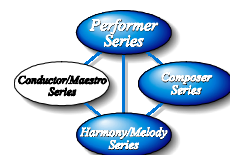


Conductor VMS Series 42 Auxiliary Terminal





This instruction provides specific hardware installation, troubleshooting, maintenance, and repair and replacement procedures information necessary for the Conductor VMS Series 42 Auxiliary Terminal. There are additional instructions that explain how to set up and use the auxiliary terminal. Refer to the table of reference documents in Section 1 for more information on these instructions.

This instruction can be used as a guide by system engineers. It is not a tutorial and assumes the reader has a general knowledge of installing and maintaining process control systems.

Some sections of this instruction have been prepared in procedure format. There is a sequence flowchart that follows the introduction to the section and any nonprocedural information. This flowchart directs personnel to the appropriate procedure located in the back of this instruction. By treating each task as a separate entity, the procedures provide an easy method for finding the information needed to perform each task. The procedures can be removed and placed in separate folders or notebooks, or carried to the job site.

The procedures have check boxes in the margin by each step. When performing a procedure, check each box as each step is completed.

Do not perform any procedures related to installation, maintenance or repair until reading and understanding this instruction.

Throughout this instruction a question mark (?) is used to indicate revision levels in part numbers and variables in nomenclature positions. In most cases, if a variable is at the end of a nomenclature item the question mark will not be included.

This instruction covers C-I-CV42C auxiliary terminals.



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Safety Summary

**GENERAL
WARNINGS**

Equipment Environment

All components, whether in transportation, operation or storage, must be in a noncorrosive environment.

Electrical Shock Hazard During Maintenance

Disconnect power or take precautions to insure that contact with energized parts is avoided when servicing.

**SPECIFIC
WARNINGS**

There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death. (p. PR6-1, PR8-1, PR14-1, PR15-1, PR24-1, PR25-1, PR26-1, PR27-1, PR29-1, PR30-1, PR32-1, PR33-1, PR36-1, PR37-1)

Disconnect power before attempting these procedures. Failure to do so could result in severe or fatal shock, or equipment damage. (p. PR17-1, PR19-1, PR20-1, PR21-1, PR23-1)

Disconnect the AC line cord or power lines from the operating branch circuit coming from the source before attempting electrical connections. Instruments powered by AC line voltage constitute a potential for personnel injury due to electric shock. (p. PR5-1)

Wear eye protection whenever working with cleaning solvents. When removing solvents from printed circuit boards using compressed air, injury to the eyes could result from splashing solvent as it is blown off the printed circuit board. (p. PR17-1)

The monitor will slide out by itself when the mounting hardware is removed. The monitor weighs approximately 27 kilograms (60 pounds) and can cause bodily injury if it is allowed to slide out by itself. Support the monitor before removing the hardware. (p. PR32-1, PR33-1, PR36-1, PR37-1)

Safety Summary (continued)

SPECIFIC CAUTIONS	On the keyboard interface connector board, set positions 5, 6 and 7 of dipswitch SW1 to closed (on). Set positions 1 through 4 and 8 of dipswitch SW1 to open (off). Failure to configure dipswitch SW1 properly will damage the CPU. (p. PR31-1)
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Support Services

Elsag Bailey will provide assistance in the operation and repair of its products. Requests for sales or application services should be made to your nearest sales or service office. Elsag Bailey can also provide installation, repair and maintenance contract services.

When ordering parts, use nomenclature or part numbers and part descriptions from equipment manuals. Parts without a description must be ordered from the nearest sales or service office. Recommended spare parts lists, including prices are available through the nearest sales or service office.

Elsag Bailey has modern training facilities available for training your personnel. On-site training is also available. Contact your nearest Elsag Bailey sales office for specific information and scheduling.

Additional copies of this instruction, or other instructions, can be obtained from the nearest Elsag Bailey sales office at a reasonable charge.

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TM DECnet	Trademark of Digital Equipment Corporation.
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TM VMS	Trademark of Digital Equipment Corporation.





Overview

The Conductor VMS™ Series 42 Auxiliary Terminal is a remote monitor and keyboard interface that connects to a main workstation. The main workstation connects to the INFI-NET® communication highway.

In this document, auxiliary terminal refers to a C-I-CV42C auxiliary terminal and main workstation refers to a C-I-CV43S-X1, C-I-CV43S-X2, or C-I-CV43S-X3 console; or a C-I-CV43S-XA or C-I-CV43S-XD driver cabinet. Refer to Table 1-1 for the C-I-CV43S instruction number.

This instruction contains information and procedures necessary to install, maintain and repair the Conductor VMS Series 42 Auxiliary Terminal.

Intended User

This instruction is intended for use by technical personnel responsible for the installation, maintenance and repair of the auxiliary terminal.

System engineers and technicians with a background in process control systems should read this instruction thoroughly before installing and using the system. **Do not** put the auxiliary terminal into operation until reading and understanding this instruction. It is a reference for installers with installation and maintenance experience on process control equipment. It is not a tutorial.

Description

These units are auxiliary terminals for the main workstation. They provide a remote operator interface for displaying graphics, alarm summaries, Symphony Enterprise Management and Control System status and for logging, trending and process control. The auxiliary terminal allows more than one operator



to use a single main workstation. An Ethernet™ network cable connects the auxiliary terminal to the main workstation.

There are four models of auxiliary terminals covered in this instruction.

Table Top Model (C-I-CV42C-1)

Figure 1-1 shows the main components of the table top model. The hardware of the table top model is located in a moveable case that sits on a work surface. The power supply and multi-bus keyboard module (IIMKM02A) are in the case. The monitor is mounted on top of the case and the keyboard interface assembly is located below the monitor. The monitor can tilt and swivel.

The rear connector panel has an AC input, alarm relays, connectors for monitor cables and a power switch. The front panel has the connectors for peripheral operator input devices and a tune-off-configuration keyswitch. The CPU is located inside the cabinet on a shelf. Access the connections from the rear of the cabinet. The alarm relays are for alarm annunciation only.

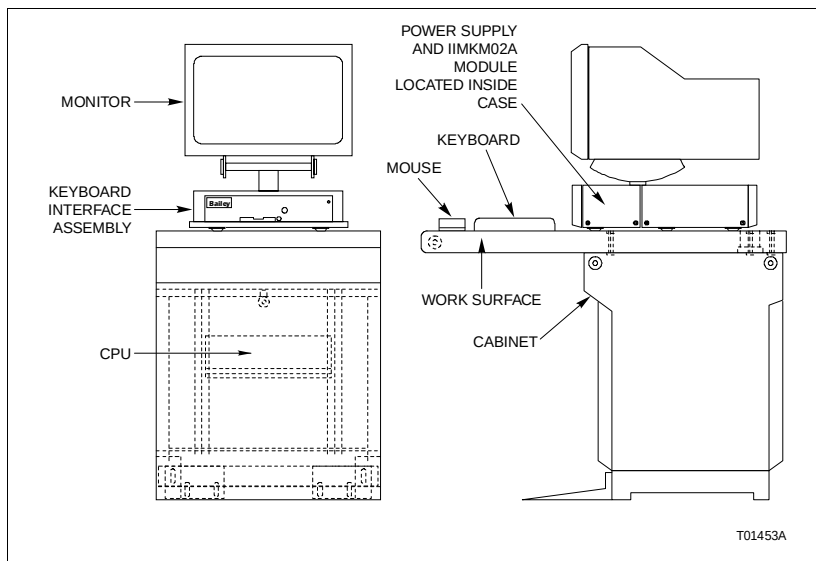


Figure 1-1. Table Top Model (C-I-CV42C-1)

Console Model (C-I-CV42C-2)

Figures 1-2 and 1-3 show the main components of the console model. The hardware of the console model of the auxiliary terminal is very similar to that of a single monitor main workstation. The auxiliary terminal has different hardware in the CPU (no hard disk drive or floppy disk drive) and has only one module in the multibus card cage. The monitors, annunciator display panel (ADP) and keyboard interface assembly are in the upper half of the auxiliary terminal. The lower half contains the power supply, CPU, power entry panel (PEP) with cable connector panel and multibus card cage. This model can have either a lower monitor (C-I-CV42C-21) or an upper monitor (C-I-CV42C-22), but not both.

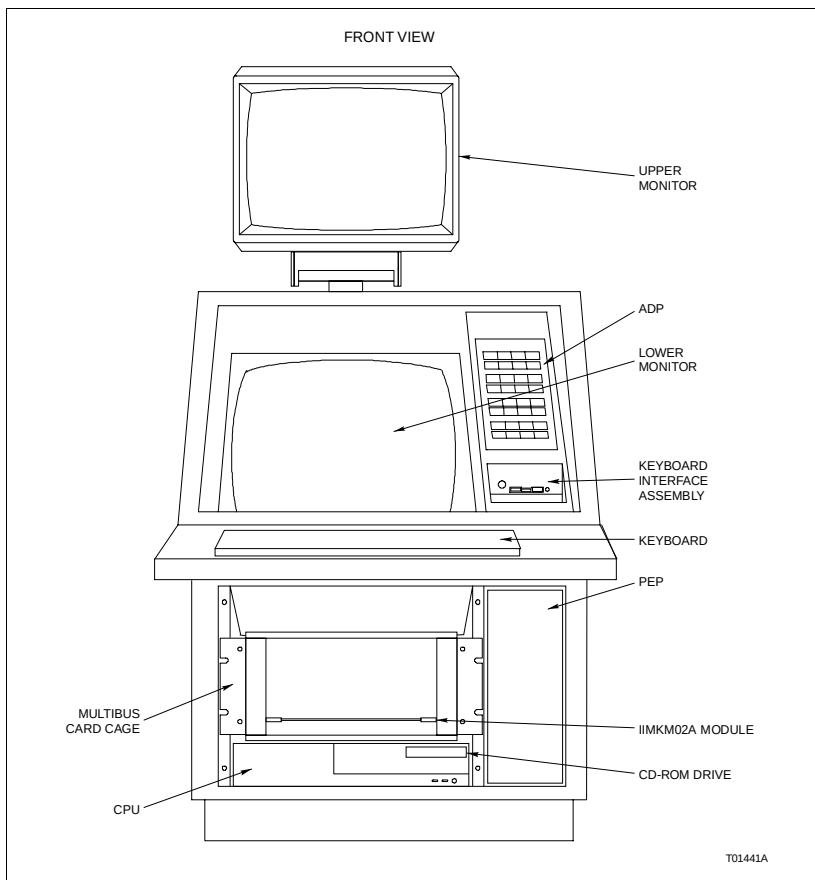


Figure 1-2. Console Model Front View (C-I-CV42C-2)

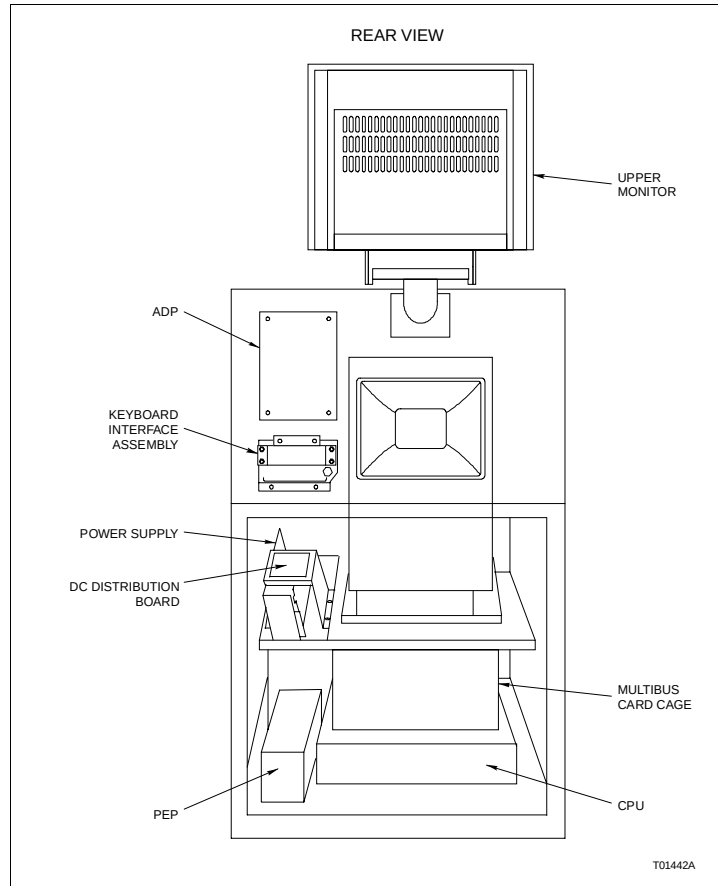


Figure 1-3. Console Model Rear View (C-I-CV42C-2)

This model has front and rear doors with individual locks. The front door has slotted openings for air intake to cool the inside of the auxiliary terminal. It has a stabilizer, which must be fastened to the front when it is not secured to the floor. A 63.5-millimeter (2.5-inch) diameter cable entry is located at the rear of the auxiliary terminal.

Environmental Model (C-I-CV42C-3)

Figure 1-4 shows the environmental model of the auxiliary terminal. The environmental model contains a monitor, power entry panel, operator keyboard, annunciator display panel and interface similar to the console model, 19-inch panel mount and table top model.

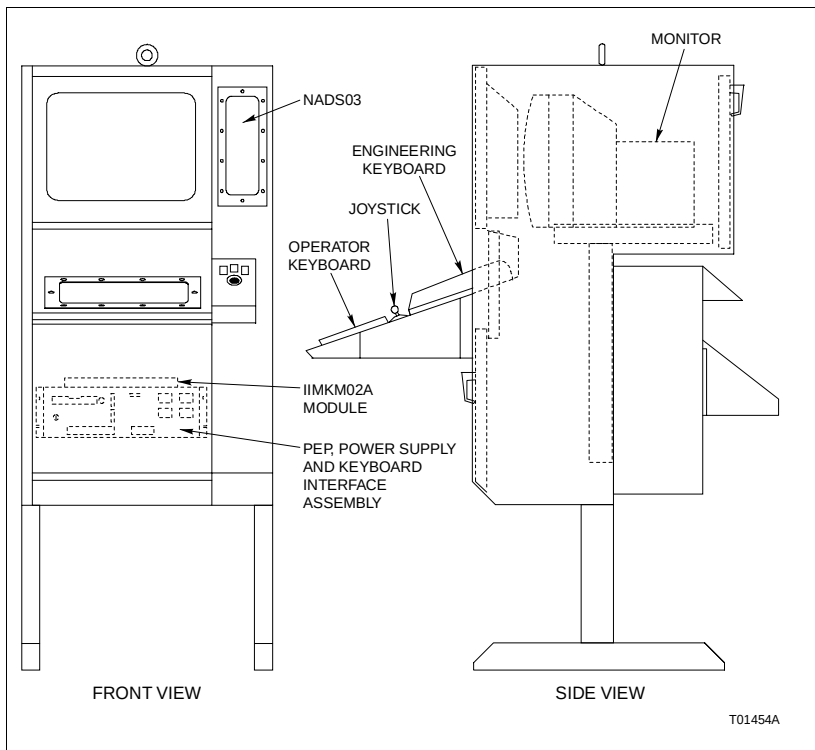


Figure 1-4. Environmental Model (C-I-CV42C-3)

The hardware of the environmental model is separated into the upper and lower half of the cabinet. The CPU and monitor are located in the top of the cabinet. The power entry panel and IIMKM02A module are in the lower half of the cabinet with the power supply. The annunciator display panel and monitor are on the front of the cabinet. The alarm relays are for alarm annunciation only.

A sealed air conditioner provides internal cooling and the stainless steel exterior provides corrosion protection.

Panel Mount Model (C-I-CV42C-4)

The hardware of the panel mount model is located behind the monitor and keyboard interface assembly. The power supply, PEP, CPU and IIMKM02A module are located with the monitor. The keyboard interface assembly is mounted on a separate panel. The alarm relays are for alarm annunciation only.

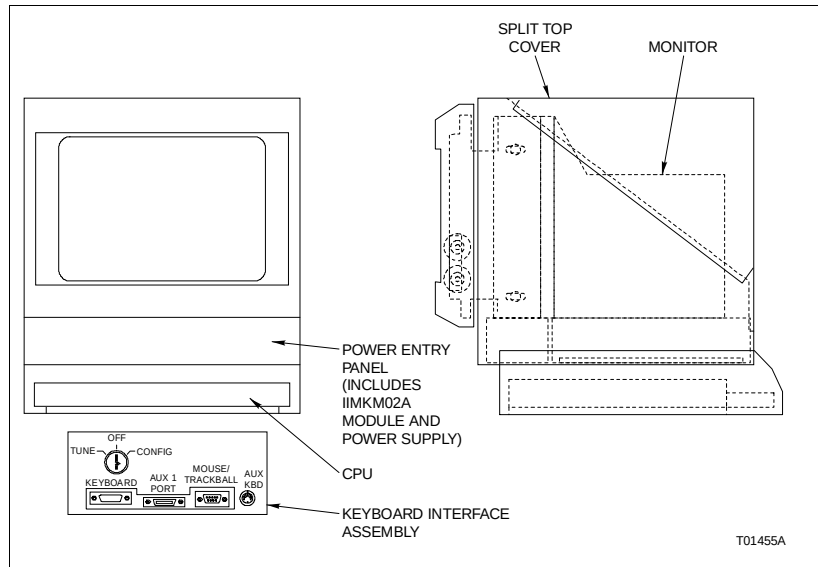


Figure 1-5. Panel Mount Model (C-I-CV42C-4)

Central Processing Unit (CPU)

The CPU described in this instruction is a Tektronix® Model XP400. Specifications for the CPU are listed at the end of this section.

Instruction Content

This instruction contains information on C-I-CV42C auxiliary terminals. It is organized into seven sections, three appendices and a set of procedures. After becoming completely familiar with it and the auxiliary terminal, it may be used as a reference.

Introduction Presents an overview of the auxiliary terminal and related hardware. It also provides a complete list of system specifications.

Description and Operation Describes the theory of operation of the auxiliary terminal and related hardware.

Installation Provides an introduction into the procedures involved in placing the auxiliary terminal into operation. Provides installation

	sequence flowcharts that direct installation personnel to the appropriate procedures.
Troubleshooting	Contains a table of error messages and corrective action, and a troubleshooting sequence flowchart that guides troubleshooting personnel to the appropriate procedures.
Maintenance	Provides an introduction into the routine maintenance of the auxiliary terminal. Includes a preventive maintenance schedule that includes references to applicable procedures.
Repair and Replacement	Provides an introduction into the procedures involved in replacing auxiliary terminal components. Includes repair and replacement sequence flowcharts that direct repair personnel to the appropriate procedures.
Replacement and Spare Parts	Includes a spare parts list.
Appendix A - Dimension Drawings	Contains dimensions drawings for various components.
Appendix B - Factory Wiring	Contains factory wiring diagrams and tables.
Appendix C - Quick Reference	Provides useful information including circuit board drawings showing the locations of specific components and switch and jumper settings.
Procedures PR1 through PR39	Provide procedures for each task.

How to Use this Instruction

Read this entire instruction through in sequence before attempting to install, maintain or repair the auxiliary terminal. After gaining a complete understanding of this instruction and the auxiliary terminal, it can be used as a reference.

Some sections of this instruction have been prepared in procedure format. There are flowcharts that follow the introduction to the section and any nonprocedural information. These flowcharts direct personnel to the appropriate procedure. By treating each task as a separate entity, the procedures provide an easy method for finding the information needed to perform each task. The procedures can be removed and placed into separate folders or notebooks, or carried to the job site.



Each procedure lists the recommended tools to perform that procedure. Specific tool sizes are listed when required, such as Allen wrench size, socket size, wrench size, etc. Screwdrivers are listed as long or short when necessary.

Reference Documents

Table 1-1 lists Elsag Bailey instructions referenced in this instruction.

Table 1-1. Reference Documents

Number	Document
I-E96-500	Site Planning and Preparation
WBPEEU1220770A0	Conductor VMS Series 43 Workstation
WBPEEU1220773A0	Operation, Conductor VMS
WBPEEU1220774A0	Configuration, Conductor VMS
WBPEEU1220775A0	File Utilities, Conductor VMS
WBPEEU1220776A0	Display Builder Reference
WBPEEU1220777A0	Introduction and Installation

Nomenclature

Table 1-2 contains the nomenclature used in this instruction. The nomenclature presented only includes the positions necessary to adequately identify and describe the auxiliary terminal.

Table 1-2. Nomenclature

Nomenclature	Description
C-I-CV42C-1	Table top model
C-I-CV42C-21	Console model with lower monitor
C-I-CV42C-22	Console model with upper monitor
C-I-CV42C-3	Environmental model
C-I-CV42C-4	Panel mount model

Specifications

Table 1-3 contains the specifications for the C-I-CV42C auxiliary terminals.

