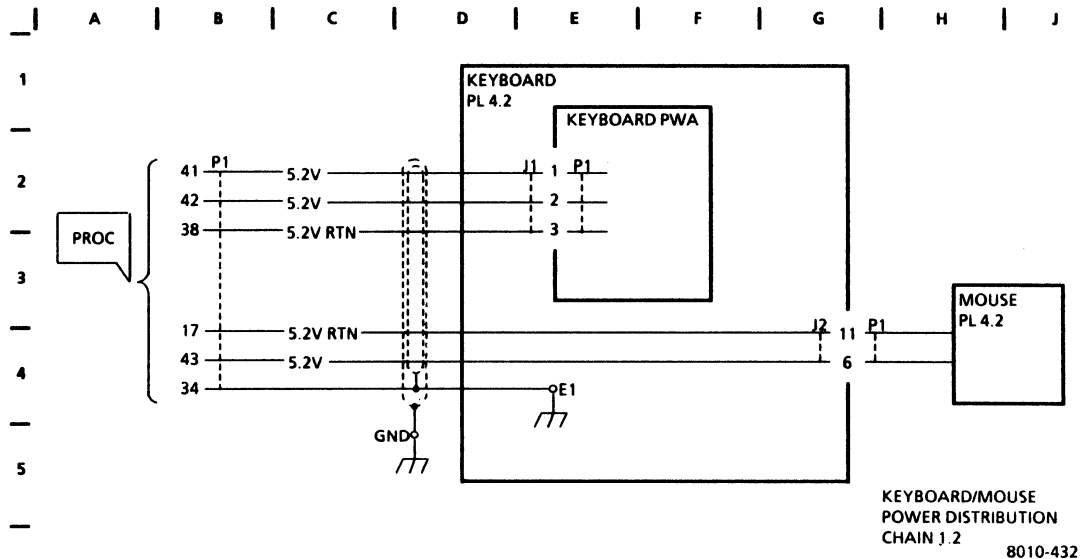
CHAPTER 7 GENERAL DATA

8000 SERIES DISPLAY/KEYBOARD SERVICE MANUAL

7

7.1 INTRODUCTION

Harnesses for the Large Format Display, the Keyboard/Mouse, and the Server Terminal are each identified with an alpha numeric code (W00). These harness codes are defined in Section 7.2. The codes are used on plug/jack location diagrams.

In Section 7 3, plug/jack location diagrams (Figures 7-1, 7-2, and 7-3) are provided to show actual locations of plugs and jacks   Each plug/jack is identified by harness code and plug/jack name.

Section 7.4 provides illustrations of the wiring data for each harness. The wiring data illustrations (Figures 7-4 to 7-7, inclusive) use letter codes, within a hexagonal symbol, which identify related connector diagrams.

Pin location diagrams for various types of connectors are provided in Section 7 5   The diagrams (Figures 7-8 to 7-14, inclusive) show pin side view of the connectors.

7.2 HARNESS IDENTIFICATION

W30	Display Cable
W31	Brightness Pot Harness
W40	Keyboard Cable
W50	Terminal Interface Cable

7.3 PLUG/JACK LOCATIONS

Refer to Figures 7-1, 7-2, and 7-3 for illustrations of plug/jack locations and identification.
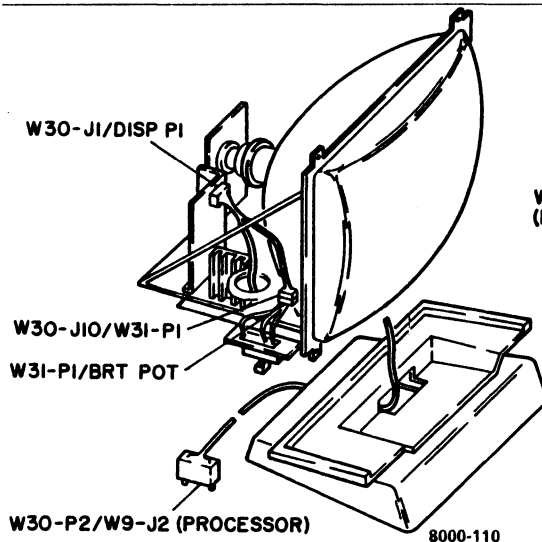
Figure 7-1 Display Plug/Jack Locations

