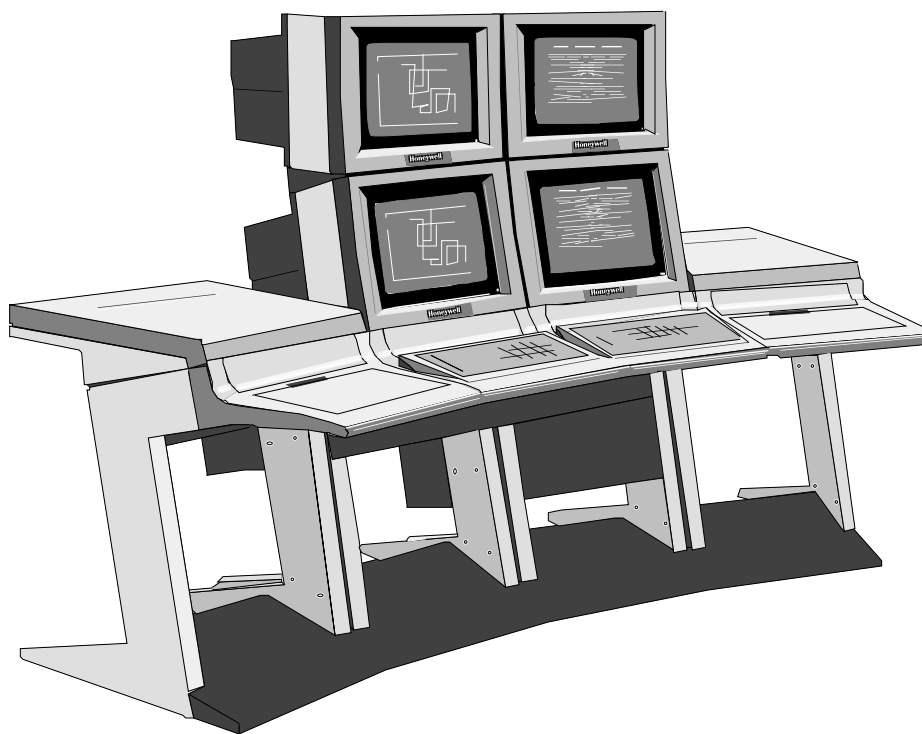


Universal Station (Ergonomic) Service

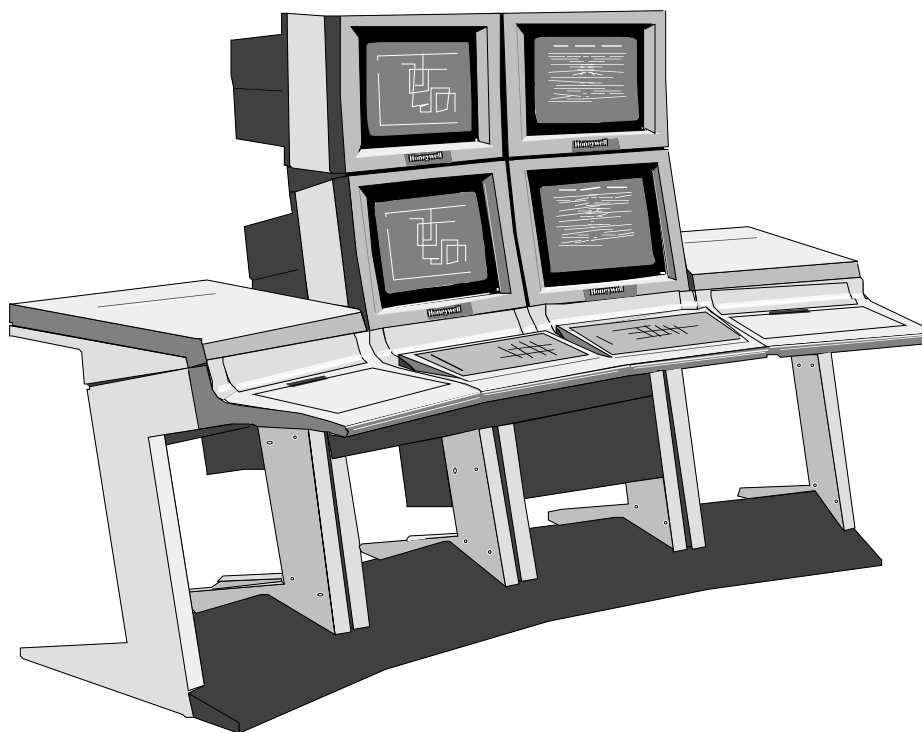
US13-520



LCN Service - 1

Universal Station (Ergonomic) Service

**US13-520
Release 510
CE Compliant
7/96**



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About This Publication

This publication provides the information required to service the Universal Station (US) node in the ergonomic furniture. This includes cleaning instructions, disassembly, reassembly, and replacement instructions, pinning instructions, and spare parts list for each functional assembly within the station.

This revision supports software Release 500, 510, and CE Compliance.

Any equipment designated as "CE Compliant" complies with the European Union EMC and Health and Safety Directives. All equipment shipping into European Union countries after January 1, 1996 require this type of compliance—denoted by the "CE Mark."

Some of the new features included in the CE Compliant hardware are:

- EMI containment and shielding enclosures around cartridge drives
- EMI containment and shielding enclosures around monitors
- EMI containment and shielding built into card files
- Shielded cables and/or ferrite core protected cables
- New I/O board design to provided grounding for cables and EMI containment and shielding for I/O card file.
- New power supplies with power factor correction in Dual Node Modules, Five-Slot Modules, and Ten-Slot Modules.

This publication supports **TotalPlant** Solution (TPS) System network Release 510. TPS is the evolution of TDC 3000^X.

Change bars are used to indicate paragraphs, tables, or illustrations containing changes that have been made to this manual effective with software Release 510. Pages revised only to correct minor typographical errors contain no change bars.

Standard Symbols

Scope

The following defines standard symbols used in this publication.

ATTENTION

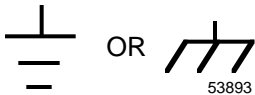
Notes inform the reader about information that is required, but not immediately evident.

CAUTION

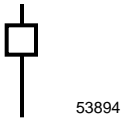
Cautions tell the user that damage may occur to equipment if proper care is not exercised.

WARNING

Warnings tell the reader that potential personal harm or serious economic loss may happen if instructions are not followed.



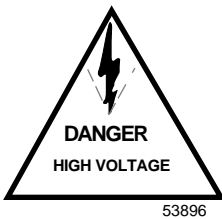
Ground connection to building safety ground.



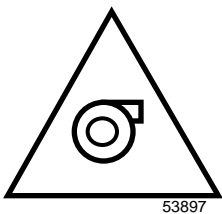
Ground stake for building safety ground.



Electrical Shock Hazard—can be lethal.



Electrical Shock Hazard—can be lethal.



Rotating Fan—can cause personal injury.

Table of Contents

SECTION 1 – OPERATION.....	1
1.1 Overview.....	1
1.2 Monitor Controls.....	3
1.3 Removable Media Drives.....	3
1.4 Operator Entry Panel (OEP).....	4
1.5 Engineer’s Keyboard.....	4
1.6 Periodic Replaceable Items.....	5
SECTION 2 – FURNITURE HARDWARE.....	7
2.1 Overview.....	7
2.2 US Node Configurations.....	8
2.3 Furniture Base.....	10
2.4 Keyboard Top.....	13
2.5 Under the Keyboard.....	14
2.7 Removable Media Drives.....	17
2.8 Peripheral Power Supply.....	18
2.9 Card File Enclosure.....	19
2.10 AC Power Distribution.....	20
2.11 Adding an Upper Monitor Mounting.....	21
2.12 Adding a Second Card File.....	25
2.13 Spare Parts.....	39
SECTION 3 – KEYBOARD SERVICE.....	41
3.1 Overview.....	41
3.2 Cleaning the Keyboard.....	42
3.3 Auxiliary Keyboard Tray.....	42
3.4 Removing the Operator Entry Panel.....	43
3.5 Connecting the Operator Entry Panel.....	43
3.6 Replacing the Manifold Board.....	46
3.7 Engineer’s Keyboard.....	49
3.8 Replacing the Multitone Annunciator.....	50
3.9 Replacing the Annunciator.....	51
3.10 Spare Parts.....	53
SECTION 4 – INTEGRATED KEYBOARD SERVICE.....	55
4.1 Overview.....	55
4.2 Functional Partition of Integrated Keyboard.....	55
4.3 Full Travel Keyboard.....	57
4.4 Relegendable Function Key Panel.....	58
4.5 Operator Control Panel.....	59
4.6 IKB Trackball.....	60
4.7 Cleaning the Integrated Keyboard.....	61
4.8 Troubleshooting the Integrated Keyboard.....	62
4.9 Removing the Integrated Keyboard Assembly.....	64
4.10 Replacing the Integrated Keyboard.....	66
4.11 Spare Parts.....	67
SECTION 5 – MOUSE SERVICE.....	69
5.1 Overview.....	69
5.2 Cleaning the Mouse.....	70
5.3 Troubleshooting the Mouse.....	71
5.4 Spare Parts.....	72

Table of Contents

SECTION 6 – TRACKBALL SERVICE.....	73
6.1 Overview.....	73
6.2 Operating the Trackball.....	74
6.3 Cleaning.....	74
6.4 Troubleshooting the Trackball.....	74
6.5 Spare Parts.....	75
SECTION 7 – FIVE-SLOT MODULE.....	77
7.1 Overview.....	77
7.2 Module Replacement.....	78
7.3 Filter Replacement.....	79
7.4 Spare Parts.....	80
SECTION 8 – CARTRIDGE DRIVE SERVICE	81
8.1 Overview.....	81
8.2 Loading/Unloading	82
8.3 Cleaning the Cartridge Drive	83
8.4 Troubleshooting an Inoperative Cartridge Drive.....	84
8.5 Removing the Cartridge Drive	85
8.6 Replacing a Cartridge Drive	86
8.7 Pinning the Cartridge Drive	88
8.8 Spare Parts.....	90
SECTION 9 – CARTRIDGE DRIVE SERVICE (CE COMPLIANT).....	91
9.1 Overview.....	91
9.2 Loading/Unloading	92
9.3 Cleaning the Cartridge Drive	93
9.4 CE Compliant Drive Enclosure	94
9.5 Troubleshooting an Inoperative Cartridge Drive.....	96
9.6 Removing the Drive Enclosure.....	97
9.7 Pinning the Cartridge Drive.....	99
9.8 Replacing the DAT Drive.....	100
9.9 Assembly of the Drive.....	100
9.10 Spare Parts.....	101
SECTION 10 – DPR 1000 TREND PEN RECORDER	103
10.1 Overview.....	103
10.2 Cleaning Trend Pen Recorders.....	105
10.3 Removing Chart Cassette.....	105
10.4 Loading Paper Charts.....	105
10.5 Replacing Print Cartridges	106
10.6 Troubleshooting a Trend Pen Recorder	107
10.7 Removing a Trend Pen Recorder	108
10.8 Replacing a Trend Pen Recorder	109
10.9 Trend Pen Calibration Check	110
10.10 Trend Pen Configuration.....	111
10.11 Spare Parts.....	113

Table of Contents

SECTION 11 – DPR 100 TREND PEN RECORDER (CE COMPLIANT).....	115
11.1 Overview.....	115
11.2 Cleaning Trend Pen Recorders.....	117
11.3 Removing Chart Cassette.....	117
11.4 Loading Paper Charts.....	117
11.5 Replacing Print Cartridges.....	118
11.6 Troubleshooting a Trend Pen Recorder.....	119
11.7 Removing a Trend Pen Recorder.....	120
11.8 Replacing a Trend Pen Recorder.....	121
11.9 Trend Pen Calibration Check.....	122
11.10 Battery Replacement.....	123
11.11 Trend Pen Configuration.....	125
11.12 Spare Parts.....	126
SECTION 12 – PERIPHERAL POWER SUPPLY.....	129
12.1 Overview.....	129
12.2 Auxiliary Power Supply Cabling.....	130
12.3 Replacing the Peripheral Power Supply.....	131
12.4 Peripheral Power Supply Cabling.....	132
12.5 Assemblies.....	133
12.6 Spare Parts.....	135
SECTION 13 – TOUCHSCREEN SERVICE.....	137
13.1 Overview.....	137
13.2 Cleaning the Touchscreen Window.....	137
13.3 Touchscreen Alignment Verification.....	138
13.4 Touchscreen Alignment Procedure.....	141
13.5 Removing the Touchscreen Assembly from a Monitor.....	143
13.6 Replacing the Touchscreen Assembly on a Monitor.....	145
13.7 Removing the Touchscreen Controller from a Monitor.....	146
13.8 Replacing the Touchscreen Controller on a Monitor.....	147
13.9 Spare Parts.....	147
SECTION 14 – MONITOR SERVICE.....	149
14.1 Overview.....	149
14.2 Monitor Assembly.....	149
14.3 Termination Switch Configuration.....	150
14.4 Cleaning the Monitor CRT.....	151
14.5 Monitor Access.....	152
14.6 Removing the Monitor.....	152
14.7 Installing the Monitor.....	156
14.8 Replacing the Monitor Control Subassembly.....	157
14.9 Monitor Adjustments.....	158
14.10 Monitor Color Bias Adjustments.....	160
14.11 Monitor Focus Adjustment.....	161
14.12 Vertical Linearity Adjustment.....	162
14.13 Horizontal Linearity Adjustment.....	163
14.14 Side Pin Cushion Control.....	164
14.15 Further Adjustments.....	164
14.16 Fuse Replacement.....	165
14.17 Spare Parts.....	165

Table of Contents

SECTION 15 – MONITOR SERVICE—CE COMPLIANT MONITOR.....	167
15.1 Overview.....	167
15.2 Monitor Assembly.....	168
15.3 Cleaning the Monitor CRT.....	169
15.4 Monitor Access.....	169
15.5 Removing the Monitor.....	170
15.6 Installing the Monitor.....	174
15.7 Replacing the Monitor Control Subassembly.....	175
15.8 Screen Adjustments.....	176
15.9 Adjustments for Touchscreen Optimization.....	177
15.10 Termination Setting.....	178
15.11 Cabling Connections.....	179
15.12 Degaussing the Monitor.....	180
15.13 Spare Parts.....	181
SECTION 16 – ASPI-32 PRINTER.....	183
16.1 Overview.....	183
16.2 Cleaning.....	184
16.3 Test/Troubleshooting Procedures.....	185
16.4 Troubleshooting Analysis.....	186
16.5 Removal/Replacement.....	188
16.6 Spare Parts.....	195
SECTION 17 – ASPI-41 PRINTER.....	197
17.1 Overview.....	197
17.2 Cleaning.....	198
17.3 Adjustments.....	198
17.4 Test/Troubleshooting.....	199
17.5 Printer Self-Tests.....	202
17.6 Diagnostic Procedure.....	204
17.7 Printer Removal and Replacement.....	207
17.8 Printer Removal.....	207
17.9 Printer Replacement or Installation.....	208
17.10 Paper Chute Installation.....	209
17.11 Ribbon Removal.....	211
17.12 Installing the Ribbon Cartridge.....	212
17.13 Installing a New Print Head.....	214
17.14 Printer Parts Replacement.....	215
17.15 Cabinet Removal/Replacement.....	216
17.16 Replacement of Main PWA (BAS4X).....	218
17.17 Removal/Replacement of Print Mechanism.....	219
17.18 Replacement of Power Supply PWA (ALI4X).....	221
17.19 Carriage Group Disassembly.....	222
17.20 Motor Group Disassembly.....	224
17.21 Printer Adjustments.....	227
17.22 Carriage Belt Adjustment.....	228
17.23 Paper Belt Tension Adjustment.....	229
17.24 Print Head to Platen Adjustment.....	230
17.25 Startup.....	231
17.26 Spare Parts.....	231

Table of Contents

SECTION 18 – ASPI-46 PRINTER.....	233
18.1 Overview.....	233
18.2 Cleaning.....	233
18.3 Adjustments.....	234
18.4 Test/Troubleshooting.....	234
18.5 Problem Solving.....	235
18.6 Printer Self-Tests.....	238
18.7 Diagnostic Procedure.....	240
18.8 Printer Removal.....	243
18.9 Printer Replacement.....	243
18.10 Ribbon Removal.....	244
18.11 Ribbon Installation.....	245
18.12 Printer Parts Removal.....	249
18.13 Upper Cabinet Removal/Replacement.....	249
18.14 Power Supply PWA Removal.....	251
18.15 Replacement of Main Processing Board.....	252
18.16 Startup.....	254
18.17 Spare Parts.....	254
SECTION 19 – SIGNUM 2043 PRINTER.....	257
19.1 Overview.....	257
19.2 Printer Cleaning.....	261
19.3 Printer Adjustments.....	261
19.4 Troubleshooting/Testing.....	262
19.4.1 Power Malfunctions.....	263
19.5 Printer Initialization.....	264
19.6 Printer Display Errors.....	264
19.6.1 Status Errors.....	265
19.6.2 Recoverable Errors.....	267
19.6.3 Nonrecoverable Errors.....	269
19.7 Printer Self-Test.....	270
19.8 Hex Dump Test.....	272
19.9 Fault Probability Guide.....	273
19.10 Test and Diagnostic Procedure.....	278
19.11 Printer Replacement.....	282
19.12 Ribbon Cartridge Replacement.....	284
19.13 Tractor Installation/Removal.....	285
19.14 Print Head Replacement.....	293
19.15 Spare Parts.....	295

Figures

Figure 1-1	Location of AC Power Switch.....	1
Figure 1-2	Features of the Station.....	2
Figure 2-1	US Options.....	8
Figure 2-2	View of Upper Station Base.....	10
Figure 2-3	Front View of Station.....	11
Figure 2-4	Rear View of Station Base.....	12
Figure 2-5	Keyboard Top.....	13
Figure 2-6	Under the Keyboard.....	14
Figure 2-7	Dual Monitor Station, Front View.....	15
Figure 2-8	Dual Monitor Station, Rear View.....	16
Figure 2-9	Removable Media Tray with Cartridge Drives.....	17
Figure 2-10	Location of Facade and Removable Media Drives.....	17
Figure 2-11	Peripheral Power Supply and Fan Assembly.....	18
Figure 2-12	Card File Enclosure.....	19
Figure 2-13	AC Power Distribution Board.....	20
Figure 2-14	Removing the Lower Monitor Shroud.....	22
Figure 2-15	Exploded View of Monitors.....	24
Figure 2-16	Mounting Card File Support Tray.....	25
Figure 2-17	Moving of the Cabinet Dust Filter.....	26
Figure 2-18	Mounting Cover Mounting Brackets.....	27
Figure 2-19	Mounting the Card File Assembly.....	28
Figure 2-20	Grounding Connection.....	30
Figure 2-21	Installation of Module Dust Filter.....	31
Figure 2-22	LCN Cables on Existing Dual Node Module.....	33
Figure 2-23	Adding New Dual Node Module to LCN Cable A.....	34
Figure 2-24	Adding New Dual Node Module to LCN Cable B.....	35
Figure 2-25	LCN Cables on Existing Dual Node Module.....	36
Figure 2-26	Adding New Five-Slot Module to LCN Cable A.....	37
Figure 2-27	Adding New Five-Slot Module to LCN Cable B.....	38
Figure 3-1	Extended Auxiliary Keyboard Shelf.....	56
Figure 3-2	Manifold Board.....	58
Figure 3-3	Keyboard and Manifold Cabling.....	60
Figure 3-4	Engineer's Keyboard and Keyboard Slide Tray.....	63
Figure 3-5	Annunciator Schematic.....	65
Figure 3-6	Location of Annunciator Board.....	66
Figure 4-1	Integrated Keyboard.....	42
Figure 4-2	Full Travel Keyboard.....	43
Figure 4-3	Relegendable Function Key Panel.....	44
Figure 4-4	Operator's Control Panel.....	45
Figure 4-5	Integrated Keyboard Trackball.....	46
Figure 4-6	Keyboard/Manifold Board Cabling.....	48
Figure 4-7	Location of Keyboard Screws.....	51
Figure 4-8	View of Keyboard Connectors from the Rear.....	51
Figure 4-9	Keyboard Grounding Bolt Assembly.....	52
Figure 5-1	Universal Station Mouse.....	69
Figure 6-1	UniversalX Station Trackball.....	73
Figure 7-1	Dual Node Module.....	77
Figure 8-1	Cartridge Drive Mounting.....	85
Figure 8-2	20 MB Cartridge Drive Cabling.....	87
Figure 8-3	20 MB Cartridge Drive SCSI Bus Termination.....	88
Figure 8-4	20 MB Cartridge Drive SCSI Address Pinning.....	88
Figure 8-5	150 MB Iomega Bernoulli Cartridge Drive Pinning.....	89

Figures

Figure 9-1	CE Compliant Cartridge Drive Enclosure	94
Figure 9-2	Cartridge Cabling	95
Figure 9-3	Exploded View of a CE Compliant Drive Enclosure	95
Figure 9-4	Location of Facade Mounting Screws	97
Figure 9-5	Location of Mounting Screws	98
Figure 9-6	Removal of Screws to Open Drive Enclosure	98
Figure 9-7	150 MB Cartridge Drive SCSI Bus Address Pinning	99
Figure 10-1	Trend Pen Recorder with Chart Cassette	103
Figure 10-2	Rear of Trend Pen Recorder	104
Figure 10-3	Trend Pen Recorder Cabling	107
Figure 10-4	Location of Retaining Screw and Pull Bar	109
Figure 10-5	Optional AC Power Configuration	110
Figure 11-1	Trend Pen Recorder with Chart Cassette	115
Figure 11-2	Rear of Trend Pen Recorder	116
Figure 11-3	Trend Pen Recorder Cabling	119
Figure 11-4	Mounting of Trend Pen Recorder Using Jackscrews	120
Figure 11-5	Replacing Battery	124
Figure 12-1	Auxiliary Power Connections	130
Figure 12-2	Peripheral Power Supply Cabling	132
Figure 12-3	Peripheral Power Supply Cabling	132
Figure 12-4	Peripheral Power Supply Assembly 51197004-100	133
Figure 12-5	Peripheral Power Supply Assembly 51197004-200	134
Figure 13-1	HVTS PDGI Test 15 Test Pattern	142
Figure 13-2	Touchscreen Assembly Exploded View	143
Figure 13-3	Touchscreen Controller Mounted to Monitor	146
Figure 14-1	Monitor Mounting and Cables	152
Figure 14-2	Monitor and Touchscreen Mounting	154
Figure 14-3	Location of Monitor Mounting Bolts	155
Figure 14-4	Location of Monitor Retaining Block	156
Figure 14-5	Monitor Control Assembly	157
Figure 14-6	Right Side Monitor Adjustments	158
Figure 14-7	Left Side Monitor Adjustments	159
Figure 15-1	CE Compliant Monitor—51197018	167
Figure 15-2	Monitor Mounting and Cables	170
Figure 15-3	Monitor and Touchscreen Mounting	172
Figure 15-4	Location of Mount Assembly Bolts	173
Figure 15-5	Location of Monitor Retain Block	174
Figure 15-6	Monitor Control Assembly	175
Figure 15-7	Screen Adjustments	176
Figure 15-8	Location and Setting of Terminations	178
Figure 15-9	Cabling Connections	179
Figure 15-10	Location of Degauss Button	180
Figure 16-1	ASPI-32 Printer	183
Figure 16-2	PWA and Bulk Power Assembly	189
Figure 16-3	Print/Function Selection	190
Figure 16-4	PWA Pinning Options	191
Figure 16-5	Printer Intercabling	192
Figure 16-6	MIRA Mechanical Assembly	193
Figure 16-7	Print Head Adjustment	194
Figure 16-8	Inked Ribbon Traction Cords Positioning	194

Figures

Figure 17-1	ASPI-41 Printer.....	197
Figure 17-2	ASPI-41 Self-Test Print Pattern.....	203
Figure 17-3	Printer User Diagnostic Test Message	206
Figure 17-4	Paper Chute Installation.....	210
Figure 17-5	Ribbon Removal	211
Figure 17-6	Ribbon Installation.....	212
Figure 17-7	Printer Cabinet—Exploded View.....	217
Figure 17-8	Replacement of Main PWA (BAS4X).....	218
Figure 17-9	Removal/Replacement of Print mechanism.....	220
Figure 17-10	Replacement of Power Supply PWA (ALI4X).....	221
Figure 17-11	Carriage Group Disassembly	223
Figure 17-12	Removal of Paper Motor and Carriage Motor.....	225
Figure 17-13	Color Motor Replacement.....	226
Figure 17-14	Carriage Belt Adjustment.....	228
Figure 17-15	Paper Belt Adjustment	229
Figure 17-16	Print Head to Platen Adjustment	230
Figure 18-1	Self-Test Print Pattern.....	239
Figure 18-2	Printer Diagnostic Test Pattern.....	241
Figure 18-3	Printer Front Cover.....	246
Figure 18-4	Paper Bail, Print head, and Paper Thickness Lever.....	246
Figure 18-5	Ribbon Cartridge.....	247
Figure 18-6	Plastic Mask Attachment.....	247
Figure 18-7	Ribbon Cartridge Alignment.....	248
Figure 18-8	Upper Cabinet Removal.....	250
Figure 18-9	Power Supply PWA Replacement.....	251
Figure 18-10	Replacement of Main Processing PWA.....	253
Figure 19-1	Front View of Signum 2043 Printer.....	258
Figure 19-2	Rear View of Signum 2043 Printer.....	259
Figure 19-3	Signum 2043 Printer Pictorial.....	260
Figure 19-4	Signum 2043 Printer Self-Test Print Pattern	271
Figure 19-5	Front Tractor Push Operation.....	286
Figure 19-6	Rear Tractor Push Operation.....	288
Figure 19-7	Rear Tractor Pull Operation.....	290
Figure 19-8	Front Tractor Push or Rear Tractor Pull Operation.....	291
Figure 19-9	Front Tractor Push and Rear Tractor Pull Operation	292
Figure 19-10	Print Head Replacement.....	294

Tables

Table 1-1	Cartridge Drive Operating Procedure.....	3
Table 1-2	Periodic Replaceable Items.....	5
Table 2-1	Removing Card File Enclosure.....	19
Table 2-2	Monitor Mounting Accumulation Kit 51197035-200	21
Table 2-3	Procedure for Adding Upper Monitor.....	23
Table 2-4	Procedure for Adding a Card File.....	25
Table 2-5	Furniture Spare Parts	39
Table 3-1	Cleaning the Keyboard.....	56
Table 3-2	Removing the Keyboard.....	57
Table 3-3	Connecting the Operator Entry Panel.....	57
Table 3-4	Replacing the Manifold Board	59
Table 3-5	Cabling Schematic Key List.....	61
Table 3-6	Replacing the Multitone Annunciator.....	64
Table 3-7	Annunciator Relay Specifications.....	65
Table 3-8	Replacing the Annunciator Panel.....	66
Table 3-9	Keyboard Spare Parts	67
Table 4-1	Cleaning the Keyboard.....	47
Table 4-2	Cleaning the Trackball	47
Table 4-3	Troubleshooting the Keyboard.....	49
Table 4-4	Removing the Integrated Keyboard.....	50
Table 4-5	Replacing the Integrated Keyboard.....	52
Table 4-6	Integrated Keyboard Spare Parts	53
Table 5-1	Cleaning the Mouse.....	70
Table 5-2	Troubleshooting the Mouse	71
Table 5-3	Mouse Spare Parts.....	72
Table 6-1	Cleaning the Trackball	74
Table 6-2	Troubleshooting the Trackball.....	74
Table 6-3	Trackball Spare Parts.....	75
Table 7-1	Replacing a Module.....	78
Table 7-2	Replacing a Filter.....	79
Table 7-3	Module Spare Parts.....	80
Table 8-1	Loading a Cartridge.....	82
Table 8-2	Unloading a Cartridge.....	82
Table 8-3	Cleaning a Cartridge Drive.....	83
Table 8-4	Troubleshooting a Cartridge Problem.....	84
Table 8-5	Removing a Cartridge Drive.....	85
Table 8-6	Replacing a Cartridge Drive.....	86
Table 8-7	20 MB Cartridge Drive Spare Parts.....	90
Table 8-8	150 MB Cartridge Drive Spare Parts.....	90
Table 9-1	Loading a Cartridge.....	92
Table 9-2	Unloading a Cartridge.....	92
Table 9-3	Cleaning a Cartridge Drive.....	93
Table 9-4	Troubleshooting a Cartridge Problem.....	96
Table 9-5	Drive Enclosure Access.....	97
Table 9-6	Drive Enclosure Removal.....	97
Table 9-7	Replacing a DAT Drive.....	100
Table 9-8	Assembling the Drive Enclosure	100
Table 9-9	150 MB Cartridge Drive Spare Parts.....	101
Table 9-10	Drive Enclosure Spare Parts	101
Table 10-1	Removing Chart Cassette.....	105
Table 10-2	Replacing a Pen Wheel	106
Table 10-3	Removing a Trend Pen Recorder (Chassis).....	108
Table 10-4	Replacing a Trend Pen Recorder (Chassis).....	109
Table 10-5	Configuration Data for DPR 1000.....	112
Table 10-6	Trend Pen Recorder Spare Parts	113

Tables

Table 11-1	Removing Chart Cassette.....	117
Table 11-2	Replacing a Pen Wheel	118
Table 11-3	Removing a Trend Pen Recorder (Unit)	120
Table 11-4	Replacing a Trend Pen Recorder (Chassis).....	121
Table 11-5	Replacing the Battery.....	123
Table 11-6	DPR 100 Trend Pen Recorder Spare Parts.....	126
Table 12-1	Replacing a Peripheral Power Supply.....	131
Table 12-2	Peripheral Power Supply Spare Parts.....	135
Table 13-1	Cleaning the Touchscreen Window.....	137
Table 13-2	Aligning the Touchscreen	138
Table 13-3	Aligning the CRT to the Touchscreen.....	141
Table 13-4	Removing the Touchscreen from a Monitor.....	144
Table 13-5	Replacing a Touchscreen.....	145
Table 13-6	Removing a Touchscreen from a Monitor.....	146
Table 13-7	Replacing a Touchscreen Controller.....	147
Table 13-8	Touchscreen Spare Parts.....	147
Table 14-1	Accessing the Monitor.....	152
Table 14-2	Removing the Monitor.....	153
Table 14-3	Installing the Monitor	156
Table 14-4	Replacing the Monitor Control Subassembly.....	157
Table 14-5	Adjusting the Color Bias	160
Table 14-6	Adjusting Focus.....	161
Table 14-7	Adjusting Vertical Linearity.....	162
Table 14-8	Adjusting Horizontal Linearity.....	163
Table 14-9	Adjusting Side Pin Cushion.....	164
Table 14-10	Monitor Spare Parts.....	165
Table 15-1	Accessing the Monitor.....	169
Table 15-2	Removing the Monitor.....	171
Table 15-3	Installing the Monitor	174
Table 15-4	Replacing the Monitor Control Subassembly.....	175
Table 15-5	Adjusting Monitor for Touchscreen Optimization.....	177
Table 15-6	Monitor Spare Parts.....	181
Table 16-1	ASPI-32 Cleaning Procedure.....	184
Table 16-2	Print Test Procedure.....	185
Table 16-3	Indicator Test Procedure	185
Table 16-4	Troubleshooting Guide	186
Table 16-5	Test Display Description	187
Table 16-6	Parts Replacement Procedure.....	188
Table 16-7	Spare Parts.....	195
Table 17-1	ASPI-41 Printer Cleaning Procedure.....	198
Table 17-2	General Troubleshooting Approach.....	199
Table 17-3	Problem Solving Guide.....	200
Table 17-4	ASPI-41 Self-Test Procedure	202
Table 17-5	Failure Diagnostic.....	204
Table 17-6	Diagnostic Procedure Error Messages.....	206
Table 17-7	Printer Removal Procedure.....	207
Table 17-8	Printer Installation Procedure.....	208
Table 17-9	Paper Chute Installation Procedure.....	209
Table 17-10	Ribbon Removal Procedure.....	211
Table 17-11	Ribbon Installation Procedure.....	213
Table 17-12	Print Head Installation Procedure	214
Table 17-13	Cabinet Removal Procedure.....	216
Table 17-14	PWA (BAS4X) Replacement Procedure	218
Table 17-15	Print Mechanism Replacement Procedure.....	219
Table 17-16	Power Supply (ALI4X) Replacement.....	221
Table 17-17	Carriage Group Disassembly Procedure.....	222
Table 17-18	Paper Motor Removal Procedure	224

Tables

Table 17-19	Carriage Motor Removal Procedure	224
Table 17-20	Color Motor Replacement Procedure	226
Table 17-21	Carriage Belt Adjustment Procedure	228
Table 17-22	Paper Belt Tension Adjustment Procedure.....	229
Table 17-23	Print Head to Platen Adjustment Procedure.....	230
Table 17-24	Spare Parts List.....	231
Table 18-1	Printer Cleaning Procedure	233
Table 18-2	General Troubleshooting Procedure.....	234
Table 18-3	Problem Solving Guide.....	235
Table 18-4	Self-Test Procedure.....	238
Table 18-5	Diagnostic Procedure.....	240
Table 18-6	Diagnostic Error Messages	242
Table 18-7	Printer Removal Procedure.....	243
Table 18-8	Printer Installation Procedure	243
Table 18-9	Ribbon Removal Procedure.....	244
Table 18-10	Ribbon Installation Procedure	245
Table 18-11	Cabinet Removal/Replacement Procedure	249
Table 18-12	Power Supply PWA Replacement Procedure	251
Table 18-13	Replacement of Main Processing Board Procedure.....	252
Table 18-14	Spare Parts List.....	254
Table 19-1	Printer Cleaning Procedure	261
Table 19-2	General Troubleshooting Procedure.....	262
Table 19-3	Power Malfunction Guide.....	263
Table 19-4	Printer Status Errors	265
Table 19-5	Printer Recoverable Errors.....	267
Table 19-6	Signum 2043 Self-Test Procedure.....	270
Table 19-7	Inconsistent Character Printing	273
Table 19-8	Printing Stops or Slow Printing.....	274
Table 19-9	Color Printing Poor.....	274
Table 19-10	Character Printing Misaligned Vertically.....	274
Table 19-11	Tractor/Friction Solenoid Not Operable.....	275
Table 19-12	Paper Not Advancing Correctly	275
Table 19-13	Display and LEDs Blank	276
Table 19-14	Display Blank	276
Table 19-15	Carriage Assembly Moves 1 Inch Right	276
Table 19-16	Printer Not Initialized and Buzzer Sounds	277
Table 19-17	T&D Tests	280
Table 19-18	Diagnostic Procedure Error Messages.....	281
Table 19-19	Printer Removal Procedure.....	282
Table 19-20	Printer Installation Procedure.....	283
Table 19-21	Ribbon Cartridge Replacement Procedure	284
Table 19-22	Tractor Front Position Installation/Removal Procedure.....	285
Table 19-23	Tractor Rear Push Position Installation/Removal Procedure	287
Table 19-24	Tractor Rear Pull Position Installation/Removal Procedure.....	289
Table 19-25	Print Head Removal/Replacement Procedure	293
Table 19-26	Optimal Replaceable Units (ORU) Parts List.....	295

Acronyms

CRT	Cathode Ray Tube
HVTS	Hardware Verification Test System
K2LCN-8	Processor/Memory/LCN Interface
LAN	Local Area Network
LCN	Local Control Network
LED	Light Emitting Diode
MB	Megabyte
ORU	Optimum Replaceable Unit
PDGI	Peripheral Display Generator Interface
Pixel	Smallest Graphic Element
RAM	Random Access Memory
RGB	Red/Green Blue (refers to three lead coax)
ROM	Read Only Memory
SCSI	Small Computer Communications Interface

References

Publication Title	Publication Number	Binder Title	Binder Number
<i>TDC 3000^X System Site Planning</i>	SW02-550	System Site Planning-1	TPS 3020-1
<i>Local Control Network Planning</i>	SW02-501	System Site Planning-1	TPS3020-1
<i>LCN System Installation</i>	SW20-500	LCN Installation	TPS 3025
<i>LCN System Checkout</i>	SW20-510	LCN Installation	TPS 3025
<i>Five/Ten-Slot Module Service</i>	LC13-500	LCN Service-2	TPS 3060-2
<i>Dual Node Module Service</i>	LC13-510	LCN Service-2	TPS 3060-2
<i>Test System Executive</i>	SW13-510	LCN Service-3	TPS 3060-3
<i>Hardware Verification Test System</i>	SW13-511	LCN Service-3	TPS 3060-3
<i>Core Module Test System</i>	SW13-512	LCN Service-3	TPS 3060-3
<i>LCNI Network Communications Test</i>	SW13-513	LCN Service-3	TPS 3060-3
<i>Process Operations Manual</i>	SW11-501	Operation/Process Operations	TPS 3050
<i>Keyboards</i>	SW09-508	Implementation/Engineering Operations-1	TPS 3032-1
<i>DPR 1000 Product Manual (Trend Pen)</i>	US11-6139	with Trend Pen Recorder	—

Section 1 – Operation

1.1 Overview

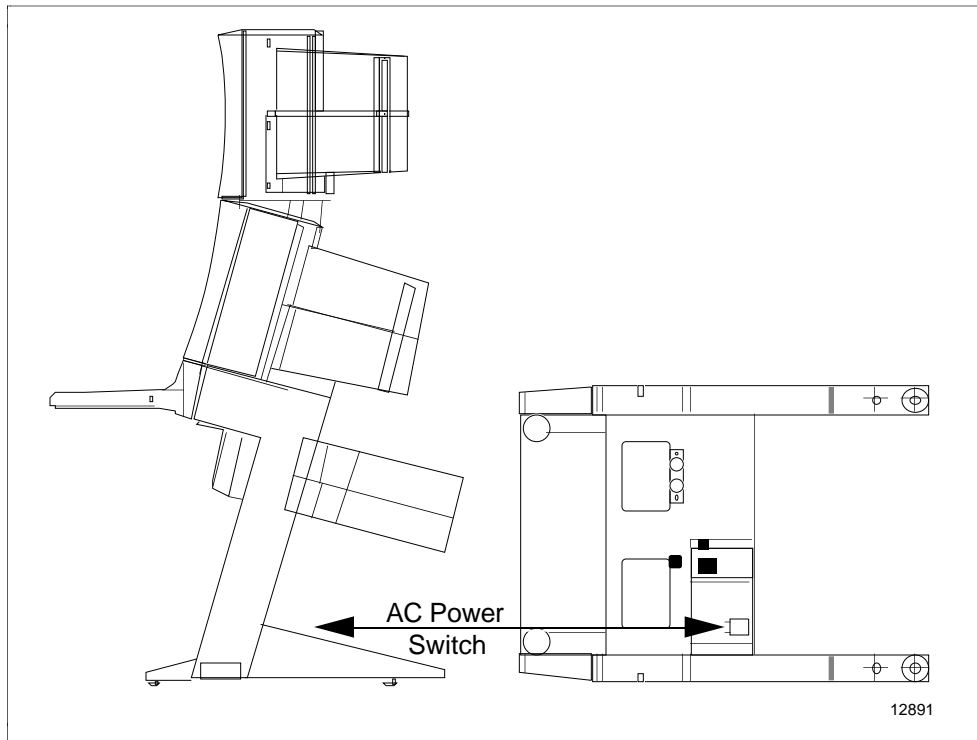
Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 1 – OPERATION.....	1
1.1	Overview.....	1
1.2	Monitor Controls.....	3
1.3	Removable Media Drives.....	3
1.4	Operator Entry Panel (OEP).....	4
1.5	Engineer's Keyboard.....	4
1.6	Periodic Replaceable Items.....	5

Power ON

The rocker switch located on the rear of the footrest (see Figure 1-1) is a master switch for the station. This switch controls the power to the entire station.

Figure 1-1 Location of AC Power Switch

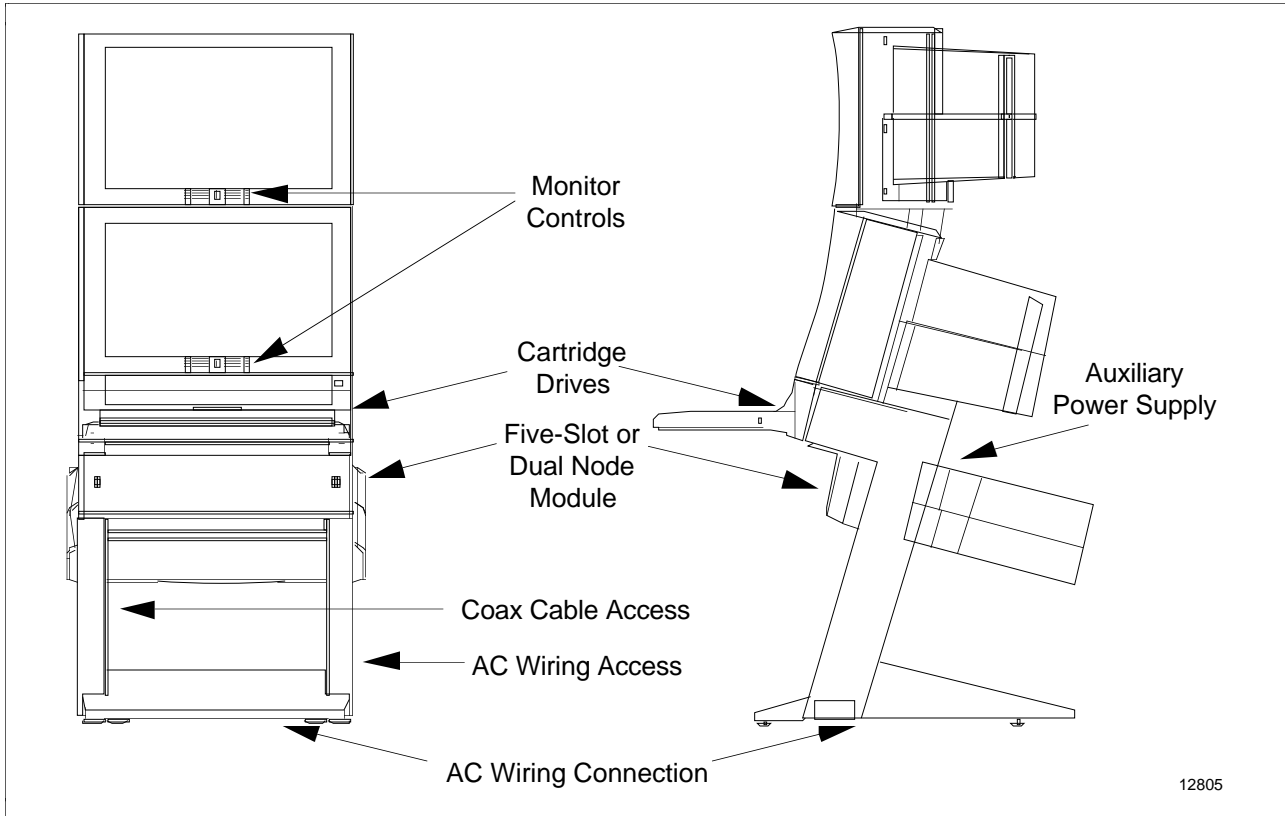


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1.1 Overview, Continued

Illustration

Figure 1-2 Features of the Station



1.2 Monitor Controls

Description

Monitor controls that control the following functions are located behind the HONEYWELL logo panel at the bottom of each Monitor:

- Intensity—a sliding control that controls the intensity of the Monitor
- Contrast—a sliding control that controls the contrast of the Monitor
- Degauss button—press the square button in the center until color purity is established.

1.3 Removable Media Drives

Description

Removable media drive(s) for the following media types of removable media are located behind the access plate located just above the Operator Entry Panel.

- Cartridge drive, single or dual

Operation

Table 1-1 Cartridge Drive Operating Procedure

Removable Media Drive	Function	Action
Cartridge Drive	Load	Insert the cartridge in the drive—the LED will flash until the drive has spun up to speed.
	Unload	Press the unload button—the LED will flash until the drive has unloaded. Remove the cartridge by pulling the cartridge out of the drive.
	Access	LED will light when the cartridge is accessed.

1.4 Operator Entry Panel (OEP)

Description

The Operator Entry Panel provides the ability for a user to input information to the system by way of a keyboard. This functionality is controlled by a keyswitch that provides access to the following functionality (in ascending order of functionality):

- Operator functions
- Supervisor functions
- Engineer functions

See the *Process Operations Manual*, *Keyboards* manual, and the various engineering functions manual for more detailed descriptions of this functionality.

1.5 Engineer's Keyboard

Description

The US Auxiliary Keyboard provides additional engineering functionality not available on the OEP. The keyboard has additional functionality in a Universal Station when in an emulation mode. See the *Keyboards* manual.

The keyboard is placed on the extended keyboard support when in use. When not in use, it can be stored in the auxiliary keyboard scabbard, mounted inside the right leg if the station is so equipped.

1.6 Periodic Replaceable Items

Table

Table 1-2 Periodic Replaceable Items

Part Number	Description
51195169-100	Cartridge Disk, 20 MB
51196485-100	35 MB Multidisk 150 MB compatible 5.25" Cartridge
51196485-400	150 MB Multidisk 150 MB Compatible 5.25" Cartridge
51196485-500	Cartridge Disk Device Cleaning Kit
51401499-100	Keyboard Insert, Blank
51401499-200	Keyboard Insert for use with HVTS
51194335-902	Matrix Printer Ribbon—ASPI-32 (optional long-life)
51108305-700	Ribbon, Black—ASPI-41
51195091-700	Ribbon, Black—ASPI-46
51196690-400	Ribbon, Black—Signum 2043 (15-pack)
51196690-401	Ribbon, Black—Signum 2043 (single-pack)
51196690-500	Ribbon, Color—Signum 2043 (15-pack)
51196690-501	Ribbon, Color—Signum 2043 (single-pack)

Section 2 – Furniture Hardware

2.1 Overview

Section contents

These are the topics covered in this section:

	Topic	See Page
	SECTION 2 – FURNITURE HARDWARE.....	7
2.1	Overview.....	7
2.2	US Node Configurations.....	8
2.3	Furniture Base.....	10
2.4	Keyboard Top.....	13
2.5	Under the Keyboard.....	14
2.7	Removable Media Drives.....	17
2.8	Peripheral Power Supply.....	18
2.9	Card File Enclosure.....	19
2.10	AC Power Distribution.....	20
2.11	Adding an Upper Monitor Mounting.....	21
2.12	Adding a Second Card File.....	25
2.13	Spare Parts.....	39

Description

Ergonomically designed Universal Station furniture is available in three heights (this refers to keyboard height):

- 650 mm (Small)
- 700 mm (Medium)
- 750 mm (Tall)

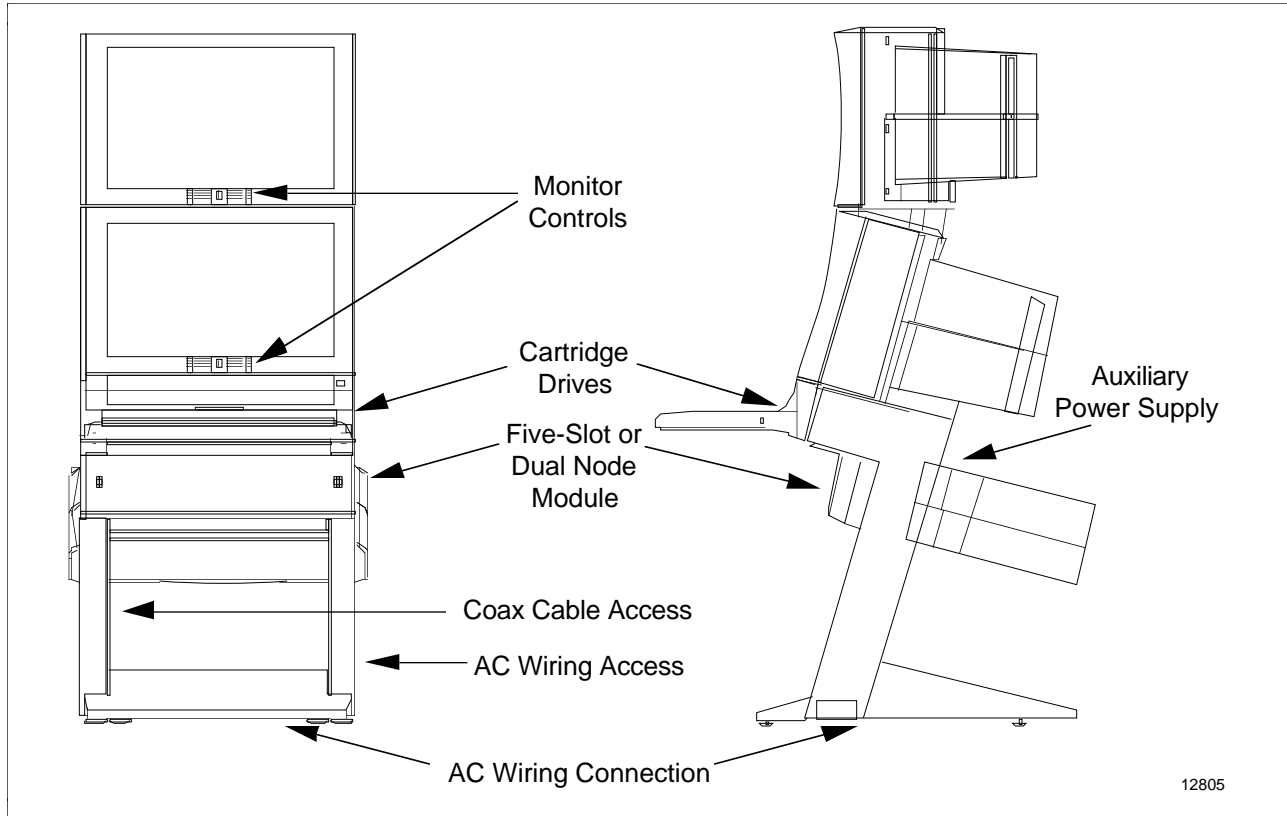
Ergonomic designed Universal Station furniture has the following features:

- 21-inch Flat Square Tube (FST) Monitor
 - Low Resolution—640 x 448 pixels (US node)
- Touchscreen capability on both Monitors (lower and upper—optional)
- Trackball for cursor control (optional) or Mouse for cursor control (optional)
- QWERTY Operator Entry Panel (OEP) keyboard
- US Auxiliary Keyboard (Engineer’s Keyboard)
- Up to four nodes in the station
 - Five-Slot Module (one or two modules—up to two nodes) and/or
 - Dual Node Module (one or two modules—up to 4 nodes)
- Work surface furniture (for printer, etc.)

2.2 US Node Configurations

Illustration

Figure 2-1 US Options



2.2 US Node Configurations, Continued

Descriptions

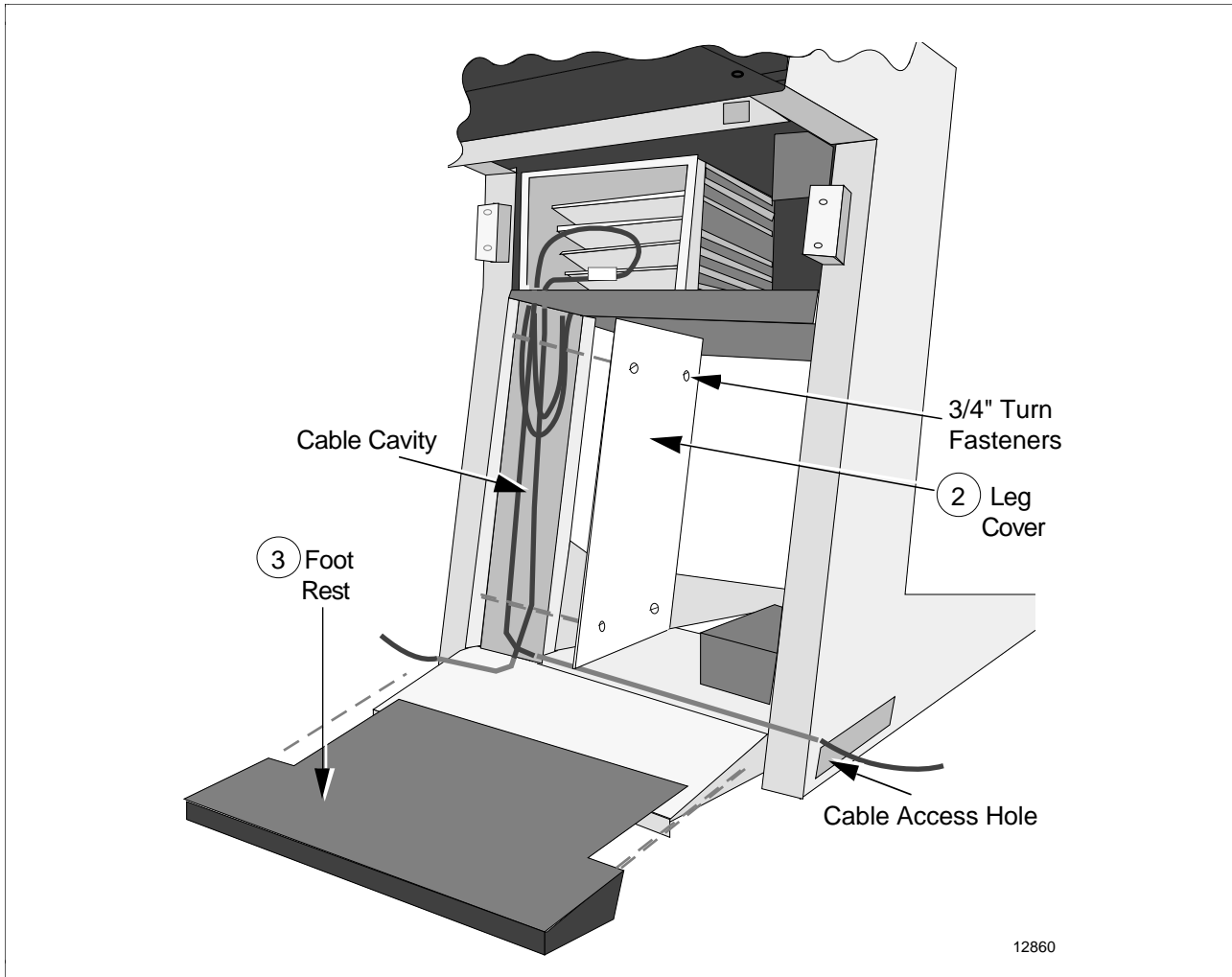
Universal Station (US) nodes are associated with both upper and lower monitor positions. US nodes in ergonomic furniture have all the options normally associated with a US in standard furniture except for floppy disk drives.

- one or two 21-inch Flat Square Tube (FST) monitors
 - Standard Resolution—640 x 448 pixels
 - Three options for cursor control on lower monitor
 - Touchscreen capability on the monitor
 - Trackball for cursor control
 - Mouse for cursor control
 - Touchscreen control of cursor on upper monitor
 - QWERTY Operator Entry Panel (OEP) keyboard
 - US Auxiliary Keyboard (Engineer's Keyboard)
 - Up to four nodes in the station
 - Five-Slot Module (one or two)
 - Dual Node Module (one or two)
one of each of the above
 - Cartridge Drive (one or two)
 - Printer (optional)
 - Trend Pen recorders (optional)
-

2.3 Furniture Base

Parts identification The base for the cabinet is shown in Figure 2-2. The number in the circle is the item number in the spare parts list.

Figure 2-2 View of Upper Station Base



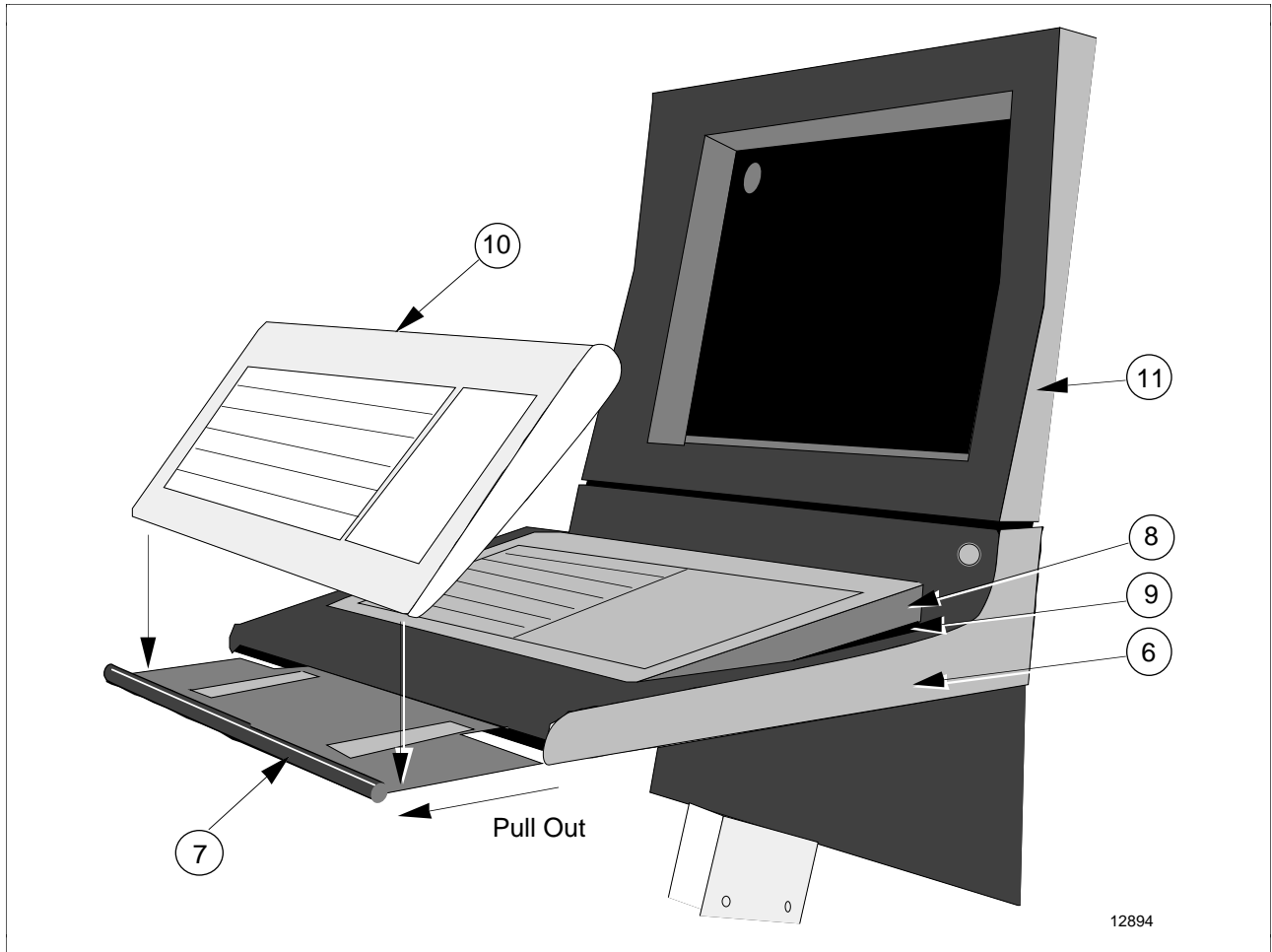
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2.3 Furniture Base, Continued

Parts identification,
continued

The front of the cabinet is shown in Figure 2-3. The number in the circle is the item number in the spare parts list.

Figure 2-3 Front View of Station



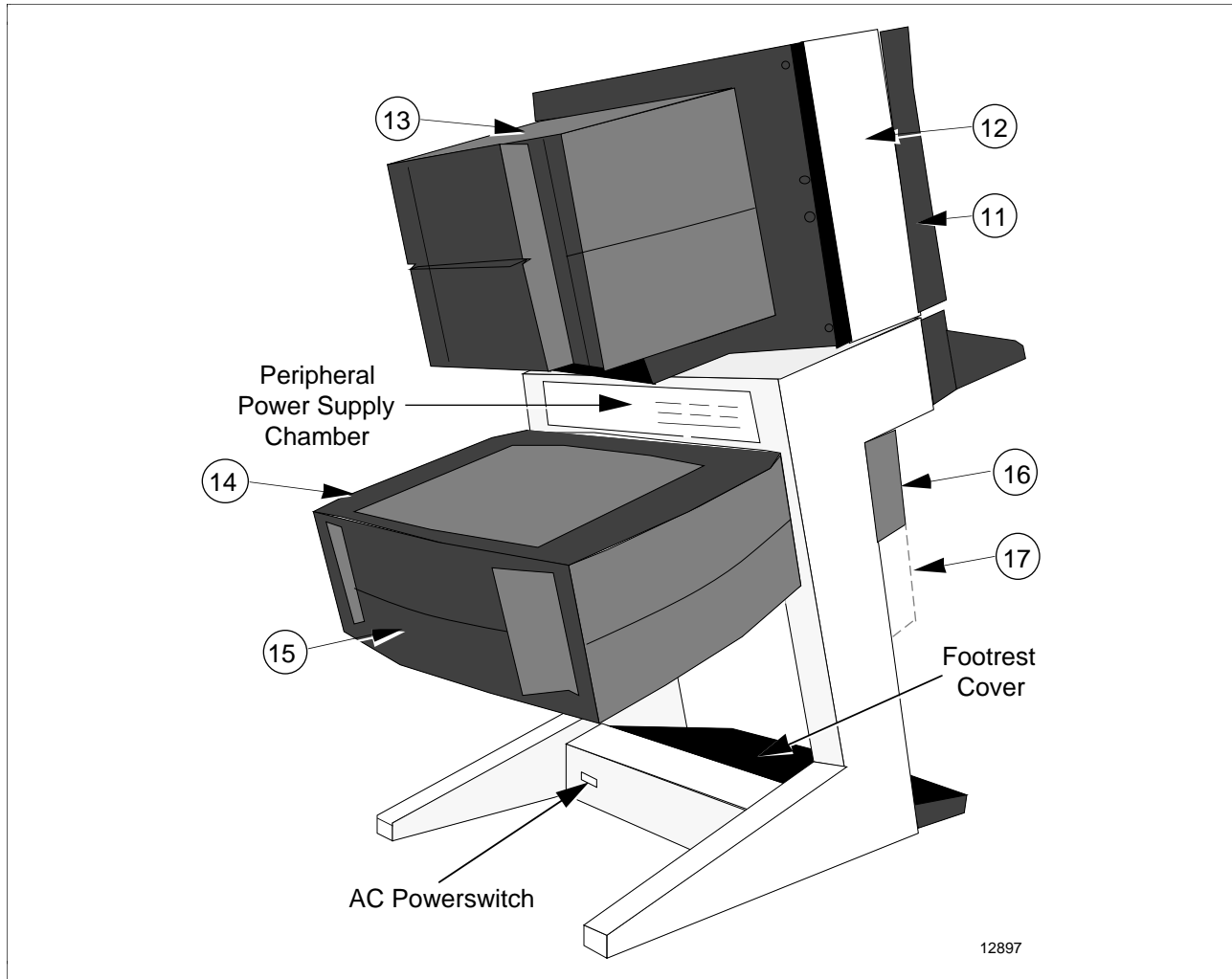
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2.3 Furniture Base, Continued

Parts identification,
continued

The base for the cabinet is shown in Figure 2-4. The number in the circle is the item number in the spare parts list.

Figure 2-4 Rear View of Station Base

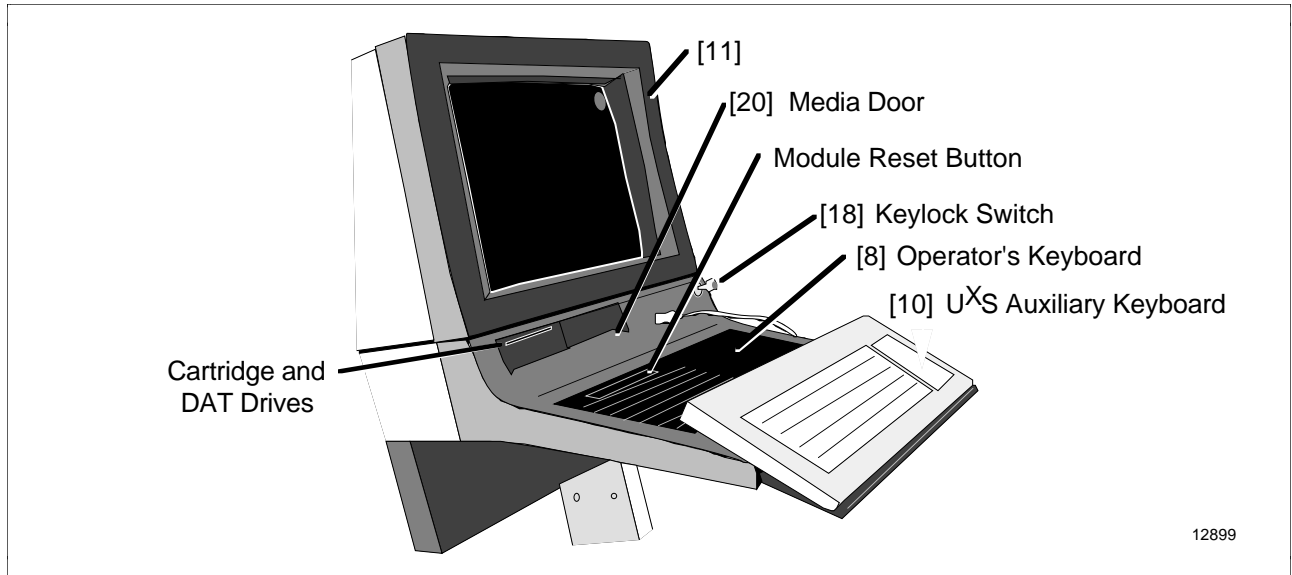


2.4 Keyboard Top

Parts identification

The keyboard top view is shown in Figure 2-5. The number in the circle is the item number in the spare parts list.

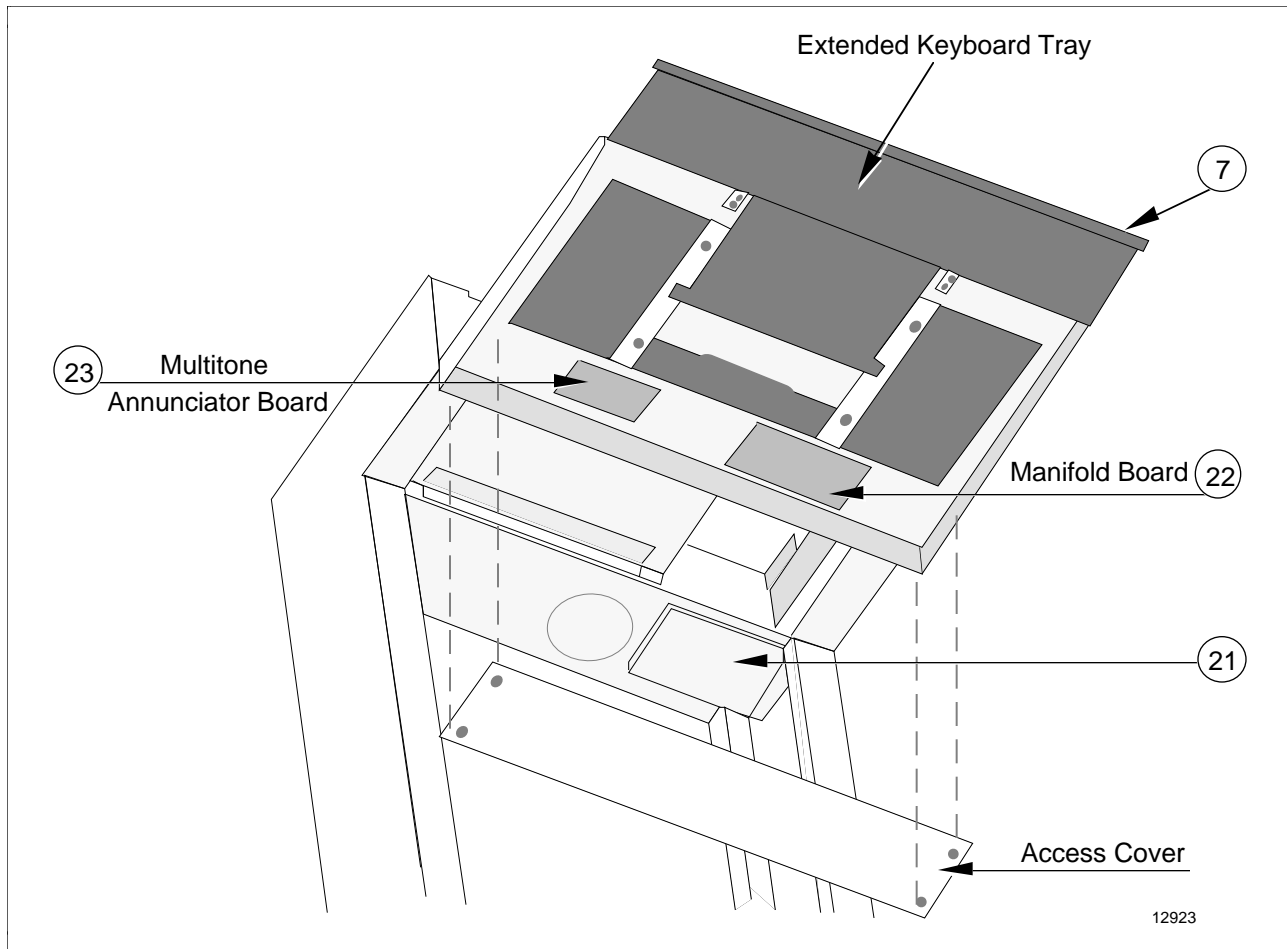
Figure 2-5 Keyboard Top



2.5 Under the Keyboard

Parts identification The view under the keyboard is shown in Figure 2-6. The number in the circle is the item number in the spare parts list.

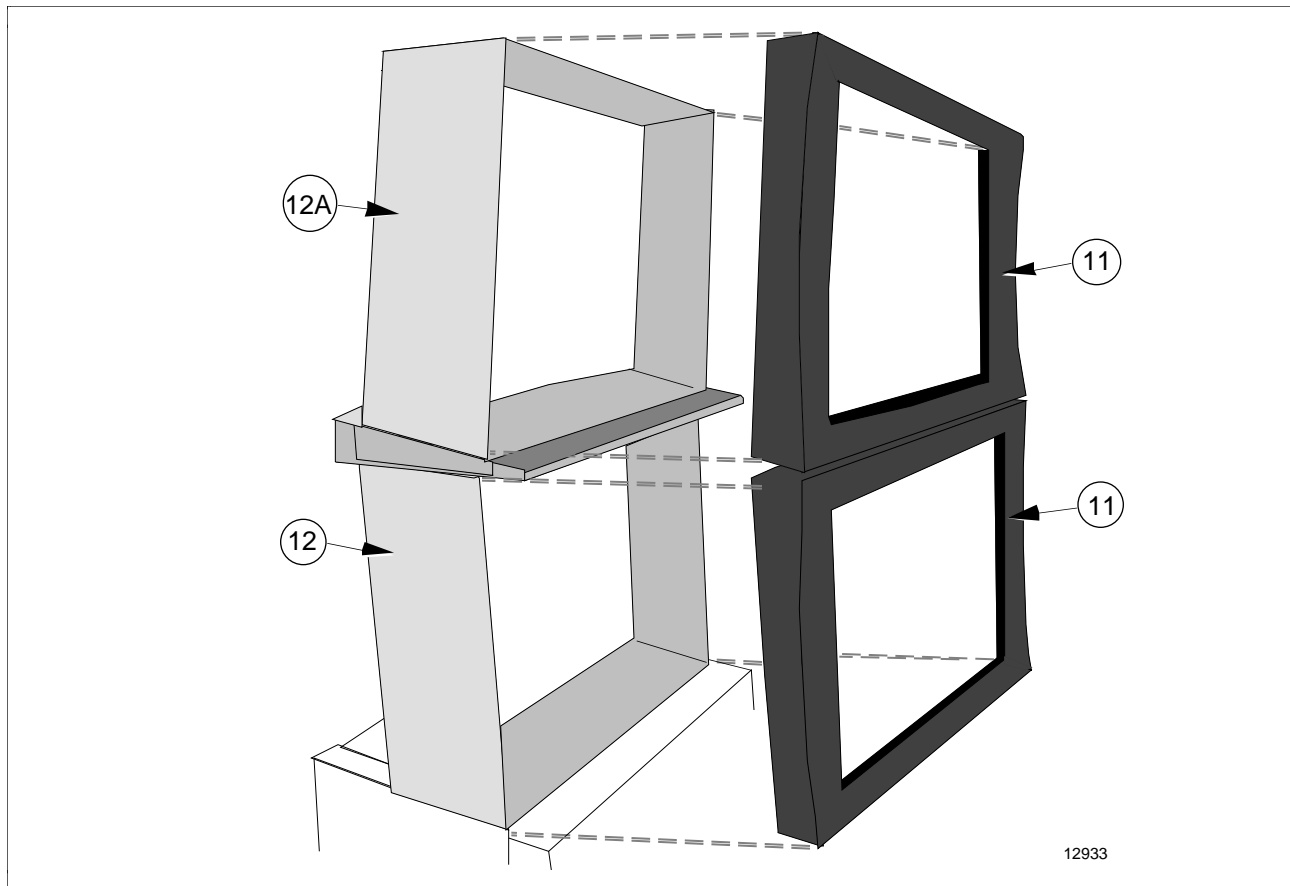
Figure 2-6 Under the Keyboard



2.6 Upper View of Station

Parts identification A front view of a dual monitor station is shown in Figure 2-7. The number in the circle is the item number in the spare parts list.

Figure 2-7 Dual Monitor Station, Front View



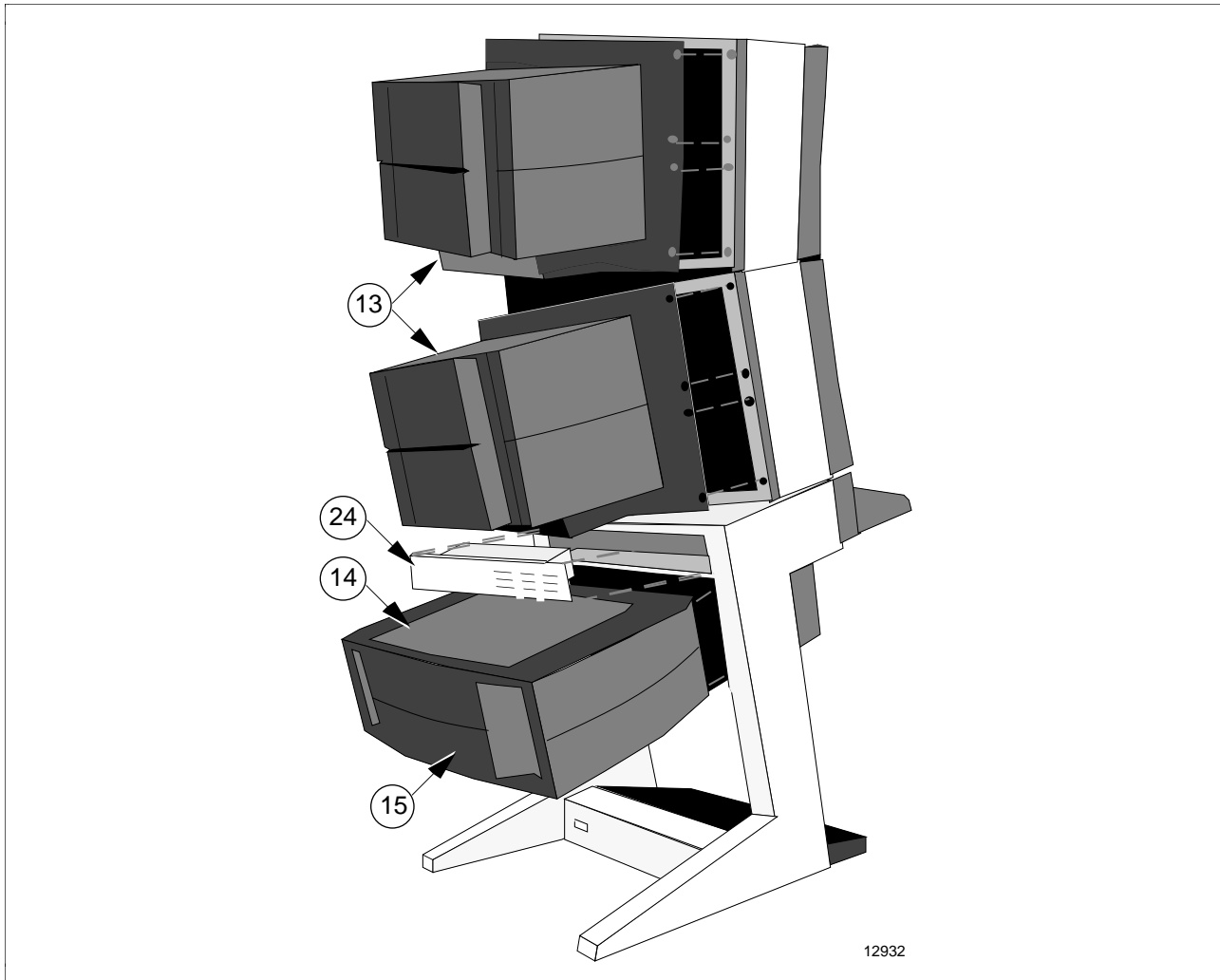
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2.6 Upper View of Station, Continued

Parts identification,
continued

A rear view of a dual monitor station configuration is shown in Figure 2-8. The number in the circle is the item number in the spare parts list.