Table 1-3. Specifications

Property	Characteristic/Value																																																							
Power	120 VAC nominal (90 VAC to 132 VAC RMS) 240 VAC nominal (180 VAC to 264 VAC RMS) Overvoltage category: III																																																							
Line voltage																																																								
Line frequency																																																								
Circuit Breaker	C-I-CV42C-1 and C-I-CV42C-4: 10 A C-I-CV42C-2 and C-I-CV42C-3: 20 A																																																							
Power consumption	<table><tr><th>Model</th><th>Voltage</th><th>Typical Amps</th><th>Maximum Amps</th><th>Typical Watts</th><th>Maximum Watts</th></tr><tr><td rowspan="2">C-I-CV42C-1</td><td>120</td><td>1.96</td><td>2.55</td><td>175</td><td>227</td></tr><tr><td>240</td><td>1.20</td><td>1.56</td><td>175</td><td>227</td></tr><tr><td rowspan="2">C-I-CV42C-2</td><td>120</td><td>1.80</td><td>2.34</td><td>158</td><td>205</td></tr><tr><td>240</td><td>1.11</td><td>1.44</td><td>162</td><td>211</td></tr><tr><td rowspan="2">C-I-CV42C-3</td><td>120</td><td>3.95</td><td>5.14</td><td>401</td><td>521</td></tr><tr><td>240</td><td>1.93</td><td>2.51</td><td>392</td><td>510</td></tr><tr><td rowspan="2">C-I-CV42C-4</td><td>120</td><td>1.96</td><td>2.55</td><td>175</td><td>227</td></tr><tr><td>240</td><td>1.20</td><td>1.56</td><td>175</td><td>227</td></tr></table>						Model	Voltage	Typical Amps	Maximum Amps	Typical Watts	Maximum Watts	C-I-CV42C-1	120	1.96	2.55	175	227	240	1.20	1.56	175	227	C-I-CV42C-2	120	1.80	2.34	158	205	240	1.11	1.44	162	211	C-I-CV42C-3	120	3.95	5.14	401	521	240	1.93	2.51	392	510	C-I-CV42C-4	120	1.96	2.55	175	227	240	1.20	1.56	175	227
Model	Voltage	Typical Amps	Maximum Amps	Typical Watts	Maximum Watts																																																			
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	240	1.20	1.56	175	227																																																			
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C-I-CV42C-4	120	1.96	2.55	175	227																																																			
	240	1.20	1.56	175	227																																																			
Power characteristics	<table><tr><th>Model</th><th>Typical Inrush Current (Amps)</th><th>Crest Factor</th><th>Typical Power Factor</th></tr><tr><td>C-I-CV42C-1</td><td>42.0</td><td>2.96</td><td>0.610</td></tr><tr><td>C-I-CV42C-2</td><td>42.0</td><td>2.34</td><td>0.730</td></tr><tr><td>C-I-CV42C-3</td><td>42.0</td><td>1.95</td><td>0.843</td></tr><tr><td>C-I-CV42C-4</td><td>42.0</td><td>2.96</td><td>0.610</td></tr></table>						Model	Typical Inrush Current (Amps)	Crest Factor	Typical Power Factor	C-I-CV42C-1	42.0	2.96	0.610	C-I-CV42C-2	42.0	2.34	0.730	C-I-CV42C-3	42.0	1.95	0.843	C-I-CV42C-4	42.0	2.96	0.610																														
Model	Typical Inrush Current (Amps)	Crest Factor	Typical Power Factor																																																					
C-I-CV42C-1	42.0	2.96	0.610																																																					
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C-I-CV42C-3	42.0	1.95	0.843																																																					
C-I-CV42C-4	42.0	2.96	0.610																																																					
Power supply	+5 VDC at 20 A, +12 VDC at 4 A, -12 VDC at 4 A																																																							

**Table 1-3. Specifications** *(continued)*

Property	Characteristic/Value		
Keyboard interface	Operator keyboard output relays rated at 250 mA 24-28 VDC per IIMKM02A module.		
	Alarm Relays	Rating	
	Contact voltage	24 VDC Overvoltage category: III	
	Contact current	0.25 A	
	Contact power	6 W	
Alarm tones	6 per keyboard		
Alarm relays	5 per keyboard		
Keyboards	1 Mylar® (operator) 1 Engineering (QWERTY)		
Annunciator display panels	4 (per IIMKM02A module) 32 pushbuttons and 64 LEDs per panel		
Environment			
Temperature	Operating: 10° to 40° C (50° to 104°F) Nonoperating ¹ : -30° to 65°C (-22° to 149°F) Storage: 5° to 50°C (41° to 122°F)		
Relative humidity	Operating: 20% to 80% noncondensing. Recommended minimum 40%. Storage: 10% to 95% noncondensing		
Altitude	Operating: -0.3 to +2.4 km (-0.2 to 1.5 mi)		
Cooling requirements (Heat dissipation)			
	Model	BTU/hr nominal	BTU/hr maximum
	C-I-CV42C-1	598	775
	C-I-CV42C-2	540	700
	C-I-CV42C-3	1,339	1,742
	C-I-CV42C-4	598	775

Table 1-3. Specifications *(continued)*

Property	Characteristic/Value						
Dimensions	Model	Height		Width		Depth	
		cm.	in.	cm.	in.	cm.	in.
	C-I-CV42C-1	55.80	22.00	49.53	19.50	60.96	24.00
	C-I-CV42C-21	107.27	42.23	71.12	28.00	109.01	42.92
	C-I-CV42C-22	156.94	61.78	71.12	28.00	109.01	42.92
	C-I-CV42C-3	177.80	70.00	76.20	30.00	95.09	37.45
	C-I-CV42C-4	614.10	24.17	116.00	45.67	94.97	37.39
Weight	Model	Weight					
		kg	lbs				
	C-I-CV42C-1	175	386				
	C-I-CV42C-21	164	360				
	C-I-CV42C-22	191	420				
	C-I-CV42C-3	240	530				
	C-I-CV42C-4	71	157				
Electrical noise	Keep cabinet doors closed. Do not use portable transmitting equipment within 2 m (6.5 ft) of a cabinet						
Certification (pending)	CSA certified for use in an ordinary (nonhazardous) controlled environment						

NOTE:

1. Nonoperating environment is defined as a transportation or storage period of less than 60 days.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Accessories

Table 1-4 lists the available accessories.

Table 1-4. Accessories

Accessory	Description
1948385?1	Antistatic field kit. Contains two wrist straps, a ground cord assembly, an alligator clip and a static dissipating work surface.
4079002 ¹	Lexmark™ Color JetPrinter 4079 PLUS 11 in. by 17 in. color printer
C3540A ¹	HP® 1600C 8.5 in. by 11.0 in. color printer

**Table 1-4. Accessories** *(continued)*

Accessory	Description
IICPI01	15° wedge
IICPI02	45° wedge
IICUC01	Utility console
IICWS01	Work and printer surface
IIPRT02	Black and white printer
IIPRT03	Color printer (up to 64 colors)
IIPRT05	High speed black and white printer
IIPRT08C	Color/black and white screen copy printer
IIPRT09	24-pin color printer

NOTE:

1. Manufacturer part number.



Introduction

This section explains the theory of operation for the Conductor VMS Series 42 Auxiliary Terminal. An operator uses the auxiliary terminal to monitor and control the process through a main workstation. It shows equipment status and process states with interactive color graphic displays. Each display uses dynamic variables and symbols allowing data to be condensed in each display. Any graphic element can be mixed with any symbol on any display such as schematics, faceplates, trends and alarm summaries. For operating procedures, refer to Table 1-1.

Functional Operation

The auxiliary terminal controls and monitors the process through the main workstation. The auxiliary terminal is a remote operator station with a monitor and keyboard controlled by a CPU. Commands between the auxiliary terminal and the main workstation pass through an Ethernet network cable using either DECnet™ or TCP/IP protocol.

The auxiliary terminal uses a Tektronix model XP400 terminal logic module. It sends video signals to the monitor. A cable connects the CPU to the RGB connectors on the monitor.

Refer to Figure 2-1 for a block diagram of the functions and connections of the auxiliary terminal.

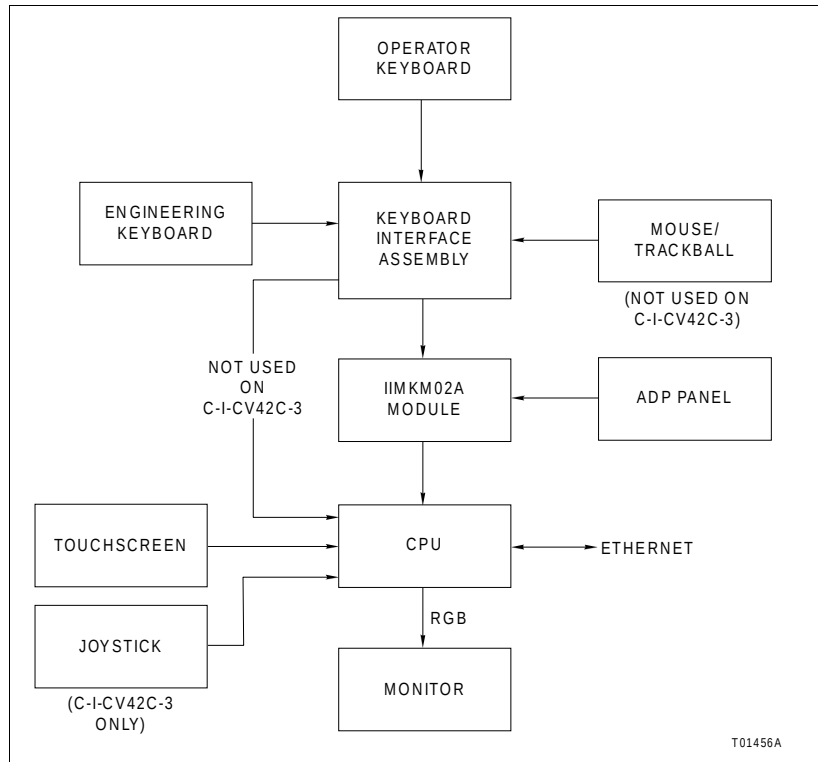


Figure 2-1. Block Diagram



Introduction

This section contains information needed when installing the Conductor VMS Series 42 Auxiliary Terminal. It includes information on special handling, unpacking and inspection, safety considerations and wiring considerations.

Following these topics are installation sequence flowcharts that guide personnel, seeking to perform a specific installation task, to the proper procedure needed to perform that task.

Special Handling

The auxiliary terminal contains sensitive electronic circuitry. This circuitry contains semiconductor devices that are subject to damage by static electricity.

A static field kit (refer to Table 1-4) is available for personnel working on components containing semiconductor devices. It contains two wrist straps, a ground cord assembly, an alligator clip and a static dissipating work surface. The intention is to connect the technician and the static dissipating work surface to the same ground point to prevent electrostatic discharge damage to the static sensitive devices.

When handling static sensitive devices:

1. Most assemblies with semiconductor devices come in a special antistatic bag. Keep the assembly in the bag as much as possible whenever the assembly is not installed.
2. Remove assemblies containing semiconductor devices from their antistatic container only under certain conditions:
 - a. When at a static-free workstation or when the bag is grounded at a field test sight.
 - b. Only after neutralizing the conductive area of the container.



- c. Only after firm contact with an antistatic mat and/or firmly gripped by grounded personnel.
3. Personnel handling assemblies with semiconductor devices should be neutralized to a static-free workstation by a grounding wrist strap connected to the station or to a good ground point at the field sight.
4. Do not allow clothing to contact semiconductor devices. Most clothing generates static electricity.
5. Avoid touching connectors or components.
6. Avoid partial connection of semiconductor devices. Most devices can be damaged by floating leads, especially the power supply connector. If an assembly must be placed in a live system, it should be done quickly. Do not cut leads or lift circuit paths when troubleshooting.
7. Be sure to ground any test equipment.
8. Avoid static charges during removal and replacement. Make sure the assembly is fully clean around its leads, but do not rub or clean with an insulating cloth.
9. Remove dust from components using an antistatic field service vacuum.

Do not use a lead (graphite) pencil to set dipswitches. This can contaminate switch contacts and cause the component to malfunction.

Unpacking and Inspection

When the auxiliary terminal is received it should be unpacked and inspected.

1. Check for any obvious damage to the crate or its contents. If damage is evident, notify the carrier and an Elsag Bailey sales representative.
2. Remove any loose packing from the crate.
3. Inspect the nameplate and verify the unit received matches the desired function.

4. If storing the auxiliary terminal prior to installation, leave it in the original crate, if possible. Store in an area free from corrosive vapors and extremes in temperature and humidity.
5. Do not store the auxiliary terminal in an area that would take it out of the specifications listed in Table 1-3.

Safety Considerations

It is critical to read, understand and heed all instructions, warnings and cautions located throughout this instruction and on the equipment itself. Only qualified personnel must be allowed to install, operate, maintain and repair this equipment.

The auxiliary terminal was designed to allow installation without anchoring; however, there is a possibility of tipping if stabilizers are not installed. Be sure to stabilize the components when removing any fasteners that secure them to their shipping pallets. Never sit or stand on work surfaces or any other part of the auxiliary terminal.

Do not remove or install printed circuit boards, or modules or components containing them with power applied. This could damage the circuit board. Remove power to all AC wiring when removing or connecting AC wires to prevent injury to personnel and equipment damage. To prevent equipment damage, remove DC power to all DC wiring when removing or connecting DC wires, circuit boards, or modules or components connected to them.

Wiring Considerations

This section discusses AC power wiring, communications wiring and grounding for the auxiliary terminal. For the procedures to accomplish these tasks, refer to the installation sequence flowcharts at the end of this section for the path to the proper procedure.

For detailed information on AC power distribution and system grounding, refer to:

- ***Site Planning and Preparation.***



- ***Recommended Practice for Powering and Grounding Sensitive Electronic Equipment (IEEE Emerald Book)***, ANSI/IEEE 1100.
- ***Recommended Practice for Grounding of Industrial and Commercial Power Systems (IEEE Green Book)***, ANSI/IEEE 142.

Do not attempt to install any system or related equipment before consulting and understanding these documents as well as any other applicable international standards.

The auxiliary terminal uses color coded wire. Table 3-1 lists the wire colors and their respective signals.

Table 3-1. Wiring Color Code

Color	Signal
Brown	AC hot (inside PEP chassis only)
Blue	AC neutral
Green/yellow	AC common
Brown	+5 VDC
White/green	DC common
Violet	-12 VDC
White/violet	+12 VDC
Green	- remote voltage sense signal wire
White	+ remote voltage sense signal wire

AC Power Wiring

The AC power input connects to a terminal block on the PEP. The PEP provides line filtering, transient suppression and a 20-amp circuit breaker on the console and environmental models, or a 10-amp circuit breaker on the panel mount model. The location and part number of the PEP varies depending on the model. The table top model does not use the PEP. It has a rear connector panel with an IEC style AC input on the keyboard interface assembly. The auxiliary terminal operates from 120/240 VAC, 50/60 hertz.

In addition to AC input terminals, the PEP has alarm relay outputs located on a terminal block and cable connectors for

peripheral devices. Note that the alarm relay outputs are for alarm annunciation only.

Setting up the auxiliary terminal for 240-VAC requires no changes. The color monitor, CPU and monitor are autosensing and need no changes for 240-VAC operation. Monitors other than those supplied by Elsag Bailey may require changes. Refer to Procedure **PR5** for more AC power wiring information.

NOTE: Be sure the auxiliary terminals are powered using the same power source and ground as the main terminal to reduce the chance of communication problems on the Ethernet. Failure to do so may cause data to be changed or lost.

The recommended minimum size for power wiring is that it be copper wire with a 2.1 square millimeter cross sectional area (14-AWG) with a 600-volt, 75-degree Celsius (167-degree Fahrenheit) rating and thermoplastic insulation. Wire with a 300-volt or 150-volt rating may be used if it is accepted by local wiring codes. Wiring must be protected by cable trays or conduit and suited for the service voltage.

Power wiring to the auxiliary terminal must include a third-wire grounding conductor. This grounding conductor must not be a smaller gauge than the power wiring and must be bare, green colored or green/yellow colored if insulated. The grounding conductor must be terminated at the system safety ground connection on the front of the PEP.

Over-current protection provided for the AC distribution must be sized to allow for the inrush current required by the hardware. Refer to Table **1-3** for the inrush current.

For more information on power wiring, grounding, line conditioning and EMI (electromagnetic interference), refer to the **Site Planning and Preparation** instruction.

Access

Wiring access varies depending on the model. Procedure **PR5** details the wiring access for the various models.



Connections

Wiring connections vary depending on the model. Procedure **PR5** details the connections for the various models.

NOTE: AC outlets are only for external peripheral equipment listed in this instruction. Do not connect motors, lights or test equipment to the AC outlets. Electrical noise may cause data to be lost or changed.

Communications Wiring

The auxiliary terminal supports Ethernet communications.

Access

Ethernet wiring access varies depending on the model. Procedure **PR10** details access for the various models.

Connections

Ethernet wiring connections vary depending on the model. Procedure **PR10** details the connections for the various models.

Grounding

This instruction does not discuss the details of grounding systems. Good grounding practices prevent problems and reduce system downtime. A complete and properly grounded electrical system is vital for personnel safety, equipment protections and normal process system operation. Digital process control systems require a single-point grounding system that has two paths: One path for an alternating current ground (safety ground) and one path for a direct current ground (system common).

For detailed information on system grounding, refer to **Site Planning and Preparation**.

Software Installation and Start-up

After installing the main workstation and all auxiliary workstations, install the software and configure the system. Refer to the appropriate instructions listed in Table **1-1** to load the software, configure and operate the system.

Installation Sequence

Figure 3-1 begins the installation sequence for the auxiliary terminal. Depending on the model, Figure 3-1 points to either Figure 3-2, 3-3, 3-4 or 3-5.

Each block of the flow represents a single task that must be completed before continuing with the sequence. In some cases, more than one path can be taken during installation. For paths that are in parallel, either complete all of the tasks in all of the paths before continuing or complete all of the tasks in only those paths that apply before continuing. At least one path must be completed.

Some blocks contain alphanumeric codes. These codes identify the procedure that describes the steps to complete an indicated task. Complete all of the steps given in a procedure before continuing to the next procedure.

The procedures have check boxes in the margin by each procedural step. When performing a procedure, check each box as each step is completed.

By treating each task as a separate entity, the procedures provide an easy method for finding the information needed to perform each task in the installation sequence.

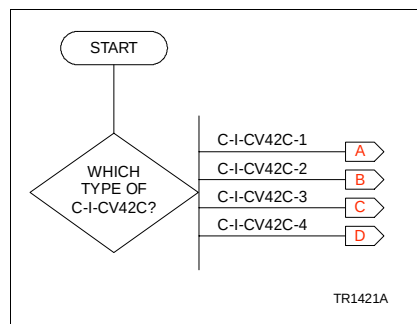
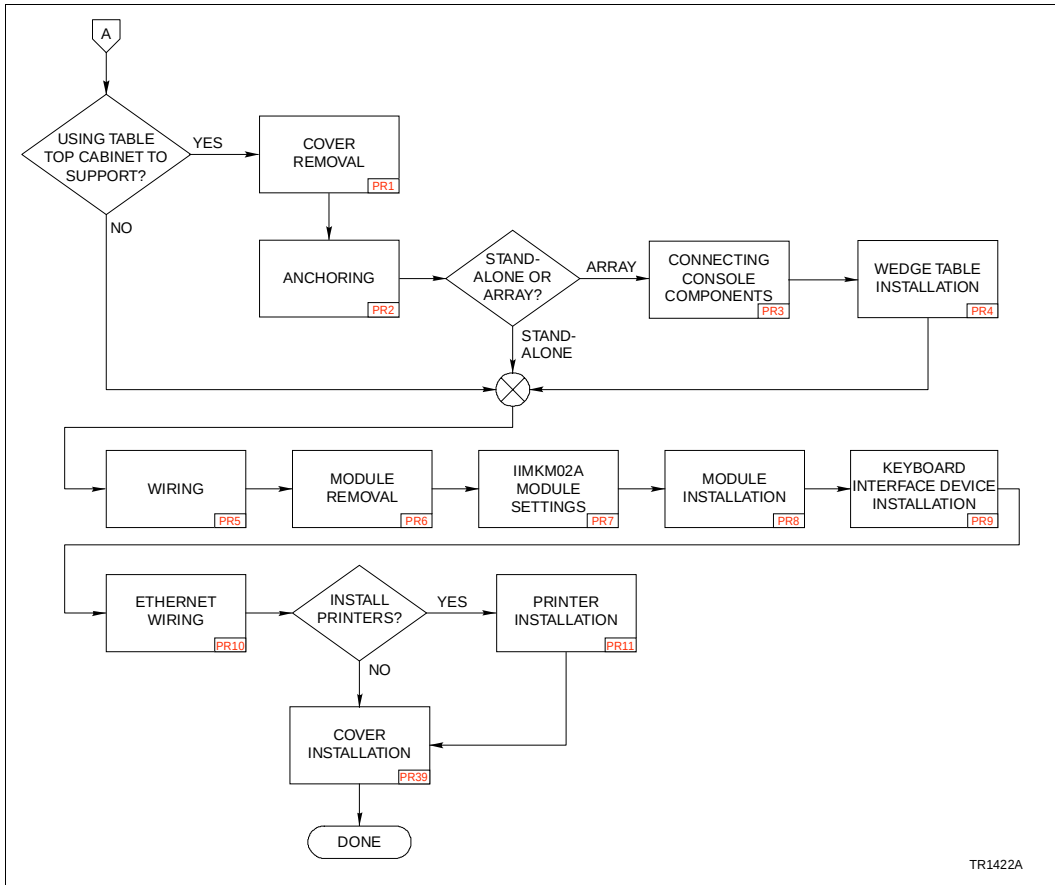
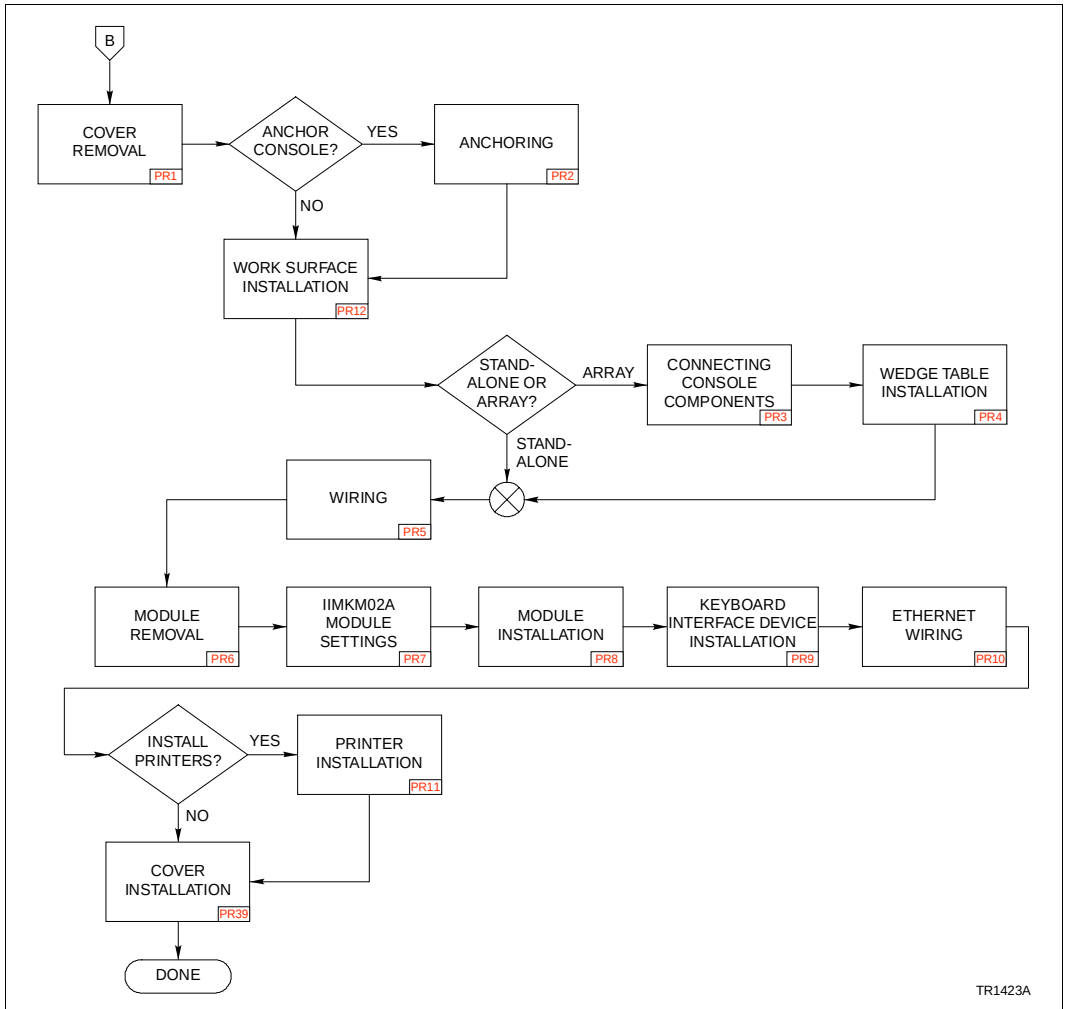