W30-JI/DISP PI

W30-JIO/W3I-PI

W3I-PI/BRT POT

W30-P2/W9-J2 (PROCESSOR)
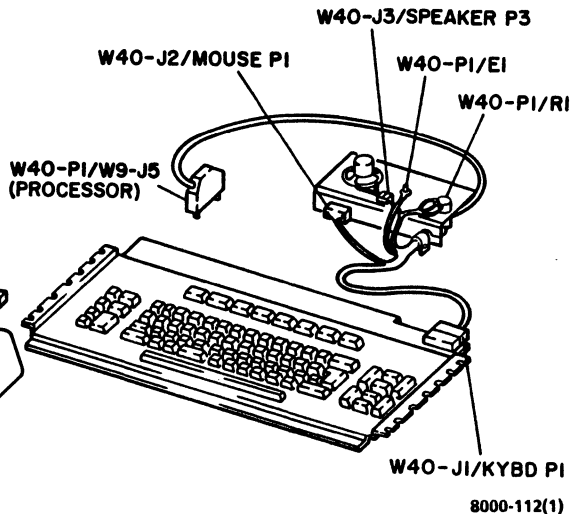
8000-110

Figure 7-2 Keyboard/Mouse Plug/Jack Locations

W40-J3/SPEAKER P3

W40-J2/MOUSE PI

W40-PI/EI

W40-PI/RI

W40-PI/W9-J5
(PROCESSOR)

W40-JI/KYBD PI

8000-112(1)

W50 - PI/W8-J7

W50-JI/
TERMINAL

7.4 WIRING DATA

Refer to Figures 7-4 to 7-7, inclusive, for illustrations of the wiring data for each harness.
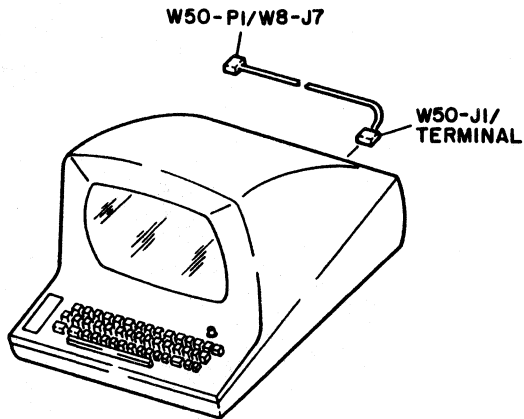
8000-111

Figure 7-3 Server Terminal Plug/Jack Locations

8010-437

8010-438

Figure 7-5 Brightness Pot Harness
W31

Figure 7-4 Display Cable   W30
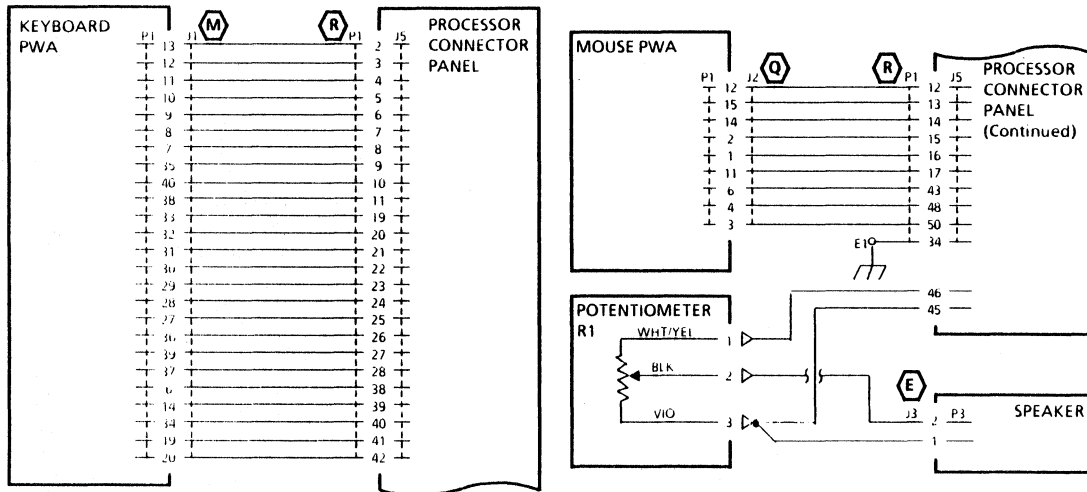
Figure 7-6 Keyboard Cable
W40