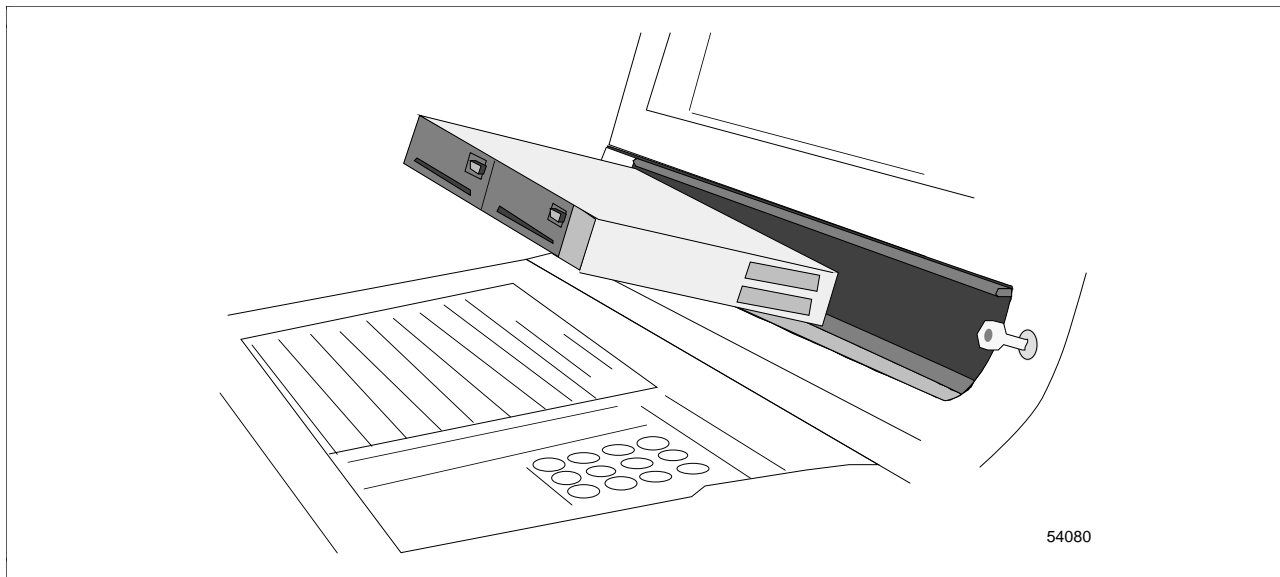
Figure 2-8 Dual Monitor Station, Rear View



2.7 Removable Media Drives

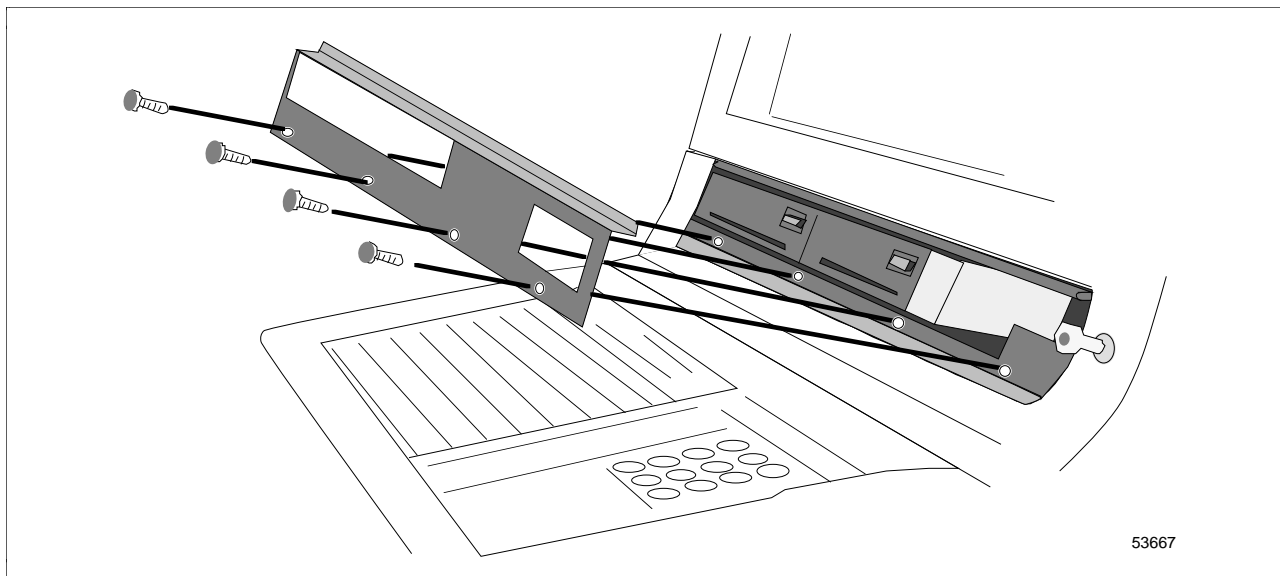
Parts identification The removable media tray with two cartridge drives is shown in Figure 2-9. See the Cartridge Drive Service section for details.

Figure 2-9 Removable Media Tray with Cartridge Drives



EMI shielding enclosure In current production Universal Stations the removable media drive are enclosed in an EMI shielding metal enclosure that is located behind a facade that covers the front of the drive cavity shown below.

Figure 2-10 Location of Facade and Removable Media Drives



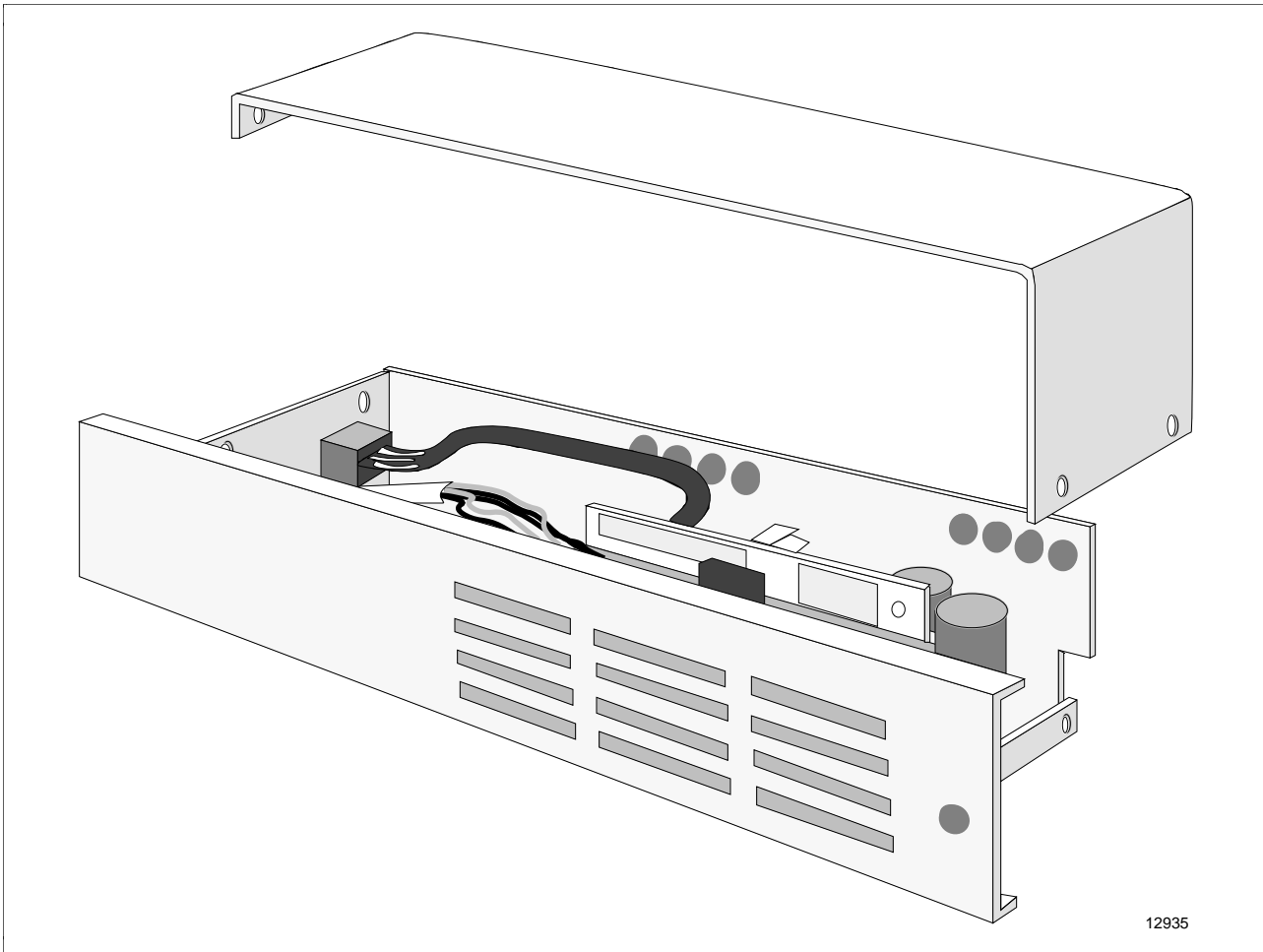
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2.8 Peripheral Power Supply

Parts identification

The Peripheral Power Supply and fan assembly are shown in Figure 2-11. The assembly and fan are meant to be reused. The Peripheral Power Supply is spared separately. See the Peripheral Power Supply section for details.

Figure 2-11 Peripheral Power Supply and Fan Assembly



2.9 Card File Enclosure

Parts identification

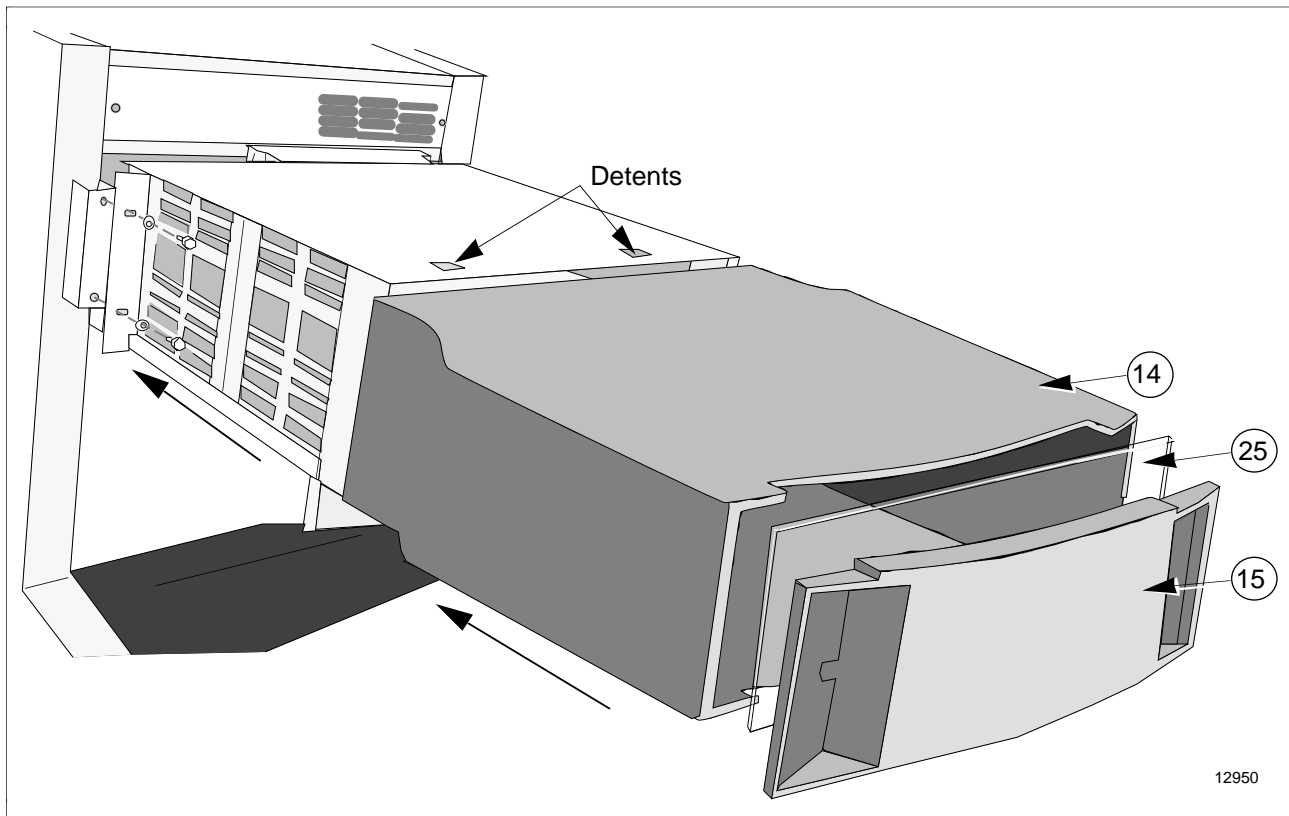
The card file enclosure is shown in Figure 2-12. The number in the circle is the item number in the spare parts list.

There are two retaining tabs on the top and bottom rear edge that keep the enclosure from sliding off. Spread the top and bottom edges away from the card file and slide forward to remove.

Table 2-1 Removing Card File Enclosure

Step	Action
1	Spread the top and bottom edges of the enclosure away from the card file and slide forward to remove.
2	ATTENTION The enclosure must be kept square with the card file in order to slide it off.

Figure 2-12 Card File Enclosure



2.10 AC Power Distribution

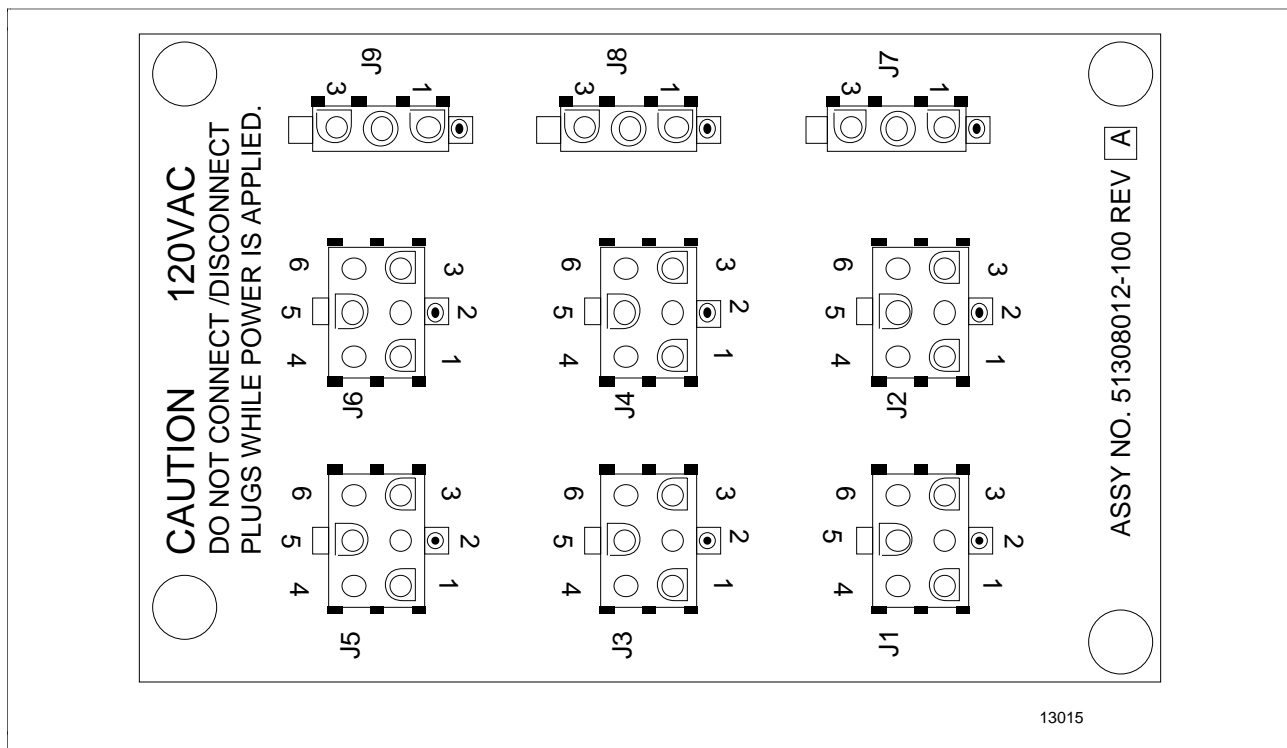
Description

AC power enters the station at the rear of the base, under the footrest. The power connection is made in the Corcom unit that has a removeable cover plate. Removing the plate gives access to the terminal strip.

The Corcom unit has a rocker power switch that is accessible from the rear of the station without removing or opening anything. See Figure 1-1.

AC power is cabled up the right leg of the station to the AC power distribution board. There are connections on the power distribution board for one input, four module connections, one Trend Pen/auxiliary connection, two monitor connections, one peripheral power supply or hard drive connection. See Figure 2-13.

Figure 2-13 AC Power Distribution Board



2.11 Adding an Upper Monitor Mounting

Scope

If, for expansion purposes, an upper monitor mounting is to be added to a station in the field:

- The existing monitor must be removed.
- The existing monitor mounting shroud must be removed.
- A new lower monitor mounting shroud and associated parts added.
- A new wedge added on top of the lower monitor mounting.
- The original monitor mounting shroud added on top of the wedge.
- The original monitor and new monitor must be placed in the station.
- Monitor bezel must be mounted to the new lower shroud.

The reason for this is that a monitor mounting shroud that is on top of the station does not have pass-through holes for cables, and a monitor mounting shroud used in the lower monitor position must have the pass-through holes for cable routing.

Required parts

The model number for the kit is MP-FHSP06. The parts required to do this modification are listed in Table 2-2.

Table 2-2 Monitor Mounting Accumulation Kit 51197035-200

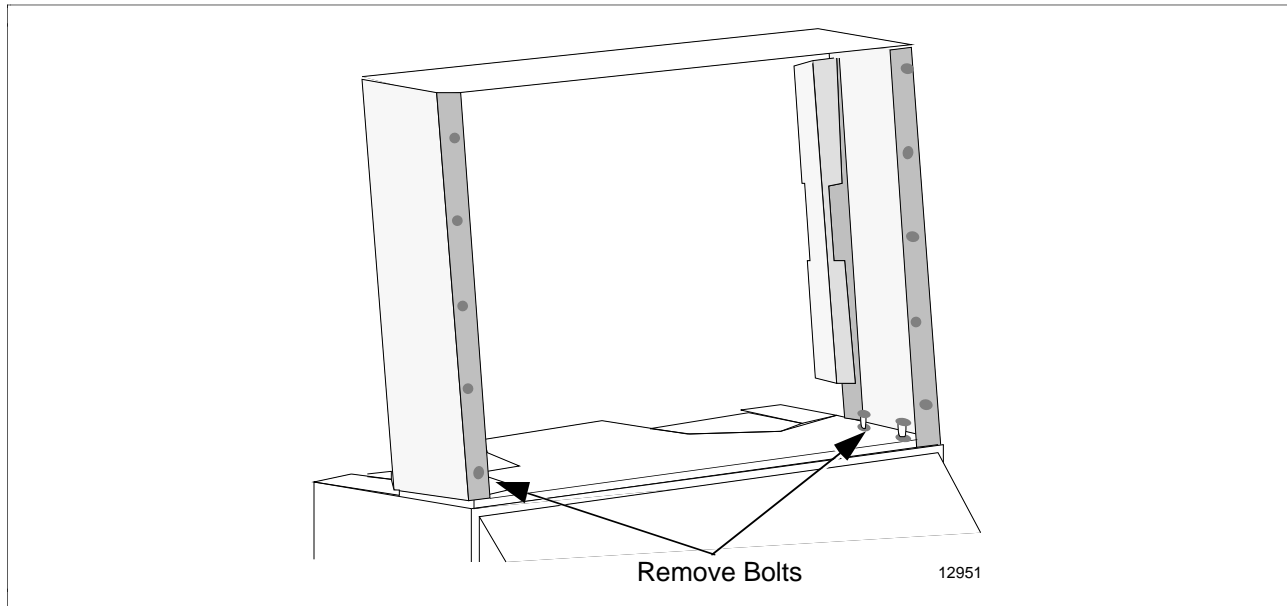
Item	Part Number	Description	Qty
1	51403095-200	Monitor Mounting Shroud (lower)	1
2	51202031-100	Plate, Monitor Mount	2
3	51403139-100	Front Bezel Assembly	1
4	51403015-100	Rear Monitor Cover	1
5	51403070-100	CRT Mounting Bracket	2
6	51202026-100	Retainer Block	1
		Mounting Hardware Required	

Continued on next page

2.11 Adding an Upper Monitor Mounting, Continued

Illustration

Figure 2-14 Removing the Lower Monitor Shroud



Continued on next page

2.11 Adding an Upper Monitor Mounting, Continued

Procedure

Table 2-3 Procedure for Adding Upper Monitor

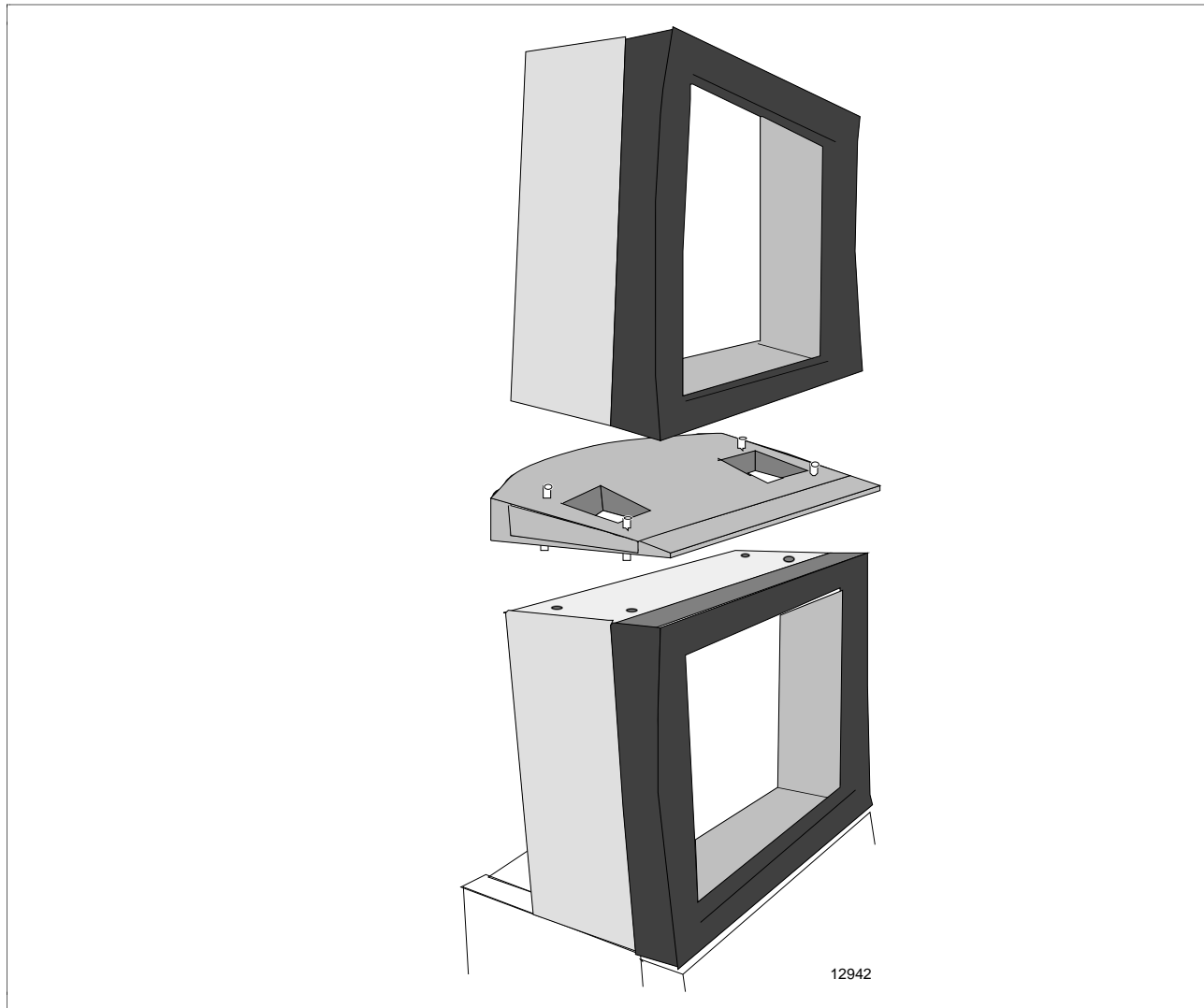
Step	Action
1	After removing the existing monitor, remove the two M8 hex-head screws and washers from each side of monitor shroud. See Figure 2-14.
2	Lift the monitor shroud (and bezel) from the station. This part will be reused as the upper monitor shroud.
3	Mount the new lower monitor shroud with the four M8 hex-head screws. Torque the screws to 60 in/lb. See Figure 2-15.
4	Mount the new bezel to the front of the lower shroud with six M5 hex-head screws. Torque the screws to 20 in/lb.
5	Place the wedge on top of the lower monitor shroud. The four stud bolts will mate with the holes in the top of the shroud. Place a serrated washer and a 51202031-100 nut on each stud and finger-tighten the nuts. Torque the nuts to 60 in/lb. See Figure 2-15.
6	Place the old monitor shroud on top of the wedge. The four stud bolts will mate with the holes in the bottom of the shroud. Place a serrated washer and an M8 nut on each stud and finger-tighten the nuts.
7	Align the edges of the two monitor shrouds and the wedge. Now torque the 8 nuts (that were just finger-tightened) to 60 in/lb.
8	Mount the retaining block (for the monitor) to the bottom of the shroud support plate using two wedge-head M5 screws. Torque the screws to 35 in/lb.
9	Install the touchscreen assembly to the front of the monitor (that is being added to the station). See the Touchscreen Service section of this manual for step-by-step instructions. Wear an ESD strap while doing this.
10	Install the touchscreen controller board to the monitor as described in the Touchscreen Service section of this manual.
11	Install the monitor control assembly to the front of the touchscreen assembly. See the Monitor Service section in this manual.
12	Install both monitors in the station according to the instructions in the Monitor Service section of this manual.
13	Replace the rear monitor covers on both monitors.

Continued on next page

2.11 Adding an Upper Monitor Mounting, Continued

Illustration

Figure 2-15 Exploded View of Monitors and Wedge Assembly



2.12 Adding a Second Card File

Scope

To add a card file involves adding the following:

- Card file tray
- Set of cover mounting brackets
- Card file (Five-Slot Module or Dual Node Module)
- Card file enclosure
- Lower front cover
- Rear door assembly

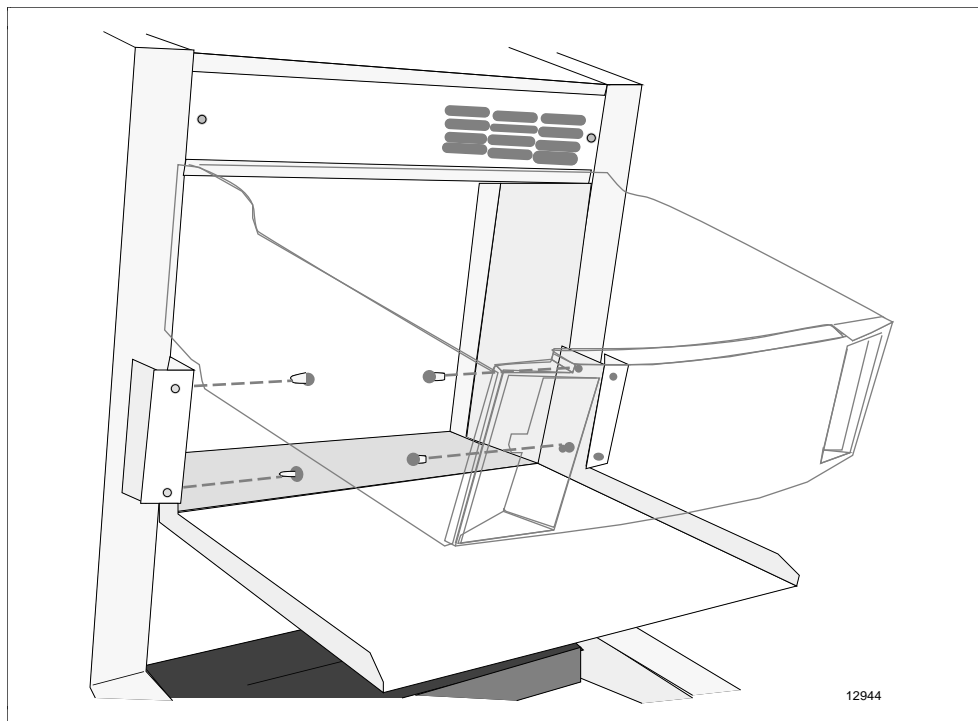
The leg covers on both sides must be replaced and the keyboard scabbard removed, if there is one.

Procedure— add card file support tray

Table 2-4 Procedure for Adding a Card File

Step	Action
1	Remove both leg covers from the inside of the station legs.
2	Remove the keyboard scabbard, if there is one installed.
3	Mount the card file tray to the legs of the station. See Figure 2-16.

Figure 2-16 Mounting Card File Support Tray



Continued on next page

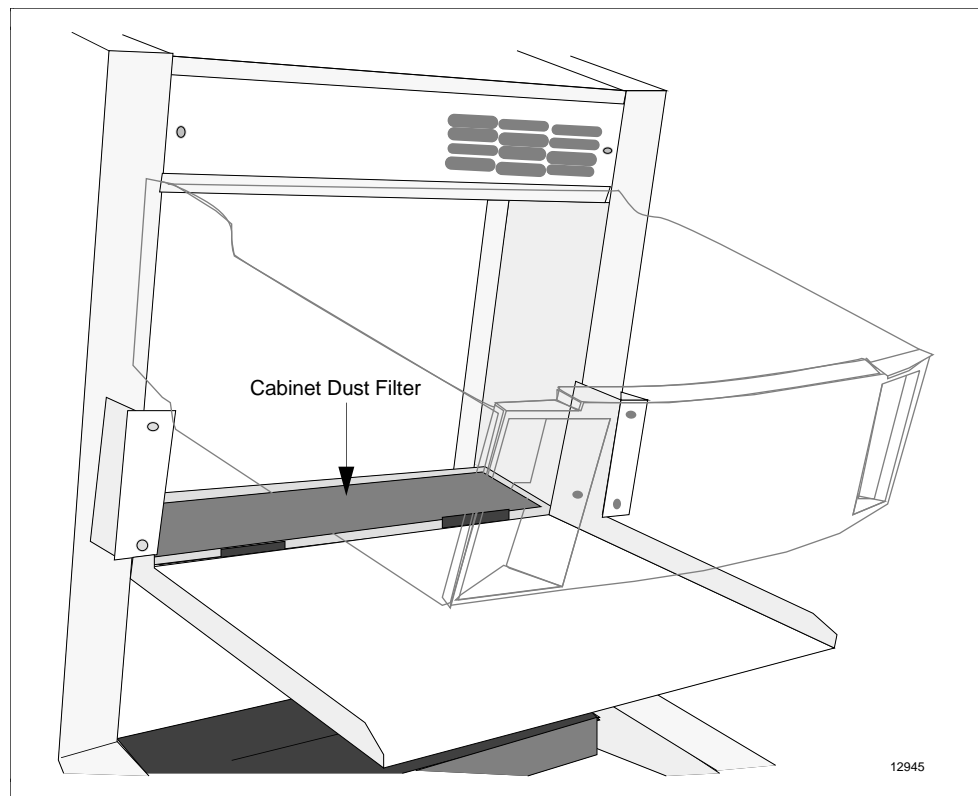
2.12 Adding a Second Card File, Continued

Procedure—
moving cabinet dust
filter

Table 2-4 Procedure for Adding a Card File, Continued

4	Remove the two M5 screws that support the vented panel located beneath the I/O card File. See Figure 2-17.
5	Relocate the vented panel to the front edge of the bottom card file support tray.
6	Replace the two M5 screws in the sides of the vented panel.

Figure 2-17 Moving of the Cabinet Dust Filter



Continued on next page

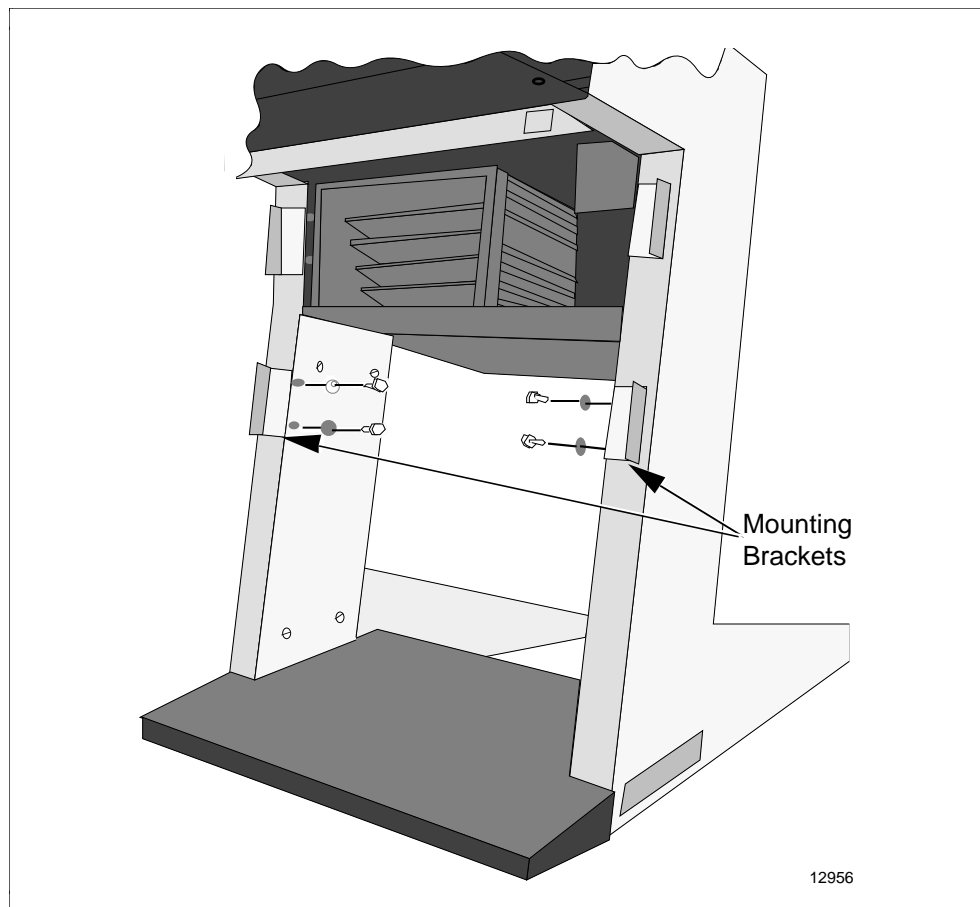
2.12 Adding a Second Card File, Continued

Procedure— mounting cover mounting brackets

Table 2-4 Procedure for Adding a Card File, Continued

Step	Action
7	Mount the set of cover mounting brackets, one bracket on each leg of the station. See Figure 2-18.

Figure 2-18 Mounting Cover Mounting Brackets



Continued on next page

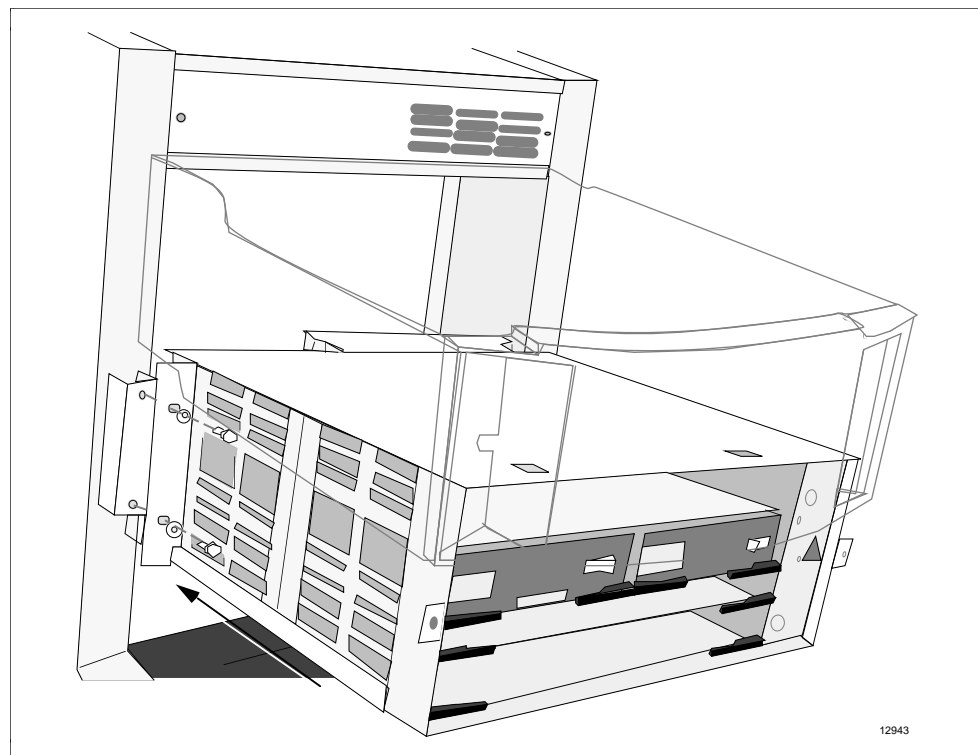
2.12 Adding a Second Card File, Continued

Procedure— Mounting card file assembly

Table 2-4 Procedure for Adding a Card File, Continued

Step	Action
8	Set the card file assembly on the card file tray from the rear of the station. Install four M5 screws and washers to retain the card file as shown in Figure 2-19. Torque the screws to 35 in/lb.
9	Slide the card file enclosure over the rear of the card file until it is tight against the legs of the station. The narrow end of the enclosure must be next to the legs of the station. The enclosure has four tabs that fit into slots in the card file assembly.

Figure 2-19 Mounting the Card File Assembly



Continued on next page

2.12 Adding a Second Card File, Continued

Procedure— grounding the new card file

Table 2-4 Procedure for Adding a Card File, Continued

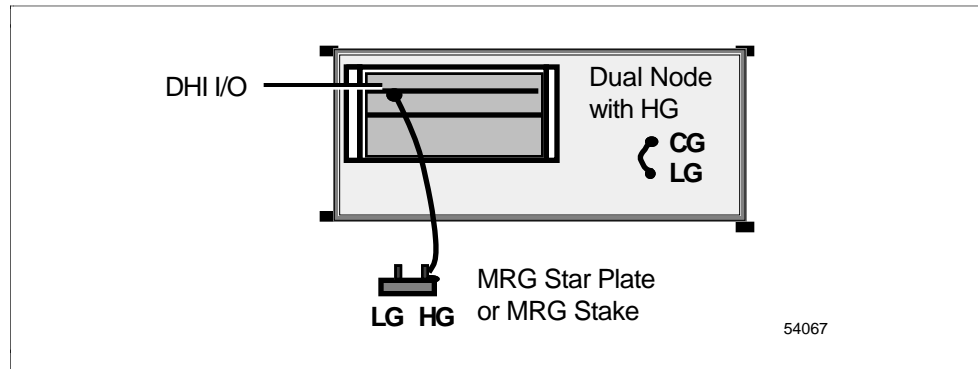
10	<p>Connect the module ground wires as follows:</p> <ul style="list-style-type: none">• Five-Slot Module—US node only<ul style="list-style-type: none">– Connect the Logic Ground terminal to the Chassis Ground– Connect the Chassis Ground terminal to Chassis Ground lug in the bottom of the station. See Figure 2-20.• Five-Slot Module—other node types<ul style="list-style-type: none">– Connect the Logic Ground terminal to the LG ground lug (MRG). This lug must be connected to the MRG Star plate or ground stake with a #4 insulated wire.– Connect the Chassis Ground terminal to Chassis Ground lug in the bottom of the station. See Figure 2-20.• Dual Node Module—Hiway Gateway node only<ul style="list-style-type: none">– Connect the Logic Ground terminal to the LG ground lug (MRG). This lug must be connected to the MRG Star plate or ground stake with a #4 insulated wire.– Connect the Chassis Ground terminal to Chassis Ground lug in the bottom of the station. See Figure 2-20.• Dual Node Module—other node types<ul style="list-style-type: none">– Connect the Logic Ground terminal to the Chassis Ground.– Connect the Chassis Ground terminal to Chassis Ground lug in the bottom of the station. See Figure 2-20.
-----------	--

2.12 Adding a Second Card File, Continued

Illustration

If the new node is a Hiway Gateway that is installed without an HTD, the ground on the DHI I/O must be connected to Master Reference Ground (MRG).

Figure 2-20 Grounding Connection



Continued on next page

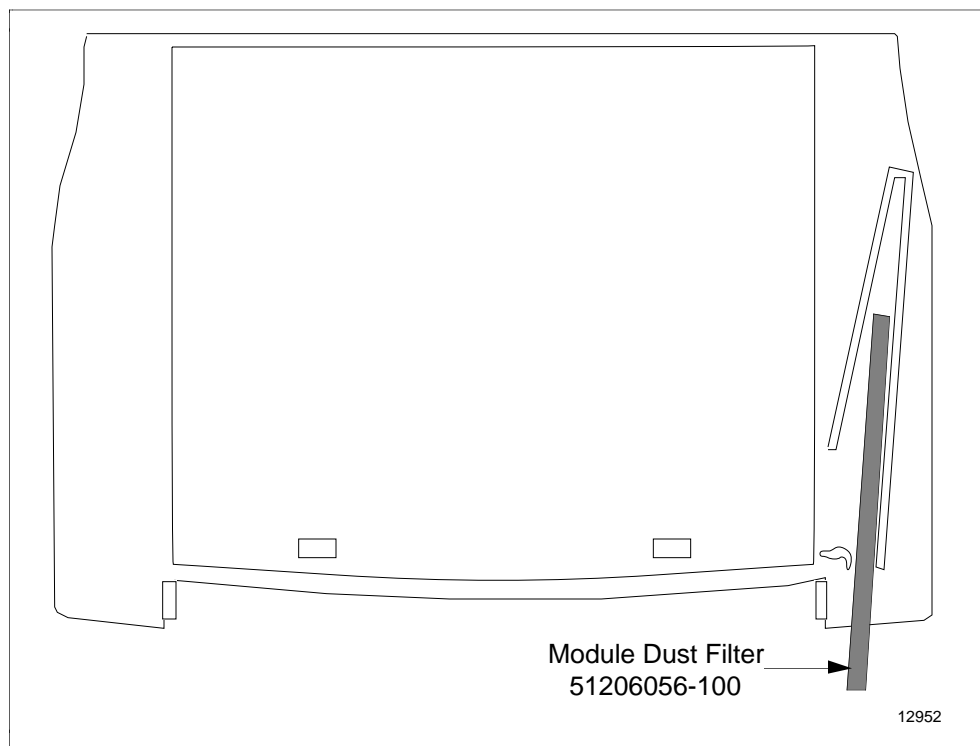
2.12 Adding a Second Card File, Continued

Procedure— installing card file dust filter

Table 2-4 Procedure for Adding a Card File, Continued

Step	Action
11	Place the 177.8 mm (7 in) by 258 mm (10.16 in) dust filter on the right side of the module enclosure as shown in Figure 2-21. This may have been done by the factory.

Figure 2-21 Installation of Module Dust Filter



Continued on next page

2.12 Adding a Second Card File, Continued

Procedure—connecting LCN coax cable

The following procedure will add a Dual Node Module to the station using Figures 2-22 through 2-24. To add a Five-Slot Module, use Figures 2-25 through 27.

ATTENTION

ATTENTION—Read and understand the complete procedure before starting to install any cables.

Table 2-4 Procedure for Adding a Card File, Continued

12	<p>CAUTION This procedure can be done on a live system, failure to follow the procedure explicitly may cause errors and expose the system to a possible slowdown in performance.</p> <p>ATTENTION Do not disconnect Cable A and Cable B at the same time.</p> <p>This step requires that LCN A and LCN B cables be disconnected, one at a time, and the 2 meter coax cable be installed between the new module and the module above, and the disconnected coax reconnected to the new module before the LCN switches back to the cable being changed. The cable is switched every 60 seconds.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Step</th> <th style="text-align: center;">Action</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Install an LCN coax T, 51190728-105, on both coax connectors of the new module. See Figure 2-22 or 2-25. Observe cable marking color codes.</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Install 2 new cables (paired), 51109806-002. <ul style="list-style-type: none"> • Connect one end of the Cable A segment to point E. Observe cable marking color codes. • Connect one end of the Cable B segment to point G. Observe cable marking color codes. </td> </tr> <tr> <td style="text-align: center;">3</td> <td>Using the System Status display, determine when the system switches from Cable A to Cable B. <ul style="list-style-type: none"> • Quickly disconnect the cable from point B in Figure 2-21 and attach it to point F in Figure 2-22. • Quickly attach the loose end of the 2 meter Cable A to point B in Figure 2-23. </td> </tr> <tr> <td style="text-align: center;">4</td> <td>After the system has cycled to Cable A, back to Cable B, and then back to Cable A again: <ul style="list-style-type: none"> • Quickly disconnect the cable from point D in Figure 2-22 and attach it to point H in Figure 2-23. • Quickly attach the loose end of the 2 meter Cable B to point D in Figure 2-23. </td> </tr> <tr> <td style="text-align: center;">5</td> <td>Check the display for correct cable swapping.</td> </tr> </tbody> </table>	Step	Action	1	Install an LCN coax T, 51190728-105, on both coax connectors of the new module. See Figure 2-22 or 2-25. Observe cable marking color codes.	2	Install 2 new cables (paired), 51109806-002. <ul style="list-style-type: none"> • Connect one end of the Cable A segment to point E. Observe cable marking color codes. • Connect one end of the Cable B segment to point G. Observe cable marking color codes. 	3	Using the System Status display, determine when the system switches from Cable A to Cable B. <ul style="list-style-type: none"> • Quickly disconnect the cable from point B in Figure 2-21 and attach it to point F in Figure 2-22. • Quickly attach the loose end of the 2 meter Cable A to point B in Figure 2-23. 	4	After the system has cycled to Cable A, back to Cable B, and then back to Cable A again: <ul style="list-style-type: none"> • Quickly disconnect the cable from point D in Figure 2-22 and attach it to point H in Figure 2-23. • Quickly attach the loose end of the 2 meter Cable B to point D in Figure 2-23. 	5	Check the display for correct cable swapping.
Step	Action												
1	Install an LCN coax T, 51190728-105, on both coax connectors of the new module. See Figure 2-22 or 2-25. Observe cable marking color codes.												
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3	Using the System Status display, determine when the system switches from Cable A to Cable B. <ul style="list-style-type: none"> • Quickly disconnect the cable from point B in Figure 2-21 and attach it to point F in Figure 2-22. • Quickly attach the loose end of the 2 meter Cable A to point B in Figure 2-23. 												
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5	Check the display for correct cable swapping.												

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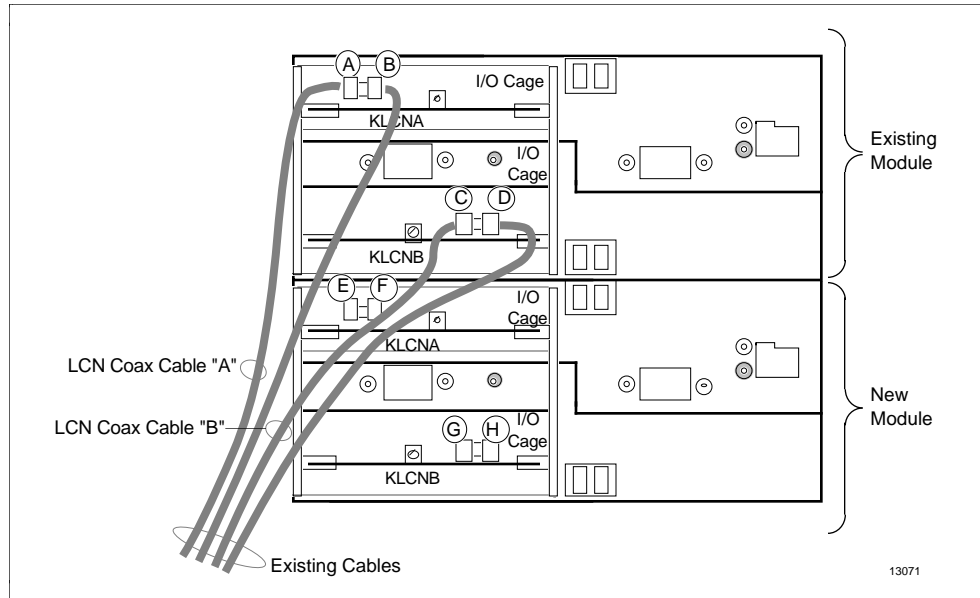
2.12 Adding a Second Card File, Continued

Illustration

Use Figures 2-22 through 2-24 for adding a additional Dual Node Module to the existing Dual Node Module in the station.

Use Figure 2-25 through 2-27 to add a Five-Slot Module to an existing Dual Node Module in the station.

Figure 2-22 LCN Cables on Existing Dual Node Module

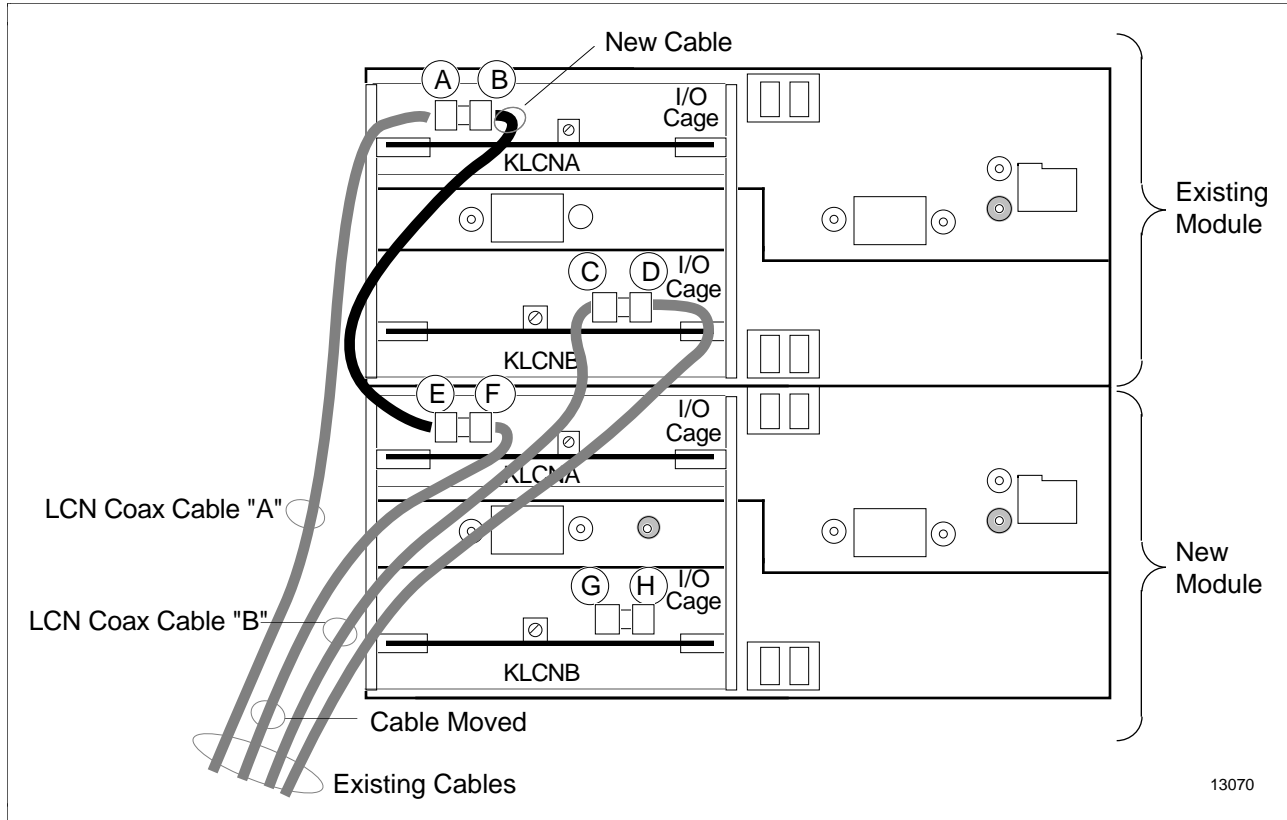


Continued on next page

2.12 Adding a Second Card File, Continued

Illustration

Figure 2-23 Adding New Dual Node Module to LCN Cable A

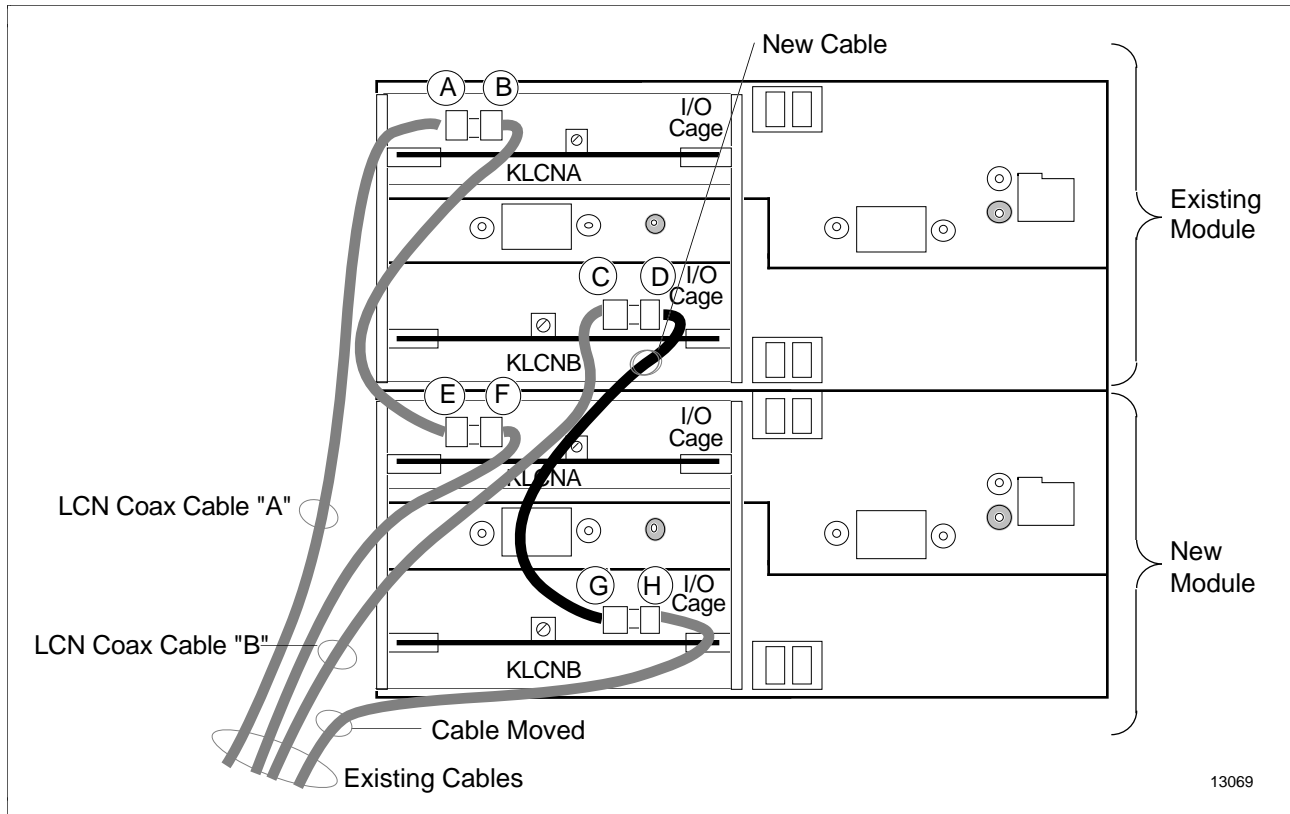


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2.12 Adding a Second Card File, Continued

Illustration

Figure 2-24 Adding New Dual Node Module to LCN Cable B



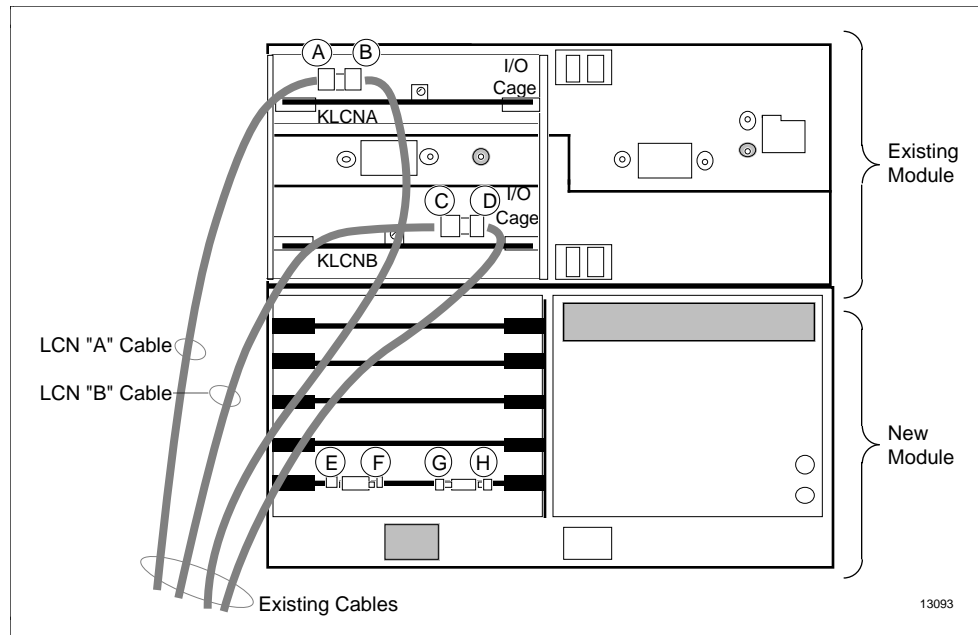
Continued on next page

2.12 Adding a Second Card File, Continued

Illustration

Use Figures 2-25 through 2-27 to add a Five-Slot Module to an existing Dual Node Module in the station.

Figure 2-25 LCN Cables on Existing Dual Node Module

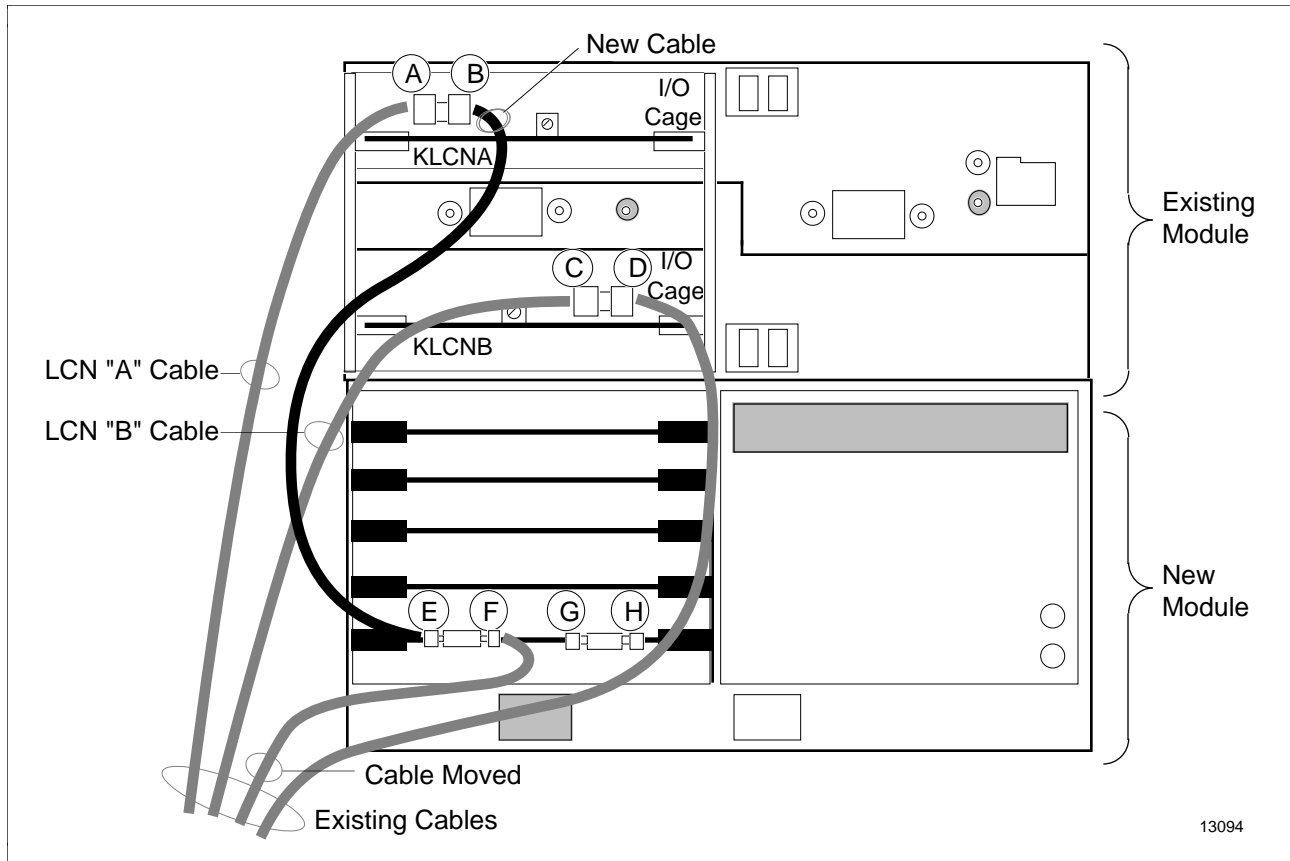


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2.12 Adding a Second Card File, Continued

Illustration

Figure 2-26 Adding New Five-Slot Module to LCN Cable A

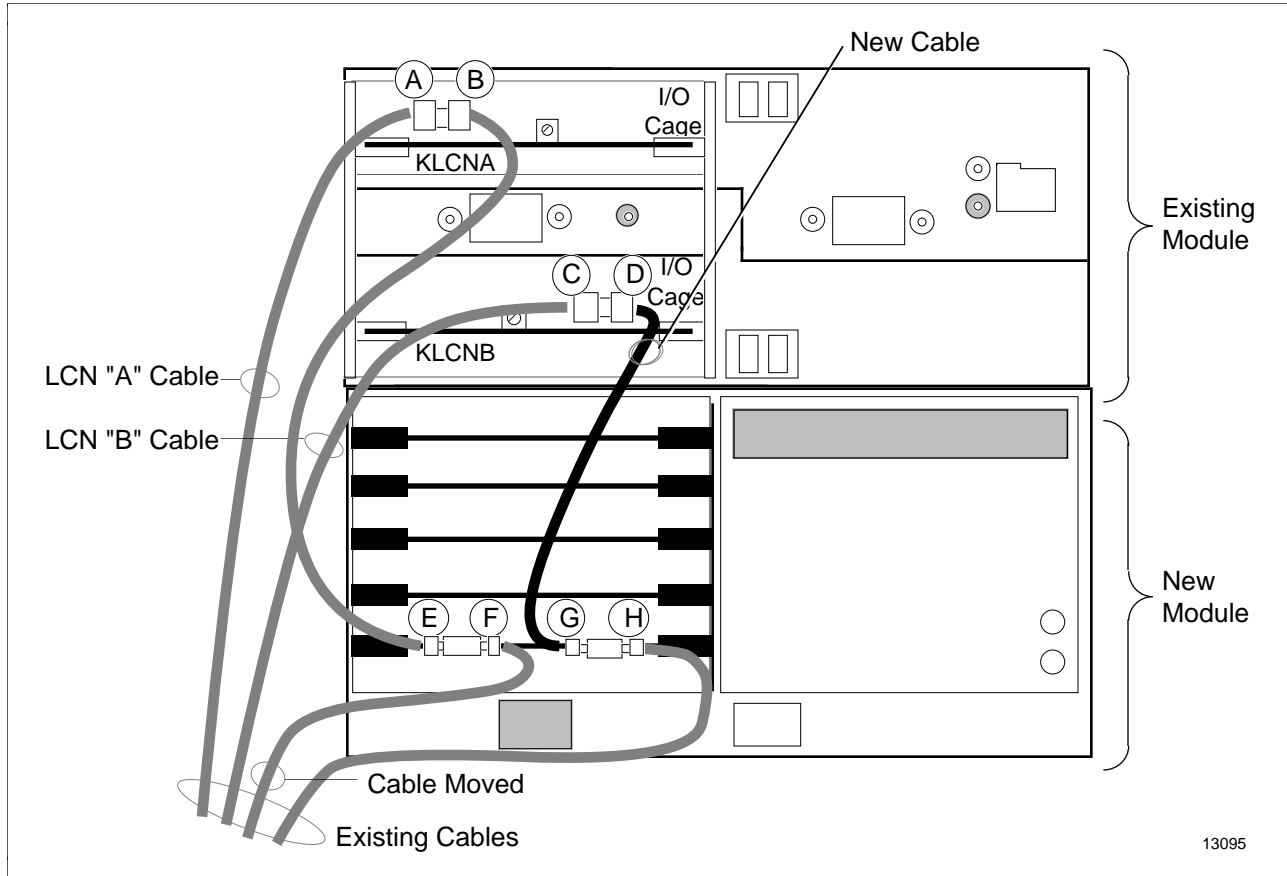


Continued on next page

2.12 Adding a Second Card File, Continued

Illustration

Figure 2-27 Adding New Five-Slot Module to LCN Cable B



Procedure— mounting front cover

Table 2-4 Procedure for Adding a Card File, Continued

13	Mount the front cover to the module enclosure (on the rear of the station) and fasten it in place.
-----------	--

2.13 Spare Parts

Spare parts list

Table 2-5 Furniture Spare Parts

Item Number	Part Number	Description
1	51403037-100	Footrest Tread Assembly
2	51403162-100	Leg Cover,Low, Left Hand
	51403162-101	Leg Cover,Low, Right Hand
	51403162-200	Leg Cover,Low, Left Hand
	51403162-201	Leg Cover,Low, Right Hand
	51403162-300	Leg Cover,Low, Left Hand
	51403162-301	Leg Cover,Low, Right Hand
	51403027-100	Leg Cover,Medium, Left Hand
	51403027-101	Leg Cover,Medium, Right Hand
	51403027-200	Leg Cover,Medium, Left Hand
	51403027-201	Leg Cover,Medium, Right Hand
	51403027-300	Leg Cover,Medium, Left Hand
	51403027-301	Leg Cover,Medium, Right Hand
	51403163-100	Leg Cover,High, Left Hand
	51403163-101	Leg Cover,High, Right Hand
	51403163-200	Leg Cover,High, Left Hand
	51403163-201	Leg Cover,High, Right Hand
	51403163-300	Leg Cover,High, Left Hand
	51403163-301	Leg Cover,High, Right Hand
3	51308039-100	Cover Mounting Bracket
4	51403012-100	Bottom Filter Cover
5	51201201-800	Air Filter Front
6	51197041-100	Keyboard Shelf with Keyhole
	51197041-200	Keyboard Shelf without Keyhole
	51403021-100	Keyboard Support Frame (not shown)
7	51197039-100	Tray Accumulation Kit (Engineer's Keyboard Tray)
8	51401560-100	QWERTY Membrane
	51401952-100	Operator Entry Panel PWA

* Indicates an Optimum Replaceable Unit (ORU)

Continued on next page

2.13 Spare Parts, Continued

Spare parts list,
continued

Table 2-5 Furniture Spare Parts, Continued

Item Number	Part Number	Description
9	51308059-100	Manifold Keyboard Interconnect Cable
10	*51401975-100	US Auxiliary Keyboard
11	51403159-100	Front Bezel Assembly
12	51403095-100	Lower Monitor Mounting Shroud (used when there is an upper Monitor)
12A	51403095-200	Upper Monitor Mounting Shroud
13	51403015-100	Rear Monitor Cover
14	51403117-100	Card File Enclosure Assembly
15	51403152-100	Rear Cover Assembly (Complete for Dual Node)
	51403152-200	Rear Cover Assembly (Complete for Five-Slot)
	51403152-101	Rear Cover EMI Shield (with EMC strip for Dual Node Module)
	51403152-201	Rear Cover EMI Shield (with EMC strip for Five-Slot Module)
16	51403089-200	Upper Front Cover
17	51403090-200	Lower Front Cover
18	*51304029-200	Keylock Switch Cable (and Keylock)
19	51403036-100	Writing Surface
20	51403034-100	Media Door
21	51308012-100	120 V Power Distribution Board Assembly
	51308014-100	240 V Power Distribution Board Assembly
22	*51308035-100	Manifold PWA for Operator's Keyboard
23	51196650-100	Multitone Annunciator Interface Cable (and PWA)
24	51403157-100	Power Supply Enclosure (only Enclosure and Fan)
25	51308086-101	Safety Barrier for Dual Node Module
	51308086-201	Safety Barrier for Five-Slot Module
	51308086-202	Safety Barrier for Five-Slot Module used for the WDA History Module

* Indicates an Optimum Replaceable Unit (ORU)

Section 3 – Keyboard Service

3.1 Overview

Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 3 – KEYBOARD SERVICE	41
3.1	Overview	41
3.2	Cleaning the Keyboard.....	42
3.3	Auxiliary Keyboard Tray	42
3.4	Removing the Operator Entry Panel.....	43
3.5	Connecting the Operator Entry Panel.....	43
3.6	Replacing the Manifold Board	46
3.7	Engineer’s Keyboard	49
3.8	Replacing the Multitone Annunciator.....	50
3.9	Replacing the Annunciator	51
3.10	Spare Parts.....	53

Description

The Operator’s Entry Panel has a QWERTY key configuration and it tilts for better visibility of the keys.

The US Auxiliary Keyboard is a QWERTY key configuration that can be rested on the keyboard shelf that slides out from under the front of the keyboard tray. This keyboard is referred to as the US Auxiliary Keyboard and performs the engineer’s keyboard function for both Universal Station and standard Universal Stations. The Auxiliary Keyboard Tray is shown in Figure 3-1.

3.2 Cleaning the Keyboard

Specification

Both keyboards can be cleaned with a damp (not saturated) soft cloth with a light washing soap solution.

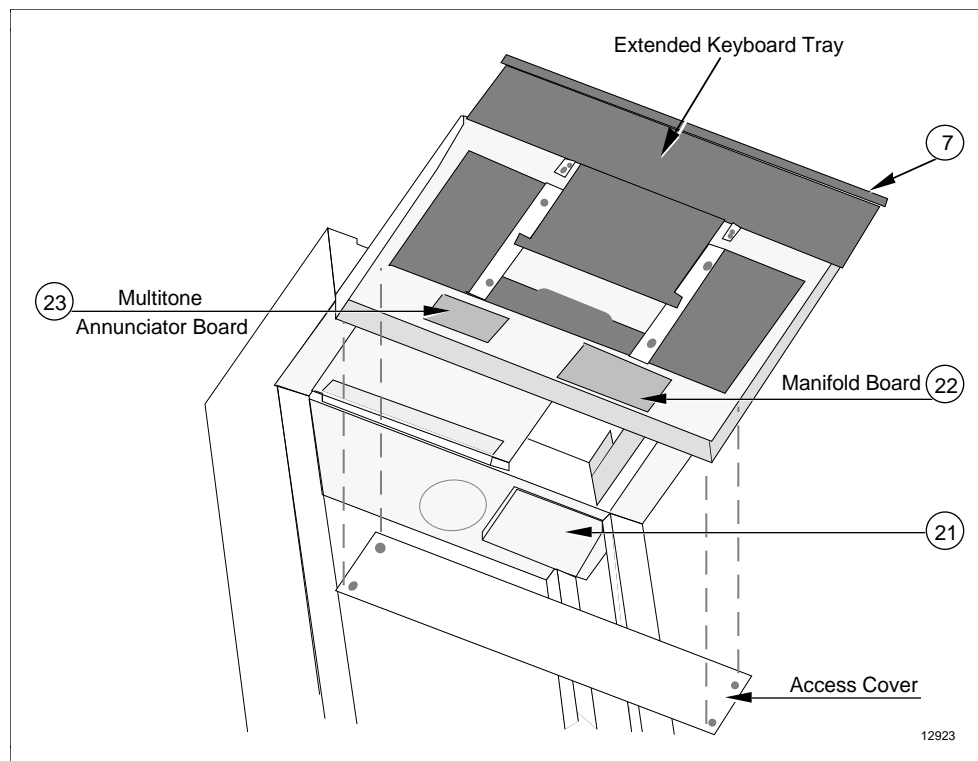
Table 3-1 Cleaning the Keyboard

Step	Action
1	Place the main power switch in the off position and disconnect the keyboard from the station.
2	Hold the keyboard in an upright position with the front edge of the keyboard resting on a stable surface.
3	Using a soft cloth dampened with a dish washing soap in water, wash the surface of the keyboard ensuring that no excess solution (there should not be any excess) runs into the keyboard assembly.
4	Rub the surfaces of the keyboard with a soft cloth to remove any remaining soap residue.
5	Reconnect the keyboard to the station.

3.3 Auxiliary Keyboard Tray

Illustration

Figure 3-1 Extended Auxiliary Keyboard Shelf



3.4 Removing the Operator Entry Panel

Procedure

Follow the procedures in Table 3-2 to remove the Operator Entry Panel (OEP) from the station.

Table 3-2 Removing the Keyboard

Step	Action
1	Remove the access panel under the keyboard tray by removing the six screws.
2	Disconnect the keyboard cable from the manifold board and pull the cable out of the station.
3	Grasp the OEP on the side closest to the monitor.
4	Tilt the OEP up to the vertical position.
5	Lift the OEP from the station and lay it face down on the extended keyboard shelf.

3.5 Connecting the Operator Entry Panel

Procedure

Follow the procedures in Table 3-3 to connect the Operator Entry Panel (OEP) to the station.

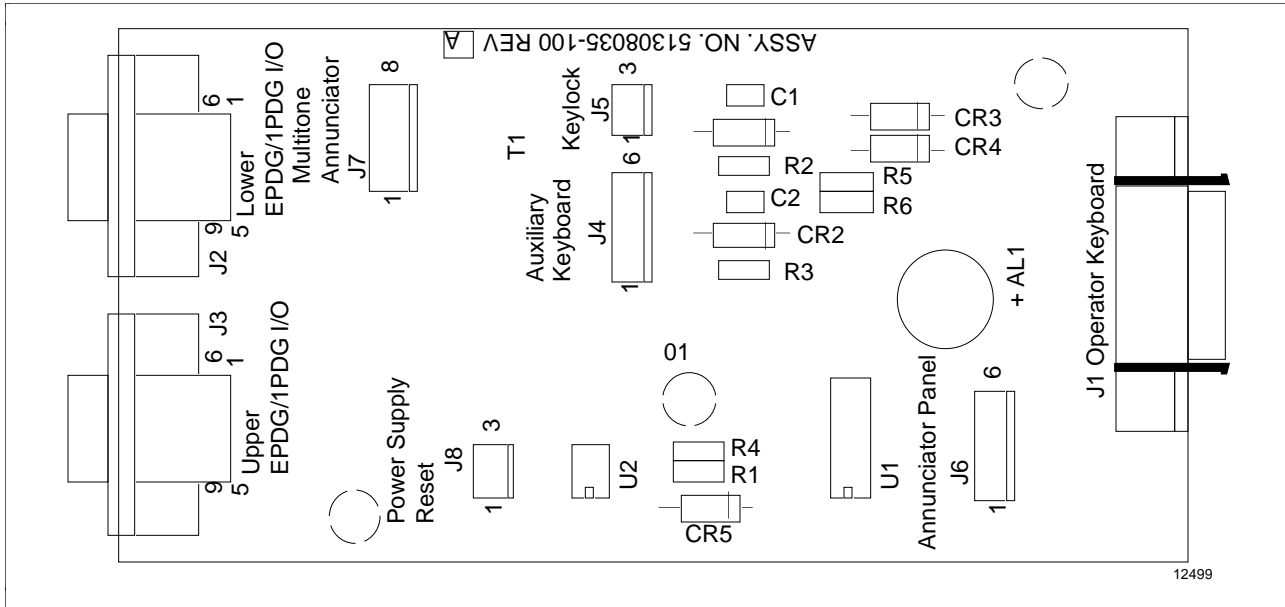
Table 3-3 Connecting the Operator Entry Panel

Step	Action
1	Grasp the OEP, holding it in the vertical position with the space bar to the bottom.
2	Place the bottom edge of the OEP into the groove located at the front edge of the open area in the keyboard tray.
3	Tilt the OEP down flat in the keyboard tray.
4	Feed the keyboard cable through the hole in the keyboard tray and connect it to the manifold board.

3.6 Replacing the Manifold Board

Illustration

Figure 3-2 Manifold Board



CAUTION

CAUTION—Observe ESD procedures when handling circuit boards.