Figure 3-1. Installation Sequence Flowchart



TR1422A

Figure 3-2. Table Top Model Installation Sequence (C-I-CV42C-1)



TR1423A

Figure 3-3. Console Model Installation Sequence (C-I-CV42C-2)

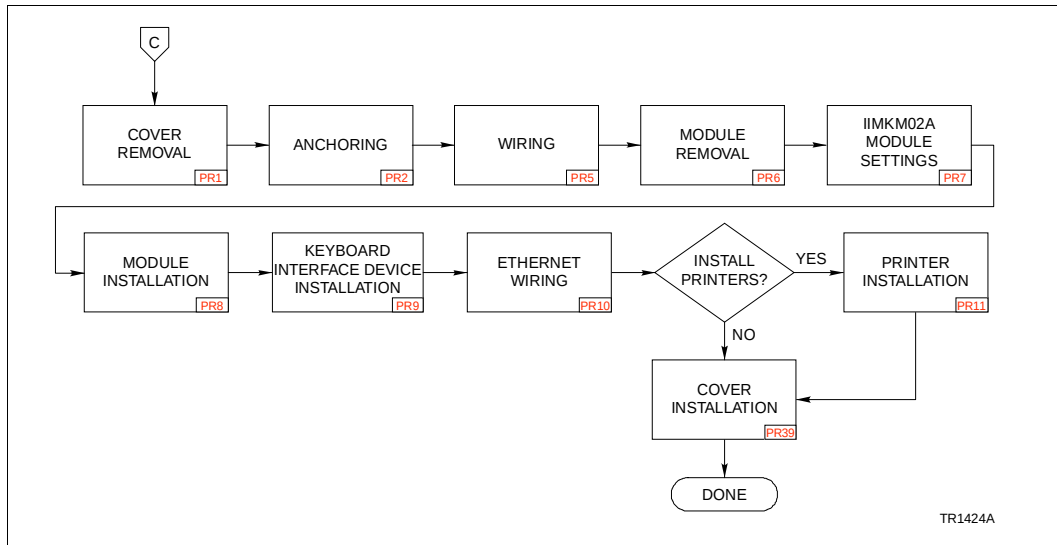


Figure 3-4. Environmental Model Installation Sequence (C-I-CV42C-3)

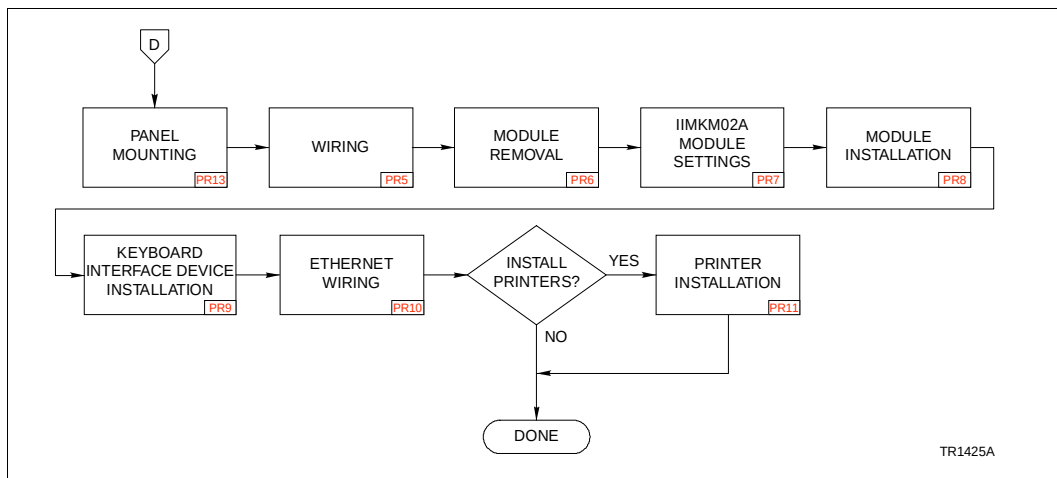


Figure 3-5. Panel Mount Model Installation Sequence (C-I-CV42C-4)



Introduction

This section provides some basic troubleshooting guidelines for the Conductor VMS Series 42 Auxiliary Terminal. It is not meant to be all inclusive. Be sure to have all the manufacturer's documentation on non-Elsag Bailey Process Automation components accessible. Also refer to Table 1-1 for any applicable Elsag Bailey documents. Many of those documents also provide troubleshooting information. If problems exist that are not included in any of the documentation, contact the local Elsag Bailey service office for assistance.

This section contains a general troubleshooting table and a troubleshooting sequence flowchart that directs troubleshooting personnel to the appropriate procedures.

NOTE: Put circuit boards containing MOS devices into antistatic bags when stored or shipped back to the factory. Do not repair circuit boards in the field. All repairs and adjustments should be performed by qualified personnel.

Troubleshooting

Table 4-1 is a general troubleshooting guide. If the general troubleshooting guide does not eliminate the problem, refer to Figure 4-1 and follow the troubleshooting sequence.

Table 4-1. Troubleshooting Guide

Symptom	Possible Problem or Solution
No power indicator on circuit	No AC power at auxiliary terminal. Check AC wiring on input. Check AC on PEP or keyboard interface assembly. Check breaker light on PEP or keyboard interface assembly.
Breaker off but indicator on	Check breaker contacts. Check breaker wiring. Check AC input wiring.
Improper/ incomplete start-up	Refer to the CPU instruction shipped with the auxiliary terminal.

**Table 4-1. Troubleshooting Guide** *(continued)*

Symptom	Possible Problem or Solution
Start-up OK but no keyboard response	Check keyboard assignment. Check all cables. Check caps lock position. Check IIMKM02A module seating and jumpers. Check main workstation configuration (keyboards/printers).
Start-up OK but no monitor picture	Check monitor AC power. Check RGB cables. Check monitor SYNC switch (sync on green). Check 75-ohm termination. Check brightness and contrast controls.

Troubleshooting Sequence

Refer to Figure 4-1 for the troubleshooting sequence for the auxiliary terminal. Each block of the flow represents a single task that must be completed before continuing with the sequence.

In some cases, more than one path can be taken. For paths that are in parallel, either complete all of the tasks in all of the paths before continuing or complete all of the tasks in only those paths that apply before continuing. At least one path must be completed.

Some blocks contain alphanumeric codes. These codes identify the procedure that describes the steps to complete an indicated task. Complete all of the steps given in a procedure before continuing to the next procedure.

The procedures have check boxes in the margin by each procedural step. When performing a procedure, check each box as each step is completed.

By treating each task as a separate entity, the procedures provide an easy method for finding the information needed to perform each task in the troubleshooting sequence.

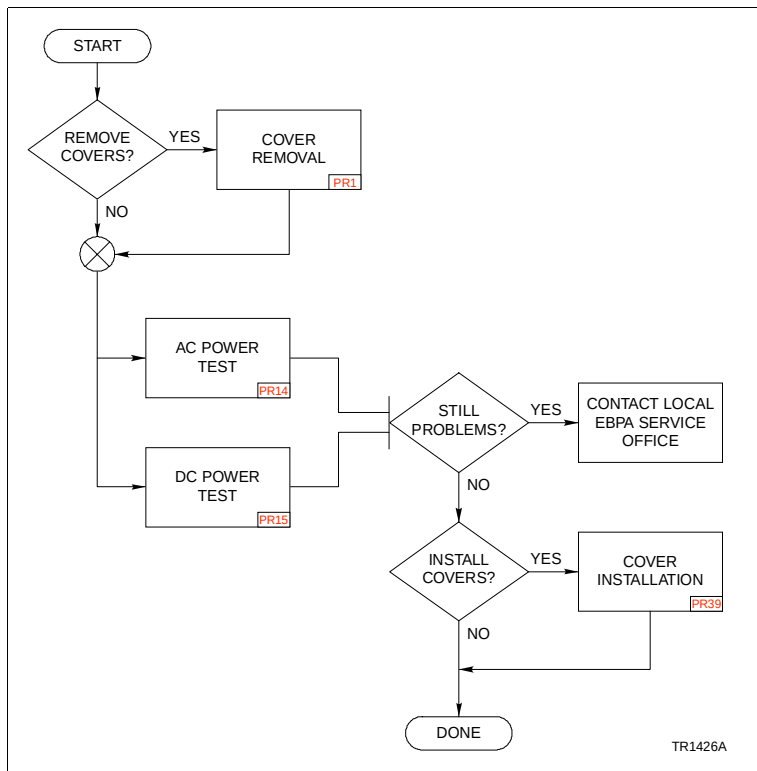


Figure 4-1. Troubleshooting Sequence





Introduction

This section contains a preventive maintenance schedule for the Conductor VMS Series 42 Auxiliary Terminal (Table 5-1). This table has a procedure reference next to the task when applicable. The reference indicates the procedure number where the procedure for that task can be found.

Be sure to follow all warnings, cautions and notes. Put boards containing semiconductors into antistatic bags when stored or shipped back to the factory. Do not repair printed circuit boards in the field. All repairs and adjustments should be performed by qualified personnel.

The maintenance of any stand-alone product or control system affects the reliability of that product. Elsag Bailey recommends that all equipment users practice a preventive maintenance program that will keep the equipment operating at an optimum level.

The procedures referred to in this section contain instructions that the customer should be able to perform on site. These preventive maintenance procedures should be used as a guideline to assist in establishing good preventive maintenance practices. Select the minimum steps required to meet the needs of your system.

Personnel performing preventive maintenance should meet the following qualifications:

- Maintenance personnel should be qualified electrical technicians or engineers that know the proper use of test equipment.
- Maintenance personnel should be familiar with the auxiliary terminal, have experience working with process control systems, and know what precautions to take when working with live AC power.



Preventive Maintenance Schedule

Table 5-1 is the preventive maintenance schedule for the Conductor VMS Series 42 Auxiliary Terminal. The table lists the preventive maintenance tasks in groups according to their specified maintenance interval. Some tasks in Table 5-1 are self explanatory. Instructions for tasks that require further explanation are found in the procedures or in the manufacturer's documentation supplied with the workstation.

Table 5-1. Preventive Maintenance Schedule

Task	Procedure	Frequency
General cleaning, including, but not limited to: Monitor Printed circuit boards Keyboards	PR16 PR17 PR18	As required
With power on, be sure fans are turning. With power off, wipe dust off all fan blades.	N/A	1 month
Check cabinet and modules for dust. Clean as necessary using an anti-static vacuum.	N/A	3 months
Check power supply outputs. Adjust power supplies if needed.	PR14, PR15	6 months
Check the air filters. Clean or replace them as necessary. Check the air filter more often in excessively dirty environments.	N/A	
Check all signal, power and ground connections within the cabinet and verify that they are secure.	PR19	
Check the quality of the plant power and grounding system. Follow the power and grounding system verification procedures in Site Planning and Preparation .	N/A	12 months
Inspect and check the PEP. In high vibration environments testing may be necessary at shorter intervals.	PR20	2 years
Replace power supplies. Call Elsas Bailey sales and service for information.	Figure 6-1	5 years
Complete all appropriate tasks in this table.	N/A	Shutdown



Introduction

This section provides repair and replacement procedures for the Conductor VMS Series 42 Auxiliary Terminal.

NOTE: Follow the procedures for working with static sensitive devices when performing the repair and replacement procedures.

Repair and Replacement Sequence

Refer to Figure 6-1 for the repair and replacement sequence for the auxiliary terminal. Figure 6-1 points to either Figure 6-2, 6-3, 6-4, 6-5 or 6-6 depending on the area of the workstation the component to be repaired or replaced resides.

Each block of the flow represents a single task that must be completed before continuing with the sequence. In some cases, more than one path can be taken during repair and replacement procedures. For paths that are in parallel, either complete all of the tasks in all of the paths before continuing or complete all of the tasks in only those paths that apply before continuing. At least one path must be completed.

Some blocks contain alphanumeric codes. These codes identify the procedure that describes the steps to complete an indicated task. Complete all of the steps given in a procedure before continuing to the next procedure. By treating each task as a separate entity, the procedures provide an easy method for finding the information needed for each task in the repair and replacement sequence.

The procedures have check boxes in the margin by each procedural step. When performing a procedure, check each box as each step is completed.

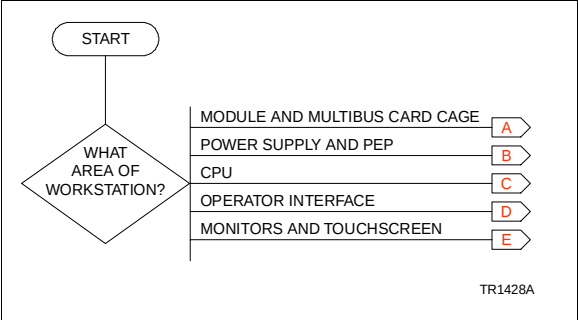


Figure 6-1. Repair and Replacement Sequence Flowchart

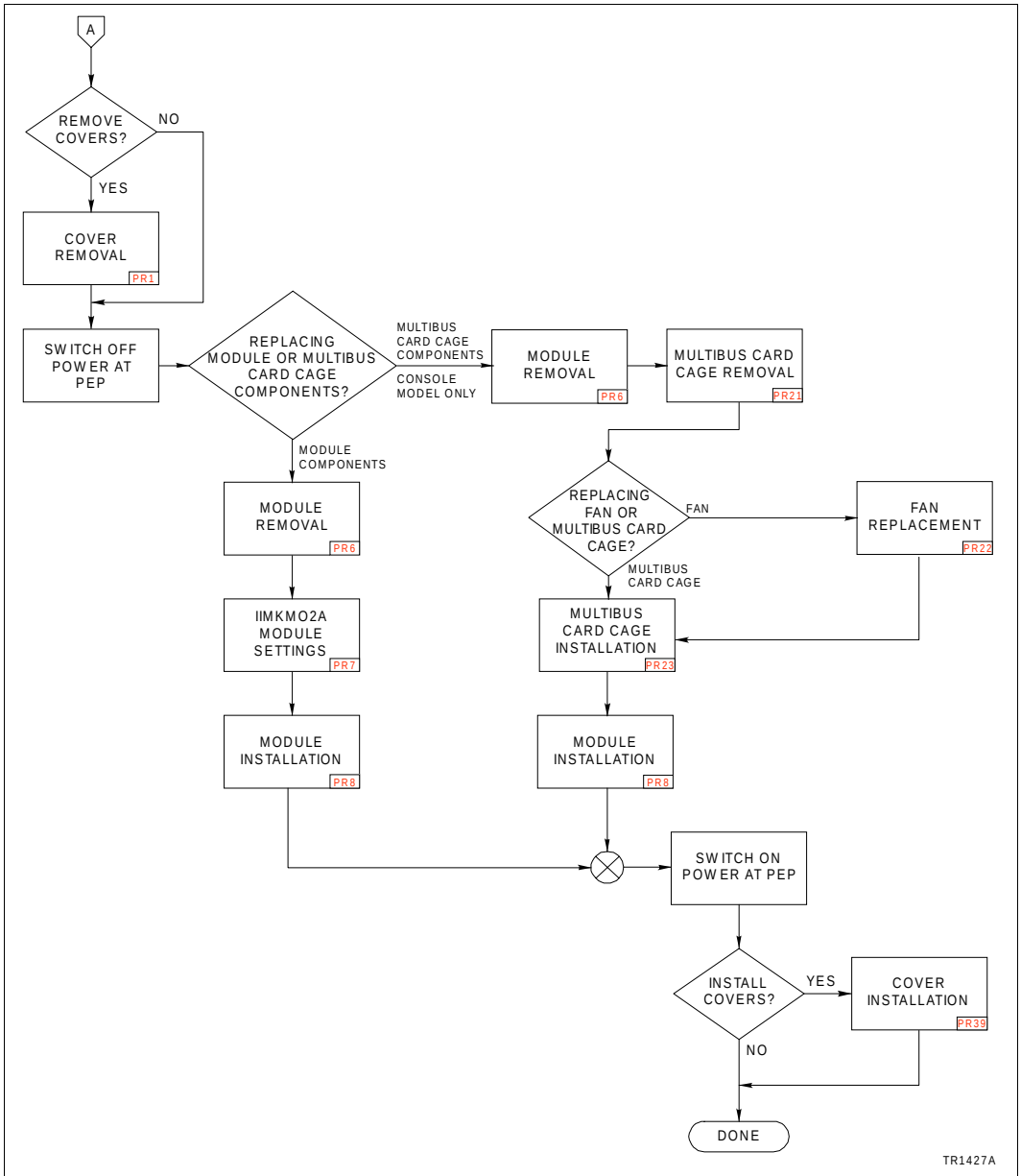


Figure 6-2. Multibus Card Cage

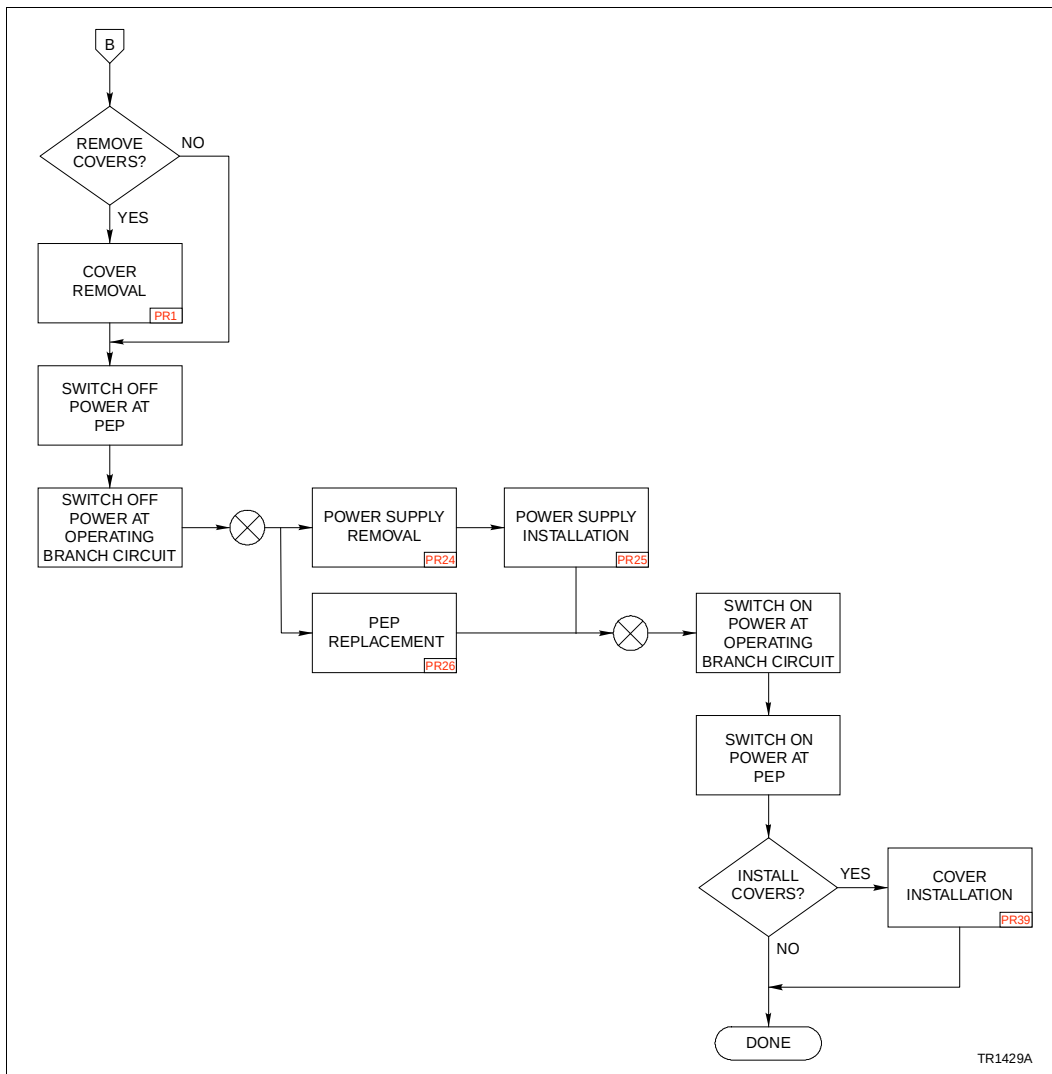
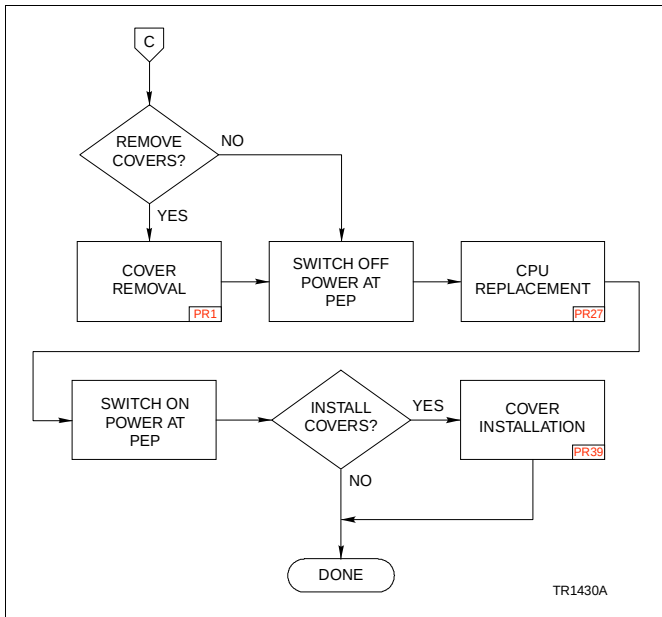