8010-439

7.5 CONNECTOR IDENTIFICATION

Refer to Figure 7-8 to 7-14, inclusive, for pin location diagrams for various types of connectors used on harnesses. The diagrams show pin side view of connectors.
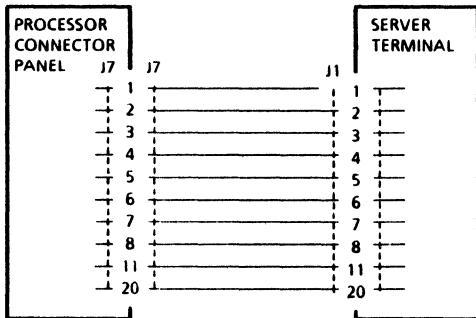
8010-440

Figure 7-7 Terminal Interface Cable
W50
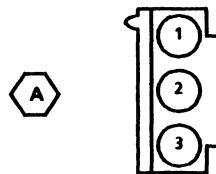
8010-069

Figure 7-8 Connector Type A

8010-091
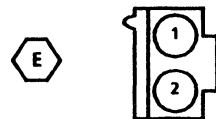
Figure 7-9 Connector Type E
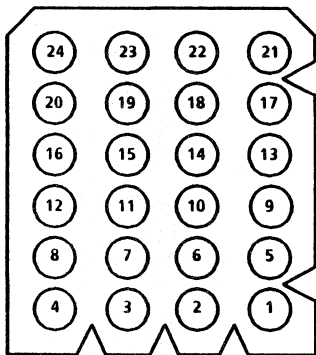
8010-210

Figure 7-10 Connector Type J
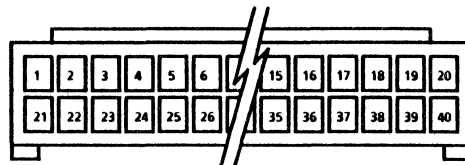
8010-211

Figure 7-11 Connector Type M
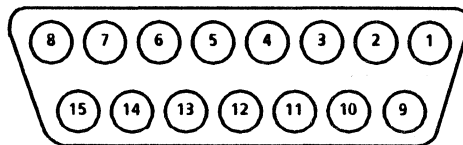
8010-080

Figure 7-12 Connector Type Q
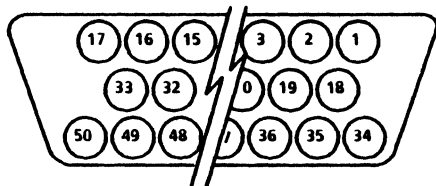
8010-043

Figure 7-13 Connector Type R
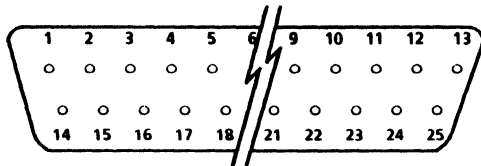
8010-082

Figure 7-14 Connector Type U

CHAPTER 8 PRINCIPLES OF OPERATION

8000 SERIES DISPLAY/KEYBOARD SERVICE MANUAL

REFER TO 8000 SERIES REFERENCE MANUAL

Use this Comment Sheet to assist in identification of errors or needed improvements in this manual. For specific errors, include specific page number in the report.

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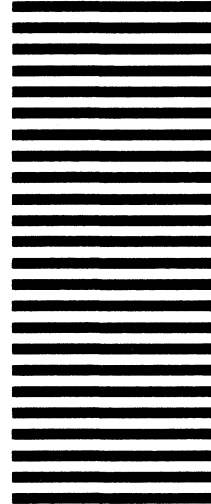**POSTAGE WILL BE PAID BY ADDRESSEE**

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