Continued on next page

3.6 Replacing the Manifold Board, Continued

Procedure

Table 3-4 Replacing the Manifold Board

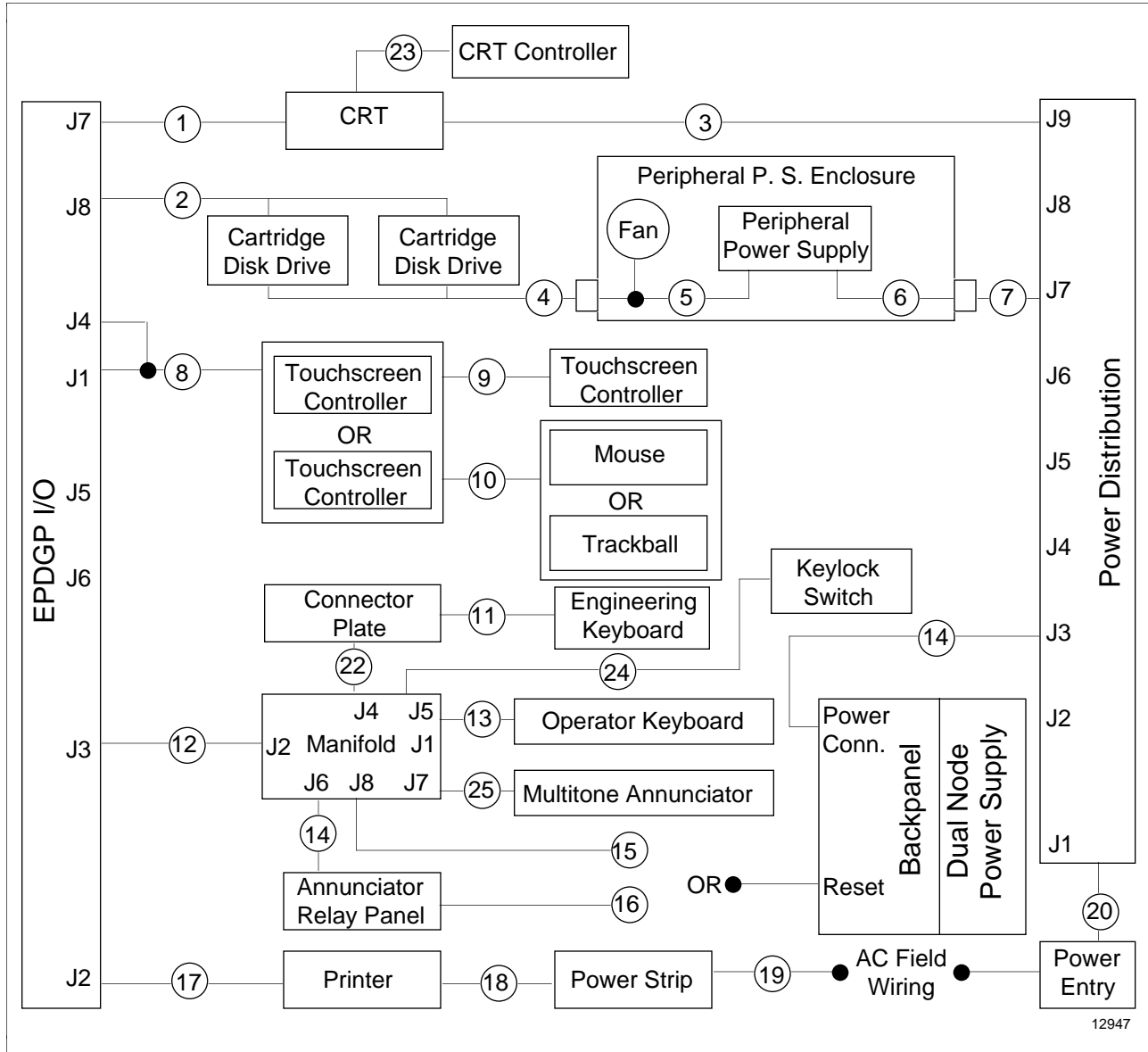
Step	Action
1	Remove the access cover from the bottom of the keyboard tray by removing the four hex-head screws (next to the module front cover.)
2	Disconnect the remaining cables from the manifold board. <ul style="list-style-type: none">• Operator Entry Panel (OEP) Assembly (J1)• EPDGP I/O (J2)• Auxiliary Keyboard Power Cable (J4)• Keylock Cable (J5)• Annunciator Terminal Board• Multitone Annunciator Cable (J7)• Power Supply Reset Cable (J8)
3	Remove the three nuts from the three corners of the manifold board.
4	Remove the old manifold board and install the new manifold board using the three nuts removed in the previous step.
5	Reconnect the cables removed in Step 2.
6	Replace the access cover and the four hex-head screws.

Continued on next page

3.6 Replacing the Manifold Board, Continued

Illustration The numbers in the circles in Figure 3-3 are the item numbers in Table 3-5.

Figure 3-3 Keyboard and Manifold Cabling



Continued on next page

3.6 Replacing the Manifold Board, Continued

Key list

Table 3-5 Cabling Schematic Key List

Item	Part Number	Identification
1	51191784-100	CRT Signal Cable
2	51304842-200	Cartridge Disk Interface Cable (Single Drive)
	51304199-300	Cartridge Disk Interface Cable (Dual Drive)
3	51308020-100	Monitor/Power Supply AC Power Cable
4	51308055-100	Drive Cable, DC Power
5	51308051-100	Power Supply Enclosure (51197004-100) DC Cable
	51308051-200	Power Supply Enclosure (51197004-200) DC Cable
6	51308052-100	Power Supply Enclosure (51197004-100) AC Cable
	51308052-200	Power Supply Enclosure (51197004-200) AC Cable
7	51308020-200	Monitor/Power Supply AC Power Cable
8	51308047-100	Touchscreen Interface Cable
	51308082-100	Mouse I/C Cable (EPDG)
	51308073-100	Trackball I/C Cable (EPDG)
9	—	Touchscreen I/C Cable (part of touchscreen)
10	—	Mouse/Trackball Cable (part of subassembly)
11	—	Keyboard Cable (part of subassembly)
12	51308059-100	Manifold/Keyboard Interconnect Cable
13	51308058-100	Keyboard I/F Cable
14	51308019-100	Module AC Power Cable (120 Vac) Right or Close Power Supply
	51308019-100	Module AC Power Cable (120 Vac) Left or Far Power Supply
	51308066-100	Module AC Power Cable (240 Vac) Right or Close Power Supply
	51308066-200	Module AC Power Cable (240 Vac) Left or Far Power Supply
15	51303420-081	Module Status Cable
16	51303420-086	Module Status Cable

Continued on next page

3.6 Replacing the Manifold Board, Continued

Key List, continued

Table 3-5 Cabling Schematic Key List, Continued

Item	Part Number	Identification
17	51303631-003	Printer Cable, 3 Meter (use with EPDG(P) I/O board)
	51303631-008	Printer Cable, 8 Meter (use with EPDG(P) I/O board)
	51303631-015	Printer Cable, 15 Meter (use with EPDG(P) I/O board)
18	51191839-100	Cable, Power, Shielded, PVC Jacket
19	51191840-203	Cable, Power, Shielded, PVC Jacket
20	51308054-100	AC Power Entry Cable (120 Vac)
	51308067-100	AC Power Entry Cable (240 Vac)
21	51304047-152	Annunciator power Cable
22	51308060-100	Eng. Keyboard I/F Cable
23	—	Monitor Remote Harness (supplied with monitor)
24	—	Keylock Switch Cable (part of subassembly)
25	—	Multitone Annunciator cable (part of subassembly)

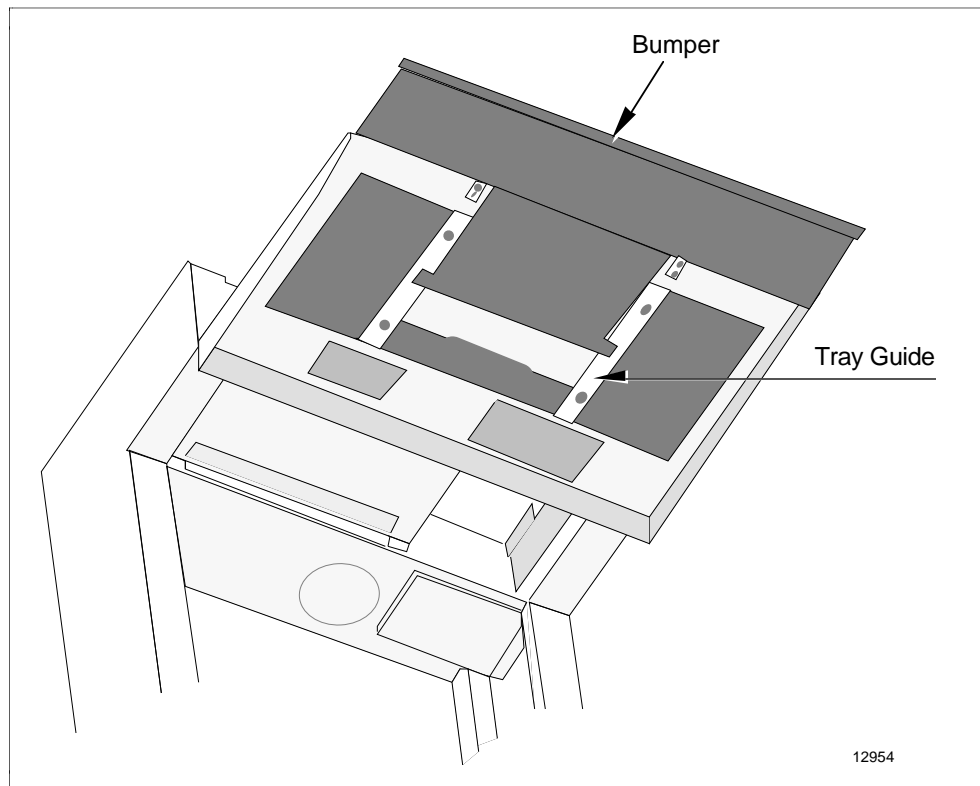
3.7 Engineer's Keyboard

Description

The Engineer's Keyboard rests on the keyboard slide tray located under the front edge of keyboard tray. The tray can be pulled forward to hold the Engineer's Keyboard when it is in use. See Figure 3-4.

See Figure 3-3 for the cable connection from the keyboard to the manifold board.

Figure 3-4 Engineer's Keyboard and Keyboard Slide Tray



3.8 Replacing the Multitone Annunciator

Purpose

The Multitone Annunciator panel is an optional multitone annunciator used as an alternative to the standard alarm annunciator. It is located next to the manifold board under the keyboard tray. Refer to Figure 3-3.

Procedure

Follow the procedures in Table 3-6 to remove the annunciator from the station.

Table 3-6 Replacing the Multitone Annunciator

Step	Action
1	Remove the access panel under the keyboard tray by removing the four screws.
2	Disconnect the cable from the multitone annunciator and replace the multitone annunciator board.
3	Reconnect the cable to the multitone annunciator.
4	Replace the access panel removed in Step 1.

3.9 Replacing the Annunciator

Description

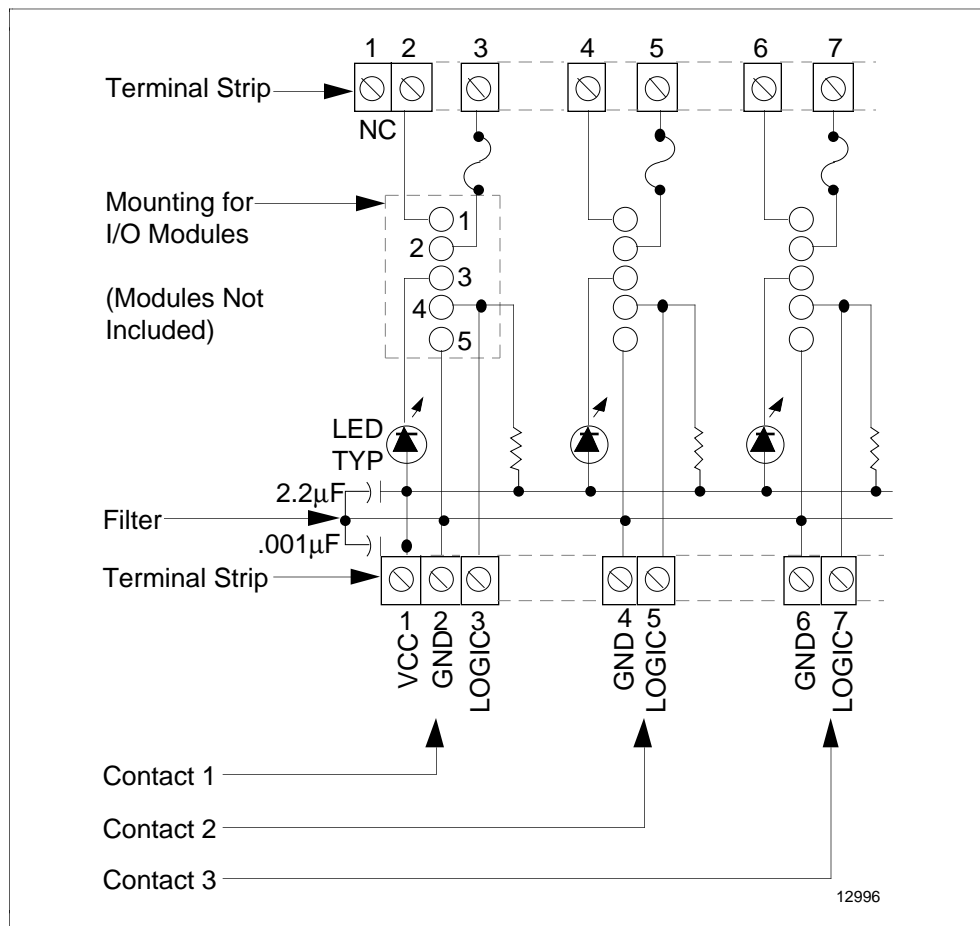
The Annunciator panel has three relays that are activated when alarm conditions (that have been defined) are detected by one of the alarm parameters. The EPDG board causes the activation of the relays through the OEP Keyboard.

Table 3-7 Annunciator Relay Specifications

Parameter	Specification
Input Turn-on Voltage Turn-off Voltage	3.0 to 6.0 Vdc -3.0 to 1.0 Vdc
Output Voltage Range Current Range Surge Current (1 second)	10 to 60 Vdc 0.02 to 3.0 A

Illustration

Figure 3-5 Annunciator Schematic



Continued on next page

3.9 Replacing the Annunciator, Continued

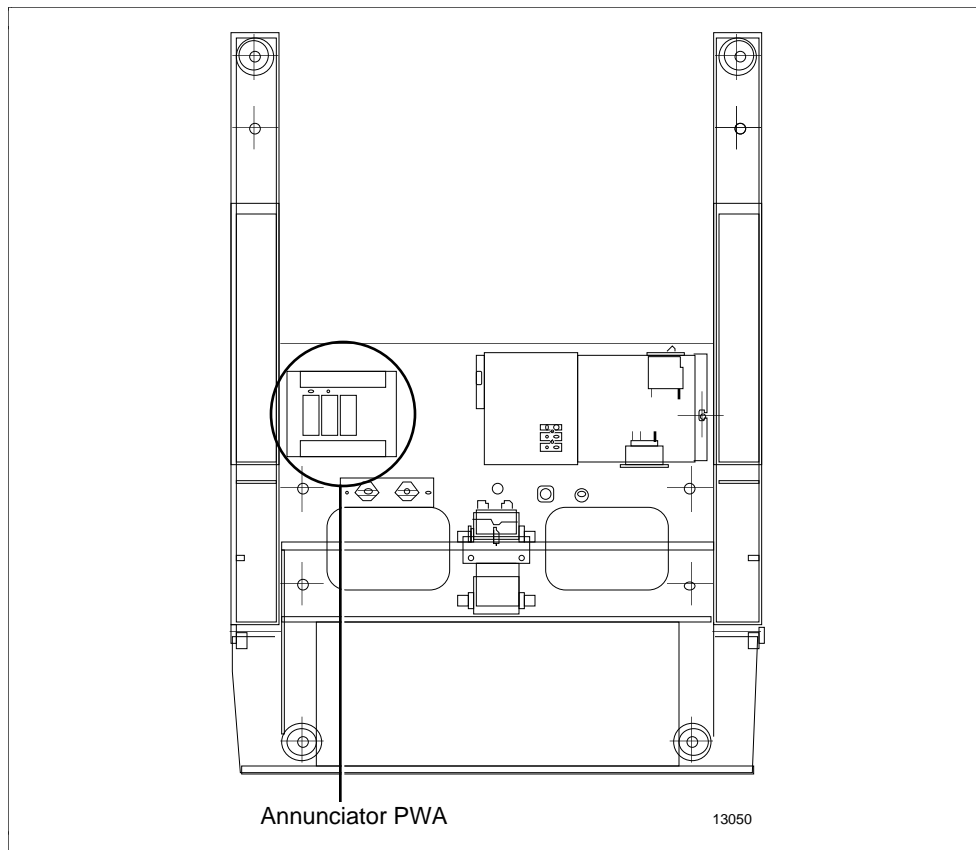
Procedure

Table 3-8 Replacing the Annunciator Panel

Step	Action
1	Remove the right and left leg cover panels.
2	Loosen the three screws at the back edge of the footrest cover.
3	Slide the footrest cover to the front, exposing a compartment.
4	Remove the four screws retaining the annunciator panel to the left rear of the compartment and replace the panel with the new one.
5	Remove the access panel covering the manifold board (under the keyboard, up close to the base of the station).
6	Pass the cable for the new assembly up the left leg of the station and connect it to J6 on the manifold board.
7	Replace the access panel, footrest cover, and leg covers.

Illustration

Figure 3-6 Location of Annunciator Board in Cabinet Base



3.10 Spare Parts

Table

The item numbers in Table 3-3 refer to item numbers in the figures in Section 2 as well as figures in this section.

Table 3-9 Keyboard Spare Parts

Item Number	Part Number	Description
8	51401560-100	QWERTY Membrane
	51401570-100	CMOS Keyboard with Prom Interface
	51403165-400	Operator Entry Panel Assembly (Operator's Keyboard) – CE Compliant
9	51308059-100	Manifold/Keyboard Interconnect Cable
10	*51401975-100	US Auxiliary Keyboard (Engineer's Keyboard)
22	*51308035-100	Manifold PWA for Operator Entry Panel Keyboard
	*51303642-300	Annunciator Terminal Board Assembly
	*51190516-100	(Annunciator Relay)
	51308058-100	Operator Keyboard Interface Cable
	51308060-100	Engineer's Keyboard Interface Cable
	51196650-100	Multitone Annunciator Interface Cable (and PWA)
	51303420-200	Module Status Cable—PS Reset (Connects to J5 on the Module)
	51308059-100	Manifold-Keyboard I/C Cable—Connect Manifold to I/O Board
19	51403036-100	Writing Surface

* Indicates an Optimum Replaceable Unit (ORU)

Section 4 – Integrated Keyboard Service

4.1 Overview

Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 4 – INTEGRATED KEYBOARD SERVICE.....	55
4.1	Overview.....	55
4.2	Functional Partition of Integrated Keyboard	55
4.3	Full Travel Keyboard.....	57
4.4	Relegendable Function Key Panel.....	58
4.5	Operator Control Panel.....	59
4.6	IKB Trackball.....	60
4.7	Cleaning the Integrated Keyboard.....	61
4.8	Troubleshooting the Integrated Keyboard.....	62
4.9	Removing the Integrated Keyboard Assembly	64
4.10	Replacing the Integrated Keyboard.....	66
4.11	Spare Parts.....	67

4.2 Functional Partition of Integrated Keyboard

Description

The integrated keyboard integrates the operator and engineer functions into one keyboard and has the following functional parts:

- Full Travel Keyboard
- Relegendable Function Key Panel
- Operator Control Panel
- Optional Cursor Control Unit (Trackball)

Continued on next page

4.2 Functional Partition of Integrated Keyboard, Continued

Illustration

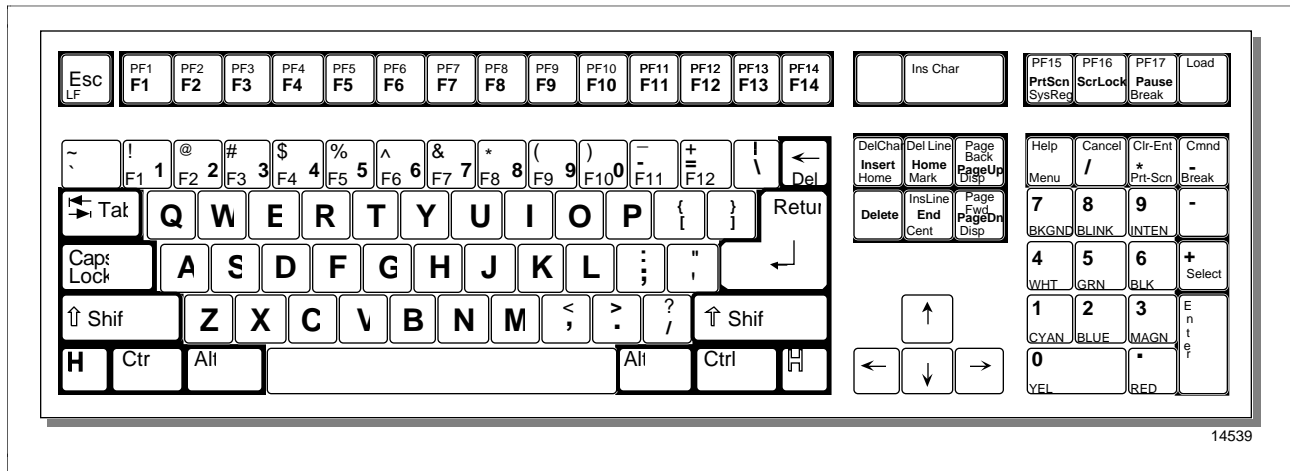
Figure 4-1 Integrated Keyboard



4.3 Full Travel Keyboard

Description This QWERTY keyboard functions as both Operator and Engineer's keyboard with multifunctional keys labeled in black, red, and blue lettering like the US Auxiliary keyboard.

Figure 4-2 Full Travel Keyboard



4.4 Relegendable Function Key Panel

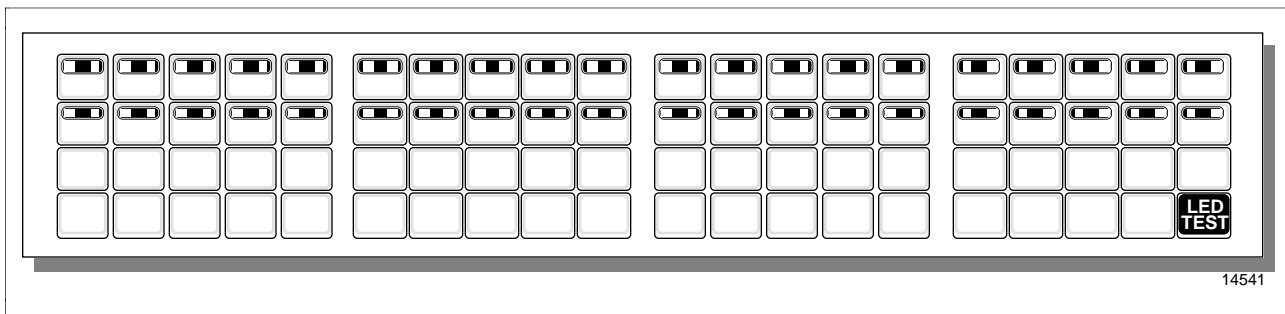
Description

Relegendable function keys (buttons) can be defined or configured by the user to perform certain functions, such as the call up of certain critical or frequently used displays, or cross-screen displays within a console, or to activate a particular Control Language program. Refer to *Button Configuration Form Instructions* and *Button Configuration Data Entry* for button configuration. Refer to Sections 7 and 8 of the *Process Operation Manual* for Alarm Annunciation.

This panel has two forms:

- Fixed—Desktop units have a fixed panel
- Hinged—new furniture Universal Station and Universal Station^X units have a hinged panel that tilts away from the monitor, revealing the 150 MB cartridge drive, DAT drive and CD-ROM drive. After the drive has been loaded the panel can be returned to the upright position.

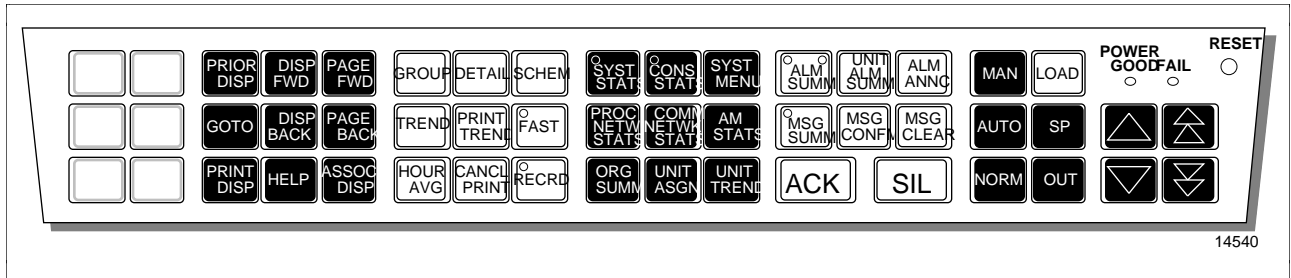
Figure 4-3 Relegendable Function Key Panel



4.5 Operator Control Panel

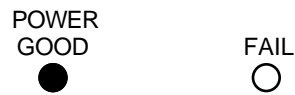
Description The operator control panel contains the RESET switch and power Good/Fail LEDs as well as the operator function keys.

Figure 4-4 Operator's Control Panel



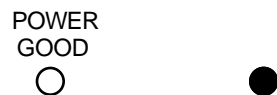
Reset Resets the Universal Station hardware; does the same thing as the white reset button on any LCN Module.

Power Good



The indicator is lit if the keyboard is properly powered.

Fail Indicator



The FAIL indicator is lit if there is a hardware failure in the keyboard.

4.6 IKB Trackball

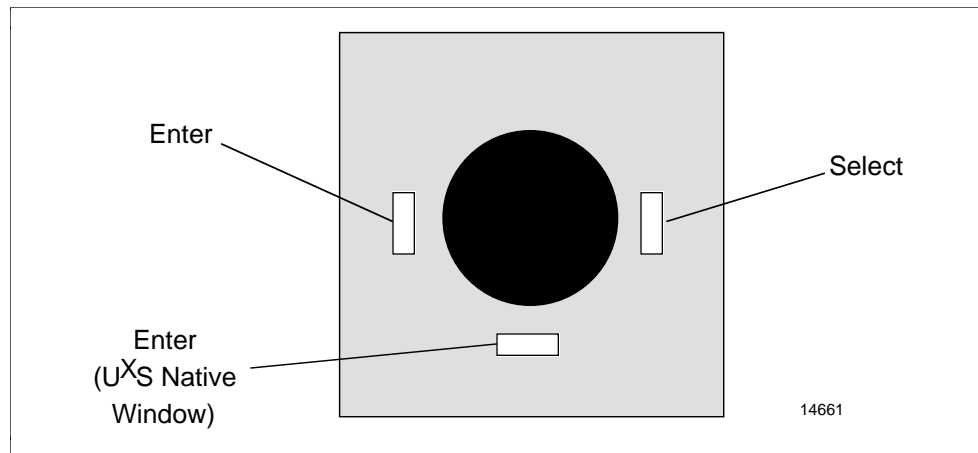
Scope The trackball is an option to the IKB. It controls the movement of the cursor on the monitor screen.

Operation The left-hand button is for the Enter function.

The front button is for the select function.

The right-hand button is for the select function.

Figure 4-5 Integrated Keyboard Trackball



4.7 Cleaning the Integrated Keyboard

Full travel keyboard Both keyboards can be cleaned with a damp (not saturated) soft cloth with a light washing soap solution.

Table 4-1 Cleaning the Keyboard

Step	Action
1	Turn OFF the main power switch and disconnect the keyboard from the EPDGC/TPDGC board.
2	Using a soft cloth slightly dampened with a dish washing soap in water, wash the surface of the keyboard ensuring that no excess solution (there should not be any excess) runs into the keyboard assembly.
3	Rub the surfaces of the keyboard with a soft cloth to remove any remaining soap residue.
4	Reconnect the keyboard to the station.

Trackball The trackball can be cleaned with a damp (not saturated) soft cloth with a light washing soap solution.

Table 4-2 Cleaning the Trackball

Step	Action
1	Turn OFF the main power switch
2	Using a soft cloth slightly dampened with a dish washing soap in water, wash the surface of the ball, the two rollers and idler, ensuring that all parts are dry and clean. Rub the surfaces of the trackball with a soft cloth to remove any remaining soap residue.
3	Turn on the main power switch.

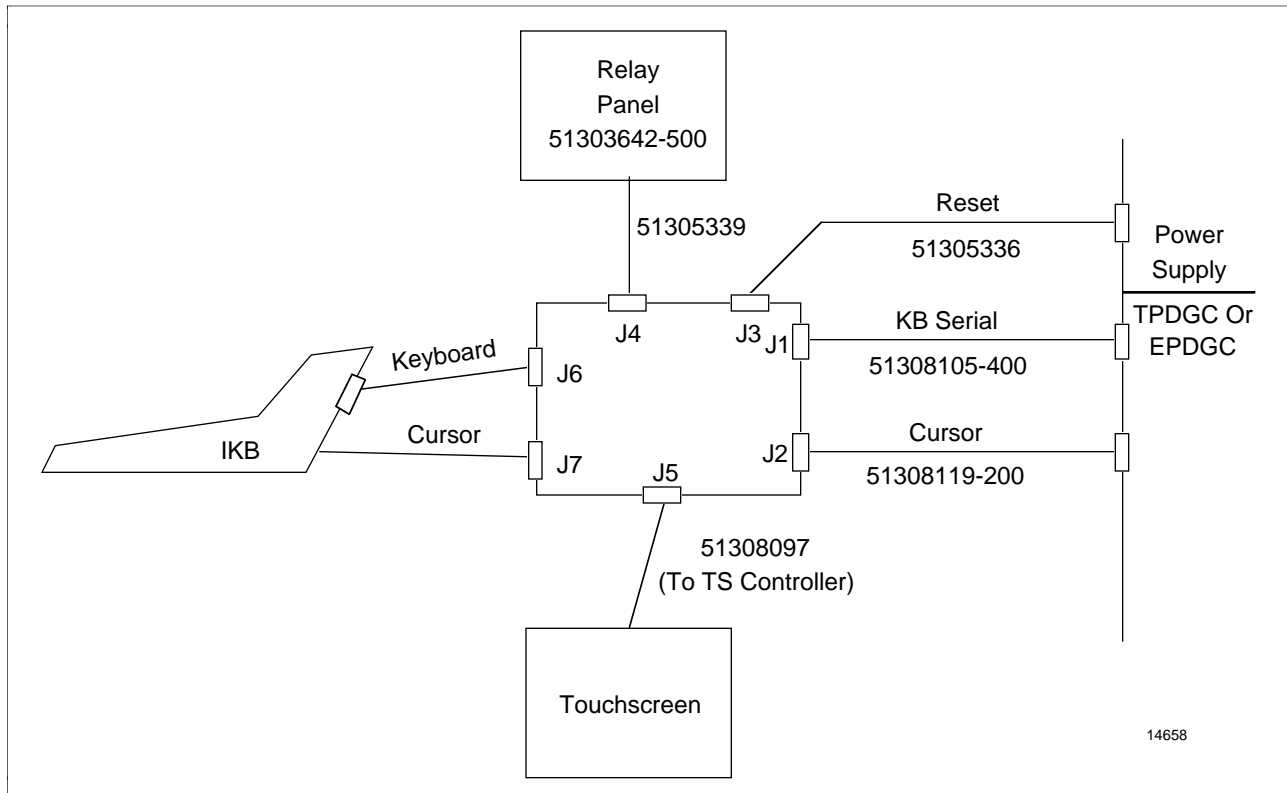
4.8 Troubleshooting the Integrated Keyboard

Scope

All four functional parts of the Integrated Keyboard (IKB) are integrated into one Optimal Replaceable Unit (ORU). That is, the whole unit must be replaced when any part is dysfunctional.

The following cabling diagram shows the connection of the keyboard interface cable and the optional cursor interface cable.

Figure 4-6 Keyboard/Manifold Board Cabling



Continued on next page

4.8 Troubleshooting the Integrated Keyboard, Continued

Procedure

Before replacing the keyboard, complete the procedure in the troubleshooting table.

Table 4-3 Troubleshooting the Keyboard

Step	Action
1	Check the power LED on the Operator Control panel. If it indicates a GOOD condition, try more than one function on each of the keyboard panels. <ul style="list-style-type: none">– If just the trackball has failed, the problem could be in the cursor interface cable.– If either the QWERTY keyboard or the button panel fails, the problem may be in the keyboard interface cable.
2	Check the connections to the manifold board, IKBM. It is accessible by removing the panel under the keyboard and directly under the tilting button panel.
3	Check the connections to the EPDGC/TPDGC board in the I/O card file.
4	If the problem still is not identified, replace the EPDGC/TPDGC board in the I/O card file.
5	If the problem still is not identified, replace the Keyboard
6	If the problem still is not identified, replace the EPDG board.

4.9 Removing the Integrated Keyboard Assembly

Procedure

The complete keyboard, including cables, is the ORU and should be replaced as a complete unit.

Table 4-4 Removing the Integrated Keyboard

Step	Action
1	Turn the ac power switch to the OFF position. It is located on the back side of the foot pedestal.
2	Remove the front cover from the upper card file module.
Removing Cover Plates from Under the Keyboard Tray	
3	Remove the two Phillips-head screws from each side of the IKB.
4	Using an 8 mm socket, remove the eight screws from under the front edge of the keyboard tray as shown in Figure 4-7.
5	Using an 8 mm socket, loosen the 8 screws from the panel located under the keyboard tray. See Figure 4-7.
6	Using an 8 mm socket, remove the remaining two screws that hold the cover plate on. See Figure 4-7. This gives access to the keyboard cable connections.
7	Raise the QWERTY keyboard. This exposes a grounding bolt on each side of the keyboard. It grounds the conductive strap that comes out of the keyboard. The conductive strap is hard to see in low-levels of light. Using an 8 mm socket, remove the two grounding bolts from under the keyboard tray.
Disconnecting the Keyboard Cables	
8	Disconnect the keyboard interface cable from J6 of the manifold board.
9	If the keyboard has a trackball, remove the cable from J7 of the manifold board.
10	Disconnect the keyboard interface cable from the keyboard. See Figure 4-8.
11	Disconnect the trackball cable from the keyboard.
12	To remove the keyboard, grasp the keyboard where it joins the station frame and lift it while pulling it towards yourself.

Continued on next page

4.9 Removing the Integrated Keyboard Assembly, Continued

Illustrations

Figure 4-7 Location of Keyboard Screws

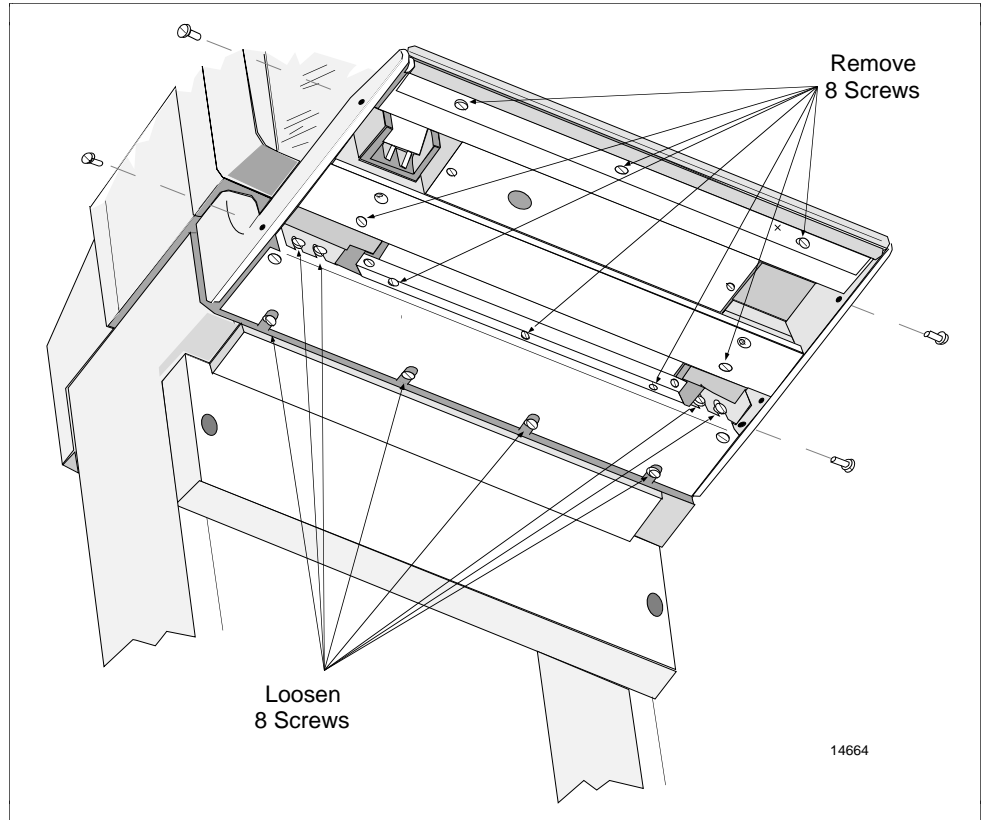
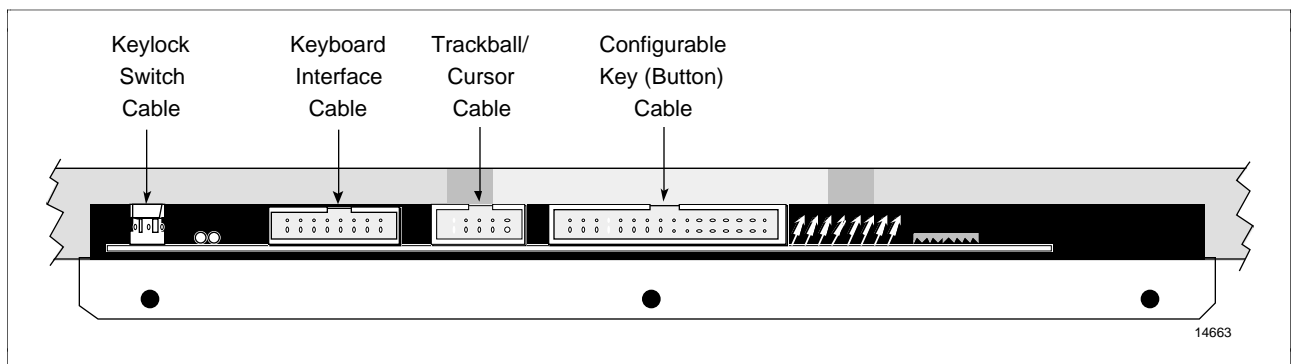


Figure 4-8 View of Keyboard Connectors from the Rear



4.10 Replacing the Integrated Keyboard

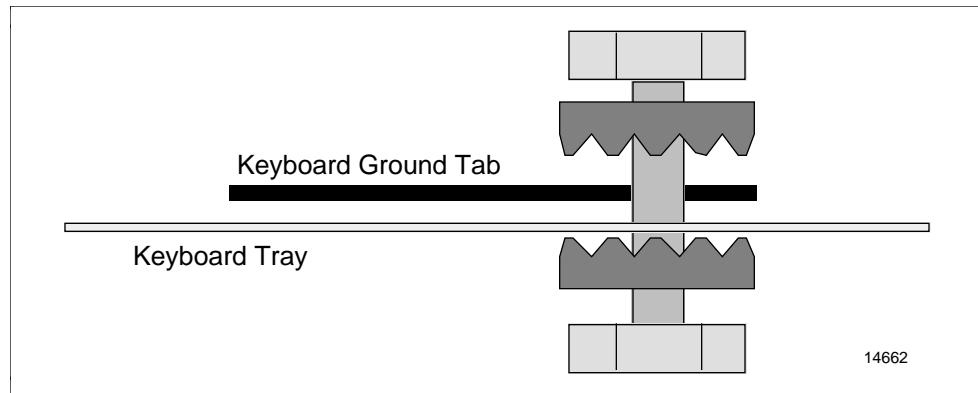
Procedure

Table 4-5 Replacing the Integrated Keyboard

Step	Action
1	Set the new keyboard on top of the support tray, but not in place.
2	Connect the keyboard interface cable and trackball cables to the keyboard connectors. See Figure 4-8.
3	Place the new keyboard in place on the tray, push it back against the station frame and down into place.
4	Replace the two grounding bolts (do not tighten), one on each side under the QWERTY keyboard panel. See Figure 4-9.
5	Lift the front edge of the keyboard and replace the rubber edged bump strip between the keyboard and the frame. The tallest edge of the bumper should be on the top side.
6	Replace but do not tighten, the eight screws under the keyboard shown as removed in Figure 4-7.
7	Replace the cover panel and the remaining two screws (do not tighten) shown in Figure 4-7. After all the screws are in place, tighten all 16 screws firmly.

Illustration

Figure 4-9 Keyboard Grounding Bolt Assembly



4.11 Spare Parts

Spare parts list

Table 4-6 Integrated Keyboard Spare Parts

Part Number	Description
*51196694-150	Integrated Keyboard without trackball
*51196694-250	Integrated Keyboard with Summagraphics protocol trackball
51305336-100	Reset Cable to I/O board
51308105-400	IKBM Keyboard Interface Cable to I/O board
51308119-200	IKBM Cursor Interface Cable to I/O board

* = Optimum Replaceable Unit (ORU)

Section 5 – Mouse Service

5.1 Overview

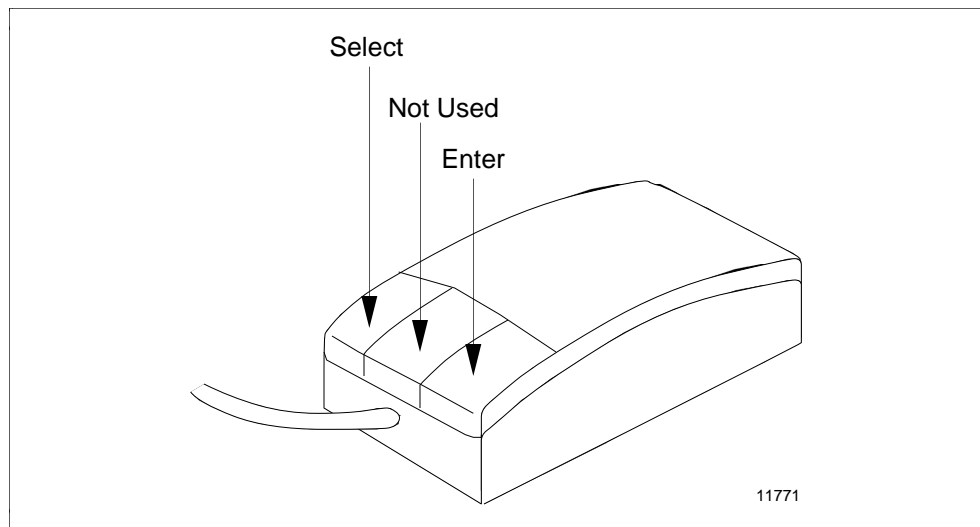
Section contents These are the topics covered in this section:

Topic	See Page
SECTION 5 – MOUSE SERVICE.....	69
5.1 Overview.....	69
5.2 Cleaning the Mouse.....	70
5.3 Troubleshooting the Mouse.....	71
5.4 Spare Parts.....	72

Description The mouse has three select switches:

Switch Location	Function
Left	Select
Center	Not used
Right	Enter

Figure 5-1 Universal Station Mouse



5.2 Cleaning the Mouse

Procedure

Table 5-1 Cleaning the Mouse

Step	Action
1	Turn the mouse upside down.
2	Unscrew the circular ring around the ball.
3	Turn the mouse over into the palm of your other hand—the ball and ring will fall out of the mouse.
4	Wipe the surface of the ball with a slightly damp cloth that has been dipped in a mild soap solution.
5	Polish the ball with a soft dry lint free cloth.
6	Place the ball in the mouse.
7	Place the ring over the ball.
8	Press the ring into the mouse and twist the ring until it locks.

5.3 Troubleshooting the Mouse

Procedure

Table 5-2 Troubleshooting the Mouse

Step	Action
1	If the cursor on the monitor does not move when the mouse is scrolled, check the cable connection at J1 (signal) on the EPDGP I/O board. See Figure 6-2.
2	Ensure that the mouse cable is connected to J4 (power) on the EPDG I/O board.
3	If checking the cable connection does not correct the problem, install each of the following until the problem is corrected: <ul data-bbox="641 674 958 779" style="list-style-type: none">• Mouse, 51196308-100• EPDGP I/O Board• EPDG Board

5.4 Spare Parts

Spare parts list

Table 5-3 Mouse Spare Parts

Part Number	Description
*51196713-100	UWS Mouse – CE Compliant

Section 6 – Trackball Service

6.1 Overview

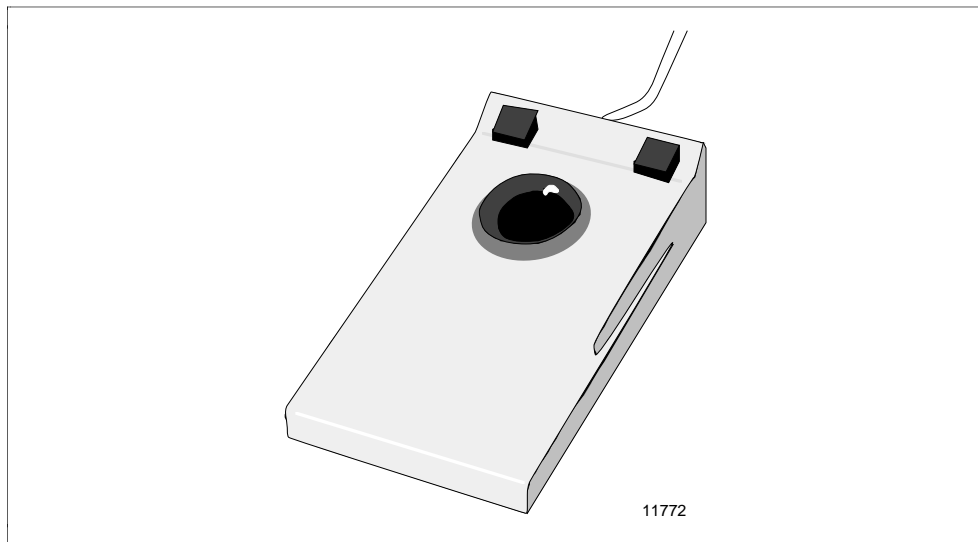
Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 6 – TRACKBALL SERVICE	73
6.1	Overview.....	73
6.2	Operating the Trackball.....	74
6.3	Cleaning.....	74
6.4	Troubleshooting the Trackball.....	74
6.5	Spare Parts.....	75

Description

The trackball is attached to the station by the interface cable and can be placed on the writing surface when it is in place over the Operator Entry Panel (OEP).

Figure 6-1 Universal Station Trackball, 51108306-200



6.2 Operating the Trackball

SELECT switch

The left-hand switch is the SELECT switch as shown in Figure 6-1.

6.3 Cleaning The Trackball

Procedure

Table 6-1 Cleaning the Trackball

Step	Action
1	Wipe the surface of the ball with a slightly damp cloth that has been dipped in a mild soap solution.
2	Polish the ball with a soft dry lint free cloth.

6.4 Troubleshooting the Trackball

Procedure

Table 6-2 Troubleshooting the Trackball

Step	Action
1	If the cursor on the monitor does not move when the trackball is scrolled, check the cable connection at the connector located to the right of the cartridge/DAT drive and at J1 (signal) and J4 (J4) on the EPDGP I/O board.
2	If no problem is corrected at the EPDGP I/O board, install a spare board for each of the following until the problem is corrected: <ul style="list-style-type: none">• EPDGP I/O Board• EPDG Board

6.5 Spare Parts

Spare parts list

Table 6-3 Trackball Spare Parts

Part Number	Description
*51196714-100	Trackball Assembly – CE Compliant

* Indicates an Optimum Replaceable Unit (ORU)

Section 7 – Five-Slot Module/Dual Node Module

7.1 Overview

Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 7 – FIVE-SLOT MODULE.....	77
7.1	Overview.....	77
7.2	Module Replacement.....	78
7.3	Filter Replacement.....	79
7.4	Spare Parts.....	80

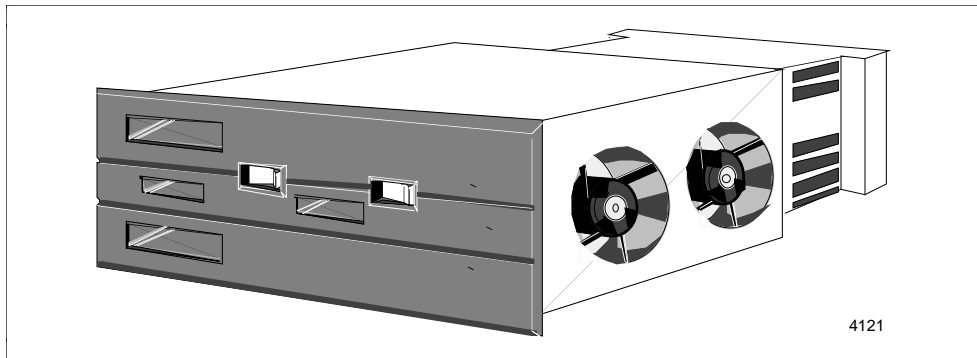
Scope This section covers the replacement of a module.

The module service is covered by *Five/Ten-Slot Module Service* and *Dual Node Module Service* manuals.

The spare part module does not have a fan module or power supply module(s). Reinstall the fan and power supply(ies) from the old module.

Illustration

Figure 7-1 Dual Node Module



7.2 Module Replacement

Procedure

Both modules replacement part is a bare chassis with backpanel and I/O card cage. The fan assembly and power supply must be removed and reused. **Remember, the front of the module faces the rear of the station.**

Table 7-1 Replacing a Module

Step	Action
1	Remove the front and rear module covers.
2	Remove card file enclosure assembly by sliding it to the rear of the station and off the shelf. To do this, grasp the top and bottom edges of the enclosure, lift the edges away from the module chassis until the two tabs are clear of the module, and pull forward.
3	Extract the I/O cards from the back of the card file. The “T” may be disconnected from the board without disconnecting it from the cables. ATTENTION DO NOT DISCONNECT THE COAX FROM THE “T”—this would break the LCN cable continuity and isolate one part of the system from the other.
4	Disconnect the power cord from the power distribution panel.
5	Disconnect the ground wire from the back of the module.
6	Remove the boards from the front of the module and install them in the same slot in the new module.
7	Remove the fan assembly from the module after loosening the bail fasteners on the front of the assembly.
8	Remove the power supply by pulling the extractor levers located on each side of the power supply module.
9	Remove the two hex-head retaining screws located on the front of the module on each side.
10	Pull the module to the rear of the station, until it clears the supporting shelf. CAUTION Support the module so it does not fall.
11	Slide the new module onto the support shelf.
12	Replace the four retaining screws.
13	Connect the ground wire to the chassis ground terminal.
14	Connect the module ac power cord to the power distribution panel.
15	Replace the power supply module, fan assembly, I/O cards, and card file enclosure assembly.
16	Replace the I/O cards in the rear of the new module.

Continued on next page

7.2 Module Replacement, Continued

Procedure, continued

Table 7-1 Replacing a Module, Continued

Step	Action
17	Connect the "T" connectors according to the color-coded rings on the cable and card connectors.
18	Place the module power switch in the ON position.
19	The cursor should appear on the screen of the monitor after 60 seconds.
20	Load the station.

7.3 Filter Replacement

Procedure

The filter is located in the right side of the module enclosure. It is accessed by removing the rear door of the module.

Table 7-2 Replacing a Filter

Step	Action
1	Push on the front edge of the filter until it is pushed back approximately 1/4 inch.
2	Swing the front edge of the filter to the right 1 inch and slide forward.
3	To install a filter, slide the filter into the groves in the right air chamber of the enclosure until some pressure is felt as the foam compresses against the stop.
4	Swing the front edge of the filter to the left and allow it to spring toward you until it catches in the detent groove.

7.4 Spare Parts

Table

Table 7-3 Module Spare Parts

Part Number	Description
*51406728-100	Dual Node Card File Assembly – CE Compliant
*51406729-100	Five-Slot Card File Assembly – CE Compliant
*51403177-100	Auxiliary Card File
51403089-200	Front cover Assembly, Upper
51403090-200	Front Cover Assembly, Lower
51308086-101	Safety Barrier for Dual Node Module
51308086-201	Safety Barrier for Five-Slot Module
51308086-202	Safety Barrier for Five-Slot Module used for WDA History Module
51403152-100	Rear Cover Assembly (Complete for Dual Node)
51403152-200	Rear Cover Assembly (Complete for Five-Slot)
51403152-101	Rear Cover EMI Shield (with EMC strip for Dual Node Module)
51403152-201	Rear Cover EMI Shield (with EMC strip for Five-Slot Module)
51197046-100	EMC Strip 3.35 inch
51197046-200	EMC Strip 4.46 inch
51403117-100	Card File Enclosure Assembly
51201201-800	Dust Filter (foam)
51308003-100	Dust Filter with Gasket (right-hand side of the rear of the module enclosure)

* ORU = Optimum Replaceable Unit

Section 8 – Cartridge Drive Service

8.1 Overview

Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 8 – CARTRIDGE DRIVE SERVICE	81
8.1	Overview	81
8.2	Loading/Unloading	82
8.3	Cleaning the Cartridge Drive	83
8.4	Troubleshooting an Inoperative Cartridge Drive.....	84
8.5	Removing the Cartridge Drive	85
8.6	Replacing a Cartridge Drive	86
8.7	Pinning the Cartridge Drive.....	88
8.8	Spare Parts.....	90

Description

Cartridge drives exist as:

- Single drive in a standard Universal Station node
- Dual drive in a standard Universal Station node

When a US node is in a Five-Slot Module, the cartridge is powered by the Acme power supply in the Five-Slot Module.

When a US node is in a Dual Node Module, the cartridge is powered by the peripheral power supply located in the Peripheral Power supply (see Figure 2-10).

ATTENTION

ATTENTION—THE CARTRIDGE SHOULD NOT REMAIN IN THE CARTRIDGE DRIVE FOR EXTENDED PERIODS OF TIME WHEN IT IS NOT IN USE. The drive automatically retracts the heads after a period of time without use, but the media is still spinning. This shortens the life of the cartridge and could result in lost data.

8.2 Loading/Unloading

Procedure

Follow the steps in Table 8-1 to load a cartridge in the drive.

Table 8-1 Loading a Cartridge

Step	Action
1	Insert the cartridge into the drive in a smooth motion until it clicks (with about 3 cm [1 inch] still sticking out) and starts to spin.
2	<p>The green LED will start flashing, then will remain steadily on when the drive is ready.</p> <ul style="list-style-type: none">• If the green LED starts to flash before the cartridge is in all the way, stop and wait till the LED stops flashing.• If the LED does not stop flashing, press the STOP button.• When the LED stops flashing, remove the cartridge.

Follow the steps in Table 8-2 to unload a cartridge from the drive.

Table 8-2 Unloading a Cartridge

Step	Action
1	<p>Press the front panel button and release it once. The LED indicator will flash on and off.</p> <p>WARNING Do not pull on the cartridge until the LED indicator stops flashing.</p>
2	When the LED indicator stops flashing, remove the cartridge by firmly pulling on the rear center of the cartridge.

8.3 Cleaning the Cartridge Drive

Periodic cleaning

Periodic cleaning of the read/write head is important for prolonging head and cartridge life. The head should be cleaned:

- every 50 hours of use (more frequently in dusty environments)
- whenever frequent errors occurs

ATTENTION

ATTENTION—Each drive should have its own cleaning cartridge.

Cleaning cartridge

The cleaning cartridge is available from Honeywell. See Table 8-7. The kit, 51195169-101, includes:

- a head-cleaning cartridge
- wiper pads
- an approved head-cleaner solution

The head-cleaning cartridge inserts into the drive the same as a standard data cartridge. Instructions are included with the head-cleaning kit.

Procedure

The cleaning cartridge has a pad that is mounted on the pad-arm assembly. Change the pad after five uses.

Table 8-3 Cleaning a Cartridge Drive

Step	Action
1	Remove any cartridge that is in the drive.
2	Press the front panel button on the disk drive and hold until the green LED starts flashing (about 2 seconds). This places the drive in the mode to accept the cleaning cartridge.
3	CAUTION Follow instructions on the container that holds the disk drive cleaner solution to avoid vapor inhalation or skin exposure.
4	Apply the cleaner by squeezing the solution from the container onto the pad through the cartridge window and center slot. ATTENTION The cleaner should be applied to the pad just before inserting the cartridge into the drive. The pad should be dampened, but not saturated with the solution.
5	Place the cleaning cartridge in the drive. The LED will glow steadily.
6	The wiper lever moves back and forth for 30 cleaning cycles.
7	After the 30 cleaning cycles are complete, press the front panel button.
8	When the green light goes out, remove the cartridge.
9	Record the date of cleaning on the label provided with the cleaning cartridge. Place the label on the outside of the storage sleeve.

8.4 Troubleshooting an Inoperative Cartridge Drive

Failure modes

In general, if only one disk drive fails, the disk drive is most likely at fault. If both disk drives are inoperative, check the power source.

- If the node is in a Five-Slot Module, the module power supply supplies the power.
 - If the node is in a Dual node Module, the peripheral power supply supplies the power.
-

Isolation procedure

Table 8-4 Troubleshooting a Cartridge Problem

Step	Action
1	If the node is in a Five-Slot Module, check the indicators on the module power supply—refer to the <i>Five/Ten Slot Module Service</i> manual.
2	Check the EPDG board error LED (red).
3	If the node is in a Dual Node Module, check the power cable by disconnecting it from the cartridge drive. <ul style="list-style-type: none">• Pins 1 & 2 = +12 Vdc \pm .1 V• Pins 3 & 4 = 5.0 Vdc \pm .25 V

8.5 Removing the Cartridge Drive

CAUTION

CAUTION—Observe ESD procedures when handling circuit boards.

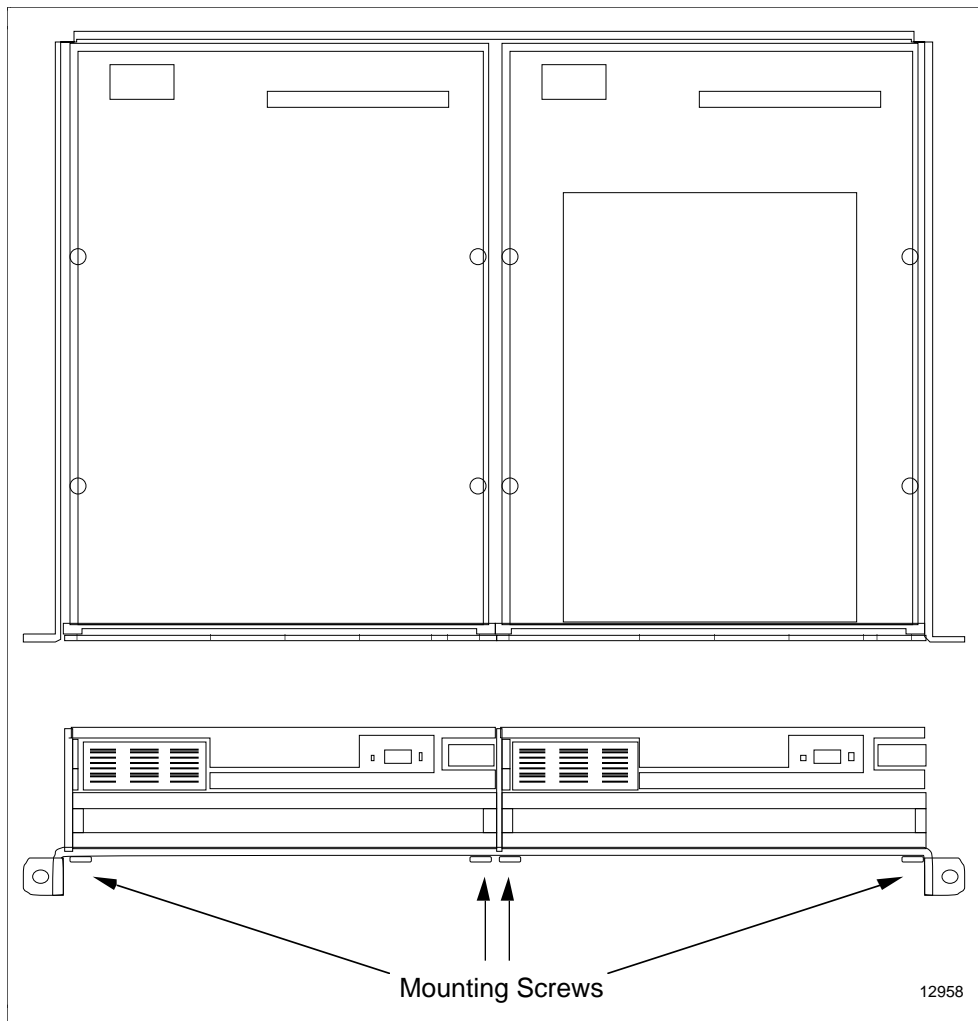
Procedure

Table 8-5 Removing a Cartridge Drive

Step	Action
1	Remove the two screws that hold the cartridge drive slide tray in place. See Figure 8-1.
2	Pull the slide tray forward and disconnect the power cables and the interface cables.
3	Remove the four screws that hold the drive in place. See Figure 8-2.

Illustration

Figure 8-1 Cartridge Drive Mounting



8.6 Replacing a Cartridge Drive

CAUTION

CAUTION—Observe ESD procedures when handling circuit boards.

Procedure

Table 8-6 Replacing a Cartridge Drive

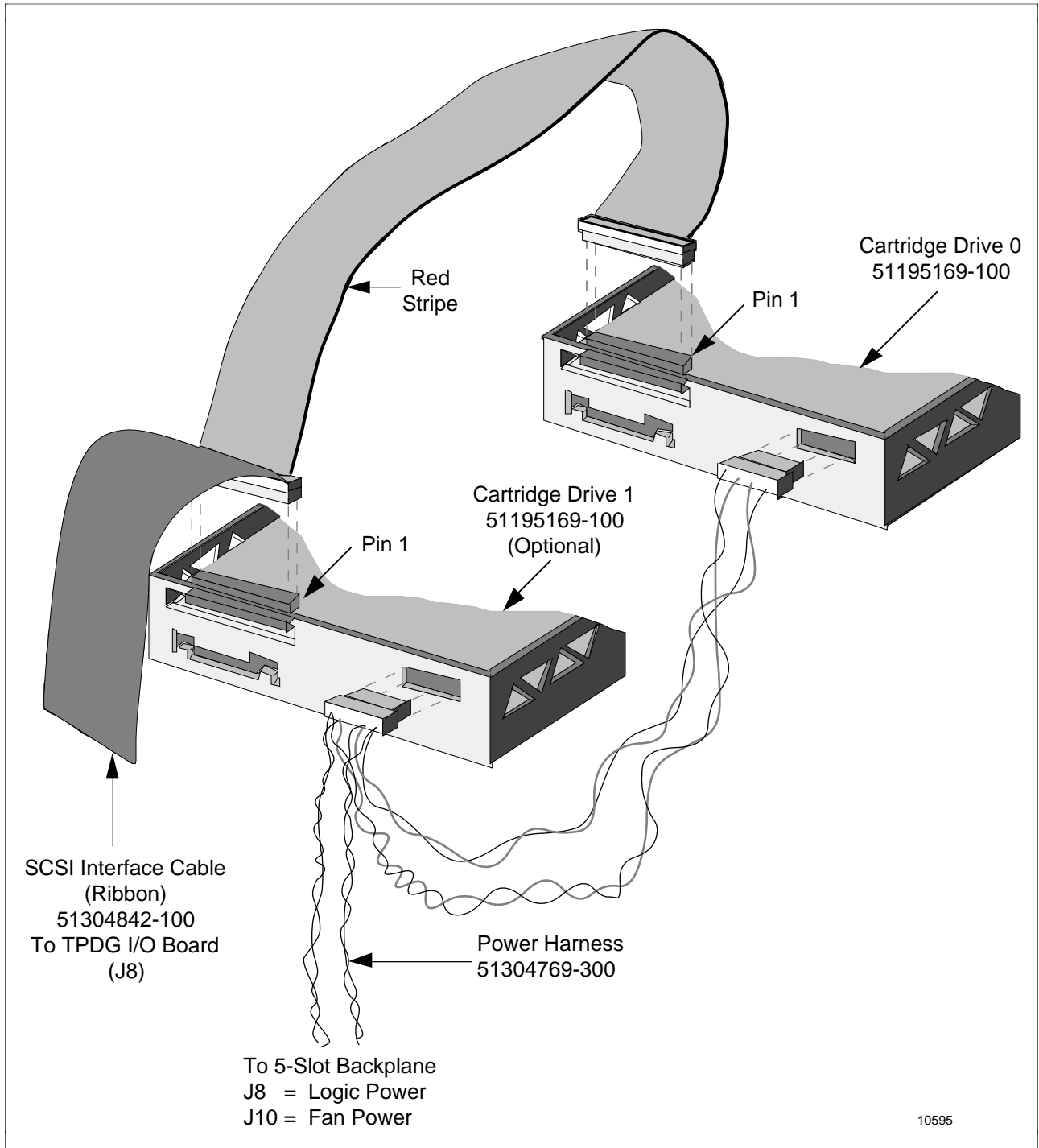
Step	Action
1	Ensure that the new drive is correctly pinned. See subsection 8.7.
2	Mount the new drive in the slide tray. See Figure 8-1
3	Connect the two cables to the rear of the drive as shown in Figure 8-2.
4	Slide the assembly back into the station.
5	Replace the two retaining screws.
6	Remove the polystyrene insert from the drive.

Continued on next page

8.6 Replacing a Cartridge Drive, Continued

Illustration

Figure 8-2 20 MB Cartridge Drive Cabling



8.7 Pinning the Cartridge Drive

Scope

The 20 MB Iomega cartridge drive has been replaced by the Iomega 150 MB cartridge drive.

For the 20 MB drive, terminate the SCSI Bus as shown in Figure 8-3. Pin the replacement cartridge drive's SCSI bus address as shown in Figure 8-4.

Illustrations

Figure 8-3 20 MB Cartridge Drive SCSI Bus Termination

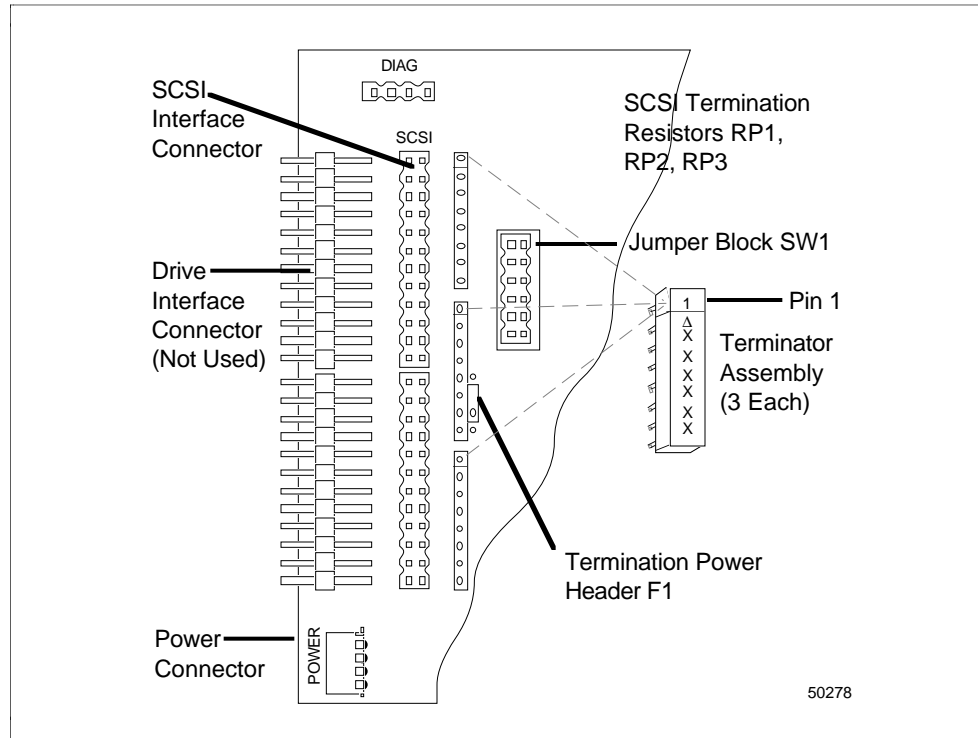
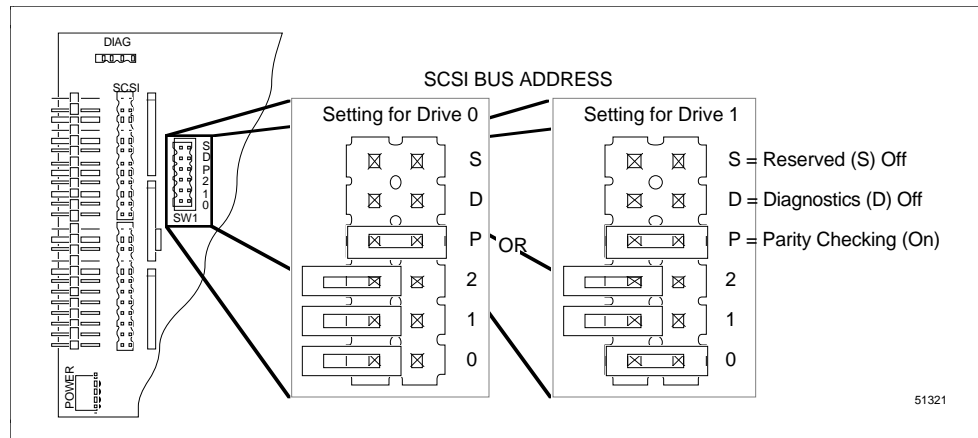


Figure 8-4 20 MB Cartridge Drive SCSI Address Pinning



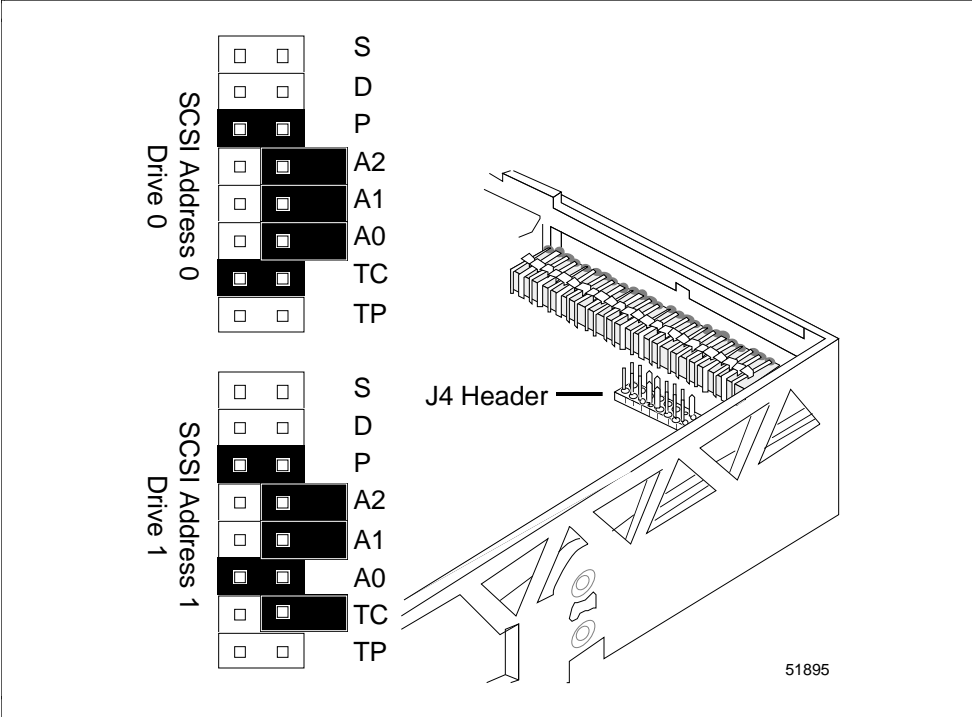
Continued on next page

8.7 Pinning the Cartridge Drive, Continued

Illustration

The 150 MB Iomega cartridge drive that replaced the 20 MB cartridge drive's SCSI bus address is pinned as shown in Figure 8-5.

Figure 8-5 150 MB Iomega Bernoulli Cartridge Drive Pinning



8.8 Spare Parts

20 MB drive parts list

Table 8-7 20 MB Cartridge Drive Spare Parts

Part Number	Description
*51195156-300	Beta 0 (Iomega Cartridge Drive)
51304842-200	SCSI Interface Cable (Single Drive)
51304199-300	SCSI Interface Cable (Dual Drive)
51308055-100	Drive Cable DC Power
51196485-500	Cartridge Drive Cleaning Kit

* ORU = Optimum Replaceable Unit

150 MB drive parts list

Table 8-8 150 MB Cartridge Drive Spare Parts

Part Number	Description
*51196483-100	Iomega's MultiDisk 150 Cartridge Drive
51304842-200	SCSI Interface Cable (Single Drive)
51304199-300	SCSI Interface Cable (Dual Drive)
51308055-100	Drive Cable DC Power
51196485-100	35 MB MultiDisk 150 MB compatible 5.25" cartridge
51196485-400	150 MB MultiDisk 150 MB compatible 5.25" cartridge
51196485-500	5.25" Cleaning Care Kit—includes <ul style="list-style-type: none"> • cleaning cartridge • one 0.25 oz bottle of cleaning solution • 2 extra cleaning pads
51196485-600	Multipak Cleaning Solution—Refill Kit <ul style="list-style-type: none"> • three 0.25 oz bottles of cleaning solution

* ORU = Optimum Replaceable Unit

Section 9 – Cartridge Drive Service (CE Compliant)

9.1 Overview

Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 9 – CARTRIDGE DRIVE SERVICE (CE COMPLIANT).....	91
9.1	Overview.....	91
9.2	Loading/Unloading.....	92
9.3	Cleaning the Cartridge Drive.....	93
9.4	CE Compliant Drive Enclosure.....	94
9.5	Troubleshooting an Inoperative Cartridge Drive.....	96
9.6	Removing the Drive Enclosure.....	97
9.7	Pinning the Cartridge Drive.....	99
9.8	Replacing the DAT Drive.....	100
9.9	Assembly of the Drive.....	100
9.10	Spare Parts.....	101

Description

Cartridge drives exist as:

- Single drive in a standard Universal Station node
- Dual drive in a standard Universal Station node

When a US node is in a Five-Slot Module, the cartridge is powered by the Acme power supply in the Five-Slot Module.

When a US node is in a Dual Node Module, the cartridge is powered by the peripheral power supply located in the Peripheral Power supply (see Figure 2-4 and 2-11).

CE Compliant enclosure

The two cartridge drives are enclosed in a universal metal box with two interface connectors and one power connector. Only the connector labeled LCN (upper connector) is connected to the cartridge drive interface(s). The other cable is unused.

ATTENTION

ATTENTION—THE CARTRIDGE SHOULD NOT REMAIN IN THE CARTRIDGE DRIVE FOR EXTENDED PERIODS OF TIME WHEN IT IS NOT IN USE. The drive automatically retracts the heads after a period of time without use, but the media is still spinning. This shortens the life of the cartridge and could result in lost data.

9.2 Loading/Unloading

Procedure

Follow the steps in Table 9-1 to load a cartridge in the drive.

Table 9-1 Loading a Cartridge

Step	Action
1	Insert the cartridge into the drive in a smooth motion until it clicks (with about 3 cm [1 inch] still sticking out) and starts to spin.
2	<p>The green LED will start flashing, then will remain steadily on when the drive is ready.</p> <ul style="list-style-type: none">• If the green LED starts to flash before the cartridge is in all the way, stop and wait till the LED stops flashing.• If the LED does not stop flashing, press the STOP button.• When the LED stops flashing, remove the cartridge.

Follow the steps in Table 9-2 to unload a cartridge from the drive.

Table 9-2 Unloading a Cartridge

Step	Action
1	<p>Press the front panel button and release it once. The LED indicator will flash on and off.</p> <p>WARNING Do not pull on the cartridge until the LED indicator stops flashing.</p>
2	When the LED indicator stops flashing, remove the cartridge by firmly pulling on the rear center of the cartridge.

9.3 Cleaning the Cartridge Drive

Periodic cleaning

Periodic cleaning of the read/write head is important for prolonging head and cartridge life. The head should be cleaned:

- every 50 hours of use (more frequently in dusty environments)
- whenever frequent errors occurs

ATTENTION

ATTENTION—Each drive should have its own cleaning cartridge.

Cleaning cartridge

The cleaning cartridge is available from Honeywell. See Table 9-7. The kit, 51195169-101, includes:

- a head-cleaning cartridge
- wiper pads
- an approved head-cleaner solution

The head-cleaning cartridge inserts into the drive as does a standard data cartridge. Instructions are included with the head-cleaning kit.

Procedure

The cleaning cartridge has a pad that is mounted on the pad-arm assembly. Change the pad after five uses.