Figure 6-3. Power Supply and PEP

**Figure 6-4. CPU**

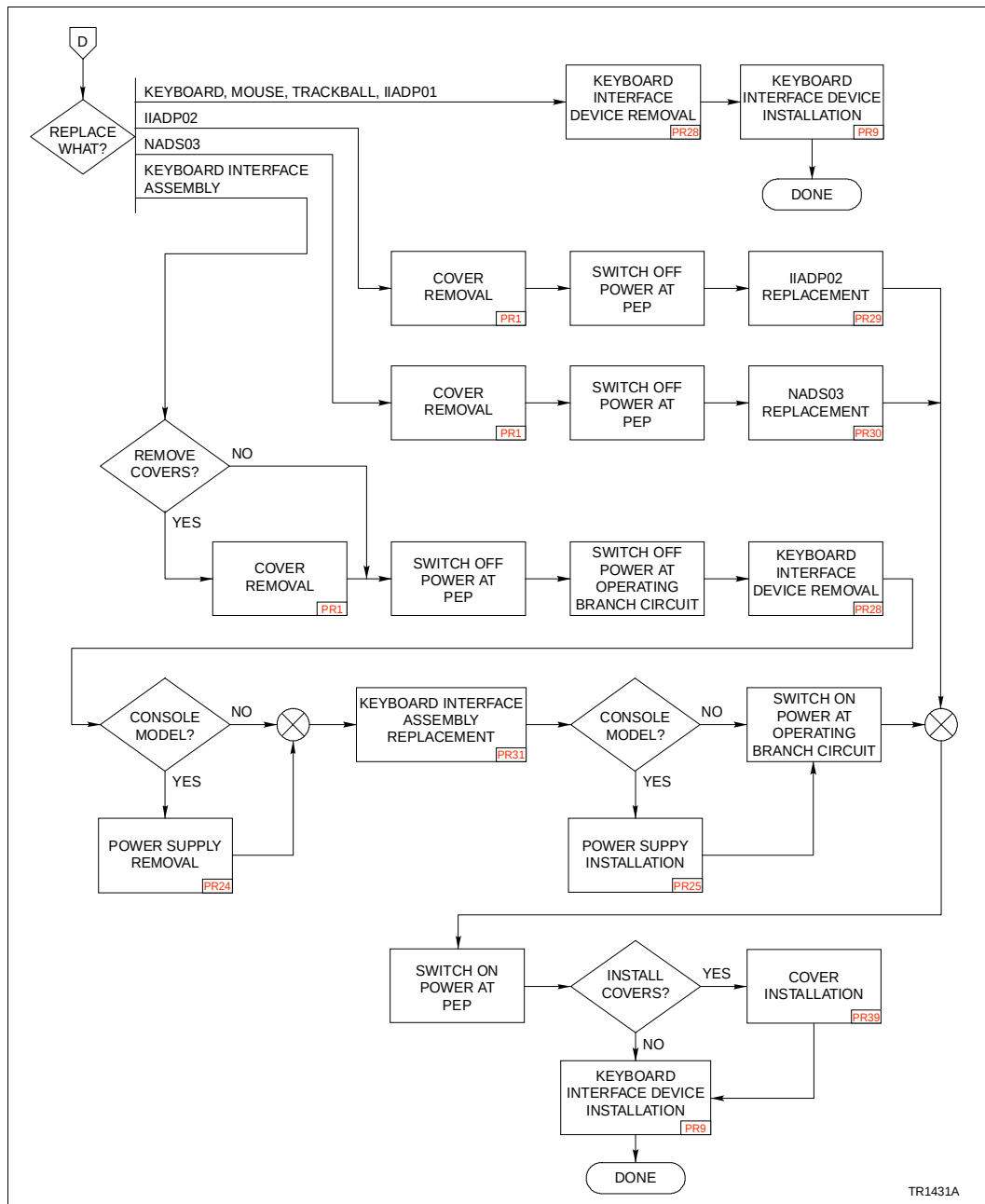


Figure 6-5. Operator Interface

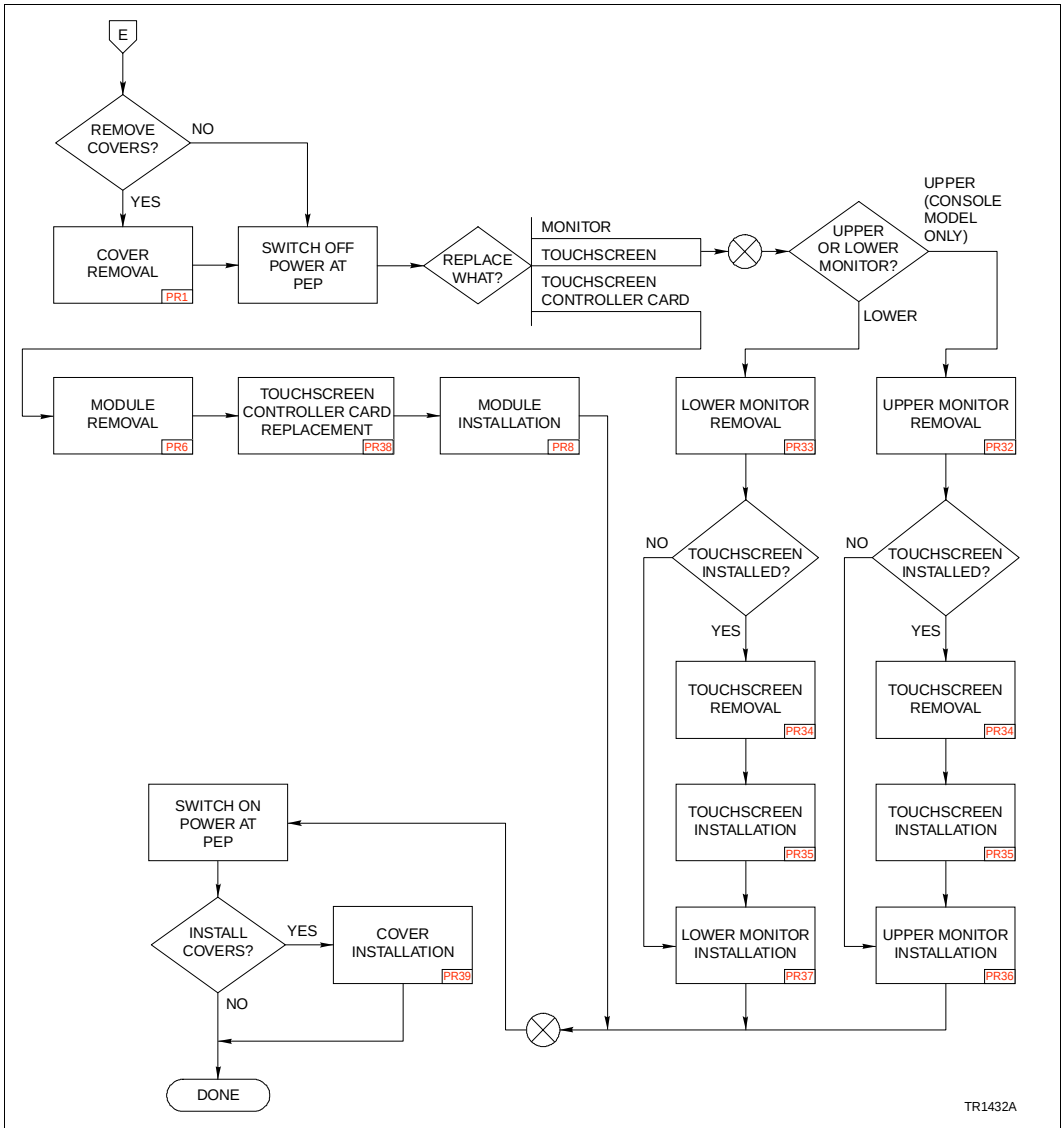


Figure 6-6. Monitors and Touchscreen





Introduction

Table 7-1 lists the recommended spare parts for the Conductor VMS Series 42 Auxiliary Terminal.

Table 7-1. Spare Parts (Recommended)

Nomenclature or Part Number	Description	C-I-CV42-			
		1	2	3	4
IIADP01	ADP, table top	•	•		•
IIADP02	ADP, panel mount		•		
IIAKB04	Keyboard, QWERTY (engineering)	•	•	• ¹	•
IIAMS04	Mouse	•	•		•
IIATB05	Trackball	•	•		•
IIMKM02A	Multibus keyboard module	•	•	•	•
NADS03	Annunciator display panel			•	
1947419?7	Fan 11.43 cm (4-1/2 in)		•		
1948623?9	Monitor (19-inch)	•	•	•	•
1948802?3	Keyboard enclosure			•	
1948803?2	Joystick			•	
1949009?1	50-Ω thinwire terminator	•	•	•	•
6638353?5	Power entry panel		•		
6638514?1	Keyboard, Mylar (operator)	•	•		•
6638514?2	Keyboard, Mylar (operator)			•	
6638553?5	Power supply		•		
6638554?2	Keyboard interface assembly		•	•	•
6638720?4	Lower monitor brightness cable		•		
6638720?5	Upper monitor brightness cable		•		
6638720?6	Monitor brightness cable	•		•	•
6639030?5	Keyboard interface assembly	•			
6639503?5	Power entry panel			• ²	
6640038?1	Power supply	•		•	•
6640300?1	Multibus card cage		•		



Table 7-1. Spare Parts (Recommended) (continued)

Nomenclature or Part Number	Description	C-I-CV42-			
		1	2	3	4
6640639?1	Fan assembly (3-inch)		•		
6640851?2	Power entry panel				•
6642485?1	CPU - Tektronix, model XP400	•	•	•	•
194776?11001	Fuse 1 A (keyboard interface front panel)	•			
1948182?22001	Fuse 2 A, 250V fast acting (keyboard interface board)	•	•	•	•

NOTES:

1. Includes keyboard interface assembly.
2. Requires IIAKB04 keyboard without adapter.



Introduction

This appendix contains installation and dimension drawings for various Conductor VMS Series 42 Auxiliary Terminal components and arrays as well as a typical anchoring scheme drawing. Table A-1 lists the figure numbers and descriptions of the drawings.

Table A-1. Installation and Dimension Drawings

Figure Number	Description
A-1	Table top model dimensions
A-2	Console model dimensions
A-3	Environmental model dimensions
A-4	Environmental model dimensions
A-5	Panel mount model dimensions
A-6	Table top and console model anchoring dimensions
A-7	Anchoring scheme (typical)
A-8	Table top and console model cable entry cutouts
A-9	Array installation drawing (typical)
A-10	IICPI01 15° wedge dimensions
A-11	IICPI02 45° wedge dimensions
A-12	IICWS01 work and printer surface dimensions
A-13	IICUC01 utility console dimensions

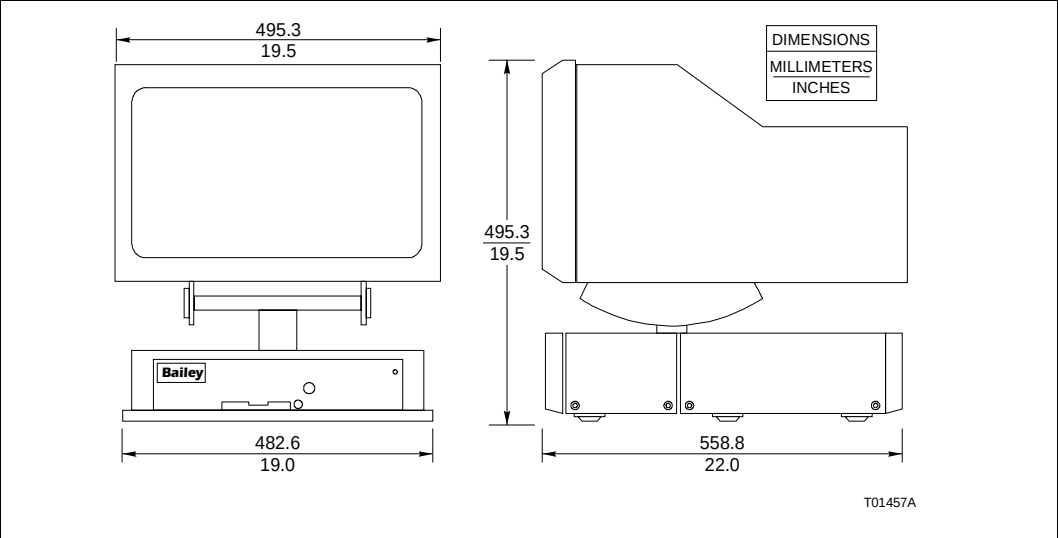


Figure A-1. Table Top Model Dimensions

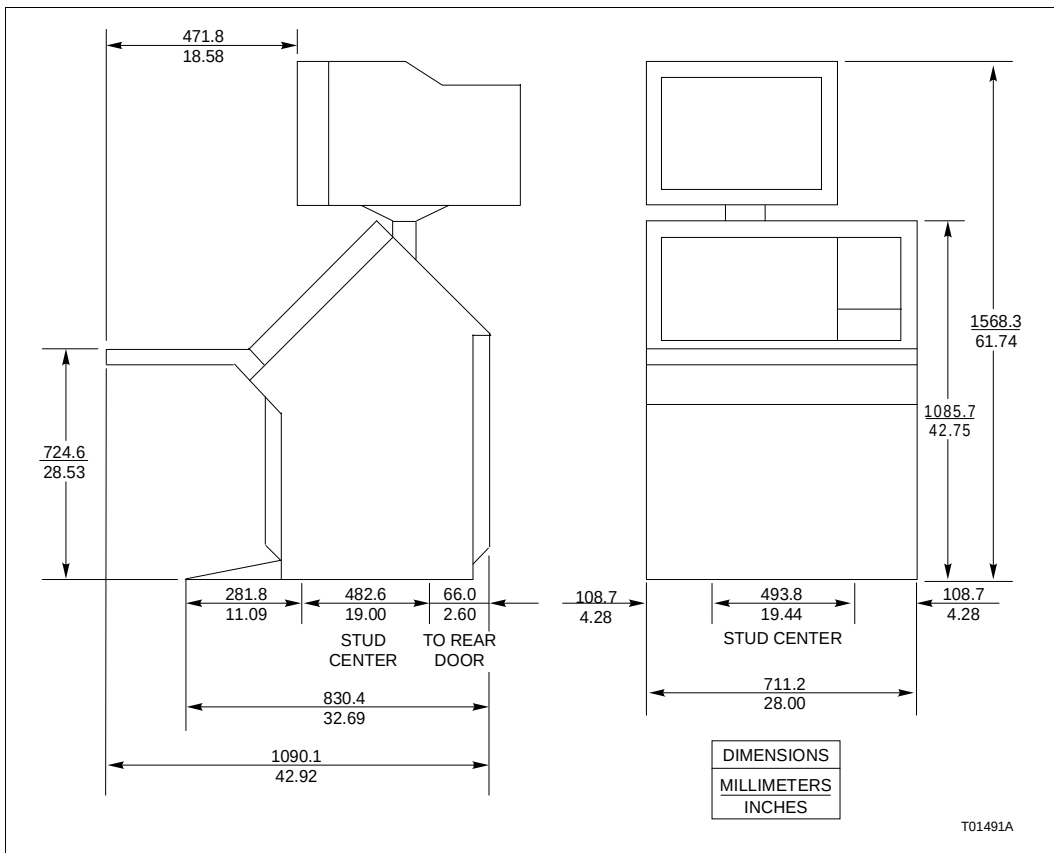


Figure A-2. Console Model Dimensions

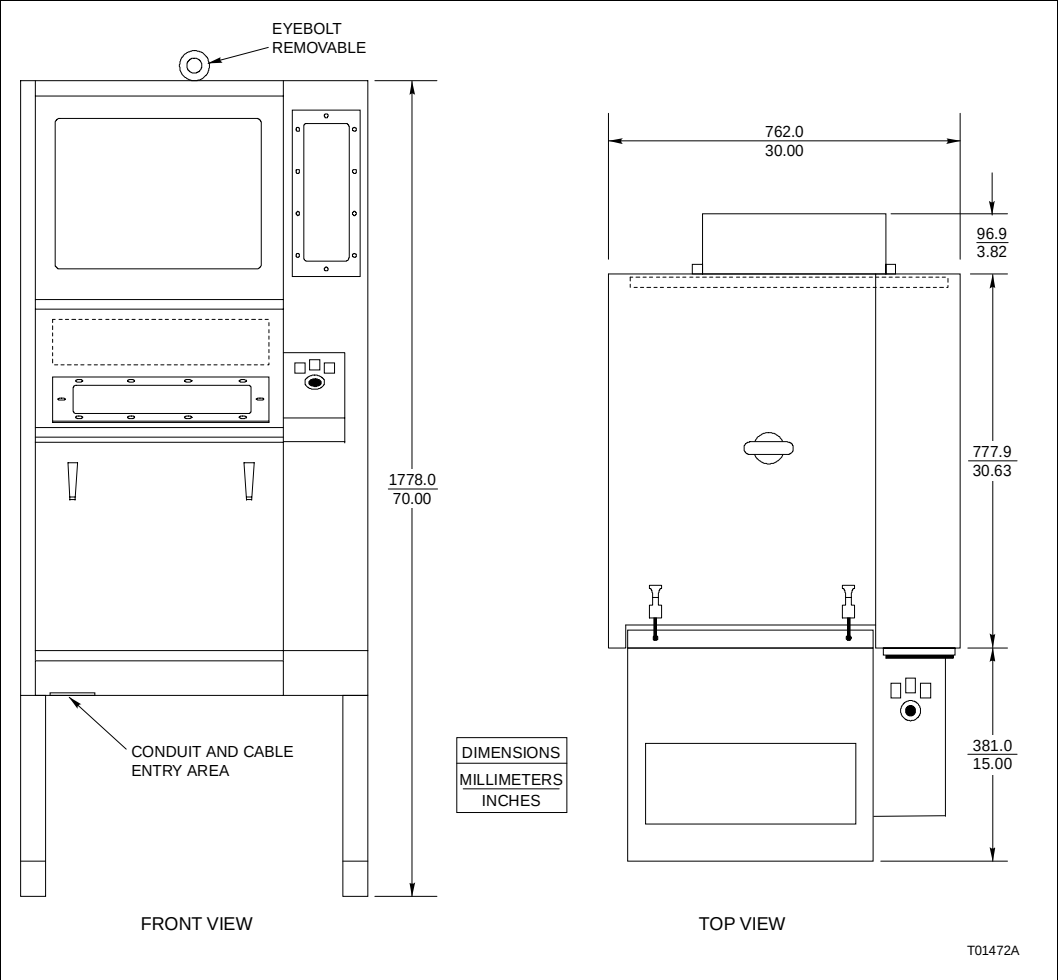


Figure A-3. Environmental Model Dimensions

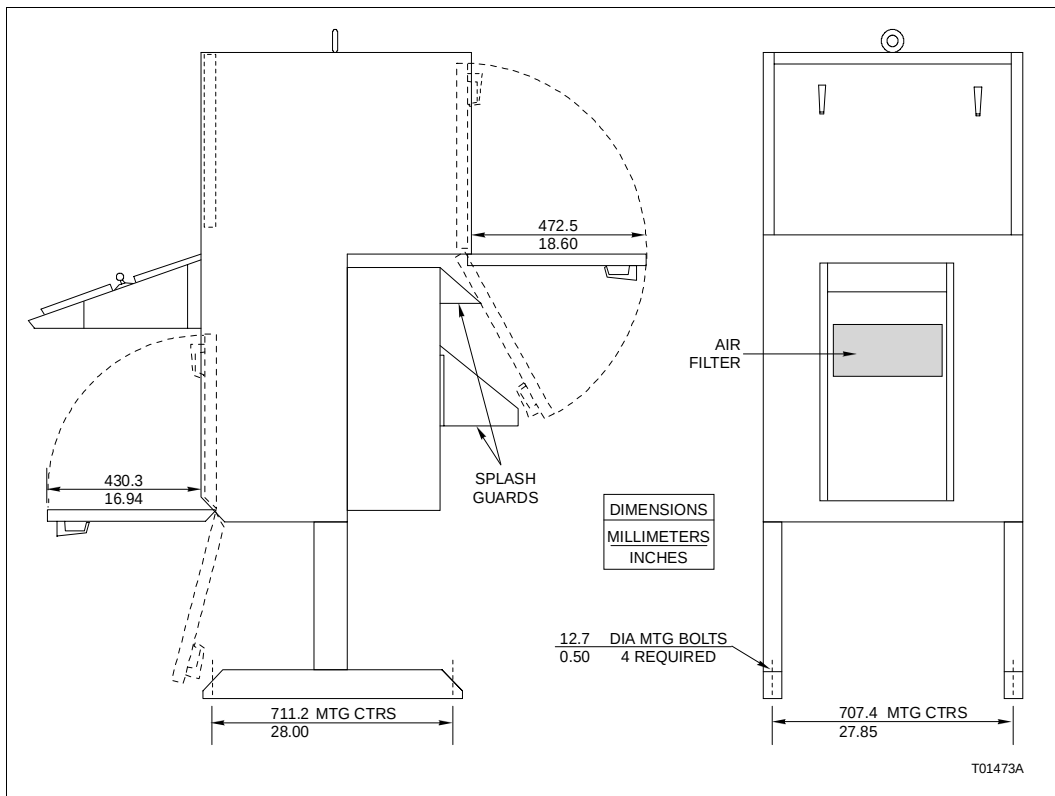


Figure A-4. Environmental Model Dimensions

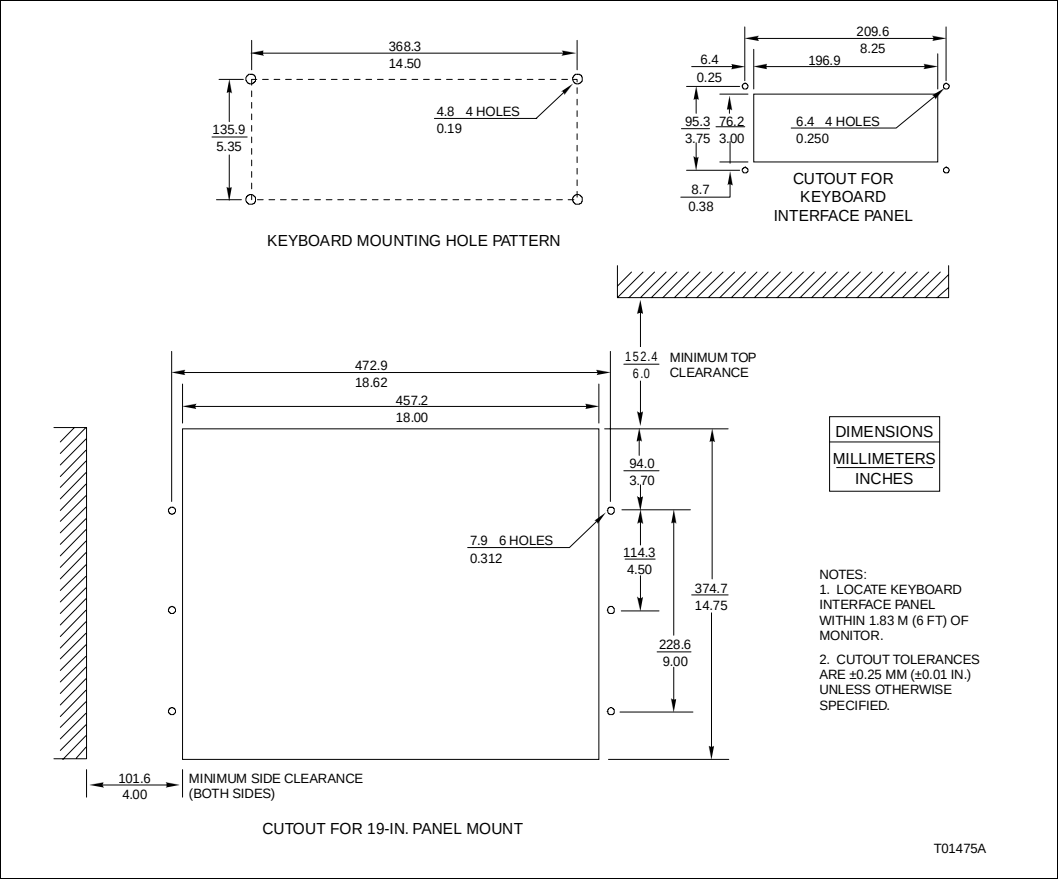


Figure A-5. Panel Mount Model Dimensions

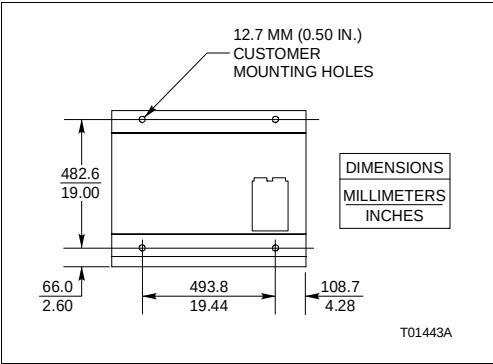


Figure A-6. Table Top and Console Model Anchoring Dimensions

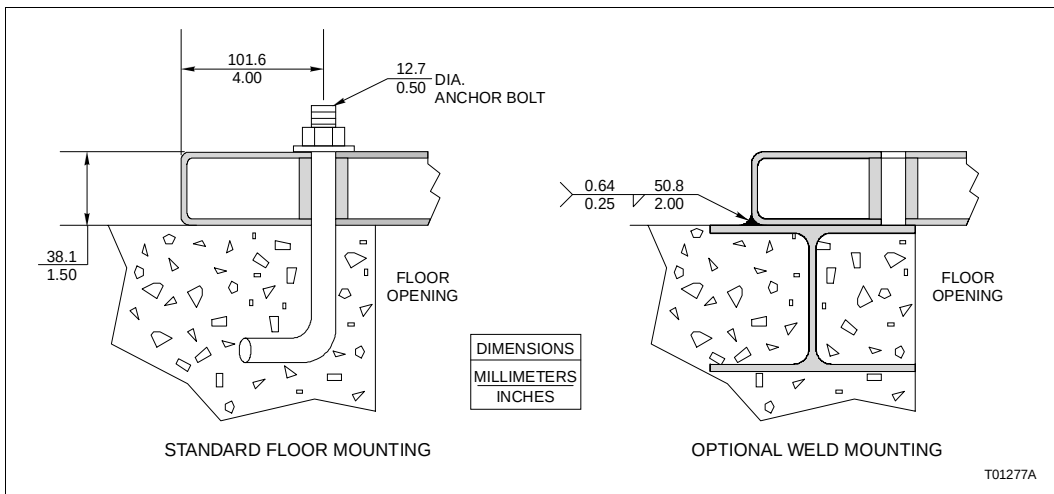


Figure A-7. Anchoring Scheme (Typical)

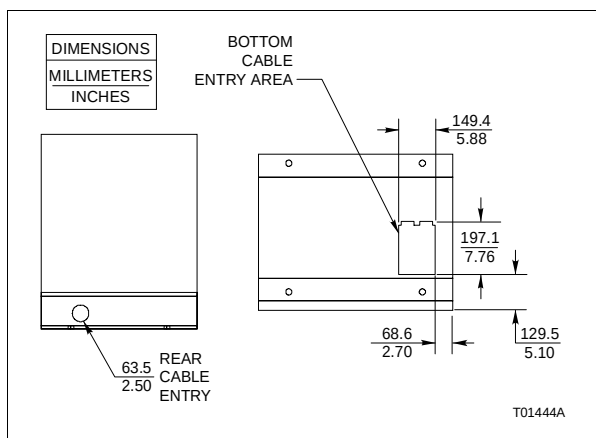


Figure A-8. Table Top and Console Model Cable Entry Cutouts

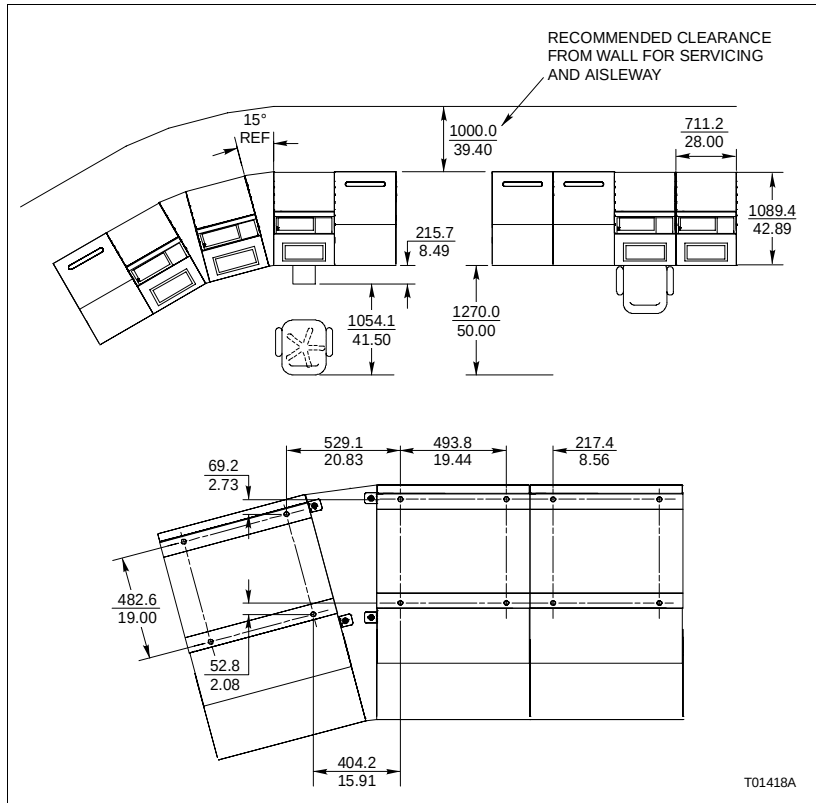


Figure A-9. Array Installation Drawing (Typical)

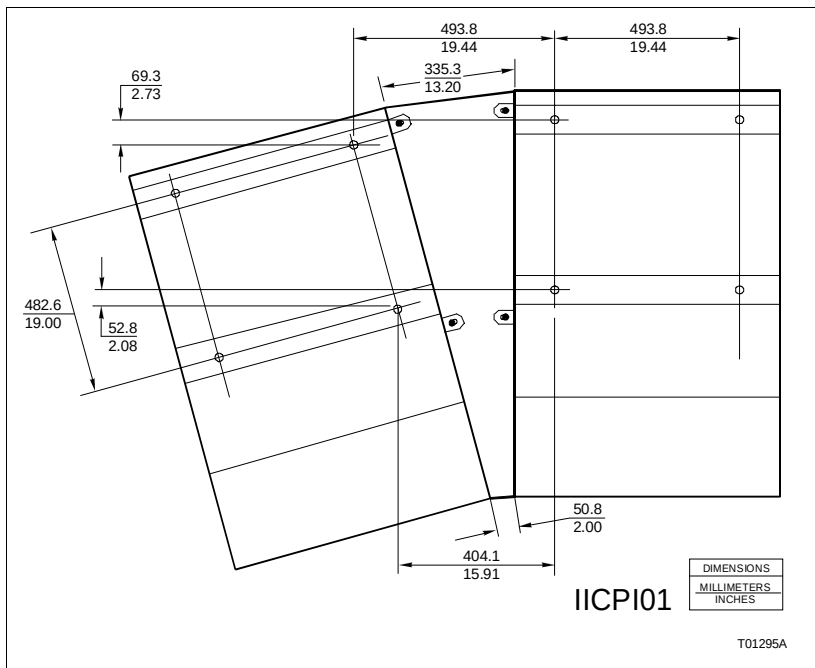


Figure A-10. IICPI01 15° Wedge Table Dimensions

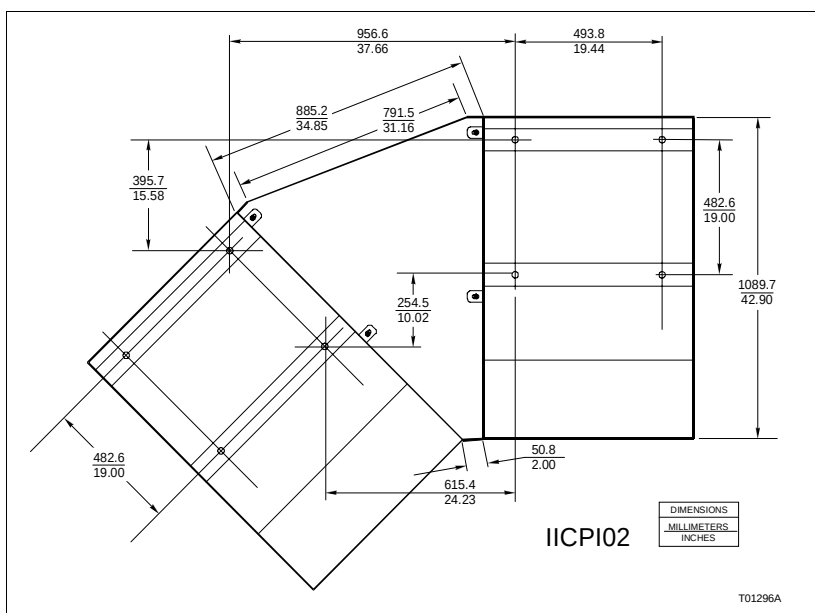


Figure A-11. IICPI02 45° Wedge Table Dimensions

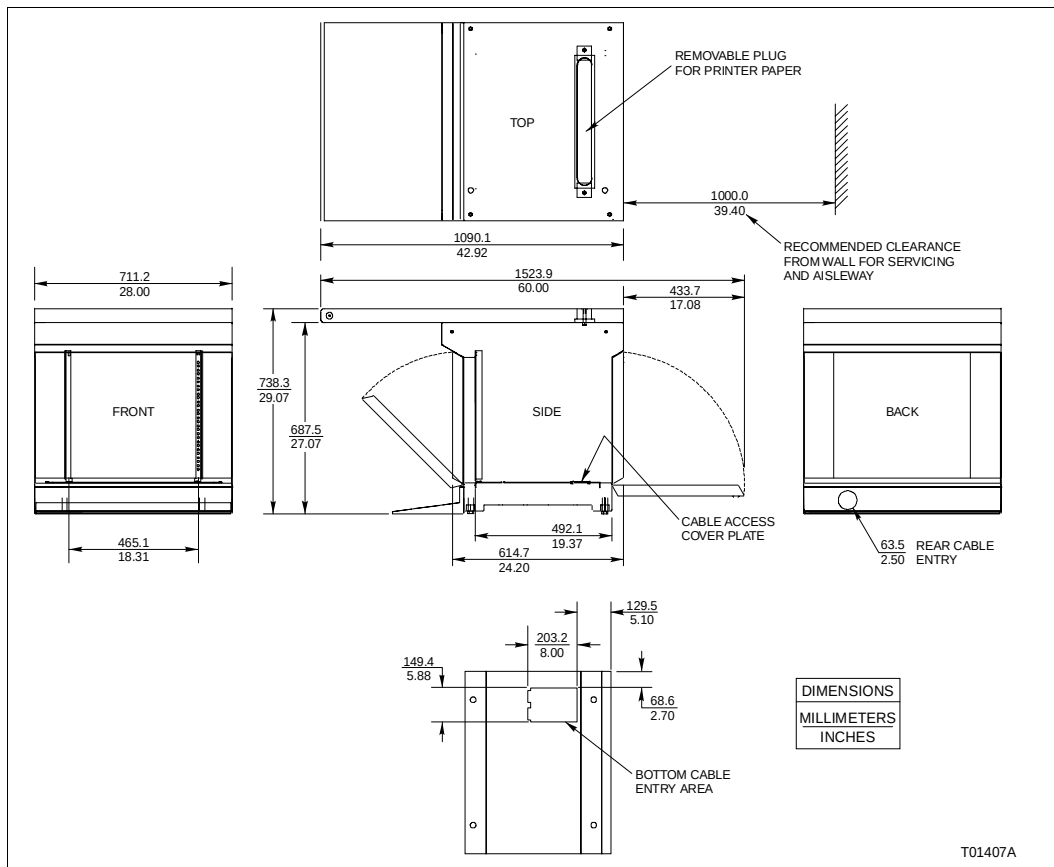


Figure A-12. IICPI01 Work and Printer Surface Dimensions

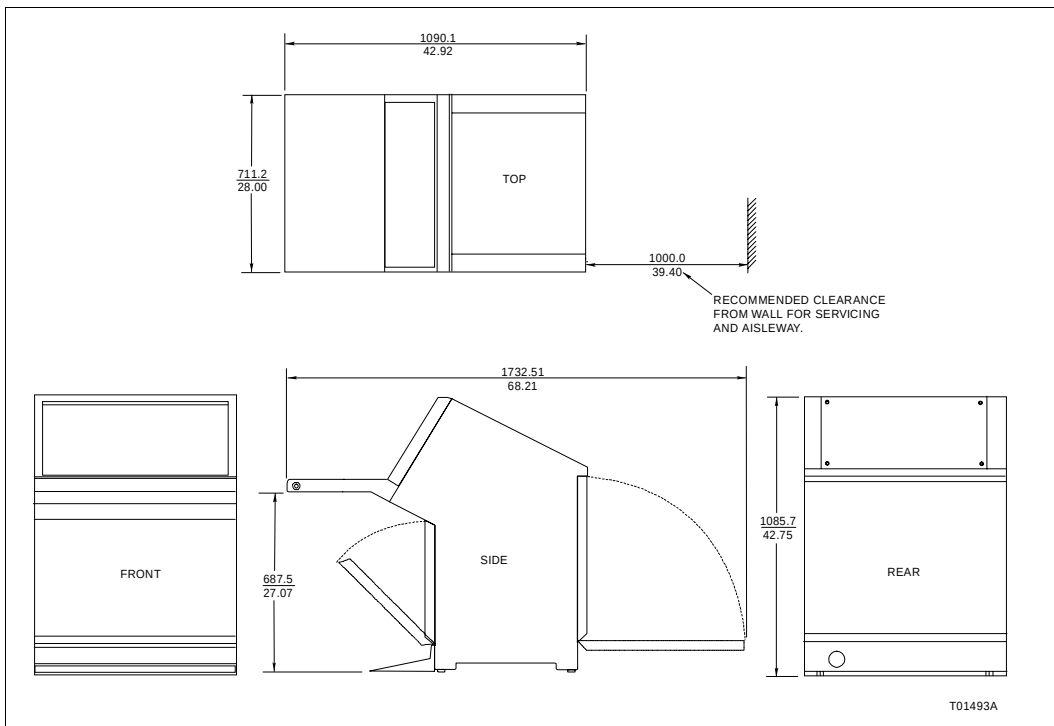


Figure A-13. IICUC01 Utility Console Dimensions





Introduction

This appendix contains factory cabling tables and diagrams for the Conductor VMS Series 42 Auxiliary Terminal. This appendix shows factory cabling only and is intended as a reference or for repair. For specific customer cabling, refer to the appropriate procedure. Table B-1 and Figure B-1 contain the cabling information for the table top model, Table B-2 and Figure B-2 contain the cabling information for the console model, Table B-3 and Figure B-3 contain the cabling information for the environmental model, and Table B-4 and Figure B-4 contain the cabling information for the panel mount model.