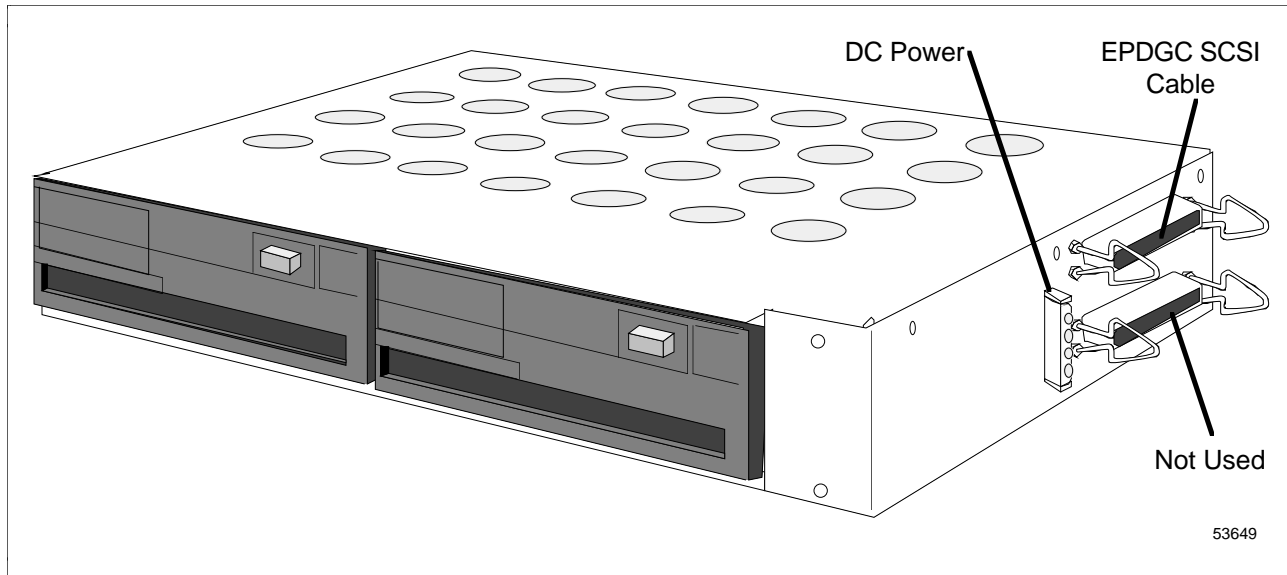
Table 9-3 Cleaning a Cartridge Drive

Step	Action
1	Remove any cartridge that is in the drive.
2	Press the front panel button on the disk drive and hold until the green LED starts flashing (about 2 seconds). <ul style="list-style-type: none"> • This places the drive in the mode to accept the cleaning cartridge.
3	CAUTION Follow instructions on the container that holds the disk drive cleaner solution to avoid vapor inhalation or skin exposure.
4	Apply the cleaner by squeezing the solution from the container onto the pad through the cartridge window and center slot. ATTENTION The cleaner should be applied to the pad just before inserting the cartridge into the drive. The pad should be dampened, but not saturated with the solution.
5	Place the cleaning cartridge in the drive. The LED will glow steadily.
6	The wiper lever moves back and forth for 30 cleaning cycles.
7	After the 30 cleaning cycles are complete, press the front panel button.
8	When the green light goes out, remove the cartridge.
9	Record the date of cleaning on the label provided with the cleaning cartridge. Place the label on the outside of the storage sleeve.

9.4 CE Compliant Drive Enclosure

Description

Figure 9-1 CE Compliant Cartridge Drive Enclosure



The enclosure has a two piece shell with a shelf inside that the drives mount on. The cables pass under the mounting shelf and up behind the connectors on the drive(s). The enclosure has screws that pass through the enclosure bottom and into the mounting shelf inside the enclosure. One of the two cables located beside the right-hand drive is not used. This common assembly has other uses where this cable is used.

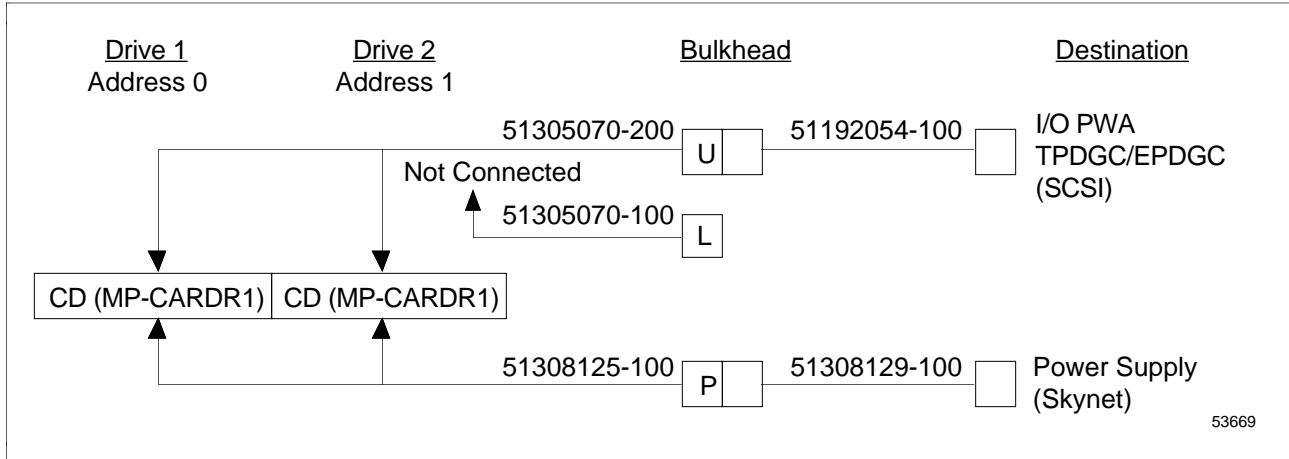
Continued on next page

9.4 CE Compliant Drive Enclosure, Continued

Cable connections

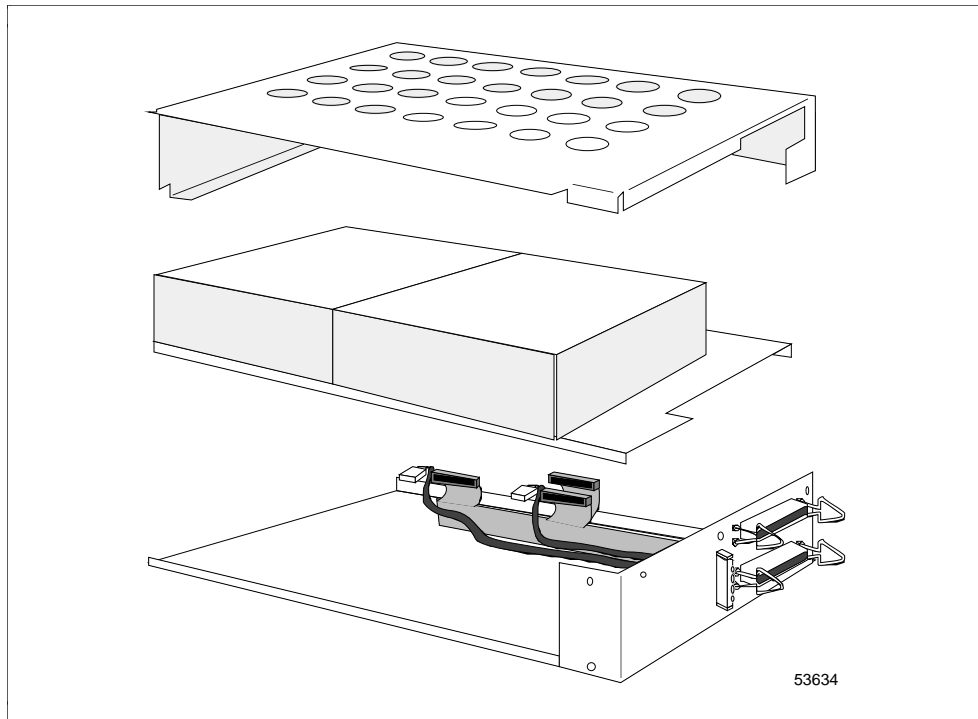
The top connector on the outside of the enclosure is part of a cable that can connect to both drives. This connector is connected to the EPDGC (I/O) board as shown in Figure 9-2.

Figure 9-2 Cartridge Cabling



Construction

Figure 9-3 Exploded View of a CE Compliant Drive Enclosure



9.5 Troubleshooting an Inoperative Cartridge Drive

Failure modes

In general, if only one disk drive fails, the disk drive is most likely at fault. If both disk drives are inoperative, check the power source.

- If the node is in a Five-Slot Module, the module power supply supplies the power.
 - If the node is in a Dual node Module, the peripheral power supply supplies the power.
-

Isolation procedure

Table 9-4 Troubleshooting a Cartridge Problem

Step	Action
1	If the node is in a Five-Slot Module, check the indicators on the module power supply—refer to the <i>Five/Ten Slot Module Service</i> manual.
2	Check the EPDG board error LED (red).
3	If the node is in a Dual Node Module, check the power cable by disconnecting it from the cartridge drive. <ul style="list-style-type: none">• Pins 1 & 2 = +12 Vdc \pm .1 V• Pins 3 & 4 = 5.0 Vdc \pm .25 V

9.6 Removing the Drive Enclosure

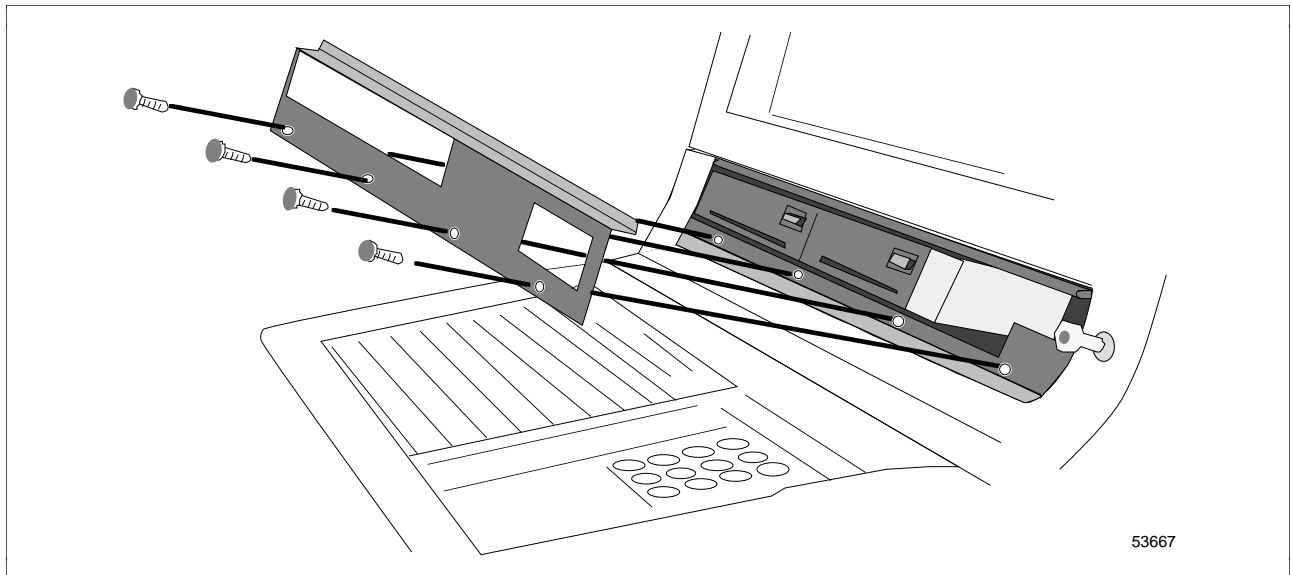
Procedure

The facade plate must be removed from the front of the drive enclosure before the enclosure can be removed.

Table 9-5 Drive Enclosure Access

Step	Action
1	Remove the four screws from the front of the facade plate that covers the cavity the drive enclosure is in. <ul style="list-style-type: none"> – The facade plate still is fastened to the keyboard cable harness but can be swung to the right, out of the way.
2	Remove the front cover from the top card file pod.

Figure 9-4 Location of Facade Mounting Screws



Removal of enclosure

Table 9-6 Drive Enclosure Removal

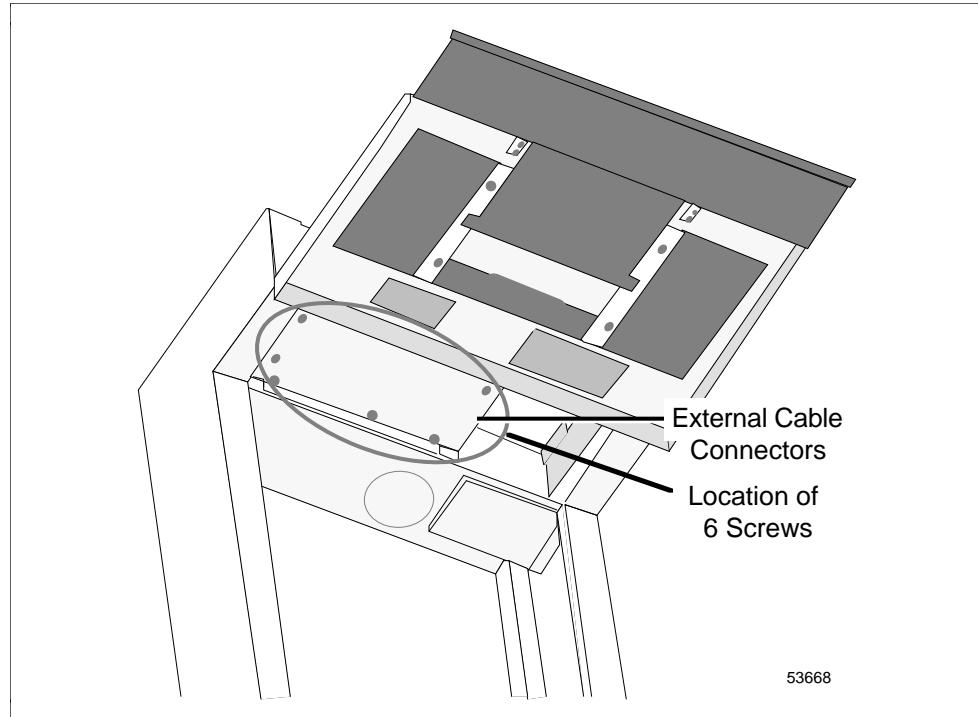
Step	Action
1	Remove upper card file cover
2	Disconnect the cable from the side of the enclosure (Figure 8-5).
3	Remove the six screws that hold the enclosure to the mounting tray.
4	Slide enclosure out of the station.

Continued on next page

9.6 Removing the Drive Enclosure, Continued

Removal

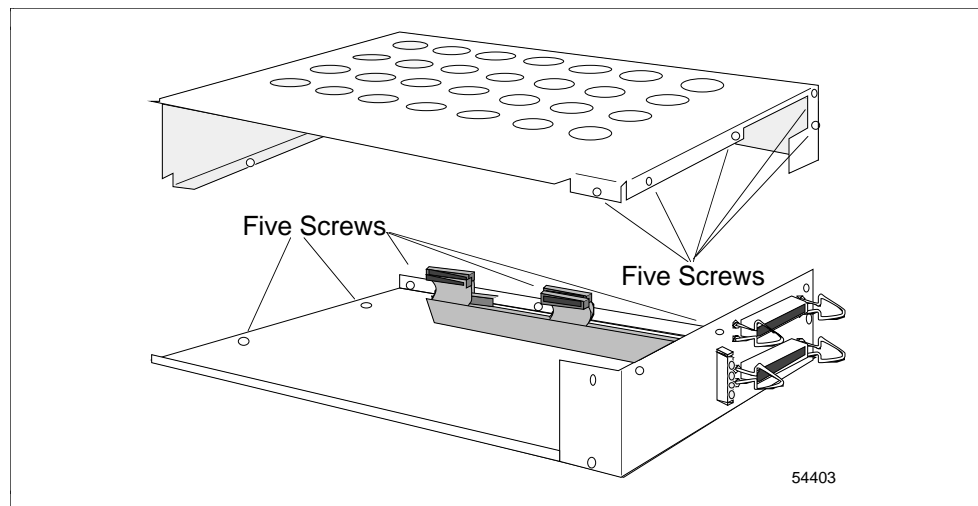
Figure 9-5 Location of Mounting Screws



Disassembly

There are 30 screws in this assembly (six have already been removed) for structural reasons and to ensure a homogeneous ground envelope. **All screws must be in place to ensure EMI containment.** Ten of the screws must be removed to allow the enclosure to be opened.

Figure 9-6 Removal of Screws to Open Drive Enclosure

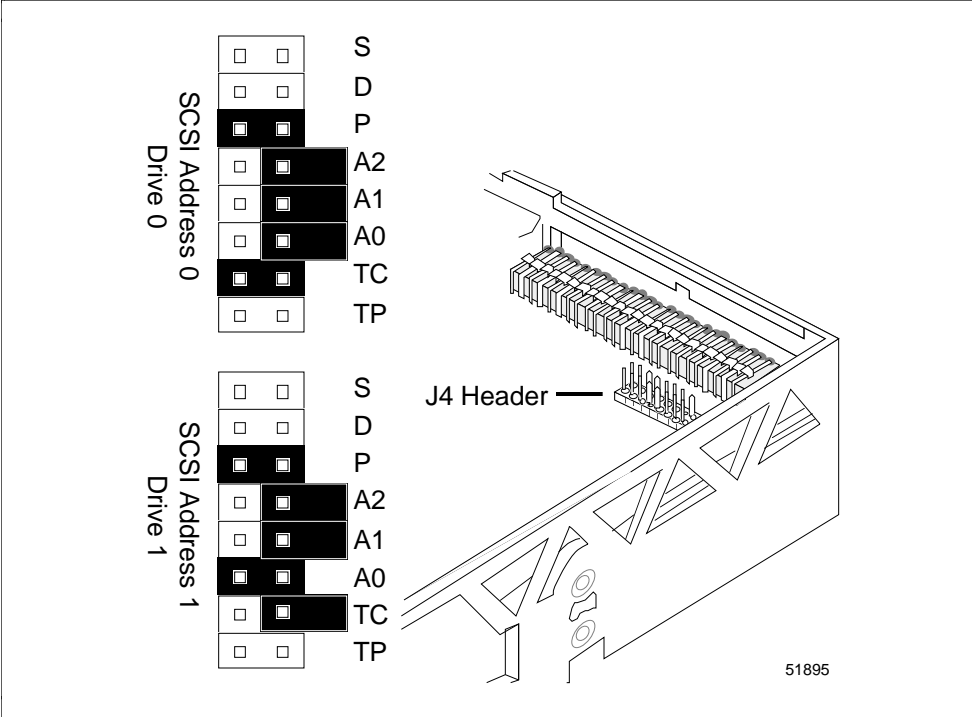


9.7 Pinning the Cartridge Drive

Instruction

The 150 MB Iomega cartridge drive's SCSI bus address is pinned as shown in Figure 9-7.

Figure 9-7 150 MB Cartridge Drive SCSI Bus Address Pinning



9.8 Replacing the DAT Drive

Procedure

Table 9-7 Replacing a DAT Drive in the Enclosure

Step	Action
1	After pinning the new Cartridge drive for the correct address, termination and setting the option switches place the drive on the inner tray of the drive enclosure.
2	Connect the power cable to the drive.
3	Connect the appropriate interface cable to the cartridge drive according to the application shown in Figures 9-2.

9.9 Assembly of the Drive Enclosure

Procedure

Table 9-8 Assembling the Drive Enclosure

Step	Action
1	Place the inner drive tray inside the enclosure on top of the cables.
2	Place the top of the enclosure over the drive(s).
3	Replace the ten screws as shown in Figure 9-6.
4	Replace the drive enclosure in the station.
5	Replace the six screws shown in Figure 9-5.
6	Reconnect the cable to the side of the drive enclosure. <ul style="list-style-type: none">– The cable from the TPDGC board, 51192054-100, connects to the top connector.– The cable from the HDDT (I/O) board, 51192054-100, connects to the bottom connector.
7	Replace the facade plate and four screws as shown in Figure 9-4.

9.10 Spare Parts

Drive spare parts list

Table 9-9 150 MB Cartridge Drive Spare Parts

Part Number	Description
*51196483-100	Iomega's MultiDisk 150 Cartridge Drive
51304842-200	SCSI Interface Cable (Single Drive)
51304199-300	SCSI Interface Cable (Dual Drive)
51308055-100	Drive Cable DC Power
51196485-100	35 MB MultiDisk 150 MB compatible 5.25" cartridge
51196485-400	150 MB MultiDisk 150 MB compatible 5.25" cartridge
51196485-500	5.25" Cleaning Care Kit—includes <ul style="list-style-type: none"> • cleaning cartridge • one 0.25 oz bottle of cleaning solution • 2 extra cleaning pads
51196485-600	Multi-pak Cleaning Solution—Refill Kit <ul style="list-style-type: none"> • three 0.25 oz bottles of cleaning solution

* ORU = Optimum Replaceable Unit

Enclosure parts list

Table 9-10 Drive Enclosure Spare Parts

Part Number	Description
51192054-101	Cable, SCSI Shielded, 50-pin (external cable)
51305070-100	Cable, SCSI (Single Drive)
51305070-100	Cable, SCSI (Dual Drive)
51308129-100	Skynet-Cart Drive Power Cable (external cable)
51308125-100	Cartridge Drive Enclosure Power Harness

Section 10 – DPR 1000 Trend Pen Recorder

10.1 Overview

Section contents These are the topics covered in this section:

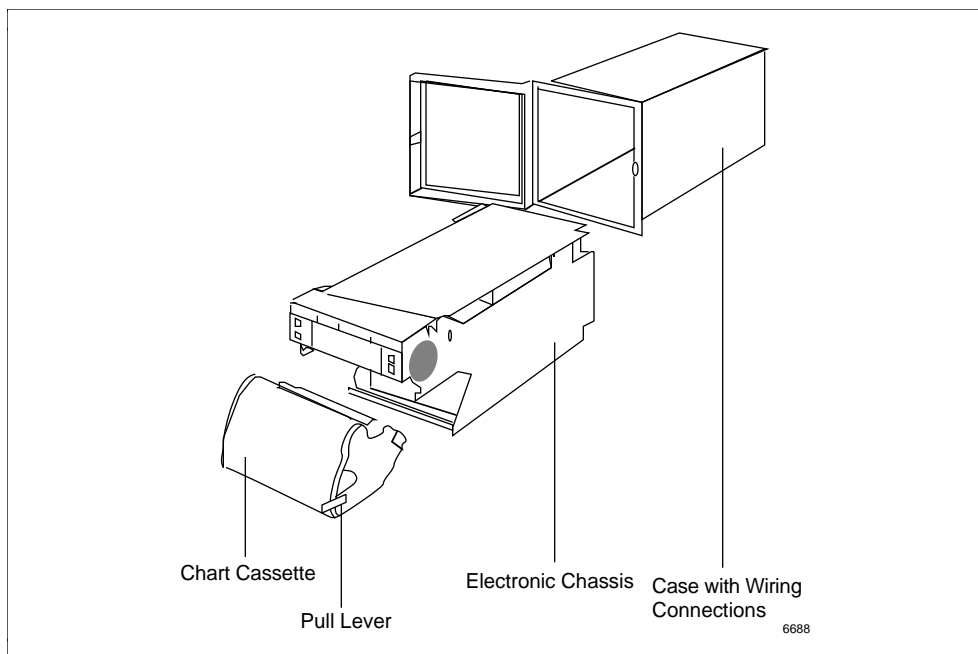
	Topic	See Page
SECTION 10 – DPR 1000 TREND PEN RECORDER		
		103
10.1	Overview.....	103
10.2	Cleaning Trend Pen Recorders.....	105
10.3	Removing Chart Cassette.....	105
10.4	Loading Paper Charts.....	105
10.5	Replacing Print Cartridges	106
10.6	Troubleshooting a Trend Pen Recorder	107
10.7	Removing a Trend Pen Recorder	108
10.8	Replacing a Trend Pen Recorder	109
10.9	Trend Pen Calibration Check	110
10.10	Trend Pen Configuration.....	111
10.11	Spare Parts.....	113

Description

Trend Pen recorders are available with either two or three pens (arranged in a 3/3/2 configuration) that are located in an Auxiliary Equipment Housing above a single monitor. Auxiliary Equipment Housings hold a maximum of 6 recorders with a 3/3/2 configuration in both the upper and lower row.

Illustration

Figure 10-1 Trend Pen Recorder with Chart Cassette



Continued on next page

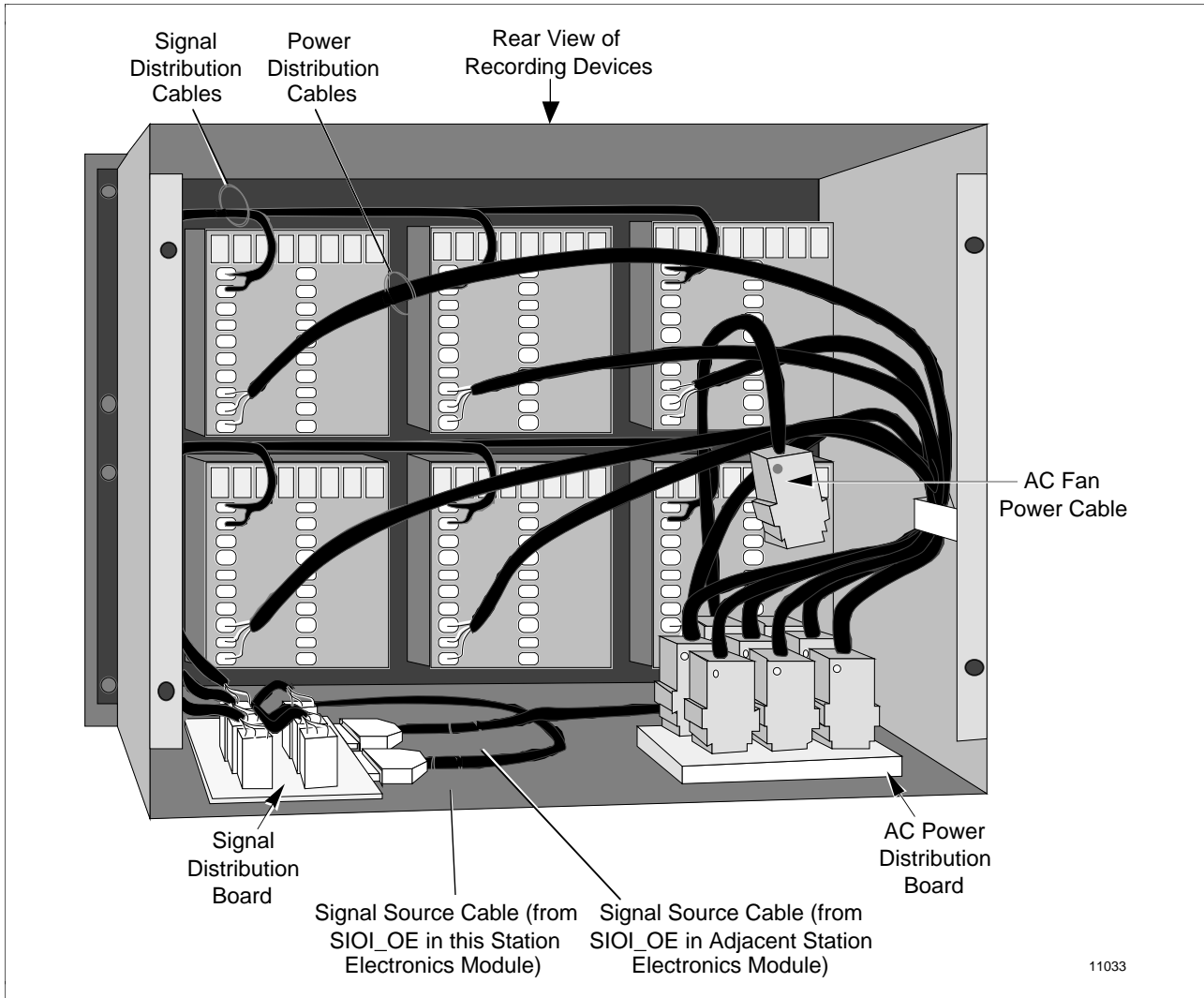
10.1 Overview, Continued

Description

The Trend Pen recorders mount to the front of the front plate. There are two connector PWAs: one that distributes ac power and one that distributes the signals to each recorder.

Illustration

Figure 10-2 Rear of Trend Pen Recorder Showing Distribution of Power and Interface



10.2 Cleaning Trend Pen Recorders

Scope

The only cleaning recommendation is to clean the front cover with a mild solution of detergent, rinse it thoroughly and dry it with a soft lint-free cloth.

10.3 Removing Chart Cassette

Procedure

Table 10-1 Removing Chart Cassette

Step	Action
1	Open the recorder door using the knob or key.
2	Pull out the lever at the lower right-hand side of the chart cassette.
3	Grasp the sides of the cassette and rotate the bottom up and lift out to withdraw it from the case.

10.4 Loading Paper Charts

Reference

Refer to the *DPR 1000 Product Manual* for instructions. The manual is included with each DPR 1000 recorder and can be inserted in this publication's binder.

10.5 Replacing Print Cartridges

Scope

The pens are contained in a wheel that has six pens (two of each color)—the two pens of each color are used alternately. When one color is depleted, the wheel must be replaced.

Table 10-2 Replacing a Pen Wheel

Step	Action
1	Remove the chart cassette as detailed in Table 10-1.
2	If the recorder has power ON, the print carriage will move to the center and the display will indicate NO PAP
3	If the recorder is not powered, gently move the print carriage to the center of its travel.
4	If replacing a used printwheel, secure the print carriage by holding the lever (H) with the left hand and withdraw the print wheel (F) to the right.
5	Continue to secure the print cartridge and fit a new print wheel, ensuring that the pin on the left engages with the corresponding hole on the print carriage gear wheel. A "click" will be heard when the print wheel engages correctly.

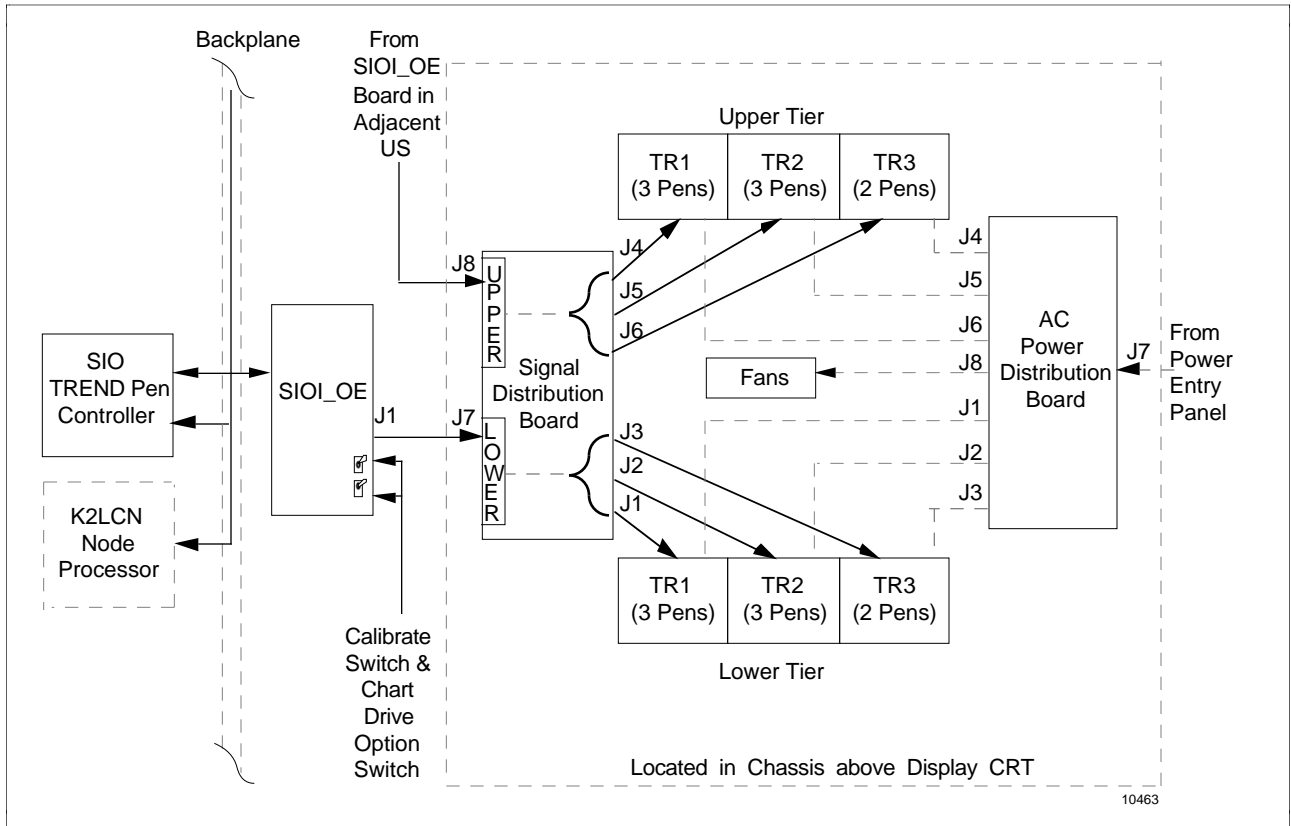
10.6 Troubleshooting a Trend Pen Recorder

Scope

To service a Trend Pen recorder subsystem:

- Refer to the DPR 1000 Service manual, EN21-6001, to service a recorder.
- Run the HVTS test, SIOS, on the SIO board.
- Examine the cables and refer to the cabling diagram in Figure 10-2.

Figure 10-3 Trend Pen Recorder Cabling



10.7 Removing a Trend Pen Recorder

ATTENTION

ATTENTION—To replace a DPR 1000 recorder with a DPR 100 recorder, the complete unit must be removed.

Procedure

Table 10-3 Removing a Trend Pen Recorder (Chassis)

Step	Action
1	Remove chart cassette as in Table 10-1.
2	Using a 5 mm (3/16 inch) screwdriver, loosen the chassis retaining screw (A) accessible through a hole near the center of the chassis (approximately 10 turns). See Figure 10-3.
3	<p>ATTENTION Take care not to damage the input boards at the rear of the chassis.</p> <p>Pull on the bar (B) at the lower front of the chassis to withdraw it from the case.</p>

10.8 Replacing a Trend Pen Recorder

ATTENTION

ATTENTION—The Trend Pen recorder case does not need to be replaced. Just pull the recorder out of the case and insert the new one.

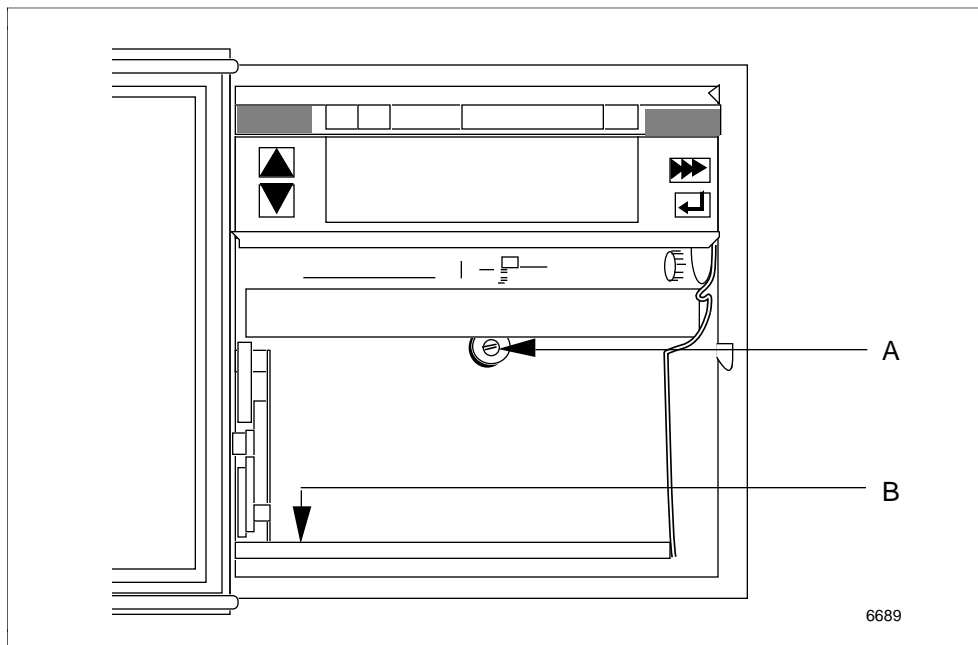
Procedure

Table 10-4 Replacing a Trend Pen Recorder (Chassis)

Step	Action
1	WARNING There is only one spare part assembly supplied for both 120/240 Vac applications. Refer to Figure 10-5 for voltage range selection before installing Replacement Recorders.
2	ATTENTION Take care not to damage the input boards at the rear of the chassis. Slide the chassis into the case until it makes contact with the case.
3	Using a 5 mm (3/16 inch) screwdriver, tighten the chassis retaining screw (A) accessible through a hole near the center of the chassis (approximately 10 turns). See Figure 10-3.
4	Remove chart cassette as in Table 10-1.

Illustration

Figure 10-4 Location of Retaining Screw and Pull Bar

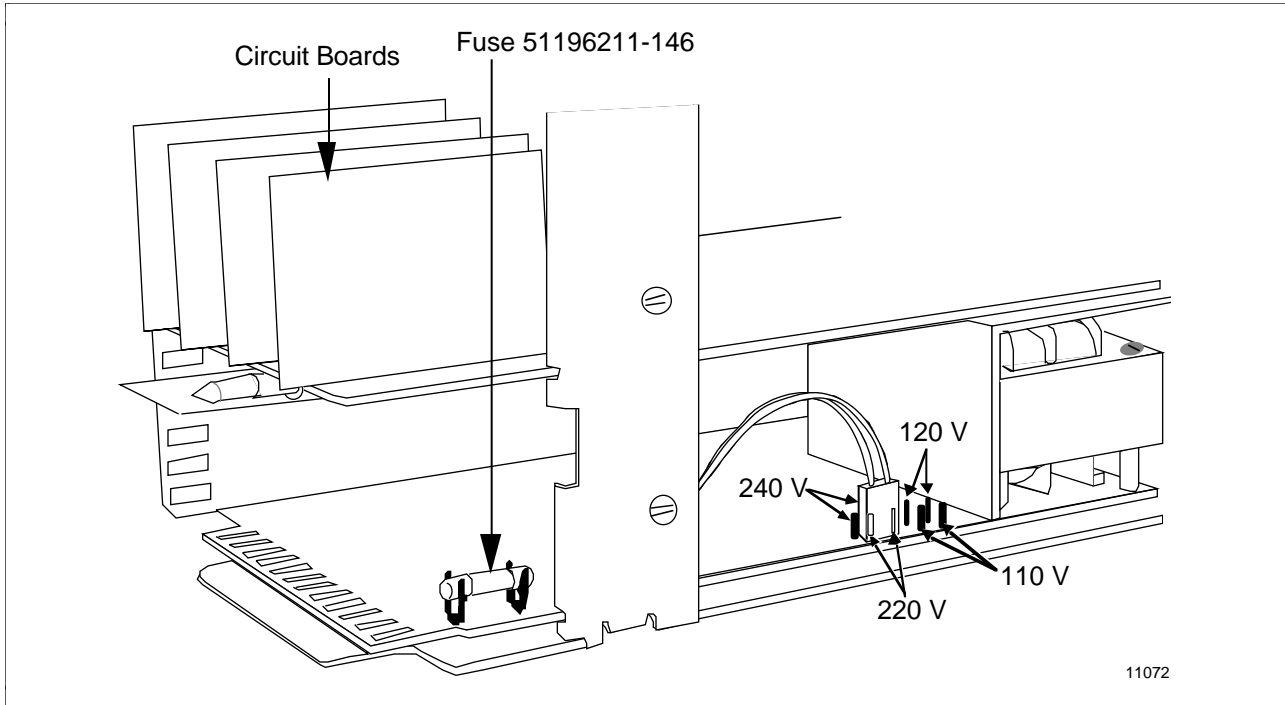


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10.8 Replacing a Trend Pen Recorder, Continued

Configuration

Figure 10-5 Optional AC Power Configuration



10.9 Trend Pen Calibration Check

Scope

The recorder is supplied with resident factory calibration data stored in nonvolatile memory for each available input actuation. This calibration data is not affected by hardware changes and therefore recalibration of the recorder is not necessary.

Calibration check

A scale check is built into the SIOI_E board. The right-hand switch on the SIOI_E board has three switch positions:

- NORMAL—normal operation
- LOW—positions pen at 2% of scale, overrides input data
- HIGH—positions pen at 98% of scale, overrides input data

System software must be active with no print inhibits active. Calibration check may be run at any time these conditions are met, since the calibrate switch overrides the input.

10.10 Trend Pen Configuration

Scope

The recorder takes full advantage of digital technology to provide maximum flexibility of configuration. All software configuration is affected by the keys on the front face of the unit, and simply involves the selection of the required parameter from the menu or the entry of a numerical value or alphanumeric sequence.

Procedure

The configuration procedure is fully explained in Section 3 of the *DPR 1000 Product Manual*, US11 6139, that came with the recorder. Using the procedures in the manual and the data from Table 10-5, the recorder can be quickly configured.

The product manual also provides descriptions of each parameter.

Configuration data

The following table provides configuration data to be used in configuring a Trend Pen recorder that has internal trending (the inputs come from the SIO board).

ATTENTION

ATTENTION—If external trending connections are used, follow the options in Section 3 of the product manual and configure accordingly.

Continued on next page

10.10 Trend Pen Configuration, Continued

Table 10-5 Configuration Data for DPR 1000

Parameter	Tab 112	Tab 122	Tab 212	Tab 222	Tab 113	Tab 123	Tab 213	Tab 223
Language	User Choice							
Model	2001				3001			
ID Number	User Assigned							
Chart Speed Unit	Input 1: Less than 300 mm/hour or less than 11.8 in/hour Input 2: Same as Speed 1				Input 1: Less than 120 mm/hour or less than 4.72 in/hour Input 2: Same as Speed 1			
Input Sequence	Input 1: ON Input 2: ON				Input 1: ON Input 2: ON Input 3: ON			
Analog Inputs	<u>Channel #</u>	<u>Input Type</u>	<u>Actuation</u>	<u>Range</u>				
	1	Transmitter	Linear	1-5 V				
	2	Transmitter	Linear	1-5 V				
	3*	Transmitter	Linear	1-5 V				
Display Config	<u>Channel #</u>	<u>Low Range</u>	<u>High Range</u>	<u>Chart Units</u>	<u>Filter</u>			
	1	1.000	5.000	V	80			
	2	1.000	5.000	V	80			
	3*	1.000	5.000	V	80			
Chart Range	<u>Channel</u>	<u>Range 1 Limit</u>		<u>Range 2 Limit</u>				
		<u>Left</u>	<u>Right</u>	<u>Left</u>	<u>Right</u>			
	1	1.000	5.000	1.000	5.000			
	2	1.000	5.000	1.000	5.000			
	3*	1.000	5.000	1.000	5.000			
Event Precursor	Off				Off			
Alarm	Off				Off			
Logic Input	<u>Logic #</u>	<u>Action</u>			<u>Logic #</u>	<u>Action</u>		
	1	Print Inhibit			1	Print Inhibit		
	2	No Channel Action			2, 3	No Channel Action		
Commun Speed	N/A							
Message Trace	Off							
Date	Current Date							
Time	Current Time							
Config Lock	All Modifications are authorized							

* For 3-pen recorders only

10.11 Spare Parts

ATTENTION

ATTENTION—A spare Trend Pen DPR 1000 recorder is configured for 120 Vac power. Refer to Figure 10-5 for configuring the recorder to other voltage options.

Spare parts list

Table 10-6 Trend Pen Recorder Spare Parts

Part Number	Description
*515196211-112	DPR 1000 Recorder, 2 pen
*515196211-113	DPR 1000 Recorder, 3 pen
51308070-200	Trend Pen Power Cable 120 Vac
51308069-200	Trend Pen Power Cable 120 Vac
*51400855-100	SIO (Serial Interface Output) Board
*51308075-100	SIOI_E (SIO I/O Board)
*51308075-100	Trend Pen Signal Distribution Board
*51308012-100	Upper Power Distribution Board (120 Volt)
*51308014-100	Upper Power Distribution Board (240 Volt)
51308076-200	Trend Pen Recorder Interface Cable
51308070-200	Trend Pen Power Cable 120 Vac
51308069-200	Trend Pen Power Cable 240 Vac
51308077-300	Trend Pen Recorder Interface Jumper Cable
51308078-300	Trend Pen Power Jumper Cable 120 Vac
51308079-300	Trend Pen Power Jumper Cable 240 Vac
51308087-200	AC Fan Power Cable
51196214-121	Fan Fold Cassette Assembly
51196214-135	Battery (approximately 10 year life)
51196214-143	Fan Fold Chart
51196214-146	Fuse 1.0 amp, 250 Vac, .85 inches long
51196214-151	Ink Cartridge (Pen Wheel)

* ORU = Optimum Replaceable Unit

Section 11 – DPR 100 Trend Pen Recorder (CE Compliant)

11.1 Overview

Section contents These are the topics covered in this section:

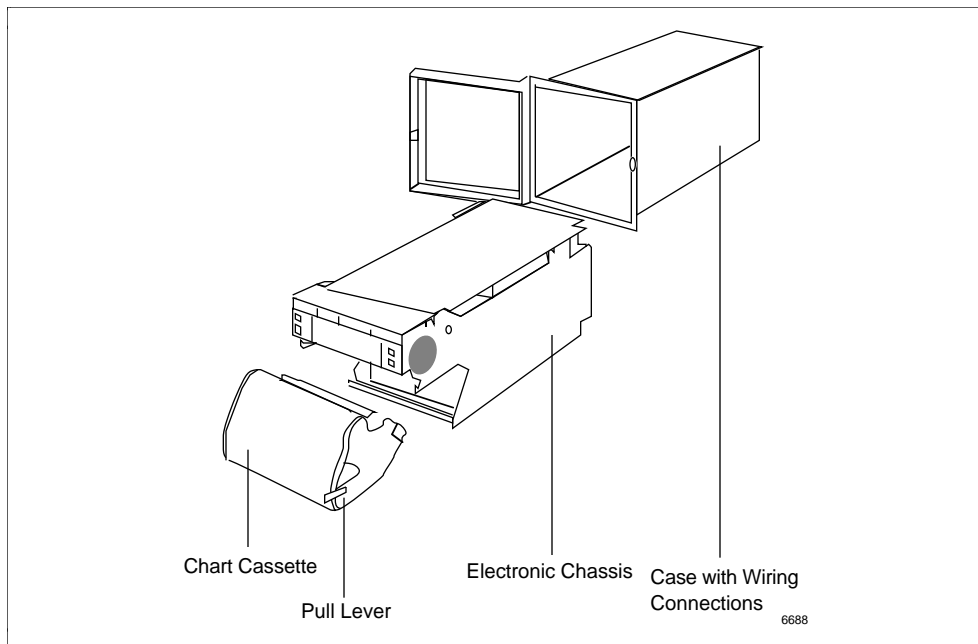
Topic	See Page
SECTION 11 – DPR 100 TREND PEN RECORDER (CE COMPLIANT).....	115
11.1 Overview.....	115
11.2 Cleaning Trend Pen Recorders.....	117
11.3 Removing Chart Cassette.....	117
11.4 Loading Paper Charts.....	117
11.5 Replacing Print Cartridges.....	118
11.6 Troubleshooting a Trend Pen Recorder.....	119
11.7 Removing a Trend Pen Recorder.....	120
11.8 Replacing a Trend Pen Recorder.....	121
11.9 Trend Pen Calibration Check.....	122
11.10 Battery Replacement.....	123
11.11 Trend Pen Configuration.....	125
11.12 Spare Parts.....	126

Description

Trend Pen recorders are available with either two or three pens (arranged in a 3/3/2 configuration) that are located in an Auxiliary Equipment Housing above a single monitor. Auxiliary Equipment Housings hold a maximum of 6 recorders with a 3/3/2 configuration in both the upper and lower row.

Illustration

Figure 11-1 Trend Pen Recorder with Chart Cassette



Continued on next page

11.1 Overview, Continued

Use as a 2 pen unit

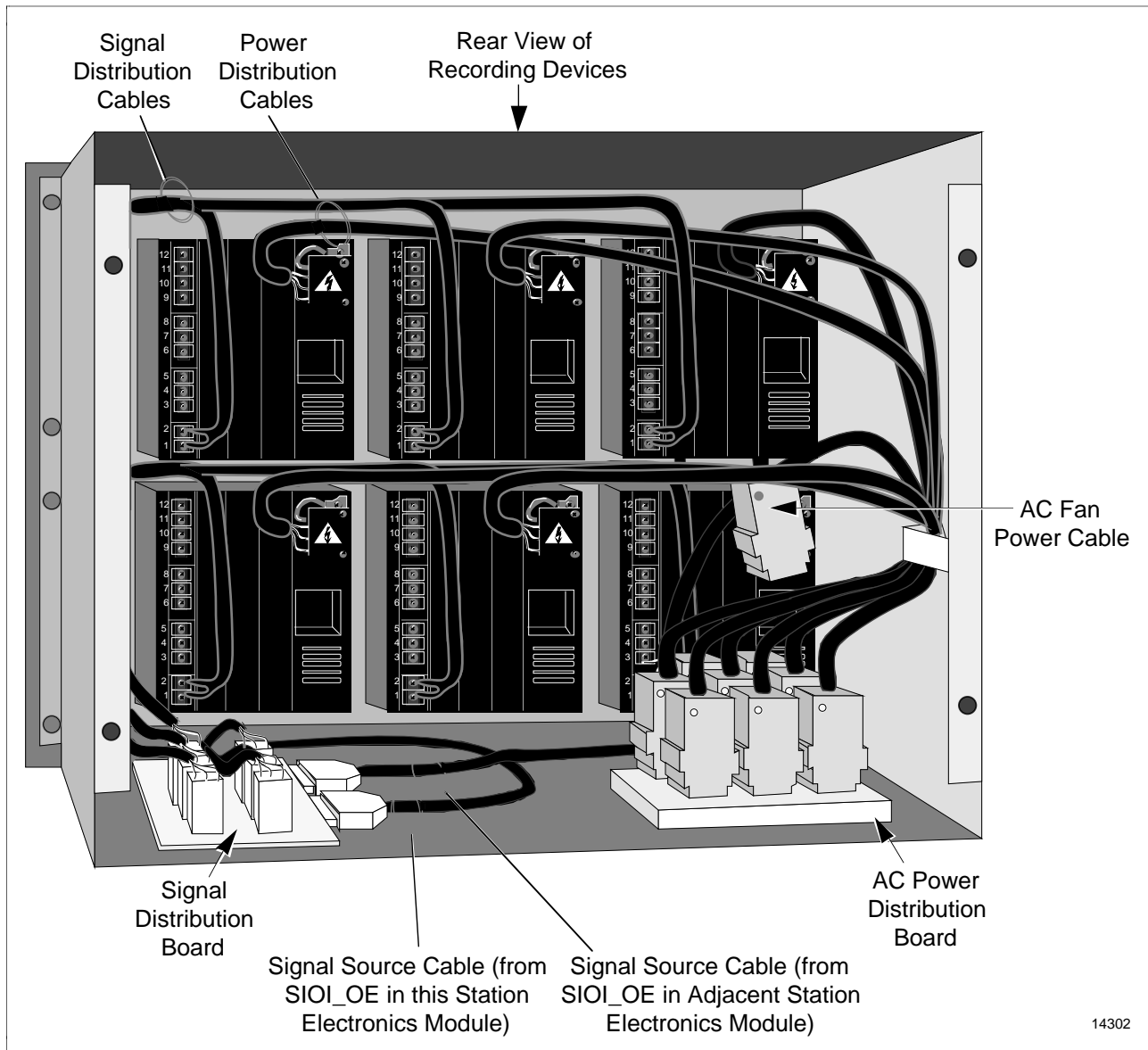
DPR 100 recorders are only available as a 3 pen unit. The third channel must be turned off. Refer to *DPR 100 Product Manual, USII-6137, Section 7, Detailed Configuration Analog Inputs, Sensor*. There should be no entry for Channel 3.

Description

The Trend Pen recorders mount to the front of the front plate. There are two connector PWAs: one that distributes ac power and one that distributes the signals to each recorder.

Illustration

Figure 11-2 Rear of Trend Pen Recorder Showing Distribution of Power and Interface



14302

11.2 Cleaning Trend Pen Recorders

Scope

The only cleaning recommendation is to clean the front cover with a mild solution of detergent, rinse it thoroughly and dry it with a soft lint-free cloth.

11.3 Removing Chart Cassette

Procedure

Table 11-1 Removing Chart Cassette

Step	Action
1	Open the recorder door using the knob or key.
2	Pull out the lever at the lower right-hand side of the chart cassette.
3	Grasp the sides of the cassette and rotate the bottom up and lift out to withdraw it from the case.

11.4 Loading Paper Charts

Reference

Refer to the *DPR 100 Product Manual* for instructions. The manual is included with each DPR 100 recorder and can be inserted in this publication's binder.

11.5 Replacing Print Cartridges

Scope

The pens are contained in a wheel that has six different colored pens. When one color is depleted, the wheel must be replaced.

Table 11-2 Replacing a Pen Wheel

Step	Action
1	Remove the chart cassette as detailed in Table 11-1.
2	If the recorder has power ON, the print carriage will move to the center and the display will indicate NO PAP
3	If the recorder is not powered, gently move the print carriage to the center of its travel.
4	If replacing a used print wheel, secure the print carriage by holding the lever (H) with the left hand and withdraw the print wheel (F) to the right.
5	Continue to secure the print cartridge and fit a new print wheel, ensuring that the pin on the left engages with the corresponding hole on the print carriage gear wheel. A "click" will be heard when the print wheel engages correctly.

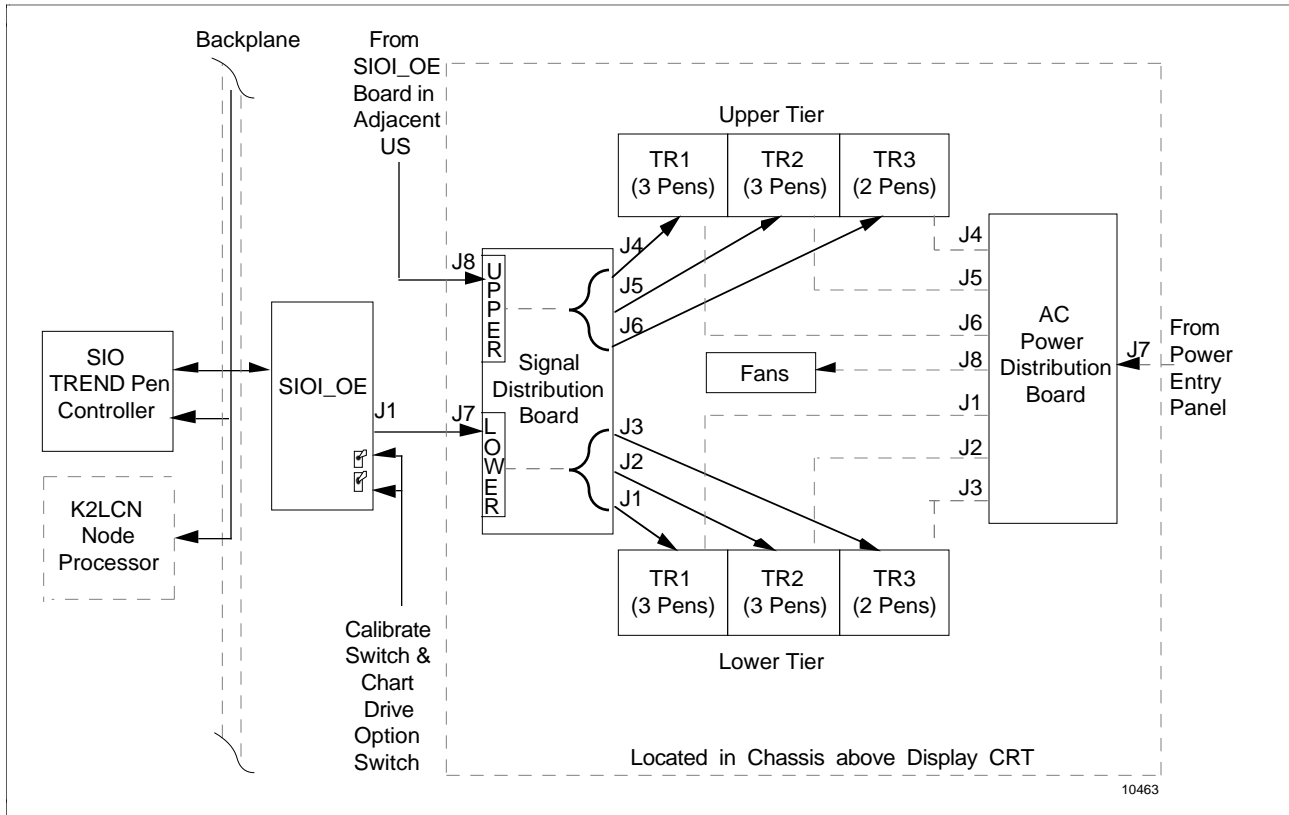
11.6 Troubleshooting a Trend Pen Recorder

Scope

To service a Trend Pen recorder subsystem:

- Refer to the DPR 100 C/DPR 100 D Product manual, US1I-6137, to service a recorder.
- Run the HVTS test, SIOS, on the SIO board.
- Examine the cables and refer to the cabling diagram in Figure 11-3.

Figure 11-3 Trend Pen Recorder Cabling



11.7 Removing a Trend Pen Recorder

ATTENTION

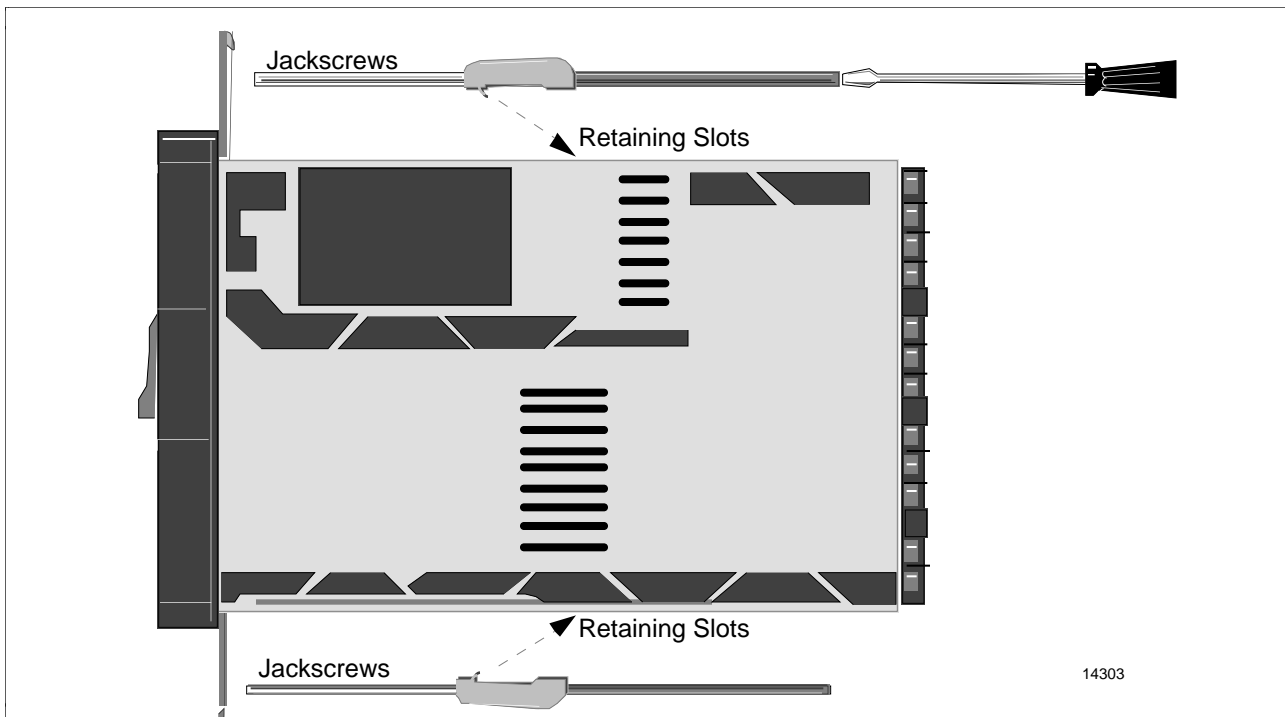
ATTENTION—The Trend Pen recorder is removed as a unit. The support bolts are located one on the top and one on the bottom. See Figure 11-4.

Procedure

Table 11-3 Removing a Trend Pen Recorder (Unit)

Step	Action
1	Remove the rear cover of the Trend Pen recorder pod.
2	Unplug the ac power cord for this recorder from the ac power distribution board. See Figure 11-2
3	Disconnect the ac power cord from the back of the recorder.
4	Note the input terminal wires used on this recorder. Hint : Write down the connections. Disconnect the signal wire(s) from the input screw(s).
5	Using a small blade screwdriver, loosen the top jackscrew 1-inch, then push it forward, slide the rear of the jackscrew to the side to disengage it from the retaining slot, and remove the jackscrew.
6	Using a small blade screwdriver, loosen the bottom jackscrew 1-inch, then push it forward, slide the rear of the jackscrew to the side to disengage it from the ketch slot, and remove the jackscrew.
7	Slide the unit out through the front of the station.

Figure 11-4 Mounting of Trend Pen Recorder Using Jackscrews



14303

11.8 Replacing a Trend Pen Recorder

ATTENTION

ATTENTION—The Trend Pen recorder is replaced as a unit. The support bolts are located one on the top and one on the bottom. See Figure 11-4.

Table 11-4 Replacing a Trend Pen Recorder (Chassis)

Step	Action
1	<p>ATTENTION Take care not to damage the input boards at the rear of the chassis.</p> <p>Slide the recorder into the cabinet until it makes contact with the front bezel.</p>
2	Insert the bottom jackscrew into the retaining slot. Using an 8-inch long blade screwdriver, tighten the jackscrew until the unit is supported horizontally. See Figure 11-4.
3	Insert the top jackscrew into the retaining slot. Using an 8-inch long blade screwdriver, tighten the jackscrew until the unit is firmly mounted.
4	Connect the signal wiring to the input terminals.
5	Verify that the ac power cord is disconnected from the ac distribution panel. See Figure 11-2.
6	Connect the ac wiring to the ac input terminals located at the upper right-hand corner of the recorder.
7	Plug the ac power cord into the ac power distribution panel.

Continued on next page

11.9 Trend Pen Calibration Check

Scope

The recorder is supplied with resident factory calibration data stored in nonvolatile memory for each available input actuation. This calibration data is not affected by hardware changes and therefore recalibration of the recorder is not necessary.

Calibration check

A scale check is built into the SIOI_E board. The right-hand switch on the SIOI_E board has three switch positions:

- NORMAL—normal operation
- LOW—positions pen at 2% of scale, overrides input data
- HIGH—positions pen at 98% of scale, overrides input data

System software must be active with no print inhibits active. Calibration check may be run at any time these conditions are met, since the calibrate switch overrides the input.

11.10 Battery Replacement

Scope

The battery has a long life. It is located on the circuit board located behind the paper cassette, under a metal plate.

Replacement procedure

Table 11-5 Replacing the Battery in DPR 100 Recorder

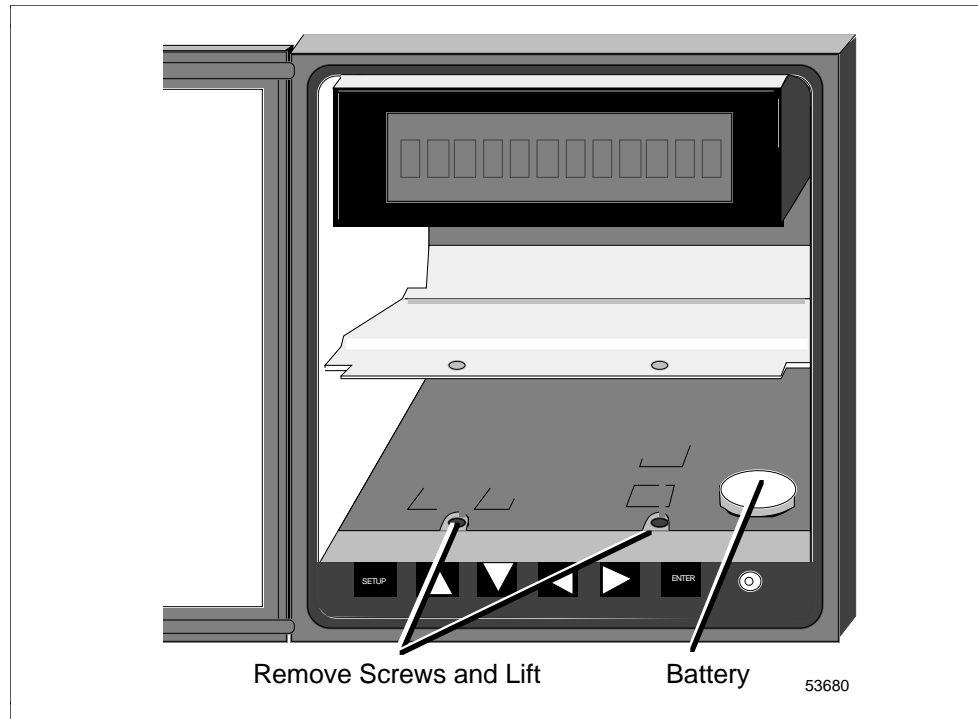
Step	Action
1	Disconnect the recorder ac power cord from the ac distribution panel.
2	Connect the ESD ground strap from your wrist to the bare metal of the station furniture.
3	Open the front cover and remove the paper cassette.
4	Remove the two screws shown in Figure 11-5.
5	Lift the metal plate to expose the circuit board.
6	Replace the battery in the battery holder.
7	Replace the cover plate.
8	Replace the two screws in the cover plate.
9	Replace the paper cassette.
10	Reconnect the ac power cord to the ac distribution panel.
11	Reload the configuration into the recorder.

Continued on next page

11.10 Battery Replacement, Continued

Illustration

Figure 11-5 Replacing Battery in DPR 100 Recorder



11.11 Trend Pen Configuration

Scope

The recorder takes full advantage of digital technology to provide maximum flexibility of configuration. All software configuration is affected by the keys on the front face of the unit, and simply involves the selection of the required parameter from the menu or the entry of a numerical value or alphanumeric sequence.

Procedure

The configuration procedure is fully explained in Section 6 and 7 of the *DPR 100 Product Manual*, US1I 6137, that came with the recorder. Section 9 of the same manual details how to load the configuration with the optional PC Loader software application.

The product manual also provides descriptions of each parameter.

Continued on next page

11.12 Spare Parts

ATTENTION

ATTENTION—A spare DPR 100 Trend Pen recorder is capable of 110/240 Vac operation.

Spare parts list

Table 11-6 DPR 100 Trend Pen Recorder Spare Parts

Part Number	Description
*51196674-100	DPR 100 Recorder
51196674-101	Ink Cartridge Multipoint (6 color)
51196674-102	Chart Roll (100 divisions)
51196674-103	Fan Fold (100 divisions)
51196674-104	Fuse (85 to 264 Vac Power Supply (Europe) 5 x 20
51196674-105	Fuse (85 to 264 Vac Power Supply (US) 6.3 x 32
51196674-106	Front Label (2 Channel)
51196674-107	Front Label (3 Channel)
51196674-108	Chart Cassette — Roll
51196674-109	Chart Cassette — Fan-fold Multipoint
51196674-110	PC Loader Interface
51196674-111	PC Loader Application Software
51196674-112	Panel Mounting Kit
51196674-113	Lithium Battery, 3.0 V (Renata CR2430)
51308070-200	Trend Pen Power Cable 120 Vac
51308069-200	Trend Pen Power Cable 120 Vac
*51400855-100	SIO (Serial Interface Output) Board
*51304814-100	SIOI_E (SIO I/O Board) – Non-CE Compliant
*51304814-200	SIOI_E (SIO I/O Board) – CE Compliant
*51308075-100	Trend Pen Signal Distribution Board
*51308012-100	Upper Power Distribution Board (120 Volt)
*51308014-100	Upper Power Distribution Board (240 Volt)
51308076-200	Trend Pen Recorder Interface Cable (same station bay)
51308076-400	Trend Pen Recorder Interface Cable (adjacent station bay)

* ORU = Optimum Replaceable Unit

Continued on next page

11.12 Spare Parts, Continued

Spare parts list,
continued

Table 11-6 DPR 100 Trend Pen Recorder Spare Parts, Continued

Part Number	Description
51308070-200	Trend Pen Power Cable 120 Vac
51308077-300	Trend Pen Recorder Interface Jumper Cable
51308078-300	Trend Pen Power Jumper Cable 120 Vac
51308079-300	Trend Pen Power Jumper Cable 240 Vac
51308087-200	AC Fan Power Cable

Section 12 – Peripheral Power Supply

12.1 Overview

Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 12 – PERIPHERAL POWER SUPPLY.....	129
12.1	Overview.....	129
12.2	Auxiliary Power Supply Cabling.....	130
12.3	Replacing the Peripheral Power Supply.....	131
12.4	Peripheral Power Supply Cabling.....	132
12.5	Assemblies.....	133
12.6	Spare Parts.....	135

Scope

In a station with a US node in a Dual Node Module, there a Peripheral Power Supply (or Auxiliary Power Supply is required) to provide power for Cartridge drive(s).

This power supply

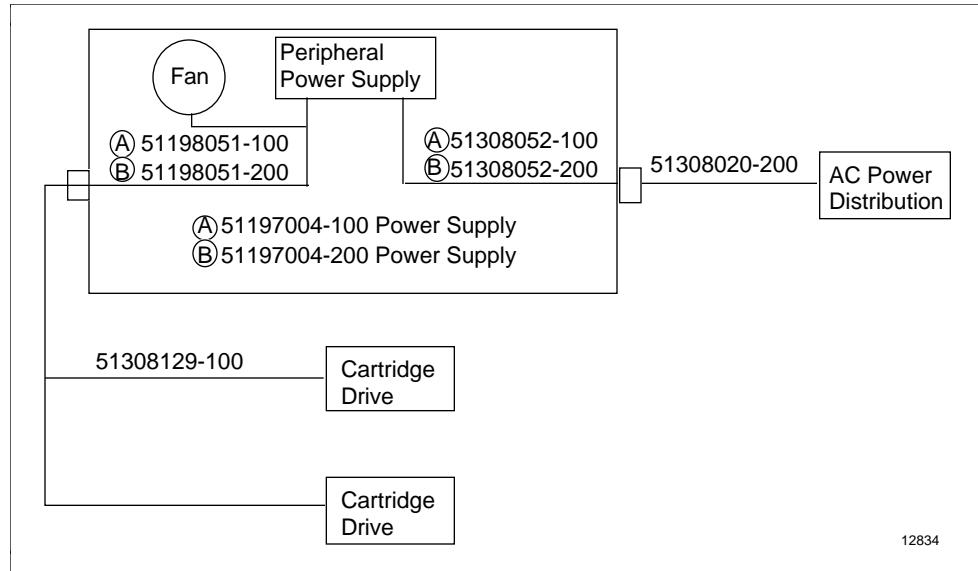
- provides the +5 Vdc and + 12 Vdc,
- has a 12 Vdc fan that provides cooling for the I/O boards in the module cavity and the Peripheral Power Supply,
- is located in the fan enclosure located behind the removable media drives, and
- is accessible from the rear of the station.

12.2 Auxiliary Power Supply Cabling

Illustration

There are two possible assemblies available: one designated by "A," the other by "B."

Figure 12-1 Auxiliary Power Connections



12.3 Replacing the Peripheral Power Supply

Procedure

The Peripheral Power Supply is located in the fan enclosure located behind the media drive (Cartridge/DAT) and is accessible from the rear.

Table 12-1 Replacing a Peripheral Power Supply

Step	Action
1	Turn the main power switch to the OFF position.
2	CAUTION Observe ESD procedures when handling circuit boards.
3	Loosen the two retaining screws from the fan enclosure.
4	Slide the enclosure out of the station.
5	Disconnect the power cables.
6	Disconnect the fan power cable from dc fan power cable (this connection is just outside the enclosure on the left-hand side).
7	Remove the two screws from each end of the enclosure cover and pull the cover off the enclosure.
8	Disconnect the two cables from the power supply printed circuit board. Each connect has a retaining clip on the side of the connector.
9	Disconnect the green ground wire from the power supply circuit board.
10	Remove the four retaining nuts that fasten the circuit card to the enclosure.
11	Replace the power supply circuit board and fasten it in place with the four retaining nuts.
12	Reconnect the green ground wire to the new power supply circuit board.
13	Reconnect the two cables to the power supply circuit board.
14	Replace the cover on the enclosure and replace the four retaining screws.
15	Reconnect the two cables to end of the enclosure.
16	Return the enclosure to the station.
17	Replace the two retaining screws.

12.4 Peripheral Power Supply Cabling

Illustration

Figure 12-2 Peripheral Power Supply Cabling

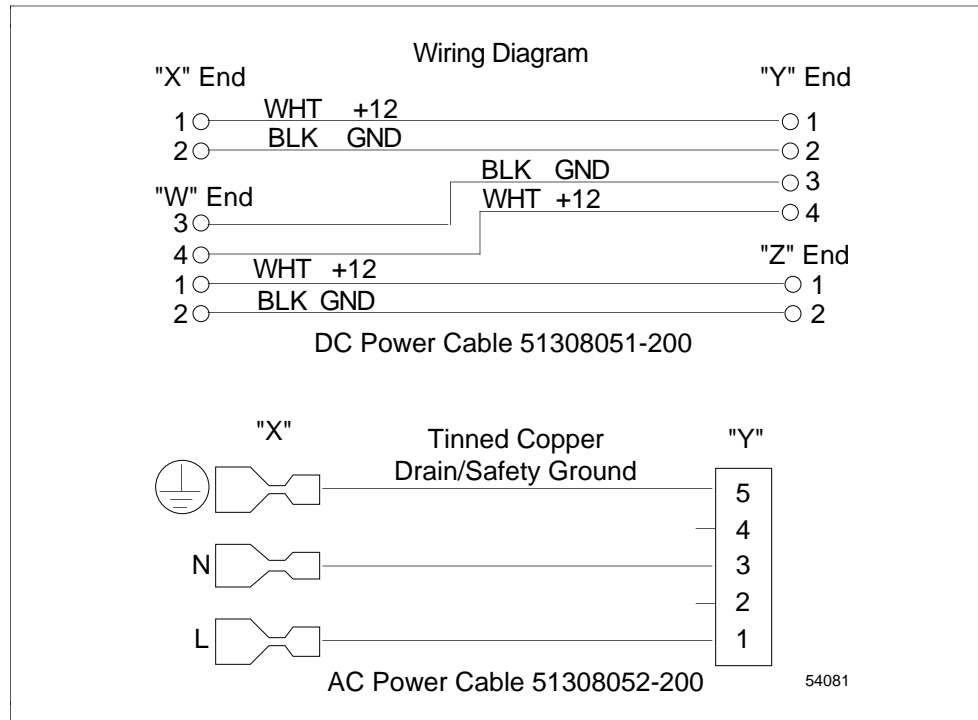
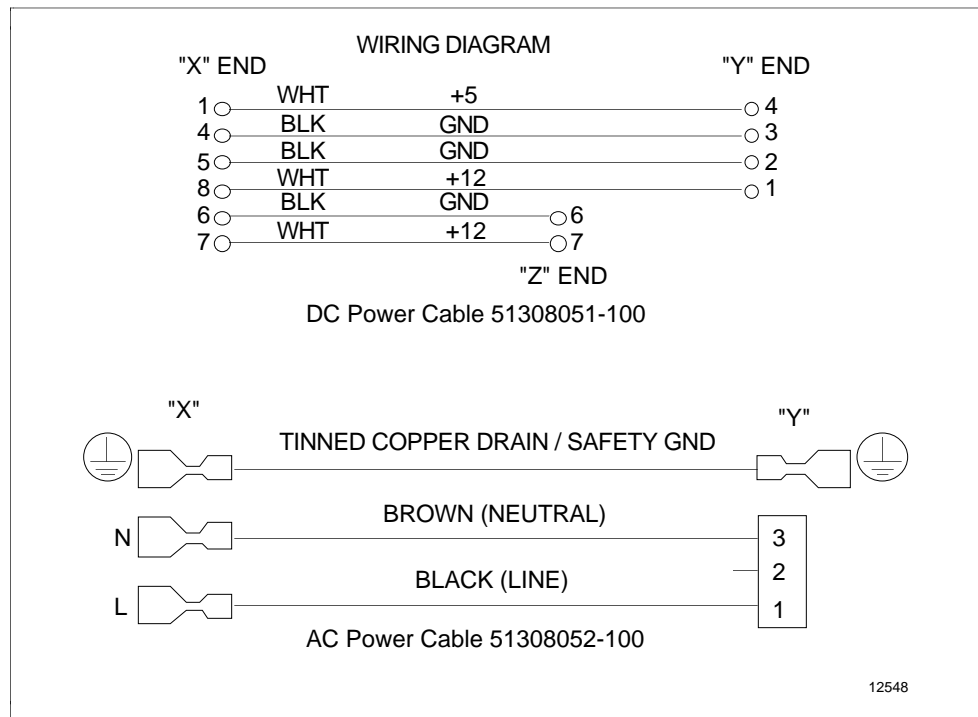


Figure 12-3 Peripheral Power Supply Cabling



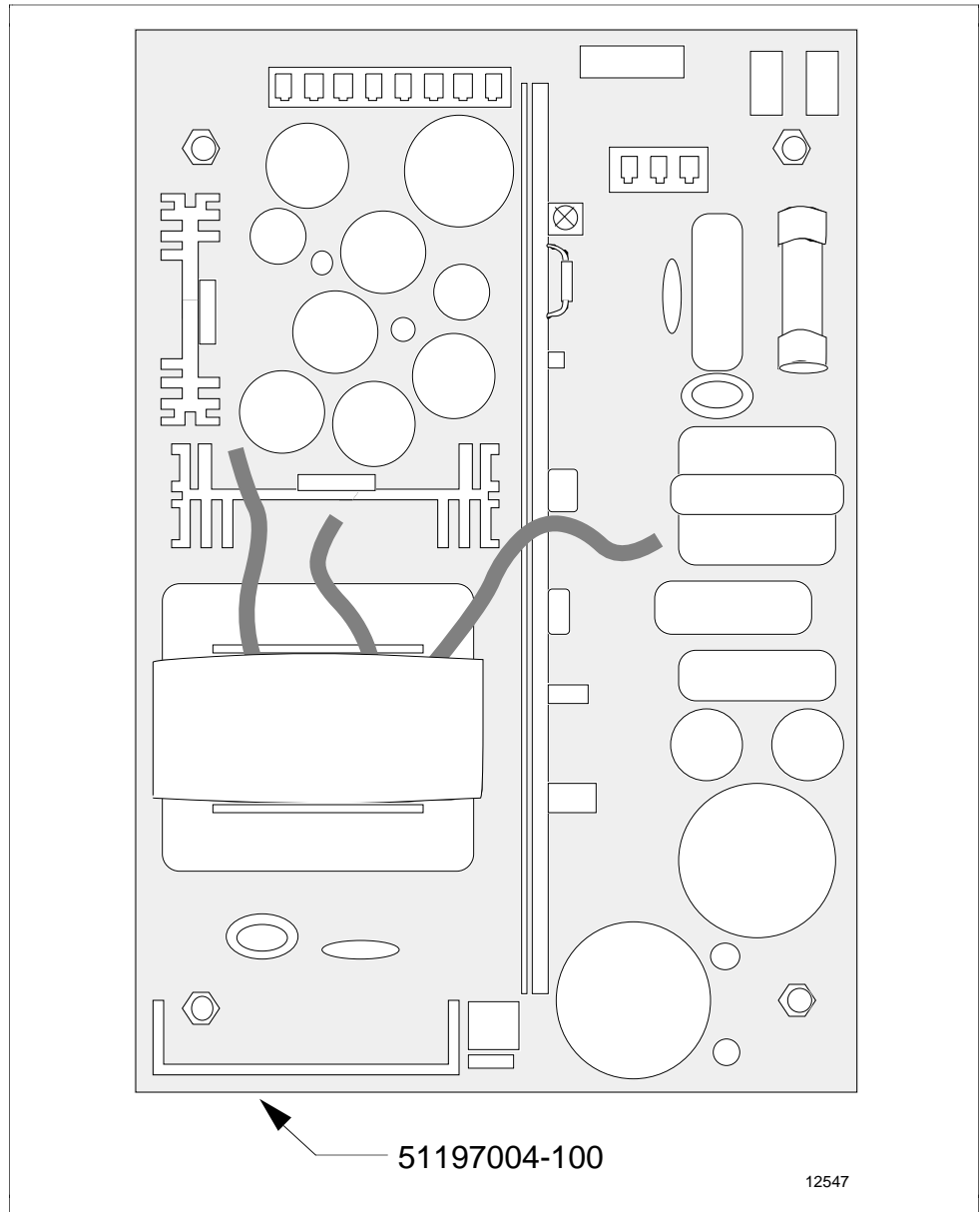
12.5 Assemblies

Introduction

There are two possible assemblies that can be used as the peripheral power source.