Table B-1. Table Top Model Factory Cabling

Cable No. (Fig. B-1)	Part No.	Connect From	Connect To
1	6642339?1	J2 on chassis	Keyboard port on CPU
2	6640778?1	J1 on chassis	0 port on CPU
3	6634512?26N15	P6 on IIMKM02A module	Terminal block on chassis
4	6634512?26N15	P5 on IIMKM02A module	P1 on keyboard interface assembly
5	6634512?26N15	P7 on IIMKM02A module	P8 on keyboard interface assembly
6	6638719?2	P4 on IIMKM02A module	Reset switch on chassis
7	6638720?6	Degauss on chassis	Brightness and contrast on monitor bezel
8	6639117?1	P9 on IIMKM02A module	J1 on chassis (inside)
9	6639211?1	P2 on power supply	Fan, P2 on keyboard interface assembly, P16 on IIMKM02A module
10	6639212?1	AC IN on chassis (inside)	P1on power supply, AC IN on monitor
11	6639213?1	P3 on IIMKM02A module	P3 on power supply
12	6639637?1	P10 on keyboard interface assembly	J3 on chassis (inside)

**Table B-1. Table Top Model Factory Cabling** *(continued)*

Cable No. (Fig. B-1)	Part No.	Connect From	Connect To
13	6640778?2	J5 on chassis	1 port on CPU
14	6640857?1	P8 on IIMKM02A module	J2 on chassis (inside)
15	6642341?1	J3 on chassis	Mouse port on CPU
16	6642342?1	Touchscreen	J5 on chassis (inside)
17	Power cable	AC IN on CPU	AC OUT on chassis
18	1949448?1	Monitor port on CPU	RGB on chassis

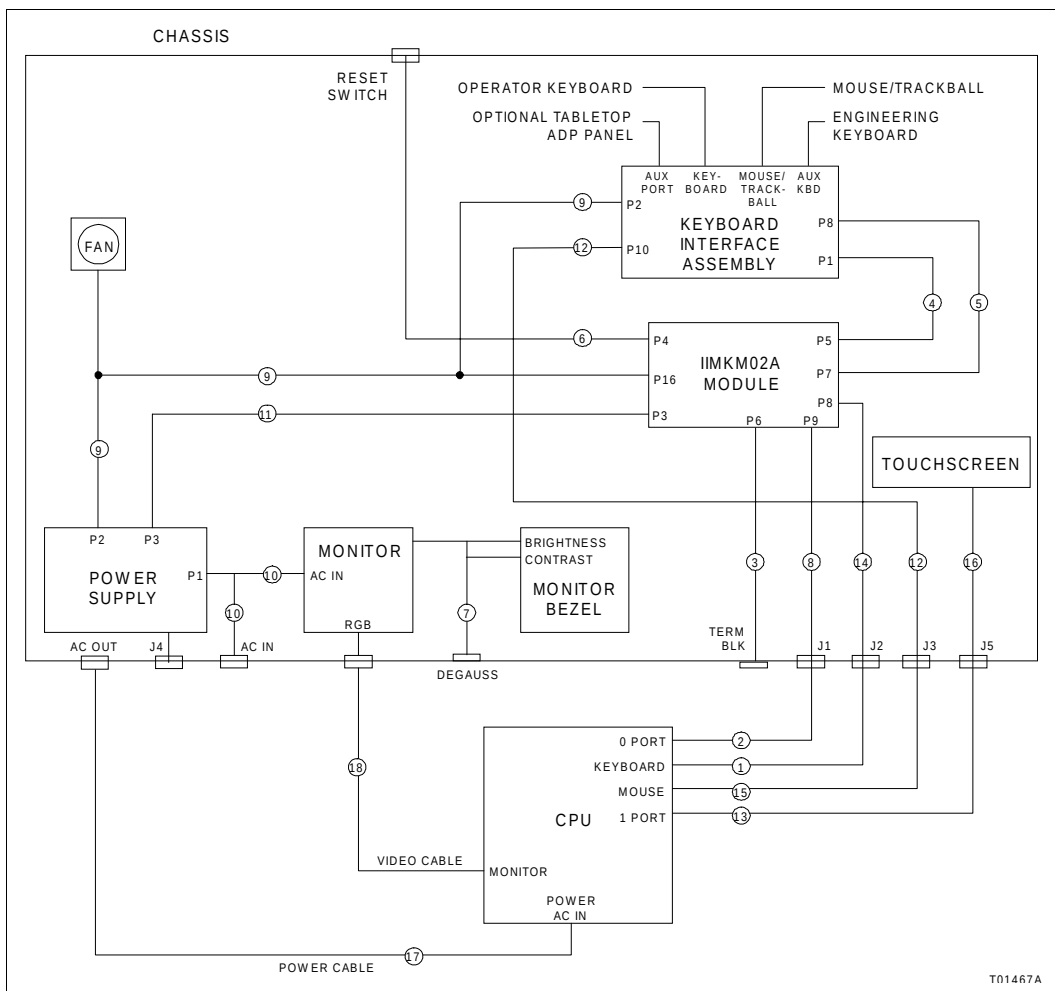


Figure B-1. Table Top Model Factory Cabling

Table B-2. Console Model Factory Cabling

Cable No. (Fig. B-2)	Part No.	Connect From	Connect To
1	1947950?5	J3 on PEP	AC IN on CPU
2	6639637?4	P9 on IIMKM02A module	0 port on CPU
3	6642339?1	P8 on IIMKM02A module	Keyboard port on CPU
4	6634512?26N72	P5 on IIMKM02A module	P1 on keyboard interface assembly
5	6634512?26N72	P6 on IIMKM02A module	Rear of terminal block on PEP



Table B-2. Console Model Factory Cabling (continued)

Cable No. (Fig. B-2)	Part No.	Connect From	Connect To
6	6637599?1	J1 AC OUT on PEP	P1 on power supply
8	6638708?1	TB2 on backplane	Terminal block on DC distribution board
9	6638713?1	P2 on keyboard interface assembly	P3 on DC distribution board
10	6638713?2 or 6639106?1	P1 on ADP board	P4 on DC distribution board
11	6638719?1	Reset switch on PEP	P4 on IIMKM02A module
12	6638720?4	9-pin connector on rear of monitor	Monitor bezel brightness and contrast, degaussing switch on PEP
13	6638720?5	9-pin connector on rear of monitor	Monitor bezel brightness and contrast, degaussing switch on PEP
14	6638849?1	P7 on IIMKM02A module	P8 on keyboard interface assembly P2 on ADP panel
15	6642341?1	P10 on keyboard interface assembly	Mouse port on CPU
16	6640113?4	P3 on power supply	P3 on IIMKM02A module
17	6640368?1	P5 on DC distribution board	P5 on backplane
18	6640368?1	P6 on DC distribution board	P6 on backplane
19	6640369?1	P2 on power supply	Terminal block on DC distribution board
20	6640640?2	P7 on DC distribution board	Cable P2 to fan on card cage
21	6640640?3	P8 on DC distribution board	Lower monitor: Cables P2, P3 and P4 to fan on lower monitor Upper monitor: Cables P2 and P3 to fan on lower monitor, cable P4 not used.
22	6640778?2	Connector on touch screen board	1 port on CPU
23	Power cable	AC power out (AUX OUTLET) on CPU	AC power connector on monitor
24	1949448?1 (lower monitor), 1949448?2 (upper monitor)	Monitor port on CPU	RGB on monitor



Table B-3. Environmental Model Factory Cabling

Cable No. (Fig. B-3)	Part No.	Connect From	Connect To
1	194795075	J2 on PEP	AC IN on monitor
2	663963774	P9 on IIMKM02A module	0 port on CPU
3	664233971	P8 on IIMKM02A module	Keyboard port on CPU
4	6634512726N15	P5 on IIMKM02A module	P1 on keyboard interface assembly
5	663871371	P1 on DC distribution board	P16 on IIMKM02A module

**Table B-3. Environmental Model Factory Cabling** *(continued)*

Cable No. (Fig. B-3)	Part No.	Connect From	Connect To
6	6638713?1	P3 on DC distribution board	P2 on keyboard interface assembly
7	6638713?4	P4 on DC distribution board	P1 on NADS03 panel
8	6638719?1	P4 on IIMKM02A module	Reset switch on PEP
9	6638720?6	Brightness on PEP, contrast on PEP, degauss on PEP	Brightness on monitor bezel, contrast on monitor bezel, monitor
10	6638849?1	P7 on IIMKM02A module	P2 on NADS03 panel, P8 on keyboard interface assembly
11	6639212?2	J1 on PEP	P1 on power supply
12	6639213?1	P3 on IIMKM02A module	P3 on power supply
13	6639513?1	Terminal block on DC distribution board	P2 on power supply
14	6640778?2	Touchscreen	1 port on CPU
16	Power cable	AC IN on CPU	AC POWER OUT on PEP
17	1949448?1	Monitor port on CPU	RGB on monitor
18	Supplied with air conditioner	AC OUT on PEP	Air conditioner
19	Supplied with joystick	Joystick	Mouse port on CPU
20	6634512?26N38	P6 on IIMKM02A module	Terminal block on PEP

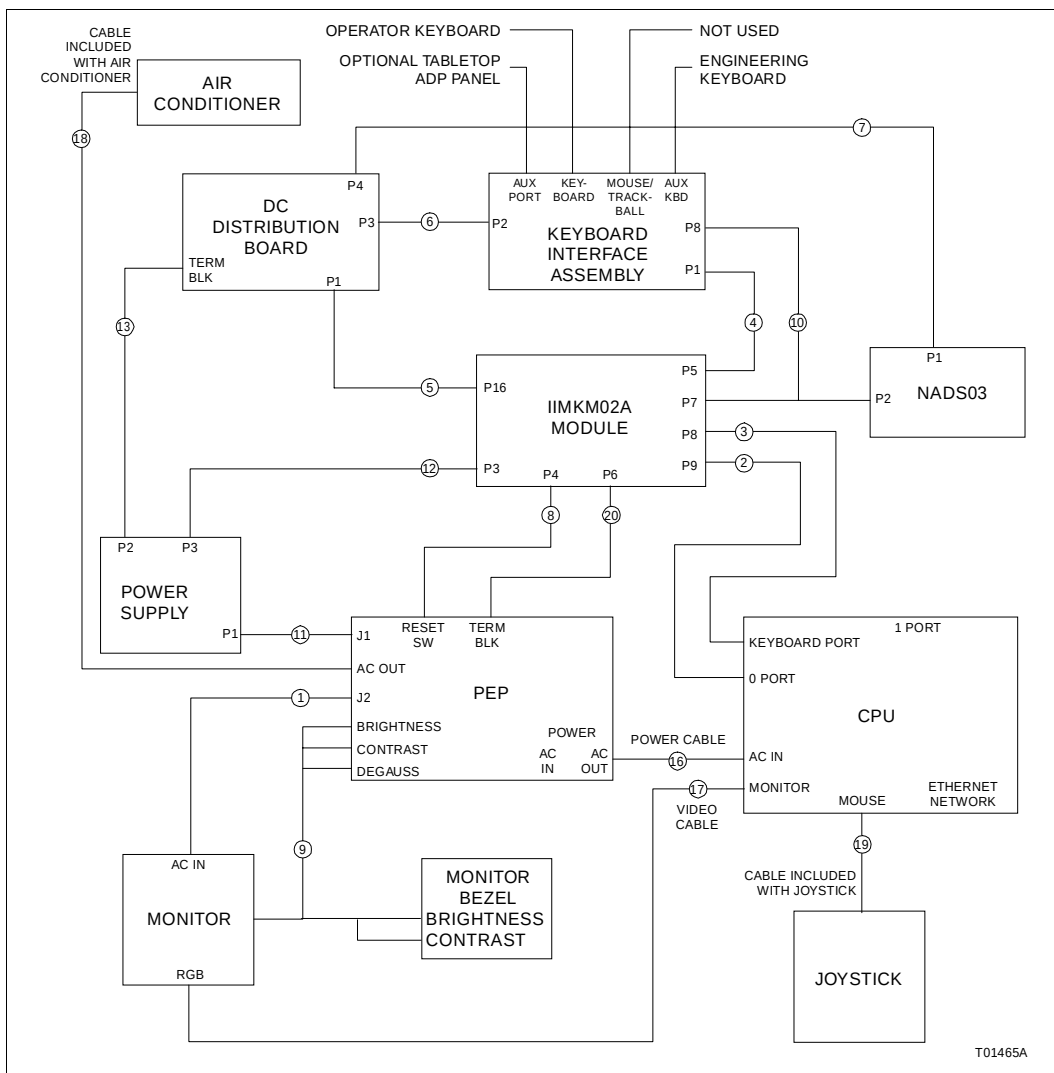


Figure B-3. Environmental Model Factory Cabling

Table B-4. Panel Mount Model Factory Cabling

Cable No. (Fig. B-4)	Part No.	Connect From	Connect To
1	6639637?4	J1 on chassis	0 port on CPU
2	6642339?1	J2 on chassis	Keyboard port on CPU
3	6634512?26N4	P6 on IIMKM02A module	Terminal block on chassis

**Table B-4. Panel Mount Model Factory Cabling** *(continued)*

Cable No. (Fig. B-4)	Part No.	Connect From	Connect To
4	6634512?26N72	P5 keyboard port on chassis	P1 on keyboard interface assembly
5	6634512?26N72	P7 ADP port on chassis	P8 on keyboard interface assembly
6	6638719?2	P4 on IIMKM02A module	Reset switch on chassis
7	6638720?6	Connector on monitor	Brightness on monitor bezel, contrast on monitor bezel, degauss switch on chassis
8	6642341?1	P10 on keyboard interface assembly	Mouse port on CPU
9	6639352?1	P2 on keyboard interface assembly	I/O power port on chassis
10	6640112?2	P2 on power supply	Line filter and E1 (chassis ground)
11	6640113?1	P3 on IIMKM02A module	P3 on power supply
12	6640164?1	P1 on power supply	P16 on IIMKM02A module and KYBD, ADP, FAN ports on chassis
13	6640778?2	Touchscreen	1 port on the CPU
14	Power cable	AC POWER IN on CPU	Power out on chassis and line filter
15	1949448?1	Monitor on CPU	RGB on monitor
16	6639031?1	AC IN on monitor	Line filter
17	1947950?7	AC power	AC IN on chassis

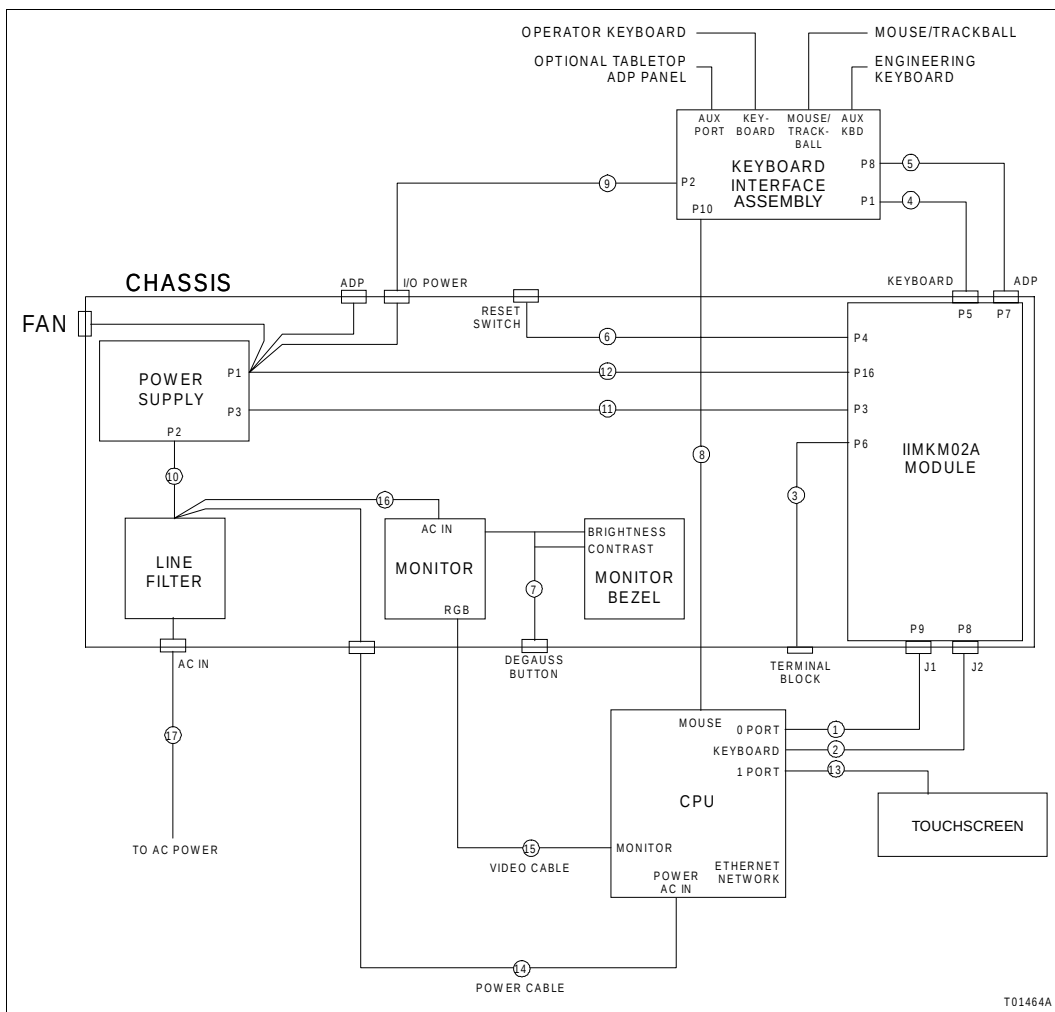


Figure B-4. Panel Mount Model Factory Cabling





Introduction

This section contains figures providing information at a glance. It is intended for those completely familiar with the Conductor VMS Series 42 Auxiliary Terminal and this instruction. Refer to the appropriate section or procedure for detailed information. Table C-1 lists the figure numbers and descriptions of the figures.

Table C-1. Quick Reference Figures

Figure Number	Description
C-1	Table top model
C-2	Console model front view
C-3	Console model rear view
C-4	Environmental model
C-5	Panel mount model
C-6	Table top model connections
C-7	Console model PEP
C-8	Environmental model PEP
C-9	Panel mount model PEP
C-10	IIMKM02A module
C-11	Table top model keyboard interface assembly
C-12	Console and panel mount model keyboard interface assembly
C-13	Environmental model connections
C-14	CPU connections
C-15	IIADP01 installation
C-16	Multibus card cage backplane
C-17	IIADP02 ADP switch settings
C-18	NADS02 ADP switch settings
C-19	Keyboard interface assembly
C-20	Touchscreen controller card

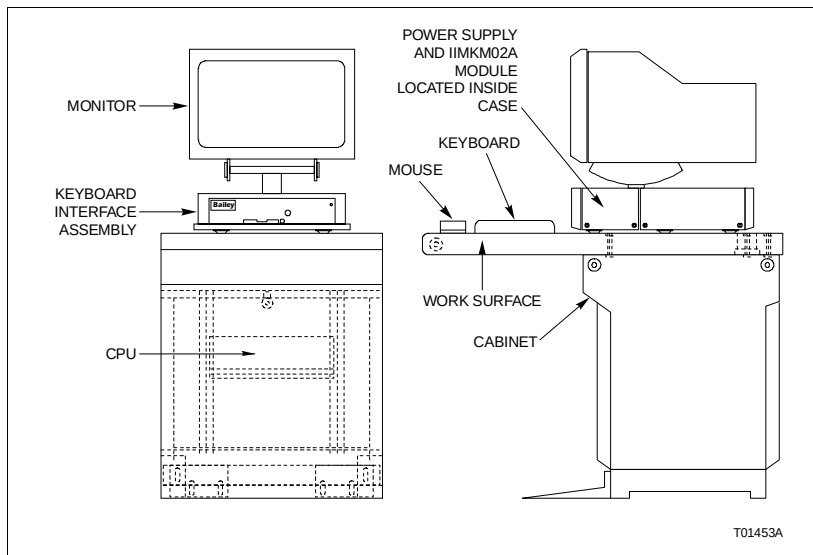


Figure C-1. Table Top Model

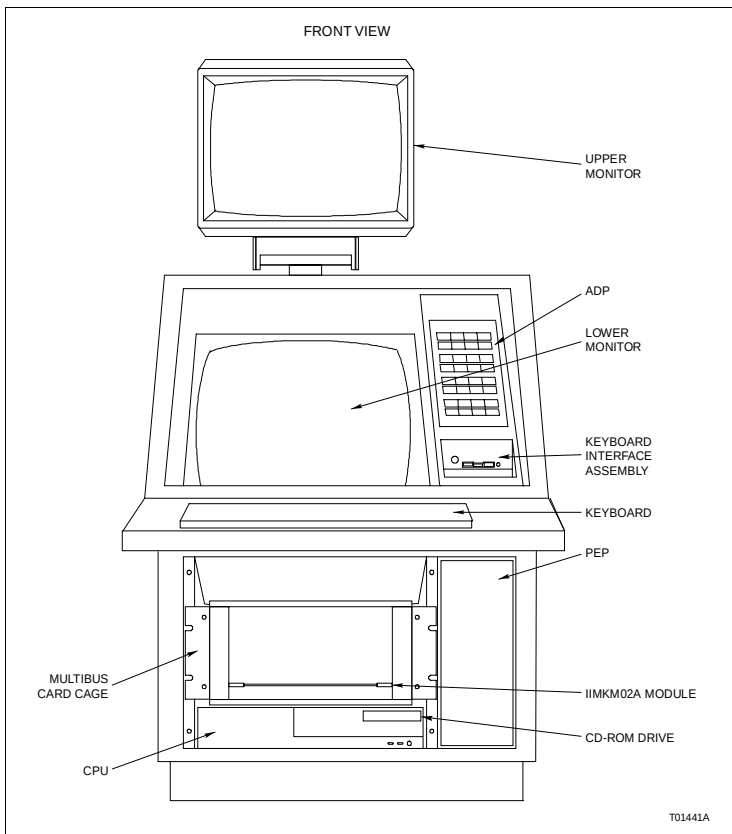


Figure C-2. Console Model Front View

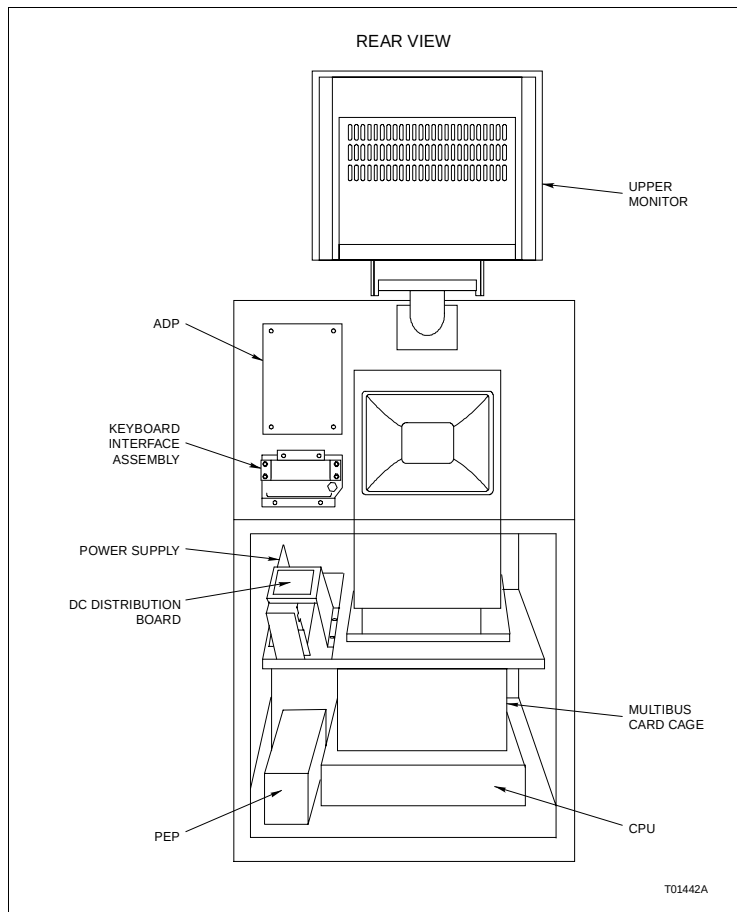


Figure C-3. Console Model Rear View

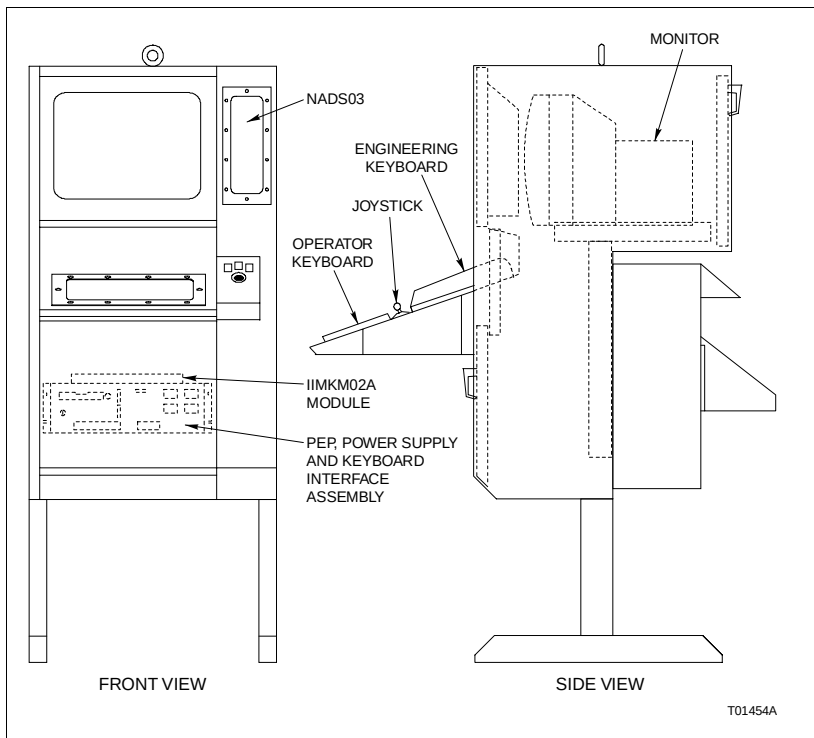


Figure C-4. Environmental Model

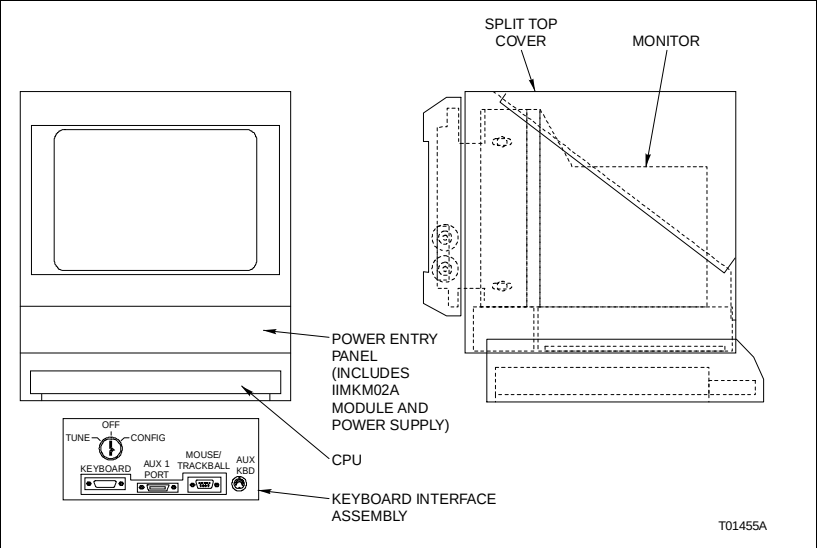


Figure C-5. Panel Mount Model

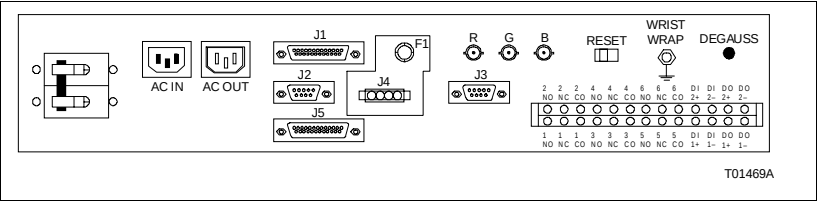


Figure C-6. Table Top Model Connections

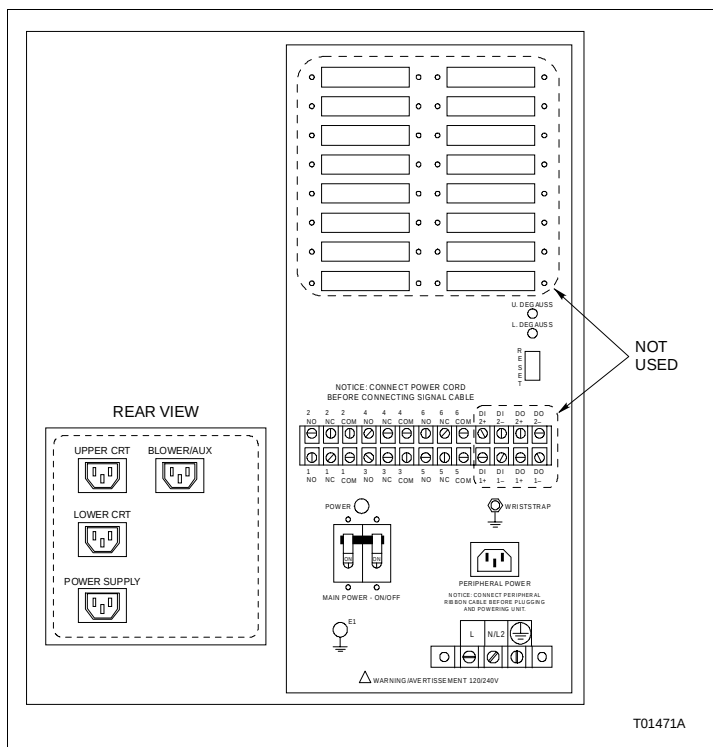


Figure C-7. Console Model PEP

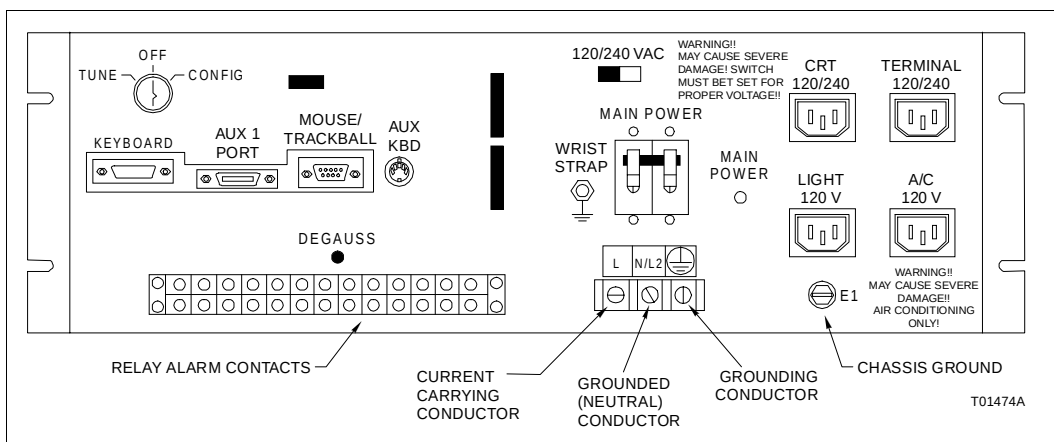


Figure C-8. Environmental Model PEP

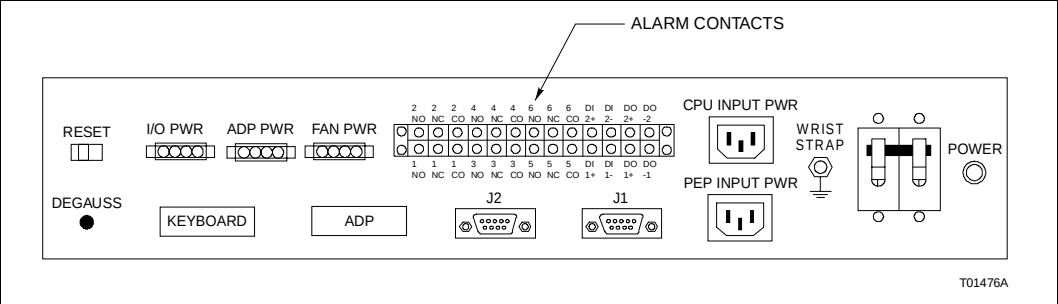


Figure C-9. Panel Mount Model PEP

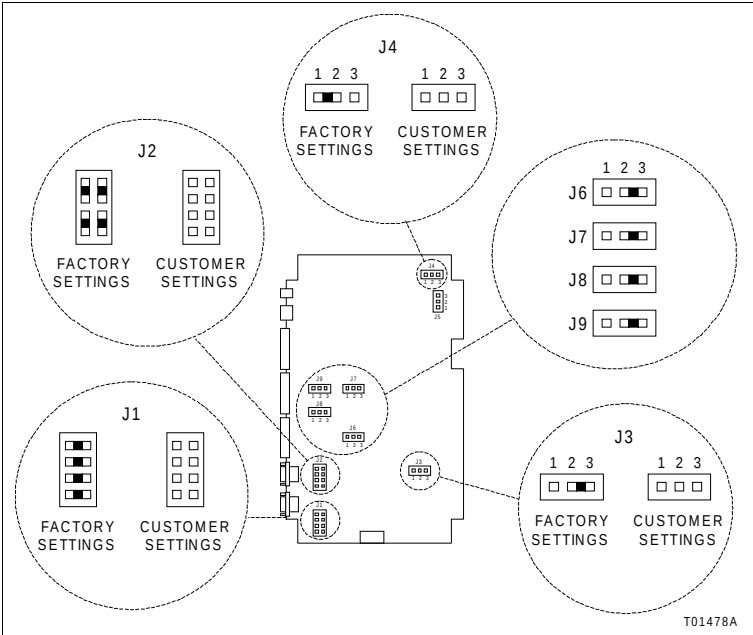


Figure C-10. IIMKM02A Module

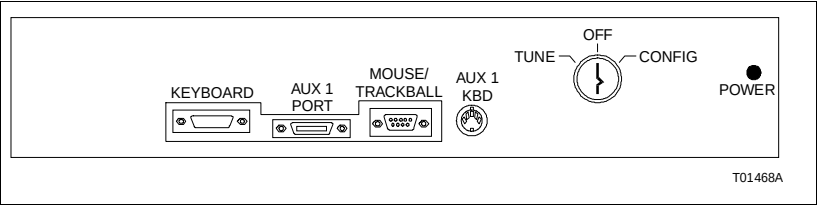


Figure C-11. Table Top Model Keyboard Interface Assembly

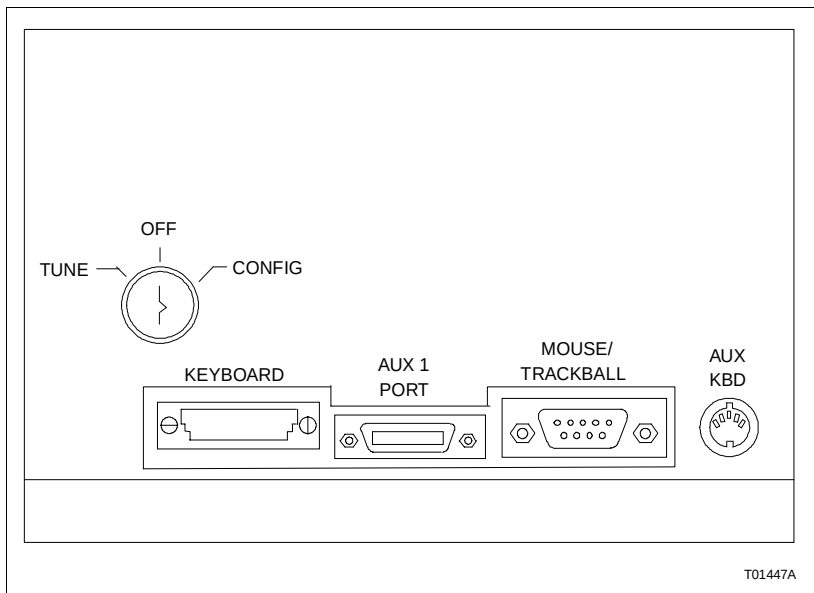


Figure C-12. Console and Panel Mount Model Keyboard Interface Assembly

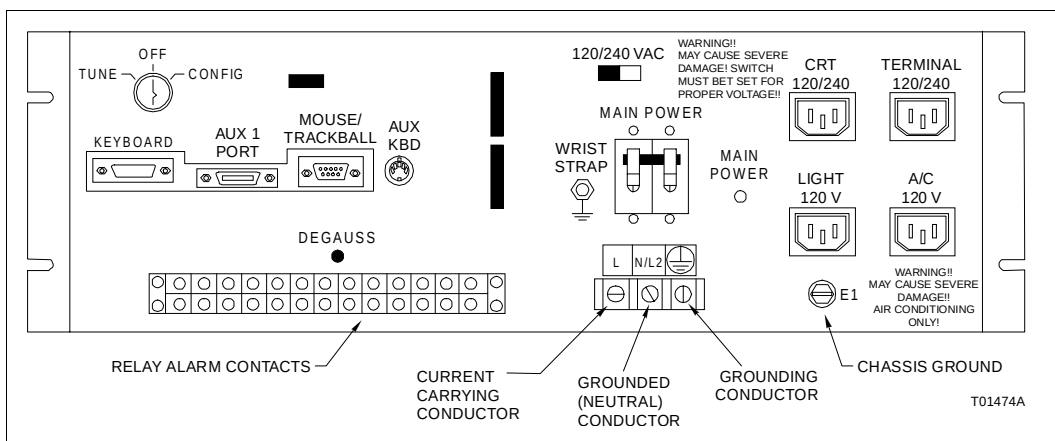


Figure C-13. Environmental Model Connections

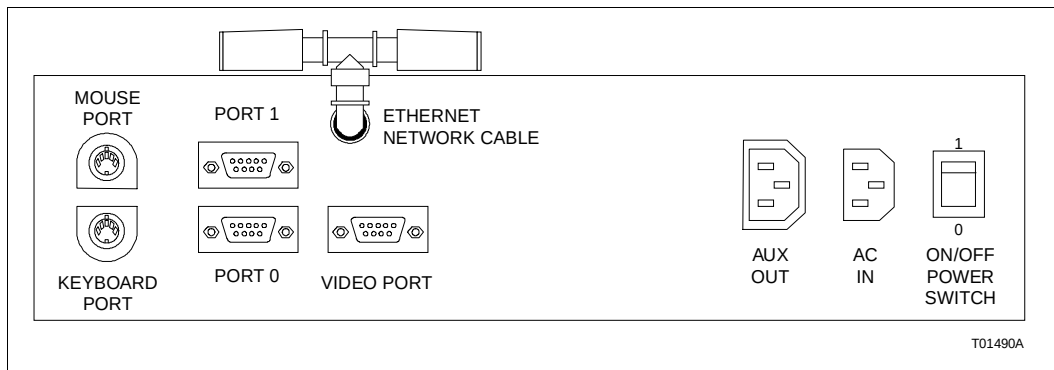


Figure C-14. CPU Connections

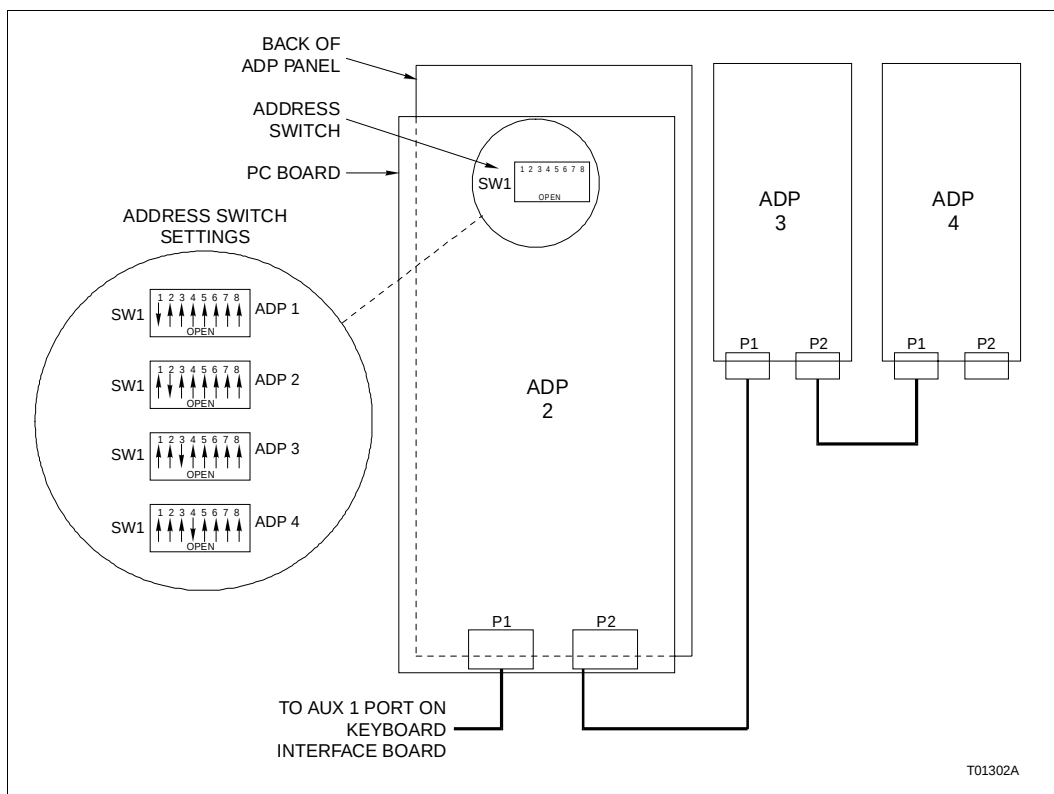


Figure C-15. IADP01 ADP Installation

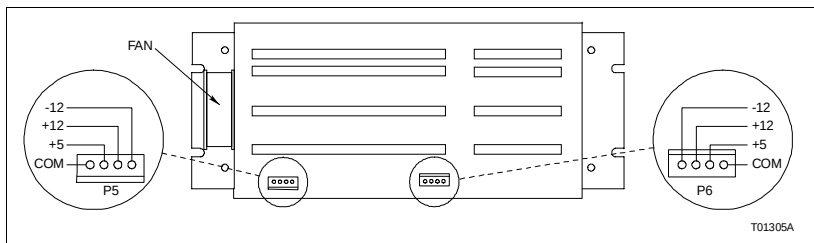


Figure C-16. Multibus Card Cage Backplane

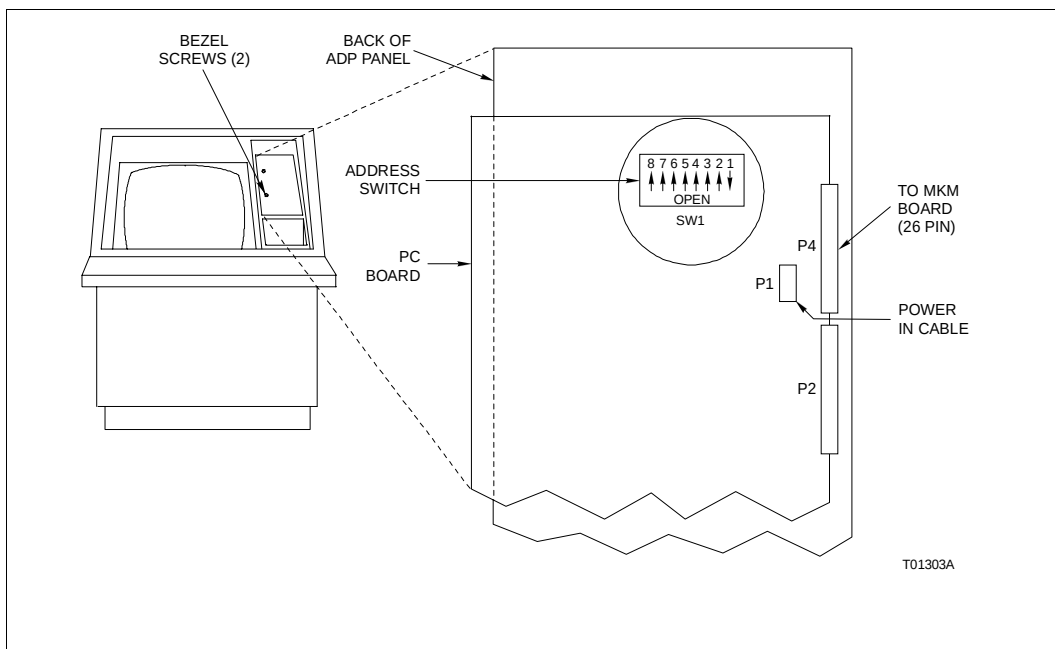


Figure C-17. IIADP02 ADP Switch Settings

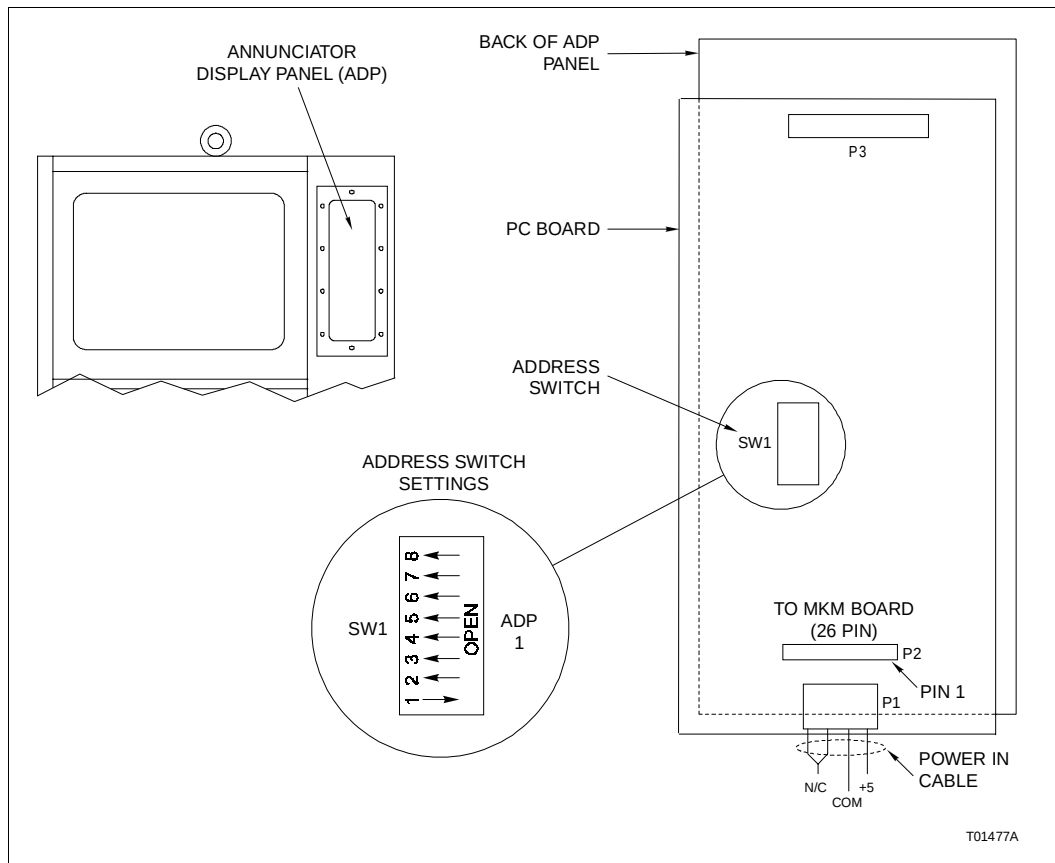


Figure C-18. NADS02 ADP Switch Settings

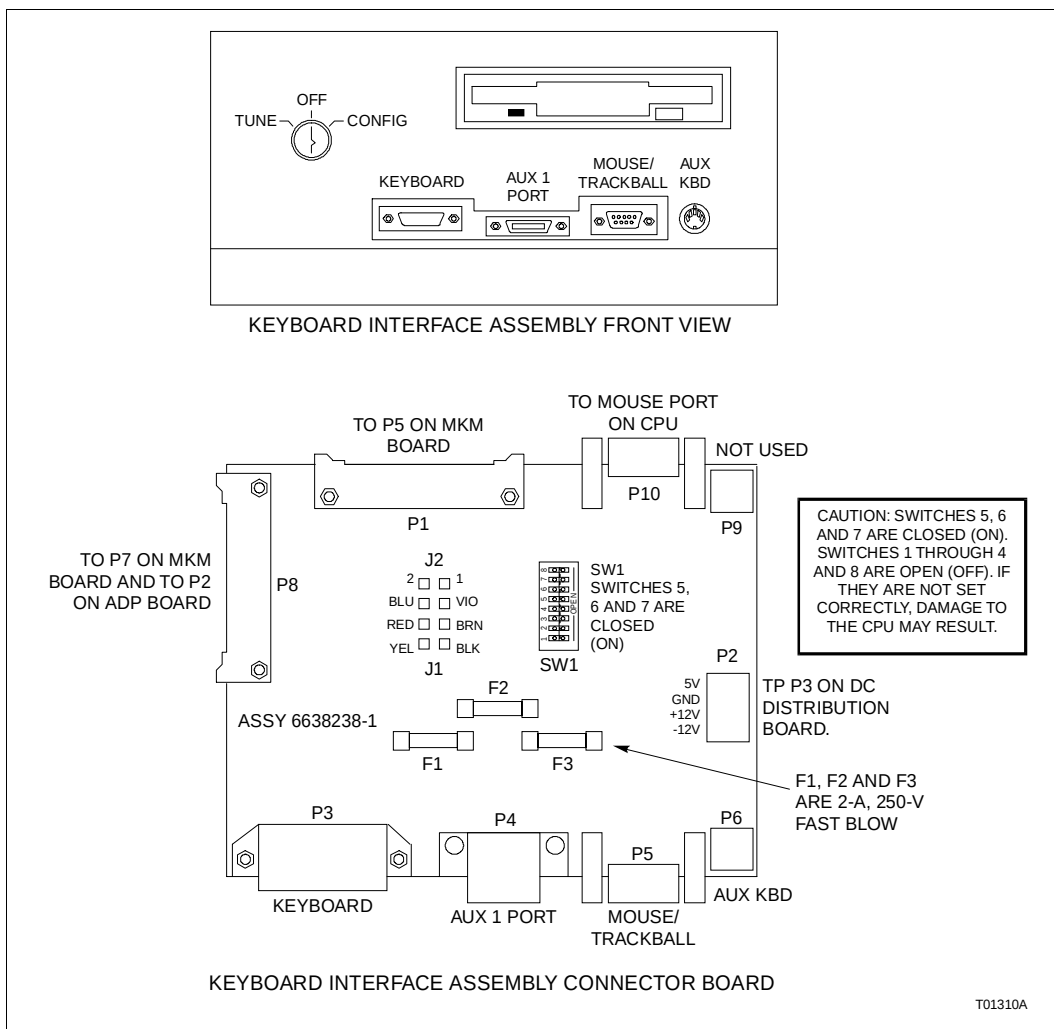


Figure C-19. Keyboard Interface Assembly

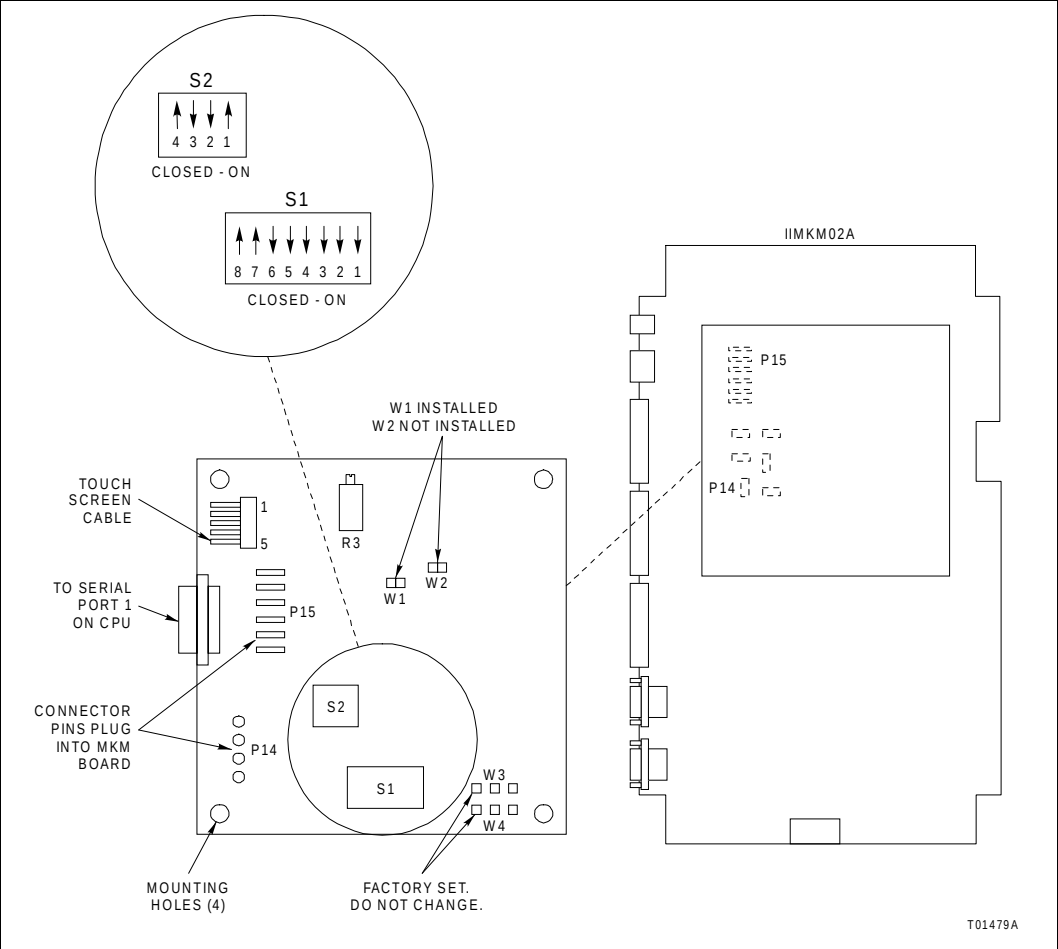


Figure C-20. Touchscreen Controller Card



Purpose/Scope

5 min.

This procedure explains how to remove the doors and top cover from the console model and how to open the doors on the environmental model.

Parts None.

Tools

- Keys.
- $\frac{1}{8}$ -inch Allen wrench.

Procedure

There are two doors and a top cover on the console model. There is a front and rear door on the environmental model.

Console Model

Front and Rear Doors

- ☐ 1. Insert the key into the lock and turn it $\frac{1}{4}$ -turn counter-clockwise.
- ☐ 2. Pull down and out on the doors to remove them.

Top Cover

- ☐ 1. Use the $\frac{1}{8}$ -inch Allen wrench to remove the five Allen screws that secure the top cover to the auxiliary terminal.
- ☐ 2. Remove the top cover.

Environmental Model

There are three latches on each door on the environmental model.

- ☐ 1. Use the $\frac{1}{8}$ -inch Allen wrench to turn the middle latch on the door to be opened $\frac{1}{4}$ -turn.
- ☐ 2. Pull out on the handle of each end latch.



- ☐ 3. Turn each end latch $\frac{1}{4}$ -turn.
- ☐ 4. Open the door.



Purpose/Scope

1 hr

Due to the numerous installation methods possible, this procedure is intended only as a reference. It is beyond the scope of this instruction to include all of the possible anchoring mechanisms. The example shown in Figure PR2-3 is for illustration purposes only and may or may not reflect the actual installation.

Parts Dependent on the installation.

Tools Dependent on the installation.

Procedure

There are two ways to secure the console model and the cabinet for the table top model at the installation site. If supplied with stabilizers, no further securing methods are required. If there are not stabilizers, they must be securely anchored to the floor. The environmental model must always be securely anchored to the floor.

If the control room has a raised false floor, the anchoring mechanism must not be fastened to the false floor.

Figure PR2-1 shows the location of the customer mounting holes for the console model. The console model dimensions are the same for the console model itself, the cabinet for the table top model, the work and printer surface, and the utility console. Figure PR2-2 shows the anchoring dimensions for the environmental model. Figure PR2-3 shows a typical anchoring scheme. This is an example only and may or may not reflect the actual installation.

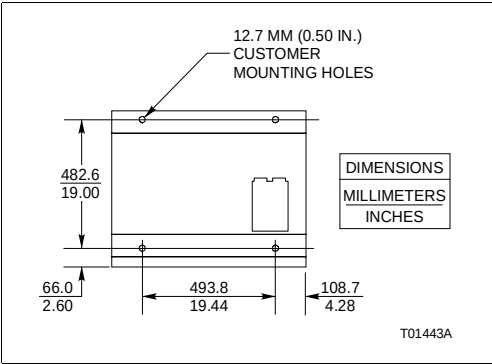