Illustration

Figure 12-4 Peripheral Power Supply Assembly 51197004-100

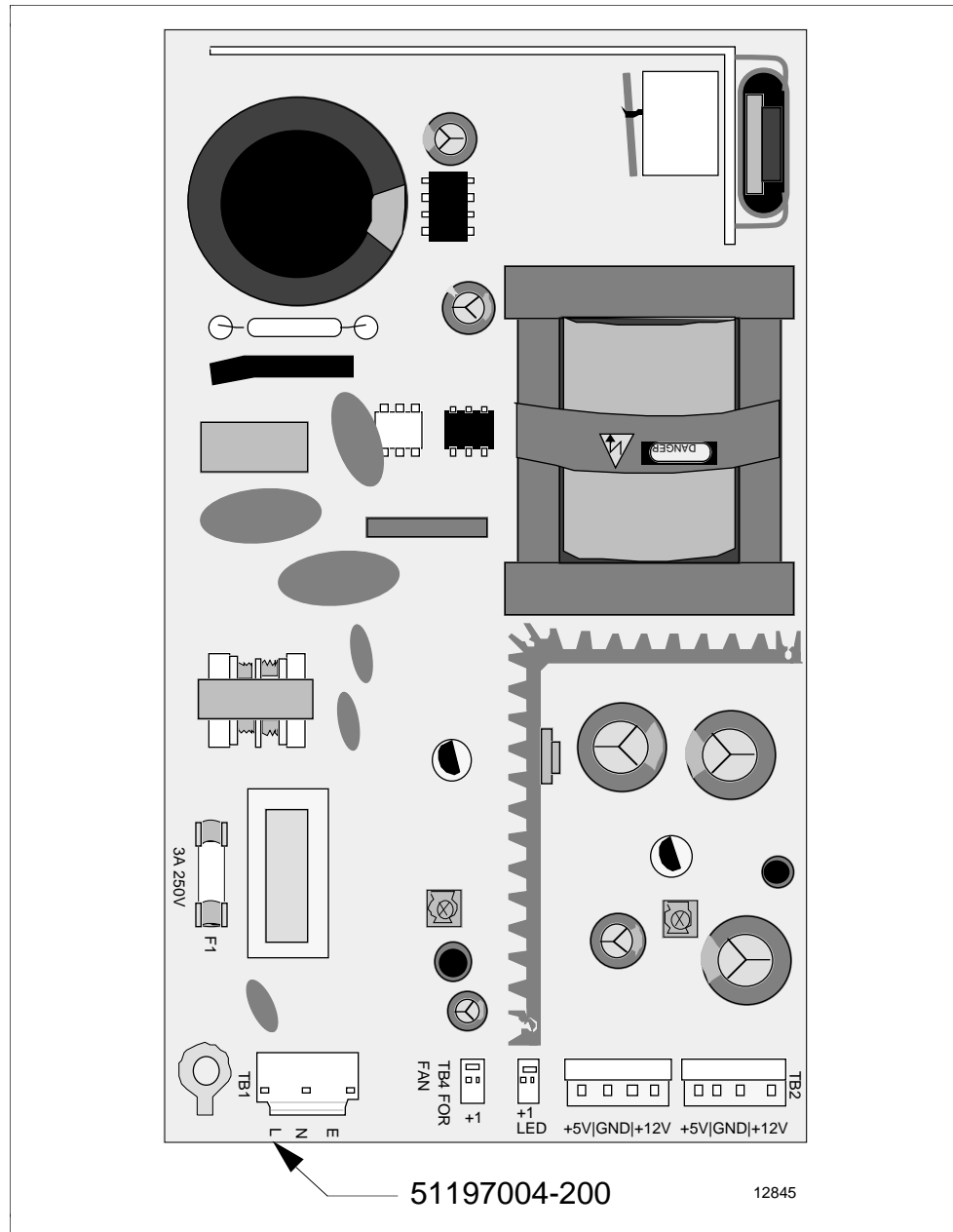


Continued on next page

12.5 Assemblies, Continued

Illustration

Figure 12-5 Peripheral Power Supply Assembly 51197004-200



12.6 Spare Parts

Table

Table 12-2 Peripheral Power Supply Spare Parts

Part Number	Description
*51403157-200	Power Supply Enclosure Assembly
51308051-100	Enclosure DC Cable for 51403157-100 Assembly
51308052-100	Enclosure AC Cable for 51403157-100 Assembly
51308053-200	Peripheral Power Supply AC Cable (external)
51190577-232	Fuse, 3.15 amp, 250 volt

* ORU = Optimum Replaceable Unit

Section 13 – Touchscreen Service

13.1 Overview

Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 13 – TOUCHSCREEN SERVICE	137
13.1	Overview	137
13.2	Cleaning the Touchscreen Window.....	137
13.3	Touchscreen Alignment Verification.....	138
13.4	Touchscreen Alignment Procedure	141
13.5	Removing the Touchscreen Assembly from a Monitor	143
13.6	Replacing the Touchscreen Assembly on a Monitor	145
13.7	Removing the Touchscreen Controller from a Monitor	146
13.8	Replacing the Touchscreen Controller on a Monitor	147
13.9	Spare Parts.....	147

Scope The touchscreen assembly is attached to the front of the monitor. The touchscreen controller is mounted to the rear of the monitor CRT.

Description The touchscreen frame is enclosed inside the touchscreen assembly that is a combination of the window bezel and the dust cover. See Figure 13-1.

ATTENTION

ATTENTION—EPDGP I/O board must be Revision D (or later) to operate in this Universal Station.

13.2 Cleaning the Touchscreen Window

Procedure

Table 13-1 Cleaning the Touchscreen Window

Step	Action
1	Gently wipe the four inside edges of the touchscreen window with a slightly damp, soft cloth.
2	Ensure that the surface of the touchscreen window is dry by wiping all four sides with a soft, dry cloth.
3	If the touchscreen still does not function correctly, disassemble the touchscreen assembly and clean the individual LEDs and sensors on the touchscreen frame before replacing the touchscreen assembly.

13.3 Touchscreen Alignment Verification

Scope

When a US node is first powered up or is reset, the firmware executes a self-test. The results of the self-test can be displayed on the screen by pressing the CONS STATS button on the Operator's Keyboard.

Procedure

Table 13-2 Aligning the Touchscreen

Step	Action
1	Turn the power switch to the US node to the ON position or, if power is already on, press the RESET button on the Operator's Keyboard.
2	After the > and the "box" symbol both appear in the upper left-hand side of the display, press the CONS STATS button on the Operator' Keyboard. Now analyze the display.

Interpretation

What follows is an excerpt of the explanation of the data fields, found in the *Customer Resource Manual*, Tab 15, Page B05. Most of the description in the *Customer Resource Manual* is for engineering debug. The BEAM ANALYSIS and SIGNAL VALUE are the two fields useful to service personnel.

ATTENTION

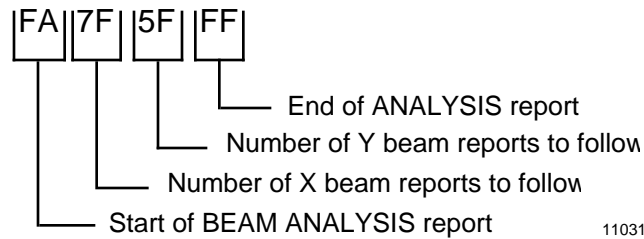
ATTENTION—There are two different report formats; one reports a numeric value of beam strength, the other reports a go/no go value. The go/no go value is reported in the same format as the other value except that the value is 00 for good and 77 for bad.

This value is reported by the firmware in newer touchscreen units. The change was made because units with a low value reported were being replaced when they were still functional, but dusty.

Continued on next page

13.3 Touchscreen Alignment Verification, Continued

BEAM ANALYSIS



- Each failed beam report will be 2 bytes long. The first byte (of the two center bytes) is the byte address and the second byte is the fault found with the beam.
- Addressing is from top down and left to right.

The fault codes are:

- 00 Firmware could not determine the problem
- 01 Failed phototransistor
- 02 Failed LED
- 03 Failed phototransistor and LED
- 04 Individual components appear to work separately, but not together; failure cannot be isolated.

EXAMPLE: FA 01 03 02 00 FF shows 1 failed beam X beam (01), failed address of 3 (03), and is a failed LED. No failed Y beams (00).

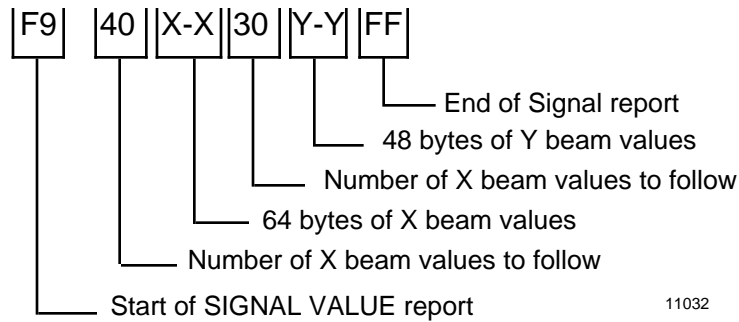
ATTENTION

ATTENTION—A failed beam could be a beam blocked by dust, etc.

Continued on next page

13.3 Touchscreen Alignment Verification, Continued

Signal value



Interpretation

The Signal Value is the differential value between the ambient reading and the reading with the beam on.

- Any reading above 00 should work, but the factory doesn't ship any unit that has a value less than 05.
- A reading of 01 or 02 may be reported as failed.
- A reading of 00 is failed.
- The screen will continue to work as beams fail, but the resolution will suffer.
- If any values are found to be below 05, then the screen should be cleaned and tested again.
- The screen doesn't need to be replaced until the BEAM ANALYSIS reports one or more failed beams.

EXAMPLE:

SIGNAL VALUE F9 40 [49 51 0D 4B 38 47 28 40 44 20 10 18 2E 4D 37 1B 27 3B 10 23 32 11 0D 17 35 44 4C 33 10 18 2E 28 58 58 11 31 35 4B 1B 1C 3E 56 48 11 44 21 57 4F 15 3B 4D 56 53 42 55 52 59 21 4E 02 59 59 50 42] 30 [3A 31 04 25 3B 45 2B 25 40 2B 27 4C 30 2E 28 37 44 26 1A 47 1D 2D 1E 2C 40 2F 25 15 28 33 14 2B 1B 0A 37 17 30 16 0A 1B 2A 32 27 2F 19 23 22 2B] FF

ATTENTION

ATTENTION—The warrantee on units is such that only units with a reading of less than 02 will be replaced.

13.4 Touchscreen Alignment Procedure

Touchscreen to CRT alignment

This procedure determines if the touchscreen is in alignment. It only works with either a PDG or an EPDG controller board.

Calibration is done by adjusting the width, height, and centers of the test image on the CRT to match the position of the touchscreen. You will be using four places on the face of the CRT as calibration points. They are the middle right and left edges, and the middle vertical top and bottom edges. Figure 13-1 shows the pattern.

Table 13-3 Aligning the CRT to the Touchscreen

Step	Action
Horizontal Positioning	
1	Turn on the power or reset the Universal Station.
2	Using HVTS, run PDGI Test 15. After the pattern appears on the screen, abort PDGI.
3	Place your finger on the square located at the middle left edge of the pattern. Notice where the cursor appears.
4	Place your finger on the square at the middle right edge of the pattern.
5	After considering the results of the two tests, adjust the horizontal centering and horizontal width controls to make the cursor appear directly under your finger each time you touch the CRT surface.
6	Repeat this adjustment until the cursor is centered in the pattern square for each side.
Vertical Positioning	
7	Place your finger on the square located at the middle top edge of the pattern. Notice where the cursor appears.
8	Place your finger on the square at the middle bottom edge of the pattern.
9	After considering the results of the two tests, adjust the vertical centering and vertical width controls to make the cursor appear directly under your finger each time you touch the CRT surface.
10	Repeat this adjustment until the cursor is centered in the pattern square for each side. ATTENTION Note that the cursor will always be slightly below the finger when testing the top target. This is due to the need to have the touchscreen high in the bezel so that the bottom beam will not be partially blocked off by the side slot's bottom edge.

Continued on next page

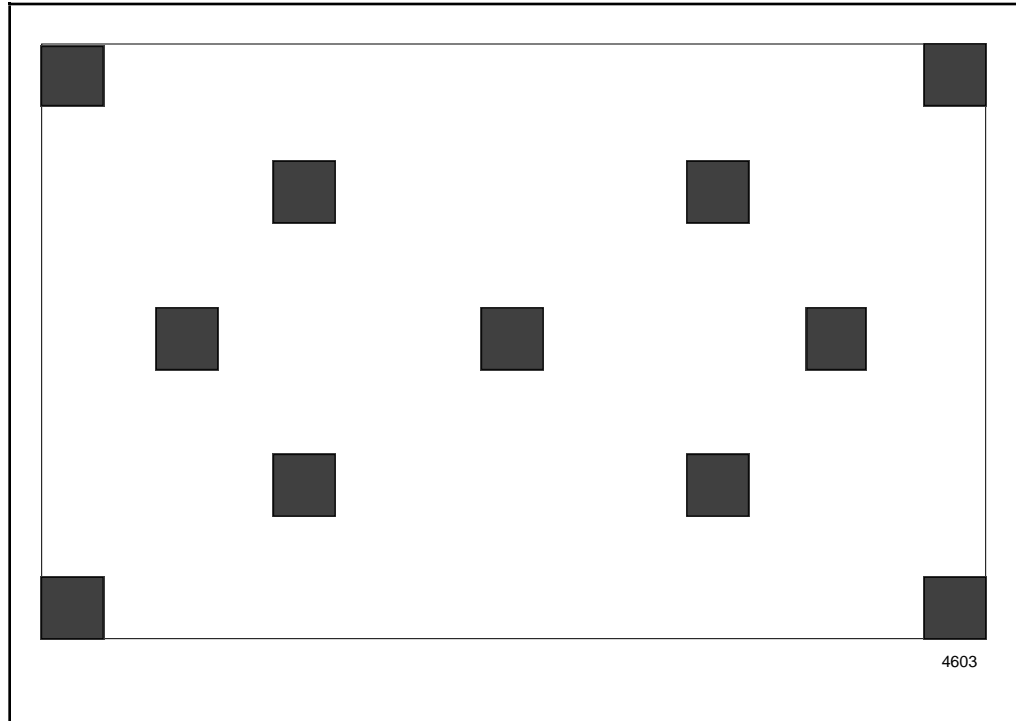
13.4 Touchscreen Alignment Procedure, Continued

Pattern control

You must be careful not to spread the pattern too wide or too tall, such that the corners of the pattern are too wide or too tall for the screen.

Illustration

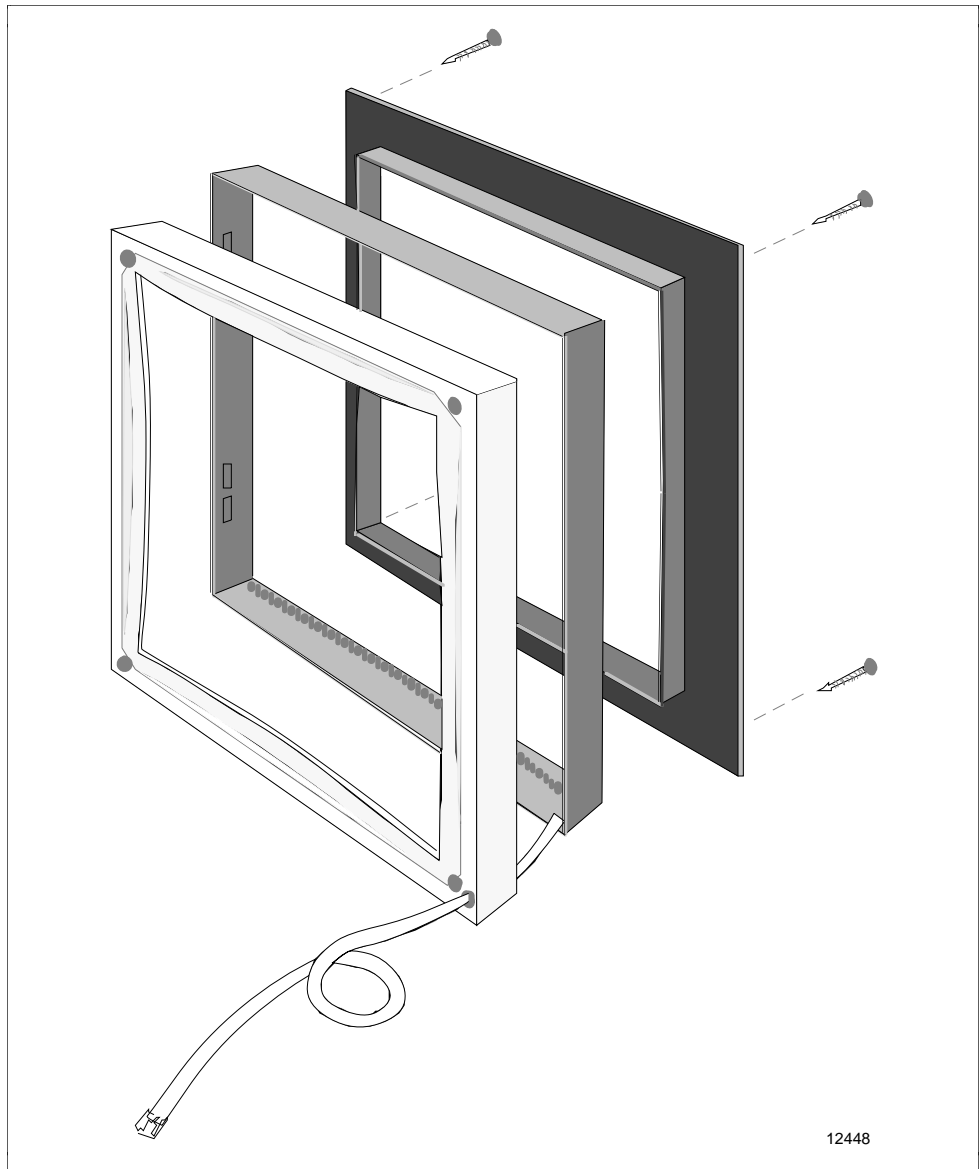
Figure 13-1 HVTS PDGI Test 15 Test Pattern



13.5 Removing the Touchscreen Assembly from a Monitor

Illustration

Figure 13-2 Touchscreen Assembly Exploded View (51403135-100)



Continued on next page

13.5 Removing Touchscreen Assembly from a Monitor, Continued

Scope

The touchscreen assembly is attached to the front of the monitor. The monitor must be removed from the station before the touchscreen assembly can be removed. See Section 11 for instructions for access and removal of the monitor.

Procedure

To remove a touchscreen assembly from the monitor, do the following:

Table 13-4 Removing the Touchscreen from a Monitor

Step	Action
1	Remove the two retaining screws that mount the monitor control panel assembly to the front of the touchscreen assembly.
2	ATTENTION When this step is complete, the touchscreen assembly is loose and can be damaged if allowed to fall. Remove the four nuts from the mounting studs located on the front side, in each corner.
3	Lift the touchscreen assembly up, over the top of the monitor.
4	Lay the touchscreen assembly on a flat surface.
5	Remove the dust cover by lifting it up and off the window bezel.
6	Free the touchscreen frame interface cable from the window bezel.
7	Lift the touchscreen frame by two opposite sides. WARNING Do not flex the touchscreen frame—handle carefully.

13.6 Replacing the Touchscreen Assembly on a Monitor

Procedure

The touchscreen frame must be placed in the window bezel, the dust cover must be installed and the assembled touchscreen assembly mounted to the monitor as follows:

Table 13-5 Replacing a Touchscreen

Step	Action
1	Lay the window bezel on a flat surface with the cavity up.
2	Place the Touchscreen frame inside the cavity with the LEDs pointing down. WARNING Do not flex the Touchscreen frame—handle carefully.
3	Place the dust cover over the window bezel, covering the cavity.
4	Insert the touchscreen assembly in front of the monitor from the top.
5	Replace the four nuts on the mounting studs.
6	Mount the monitor control assembly to the front of the touchscreen assembly.

13.7 Removing the Touchscreen Controller from a Monitor

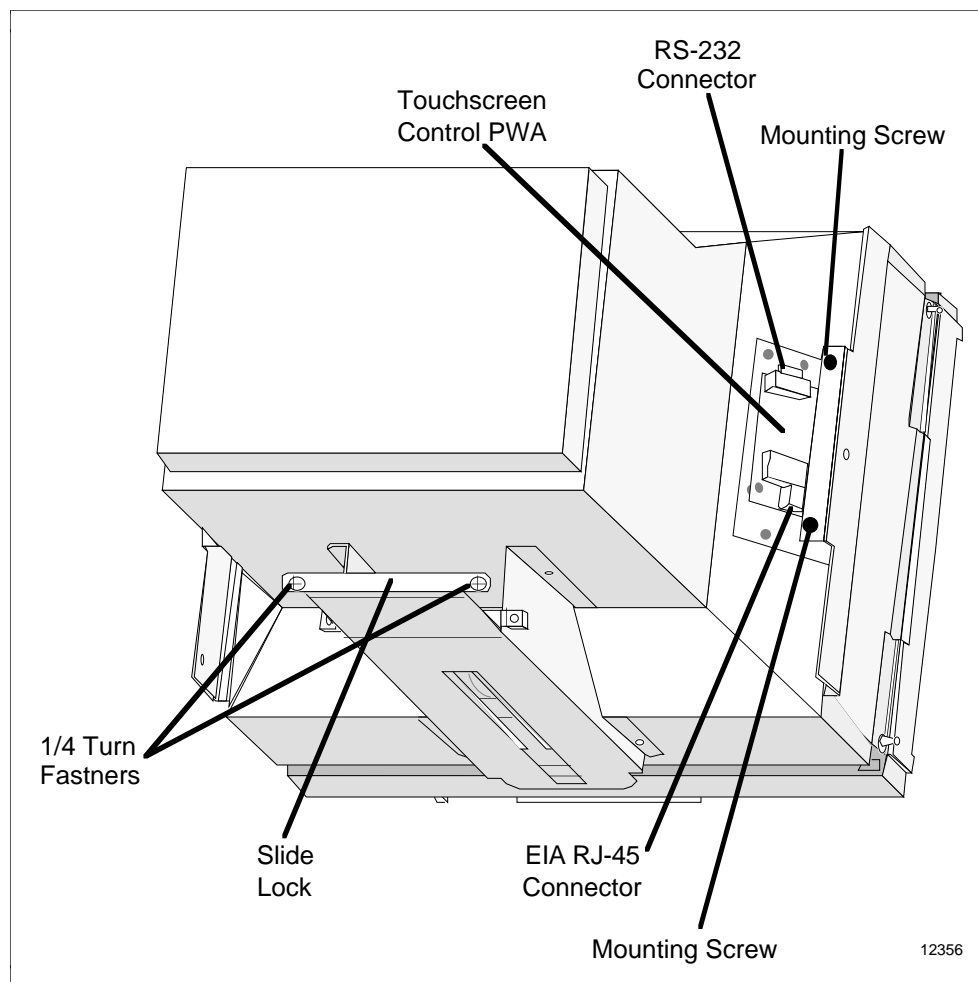
Procedure

Table 13-6 Removing a Touchscreen from a Monitor

Step	Action
1	Disconnect the two cables from the touchscreen controller board.
2	Remove the touchscreen controller mounting bracket from the monitor.
3	Note the positioning of the board connector in relation to the position of the bracket— this will ensure proper reassembly.
4	Remove the two screws that mount the touchscreen controller board to the mounting bracket.

Illustration

Figure 13-3 Touchscreen Controller Mounted to Monitor



13.8 Replacing the Touchscreen Controller on a Monitor

Procedure

Table 13-7 Replacing a Touchscreen Controller

Step	Action
1	Mount the new touchscreen controller board to the mounting bracket with the three screws.
2	Mount the touchscreen controller bracket to the monitor as shown on Figure 13-3.
3	Reconnect the two interface cables to the touchscreen controller board.

13.9 Spare Parts

Spare parts list

Table 13-8 Touchscreen Spare Parts

Part Number	Description
*51197005-200	Touchscreen Controller Board
*51403135-100	Touchscreen Assembly
51308047-100	Touch screen Interface Cable
51403005-100	Window Bezel
51403006-100	Dust Cover

* ORU = Optimum Replaceable Unit

Section 14 – Monitor Service

14.1 Overview

Section contents These are the topics covered in this section:

Topic	See Page
SECTION 14 – MONITOR SERVICE.....	149
14.1 Overview.....	149
14.2 Monitor Assembly.....	149
14.3 Termination Switch Configuration.....	150
14.4 Cleaning the Monitor CRT.....	151
14.5 Monitor Access.....	152
14.6 Removing the Monitor.....	152
14.7 Installing the Monitor.....	156
14.8 Replacing the Monitor Control Subassembly.....	157
14.9 Monitor Adjustments.....	158
14.10 Monitor Color Bias Adjustments.....	160
14.11 Monitor Focus Adjustment.....	161
14.12 Vertical Linearity Adjustment.....	162
14.13 Horizontal Linearity Adjustment.....	163
14.14 Side Pin Cushion Control.....	164
14.15 Further Adjustments.....	164
14.16 Fuse Replacement.....	165
14.17 Spare Parts.....	165

14.2 Monitor Assembly

Description

The monitor assembly is comprised of the following:

- Monitor with a Flat Square Tube (FST) enclosed in an EMI shield.
- Monitor control panel mounted to the front of the touchscreen assembly
- Touchscreen assembly mounted to the front of the monitor
- Touchscreen controller assembly mounted to the side of the monitor.
- All of the above are assembled together and can be slid out of the monitor enclosure and removed as one assembly.

In general the monitor:

- Straddles the retaining block and is locked in place by sliding a slide lock panel into slots in the retaining block to lock the monitor in place.
- Can be replaced by transferring the touchscreen assembly, touchscreen control, and monitor control assembly to the new monitor.
- Can be removed from the station without disassembly of the touchscreen assembly or monitor control assembly.

Continued on next page

14.2 Monitor Assembly, Continued

Specifications

Type	Standard Resolution
Resolution	640 x 448 pixels
Frequency	31.25 \pm 2 KHz
Interface Video Sync Impedance Video Sync	Analog RGB Separate 75 ohm 4.7 K ohm
AC Input Voltage Frequency Power	 90 to 132 198 to 264 47 - 63 Hz 165 watts
Weight	30.4 Kgs (67 lb)

14.3 Termination Switch Configuration

Switch setting

The termination switch identified in Figure 14-1 should always be in the 75-ohm position.

14.4 Cleaning the Monitor CRT

Monitor screen

An anti-reflection panel is provided on the CRT screen to reduce eye strain. Avoid touching the CRT screen since soil and fingerprints reduce legibility and the effectiveness of the anti-reflection treatment. To remove soil or fingerprints from the screen, do the following:

- Use a cleaner (such as window cleaning solution) to clean the screen face. Be careful not to scratch or mar the anti-reflective treatment. Before using an untested cleaner, spot test an area of the screen to determine if the results are satisfactory.
 - Remove the cleaner with a damp cloth and wipe the surface with a soft, dry cloth.
-

Monitor interior

High static electric fields exist inside the monitor during normal operation, attracting dust through the console ventilation slots. Because dust can collect on charged surfaces, it is recommended that you occasionally clean the inside of the monitor, especially around the area of the CRT anode cap. The environmental conditions determine how often the area around the anode cap should be cleaned.

- To remove accumulated dust, use a soft dry, lint-free cloth, a soft brush, or a small vacuum hose to clean the monitor's interior.
 - Make sure not to disturb or damage components or wiring connections.
 - Check for improperly fitted connectors, sharply bent or unintentionally exposed wiring, and broken plugs or plug insulators.
-

14.5 Monitor Access

Procedure

To access the monitor, remove the rear cover:

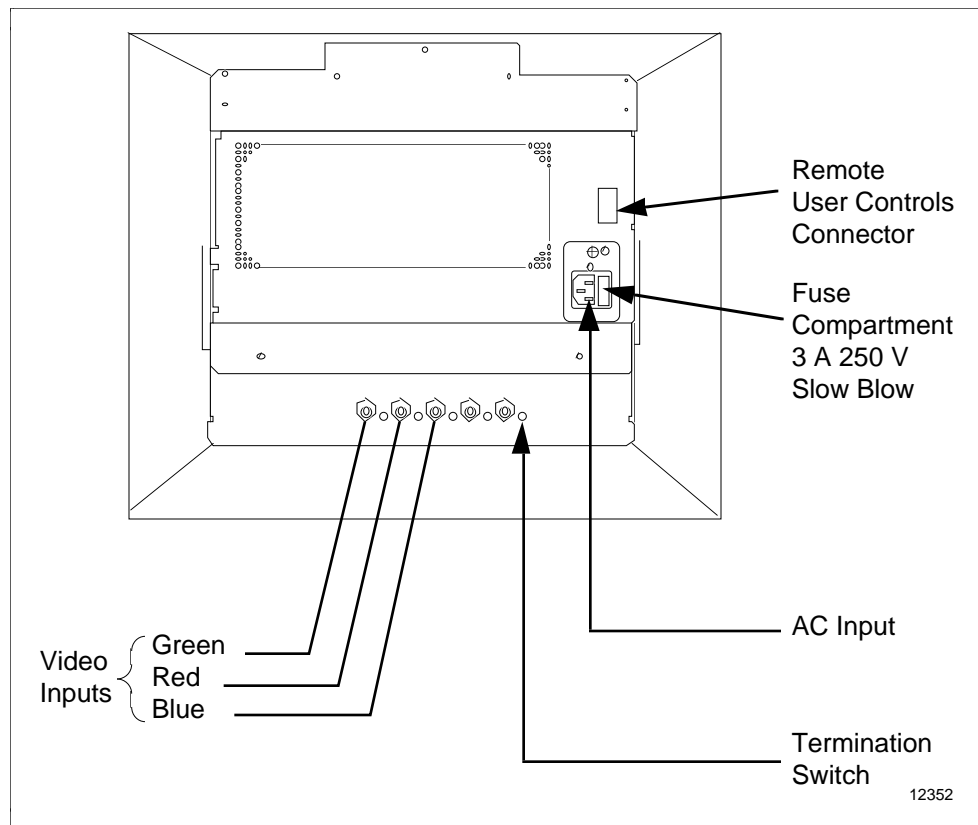
Table 14-1 Accessing the Monitor

Step	Action
1	Remove the 8 hex-head screws (4 on each side) from the cover using an 8 mm socket.
2	Slide the cover off to the rear.

14.6 Removing the Monitor

Illustration

Figure 14-1 Monitor Mounting and Cables



Continued on next page

14.6 Removing the Monitor, Continued

Procedure

Because the monitor weighs in excess of 80 pounds, two people are required to safely remove it from the console.

Table 14-2 Removing the Monitor

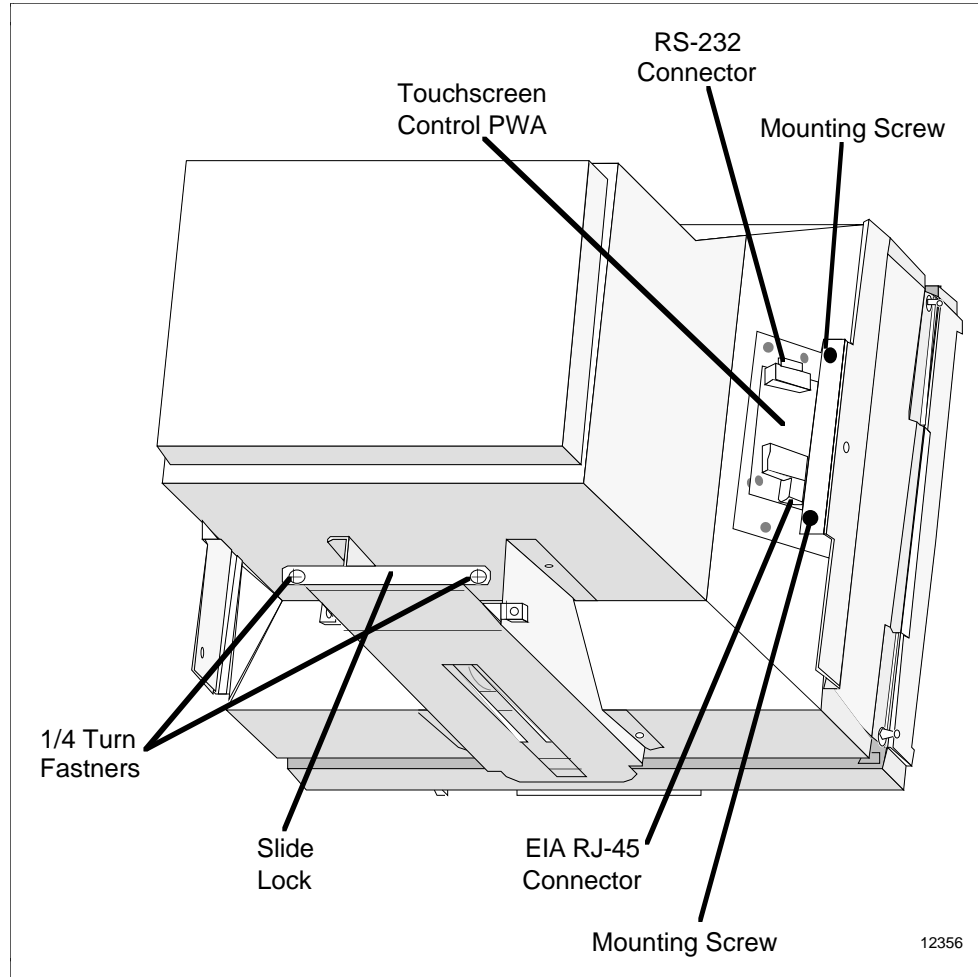
Step	Action
1	Disconnect the ac power cable from the back of the monitor. See Figure 14-1.
2	Disconnect the five coax cables from the rear of the monitor. See Figure 14-1.
3	Disconnect the touchscreen interface cable from the EIA RJ-45 connector located at the bottom of the touchscreen control board. See Figure 14-2.
4	Remove the 3 hex-head screws on each side of the monitor mounting bracket. See Figure 14-2. Hint: Loosen four bolts on each side to allow easier removal. See Figure 14-2.
5	ATTENTION If this is a tilted monitor, it will slide forward if you let go of it. Slide the monitor to the rear of the cabinet as far as it will go.
6	ATTENTION Once this step is completed, the monitor is no longer locked in place. Remove the monitor slide lock by releasing the two, 1/4-turn screws and pulling the monitor slide lock out. See Figure 14-2.
7	ATTENTION Using two people, lift the monitor off the retaining block. The monitor assembly weighs in excess of 80 pounds.
8	If the monitor is to be replaced, the touchscreen assembly and touchscreen control panel assembly must be transferred to the new monitor (the monitor control panel remains mounted to the touchscreen). <ul style="list-style-type: none"> • Disconnect the monitor control panel cable from the rear of the monitor. See Figure 14-1. • Remove the four bolts from each side of the mount assembly as shown in Figure 14-3 and the touchscreen, touchscreen control board, and mounting bracket will slide off the monitor. Mount it on the new monitor. Use the same hardware removed from the old monitor. • Reconnect the monitor control panel cable to the rear of the monitor.

Continued on next page

14.6 Removing the Monitor, Continued

Illustration

Figure 14-2 Monitor and Touchscreen Mounting

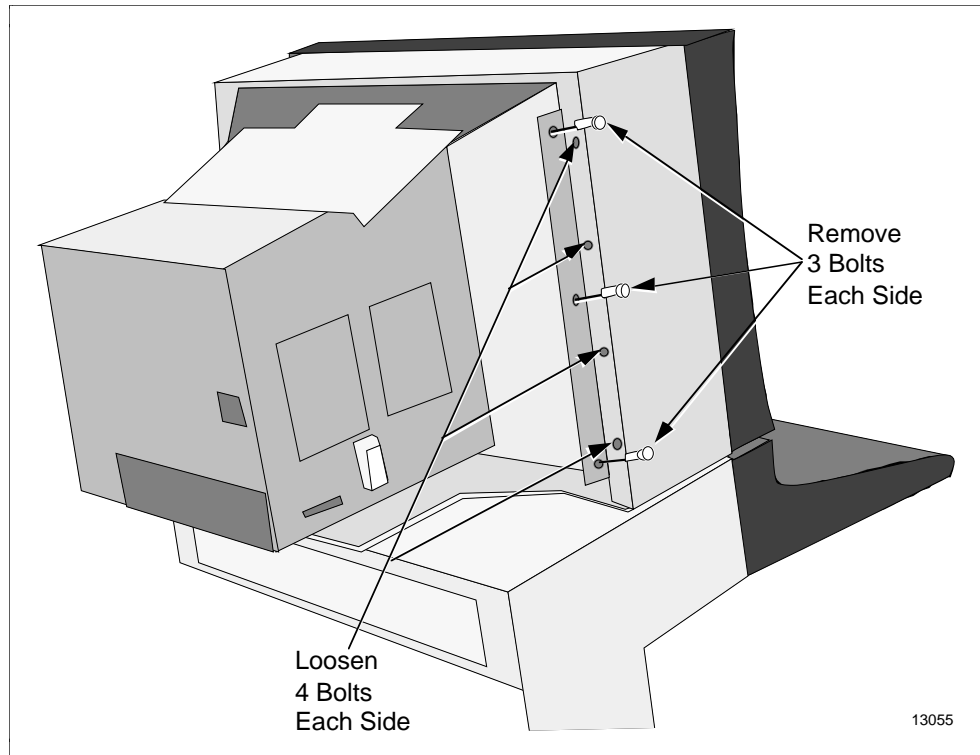


Continued on next page

14.6 Removing the Monitor, Continued

Illustration

Figure 14-3 Location of Monitor Mounting Bolts



14.7 Installing the Monitor

Procedure

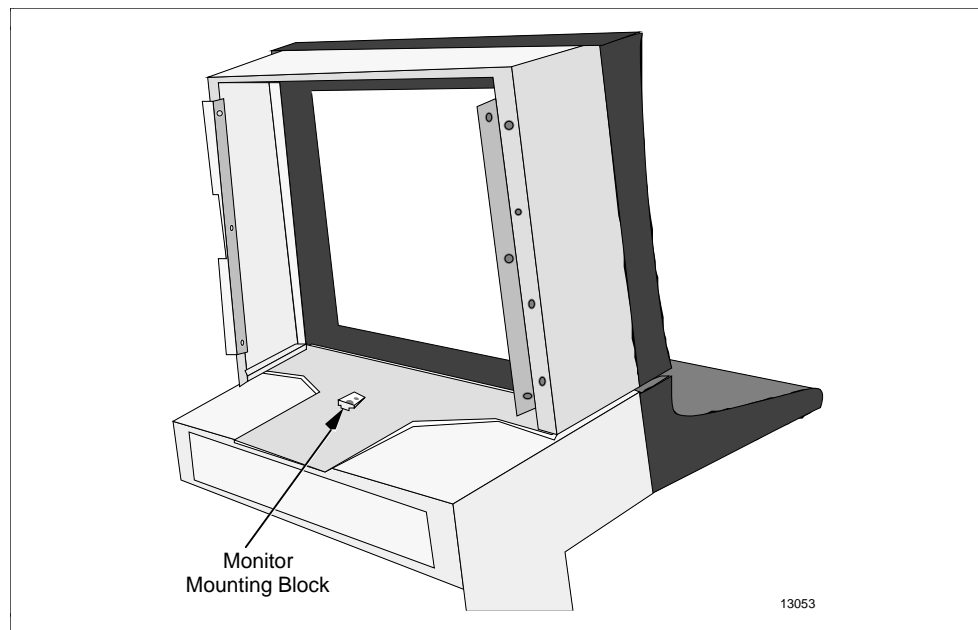
To install (replace) the monitor in the console:

Table 14-3 Installing the Monitor

Step	Action
1	Ensure that the termination switch is in the 75-ohm position.
2	ATTENTION Use 2 people to lift the monitor and set it on the retaining block. The monitor assembly weighs in excess of 80 pounds. See Figure 14-4.
3	Install the monitor slide lock shown in Figure 14-2.
4	Carefully slide the monitor forward against the front bezel. Ensure that the monitor control panel cable is not pinched and that the monitor control panel lines up in the access door correctly.
5	Replace the 3 hex-head screws on each side of the monitor mounting bracket. See Figure 14-2. Ensure that the four bolts shown in Figure 14-2 are tight.
6	Connect the touchscreen interface cable to the bottom of the touchscreen control panel.
7	Connect the 5 coax cables to the back of the monitor. Ensure that the color-coding of the cables matches the labels on the monitor.
8	Connect the ac power cord to the monitor.

Illustration

Figure 14-4 Location of Monitor Retaining Block



14.8 Replacing the Monitor Control Subassembly

Procedure

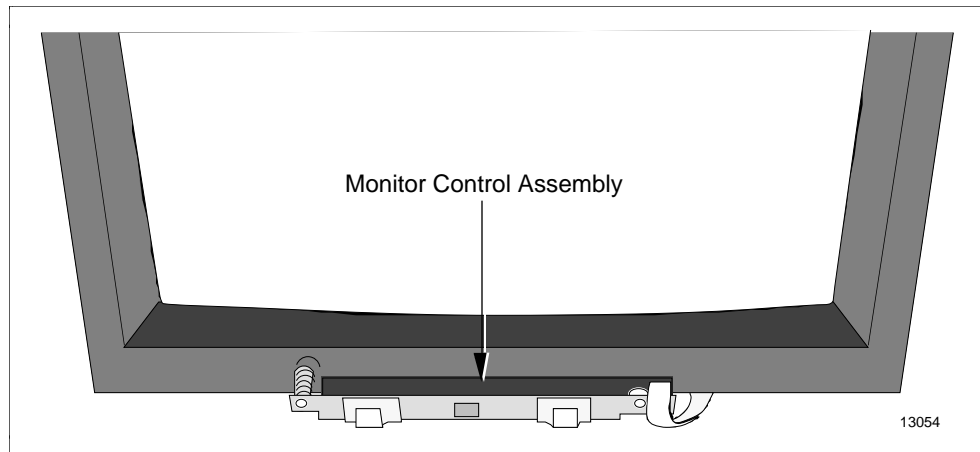
To replace the monitor control subassembly, the rear cover and the monitor must be removed first. Reference subsection 14.4 and subsection 14.5.

Table 14-4 Replacing the Monitor Control Subassembly

Step	Action
1	Remove the rear cover as detailed in subsection 14.4.
2	Remove the monitor as detailed in subsection 14.5.
3	Remove the two screws holding the monitor control assembly into the touchscreen bezel. See Figure 14-2.
4	Remove the monitor control assembly from the bezel.
5	Install the new monitor control assembly on the bezel. See Figure 14-5.
6	Install the two screws to hold the assembly to the bezel.
7	Replace the monitor as detailed in subsection 14.6.
8	Replace the rear cover over the monitor.

Illustration

Figure 14-5 Monitor Control Assembly

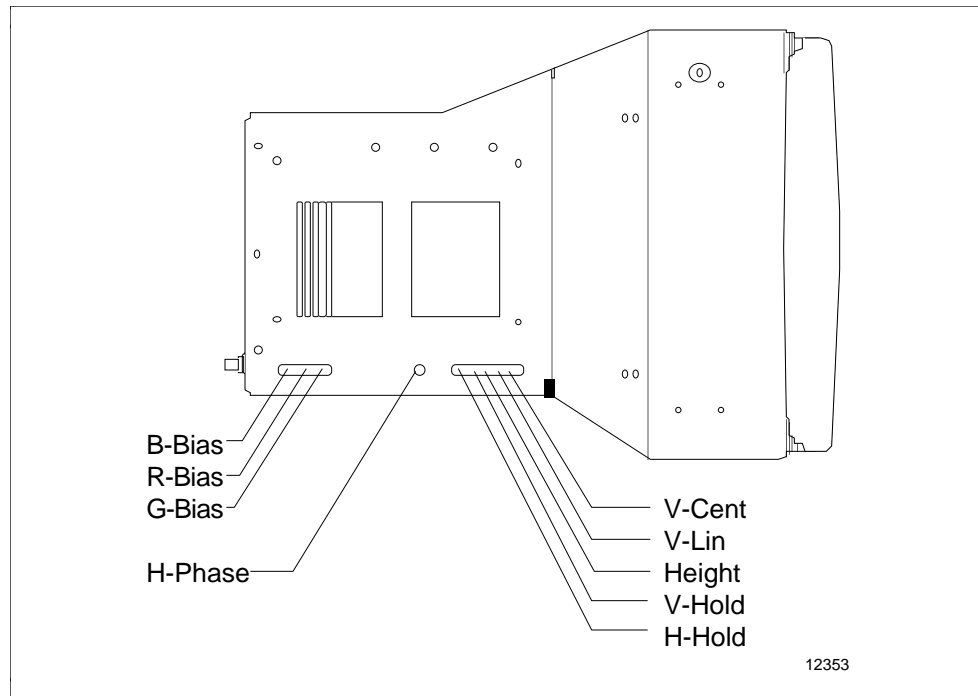


14.9 Monitor Adjustments

Scope

Both the standard and high resolution monitors have the same adjustments as shown in Figure 14-6 and Figure 14-7.

Figure 14-6 Right Side Monitor Adjustments

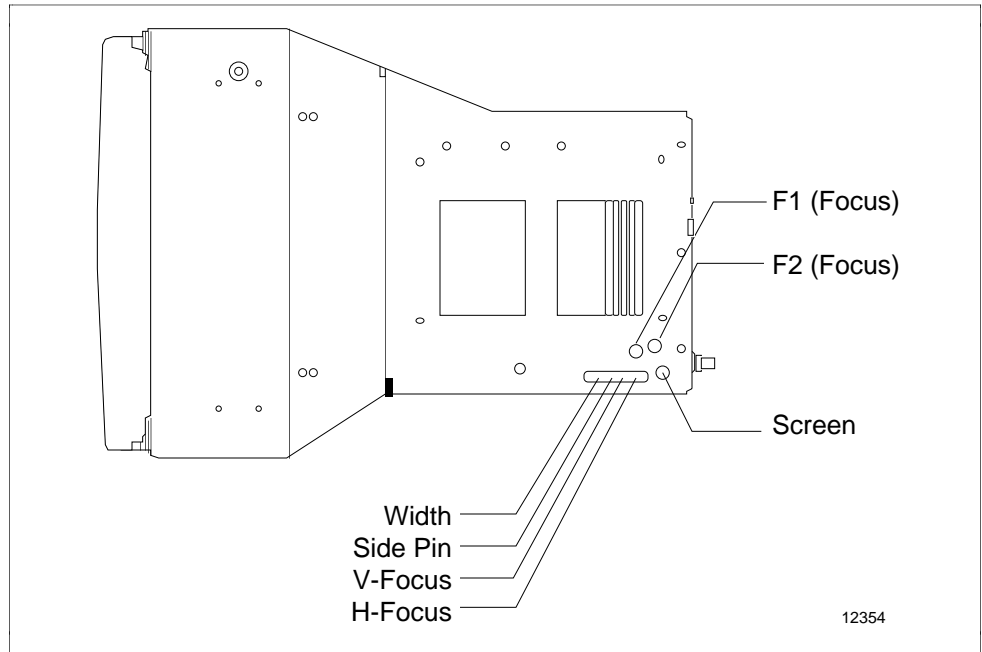


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14.9 Monitor Adjustments, Continued

Illustration

Figure 14-7 Left Side Monitor Adjustments



14.10 Monitor Color Bias Adjustments

CRT Bias

The CRT Bias adjustment controls are located on the input video circuits, which reside on the mother board. If required, make the adjustment before attempting to balance the color.

ATTENTION

ATTENTION—Before adjusting color level, be sure to degauss the monitor. Use the following procedures to adjust the CRT Bias.

Procedure

Table 14-5 Adjusting the Color Bias

Step	Action
1	Ensure that the brightness is at its minimum position.
2	Align the adjustment slot by setting each cathode bias control: <ul style="list-style-type: none">• Red Bias (R Bias)• Green Bias (G Bias)• Blue Bias (B Bias) to the 12 o'clock position.
3	Turn the screen control (G2) clockwise until a dim raster appears on the screen. Then turn counterclockwise until the background raster begins to disappear.
4	Observe the screen (in a darkened area) with a cupped hand or an eyepiece and adjust each cathode bias control to a balanced level. <ul style="list-style-type: none">• Turn the R BIAS control clockwise until a dim, red background appears.• Then turn counterclockwise until the background begins to disappear.• Repeat these steps for both G BIAS and B BIAS controls.
5	Turn the Brightness control to its maximum position—until a dim, gray background appears. If the gray shifts in hue towards any color, repeat Step 4.
6	Turn the Brightness control to its minimum position.

14.11 Monitor Focus Adjustment

Scope

The following adjustment procedure is designed to be done using a video test generator. However, in the customer's environment, this could be done on screen filled with small text. As you adjust the focus, be sure to observe the four corners, the midpoint of each edge, as well as the center of the screen.

Procedure

Table 14-6 Adjusting Focus

Step	Action
1	Set the video test generator to display a white grid test pattern.
2	Turn the Contrast control for the maximum display luminance.
3	Adjust the Brightness control until the background is no longer visible.
4	Use the F2 focus control to adjust the focus pot until the vertical axis line at the center of the test pattern is as thin as possible, at both the center and edge of the screen.
5	Use the F1 control to adjust the focus pot until the horizontal axis line at the center of the test pattern is as thin as possible, at both the center and edge of the screen.
6	Repeat Steps 4 and 5 at least three times until optimum focus is achieved.

14.12 Vertical Linearity Adjustment

Scope

Vertical Linearity is the proportionate size of the top and bottom of the display, with reference to the center. If the top and bottom of the display are not linear, use the Vertical Linearity (V-LIN) control shown in Figure 14-3 to make the adjustment. HVTS PDGI Test 18 (pattern of squares) is available for this purpose—measure the size of the squares at the top, middle, and bottom of the screen.

Procedure

Table 14-7 Adjusting Vertical Linearity

Step	Action
1	Set up the pattern using Test 18 of the HVTS PDGI. ATTENTION This requires that the station be taken out of service.
2	Turn the V-LIN control clockwise to increase the size of the top grid boxes and to decrease the size of the bottom grid boxes. Turn the control counterclockwise for the opposite effect.
3	Adjust the V-LIN control until the top boxes are equal in height to the bottom boxes. In the optimum condition, the top and bottom boxes are equal to each other and the box in the center of the display. If the V-LIN control is significantly adjusted, use the Vertical Centering (V-CEN) control to readjust the vertical centering.

14.13 Horizontal Linearity Adjustment

Scope

Horizontal linearity refers to the proportionate size of the left and right sides of the display. If the sides of the display are not linear, with reference to the center, use the Horizontal Linearity (H-LIN) control (L802) to adjust the left and right sides of the display.

Procedure

Table 14-8 Adjusting Horizontal Linearity

Step	Action
1	Set up the pattern using Test 18 of the HVTS PDGI.
2	Rotate the thumbwheel on the coil (L802), stretching or compressing the width of the grid blocks, to change the left side of the display. WARNING Make sure you do not touch exposed terminals.
3	Rotate the thumbwheel until the width of the left grid block is equal to the right grid block.
	ATTENTION If the H-LIN control is adjusted significantly, readjust the Horizontal centering control (H-Cent), located in the center of the mother board to adjust the horizontal centering.

14.14 Side Pin Cushion Control

Scope

The side pin cushion (SIDE PIN) control adjusts the straightness of the left and right sides of the display. It also corrects pin cushion distortion that occurs naturally with the CRT. Other distortions, such as trapezoidal and parallelogram, are functions of tube performance and cannot be corrected with the SIDE PIN control.

Procedure

Table 14-9 Adjusting Side Pin Cushion

Step	Action
1	Set up the pattern using Test 18 of the HVTS PDGI.
2	Turn the SIDE PIN control until the left and right display are as straight as possible.

14.15 Further Adjustments

WARNING

WARNING—Further adjust must not be attempted. The adjustment controls have been sealed at the factory and an attempt to adjust them will **RESULT IN DAMAGE** to the board.

14.16 Fuse Replacement

Procedure

The spare fuse is located in the right side of the ac power connector housing and is accessed by extracting the small compartment holding the spare fuse.

14.17 Spare Parts

Spare parts list

Touchscreen parts are listed in the Touchscreen Service section.

Table 14-10 Monitor Spare Parts

Part Number	Description
*51197020-100	Low Resolution Monitor 21" FST
51190577-232	Fuse, time-delay, 3.0 amp, 250 volts, .2 in. diameter by .8 in. long
51403158-100	Control Panel Subassembly
51308020-100	Monitor AC Power Cable
51195904-012	Monitor Interface Cable (to EPDGP I/O)
51403087-100	Mount Assembly
51403138-200	Monitor Slide Lock
51202026-100	Retainer Block

* ORU = Optimum Replaceable Unit

Section 15 – Monitor Service—CE Compliant Monitor

15.1 Overview

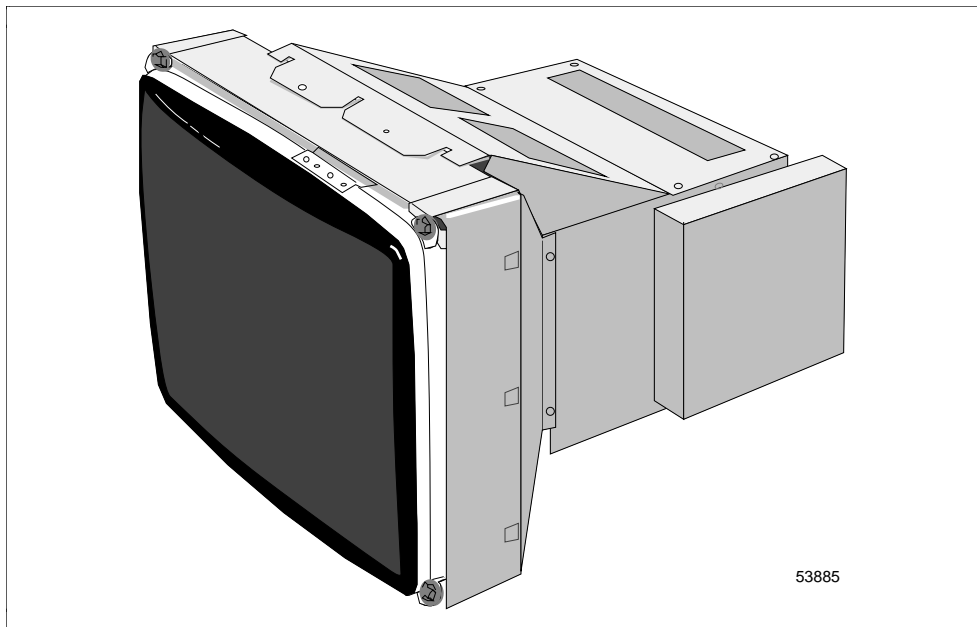
Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 15 – MONITOR SERVICE—CE COMPLIANT MONITOR.....	167
15.1	Overview.....	167
15.2	Monitor Assembly.....	168
15.3	Cleaning the Monitor CRT.....	169
15.4	Monitor Access.....	169
15.5	Removing the Monitor.....	170
15.6	Installing the Monitor.....	174
15.7	Replacing the Monitor Control Subassembly.....	175
15.8	Screen Adjustments.....	176
15.9	Adjustments for Touchscreen Optimization.....	177
15.10	Termination Setting.....	178
15.11	Cabling Connections.....	179
15.12	Degaussing the Monitor.....	180
15.13	Spare Parts.....	181

Scope This CE Compliant Monitor is the Optimum Replaceable Unit (ORU) and the screen adjustments are given here.

Illustration

Figure 15-1 CE Compliant Monitor—51197018



15.2 Monitor Assembly

Description,

The monitor assembly is comprised of the following:

- Monitor with a Flat Square Tube (FST) enclosed in an EMI shield
- Monitor control panel mounted to the front of the touchscreen assembly
- Touchscreen assembly mounted to the front of the monitor
- Touchscreen controller assembly mounted to the side of the monitor
- All of the above are assembled together and can be slid out of the monitor enclosure and removed as one assembly.

In general the monitor:

- Straddles the retaining block and is locked in place by sliding a slide lock panel into slots in the retaining block to lock the monitor in place.
 - Can be replaced by transferring the touchscreen assembly, touchscreen control, and monitor control assembly to the new monitor.
 - Can be removed from the station without disassembly of the touchscreen assembly or monitor control assembly.
-

Specifications

Type	High Resolution
Resolution	1280 x 1024 pixels
Frequency	78 ±2 KHz
Interface Video Sync Impedance Video Sync	Analog RGB Separate 75 ohm 4.7 K ohm
AC Input Voltage Frequency Power	 90 to 132 198 to 264 47 - 63 Hz 165 watts
Weight	30.4 Kgs (67 lb)

15.3 Cleaning the Monitor CRT

Monitor screen

An anti-reflection panel is provided on the CRT screen to reduce eye strain. Avoid touching the CRT screen since soil and fingerprints reduce legibility and the effectiveness of the anti-reflection treatment. To remove soil or fingerprints from the screen, do the following:

- Use a cleaner (such as window cleaning solution) to clean the screen face. Be careful not to scratch or mar the anti-reflective treatment. Before using an untested cleaner, spot test an area of the screen to determine if the results are satisfactory.
 - Remove the cleaner with a damp cloth and wipe the surface with a soft, dry cloth.
-

15.4 Monitor Access

Procedure

To access the monitor, remove the rear cover.

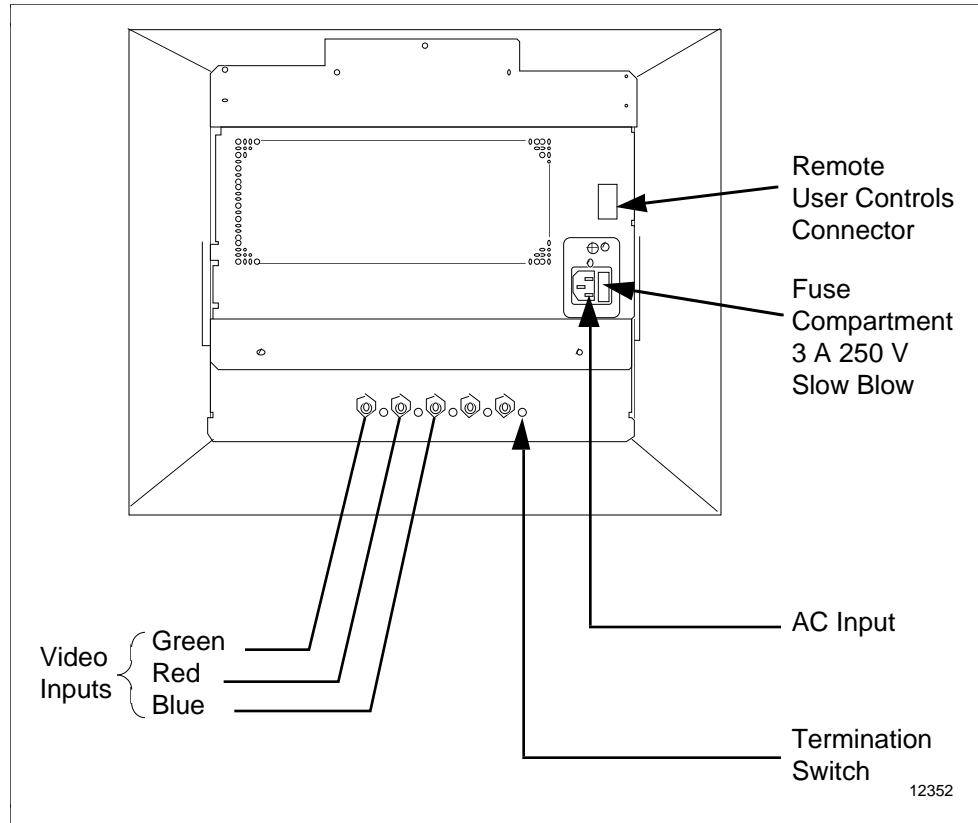
Table 15-1 Accessing the Monitor

Step	Action
1	Remove the eight hex-head screws (4 on each side) from the cover using an 8 mm socket.)
2	Slide the cover off to the rear.

15.5 Removing the Monitor

Illustration

Figure 15-2 Monitor Mounting and Cables



Continued on next page

15.5 Removing the Monitor, Continued

Procedure

Because the monitor weighs in excess of 80 pounds, two people are required to safely remove it from the console.

Table 15-2 Removing the Monitor

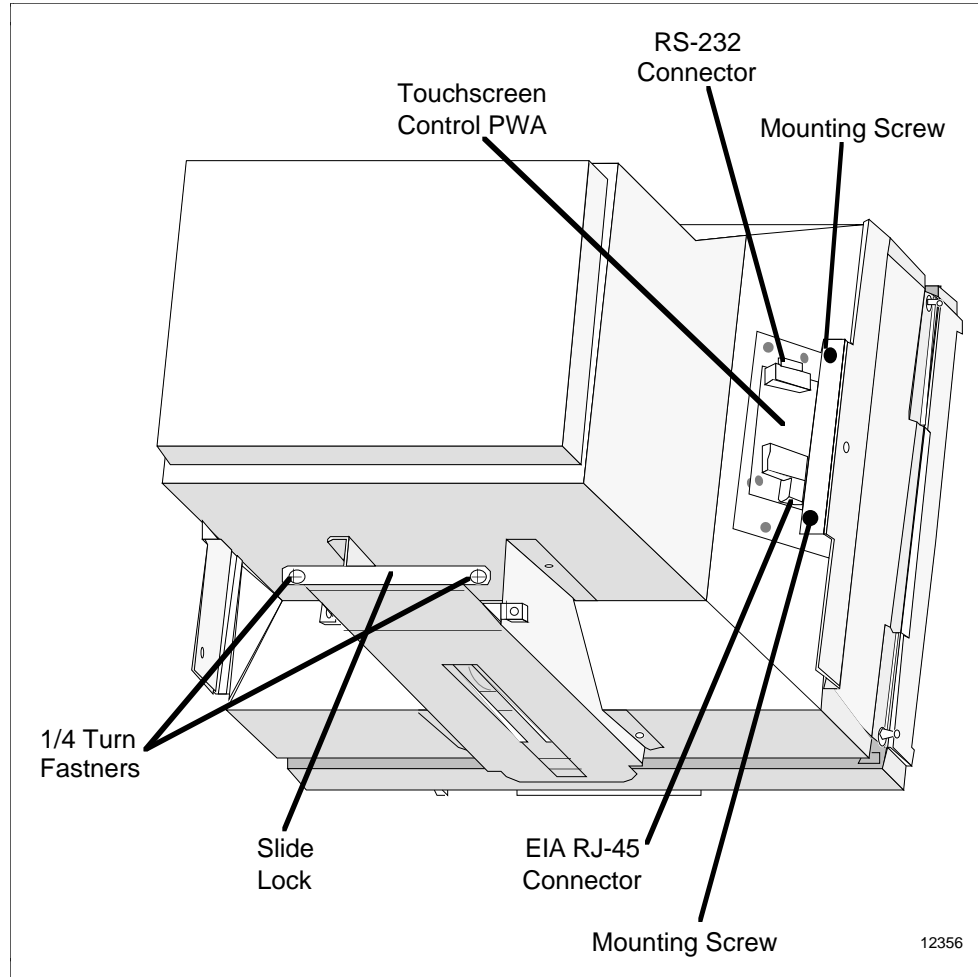
Step	Action
1	Disconnect the ac power cable from the back of the monitor. See Figure 15-2.
2	Disconnect the five coax cables from the rear of the monitor. See Figure 15-2.
3	Disconnect the touchscreen interface cable from the EIA RJ-45 connector located at the bottom of the touchscreen control board. See Figure 15-3.
4	Remove the 3 hex-head screws on each side of the monitor mounting bracket. See Figure 15-3. Hint: Loosen four bolts on each side to allow easier removal. See Figure 15-4.
5	ATTENTION If this is an upper monitor, it will slide forward if you let go of it. Slide the monitor to the rear of the cabinet as far as it will go.
6	ATTENTION Once this step is completed, the monitor is no longer locked in place. Remove the monitor slide lock by releasing the two, 1/4-turn screws and pulling the monitor slide lock out. See Figure 15-3.
7	ATTENTION Using two people, lift the monitor off the retaining block. The monitor assembly weighs in excess of 80 pounds.
8	If the monitor is to be replaced, the touchscreen assembly and touchscreen control panel assembly must be transferred to the new monitor (the monitor control panel remains mounted to the touchscreen). <ul style="list-style-type: none"> • Disconnect the monitor control panel cable from the rear of the monitor. See Figure 15-2. • Remove the four bolts from each side of the mount assembly as shown in Figure 15-4 and the touchscreen, touchscreen control board, and mounting bracket will slide off the monitor. Mount it on the new monitor. Use the same hardware removed from the old monitor. • Reconnect the monitor control panel cable to the rear of the monitor.

Continued on next page

15.5 Removing the Monitor, Continued

Illustration

Figure 15-3 Monitor and Touchscreen Mounting

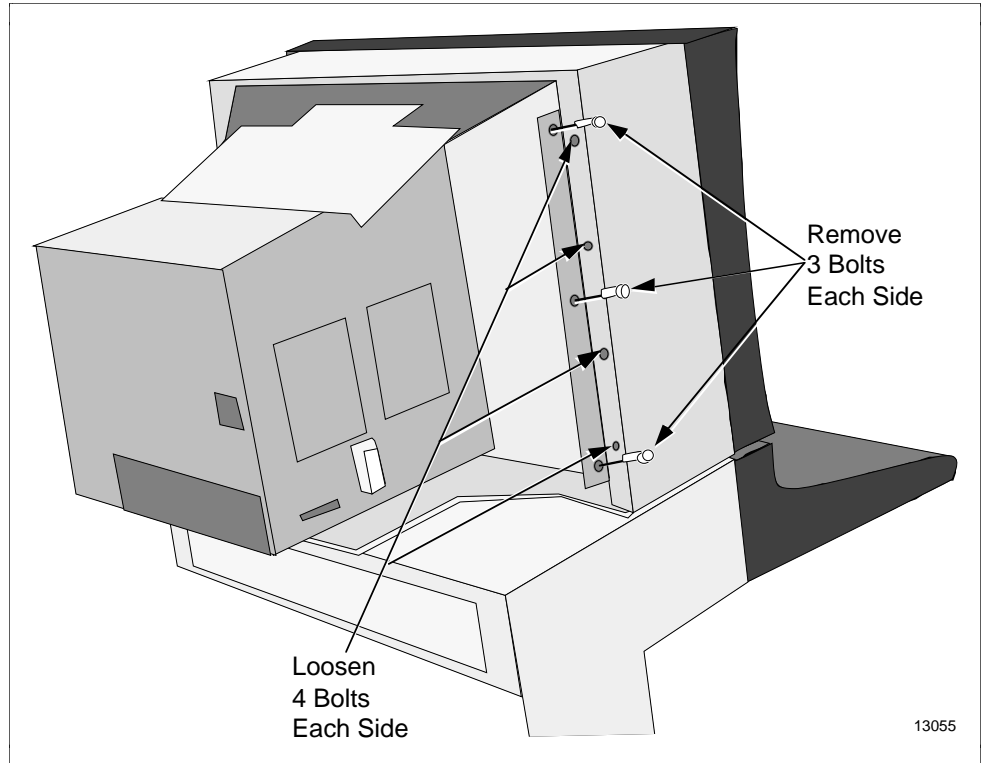


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15.5 Removing the Monitor, Continued

Illustration

Figure 15-4 Location of Mount Assembly Bolts



15.6 Installing the Monitor

Procedure

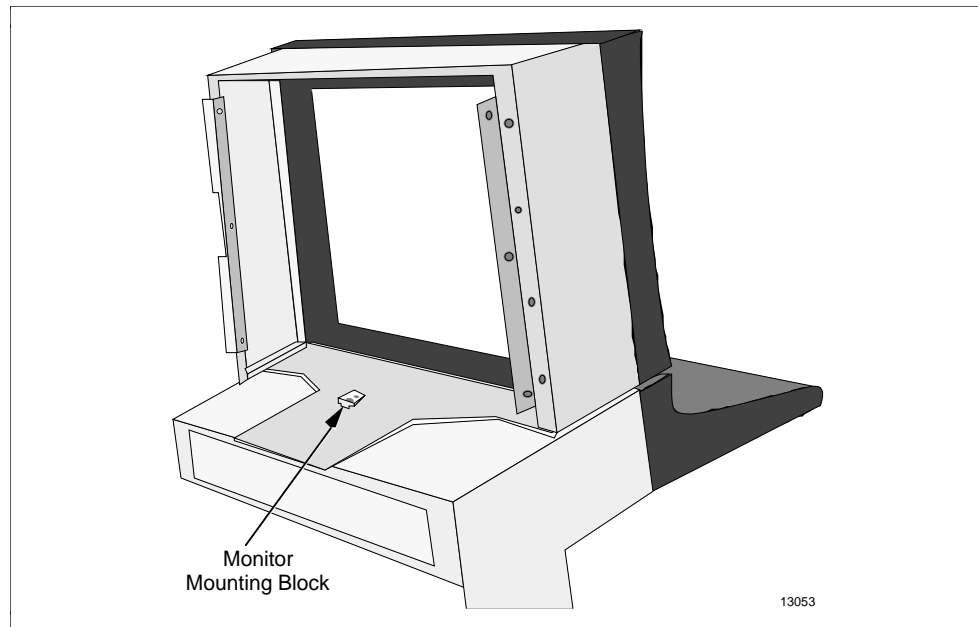
To install (replace) the monitor in the console:

Table 15-3 Installing the Monitor

Step	Action
1	Ensure that the termination switch is in the 75-ohm position.
2	ATTENTION Use 2 people to lift the monitor and set it on the retaining block. The monitor assembly weighs in excess of 80 pounds. See Figure 15-5.
3	Install the monitor slide lock shown in Figure 15-3.
4	Carefully slide the monitor forward against the front bezel. Ensure that the monitor control panel cable is not pinched and that the monitor control panel lines up in the access door correctly.
5	Replace the 4 hex-head screws on each side of the monitor mounting bracket. See Figure 15-4. Ensure that the four bolts shown in Figure 15-4 are tight.
6	Connect the touchscreen interface cable to the bottom of the touchscreen control panel.
7	Connect the 5 coax cables to the back of the monitor. Ensure that the color-coding of the cables matches the embossed labels on the monitor. See Figure 15-2.
8	Connect the ac power cord to the monitor.

Illustration

Figure 15-5 Location of Monitor Retain Block



15.7 Replacing the Monitor Control Subassembly

Procedure

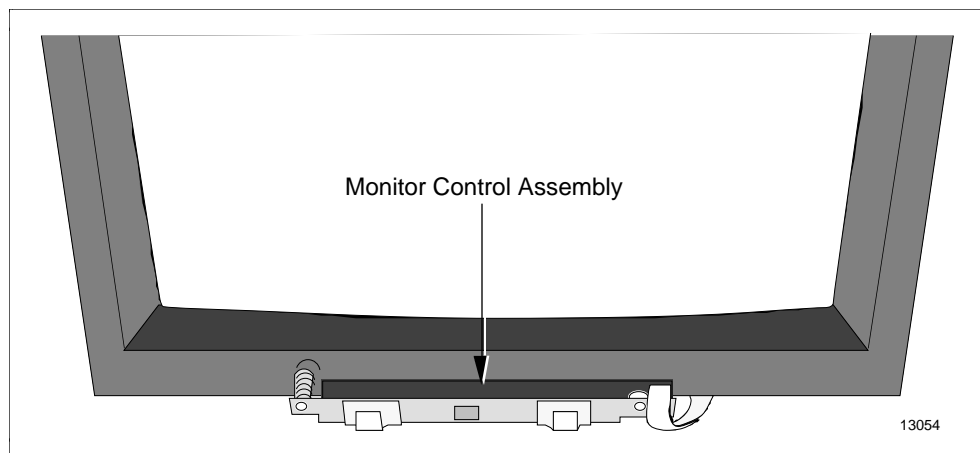
To replace the monitor control subassembly, the rear cover and the monitor must be removed first. Reference subsection 15.4 and subsection 15.5.

Table 15-4 Replacing the Monitor Control Subassembly

Step	Action
1	Remove the rear cover as detailed in subsection 15.4.
2	Remove the monitor as detailed in subsection 15.5.
3	Remove the two screws holding the monitor control assembly into the touchscreen bezel. See Figure 15-6.
4	Remove the monitor control assembly from the bezel.
5	Install the new monitor control assembly on the bezel. See Figure 15-5.
6	Install the two screws to hold the assembly to the bezel.
7	Replace the monitor as detailed in subsection 15.6.
8	Replace the rear cover over the monitor.

Illustration

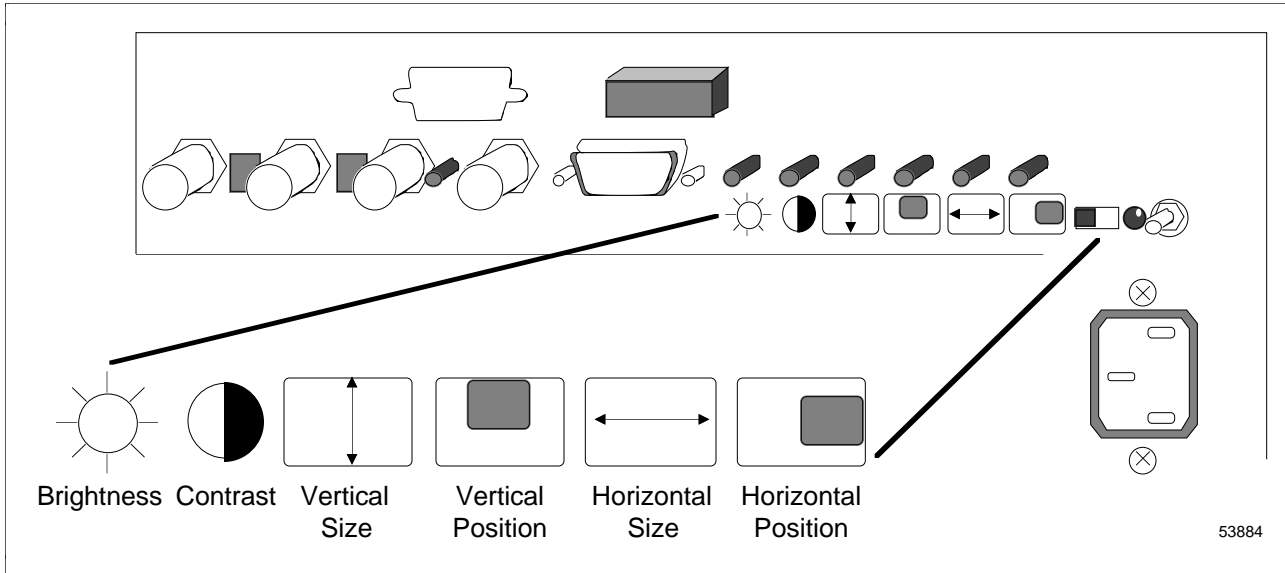
Figure 15-6 Monitor Control Assembly



15.8 Screen Adjustments

Illustration

Figure 15-7 Screen Adjustments



Remote adjustments

The remote brightness, contrast and degauss controls are mounted on the front of the monitor bezel and override the rear panel controls shown here.

Brightness control

After allowing the monitor to warm up for at least 1-minute, adjust for the least amount of brightness to make the display clearly visible.

Contrast control

Use the contrast control to vary the difference between the display's light and dark elements. With a suitable image displayed on the screen, adjust balance between image brightness and fine detail rendition. The optimum setting may vary slightly with different displays and changes in ambient lighting, as well as individual taste.

Vertical size

Use this control to make the display taller or shorter.

Vertical position

Use this control to center the display vertically on the screen.

Horizontal size

Use this control to make the display wider or narrower.

Horizontal position

Use this control to center the display horizontally.

15.9 Adjustments for Touchscreen Optimization

Procedure

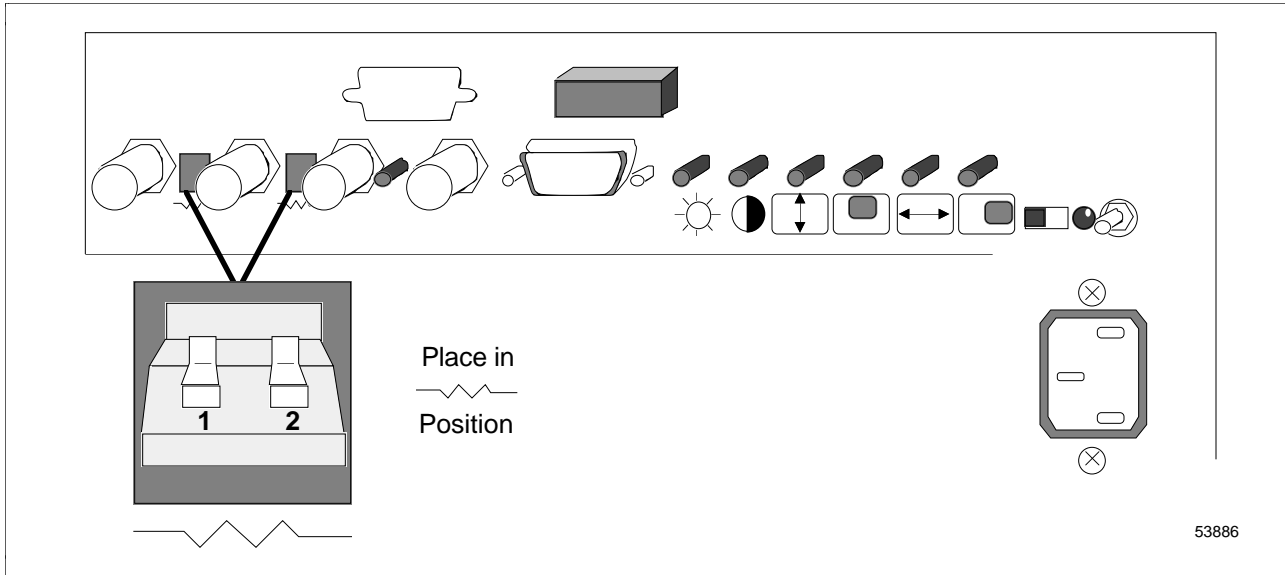
Table 15-5 Adjusting Monitor for Touchscreen Optimization

Step	Action
1	Center the display vertically and horizontally.
2	Using a small stylus positioned in each corner of the display, one corner after another, adjust the vertical and horizontal size until the arrow is cursor is directly under the stylus.
3	Adjust the screen size until the optimum performance of the four locations is reached.

15.10 Termination Setting

Illustration The coax interface cables must be terminated at 75 ohms.

Figure 15-8 Location and Setting of Terminations

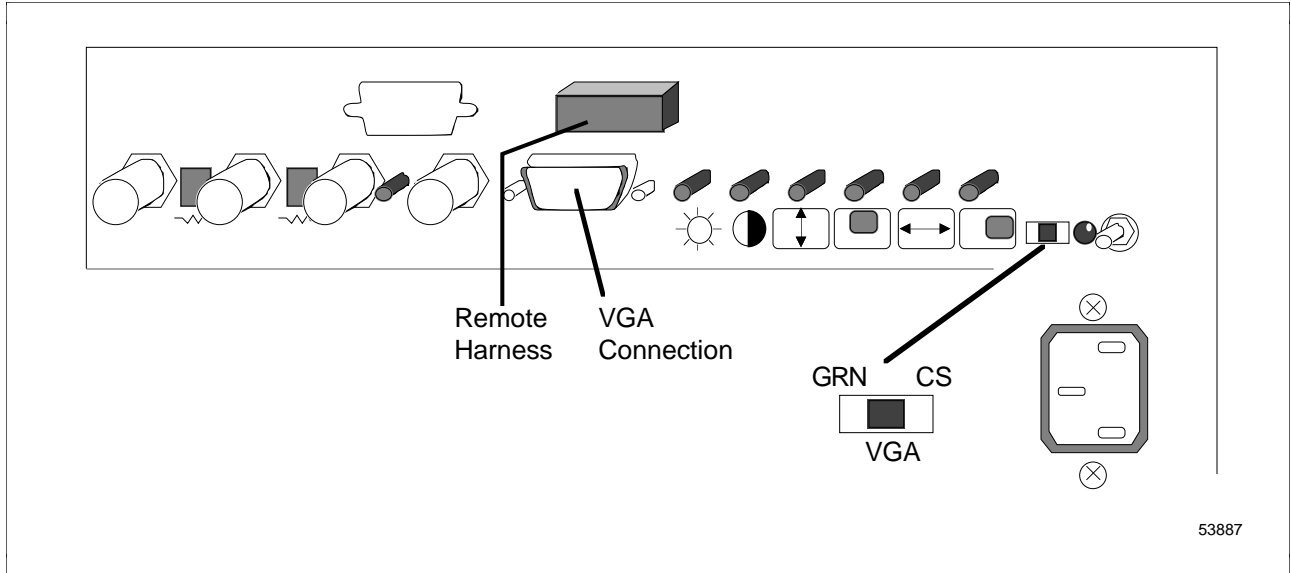


15.11 Cabling Connections

Illustration

The remote harness, VGA cable (interface cable) and VGA cable sync selection are shown here.

Figure 15-9 Cabling Connections for Universal Station



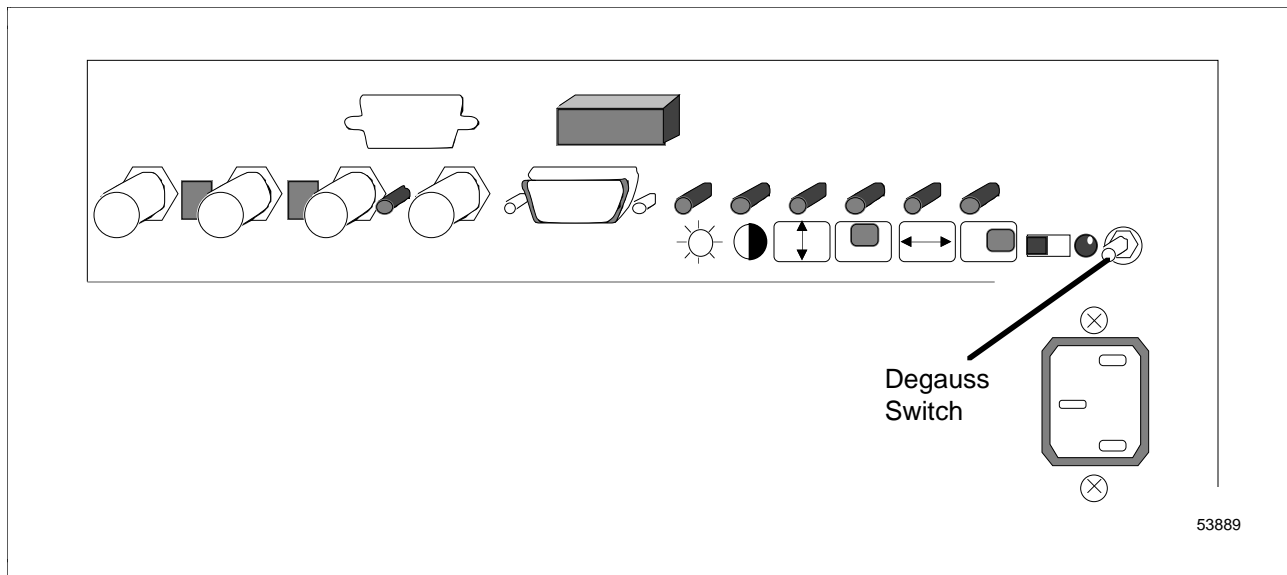
15.12 Degaussing the Monitor

Scope

The monitor is degaussed automatically each time the monitor is powered on. The degaussing eliminates color impurities and other distortions by neutralizing the effects of magnetic fields in the surrounding environment.

Monitors can pick up additional magnetic flux when left on for long periods of time. Whenever color purity is in question, degauss the CRT tube by pressing on the DEGAUSS button. Allow 15 minutes between attempts to degauss the monitor.

Figure 15-10 Location of Degauss Button



15.13 Spare Parts

Spare parts list

The fuse is inaccessible and should not be replaced upon failure.

Table 15-6 Monitor Spare Parts

Part Number	Description
*51197018-100	21" Monitor
51403158-100	Control Panel Subassembly
	Monitor AC Power Cable
	Monitor Interface Cable to EPDGC
51403087-100	Mount Assembly
51403138-200	Monitor Slide Lock
51202026-100	Retainer Block

* = ORU

Section 16 – ASPI-32 Printer

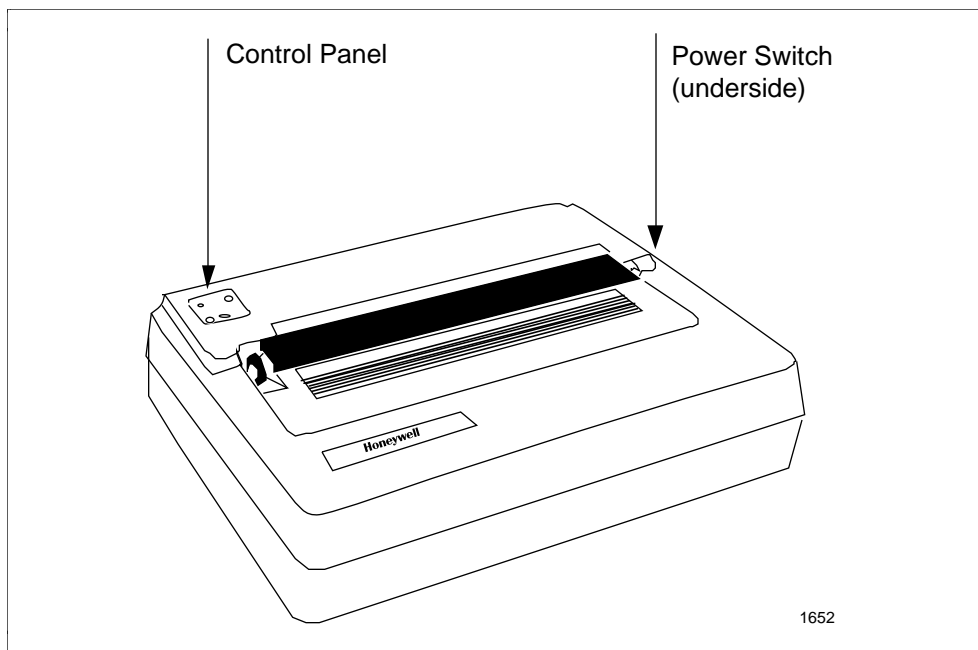
16.1 Overview

Section contents These are the topics covered in this section:

Topic	See Page
SECTION 16 – ASPI-32 PRINTER.....	183
16.1 Overview.....	183
16.2 Cleaning.....	184
16.3 Test/Troubleshooting Procedures.....	185
16.4 Troubleshooting Analysis.....	186
16.5 Removal/Replacement.....	188
16.6 Spare Parts.....	195

Illustration

Figure 16-1 ASPI-32 Printer



ASPI-32 printer replacement

The ASPI-32 printer is no longer available from the manufacturer. The ASPI-41, ASPI-46, and Signum 2043 printers are functional replacements for the ASPI-32 printer.

16.2 Cleaning

Procedure

Table 16-1 ASPI-32 Cleaning Procedure

Step	Action
1	Set the power switch (see Figure 16-1) to OFF and unplug the power cord.
2	Lift the top-half of the cover and remove the paper, if present.
3	Vacuum the dirt/dust from inside of the unit. <ul style="list-style-type: none">• Use a brush to loosen dirt accumulations, but take care not to damage or misalign delicate items, such as the print head.
4	Close the cover and wipe the outside clean with a cloth and mild detergent solution.
5	Plug the power cord back into the unit.

16.3 Test/Troubleshooting Procedures

Print test

The matrix printer includes a built-in diagnostic test intended for use by the operator. See Figure 16-1 for power switch and control panel location. To initiate the test:

Table 16-2 Print Test Procedure

Step	Action
1	Set the power switch to OFF. <ul style="list-style-type: none">• Ensure that there is paper in the printer.
2	Press the START button while setting the power switch to ON, then release the START button. The printer prints the full character-set. Press the STOP button to stop printing. The print should be clear and complete; if not, see Table 16-4 Troubleshooting Guide.
3	Set the power switch to OFF. Press and hold the BREAK button while setting the power switch to ON, then release the button. The ERROR, STAND BY, ON LINE, and PAPER OUT light indicators blink sequentially, then flash in unison for about 5 seconds before the ON LINE indicator steadily lights while the other indicators are off. If a fault is indicated, see Table 16-5 for test display description.

Indicator Test

Table 16-3 Indicator Test Procedure

Step	Action
1	Set the power switch to OFF. Ensure that there is paper in the printer.
2	Press the START button while setting the power switch to ON, then release the START button. The printer prints the full character-set. Press the STOP button to stop printing. The print should be clear and complete; if not, see Table 16-4 Troubleshooting Guide.
3	Set the power switch to OFF. Press and hold the BREAK button while setting the power switch to ON, then release the button. The ERROR, STAND BY, ON LINE, and PAPER OUT light indicators blink sequentially, then flash in unison for about 5 seconds before the ON LINE indicator steadily lights while the other indicators are off. If a fault is indicated, see Table 16-5 for test display description.

16.4 Troubleshooting Analysis

Troubleshooting guide

Table 16-4 Troubleshooting Guide

	Self Test Cause	Symptom
NO	Unit does not turn ON.	1 AC fuse 2 PWA BROSSY 3 Bulk PS
NO	Unit not initialized.	1 Fuses, PWA 2 BROSSY 3 PWA BROSSY Optical Sensor
NO	Unit initialized, plus PAPER OUT and ERROR lit.	1 No paper 2 Paper switch
YES/NO	One or more needles do not print	1 PWA BROSSY 2 Print head
YES	Inked ribbon does not turn. Printing correct.	1 Ribbon cords 2 Print head
YES/NO	Jammed on first line of print after first few lines and is repetitive; shift to left or right of the line of print.	1 PWA BROSSY 2 Carriage rods dirty 3 Ribbon jammed 4 Optical reader 5 Carriage motor
YES	First printed characters expanded.	1 Belt slackened 2 Pulley slackened
YES	Line feed not executed or badly accomplished. Page set not executed.	1 PWA BROSSY 2 Paper knob 3 Paper motor
YES	Tabulations not executed only line feed executed. Does not make connection with console module (PIC).	1 Thermistor 2 PWA ROS-A 3 Line trouble
NO	Print quality is poor on left and/or right side, even after ribbon replacement.	1 Penetration Adj. may be set back too far.

Continued on next page

16.4 Troubleshooting Analysis, Continued

Test display

Table 16-5 Test Display Description

Printer Panel Indicators	Fault Analysis	
	1.	Test on RAM of DA. If there is a fault display, replace PWA ROS-A.
	2.	Test on EPROM of DA (U13). If there are fault displays, replace it (wired on PWA ROS-A).
	3.	Test on EPROM of DA (U11). If a fault is displayed, replace it (wired on PWA ROS-A).
	4.	Test on series I/O gate of DA. When a fault is displayed, replace PWA ROS-A.
	5.	Test on DA parallel I/O gate. When a fault is displayed, replace PWA ROS-A.
	6.	Test on interface bus between DA and DOE. When a fault is displayed it will have occurred on PWA BROSY or PWA ROS-A.
	7.	Test on RAM of DOE. When a fault is displayed, replace PWA BROSY.
	8.	Test on the interface of DOE towards the print head and the carriage. When a fault is displayed, replace PWA BROSY.
	9.	Test on EPROM of DOE. When a fault is displayed, replace it (wired on PWA BROSY).
	10.	Test on EPROM of DOE. When a fault is displayed, replace PWA BROSY.
	END	Display of end of diagnostic test.
Indicator Legend	Note	
LIT OFF BLINKING	 	Displays other than those shown, indicate major errors beyond the scope of the diagnostic test. Check the indicator lamps and panel.

16.5 Removal/Replacement

Procedure

The following parts replacement and adjustment procedures are to be performed by the maintenance technician, as called for in the Troubleshooting Guide, Table 16-4, and the Test Display Description, Table 16-5.

CAUTION

CAUTION—Before performing any maintenance or parts replacement, disconnect the printer power cord from the power entry box at the rear of the printer.

Procedure

To gain access to the printer, turn off the power switch, remove paper and raise top cover by pushing up on the front of the cover. Before replacing the OPRO1, BROSY, or ROS-A boards, set the configurator switches and jumpers to the same configuration as the removed PWA, see Figures 16-2 through 16-8.

Table 16-6 Parts Replacement Procedure

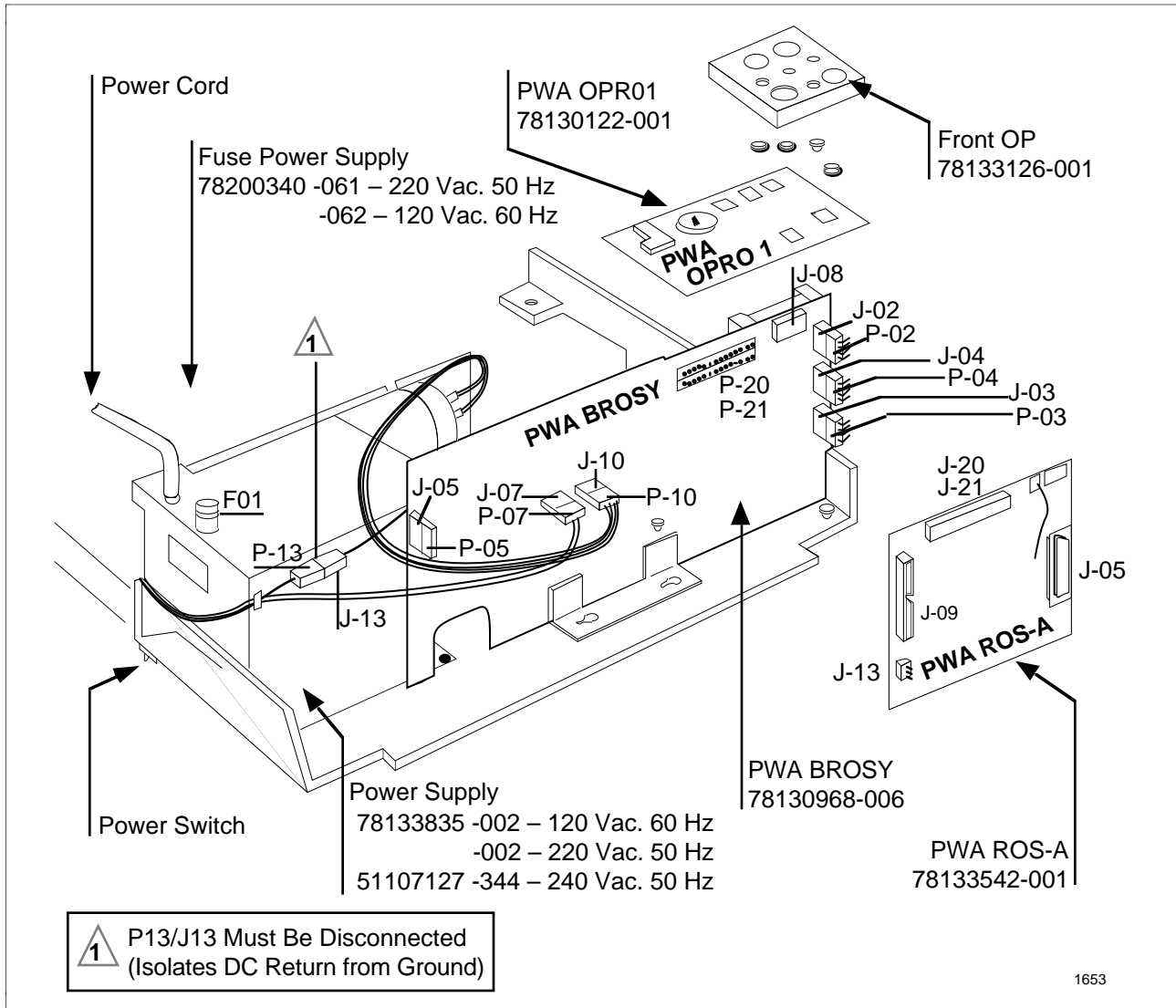
Step	Action
1	Turn off the power switch.
2	Raise top cover by pushing up on the front of the cover.
3	Remove the paper.
4	Before replacing the OPRO1, BROSY, or ROS-A boards, set the configurator switches and jumpers to the same configuration as the removed PWA, see Figures 16-2 through 16-8.

Continued on next page

16.5 Removal/Replacement, Continued

Illustration

Figure 16-2 PWA and Bulk Power Assembly



Continued on next page

16.5 Removal/Replacement, Continued

Illustration

Figure 16-3 Print/Function Selection

Form length selec. (inches)

S13	
0-8"= 3.5	4 = 8.3
0-9"= 1	5 = 11
2 = 5.5	6 = 12
3 = 7	7 = 14

Baud rate selection

S01	S02	S03	BAUD
1	1	0	9600
0	0	1	2400
1	0	1	1800
0	1	1	1200
1	1	1	300

LCR LOC REM LF on CR Vert. SPAC.

S04	S05	S08	S09
1	1	1	1
LCR	Rem.	CR = CR+LF	6LPI
0	0	0	0
NO		CR =	
LCR	Local	CR	8LPI

Print density

S06	S07	CPI
0	0	10
0	1	16.6
1	0	12.5
1	1	10

ON OFF

S 13

S01 S09

S01	S09
S02	S10
S03	S11
S04	S12
S05	
S06	
S07	
S08	

⊙ Position present with rotary switch (A)

S10	S11	S12	CHARACTER SET
ON	ON	ON	INTERNATIONAL
ON	ON	ON	GERMANY
ON	OFF	ON	SWEDEN/FINLAND
ON	OFF	OFF	DENMARK/NORWAY
OFF	ON	ON	SPAIN/MEXICO/ARGENTINA
OFF	ON	OFF	U.K.
OFF	OFF	ON	PORTUGAL/BRAZIL
OFF	OFF	OFF	FRANCE/BELGIUM

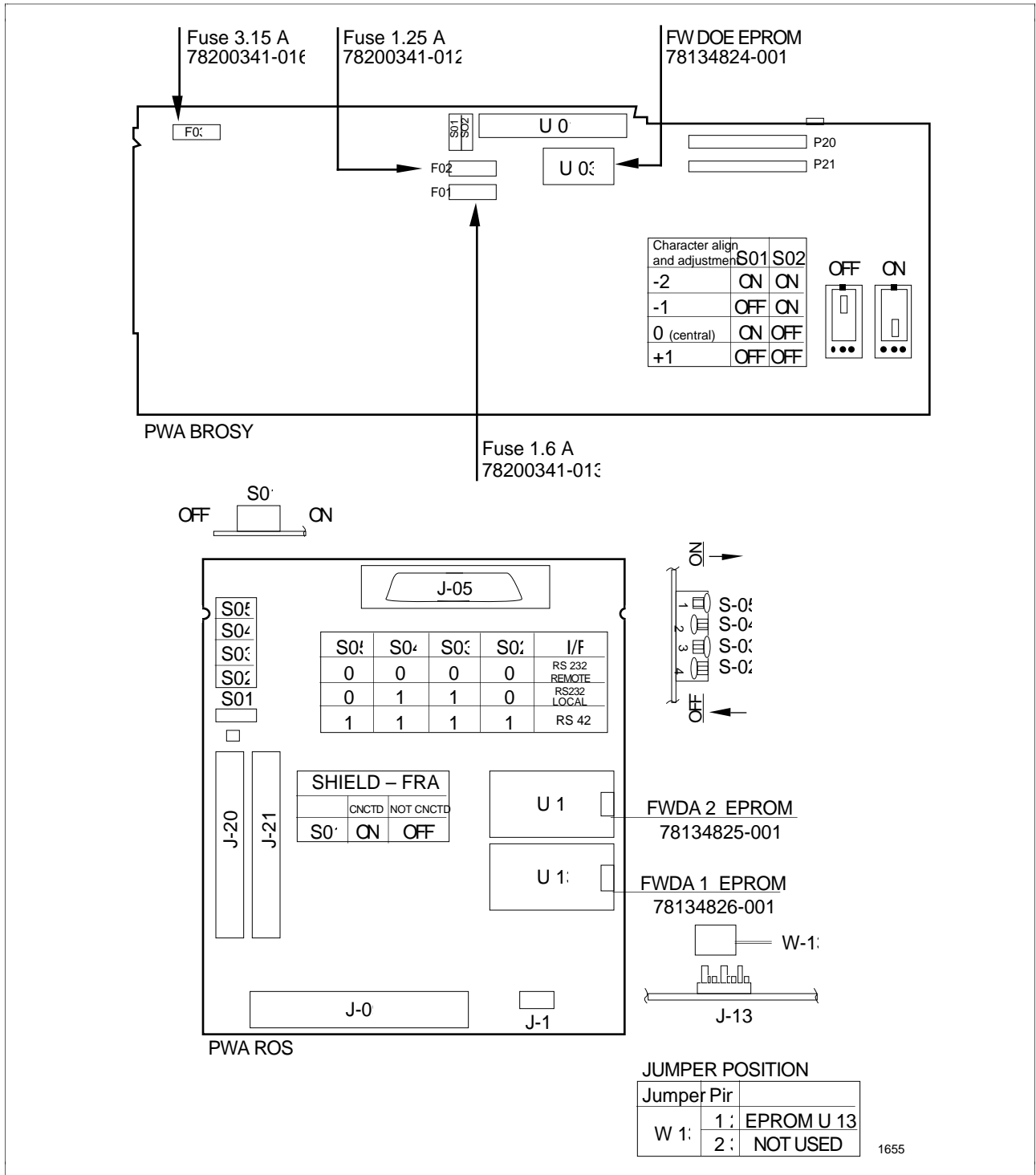
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16.5 Removal/Replacement, Continued

Illustration

Figure 16-4 PWA Pinning Options

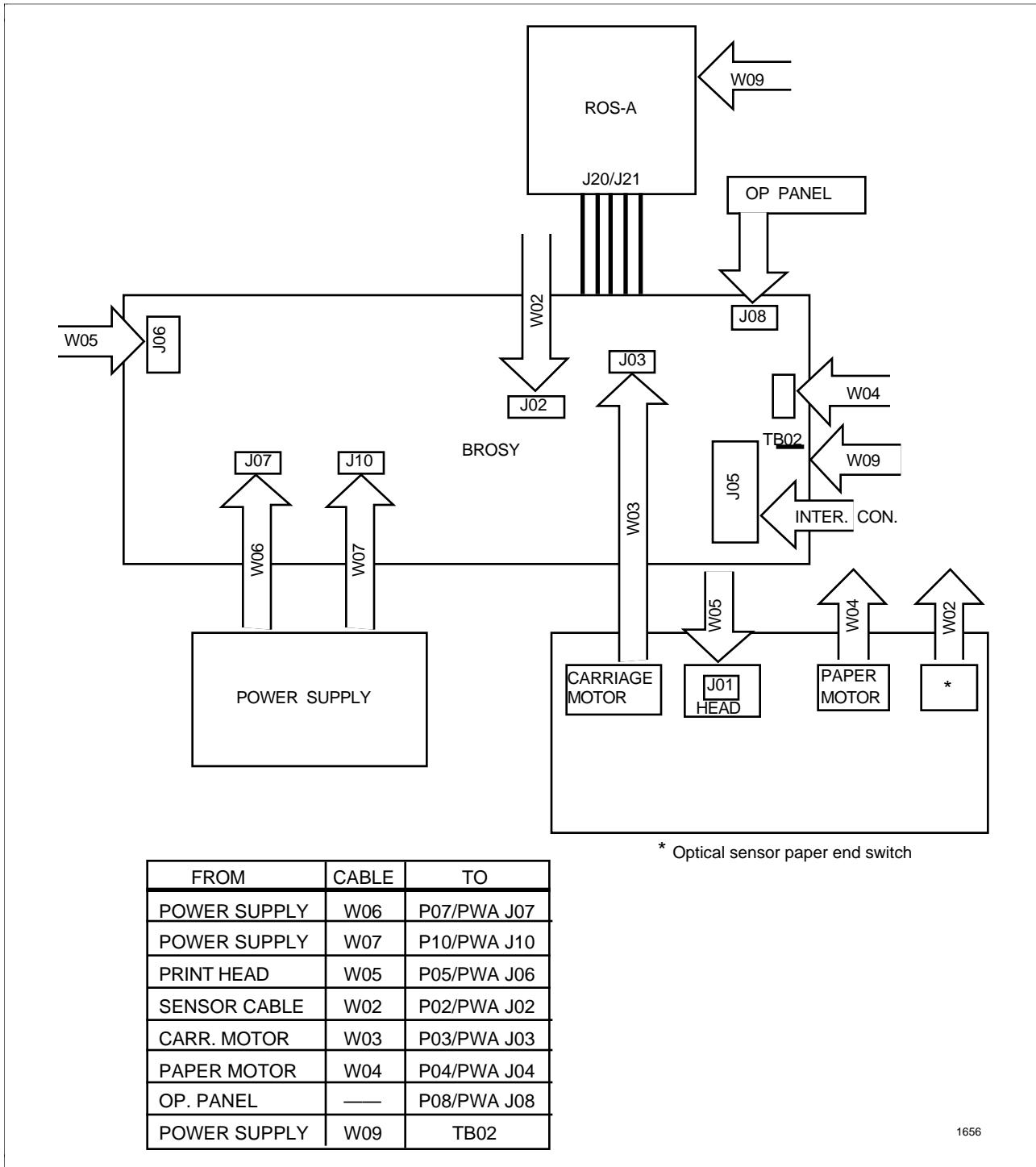


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16.5 Removal/Replacement, Continued

Illustration

Figure 16-5 Printer Intercabling



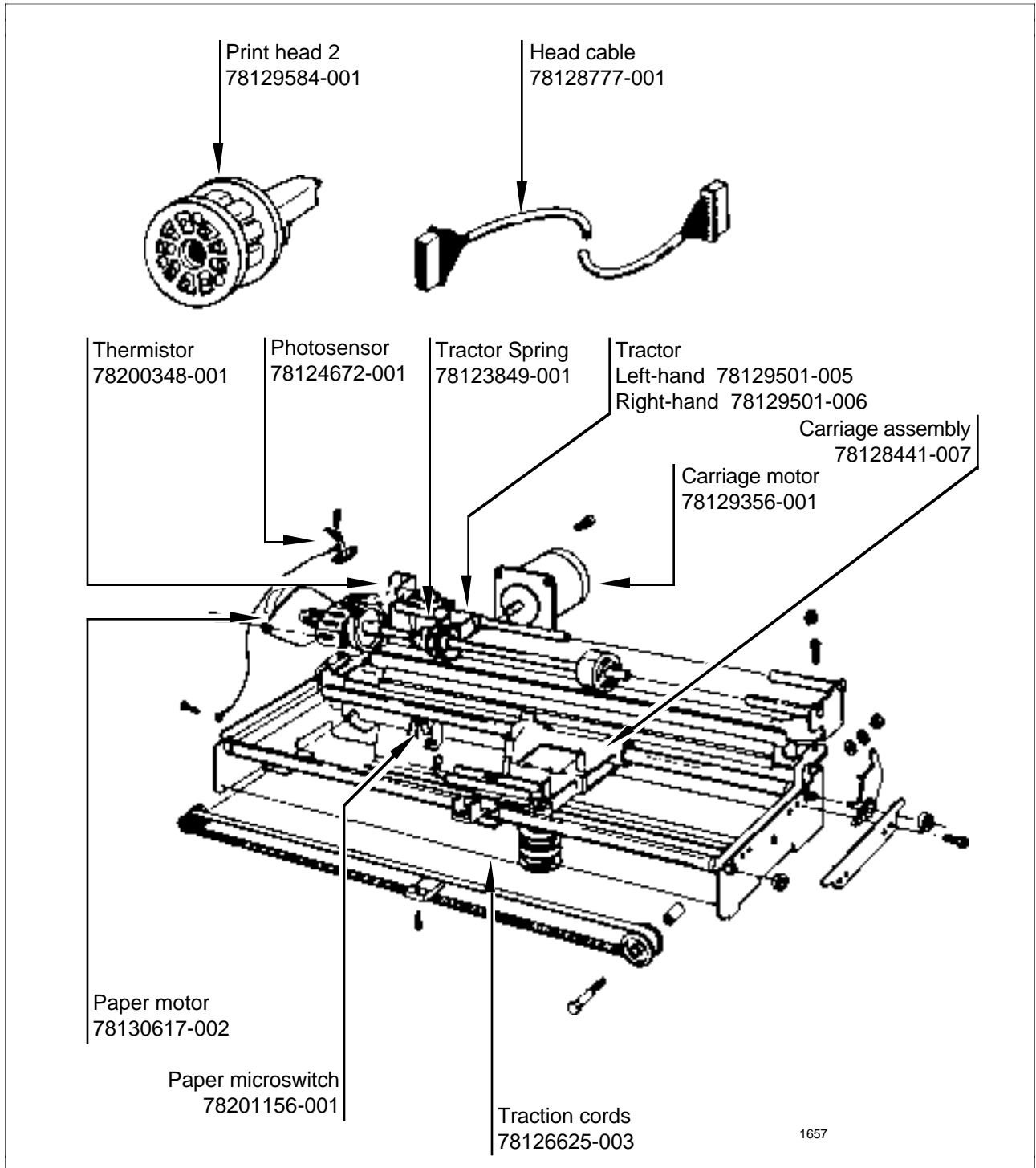
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16.5 Removal/Replacement, Continued

Illustration

Figure 16-6 MIRA Mechanical Assembly

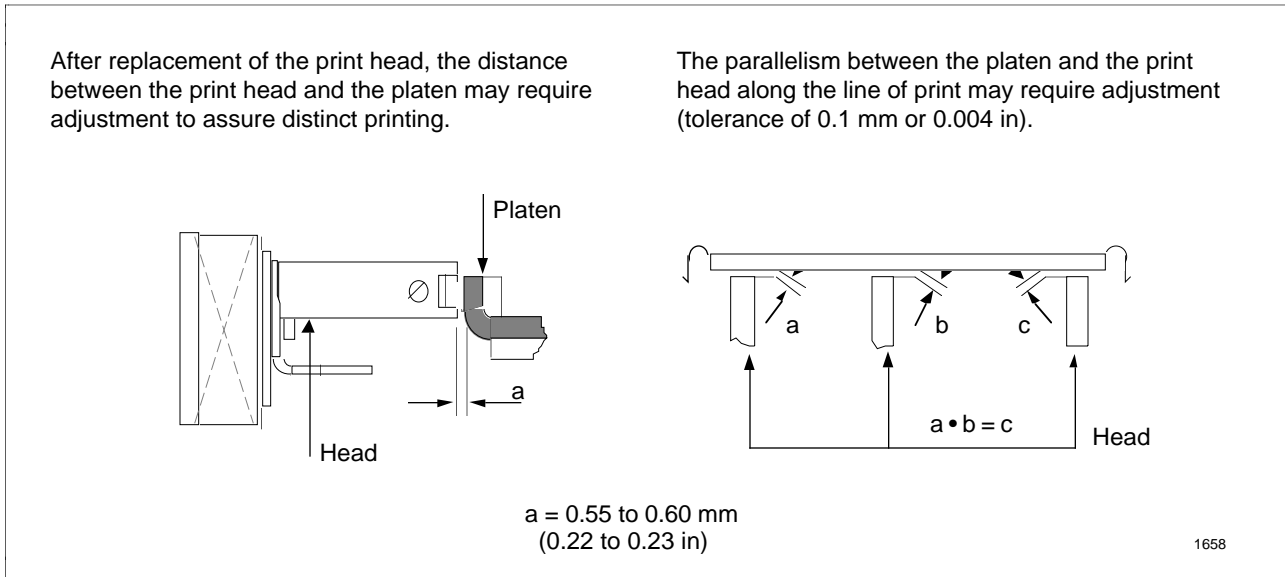


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16.5 Removal/Replacement, Continued

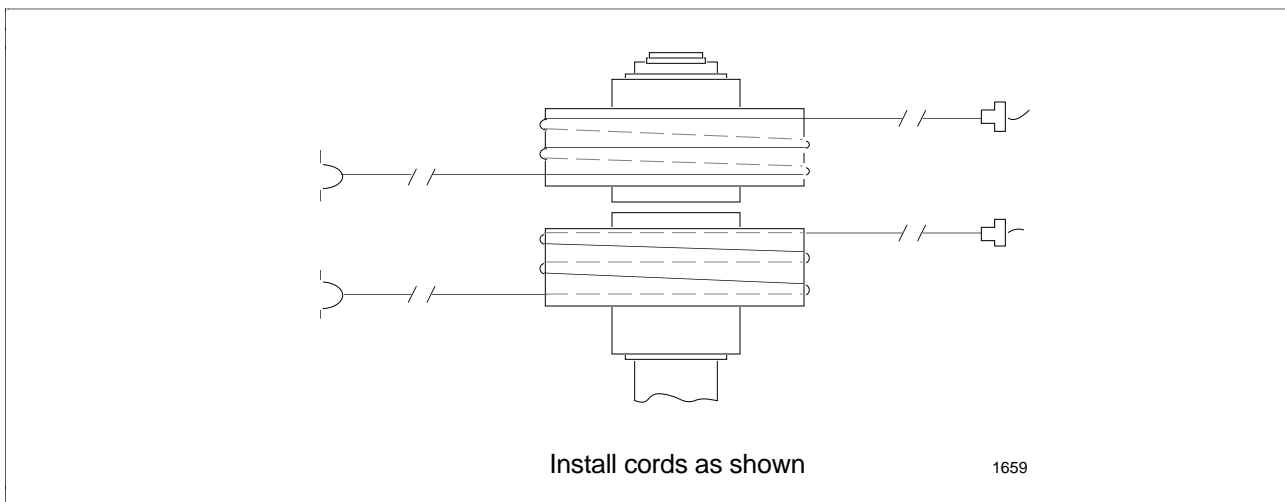
Illustration

Figure 16-7 Print Head Adjustment



Illustration

Figure 16-8 Inked Ribbon Traction Cords Positioning



16.6 Spare Parts

Spare parts list

Table 16-7 Spare Parts

Part Number	Description
* 51048254-400	Printer, 120 Vac, 47-63 Hz.
* 51108254-500	Printer, 220 Vac, 47-63 Hz.
* 51108254-700	Basket, Paper
* 78130968-009	PWA BROS Y
* 78133542-001	PWA ROS-A
* 78130222-001	PWA OPR01
51303631-003	Cable, RS-232 Direct Connect, 3 m (PIC, PDG, or EPDG(P) I/O board)
51303631-004	Cable, RS-232 Direct Connect, 4 m (PIC, PDG, or EPDG(P) I/O board)
51303631-008	Cable, RS-232 Direct Connect, 8 m (PIC, PDG, or EPDG(P) I/O board)
51303631-010	Cable, RS-232 Direct Connect, 10 m (PIC, PDG, or EPDG(P) I/O board)
51303631-015	Cable, RS-232 Direct Connect, 15 m (PIC, PDG, or EPDG(P) I/O board)
51308103-003	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)
51308103-008	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)
51308103-015	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)
78133126-001	Front OP
* 78200340-061	Fuse, Power Supply—220 Vac 50 Hz.
* 78200340-062	Fuse, Power Supply—120 Vac 60 Hz.
* 78200341-013	Fuse, PWA F01 1.6 A
* 78200341-012	Fuse, PWA F02 1.25 A
* 78200341-016	Fuse, PWA F03 3.15 A
78134824-001	FW DOE PROM
78134825-001	FW DA 2 PROM
78134826-001	FW DA 1 PROM

* ORU Level Replacement Item

Continued on next page

16.6 Spare Parts, Continued

Spare parts list,
continued

Table 16-7 Spare Parts, Continued

Part Number	Description
78140531-001	Carriage Assembly
78129356-001	Carriage Motor
78128777-001	Head Cable
78130617-002	Motor, Paper
78201156-001	Microswitch, Paper
78124672-001	Photosensor
* 78133835-002	Power Supply, 120 Vac 60 Hz.
* 78133835-001	Power Supply, 220 Vac 50 Hz.
* 78129584-001	Print Head 2 (NFXT use)
* 78123849-001	Spring, Tractor
78200348-001	Thermistor
78126625-003	Traction Cords
* 78129501-005	Tractor, Left-Hand
* 78129501-006	Tractor, Right-Hand

Section 17 – ASPI-41 Printer

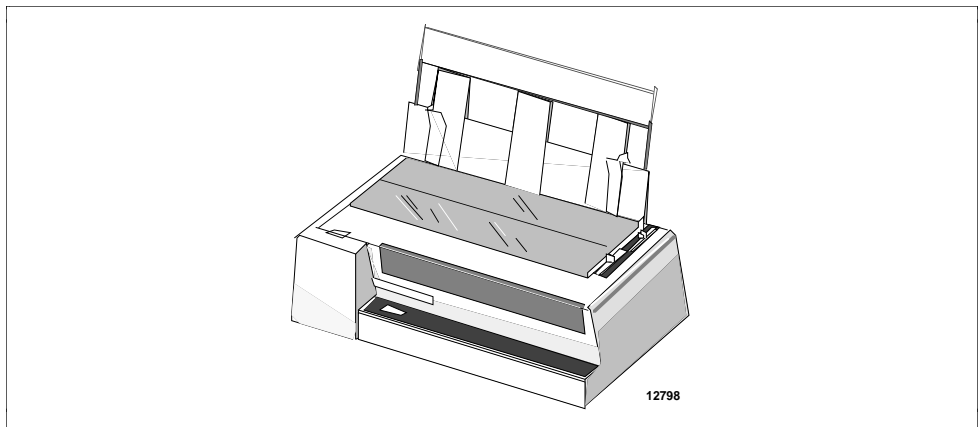
17.1 Overview

Section contents These are the topics covered in this section:

Topic	See Page
SECTION 17 – ASPI-41 PRINTER.....	197
17.1 Overview.....	197
17.2 Cleaning.....	198
17.3 Adjustments.....	198
17.4 Test/Troubleshooting.....	199
17.5 Printer Self-Tests.....	202
17.6 Diagnostic Procedure.....	204
17.7 Printer Removal and Replacement.....	207
17.8 Printer Removal.....	207
17.9 Printer Replacement or Installation.....	208
17.10 Paper Chute Installation.....	209
17.11 Ribbon Removal.....	211
17.12 Installing the Ribbon Cartridge.....	212
17.13 Installing a New Print Head.....	214
17.14 Printer Parts Replacement.....	215
17.15 Cabinet Removal/Replacement.....	216
17.16 Replacement of Main PWA (BAS4X).....	218
17.17 Removal/Replacement of Print Mechanism.....	219
17.18 Replacement of Power Supply PWA (ALI4X).....	221
17.19 Carriage Group Disassembly.....	222
17.20 Motor Group Disassembly.....	224
17.21 Printer Adjustments.....	227
17.22 Carriage Belt Adjustment.....	228
17.23 Paper Belt Tension Adjustment.....	229
17.24 Print Head to Platen Adjustment.....	230
17.25 Startup.....	231
17.26 Spare Parts.....	231

Illustration

Figure 17-1 ASPI-41 Printer



Continued on next page

17.1 Overview, Continued

ASPI-32 replacement The ASPI-32 printer is no longer available from the manufacturer. The ASPI-41 printer is a functional replacement for the ASPI-32 printer.

17.2 Cleaning

Procedure Clean the exterior of the printer, using a soft-bristled brush and vacuum.

Table 17-1 ASPI-41 Printer Cleaning Procedure

Step	Action
1	Turn off the ac power switch located on the rear of the printer, just above the power cord, then unplug the power cord.
2	Lift the top transparent cover from the rear and remove any paper, if present.
3	Vacuum the dirt and dust from inside of the unit. <ul style="list-style-type: none">• Use a brush to loosen dirt accumulations, but take care not to damage or misalign delicate items, such as the print head.
4	Close the cover and wipe the outside clean with a cloth and mild detergent solution.
5	Plug the power cord back into the unit and turn power on, if required.

17.3 Adjustments

Reference There are no adjustments to this printer at the ORU (Optimum Replaceable Unit) level.

A skilled user, however, may choose to replace parts and make adjustments beyond the ORU level. See subsections 17.5 through 17.24 for assistance in removing and replacing those parts and making the necessary adjustments.

17.4 Test/Troubleshooting

General

To help you isolate and correct minor printer problems, the topics covered here include problem solving, the printer self-tests, the built-in printer diagnostic procedure, and the error messages resulting from the diagnostic procedure.

When your printer has a problem, follow the troubleshooting sequence in Table 17-2.

Table 17-2 General Troubleshooting Approach

Step	Action
1	Use the Problem Solving Guide (Table 17-3) to identify and correct problems.
2	Run the printer Self-Test. The instructions are in subsection 17.5.
3	Run the Diagnostic Procedure. The instructions are in subsection 17.6.
4	Call the Honeywell Technical Assistance Center (TAC). <ul style="list-style-type: none">• In the U.S.A. use our toll-free number 1*800-822-7673 (available in the contiguous states except Arizona).• In Arizona dial 313-5558).

Continued on next page

17.4 Test/Troubleshooting, Continued

Problem Solving Use the guide in Table 17-3 to help identify and correct printer problems.

Table 17-3 Problem Solving Guide



Problem	Possible Cause	Solution
POWER indicator does not light.	Power Switch off. Power cable not connected properly.	Turn printer on. Verify that the cable is connected properly to the printer and the ac power outlet.
Printer does not print.	Display window shows WAIT . Interface cable is not properly connected.	Press the ON LINE button to enable printing. Push cable firmly into connectors at both ends, and make sure the screws are secure.
Continuous forms paper is not advancing.	Paper holes are torn. Paper is not correctly aligned on sprocket wheels.	Remove torn paper and replace with the next good sheet. Check tension of paper between left and right sprocket wheels. If too tight, loosen by moving the right tractor slightly to the left. Reload paper, ensuring that the corresponding holes at each side of the paper are correctly aligned on the sprocket wheels.
Print fading.	Ribbon not feeding. Ribbon worn or damaged. Print head too far from paper. Print head is worn or damaged.	Check that ribbon is correctly loaded (see subsection 17.12). Turn ribbon advance knob to ensure that ribbon is not jammed. Replace ribbon (see subsections 17.11 and 17.12). Push paper thickness lever towards the back of the printer to move print head closer to the paper. Run self-test (see subsection 17.5) as a check. Replace print head (see subsection 17.13) and run self-test (see subsection 17.5).

Continued on next page

17.4 Test/Troubleshooting, Continued

Problem solving, continued

Table 17-3 Problem Solving Guide, Continued

Problem	Possible Cause	Solution
Dark, smudgy printing.	Print head too close to paper.	Pull paper thickness lever towards the front of the printer to move print head away from the paper.
Self-test not printed.	ON LINE not pressed while turning the printer on.	Repeat the sequence (see subsection 17.5).
	Carriage fault.	Press ON LINE and repeat the sequence (see subsection 17.5).
Display window shows JAM.	Paper jammed or torn.	Check paper. If it is jammed or torn, try to move paper forwards or backwards using the  or  keys. Otherwise, try to extract the paper manually. Note: Clear JAM indicator by turning power off, then on.
The display shows FLT.	A carriage synchronization error has occurred.	Turn the printer off and then on.
	The font cartridge has not been inserted or removed correctly.	Check cartridge. Turn the printer off and then on.
Single sheet is not loaded correctly.	You have not inserted the single sheet correctly.	Insert single sheet well into the front paper entry slot, making sure that it reaches the platen. The sheet must be pushed a little further in after P.E. disappears from the display.

17.5 Printer Self-Tests

Preparation

After installing the printer (see subsection 17.9), test its operation by using the self-test procedure in Table 17-4. Before beginning the self-test, verify that:

- The paper and ribbon cartridge are inserted correctly.
- The power cable is connected and the power switch (right rear) is off.
- The printer cover is closed.

Self-test procedure

Table 17-4 ASPI-41 Self-Test Procedure

Step	Action
1	Press and hold the ON LINE button while powering the printer on. <ul style="list-style-type: none">• The display window shows TEST, and a pattern is printed on the loaded paper as shown in Figure 17-1. The printer continues to print until you press the ON LINE button.• The self-test also ends if the printer runs out of paper and the window shows P.E.
2	The display window shows WAIT . <ul style="list-style-type: none">• You can run self-test with the interface cable disconnected. If the interface cable is not connected to an operating host, the printer will show OFFD rather than WAIT when stopped.

ATTENTION

ATTENTION—The self-test pattern can be printed in Quality print by pressing the **QUALITY** button.

You can also select different character fonts for self-test by inserting optional font cartridges and pressing **FONT**.

Continued on next page

17.5 Printer Self-Tests, Continued

Illustration

Figure 17-2 ASPI-41 Self-Test Print Pattern

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥
BCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥
CDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|
DEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§
EFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"
FGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©
GHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª
HIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«
IJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬
JKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®
LMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®¯
MNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±
NOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²
OPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³´
QRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³´µ
STUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³´µ¶
TUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³´µ¶"
UVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³´µ¶"´
VWXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³´µ¶"´¹
WXYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³´µ¶"´¹º
XYZ[\]^_`abcdefghijklmnopqrstuvwxy{|}~ ;ç£α¥|§"©ª«¬–®°±²³´µ¶"´¹º»
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17.6 Diagnostic Procedure

Scope

This diagnostic procedure helps identify printer problems so that when a unit fails, you know for certain it is the printer at fault and not some other part of the subsystem.



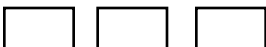


The diagnostic procedure checks the control panel indicators, the display window, and internal printer functions, then prints out its hardware and firmware configuration. At the end of the diagnostic, it either displays **?END** or an error number if an error is found.

Before starting, verify that:

- The printer power is turned off.
- The printer's top and rear covers are closed.
- Paper is loaded.
- The LCN-based system is not sending data.

Procedure

Table 17-5 Failure Diagnostic

Step	Action
1	Press the  button while turning on the power to the printer. The indicators on the control panel light up.
2	<p>The display window shows, in a sequence of a to e, the following patterns to check its display capability. As each pattern is displayed, the printer "beeps." Verify that the display window shows:</p> <p style="margin-left: 40px;">a. </p> <p style="margin-left: 40px;">b. * </p> <p style="margin-left: 40px;">c. * * </p> <p style="margin-left: 40px;">d. * * * </p> <p style="margin-left: 40px;">e. * * * *</p> <p>After displaying the above sequence, the diagnostic procedure automatically enters test execution.</p>

Continued on next page

17.6 Diagnostic Procedure, Continued

Procedure,
continued

Table 17-5 Failure Diagnostic, Continued

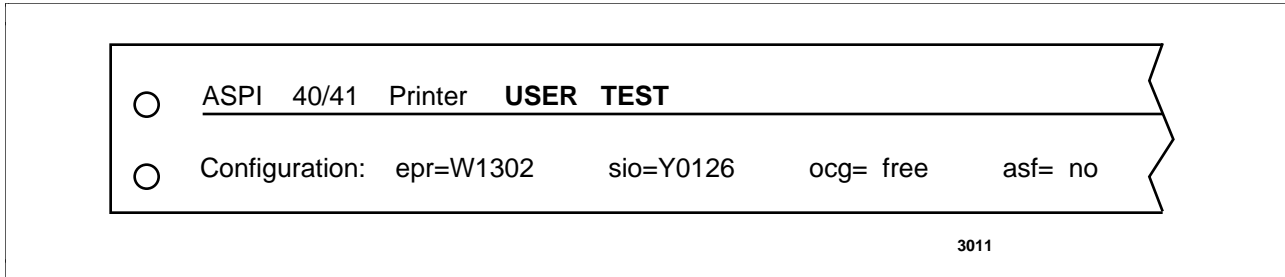
Step	Action
3	The display window shows T&Dx , where x is an alphanumeric number in sequence as the test continues. Some of the T&D tests may take several seconds while some are finished in an instant.
4	<p>When the display window shows T&DG, the printer prints configuration information similar to that shown on Figure 17-3.</p> <p>The configuration information is:</p> <ul style="list-style-type: none"> • epr Indicates firmware release • sio Indicates serial interface • ocg Indicates if the font cartridge is present • asf Indicates if the automatic sheet feeder has been connected to the printer <p>See Figure 17-3.</p>
5	<p>The display reports it is an ASPI-41 by flashing A 41, then the test terminates by either:</p> <ul style="list-style-type: none"> • Flashing ?END for 5 seconds, or • Displaying an error message in the format ORUx where x is the error number. The printer will also "beep" three times and the indicators will blink. Table 17-6 lists the possible error messages.
6	<p>After displaying ?END for 5 seconds, the printer is ready to print.</p> <p>If you press the PROG button while either ?END or the error message is displayed, the diagnostic procedure will be repeated. It can be stopped by pressing PROG within 5 seconds of the subsequent ?END display.</p>

Continued on next page

17.6 Diagnostic Procedure, Continued

Illustration

Figure 17-3 Printer User Diagnostic Test Message



Error messages

Table 17-6 Diagnostic Procedure Error Messages

Error Number (X)	Description
ORU0	General fault
ORU1	Fault on main board
ORU2	Fault on interface board
ORU3	Fault on chip U03 (interface board)
ORU4	(Reserved for future use)
ORU5	Fault on operator panel
ORU6	Character generator fault
ORU7	Paper load lever fault

17.7 Printer Removal and Replacement

Scope

The printer is the Optimal Replaceable Unit (ORU). Replacement parts for a lower level of replacement are currently (1993) available by factory order.

17.8 Printer Removal

Procedure

Table 17-7 Printer Removal Procedure

Step	Action
1	Turn off the ac power switch located on the rear of the printer, just above the power cord.
2	Disconnect the power cord.
3	Disconnect the data cable from the left rear of the printer.

17.9 Printer Replacement or Installation

ATTENTION

ATTENTION—Check that the line voltage is the same as the voltage requirement displayed on the back of the printer. If the line voltage does not match the printer voltage, do not use the printer; instead, seek advice from your supplier.

Procedure

Table 17-8 Printer Installation Procedure

Step	Action
1	Make sure that the power switch on the back of the printer is in the off position (0), then insert the power cable plug into the socket on the back of the printer.
2	Insert the other end of the power cable in a convenient outlet.
3	Remove the following: <ul style="list-style-type: none">• Transparent cover as shown in Figure 17-5, illustration 1• Shipping ties or blocks in the printer If not already installed, install a ribbon cartridge as covered in subsection 17.12.
4	If your printer was shipped from the factory, the paper chute was packed separately in the carton. See subsection 17.10 for the procedure for attaching the chute.
5	If not already installed, install a ribbon cartridge as covered in subsection 17.12.
6	Connect one end of the 25-pin interface cable firmly to the printer I/O interface (PIC I/O, PDG I/O EPDG I/O, or TPDG I/O) in the US module by which the printer is to be driven.
7	Connect the other end of the cable to the socket at the rear of the printer. Tighten all screws on the cable ends to ensure the cable will remain in place.
8	To power the printer on, press the part of the power switch marked 1 on the back of the printer. Note that the print head moves and stops near the left side of the printer.

17.10 Paper Chute Installation

Procedure

When the printer was packed for shipment, the paper chute was placed separately in the carton. To install it correctly, stand in front of the printer holding the chute in the position shown in Figure 17-4, illustration 4.

Numbers on illustrations in Figure 17-4 refer to the steps that follow.

Table 17-9 Paper Chute Installation Procedure

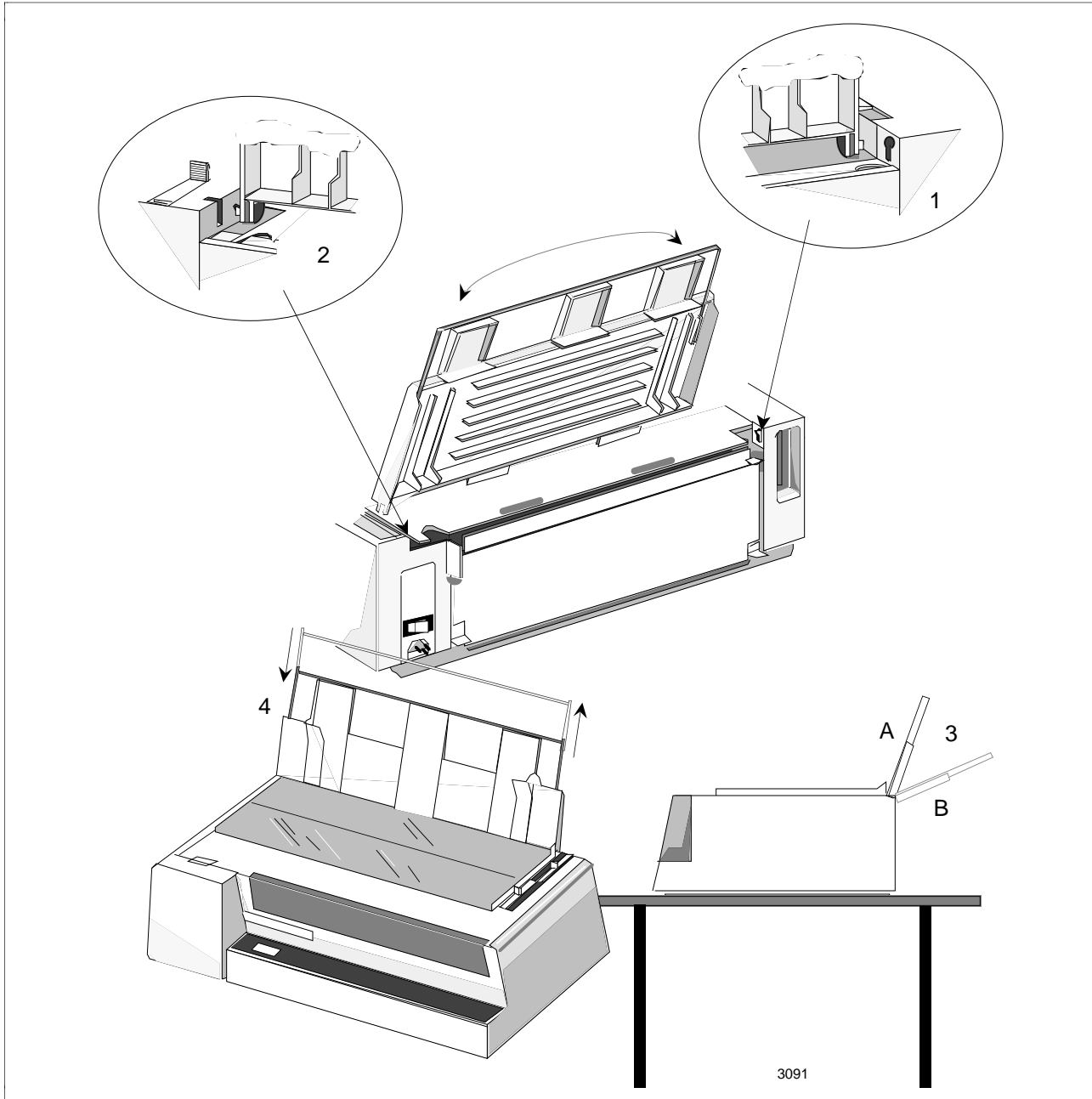
Step	Action
1	Insert the hook on the left side of the chute into the hole near the paper entry slot.
2	Bend the chute towards the front of the printer and insert the hook on the right side into the corresponding hole in the printer cabinet.
3	The paper chute assumes two positions depending upon the type of paper used: <ul style="list-style-type: none">• Raised (A position) for single sheet use.• Lowered (B position) for continuous forms paper (common usage).
4	Positioning the chute: <ul style="list-style-type: none">• To position the chute up, hold the chute with a hand on either side and place it in the A position.• To position the chute down, use both hands on either side of the chute to lift it up, then lower it gently until it stops in the B position.• Now gently, but firmly push it toward the printer body and note the chute moves about a centimeter and locks.

Continued on next page

17.10 Paper Chute Installation, Continued

Illustration

Figure 17-4 Paper Chute Installation



17.11 Ribbon Removal

ATTENTION

ATTENTION—The ribbon cartridge can be removed and replaced either with the printer on (the display window showing **P.E.** or **WAIT**) or with the printer off.

CAUTION

CAUTION—If power is turned off with data in the input buffer, the data will be lost.

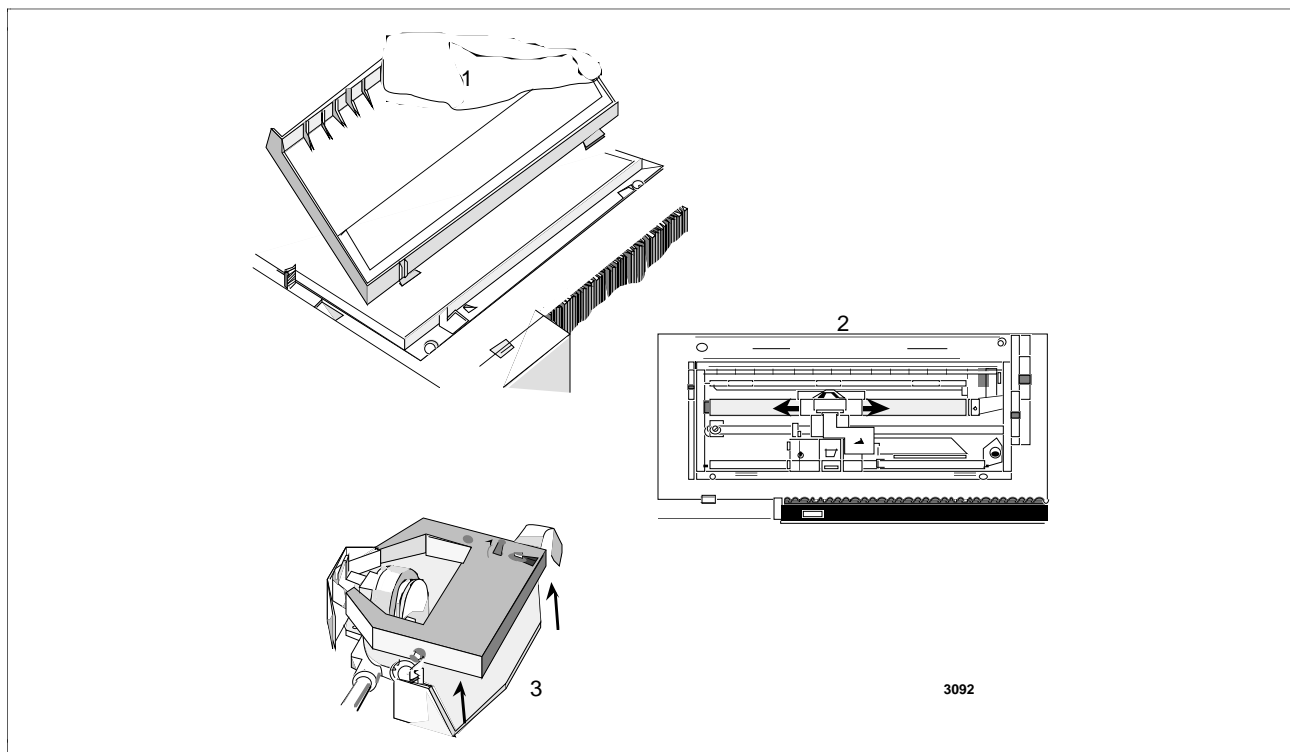
Procedure

Numbers on illustrations in Figure 17-5 refer to the steps that follow.

Table 17-10 Ribbon Removal Procedure

Step	Action
1	Remove the printer cover.
2	Move the printer carriage to the center of the printer. DO NOT perform this step if the printer is on.
3	Grasp the cartridge firmly by its sides and lift the ribbon cartridge straight up until the side clips release it.
4	Now you are ready to insert a new ribbon cartridge by continuing with subsection 17.12.

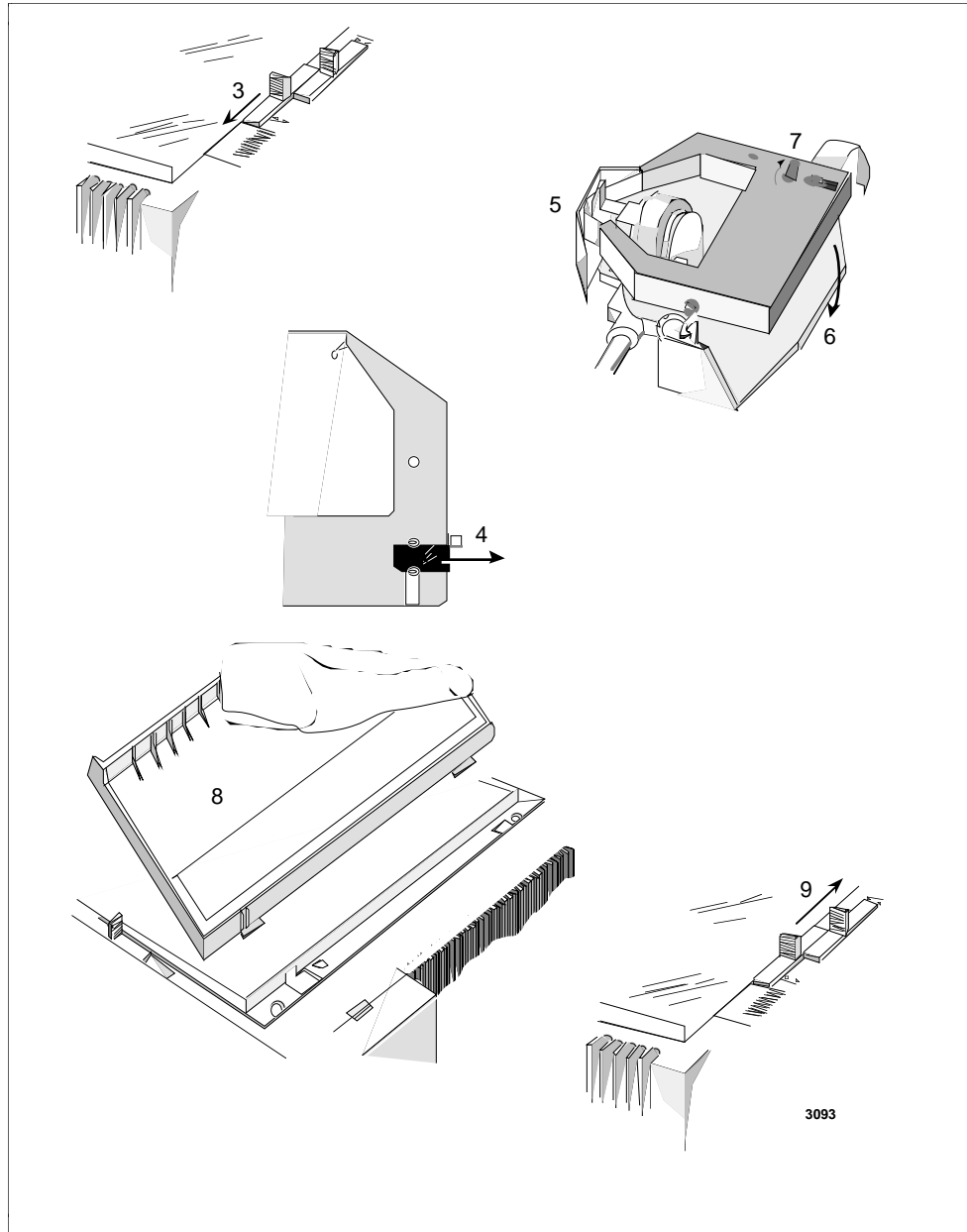
Figure 17-5 Ribbon Removal



17.12 Installing the Ribbon Cartridge

Illustration

Figure 17-6 Ribbon Installation



Continued on next page

17.12 Installing the Ribbon Cartridge, Continued

Procedure

Numbers on illustrations in Figures 17-5 and 17-6 refer to the steps that follow.

Table 17-11 Ribbon Installation Procedure

Step	Action
1	Remove the printer cover (Figure 17-5, step 1).
2	Move the printer carriage to the center (Figure 17-5, step 2).
3	Pull the paper thickness lever towards the front of the printer to facilitate ribbon insertion.
4	Remove the new ribbon cartridge from its bag. Remove and discard the holdfast that blocks the ribbon.
5	Insert the ribbon between the print head and the print head mask. Lay the cartridge over the printer carriage. Make sure the two pins on each side of the cartridge are positioned over the white retaining clips of the printer carriage.
6	Push the cartridge gently down while turning the tension knob. Make sure that the cartridge clips into place.
7	To tighten the ribbon, turn the tension knob in the direction shown by the arrow on the ribbon cartridge.
8	Replace the printer cover.
9	Move the paper thickness lever towards the back of the printer and adjust it to obtain the best quality printing.
10	Check the quality of print with the self-test procedure in subsection 17.5. If the pattern does not satisfy your expectations, adjust the paper thickness lever accordingly.

17.13 Installing a New Print Head

Procedure

Table 17-12 Print Head Installation Procedure

Step	Action
1	Turn the power switch off and remove the power cord. Remove the ribbon cartridge per subsection 17.11. Make sure the print head is not too hot to touch. Do not replace the printer cover.
2	Disconnect the color connector (the smallest one, vertically oriented) from the print head and unscrew the two screws on the print head. Lift the print head. Remove the stirrup that secures the other (horizontal) connector, then unplug and discard the used print head.
3	Install a new print head by performing the above steps in reverse order. Replace the printer cover.

Self-test

Run the self-test (subsection 17.5) to verify that the new print head is properly installed.

17.14 Printer Parts Replacement

Scope

A skilled user can replace other parts in the printer beyond the ORU level (see the Spare Parts subsection 17.26). Use this subsection as a guide in removing and replacing those parts.

The printer is composed of the following basic assemblies:

- The cabinet
 - A print head
 - The printer mechanism composed of the mechanism group and the carriage group
 - The main board BAS4X PWA
 - The power supply and line filter (ALI4X PWA)
 - An operator panel
-

17.15 Cabinet Removal/Replacement

Scope

The cabinet must be removed to access the main PWA (BAS4X) and you must remove the print mechanism to access the power supply PWA (ALI4X).

Procedure

Numbers in parentheses refer to parts shown in Figure 17-7.

Table 17-13 Cabinet Removal Procedure

Step	Action
1	Unplug the power cable and disconnect the interface cable.
2	Open the font cartridge cover (7) by pulling its top forward.
3	Remove the interface board cover (10) by pulling up on its front latch and sliding the cover to the rear.
4	Release the interface board by pulling out on the locking knob at the rear of the board.
5	The board can now be unplugged and removed.
6	Remove the paper chute (1) and the transparent cover (4).
7	Remove drive selection (2), paper thickness (3) and paper bail (8) knobs by pulling them straight up.
8	Lift off the panel caps (11, 12).
9	Unscrew four screws (13) holding the corners of the cabinet (5) and one screw (14) near the operators panel.
10	Remove font cartridges (6), if provided.
11	Close the font cartridge cover (7).
12	Unlatch the rear cover (9) by pulling out on both lower corners, then lift the cabinet straight up off its base.

Replacement procedure

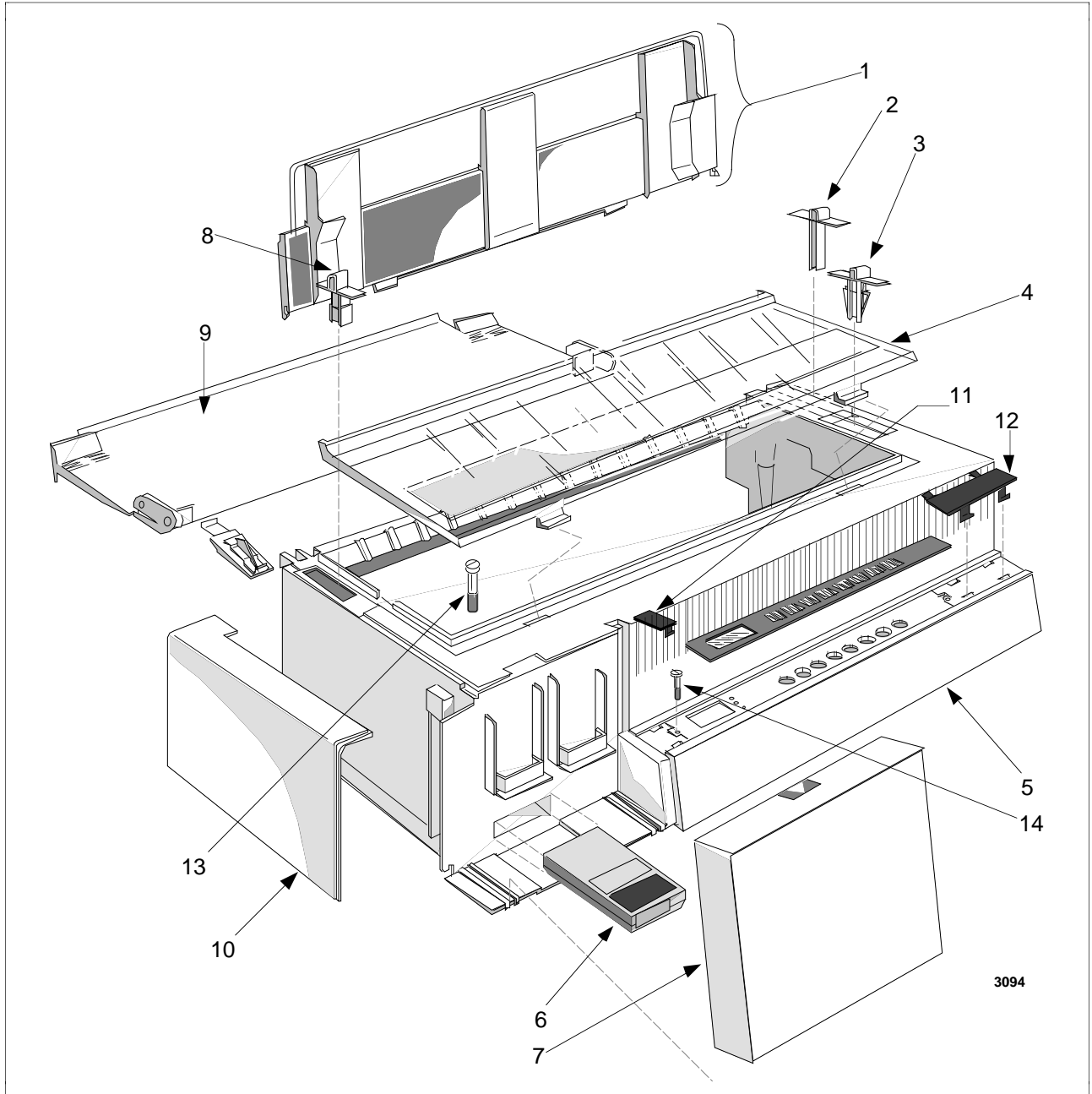
To replace the cabinet, reverse the above procedure.

Continued on next page

17.15 Cabinet Removal/Replacement, Continued

Illustration

Figure 17-7 Printer Cabinet—Exploded View



17.16 Replacement of Main PWA (BAS4X)

Scope

The printer cabinet must be removed before you can gain access to the main PWA board. Remove the cabinet (see subsection 17.15) before proceeding.

Numbers on illustrations in Figure 17-8 refer to the steps that follow.

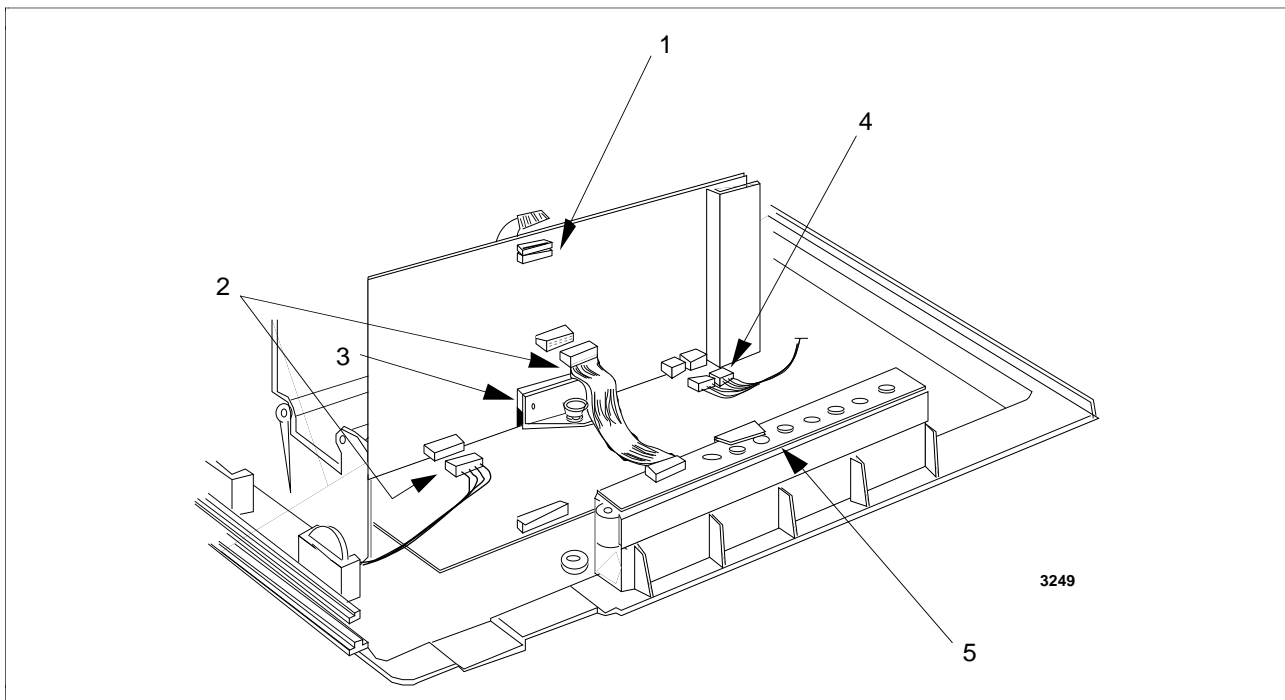
Table 17-14 PWA (BAS4X) Replacement Procedure

Step	Action
1	Using a screwdriver, release the cable to the print head. Carefully remove the cable.
2	Disconnect the operators panel cable and the sensors cable.
3	Release the board from the printer base by pulling up on the locking knob at the base of the board.
4	Disconnect the motor connectors P05 and P06.
5	The operators panel is now loose. Use care to position it properly during reassembly.

Reassembly procedure Reverse the above procedure to reassemble the printer.

Illustration

Figure 17-8 Replacement of Main PWA (BAS4X)



17.17 Removal/Replacement of Print Mechanism

Scope

The print mechanism must be removed to gain access to the power supply PWA.

Procedure

Numbers on illustrations in Figure 17-9 refer to the steps that follow.

Table 17-15 Print Mechanism Replacement Procedure

Step	Action
1	Slip off the ground connector.
2	Unscrew and remove the line filter cover.
3	Remove the screws that secure the mechanism to the printer base.
4	Lift the mechanism straight up and off the base.

Replacement procedure

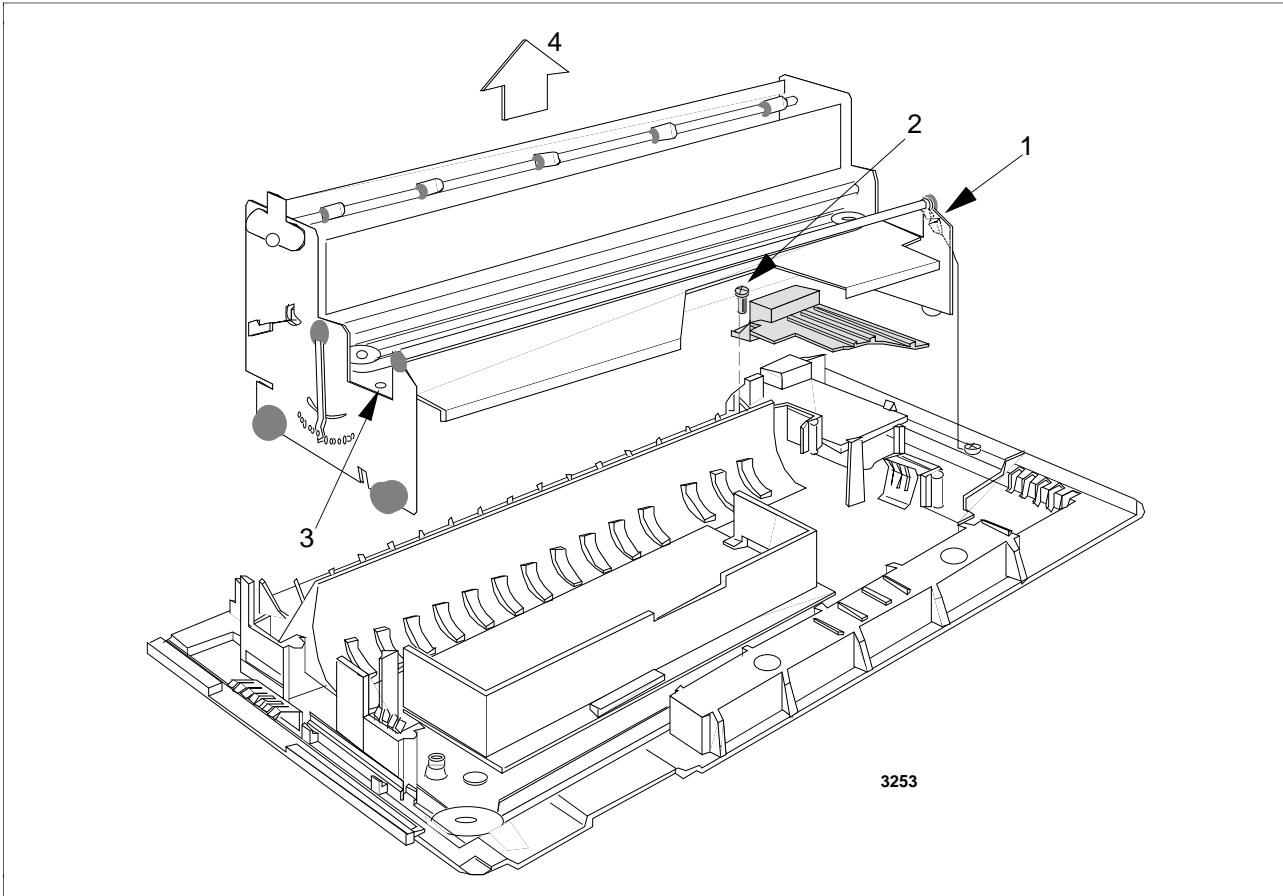
To replace the printer mechanism, reverse the above procedure.

Continued on next page

17.17 Removal/Replacement of Print Mechanism, Continued

Illustration

Figure 17-9 Removal/Replacement of Print mechanism



17.18 Replacement of Power Supply PWA (ALI4X)

Scope

The print mechanism must be removed before you can gain access to the power supply PWA. Remove the print mechanism (see subsection 17.17) before proceeding.

Procedure

Numbers on illustrations in Figure 17-10 refer to the steps that follow.

Table 17-16 Power Supply (ALI4X) Replacement

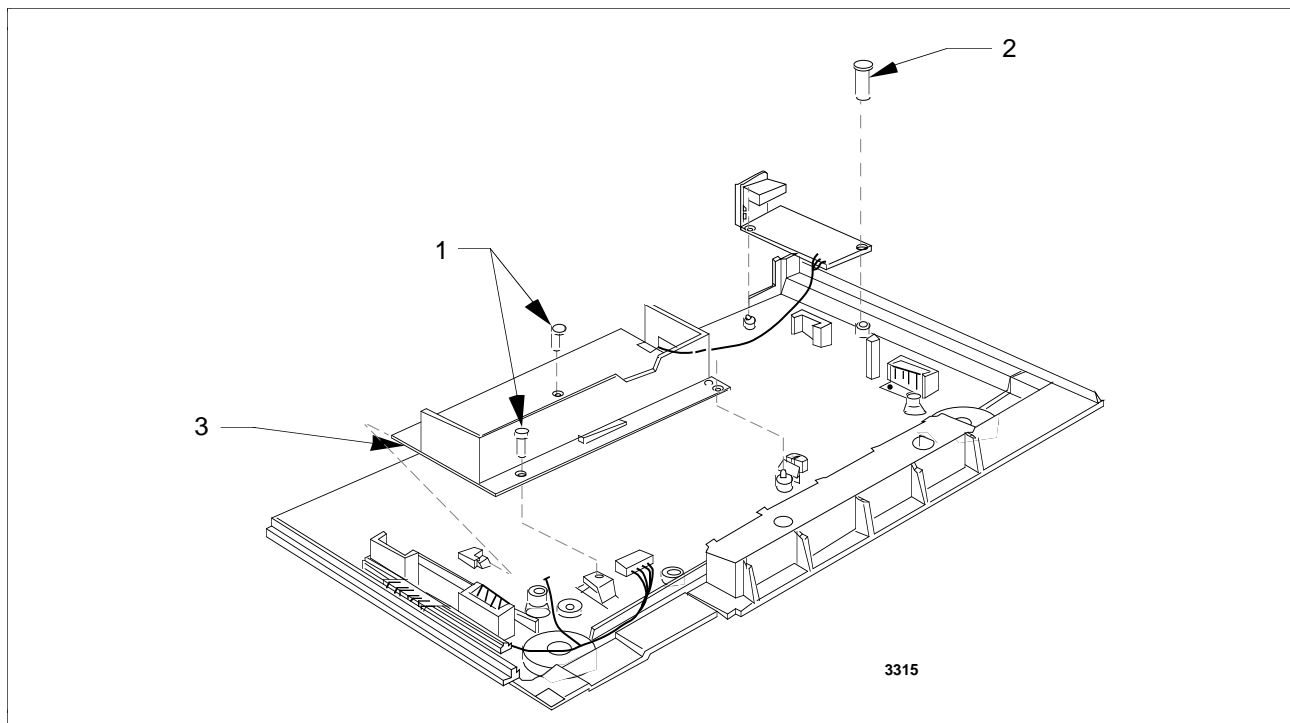
Step	Action
1	Remove three screws holding the power supply board.
2	Remove two screws holding the line filter assembly.
3	Release the power supply board from pins and catches in the printer base as shown in Figure 17-10.
4	Remove the power supply and line filter boards together.

Replacement procedure

To replace the power supply and line filter boards, reverse the above procedure.

Illustration

Figure 17-10 Replacement of Power Supply PWA (ALI4X)



17.19 Carriage Group Disassembly

Procedure

Numbers on illustrations in Figure 17-11 refer to the steps that follow.

Table 17-17 Carriage Group Disassembly Procedure

Left Side Procedure	
Step	Action
1	Remove screws from the front and rear drive bars.
2	Unscrew and remove the inner copy lever.
3	Remove the front bar lockwasher.
4	Unscrew and remove the carriage belt idle gear.
Right Side Procedure	
5	Remove screws from the front and rear drive bars.
6	Remove the front bar lockwasher.
7	Remove the ribbon take-up tension spring.
8	Remove the carriage belt.
9	Remove the print head cable clamp.

The carriage group and drive bars are now free to be removed together.

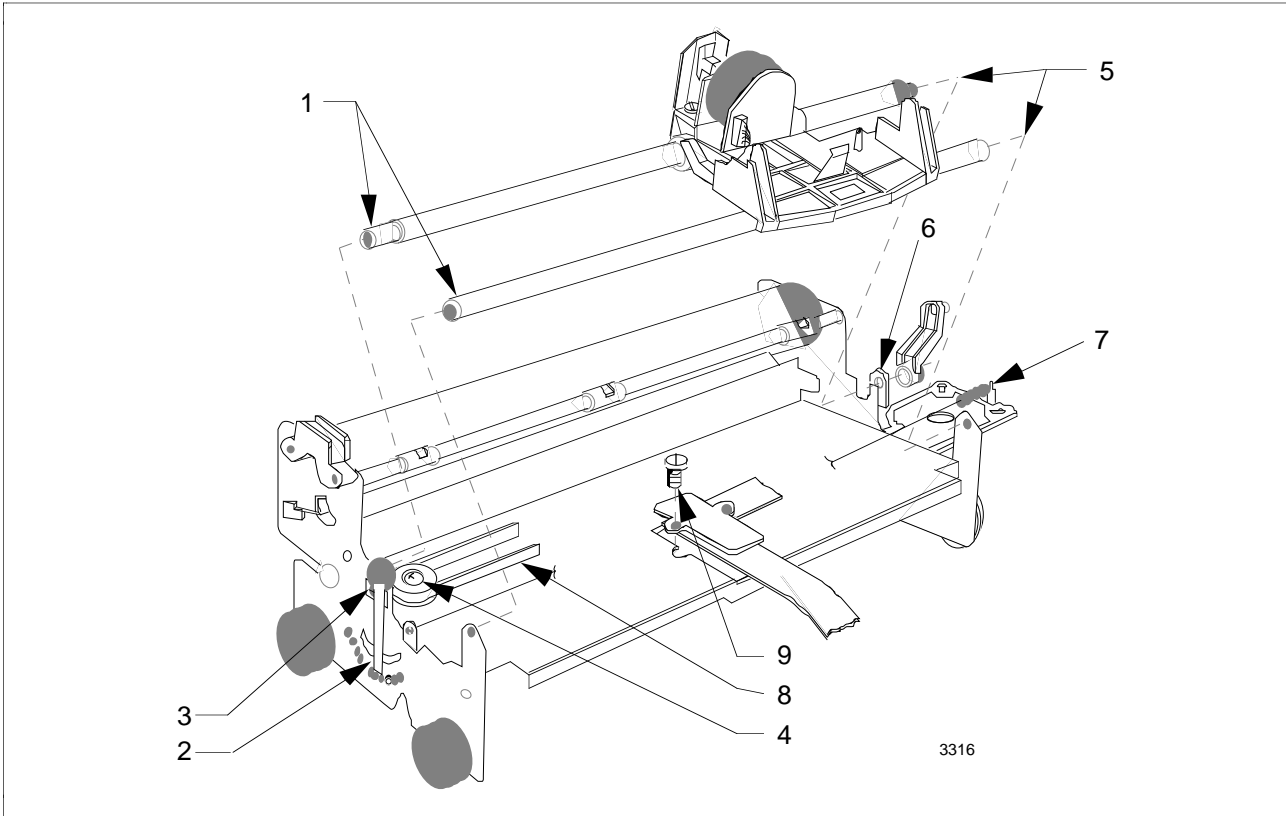
To replace the carriage group and drive bars, reverse the above procedure.

Continued on next page

17.19 Carriage Group Disassembly, Continued

Illustration

Figure 17-11 Carriage Group Disassembly



17.20 Motor Group Disassembly

Scope

There are three motors in the printer. First, consider removing the paper motor and carriage motor. Numbers on illustrations in Figure 17-12 refer to the following steps in Table 17-18 and 17-19.

Secondly, consider removing the color motor. Numbers on illustrations in Figure 17-13 refer to the following steps in Table 17-20.

Procedure

Table 17-18 Paper Motor Removal Procedure

Step	Action
1	Remove the screws holding the motor and remove it as shown in Figure 17-12.

Table 17-19 Carriage Motor Removal Procedure

Step	Action
2	Unscrew and remove the carriage belt idle gear.
3	Remove the carriage belt.
4	Remove the screws holding the motor and remove it as shown in Figure 17-12.

Replacement procedure

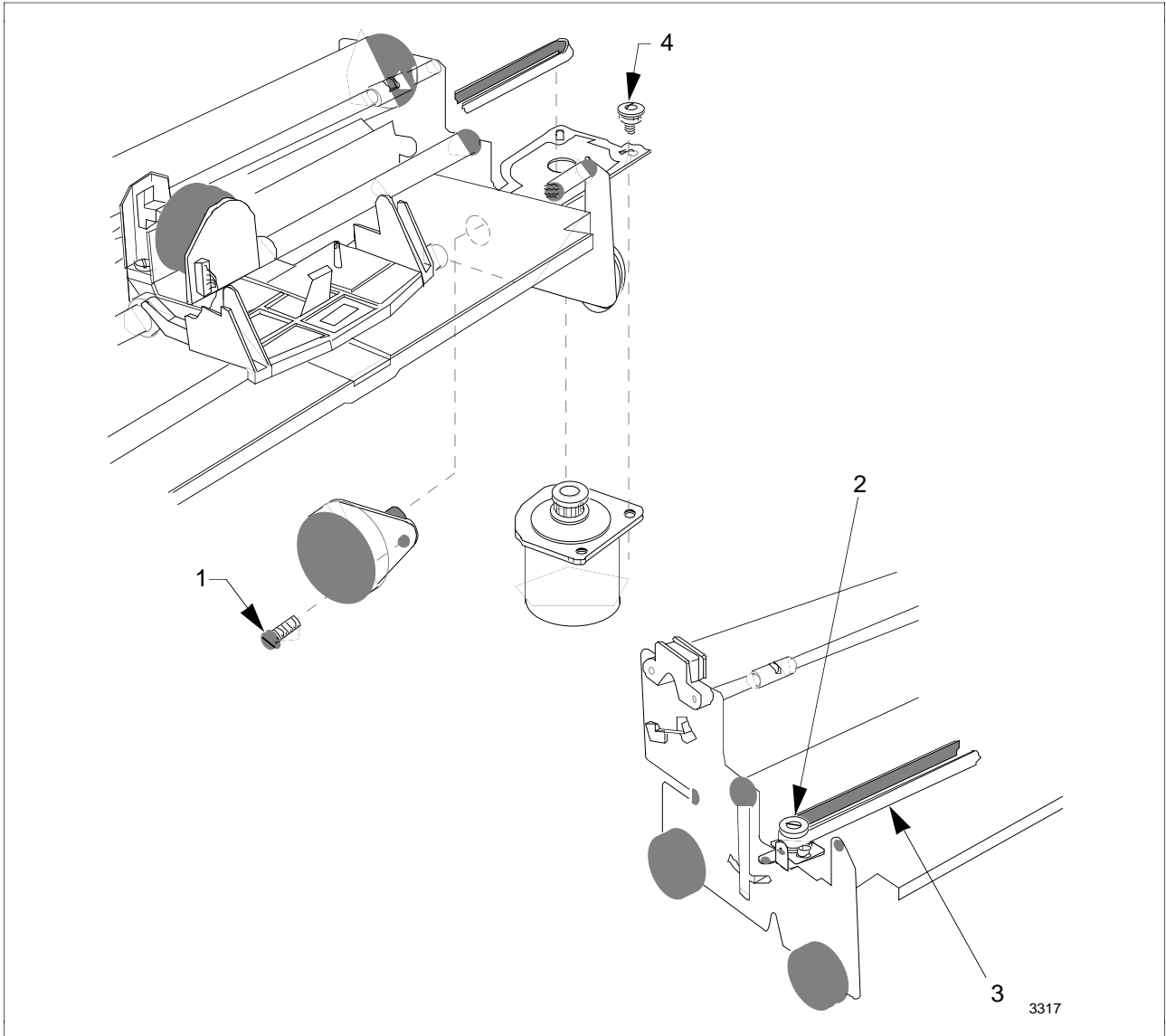
To replace the motors, reverse the above procedure.

Continued on next page

17.20 Motor Group Disassembly, Continued

Illustration

Figure 17-12 Removal of Paper Motor and Carriage Motor



Continued on next page

17.20 Motor Group Disassembly, Continued

Procedure

Table 17-20 Color Motor Replacement Procedure

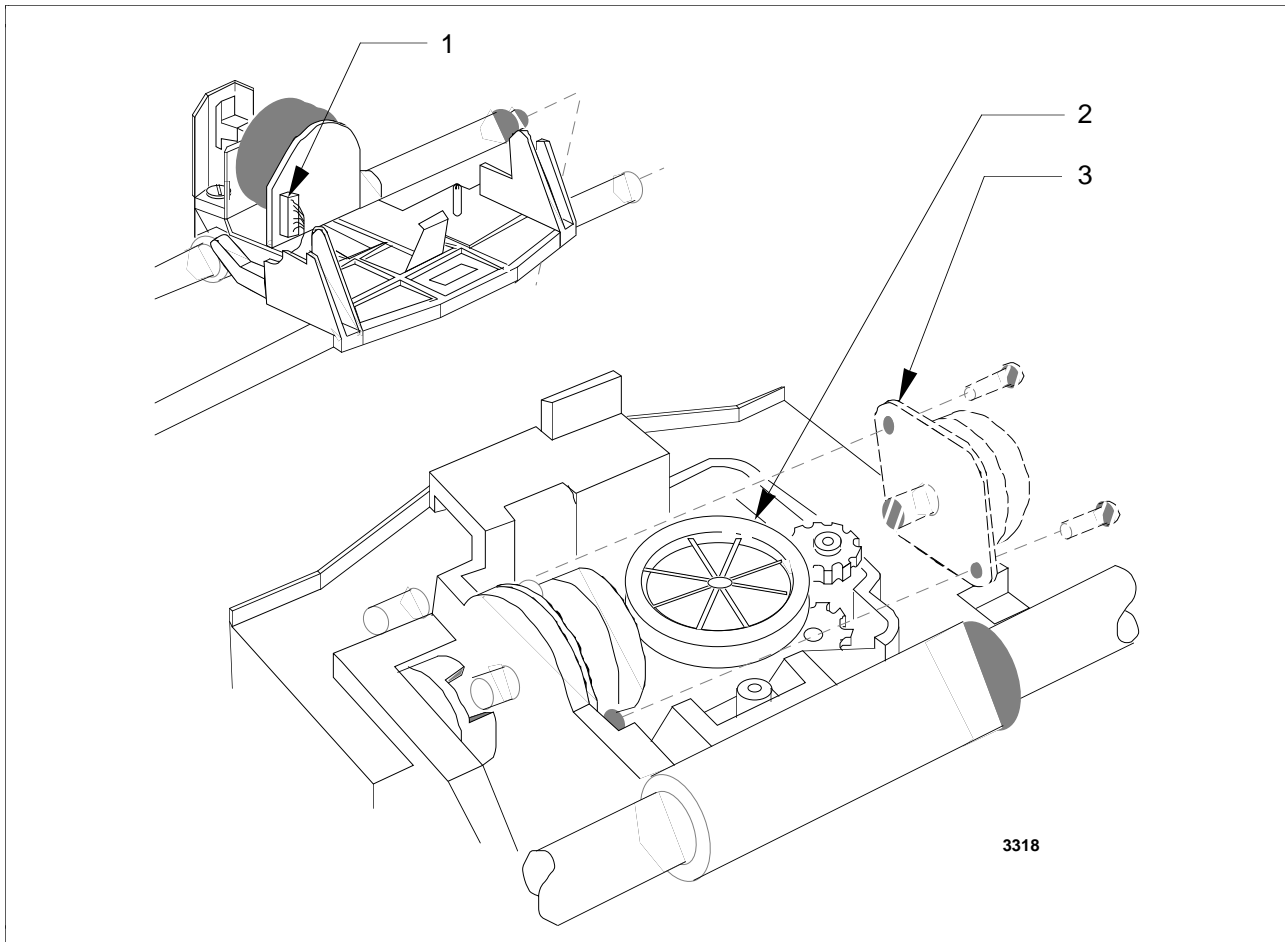
Step	Action
1	Disconnect the color connector and cable from the print head.
2	Remove the pulley.
3	Remove the screws holding the motor and carefully remove it as shown in the illustration.

Replacement procedure

To replace the motors, reverse the above procedure.

Illustration

Figure 17-13 Color Motor Replacement



17.21 Printer Adjustments

Scope

A skilled user can replace other parts in the printer beyond the ORU level (see *Spare Parts*, subsection 17.26). Use this subsection as a guide in adjusting those replaced parts.

17.22 Carriage Belt Adjustment

Procedure

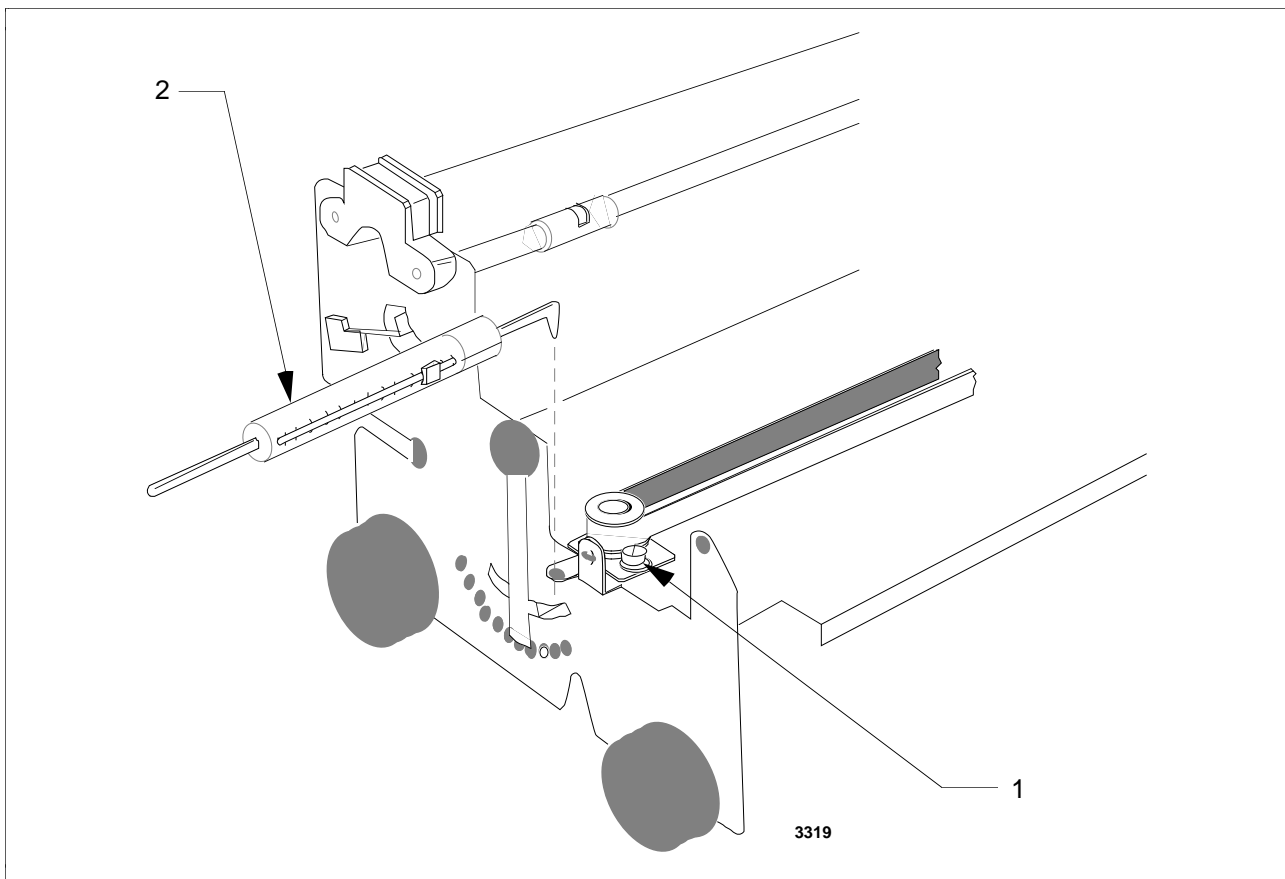
Numbers on illustrations in Figure 17-14 refer to the steps in Table 17-21.

Table 17-21 Carriage Belt Adjustment Procedure

Step	Action
1	Loosen (do not remove) the screws holding the cable pulley plate.
2	Using a tension gauge, apply a force of 3.8 kg + 0.3 kg (8.36 lb + 0.66 lb) to the cable pulley plate as shown.
3	Secure the cable pulley plate.

Illustration

Figure 17-14 Carriage Belt Adjustment



17.23 Paper Belt Tension Adjustment

Procedure

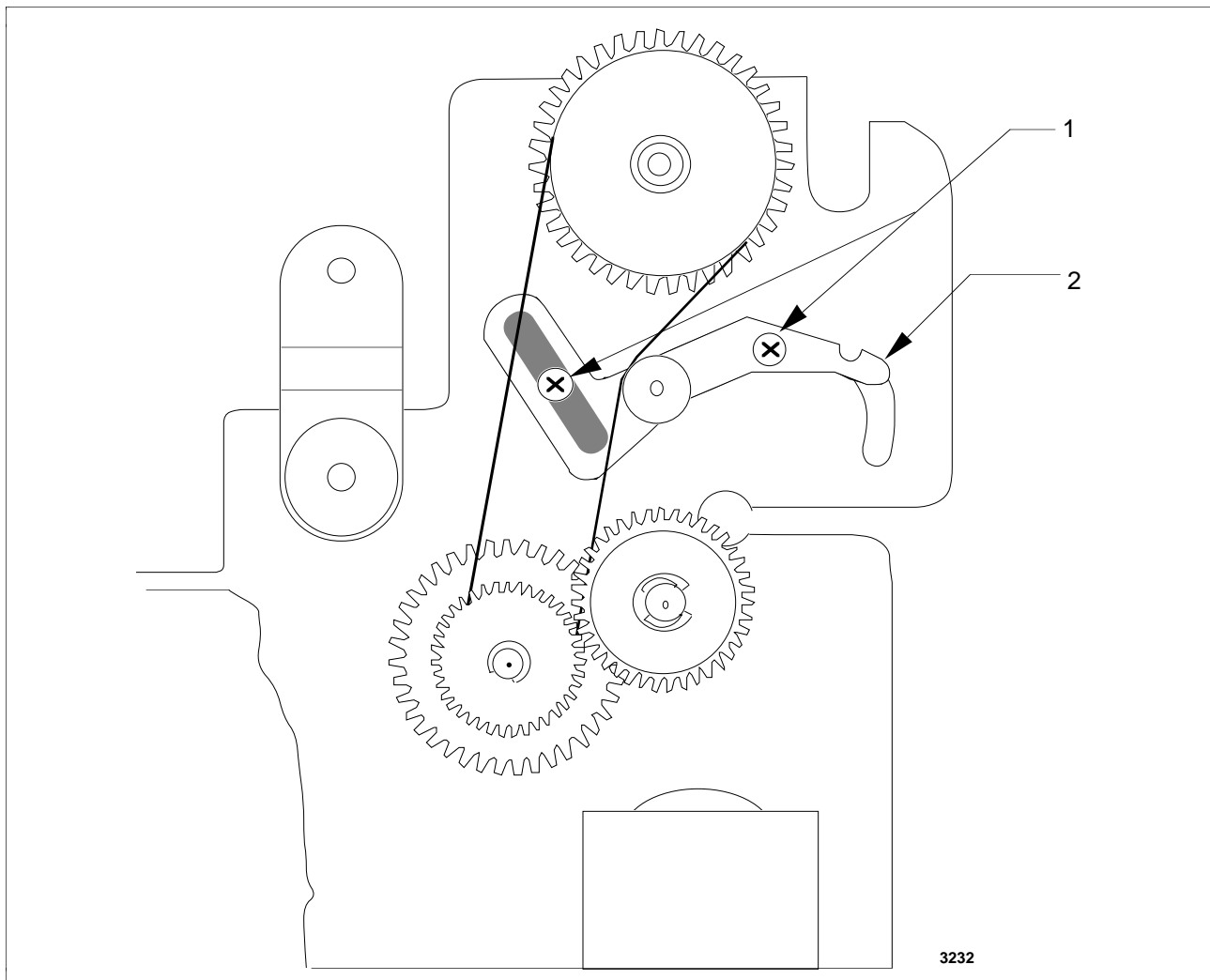
Numbers on illustrations in Figure 17-15 refer to the steps which follow.

Table 17-22 Paper Belt Tension Adjustment Procedure

Step	Action
1	Loosen (do not remove) the two screws holding the belt idler assembly.
2	Using a tension gauge, apply a force of 0.5 kg (1.10 lb) downward on the belt idler assembly arm at point 2.
3	Secure the belt idler assembly.

Illustration

Figure 17-15 Paper Belt Adjustment



17.24 Print Head to Platen Adjustment

Procedure

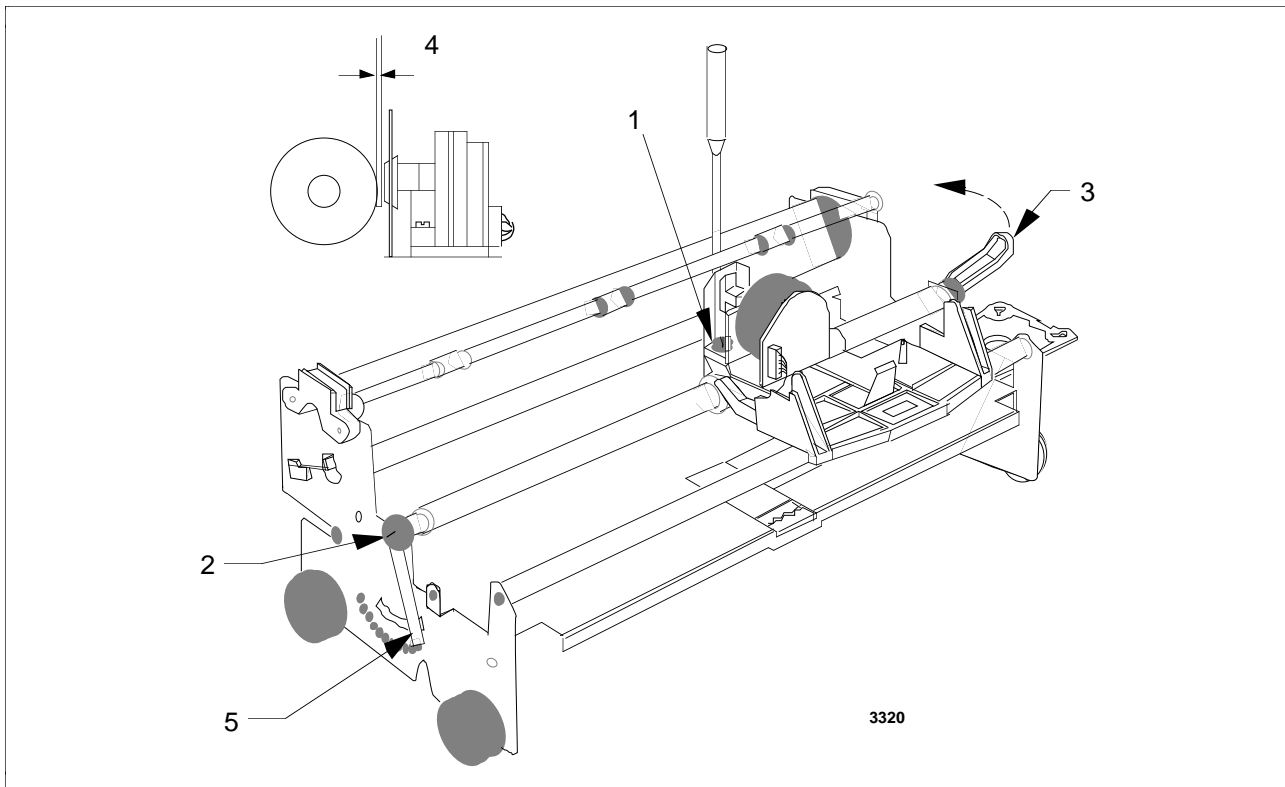
Numbers on illustrations in Figure 17-16 refer to the steps which follow.

Table 17-23 Print Head to Platen Adjustment Procedure

Step	Action
1	Remove the ribbon mask.
2	Move the carriage to the center of the printer. Loosen the screw holding the front bar positioning lever.
3	Use the copy lever on the right side to move the carriage in the next step.
4	Use a feeler gauge to adjust the distance between the print head and the platen to 0.35 mm (0.14 inch).
5	Move the front bar positioning lever to the right-most position and tighten the screw which holds it.
6	Recheck your work now that all screws have been tightened. Replace the ribbon mask.

Illustration

Figure 17-16 Print Head to Platen Adjustment



17.25 Startup

Reference

Refer to the *Process Operations Manual*, in the *Process Operations* binder, for operational procedures.

17.26 Spare Parts

Spare parts list

Table 17-24 Spare Parts List

Part Number	Description
51107144-114	Bar Tractor Spring
* 51108305-700	Black Ribbon
51107144-129	Cabinet
51303631-003	Cable, RS-232 Direct Connect, 3 m (PIC, PDG, or EPDG(P) I/O board)
51303631-004	Cable, RS-232 Direct Connect, 4 m (PIC, PDG, or EPDG(P) I/O board)
51303631-008	Cable, RS-232 Direct Connect, 8 m (PIC, PDG, or EPDG(P) I/O board)
51303631-010	Cable, RS-232 Direct Connect, 10 m (PIC, PDG, or EPDG(P) I/O board)
51303631-015	Cable, RS-232 Direct Connect, 15 m (PIC, PDG, or EPDG(P) I/O board)
51308103-003	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)
51308103-008	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)
51308103-015	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)
51107144-143	Carriage Belt
51107144-122	Carriage Group
51107144-117	Carriage Motor Group
51107144-115	Color Motor Group
51107144-105	Copy Lever
51107144-107	Front Cartridge Flap
* 51107144-101	Fuse, 3 A 250 V

* ORU Level Replacement Item

Continued on next page

17.26 Spare Parts, Continued

Spare parts list,
continued

Table 17-24 Spare Parts List, Continued

Part Number	Description
51107144-119	Idle Pulley
51107144-108	Interface Cover
51107144-111	Internal Copy Lever
51107144-112	Internal F/T
51107144-134	Mylar
51107144-113	Nylon String
51107144-136	Optical Reflection Sensor
* 51108305-900	Optional Pedestal for ASP-41 Printer
51107144-138	P. E. Switch/Color Switch
51107144-139	Power Supply Switch
51107144-123	Paper Bail Spring
51107144-142	Paper Belt
51107144-127	Paper Chute
51107144-106	Paper Load Lever
51107144-116	Paper Motor Group
* 51107144-102	Print Head
51107144-133	Print Head Cable
51107144-120	Print Head Shield
* 51108305-100	Printer, Replacement
51107144-110	Pulley
51107144-121	Push Button O. P.

* ORU Level Replacement Item

Section 18 – ASPI-46 Printer

18.1 Overview

Section contents These are the topics covered in this section:

Topic	See Page
SECTION 18 – ASPI-46 PRINTER.....	233
18.1 Overview.....	233
18.2 Cleaning.....	233
18.3 Adjustments.....	234
18.4 Test/Troubleshooting.....	234
18.5 Problem Solving.....	235
18.6 Printer Self-Tests.....	238
18.7 Diagnostic Procedure.....	240
18.8 Printer Removal.....	243
18.9 Printer Replacement.....	243
18.10 Ribbon Removal.....	244
18.11 Ribbon Installation.....	245
18.12 Printer Parts Removal.....	249
18.13 Upper Cabinet Removal/Replacement.....	249
18.14 Power Supply PWA Removal.....	251
18.15 Replacement of Main Processing Board.....	252
18.16 Startup.....	254
18.17 Spare Parts.....	254

18.2 Cleaning

Procedure Clean the exterior of the printer, using a soft-bristled brush and vacuum.

Table 18-1 Printer Cleaning Procedure

Step	Action
1	Set the power switch (on the rear, above the power cord) to OFF and unplug the power cord.
2	Lift the top-half of the cover and remove the paper, if present.
3	Vacuum the dirt/dust from inside of the unit. Use a brush to loosen dirt accumulations, but take care not to damage or misalign delicate items, such as the print head.
4	Close the cover and wipe the outside clean with a cloth and mild detergent solution.
5	Plug the power cord back into the unit.

18.3 Adjustments

No adjustments There are no adjustment procedures for this printer.

18.4 Test/Troubleshooting

Scope To help you isolate and correct minor printer problems, the topics covered here include problem solving, the printer self-tests, printer diagnostic procedure, and the hexadecimal dump procedure.

Procedure

Table 18-2 General Troubleshooting Procedure

Step	Action
1	Use the Problem Solving Guide (Table 18-3) to identify and correct problems.
2	Run the printer Self-Test. The instructions are in subsection 18.6.
3	Run the Diagnostic Procedure. The instructions are in subsection 18.7.
4	Call the Technical Assistance Center (TAC). In the U.S.A., use our toll-free number 1*800-822-7673 (available in the contiguous states except Arizona; in Arizona dial 1*602-313-5558).

18.5 Problem Solving

Problem solving

Table 18-3 Problem Solving Guide

Problem	Possible Cause	Solution
POWER indicator does not light	<p>Power Switch off</p> <p>Power cable not connected properly</p> <p>AC outlet not working</p> <p>Power supply fuse has blown</p> <p>After power off, power was turned on within 3 seconds</p>	<p>Turn printer on.</p> <p>Verify that the cable is connected properly to the printer and the ac power outlet.</p> <p>Test outlet. Use another outlet until the first outlet is restored to service.</p> <p>Locate power supply fuse on the right side of the printer. Turn printer power off. Unplug both ends of the power cord. Insert a screwdriver under the upper edge of the power fuse holder and pry the holder off the printer. Remove the fuse, check it, and if it has blown, replace it with a new fuse that matches the printer's voltage and current requirements. Replace the fuse holder so the small arrow on the case is pointing to the correct voltage. Turn the printer on.</p> <p>Turn printer power off, wait 1.5 minutes, then turn power on again.</p>
Printer does not print	<p>Display window shows "WAIT"</p> <p>Interface cable is not properly connected</p> <p>Incorrect Interface cable</p> <p>Configuration settings don't match host requirements</p>	<p>Press the ON LINE button to enable printing.</p> <p>Push cable firmly into connectors at both ends and make sure the screws are secure.</p> <p>Replace with correct cable.</p> <p>Correct configuration settings to match host requirements.</p>

Continued on next page

18.5 Problem Solving, Continued

Problem solving,
continued

Table 18-3 Problem Solving Guide, Continued

Problem	Possible Cause	Solution
Continuous forms paper is not advancing	Friction/Tractor selector is in the wrong position Paper holes are torn Paper is not correctly aligned on tractors	Set the selector to the "Tractor" position. Remove torn paper and replace with the next good sheet. Check tension tractors. If too tight, loosen by moving the right tractor slightly to the left. See paper loading instructions in the <i>Process Operations Manual</i> , in the <i>Process Operations</i> binder. Reload paper, ensuring that corresponding holes at each side of the paper are correctly aligned on the tractors.
Single sheet does not load correctly	The single sheet has not been inserted correctly.	Insert single sheet well into the front paper-entry slot making sure that it reaches the roller. The sheet must be pushed slightly further in after "P.E." disappears from the display window.
Single sheet starts to load, then backs up	Friction/Tractor selector is set to wrong position Forms overlay (OVRL) not selected	Set selector to "Friction" position. Change OVRL to OV Y to select forms overlay.
Display window shows "JAM"* while loading a sheet from the ASF, and ejects the sheet or continuous form	Friction/Tractor selector set to "Tractor"	Set selector to the "Friction" position.
Printing partial, incomplete characters, or light printing	Ribbon not feeding Ribbon worn or damaged Print head too far from paper Print head is worn or damaged	Check that ribbon is correctly loaded. Turn ribbon advance knob to ensure that the ribbon is not jammed. Replace ribbon. Push paper thickness lever towards back of printer to move print head closer to paper. Print head needs replacement.

* NOTE: To clear "JAM" from the display window, try turning the power off, then on again.

Continued on next page

18.5 Problem Solving, Continued

Problem solving, continued

Table 18-3 Problem Solving Guide, Continued

Problem	Possible Cause	Solution
Dark, smudgy printing	Foreign matter on print head Print head too close to paper Ribbon loaded improperly	Remove ribbon, wipe off print head, then replace ribbon. Pull paper thickness lever towards front of the paper to move the print head away from paper. Remove, then replace properly. See <i>Process Operations Manual</i> , in the <i>Process Operations</i> binder.
Display Window shows "JAM" *	Paper jammed or torn Printer withdrew more than 17 inches of continuous form while inserting single sheet Single sheet is too long (longer than 17 inches) or is jammed	Remove and reload paper. Press the down-arrow button until "P.E." displays, then continue operation. Press the up-arrow button continuously to clear the sheet. If necessary, clear the sheet manually.
Display window shows "FLT"	A carriage synchronization error has occurred One or both font cartridges have not been inserted or removed correctly	Turn the printer power off, then on. If "FLT" is still displayed, report the problem to the TAC. Turn the printer power off. Check the font cartridges. Then turn the power on again.

* NOTE: To clear "JAM" from the display window, try turning the power off, then on again.

18.6 Printer Self-Tests

Scope

After installing the printer, you can test its operation by using the self-test procedure. Before beginning the self-test, verify that:

- The paper and ribbon cartridge are inserted correctly.
 - The power cable is connected, but the power is turned off.
 - The front cover is closed.
-

Procedure

Table 18-4 Self-Test Procedure

Step	Action
1	Press and hold the ON LINE button while you turn the printer on. The display window shows "TEST," and a pattern is printed on the loaded paper as shown in Figure 18-1. Note that the printer continues to print until you press the ON LINE button.
2	The display window shows "WAIT."

Continued on next page

18.6 Printer Self-Tests, Continued

Illustration

Figure 18-1 Self-Test Print Pattern



ATTENTION

ATTENTION—The self-test also ends if the printer runs out of paper and the window shows "P.E."

The self-test pattern can be printed in quality print by pressing the QUALITY button.

You can also select different character fonts for self-test by inserting optional font cartridges and pressing FONT.

18.7 Diagnostic Procedure

Scope

This diagnostic procedure helps to identify printer faults so that when a unit fails, you will know for sure that it is the printer that has failed and not some other part of the subsystem that is at fault.

The diagnostic procedure checks the control panel indicators, the display window, and internal printer functions, then does a printing test. At the end of the diagnostic, the display window shows END or displays an error number if an error is found.

Procedure

Before starting, verify that:

- The printer power is turned off.
- The printer's front and rear covers are closed.
- Paper is loaded.
- The LCN-based system is not sending data.

As you perform the diagnostic procedure, note any problems you find. To run the diagnostic, follow the steps in Table 18-5.

Table 18-5 Diagnostic Procedure

Step	Action
1	Press the PROG button while turning on the power to the printer. <ul style="list-style-type: none"> • The printer beeps five times, and all the indicators on the control panel and on the font cartridges (if inserted) light up.
2	The display window shows, in a sequence of a to e, the following patterns to check its display capability. As each pattern is displayed, the printer "beeps." Verify that the display window shows: a. <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> b. * <input type="text"/> <input type="text"/> <input type="text"/> c. * * <input type="text"/> <input type="text"/> d. * * * <input type="text"/> e. * * * * After displaying the above sequence, the diagnostic procedure automatically enters test execution.
3	The display window shows T&Dx, where x is the hexadecimal number in sequence as the test continues.

Continued on next page

18.7 Diagnostic Procedure, Continued

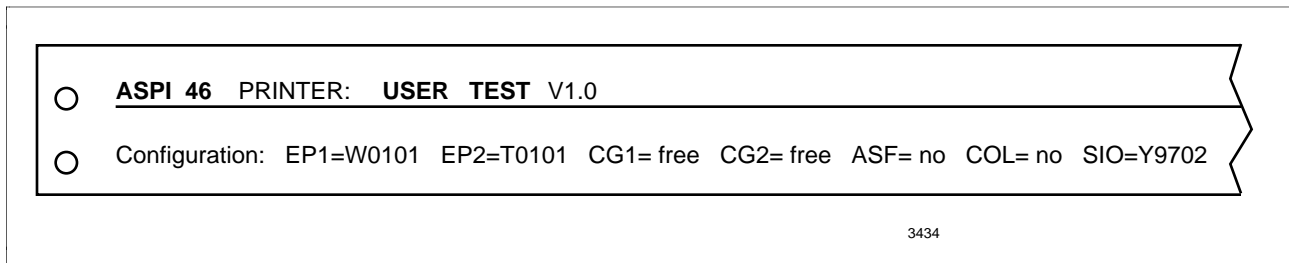
Procedure,
continued

Table 18-5 Diagnostic Procedure, Continued

Step	Action
4	When the display window shows T&DB, the printer prints a test pattern. See Figure 18-1.
5	The test terminates by: <ul style="list-style-type: none">• Flashing END? several times, or• Displaying an error message in the format ORUx where x is the error number. The printer will also "beep" three times and the indicators will blink. Table 18-6 lists the possible error messages.
6	If you press the PROG button while END? or the error message is displayed, the diagnostic procedure repeats continuously until you stop it by pressing the PROG button.

Illustration

Figure 18-2 Printer Diagnostic Test Pattern



Continued on next page

18.7 Diagnostic Procedure, Continued

Messages

Table 18-6 Diagnostic Error Messages

Error Number (X)	Description
ORU0	General fault
ORU1	Fault on main board
ORU2	Fault on firmware board
ORU3	Fault on chip U03 (firmware board)
ORU4	Fault on chip U04 (firmware board)
ORU5	Fault on operator panel
ORU6	Character generator 1 fault
ORU7	Character generator 2 fault
ORU8	Interlock fault
ORU9	Paper load lever fault
ORUA	Color fuse fault
ORUB	Automatic sheet feeder fuse fault
ORUC	Serial interface fault
ORUD	Fault on chip B09 (serial interface board)
ORUE	Fault on chip D10 (serial interface board)

18.8 Printer Removal

Procedure

Table 18-7 Printer Removal Procedure

Step	Action
1	Turn off the ac power switch located on the rear of the printer, just above the power cord.
2	Disconnect the power cord.
3	Disconnect the data cable from the left rear of the printer.

18.9 Printer Replacement

Procedure

Table 18-8 Printer Installation Procedure

Step	Action
1	Remove the plastic ties from the print head.
2	Verify that the power fuse holder, located under the power socket on the rear of the printer, has the proper voltage selected (i.e., 120 V) is immediately above the triangular arrow, if 120 Vac power is to be used.
3	Install a ribbon cartridge as covered in subsection 18.10.
4	Connect data cable to connector located at the left rear of the printer.
5	Connect ac power cord to the rear of the printer.
6	Turn on power switch located just above the power cord.

18.10 Ribbon Removal

ATTENTION

ATTENTION—Turning off the power with data in the input buffer causes the data to be lost.

The ribbon cartridge can be removed when the printer is on and the display window shows P.E. or WAIT, or when the printer is off.

Procedure

Table 18-9 Ribbon Removal Procedure

Step	Action
1	Raise the front cover (Figure 18-3).
2	Using both hands, pull the paper bail towards the front of the printer, then lift it up (Figure 18-4).
3	Pull the left release arm toward the front of the printer (Figure 18-4), then lift the left side of the ribbon cartridge free.
4	Now pull the right release arm toward the front of the printer and lift the right side of the ribbon cartridge free.
5	Lift the ribbon cartridge out of the printer.

18.11 Ribbon Installation

Procedure

Table 18-10 Ribbon Installation Procedure

Step	Action
1	Raise the front cover (Figure 18-3).
2	Using both hands, pull the paper bail (Figure 18-4) towards the front of the printer, then lift it up.
3	Move the print head to the center of the printer (Figure 18-4).
4	Pull the paper thickness lever towards the front of the printer to make ribbon insertion easier (Figure 18-4).
5	Remove the ribbon cartridge from its bag.
6	Remove and discard the holding pin from the cartridge (Figure 18-5).
7	Turn the ribbon tension knob (Figure 18-5) in the direction indicated by the arrow, until the ribbon is taut.
8	Place the ribbon cartridge inside, so it rests between the release arms of the retaining clips (Figure 18-4).
9	Slide the white plastic mask on the ribbon until the mask is aligned with the print head. Slip the mask onto the pins at either side of the print head (Figure 18-6).
10	Push the cartridge gently down until it snaps into place (Figure 18-7).
11	Slide the print head along the print carriage to check that the mask moves freely along the ribbon.
12	Using two hands, lift the paper bail towards the front of the printer, lower it, then release it gently. This action repositions the paper bail (Figure 18-4).
13	Close the front cover. CAUTION Before closing the front cover, make sure that the paper bail is correctly positioned; otherwise, the cover could be damaged.
14	Move the paper thickness lever (Figure 18-4) towards the back of the printer.
15	Align the lever with the last mark on the cover.

Continued on next page

18.11 Ribbon Installation, Continued

Illustration

Figure 18-3 Printer Front Cover

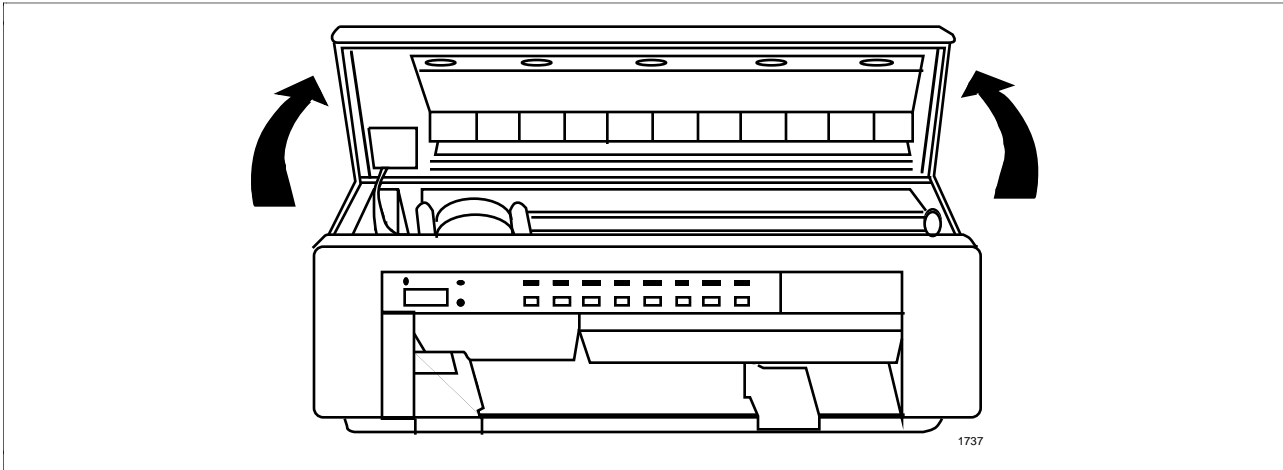
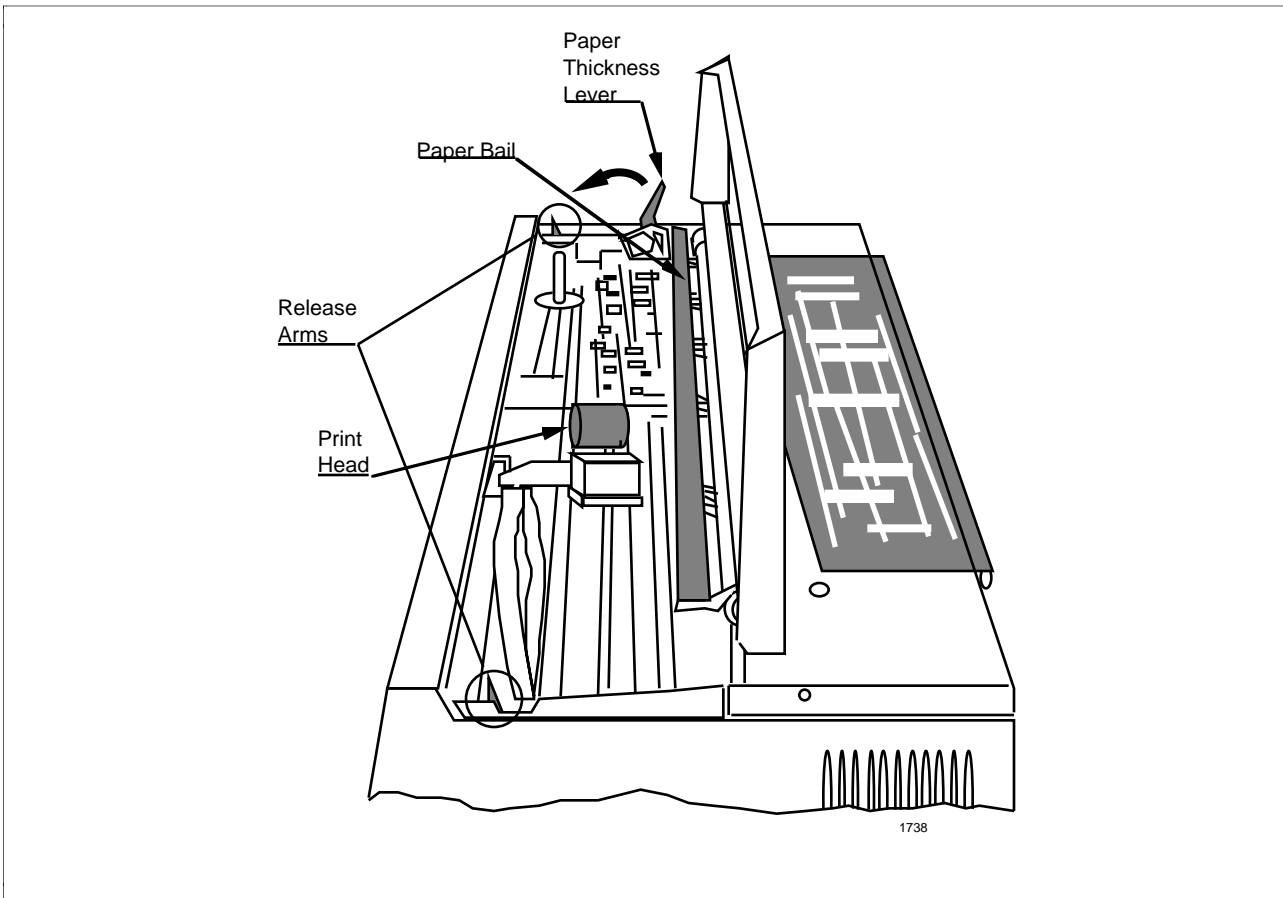


Figure 18-4 Paper Bail, Print head, and Paper Thickness Lever



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18.11 Ribbon Installation, Continued

Illustration

Figure 18-5 Ribbon Cartridge

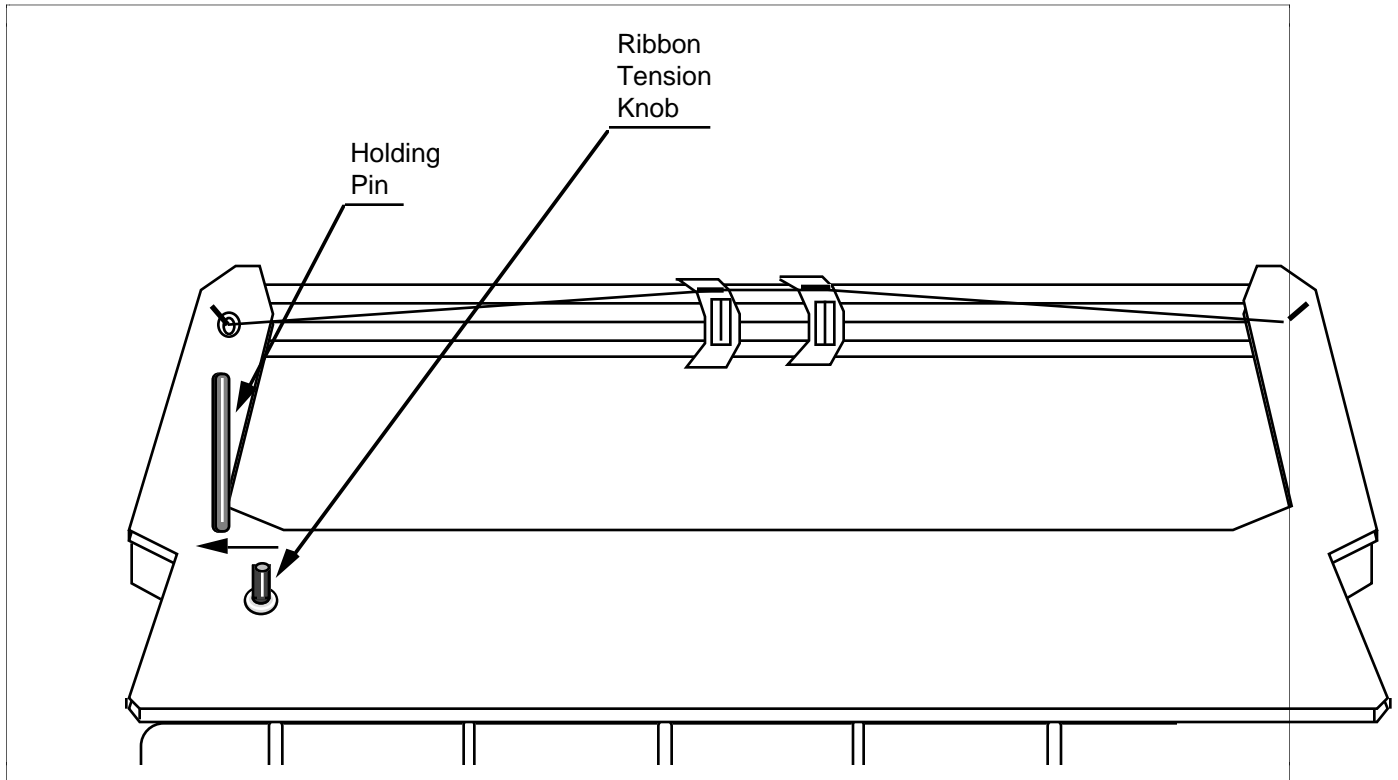
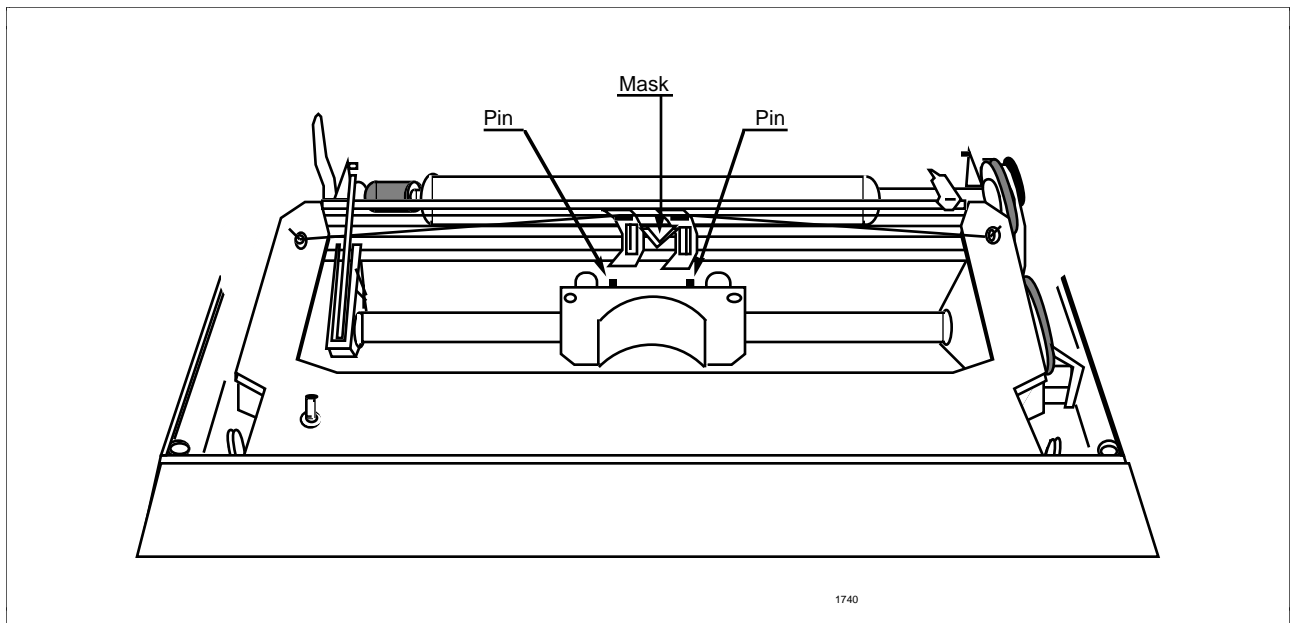


Figure 18-6 Plastic Mask Attachment

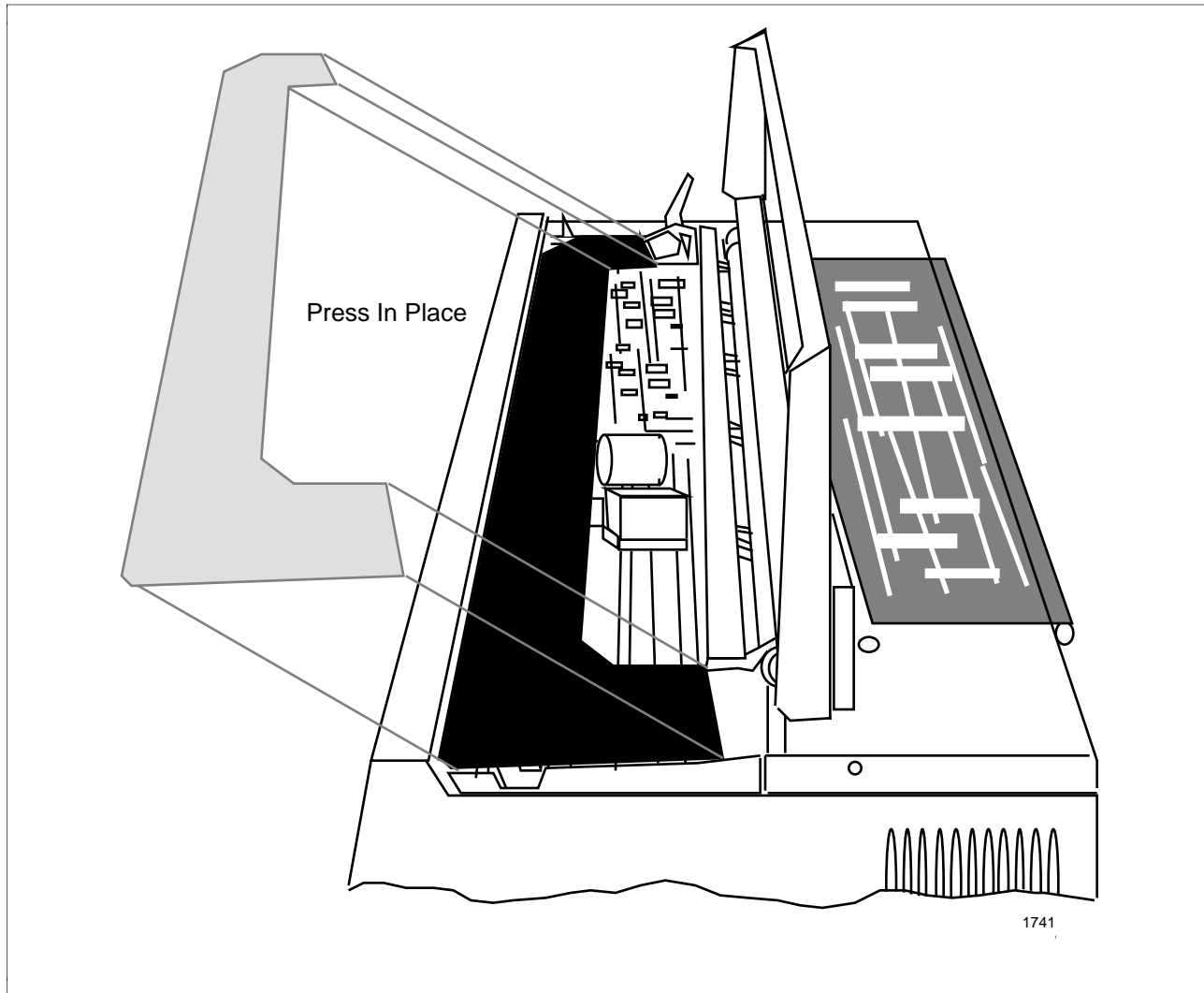


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18.11 Ribbon Installation, Continued

Illustration

Figure 18-7 Ribbon Cartridge Alignment



18.12 Printer Parts Removal

Scope

The Optimum Replacement Unit for the ASPI-46 printer is the printer itself. Repair below this level is not recommended for untrained personnel. Replacement procedures for some high-level assemblies are given in the next few subsections.

18.13 Upper Cabinet Removal/Replacement

Procedure

Table 18-11 Cabinet Removal/Replacement Procedure

Step	Action
1	Unplug the power cable and disconnect the interface cable.
2	Remove the tractor assembly by pulling up on each side of the back of the tractors until the assembly unsnaps from the printer.
3	Remove the two screws located under the front cover (see Figure 18.8).
4	Remove the two screws located under the rear cover.
5	Disconnect the left-side interlock cable connector (note wire-color polarity).
6	Lift off the upper cabinet and set it aside.

Replacement procedure

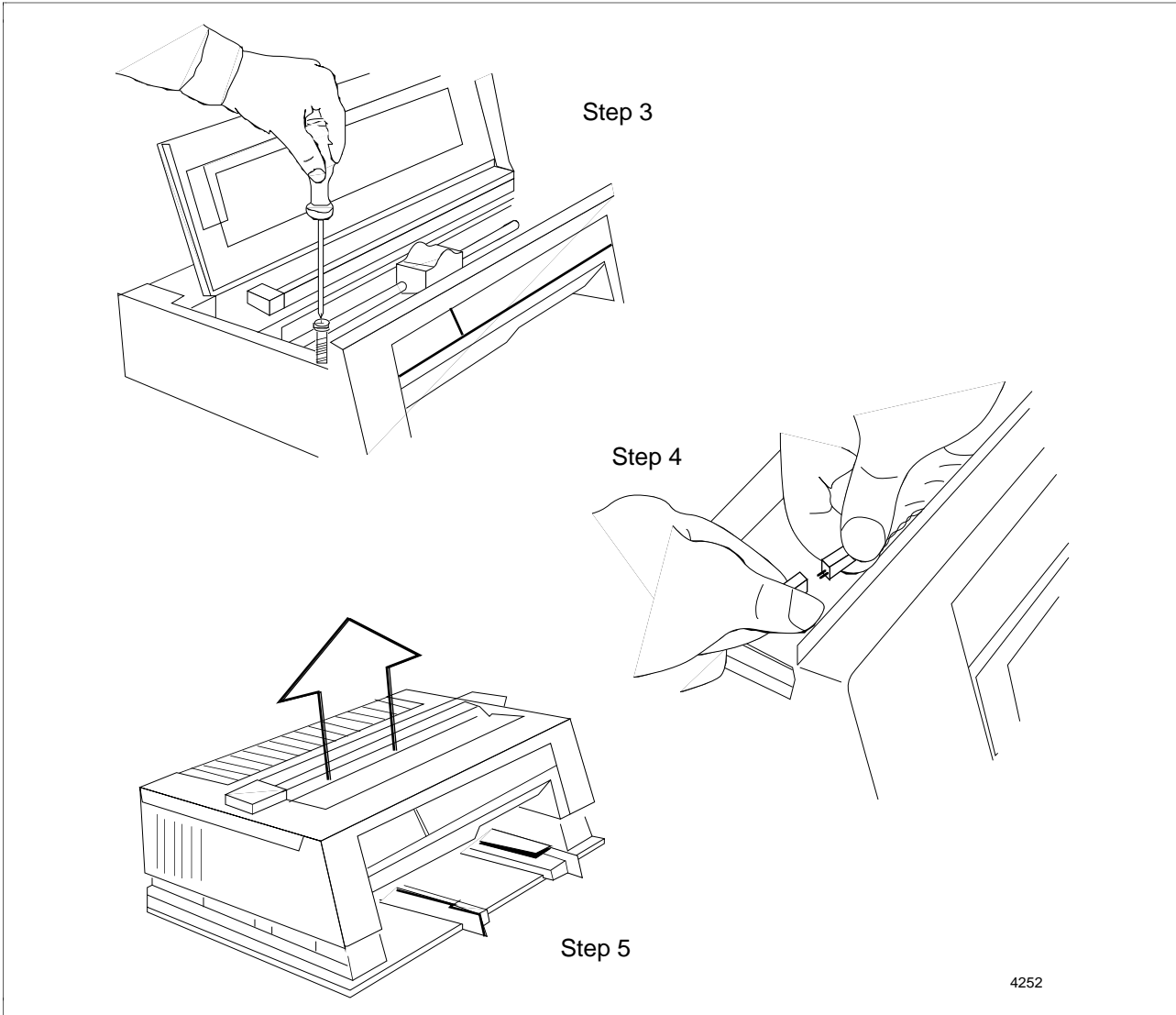
To replace the upper cabinet, reverse the above procedure.

Continued on next page

18.13 Upper Cabinet Removal/Replacement, Continued

Illustration

Figure 18-8 Upper Cabinet Removal



18.14 Power Supply PWA Removal

Procedure

Table 18-12 Power Supply PWA Replacement Procedure

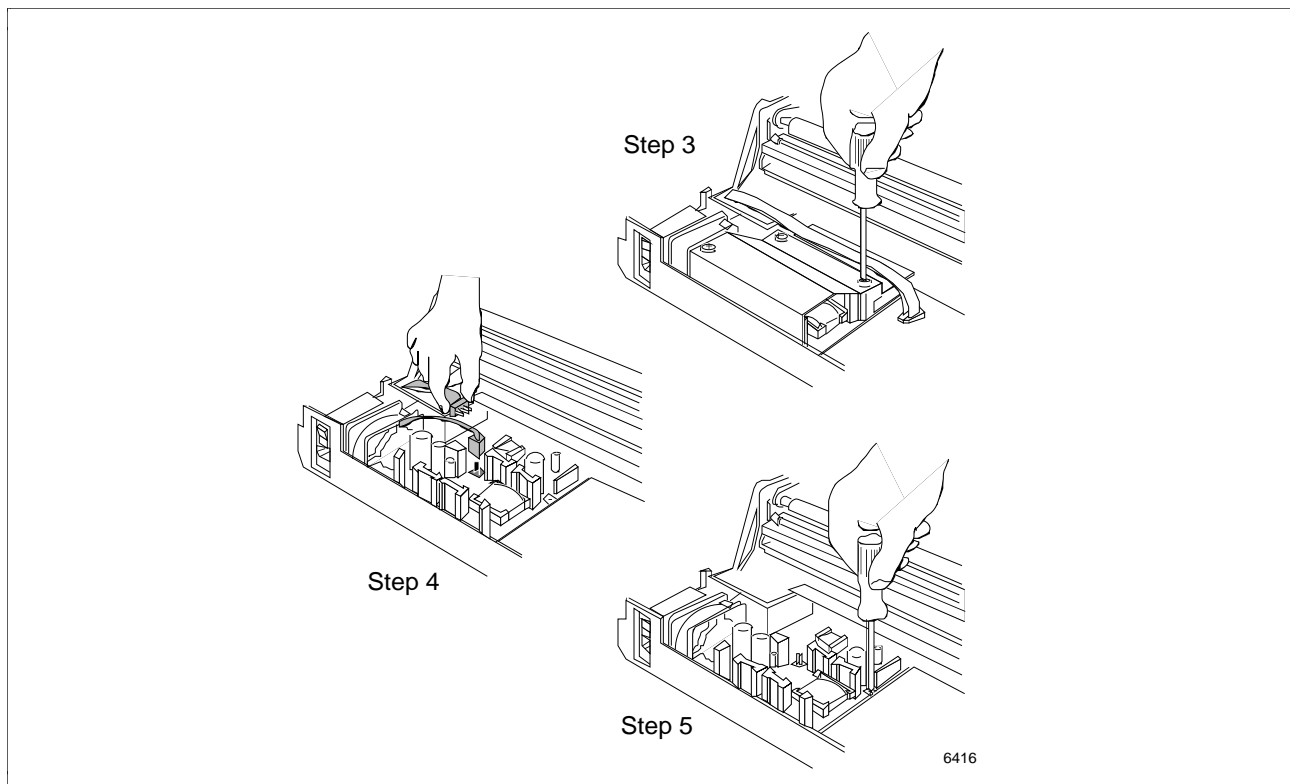
Step	Action
1	Unplug the power cable and disconnect the interface cable.
2	Remove tractor assembly.
3	Remove the upper cabinet. See subsection 18.3.
4	Slip all the cables off their clamps and remove the metal protection by unscrewing the three cross-head screws placed on the upper side as shown in Figure 18-9.
5	Carefully disconnect all the cables plugged onto the power supply board.
6	Remove the power supply PWA by unscrewing the four cross-head screws.

Replacement procedure

To replace the power supply board, reverse the above procedure.

Illustration

Figure 18-9 Power Supply PWA Replacement



18.15 Replacement of Main Processing Board

Procedure

Table 18-13 Replacement of Main Processing Board Procedure

Step	Action
1	Unplug the power cable and disconnect the interface cable. Remove ribbon cartridge (subsection 18.10).
2	Remove tractor assembly. Remove the upper cabinet. See subsection 18.13.
3	Carefully disconnect all the cables plugged onto the main processing board as shown in Figure 18-10. Remove the serial interface board (not shown) by partially removing two cross-head screws which hold it to the base of the printer. One screw is located approximately 4 cm (1.5 inches) to the left of the DB-25 printer connector and the other is just around the corner from the DB-25 connector. When the screws have been loosened, pull straight up on the interface board to disconnect it from the main processing board.
4	Remove the inner side cross-head screw and washer (located on the left-side socket of the lower base), which secures the ASF 15-pin Cannon connector (RS-232) to the main processing board.
5	Slightly bend inward the two side connector clips of the 36-pin connector, located on the left-side socket of the lower base. This allows the connector to clear the cabinet in Step 7.
6	To release the main processing board, unscrew four cross-head screws on the sides of the board and another screw placed behind the power connector (5 screws in all).
7	Carefully remove the processing board by gently pushing it towards the front of the printer until the 36-pin connector clears the back of the printer, then lift the rear of the board up and out of the printer.

Replacement procedure

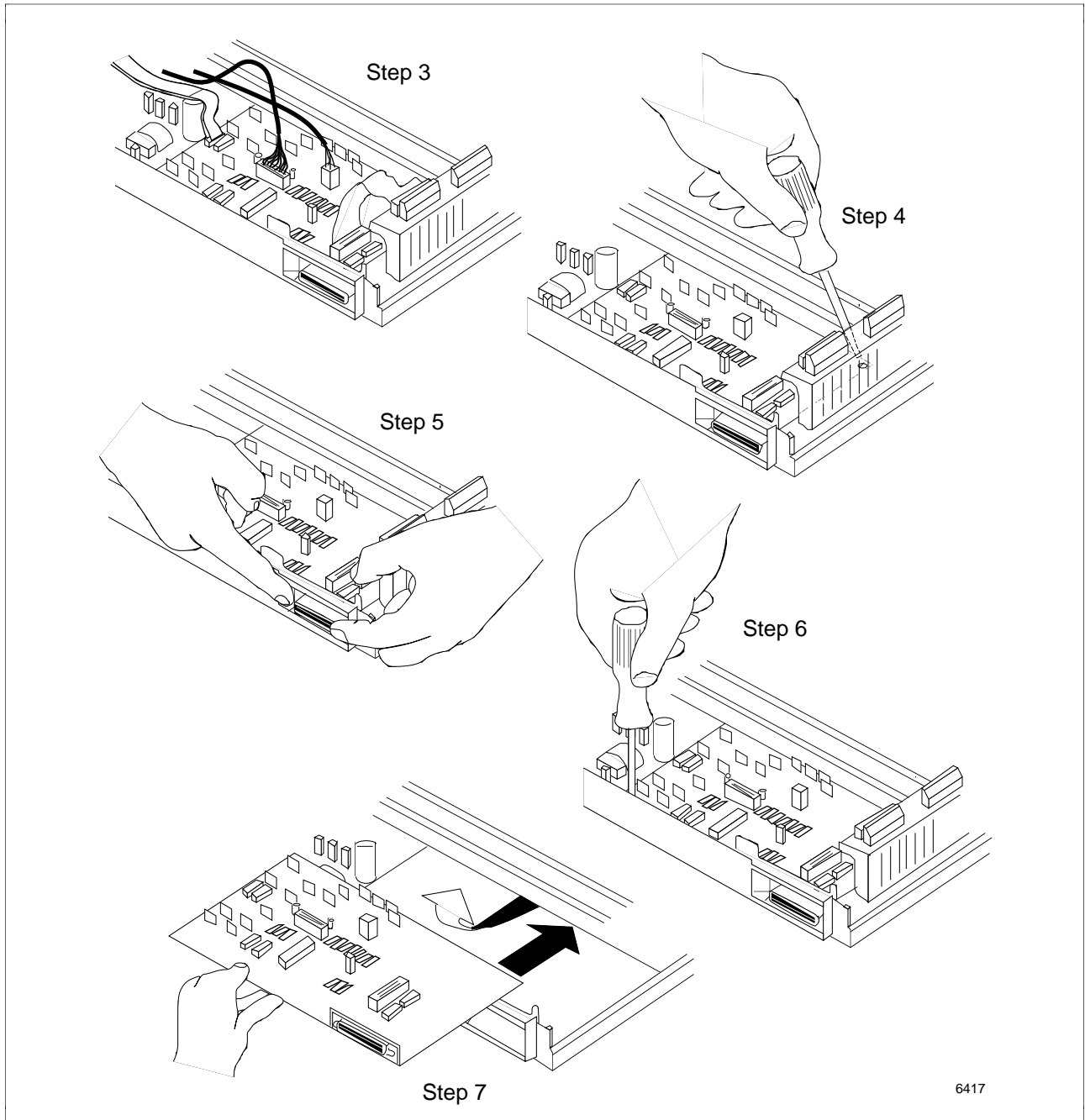
To replace the main processing board, reverse this procedure.

Continued on next page

18.15 Replacement of Main Processing Board, Continued

Illustration

Figure 18-10 Replacement of Main Processing PWA



18.16 Startup

Reference

Refer to the *Process Operations Manual*, in the *Process Operations* binder, for paper loading, ribbon changing, and other operational procedures.

18.17 Spare Parts

Spare parts list

Table 18-14 Spare Parts List

Part Number	Description
* 51195091-100	Printer, Replacement
51107142-100	PWA GH4B46
51107142-101	PWA GD2SUP
51107142-102	PWA Power Supply
51107142-103	PWA Operator Panel
51107142-104	PWA Protocol FW
* 51107142-105	Print Head
51107142-106	Cable, Print Head
51107142-107	Cartridge, Protocol
51107142-108	Paper Guide Assembly
51107142-109	Tractor, Right
51107142-110	Tractor, Left
51107142-111	Lever, Tractor Unlock
51107142-112	Spring, Tractor Lock
51107142-113	Lever, Roller Arm
51107142-114	Lever, Copy
51107142-115	Cartridge, Motor Assembly
51107142-116	Motor, Carriage
51107142-117	Shaft Assembly

* ORU Level Replacement Item

Continued on next page

18.18 Spare Parts, Continued

Spare parts list,
continued

Table 18-14 Spare Parts List, Continued

Part Number	Description
51107142-118	Pulley, Inked Ribbon
51107142-119	Belt, Cartridge
51107142-120	Belt, Paper
51107142-121	Operator Panel Assembly
51107142-122	Fan
51107142-123	Uni-Block
51107142-124	Cover, Transparent
* 51195091-700	Ribbon, Black
* 51107142-125	Fuse, 1.6 A
51107142-126	Black Ribbon Motor Assembly
51303631-003	Cable, RS-232 Direct Connect, 3 m (PIC, PDG, or EPDG(P) I/O board)
51303631-004	Cable, RS-232 Direct Connect, 4 m (PIC, PDG, or EPDG(P) I/O board)
51303631-008	Cable, RS-232 Direct Connect, 8 m (PIC, PDG, or EPDG(P) I/O board)
51303631-010	Cable, RS-232 Direct Connect, 10 m (PIC, PDG, or EPDG(P) I/O board)
51303631-015	Cable, RS-232 Direct Connect, 15 m (PIC, PDG, or EPDG(P) I/O board)
51308103-003	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)
51308103-008	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)
51308103-015	Cable, RS-232 Direct Connect, 3 m (EPDGC I/O board)

Section 19 – Signum 2043 Printer

19.1 Overview

Section contents These are the topics covered in this section:

	Topic	See Page
	SECTION 19 – SIGNUM 2043 PRINTER.....	257
19.1	Overview.....	257
19.2	Printer Cleaning.....	261
19.3	Printer Adjustments.....	261
19.4	Troubleshooting/Testing.....	262
19.4.1	Power Malfunctions.....	263
19.5	Printer Initialization.....	264
19.6	Printer Display Errors.....	264
19.6.1	Status Errors.....	265
19.6.2	Recoverable Errors.....	267
19.6.3	Nonrecoverable Errors.....	269
19.7	Printer Self-Test.....	270
19.8	Hex Dump Test.....	272
19.9	Fault Probability Guide.....	273
19.10	Test and Diagnostic Procedure.....	278
19.11	Printer Replacement.....	282
19.12	Ribbon Cartridge Replacement.....	284
19.13	Tractor Installation/Removal.....	285
19.14	Print Head Replacement.....	293
19.15	Spare Parts.....	295

Introduction

The Signum 2043 matrix printer is a replacement for the ASPI-41 and ASPI-46 printers. It is a 136 column printer that is capable of 400 characters per second with an ASPI protocol. Seven printable colors are available when a color ribbon is installed in the printer.

Two models of the printer are available: a 120 Vac model and a 240 Vac model. Both models are CE Compliant.

Figures 19-1 and 19-2 are front and rear views of the Signum 2043 printer. Figure 19-3 is a pictorial of the printer's components.

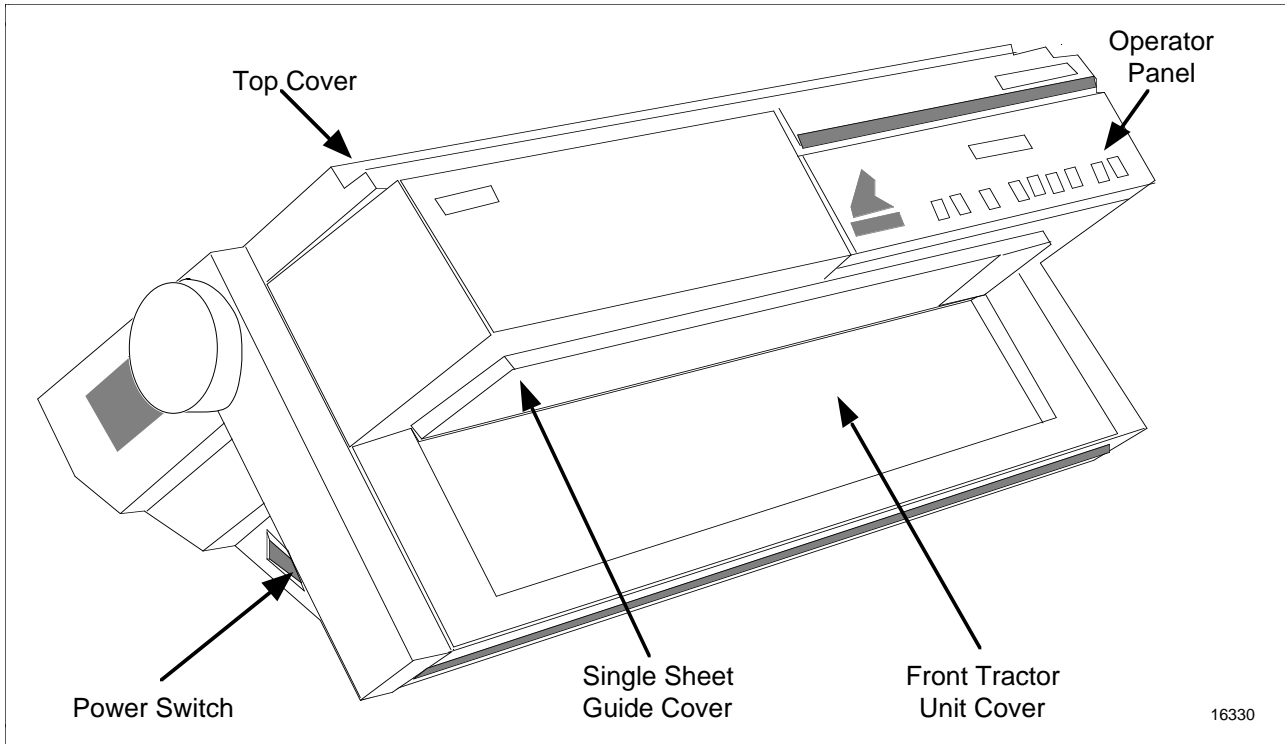
Continued on next page

19.1 Overview, Continued

Front view of Signum 2043 printer

Figure 19-1 illustrates a front view of the Signum 2043 printer.

Figure 19-1 Front View of Signum 2043 Printer



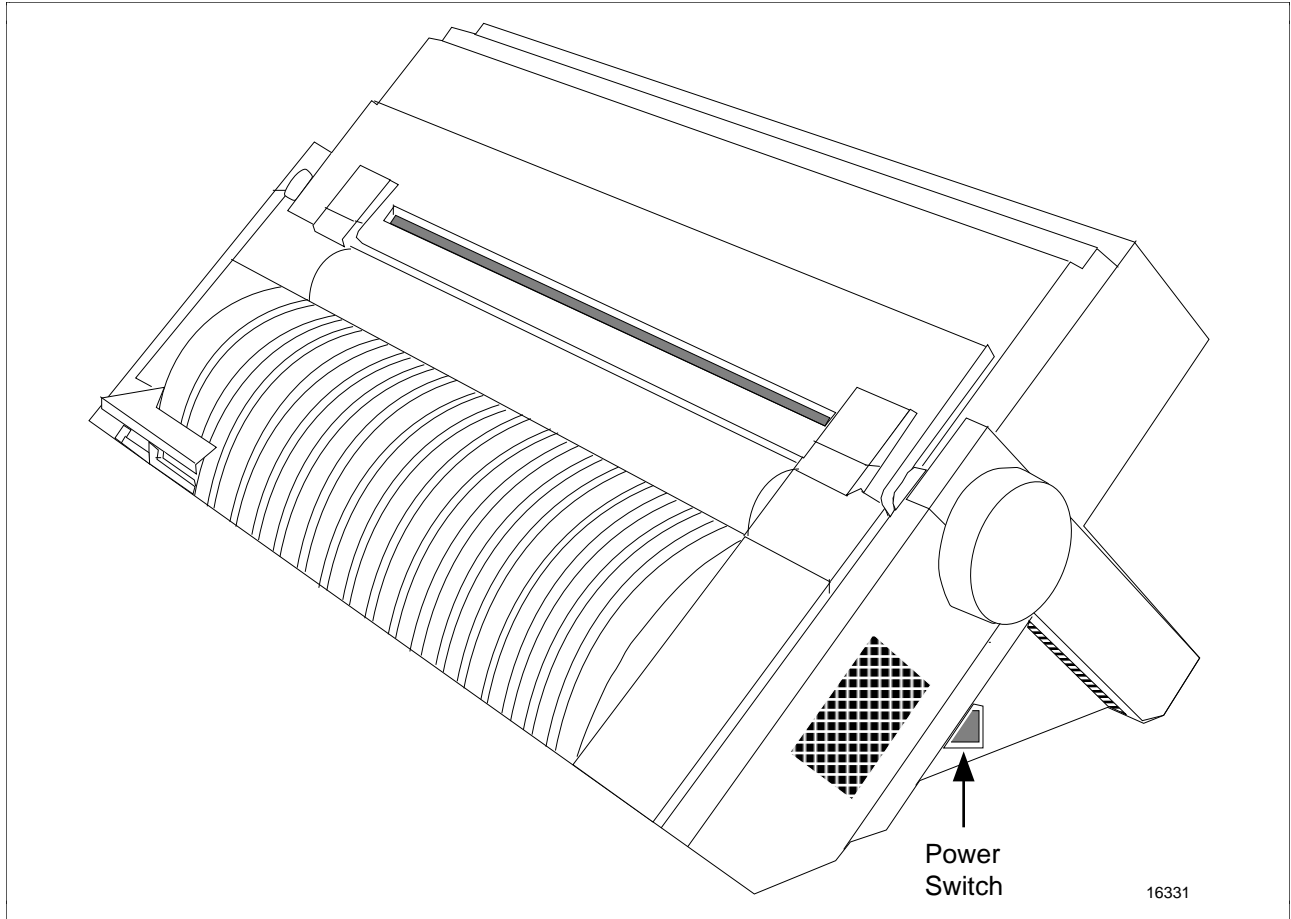
Continued on next page

19.1 Overview, Continued

Rear view of Signum 2043 printer

Figure 19-2 illustrates a rear view of the Signum 2043 printer.

Figure 19-2 Rear View of Signum 2043 Printer



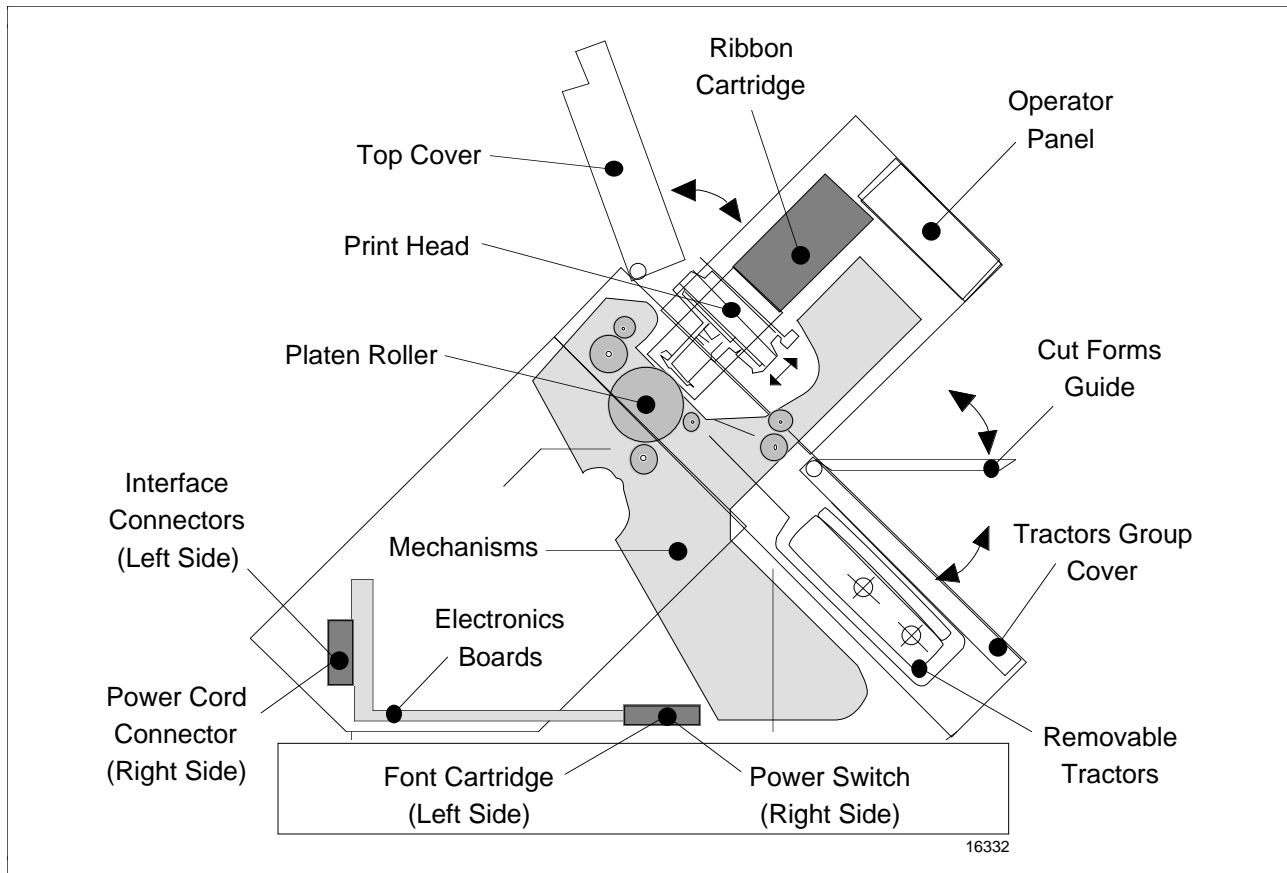
Continued on next page

19.1 Overview, Continued

Signum 2043 printer pictorial

Figure 19-3 is a pictorial of the Signum 2043 printer.

Figure 19-3 Signum 2043 Printer Pictorial



19.2 Printer Cleaning

ATTENTION

ATTENTION—Due to the high temperature of some mechanical parts during prolonged operation (print head, carriage motor, and paper motor), be sure power has been removed from the printer for at least 5 minutes before beginning any cleaning.

Cleaning procedure

There is no scheduled preventive maintenance other than periodic cleaning. Periodic cleaning of the printer will help provide optimal printer performance. Use the printer cleaning procedure in Table 19-1.

Table 19-1 Printer Cleaning Procedure

Step	Action
1	Place the printer's power switch that is located at the left side of printer in the OFF position and unplug the power cord.
2	Open the top cover. If paper is loaded into the printer, remove the paper.
3	With a vacuum cleaner, remove any dirt or dust inside the printer. If necessary, use a brush to loosen any dirt accumulation, but be careful not to damage or misalign delicate components, such as the print head.
4	Close the cover and clean the exterior of the printer by using a soft-bristled brush or vacuum cleaner. Use a neutral detergent or water solution on a soft cloth to remove dirt and grease from the printer cabinet. Do not use an abrasive cloth, alcohol, paint thinner, or similar agents because they may discolor or scratch the cabinet surface.
5	Reconnect the power cord to the printer and place the printer's power switch in the ON position.

19.3 Printer Adjustments

No adjustments

There are no printer adjustments at the ORU (Optimum Replaceable Unit) level.

19.4 Troubleshooting/Testing

Introduction

To help you isolate and correct minor printer problems, the following problem solving checks and procedures are recommended.

- Initializing procedure with Operator Panel messages
- Power malfunction checks
- Self-test procedure
- Test and diagnostic (T&D) procedure with error messages

Troubleshooting approach

When your printer has a problem, use the general troubleshooting/testing procedure in Table 19-2.

Table 19-2 General Troubleshooting Procedure

Step	Action
1	If appropriate, perform the power malfunction checks.
2	If appropriate, observe the initialization procedure and Operator Panel messages.
3	Perform the printer self-test procedure. The instructions are in subsection 19.7.
4	Perform the diagnostic procedure. The instructions are in subsection 19.10.
5	If unable to diagnose and correct a problem, call the Honeywell Technical Assistance Center (TAC) for assistance. <ul style="list-style-type: none">• In the U.S.A., use the toll-free number 1*800-822-7673 (available in the contiguous states except Arizona).• In Arizona, use 602-313-5558.

19.4.1 Power Malfunctions

WARNING

WARNING—The printer power supply is a switching type with some parts exposed to high voltage. The power supply cover must be in place before performing any operation while the printer's rear cover is removed.

Problem Solving

Use the suggestions in Table 19-3 to help identify and correct a power malfunction.

Table 19-3 Power Malfunction Guide

Problem	Possible Cause	Solution
POWER indicator extinguished	Power switch not in the on (1) position.	Place the printer's power switch in the on (1) position.
	Power cable not connected.	Verify that the cable is properly connected to the printer and the ac power outlet.
	Power absent at ac power outlet.	Verify that power is present at the ac power outlet.
	Primary power fuse blown.	Replace the primary power fuse. 120 Vac – 5 A (1 fuse) 240 Vac – 3.15 A (2 fuses)
No display information	The Operator Panel assembly is faulty or has a bad connection.	Check the connection to the main circuit board assembly.

19.5 Printer Initialization

Introduction

When power is applied to the printer by placing the Power switch in the on (1) position, it enters the initialization mode (bootstrap) before entering the normal operational mode. While in the initialization mode, the printer firmware initializes the hardware resources for the correction functionality.

The printer display will momentarily display: **STARTING UP** and then perform a full-matrix display check from the leftmost to the rightmost character position.

The printer display will momentarily display: ● ● ● ● ● ● ● ● ● ●

If initialization is successful, the printer enters the normal operational mode, moves the carriage assembly to the leftmost position to check the home position sensor, and then enters either the READY (paper installed) or WAIT (paper not installed) state.

If the printer does not initialize correctly, an error message is displayed on the printer display. See subsection 19.6 for the list of error messages.

19.6 Printer Display Errors

Introduction

Some errors can be displayed by the printer. The errors are divided into three main groups.

- Status errors
 - Recoverable errors
 - Nonrecoverable errors
-

19.6.1 Status Errors

Introduction

When a Status error occurs, the printer enters the WAIT state and displays a primary message that indicates the error. If appropriate, a secondary error message is displayed that provides more specific information about the primary error.

Pressing the ON LINE key resets the error condition.

Error messages

Table 19-4 describes the printer status error messages.

Table 19-4 Printer Status Errors

First Message	Second Message	Cause/Solution
PAPER JAM	CHECK ALL PATHS	<p>Cause: A paper jam error condition exists in the paper path.</p> <p>Solution: Check all the paper paths and remove the jammed paper. Press the ON LINE key to reset the error condition.</p>
JAM ON PATH2	CHECK PAPER	<p>Cause: A paper jam error condition exists in paper path 2.</p> <p>Solution: Check the front push tractor unit and remove the jammed paper. Press the ON LINE key to reset the error condition.</p>
JAM ON PATH3	CHECK PAPER	<p>Cause: A paper jam error condition exists in paper path 3.</p> <p>Solution: Check the front push tractor unit and remove the jammed paper. Press the ON LINE key to reset the error condition.</p>
AGA NOT OPER	ADJUST THE GAP	<p>Cause: The automatic gap adjustment (A.G.A.) is not enabled.</p> <p>Solution: Manually adjust the gap. Press the ON LINE key to reset the error condition.</p>
BUFFER OVERFLOW	CHARACTER LOST	<p>Cause: An overflow condition exists in the buffer.</p> <p>Solution: Place the printer in the OFF position, and the buffer will be cleared. Press the ON LINE key to reset the error condition.</p>
DATA SET OFF	N/A	<p>Cause: The DSR signal is off, and the printer is not ready for data transfer.</p> <p>Solution: Press the ON LINE key to reset the error condition.</p>

Continued on next page

19.6.1 Status Errors, Continued

Error messages,
continued

Table 19-4 Printer Status Errors, Continued

First Message	Second Message	Cause/Solution
RIBBON BLOCKED	CHECK RIBBON	<p>Cause: The cartridge ribbon is blocked.</p> <p>Solution: Check to be sure that the ribbon cartridge is inserted correctly. Turn the tension knob to verify that the ribbon is not jammed. Press the ON LINE key to reset the error condition.</p>
PATH2 TRIM ERROR	N/A	<p>Cause: A trimmer sensor error exists in paper path 2.</p> <p>Solution: Press the ON LINE key to reset the error condition.</p>
PATH3 TRIM ERROR	N/A	<p>Cause: A trimmer sensor error exists in paper path 3.</p> <p>Solution: Press the ON LINE key to reset the error condition.</p>
PRINT INTEGRITY	N/A	<p>Cause: Abnormal print out because of a possible print carriage blocking.</p> <p>Solution: Press the ON LINE key to reset the error condition.</p>

19.6.2 Recoverable Errors

Introduction

When a recoverable error occurs, the printer enters the WAIT state and displays a primary error message. If appropriate, a secondary error message is displayed that provides more specific information about the primary error. An intermittent buzzer may sound.

All error displays are reset by either pressing the ON LINE key or by a specific action.

Error messages

Table 19-5 describes the printer status error messages.

Table 19-5 Printer Recoverable Errors

First Message	Second Message	Cause/Solution
# COVER OPEN	N/A (Continuous buzzer)	<p>Cause: The top cover was open during the Initialization mode.</p> <p>Solution: Close the cover. Check to see if a magnet is installed on the cover.</p> <p>Cause: The Operator Panel may be faulty.</p> <p>Solution: Replace the Operator Panel.</p>
CLOSE COVER	N/A	<p>Cause: The top cover was opened during operation.</p> <p>Solution: Close the top cover.</p>
PAPER JAM	CHECK ALL PATHS	<p>Cause: A paper jam error condition existed in a paper path during a print head parking or paper ejection operation.</p> <p>Solution: Check to see that the paper is correctly installed and remove the paper if it is jammed.</p>
RIBBON BLOCKED	CHECK RIBBON	<p>Cause: The cartridge ribbon is blocked and the relative sensors detect the fault. The problem occurs when some characters are printed with poor ink density.</p> <p>Solution: Check that the ribbon is properly inserted. To be sure that the ribbon is not jammed, remove the ribbon and turn the tension knob.</p>
PRINT INTEGRITY	N/A	<p>Cause: The carriage assembly is blocked and the relative home position sensor detected the fault. The problem occurs when the printout is shifted to the right or left side.</p> <p>Solution: Check to see that the carriage assembly is free.</p>

Continued on next page

19.6.2 Recoverable Errors, Continued

Error messages,
continued

Table 19-5 Printer Recoverable Errors, Continued

First Message	Second Message	Cause/Solution
BUFFER OVERFLOW	CHARACTER LOST	<p>Cause: An overflow condition occurred in the input buffer. The EPDG I/O, EPDGC I/O, TPDG I/O, or TPDGC I/O board is transmitting data to the printer even though it was signaled to stop.</p> <p>Solution: Check the connection between the printer and the EPDG I/O, EPDGC I/O, TPDG I/O, or TPDGC I/O board. Press the ON LINE key to reset the error. If the buffer must be cleared, cycle the printer power off, then back on.</p>
DATA SET OFF	N/A	<p>Cause: The DSR signal to the printer is not active, and the printer is not ready for data transfer.</p> <p>Solution: Check the connection between the printer and the EPDG I/O, EPDGC I/O, TPDG I/O, or TPDGC I/O board.</p>

19.6.3 Nonrecoverable Errors

Introduction

When a nonrecoverable error occurs, the printer is halted and enters an Error state. A nonrecoverable error cannot be reset by a specific action, and therefore the printer power must be cycled off and back on.

Typically, a nonrecoverable error is detected while the printer is in the Bootstrap or normal operational state.

If the nonrecoverable error repeats after cycling the printer power off and back on, run the T&D test that is described in subsection 19.10 to identify the defective ORU. If after correction or replacement of the identified ORU, the nonrecoverable error reoccurs, contact your nearest Honeywell Technical Assistance Center.

Bootstrap error messages

In the Bootstrap state, the following error messages could be displayed. If one of the messages does appear, the Bootstrap will not complete, and consequently the printer hardware is not properly initialized.

- STARTING UP (fixed)
- SOFTWARE ERROR
- ENGINE DRIVER
- PM SET-UP ERR
- # VOID EXEC LIST
- # MFILE CHECKSUM
- UNK MFILE TYPE
- TOO MANY FILES
- # CARD 0 REMOVED

Generally, all the above error messages are related to either an EPROM, microcontroller, or data bus failure.

Normal operation error messages

In the normal operational mode, the following messages may be displayed. If one of the messages does appear, the Bootstrap was completed, but a handshaking problem occurred between two of the firmware modules.

- SPV FLT n1 n2 n3 (Supervisor fault)
 - INT FLT n1 n2 n3 (Interpreter fault)
 - P_M FLT n1 n2 n3 (Print Manager fault)
 - ENG FLT n1 n2 n3 (Engine Device fault)
-

19.7 Printer Self-Test

Introduction

Self-test is an internal printer test that checks the printer's logic and electromechanical performance at the user level. A test pattern will be produced on a sheet of printer paper.

Preparation

Before beginning the self-test, verify that:

- the paper and ribbon cartridge are installed correctly.
- the power cable is connected and the printer's power switch is in the off (0) position.
- The printer's top cover is closed.

Self-test procedure

Use the procedure in Table 19-6 to initiate and execute the printer's self-test. Figure 19-4 is an illustration of the printout.

Table 19-6 Signum 2043 Self-Test Procedure

Step	Action
1	<p>Press and hold the ON LINE key while placing the printer's power switch in the on (1) position. Release the ON LINE key.</p> <p>The display shows TEST, and a pattern is printed on the paper as illustrated in Figure 19-4. The printer continues to print until the ON LINE key is pressed a second time.</p> <p>Self-test will end if the printer runs out of paper.</p>
2	<p>The display shows WAIT.</p> <p>You can run self-test with the interface cable disconnected. If the interface cable is not connected to the EPDG I/O, EPDGC I/O, TPDG I/O, or TPDGC I/O board, the printer will display OFFD rather than WAIT when stopped.</p>

Character inspection

Inspect the printout for the following qualities.

- Equal character density
- Equal character darkness
- Character sharpness
- Character completeness
- Character underline and descenders
- Character smudges or strikes
- Equal line density
- Character composition (graphics)

Continued on next page

19.7 Printer Self-Test, Continued

Self-test pattern

Figure 19-4 illustrates the Signum 2043 printer's self-test pattern.

Figure 19-4 Signum 2043 Printer Self-Test Print Pattern

```
ABCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼
BCDEFGHIJKLMN OPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½
CDEFGHIJKLMN OPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|
DEFGHIJKLMN OPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§
EFGHIJKLMN OPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§"
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LMN OPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§"©ª«¬-®-
MN OPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§"©ª«¬-®-°
NOPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§"©ª«¬-®-°±
OPQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§"©ª«¬-®-°±2
PQRSTUVWXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§"©ª«¬-®-°±23
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WXYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§"©ª«¬-®-°±23´µ¶" , ¡°
XYZ[\]^_ 'abcdefghijklmnopqrstu vwxyz{|}~ ¡¢£¼½|§"©ª«¬-®-°±23´µ¶" , ¡°»
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19.8 Hex Dump Test

Introduction

The hex dump test should be performed when a protocol line error is detected, and other internal tests do not detect an error. The hex dump test provides a printout of all the characters that were previously transmitted to the printer by the host hardware. Control codes are also included such as ESC, DC4, CR, LF, etc.

Procedure overview

The procedure is executed by entering PROGRAM SETUP, selecting HEX-DUMP PRNT, and choosing the value YES. After initiating the procedure, any character sent to the printer will be printed as its hexadecimal value.

Example: Text in normal mode

ASCII: ESC C H
HEX: 1B 43 48
BASIC: CHR\$(27);CHR\$(67);CHR\$(72)

Example: Same text in hex-dump mode

41 53 43 49 49 3A 20 45 53 43 20 43 20 48 0D 0A 48 45 58 20 20 3A 20 31
42 20 34 33 20 34 38 0D 0A 42 41 53 49 43 3A 20 43 48 52 24 28 32 37 29
3B 43 48 52 24 28 36 37 29 3B 43 48 52 24 28 37 32 29 0D 0A

19.9 Fault Probability Guide

Introduction

Sometimes a fault is detected, but there is no error display.

Usually, if a fault is associated with an electromechanical assembly, no error is detected by the printer firmware because there is no electronic feedback for the fault condition. Specifically, except for the home position and ribbon sensors, the other mechanical parts do not have a return feedback because they are part of an open loop circuit. The home position and ribbon sensors have a feedback circuit to return the status of the part.

Example: electromechanical fault

An example of an electromechanical fault is the paper not advancing upon command. The paper motor, driver circuit, and logic circuitry are involved, but there is no way to identify the part that actually failed. For this fault, only paper movement verification is possible during the T&D printout.

Inconsistent character printing

Table 19-7 is a list of causes and solutions for inconsistent character printing. The character printing may be dark, light, have gaps or spaces, or be incomplete.

Table 19-7 Inconsistent Character Printing

Cause	Solution
The ribbon cartridge installed improperly.	Reinstall the cartridge.
The ribbon cartridge may be faulty.	Install a new cartridge.
The ribbon does not perform correctly (RIBBON BLOCKED error message).	Verify that the carriage unit movement does not interfere with the ribbon movement. If it does, the left support group pivot assembly must be replaced.
The print head cable is installed improperly.	Check the mounting of the print head cable. The print head cable must be reinstalled or replaced.
The print head may be faulty.	The print head must be replaced.
The main electronics board may be faulty.	The main electronics board must be replaced.
The power supply electronics board may be faulty.	The power supply electronics board must be replaced.
The gap between the print head and platen is incorrect.	The gap between the platen and print head must be adjusted.

Continued on next page

19.9 Fault Probability Guide, Continued

Printer stops printing or prints slowly

Table 19-8 is a list of causes and solutions when the printer stops printing or prints slowly.

Table 19-8 Printing Stops or Slow Printing

Cause	Solution
The thermosensor in the print head is damaged.	It may be necessary to replace the print head if it is not to specifications.
The connection between the print head and the main electronics board is faulty.	Check the connection. It may be necessary to replace the cable.
The main electronics board may be faulty.	It may be necessary to replace the main electronics board.

Color printing quality is poor

Table 19-9 is a list of causes and solutions when the quality of the color printing is poor.

Table 19-9 Color Printing Poor

Cause	Solution
The color ribbon cartridge is installed incorrectly.	Reinstall the color ribbon cartridge.
The color motor is not mounted correctly or is faulty.	Check the mounting of the motor. It may be necessary to replace the motor.
The connection between the print head and the main electronics board is faulty.	Check the connections. It may be necessary to replace the cable.
The main electronics board may be faulty.	It may be necessary to replace the main electronics board.

Character printing misaligned vertically

Table 19-10 is a list of causes and solutions when the character printing is misaligned vertically.

Table 19-10 Character Printing Misaligned Vertically

Cause	Solution
The printer is misaligned.	Run T&D to check vertical printer alignment.
The carriage belt is not adjusted correctly.	The carriage belt may require adjustment.

Continued on next page

19.9 Fault Probability Guide, Continued

Tractor/friction solenoid not operable

Table 19-11 is a list of causes and solutions when the tractor/friction solenoid is not operable.

Table 19-11 Tractor/Friction Solenoid Not Operable

Cause	Solution
The tractor/friction solenoid may be faulty.	It may be necessary to replace the tractor/friction solenoid.
The connection between the tractor/friction solenoid and the main electronics board may be faulty.	Check the connection. It may be necessary to replace the cable.
The main electronics board may be faulty.	It may be necessary to replace the main electronics board.

Paper not advancing correctly

Table 19-12 is a list of causes and solutions when the paper does not advance correctly.

Table 19-12 Paper Not Advancing Correctly

Cause	Solution
The connection between the paper motor and the main electronics board is faulty.	Check the connection on the board. It may be necessary to replace the motor.
The paper motor may be faulty.	It may be necessary to replace the motor.
The paper movement does not provide equal line spacing.	The belt tension may require adjustment.
The main electronics board may be faulty.	It may be necessary to replace the main electronics board.
The holes of the paper fanfold are torn.	Remove the torn paper and reload the paper. Adjust the tension of the paper between the left and right tractors.
The paper is not aligned correctly on the sprocket wheels.	Reload the paper and ensure that the corresponding holes on each side of the paper are properly aligned on the tractors.

Continued on next page

19.9 Fault Probability Guide, Continued

Printer initialized, display and LEDs blank

Table 19-13 is a list of causes and solutions when the printer initialized, but the display and LEDs are blank. The Operator keys are available.

Table 19-13 Display and LEDs Blank

Cause	Solution
The connection between the Operator Panel and the main electronics board is faulty.	Check the connections. It may be necessary to replace the Operator Panel or main electronics board.

Printer initialized, display blank

Table 19-14 is a list of causes and solutions when the printer initialized, but the display is blank. The Operator keys are not available.

Table 19-14 Display Blank

Cause	Solution
The connection between the Operator Panel and the main electronics board is faulty.	Check the connections. It may be necessary to replace the Operator Panel or main electronics board.
The ribbon sensor is faulty.	Check the ribbon sensor action through the pivot assembly. It may be necessary to replace the pivot assembly, the sensors cable, or the ribbon motor assembly.

Printer initialized, carriage assembly moves 1 inch to right

Table 19-15 is a list of causes and solutions when the printer initialized, but the carriage assembly moved 1 inch to the right.

Table 19-15 Carriage Assembly Moves 1 Inch Right

Cause	Solution
The connection to the home position sensor or the carriage motor is faulty.	Check the home position sensor connection and carriage motor connection on the main electronics board.
The home position sensor or carriage motor assembly are faulty.	Check the ribbon sensor action through the carriage assembly and the impedance of the motor. It may be necessary to replace the home position sensor cable or the carriage motor assembly.

Continued on next page

19.9 Fault Probability Guide, Continued

**Printer not initialized,
buzzer sounds
continuously**

Table 19-16 is a list of causes and solutions when the printer did not initialize and the buzzer sounds continuously.

Table 19-16 Printer Not Initialized and Buzzer Sounds

Cause	Solution
The Controller EPROM or the main electronics board may be faulty.	It may be necessary to replace the Controller EPROM or main electronics board.

19.10 Test and Diagnostic Procedure

Introduction

The Test and Diagnostic (T&D) program checks the various functional parts that compose the printer and diagnoses possible operating defects which may occur during operation.

The T&D program can also be considered as a software tool to support production activities.

T&D structure

The printer's firmware architecture is composed of two layers. The Platform layer manages the interface between the hardware resources. The Application layer contains emulation management modules.

The T&D program is an application module that uses the Platform layer to test the electrical and electromechanical hardware.

During T&D, the printer's RAM is tested to ensure that there are no failures in the area where the operating system will reside. This portion of the T&D is performed during the printer's Bootstrap. If the Bootstrap tests are successful, the diagnostic application is initialized, and subsequent T&D tests can proceed.

Continued on next page

19.10 Test and Diagnostic Procedure, Continued

T&D requirements

The User T&D is the T&D procedure for field maintenance. It has the following requirements.

- The MFG jumper on the Operator Panel must not be present.
- Loopback connectors must be installed on the serial and parallel interface connectors.
- A loopback connector must be installed on the paper stacker connector.
- Fanfold paper (136 character, 72 lines) must be installed in the front tractor before beginning the T&D program.

Initiating the T&D program

To initiate the T&D program, simultaneously press the ON LINE and PITCH keys for at least 2 seconds while placing the printer power switch in the on (1) position. If the keys are held for an extended time, a KEYLOCK message appears.

Testing overview

All the tests that are listed in Table 19-17 are sequentially executed. During the execution of each test, the Operator Panel display will provide messages as an indication of the activity in progress or the task that the operator must perform during the test.

At the end of the tests, sample forms are printed out for all electromechanical checks and mechanical adjustments.

ATTENTION

It is required that no paper debris is present in any paper path when the T&D program is executed. The sensors must not be covered by paper at the beginning of the program.

The T&D program automatically adjusts, without intervention, all the reflective sensors (single sheet, front fanfold, and rear fanfold) in the printer.

Also, the front cover must be closed. If not, a # COVER OPEN message will be displayed.

Continued on next page

19.10 Test and Diagnostic Procedure, Continued

T&D test list

Table 19-17 is a list of all T&D tests that are performed in sequence.

Table 19-17 T&D Tests

Test Code	Test Description	ORU
T&D 0	Boot RAM Test	Main electronics board
T&D 1	Hardware/Firmware Check Test	EPROM/Main electronics board
T&D 2	Controller EPROM CRC Test	Controller EPROM
T&D 4	Option Card EPROM CRC Test	Option card
T&D 5	Generator EPROM CRC Test	Generator EPROM
T&D 6	Operator Panel Test	Operator Panel electronics board
T&D 7	Not used	
T&D 8	NVM Test	Main electronics board
T&D 9	Serial Interface Test	Serial interface electronics board
T&D 10	Mechanical Option Test	Paper stacker/ASF
T&D 11	Ribbon and Color Motor Test	Main electronics board/color motor/ribbon motor
T&D 12	AGA Calibrate Test	Main electronics board/AGA motor
T&D 13	Not used	
T&D 14	Fanfold Module Printout Test	Main electronics board/print head mechanism
T&D 15	First Line Adjustment Test	Main electronics board/mechanism
T&D 16	Vertical Adjustment Test	Main electronics board/mechanism
T&D 17	Tear-Off Adjustment Test	Main electronics board/mechanism
T&D 18	Single Sheet Printout Test	Main electronics board/print head mechanism
T&D 19	Interlock Test	Operator Panel electronics board
T&D 20	T&D End Dummy Test	N/A
T&D 21	Watch Dog Test	Main electronics board

Continued on next page

19.10 Test and Diagnostic Procedure, Continued

T&D error messages

Table 19-18 lists the possible T&D error messages.

Table 19-18 Diagnostic Procedure Error Messages

Error Number (X)	Description
ORU0	Main Electronic Board Failure
ORU1	Operator Panel Board Failure
ORU2	Diagnostic Card Failure
ORU3	Electromechanical Failure
ORU4	Supervisor Firmware Failure
ORU5	EPROM Failure

19.11 Printer Replacement

CAUTION

CAUTION—When replacing a printer, be sure that the power source line voltage is the same as the voltage requirement displayed at the back of the printer. If the line voltage does not match the printer voltage, do not use the printer; instead, consult your Honeywell representative.

Introduction

The printer is the Optimal Replaceable Unit (ORU). A few lower level replacement parts are also currently (1996) available by factory order.

Removal procedure

Use the procedure in Table 19-19 to disconnect and remove a printer.

Table 19-19 Printer Removal Procedure

Step	Action
1	Place the printer's power switch that is located at the left side of the printer in the off (0) position.
2	Disconnect the ac power cord.
3	Disconnect the data cable from its connector at rear of the printer.
4	Remove the printer.

Continued on next page

19.11 Printer Replacement, Continued

Installation procedure Use the procedure in Table 19-20 to install a printer.

Table 19-20 Printer Installation Procedure

Step	Action
1	Lift the printer from its shipping box by firmly grasping both sides of the printer. Temporarily place the printer on a flat work surface.
2	<p>Remove the printer accessories that are included in the box. The accessories should include the following items.</p> <ul style="list-style-type: none"> • ribbon cartridge • tractor unit • power cable • driver diskette <p>An optional second tractor unit and color ribbon cartridge in separate boxes may be included with the printer.</p>
3	If a ribbon cartridge is not installed in the printer, use the procedure in subsection 19.12 to install a ribbon cartridge.
4	If the printer must operate with one or two tractors, use the procedure in subsection 19.13 to install the tractor(s).
5	<p>Choose a suitable location for the printer. Consider the following.</p> <ul style="list-style-type: none"> • The distance between the printer and the US module must not exceed the length of the interface cable. • The location must be sturdy, horizontal, and stable. • The printer must not be exposed to direct sunlight, extreme heat, cold, dust, or high humidity. • The ac power outlet must be near the printer and compatible with the printer's power cord plug. Ground must be provided through the plug. The voltage at the outlet must match the voltage shown on the printer's name plate. <p>Place the printer in its operating location.</p>
6	<p>Connect one end of the 25-pin interface cable to the I/O interface board (EPDG I/O or EPDGC I/O) in the US module that will control the printer and the other end of the cable to the printer.</p> <p>To secure the connections, tighten the connector screws at both ends of the cable.</p>
7	<p>Verify that the printer's power switch that is located at the left side of the printer is in the off (0) position.</p> <p>Connect the power cord to the power connector at the rear of the printer.</p>
8	Place the power switch in the on (1) position. The print head should move to the left side of the printer and stop.

19.12 Ribbon Cartridge Replacement

CAUTION

CAUTION—The print head can become hot during extended operation. Be sure it is cool enough to touch before starting to remove the printer cartridge.

Printer cartridge replacement procedure

Use the procedure in Table 19-21 to replace a printer ribbon cartridge.

Table 19-21 Ribbon Cartridge Replacement Procedure

Step	Action
1	Place the printer's power switch in the off (0) position.
2	Open the printer cover by pressing on the release buttons.
3	Move the printer carriage to the center of the printer.
4	Pull the paper thickness lever towards the front of the printer to facilitate the removal of the ribbon cartridge.
5	Grasp the ribbon cartridge firmly at its sides and lift it straight up until the side clips release it.
6	Remove the new ribbon cartridge from its bag. Remove and discard the hold fast that blocks the ribbon.
7	Before installing the ribbon cartridge, turn the ribbon winding knob on the cartridge in the direction of the arrow on the cartridge to take up any ribbon slack.
8	Insert the ribbon between the print head and the print head mask. Lay the cartridge over the printer carriage. Make sure the two pins on each side of the cartridge are positioned over the white retaining clips of the printer carriage.
9	Push the cartridge gently down while turning the tension knob. Make sure that the cartridge clips into place.
10	To tighten the ribbon, turn the tension knob in the direction of the arrow on the ribbon cartridge.
11	To ensure that the ribbon guide is free, manually move the print carriage from right to left and back.
12	Move the paper thickness lever towards the back of the printer and adjust it to obtain the best quality printing.
13	Check the quality of print with the self-test procedure in subsection 19.7. If the pattern is not satisfactory, adjust the paper thickness lever accordingly.
14	Close the front printer cover.
15	Place the printer's power switch in the on (1) position.

19.13 Tractor Installation/Removal

Introduction

A paper tractor can be installed in three positions. One position is in the front of the printer, and two positions are at the rear of the printer.

The front position provides push paper feeding, and the rear positions are for either push or pull paper feeding.

CAUTION

CAUTION—Be sure the printer's power switch is in the off (0) position before installing or removing a tractor.

Front position installation/removal

Use the procedure in Table 19-22 to install or remove a tractor in the front position.

Table 19-22 Tractor Front Position Installation/Removal Procedure

Step	Action
1	Place the printer's power switch in the off (0) position.
2	To install the tractor, lift the front tractor cover and fasten it to the single sheet support cover.
3	Lift the tractor connector protector at the right side of the printer. Insert the tractor with its connector on the right by pushing it upward until it clicks.
4	Close the front tractor cover.
5	To remove the tractor, press the two small levers at both sides of the tractor that secure the tractor in place and pull the tractor downward. Close the tractor connector protector.
6	Close the front tractor cover.
7	Place the printer's power switch in the on (1) position.

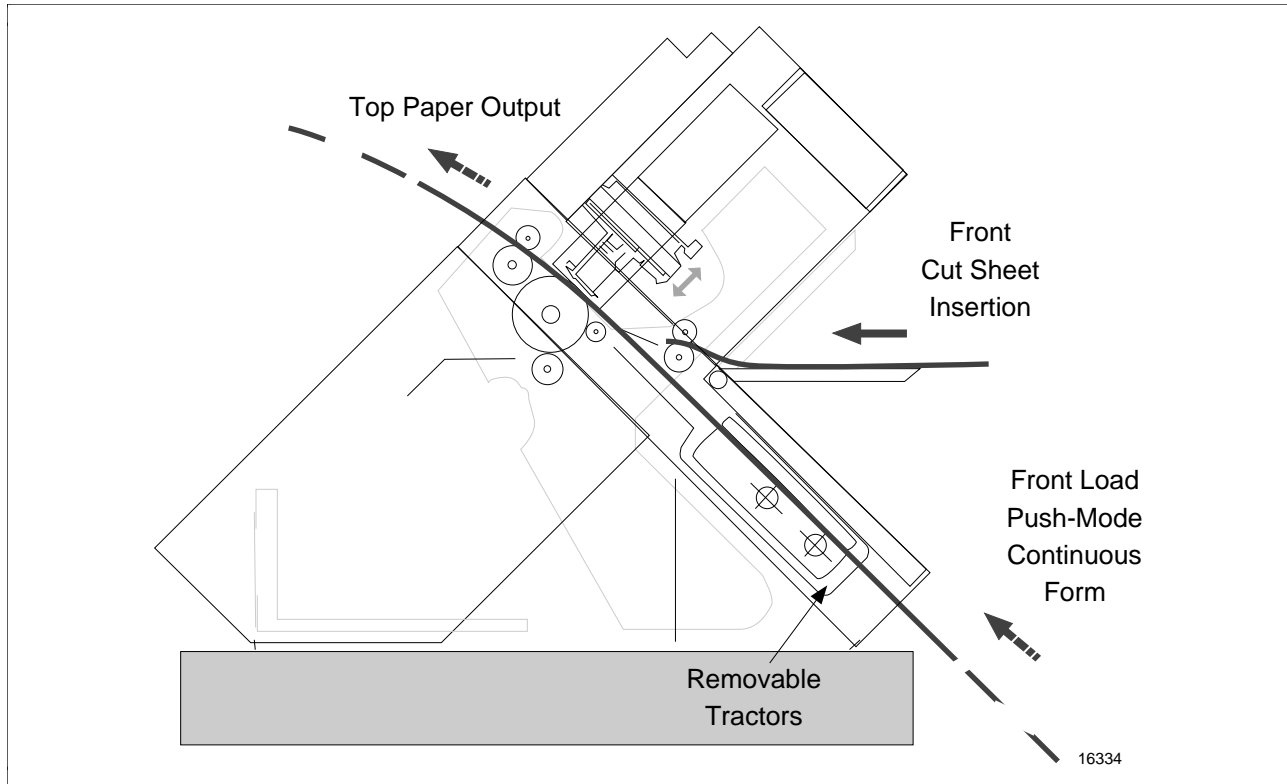
Continued on next page

19.13 Tractor Installation/Removal, Continued

Front tractor push operation

Figure 19-5 illustrates front tractor push operation.

Figure 19-5 Front Tractor Push Operation



Continued on next page

19.13 Tractor Installation/Removal, Continued

Rear push position installation/removal

Use the procedure in Table 19-23 to install or remove a tractor in the rear push position.

Table 19-23 Tractor Rear Push Position Installation/Removal Procedure

Step	Action
1	Place the printer's power switch in the off (0) position.
2	Remove the rear tractor cover.
3	Set the slider on the tractor in the push position (down position).
4	Orient the tractor with its grooves facing downward and its connector on the left side.
5	Insert the left and right tractor grooves into the printer pins until the tractor clicks in place.
6	To remove the tractor, press the two small levers that secure the tractor in place and pull upward.
7	Replace the rear tractor cover.
8	Place the printer's power switch in the on (1) position.

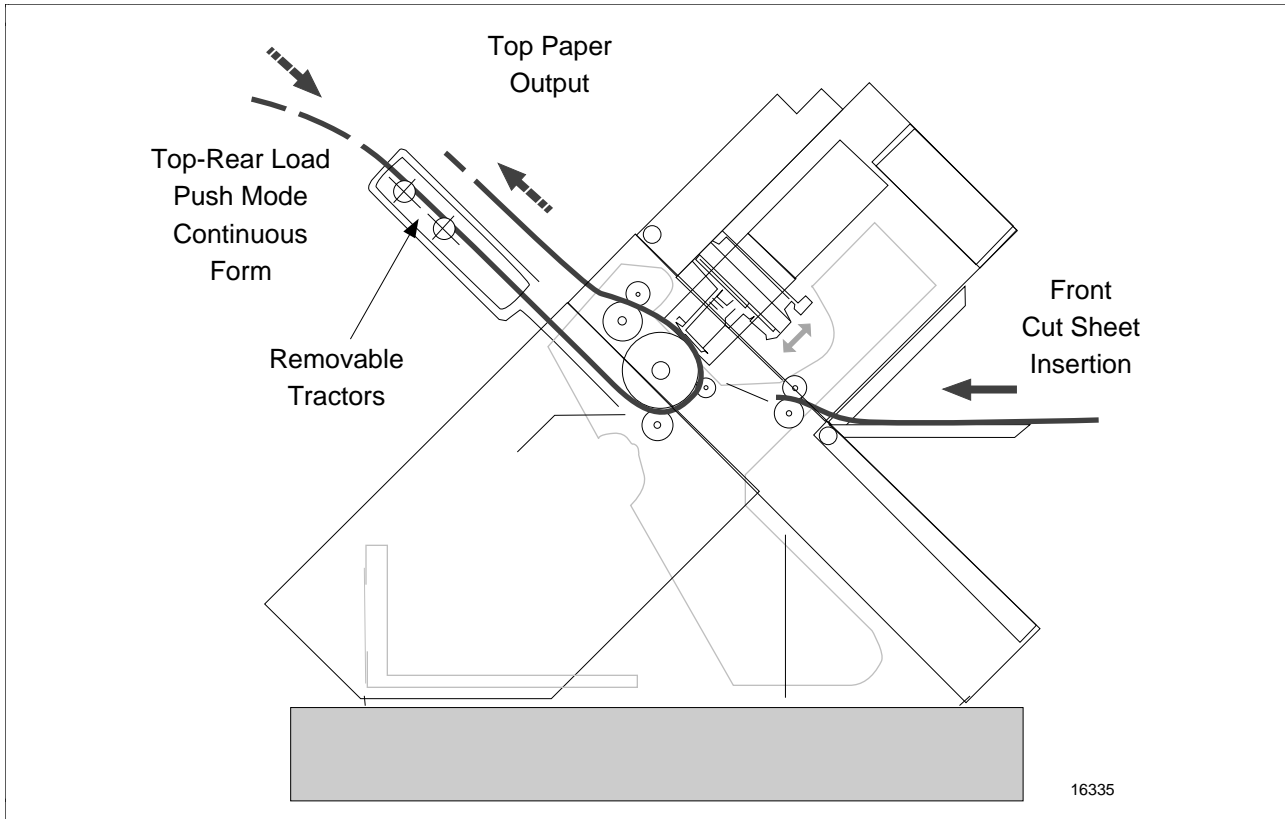
Continued on next page

19.13 Tractor Installation/Removal, Continued

Rear tractor push operation

Figure 19-6 illustrates rear tractor push operation.

Figure 19-6 Rear Tractor Push Operation



Continued on next page

19.13 Tractor Installation/Removal, Continued

Rear pull position installation/removal

Use the procedure in Table 19-24 to install or remove a tractor in the rear pull position.

Table 19-24 Tractor Rear Pull Position Installation/Removal Procedure

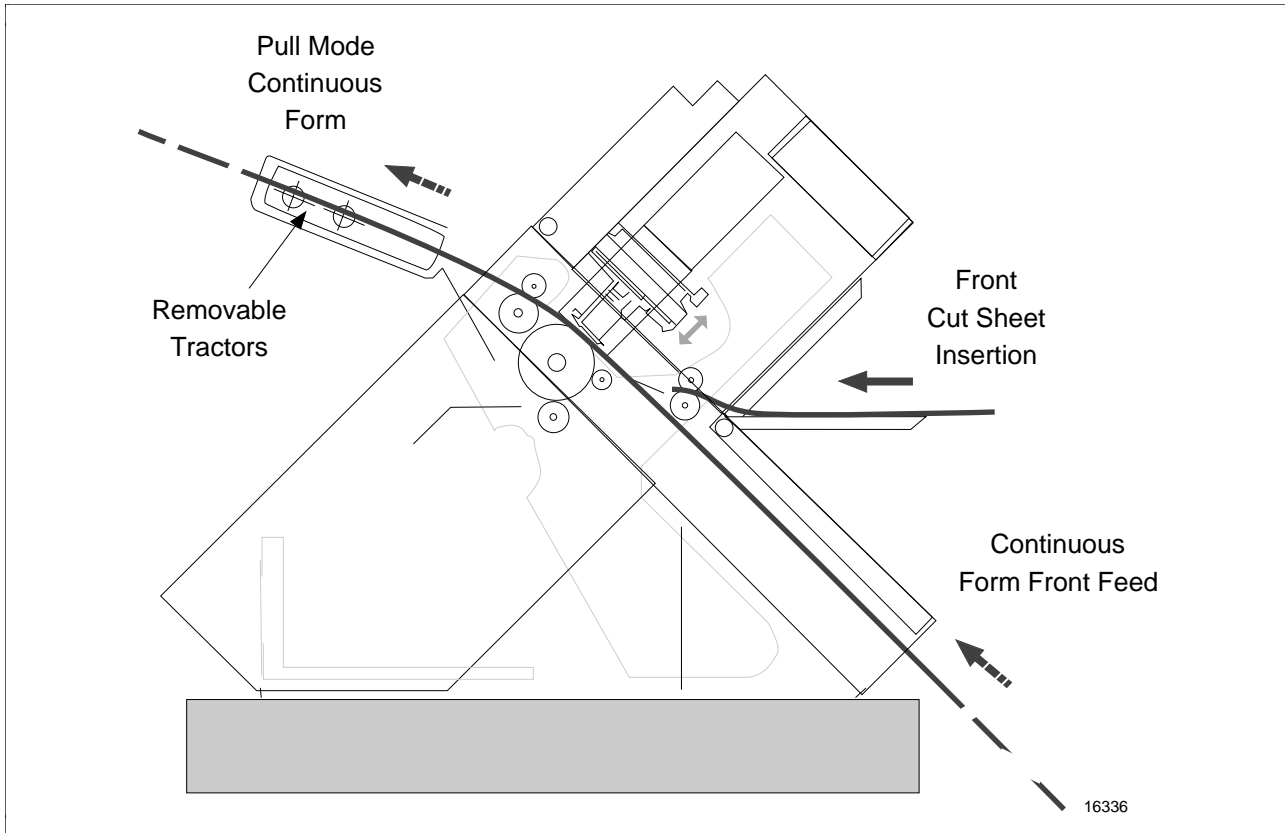
Step	Action
1	Place the printer's power switch in the off (0) position.
2	Remove the rear tractor cover.
3	Set the slider on the tractor in the pull position (up position).
4	Move the paper bail to the forward position.
5	Orient the tractor with its grooves facing downward and its connector on the left side.
6	Insert the left and right tractor grooves into the printer pins until the tractor clicks in place.
7	Position the levers under the tractor down to unlock them and gently press the tractor downward until it clicks in place.
8	To remove the tractor, lift the tractor, press the two small levers that secure the tractor, and pull upward.
9	Replace the rear tractor cover.
10	Place the printer's power switch in the on (1) position.

19.13 Tractor Installation/Removal, *Continued*

Rear tractor pull operation

Figure 19-7 illustrates rear tractor pull operation.

Figure 19-7 Rear Tractor Pull Operation



Continued on next page

19.13 Tractor Installation/Removal, Continued

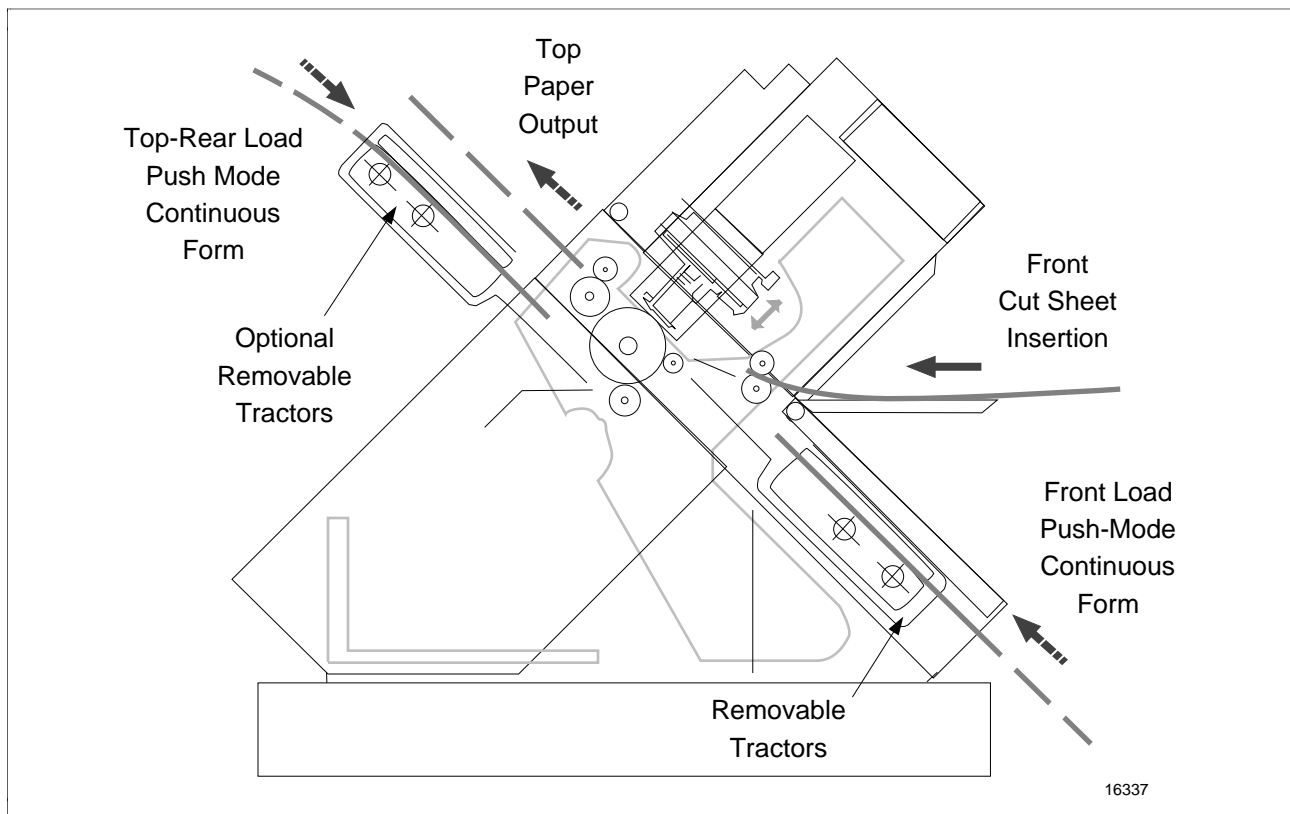
Dual tractor operation

Dual tractors can be installed in both the front and rear positions simultaneously. Continuous paper can be loaded at either the front or rear of the printer.

Front tractor push or rear tractor pull operation

Figure 19-8 illustrates either front tractor push operation or rear tractor pull operation.

Figure 19-8 Front Tractor Push or Rear Tractor Pull Operation



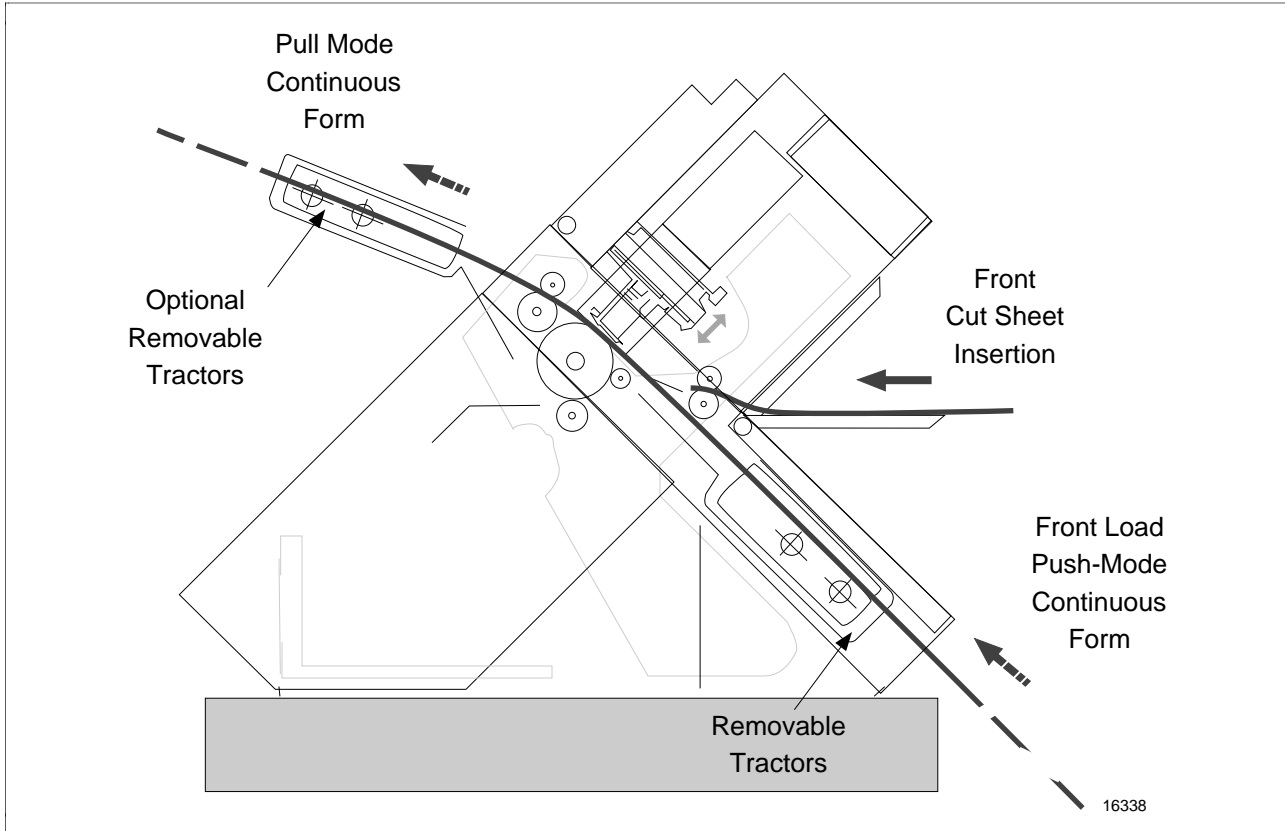
Continued on next page

19.13 Tractor Installation/Removal, Continued

Front tractor push and rear tractor pull operation

Figure 19-9 illustrates front tractor push operation and rear tractor pull operation.

Figure 19-9 Front Tractor Push and Rear Tractor Pull Operation



19.14 Print Head Replacement

Replacement procedure

Use the procedure in Table 19-25 to remove and replace a print head.

Table 19-25 Print Head Removal/Replacement Procedure

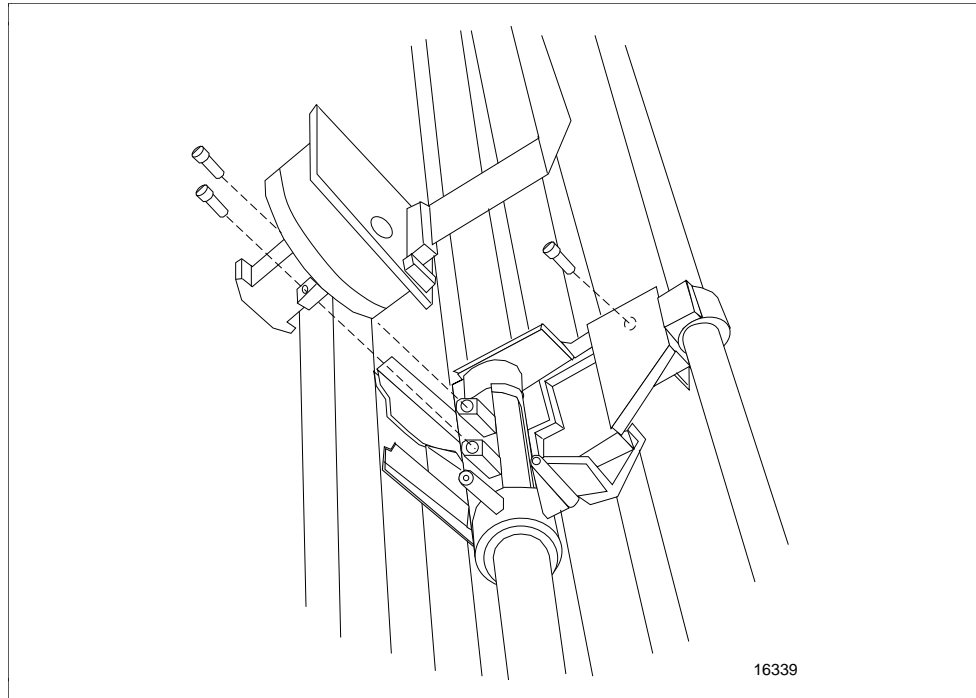
Step	Action
1	Place the printer's power switch in the off (0) position. Be sure the print head is not too hot to touch.
2	Depress the pushbuttons on each side of the top cover and open the cover.
3	Use the procedure in subsection 19.12 to remove the ribbon cartridge.
4	Loosen and remove the screw that secures the print head cable to the carriage assembly.
5	Disconnect the print head cable from the print head.
6	Loosen and remove the two screws that secure the print head to the carriage assembly.
7	Remove the print head from the carriage assembly.
8	Install a new print head by performing the above steps in reverse order.
9	Run the self-test (subsection 19.7) to verify that the new print head is properly installed.

Continued on next page

19.14 Print Head Replacement, Continued

Print head replacement Figure 19-10 illustrates replacement of the print head.

Figure 19-10 Print Head Replacement



19.15 Spare Parts

Optimal Replaceable Units (ORUs)

Table 19-26 is a list of Optimal Replaceable Units (ORU) for the Signum 2043 printer that can be purchased from Honeywell. Other than a replacement print head and a tractor, no other electromechanical assemblies or electronic board assemblies are considered ORU parts.

Table 19-26 Optimal Replaceable Units (ORU) Parts List

Description	Part Number
Signum 2043 Printer, 120 Vac	51196690-100
Signum 2043 Printer, 240 Vac	51196690-200
Ribbon Cartridge, Black	51196690-400
Ribbon Cartridge, Color	51196690-501
Paper Tractor Unit	51196690-800
Printer Floor Pedestal	51196690-900
Print Head	51196690-920

Index

A, B

- Adding A Module
 - Grounding Connection 30
- Annunciator 50
 - Replacement 52
 - Schematic 51
 - Spare Part 53
 - Specifications 51
- ASPI-32
 - Bulk Power Assembly 189
 - Cleaning Procedure 184
 - Indicator Test 185
 - MIRA Mechanical Assembly 193
 - Parts Replacement 188
 - Print Head Adjustment 194
 - Print Test 185
 - Print/Function Selection 190
 - Printer Intercabling 192
 - PWA Pinning Options 191
 - Ribbon Traction Cords Adjustment 194
 - Spare Parts 195
 - Troubleshooting Analysis 187
 - Troubleshooting Guide 186
- ASPI-41
 - Adjustments 198
 - ALIX Power Supply Replacement 221
 - Cabinet Removal 216
 - Carriage Belt Adjustment 228
 - Carriage Group Replacement 222
 - Carriage Motor Replacement 224
 - Cleaning Procedure 198
 - Color Motor Replacement 226
 - Diagnostic 199
 - Diagnostic Procedure 204
 - Diagnostic Test message 206
 - Installation Procedure 208
 - Paper Belt Tension Adjustment 229
 - Paper Chute Installation 209
 - Paper Motor Replacement 224
 - Print Head Installation 214
 - Print Head to Platen Adjustment 230
 - Print Mechanism Replacement 219
 - Printer Cabinet—Exploded View 217
 - Problem Solving Guide 200
 - Removal Procedure 207
 - Ribbon Installation 212
 - Ribbon Removal 211
 - Self-Test Pattern 203
 - Self-Test Procedure 202
 - Spare Parts List 231
 - Test/Troubleshooting 199
- ASPI-46
 - Cabinet Removal 249
 - Cleaning Procedure 233
 - Diagnostic Error Messages 242
 - Diagnostic Procedure 240

- Main Processing Board 252
- Power Supply Board Replacement 251
- Printer Diagnostic Test Pattern 241
- Printer Parts Removal 249
- Printer Removal 243
- Problem Solving Guide 235
- Ribbon Installation 245
- Ribbon Removal 244
- Self-Test Procedure 238
- Spare Parts List 254
- Startup 254
- Troubleshooting Procedure 234

C

- Calibration
 - Trend Pen Recorder 110, 122
- Cartridge Drive
 - Cabling 87
 - Cleaning 83, 93
 - Loading 82, 92
 - Mounting 85
 - Operating Procedure 3
 - Pinning 88
 - Removal Procedure 85
 - Replacing 86
 - Spare Parts 90, 101
 - Troubleshooting 84, 96
 - Unloading 82, 92
- Cartridge Enclosure
 - Definition 91
- CE Compliant
 - Cartridge Enclosure 91
 - Monitor 167
 - Monitor Description 168
- CE Compliant Monitor
 - Cabling 179
 - Degaussing 180
 - Screen Adjustments 176
 - Spare Parts 181
 - Terminations 178
- Cleaning
 - ASPI-32 184
 - ASPI-41 198
 - ASPI-46 233
 - Cartridge 83, 93
 - CE Compliant Monitor 169
 - Monitor 151
 - Signum 2043 261
 - Touchscreen 137
- Connecting the Operator Entry Panel 43
- Controls
 - AC power switch 1
 - Contrast 3
 - Cursor 9
 - Degauss button 3
 - Intensity 3

Index

D

DAT Drive
Removal *100*

Diagnostic
ASPI-32 *185*
ASPI-41 *199, 204*
ASPI-46 *240*
Signum 2043 *278*

Dual Node Module *77*

E

Engineer's Keyboard *9*
Engineer's Keyboard *4*
Expansion to Add Monitor *21*

F, G

Fail Indicator *59*
Filter Replacement *79*
Five-Slot Module *77*
Furniture
Description *7*
Spare Parts *39*

Furniture Hardware *7*

H

HVTS PDGI 15 Test Pattern *142*

I, J

Integrated Keyboard
F1-F12 Description *57*
Full Travel Keyboard *57*
Functional Description *55*
Operator Panel *59*
Relegendable Keys *58*
Relegendable Key Panel *58*

K, L

Keyboard
Extended Auxiliary Keyboard *42*
Insert *5*
Keyboard and Manifold board Cabling *46*
Manifold Board *44*
Slide Tray *49*
Spare Parts *53*
Top *13*

M, N

Matrix Printer Ribbon—ASPI-32 *5*

Module
Fan module *77*
Power Supply, Module *77*
Spare Parts *80*

Module Replacement *78*

Monitor
Access *152, 169*
Adjustments-Left Side *159*
Adjustments-Right Side *158*
Cabling *152, 170*
CE Compliant *167*
Cleaning *151, 169*
Description *149*
Focus Adjustment *161*
Further Adjustments *164*
Fuse Replacement *165*
Horizontal Linearity *163*
Installing *174*
Mounting Bolts *155, 173*
Removing *152, 170*
Replacing Control Assembly *157, 175*
Retaining Block *156, 174*
Side Pin Cushion Adjustment *164*
Spare Parts *165*
Specifications *150*
Termination Switch *150*
Touchscreen Mounting *154, 172*
Vertical Linearity *162*

Monitor controls *3*
monitor positions *9*

Mouse
Cleaning *70*
Select Switches *69*
Spare Parts *72*
Troubleshooting *71*

Multitone Annunciator *50*

O

Operator Entry Panel *4*

Index

P

- Parts Identification
 - AC Power Distribution 20
 - Adding Upper Monitor 23
 - Cabinet Dust Filter 26
 - Card File Assembly 28
 - Card File Enclosure 19
 - Card File Support Tray 25
 - Cover Mounting Brackets 27
 - Dual Monitor Front 15
 - Dual Monitor Rear 16
 - Fan Assembly 18
 - Front Station Base 11
 - Keyboard Top 13
 - Module Dust Filter 31
 - Monitor Wedge Assembly 24
 - Peripheral Power Supply 18
 - Rear Station Base 12
 - Under Keyboard 14
 - Upper Station Base 10
- Periodic Replaceable Items 5
- Peripheral Power Supply
 - Assemblies 133, 134
 - Auxiliary power Connections 130
 - Cabling 132
 - Replacing 131
 - Spare Parts 135
- Peripheral Power Supply Cabling 132
- Pinning
 - ASPI-32 Printer 191
 - Cartridge Drive 88
 - Five Slot Module/Dual Node Module 77
- Pinning the Cartridge Drive 88
- Pinning the Cartridge Drive, Continued 89
- Power Good 59

Q

- QWERTY Operator Entry Panel 9
- QWERTY Operator's Keyboard 41

R

- Removable media drive 3
- Removing the Operator Entry Panel 43
- Replacing the Peripheral Power Supply 131
- Reset 59
- Ribbon, Black—ASPI-32 5
- Ribbon, Black—ASPI-41 5
- Ribbon, Black—ASPI-46 5
- Ribbon, Black—Signum 2043 (15-pack) 5
- Ribbon, Black—Signum 2043 (single-pack) 5
- Ribbon, Color—Signum 2043 (15-pack) 5
- Ribbon, Color—Signum 2043 (single-pack) 5

S

- Section contents 1, 7, 41, 55, 69, 73, 81, 91, 103, 115, 129, 137, 149, 183, 197, 233
- Self-Test Print Pattern 239
- Signum 2043
 - Adjustments 261
 - Cleaning Procedure 261
 - Diagnostic Procedure 278
 - Installation Procedure 283
 - Print Head Installation 293
 - Removal Procedure 282
 - Self-Test Pattern 271
 - Self-Test Procedure 270
 - Tractor Installation/Removal 285, 287, 289
- Spare Parts
 - ASPI-32 Printer 195
 - ASPI-41 Printer 231
 - ASPI-46 Printer 254
 - Furniture 39
 - Module 80
 - Monitor 165
 - Mouse 72
 - Periodic Replaceable Items 5
 - Peripheral Power Supply 135
 - Touchscreen 147
 - Trackball 75

Index

T

Termination Switch Configuration *150*

Test Pattern

ASPI 41 *206*

ASPI 46 *241*

Touchscreen

Alignment Procedure *141*

Assembly exploded View *143*

Assembly Procedure *145*

Cleaning *137*

Mounted to Monitor *146*

Removing *143*

Replacing *147*

Spare Parts *147*

Trackball

Spare Parts *75*

Trend Pen

Calibration *110, 122*

Trend Pen Recorder

Cabling *107, 119*

Cleaning *105, 117*

Configuring AC Power Option *110*

Loading Charts *105, 117*

Removing *108, 120*

Removing Chart Cassette *105, 117*

Replacing *109, 121*

Replacing Print Cartridges *106, 118*

Troubleshooting *107, 119*

U, V, W, X, Y, Z

US Auxiliary Keyboard *4, 9, 41*

US Node Configuration *9*

US Options *8*

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