Figure PR2-1. Console Model and Table Top Cabinet Anchoring Dimensions

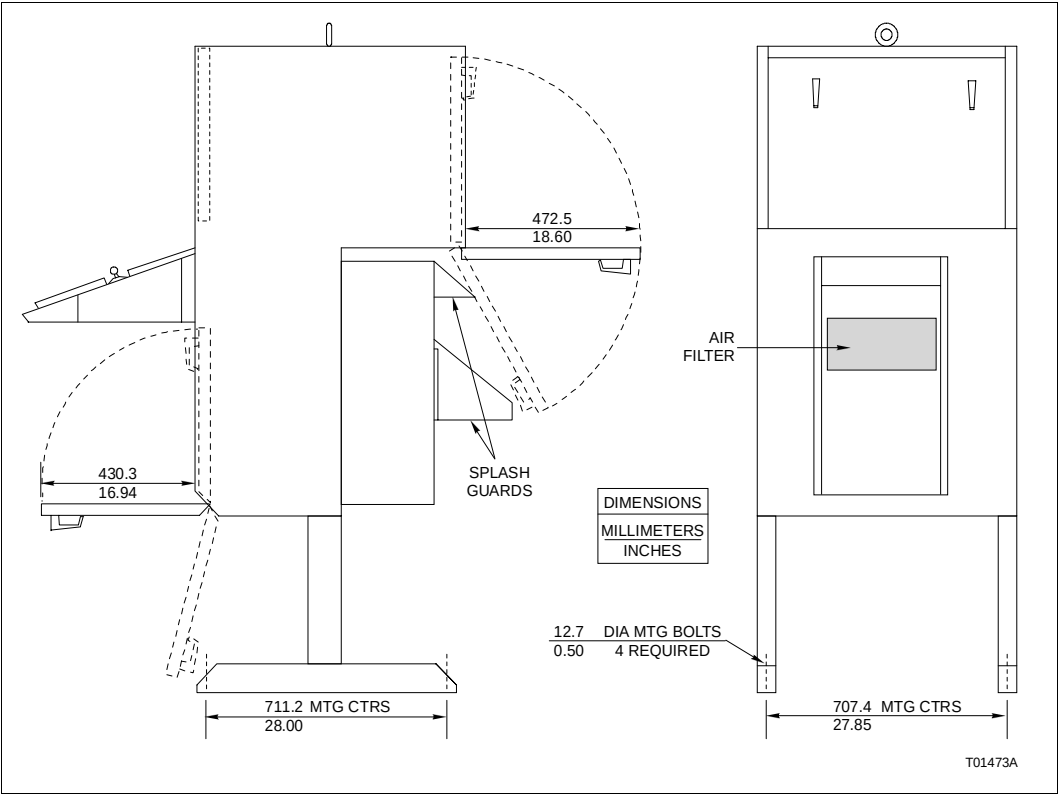


Figure PR2-2. Environmental Model Anchoring Dimensions

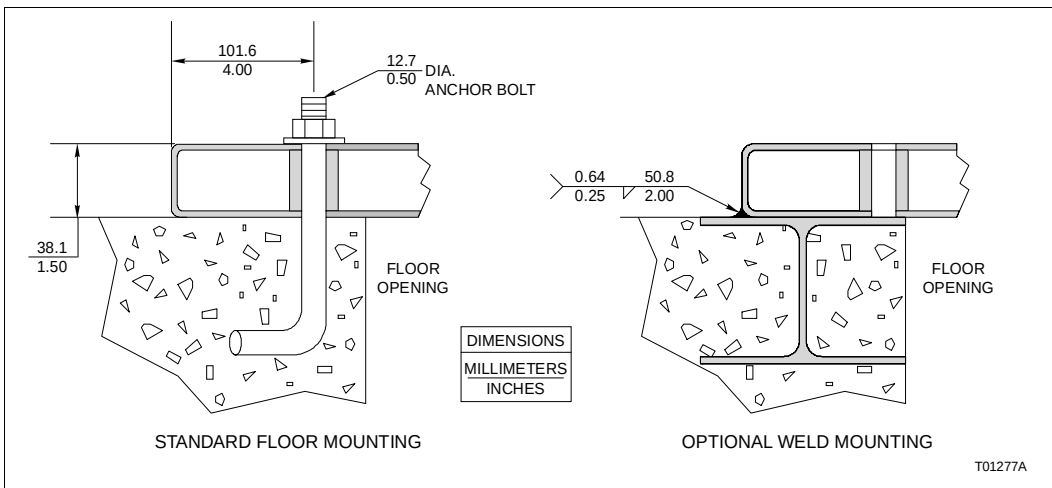


Figure PR2-3. Anchoring Scheme (Typical)



Connecting Console Components



PR3

Purpose/Scope

10 min.

This procedure explains how to connect two components together in an array. It does not include installing wedge tables. Wedge table installation is covered in [PR4](#).

Parts None.

Tools • ½-inch open end wrench.

Procedure

1. The work surface is bolted to the table support brackets through oversized holes. Use the ½-inch open end wrench to loosen the six bolts (three per table support bracket as shown in [Fig. PR3-1](#)).

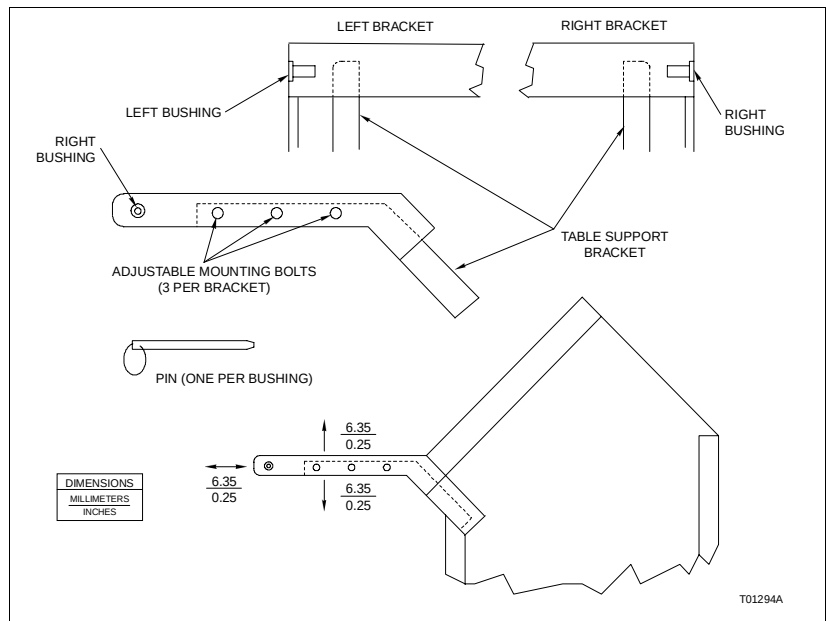


Figure PR3-1. Connecting Console Components



- ☐ 2. Move the work surface up to 6.35 millimeters (0.25 inches) up, down, forward or back toward the cabinet to line up the work surfaces.
- ☐ 3. Two steel alignment pins are shipped inside the brass bushings located on each side of each work surface. When two work surfaces are lined up, push the pins outward into the bushing of the tabletop to the right of the cabinet.
- ☐ 4. Use the ½-inch open end wrench to tighten the six bolts.

Wedge Table Installation



PR4

Purpose/Scope

10 min.

This procedure explains how to install wedge tables in an array.

Parts

Number	Qty	Description
197846?1	2	Pin, retaining
6638635?1	4	Bracket
6638636?1	1	15° wedge table (IICPI01)
6639210?1		45° wedge table (IICPI02)
NTCAC13000	4	Washer, flat
NTJAC13030	4	Lock washer, spring
NAUAC25012	4	Hex cap screw, 0.375-16 x 0.75 long
NAUAC25028	4	Hex cap screw, 0.375-16 x 1.75 long

Tools • $\frac{9}{16}$ -inch open end wrench.

Procedure

- ☐ 1. Place the wedge table upside down on the floor or workbench.
- ☐ 2. Position the four brackets so that the orientation after fastening will be as shown in Figure [PR4-1](#).
- ☐ 3. Place a spring lock washer and then a flat washer over the 1.75-inch long hex head cap screws.
- ☐ 4. Use the $\frac{9}{16}$ -inch open end wrench to fasten the brackets to the wedge table using the assemblies from Step 3.
- ☐ 5. Position the wedge table between two components in the array.
- ☐ 6. Place a spring lock washer and then a flat washer over the 0.75-inch long hex head cap screws.

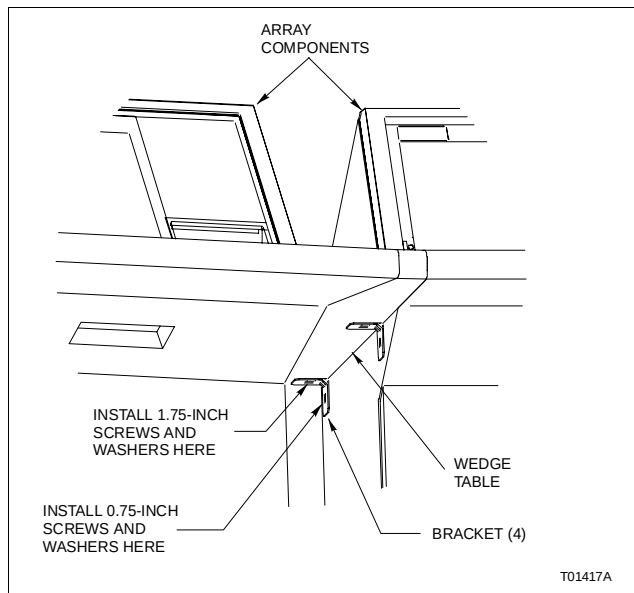


Figure PR4-1. Wedge Table Installation

- ☐ 7. Use the $\frac{9}{16}$ -inch open end wrench to fasten the brackets to the components in the array using the assemblies from Step 6.
- ☐ 8. Install the retaining pins from the underneath the component work surface through and into the wedge table.



Purpose/Scope

10 min.

This procedure explains how to install power wiring.

Parts None.

Tools • Bladed screwdriver.

Safety Considerations

WARNING

1. Disconnect the AC line cord or power lines from the operating branch circuit coming from the source before attempting electrical connections. Instruments powered by AC line voltage constitute a potential for personnel injury due to electric shock.

Procedure

The AC power input connects to a terminal block on the PEP. The PEP provides line filtering, transient suppression and a 20-amp circuit breaker on the console and environmental models, or a 10-amp circuit breaker on the panel mount model. The location and part number of the PEP varies depending on the model. The table top model does not use the PEP. It has a rear connector panel with an IEC style AC input on the keyboard interface assembly. The auxiliary terminal operates from 120/240 VAC, 50/60 hertz.

In addition to AC input terminals, the PEP has alarm relay outputs located on a terminal block and cable connectors for peripheral devices. Note that the alarm relay outputs are for alarm annunciation only.

Setting up the auxiliary terminal for 240-VAC requires no changes. The color monitor, CPU and monitor are autosensing



and need no changes for 240-VAC operation. Monitors other than those supplied by Elsasg Bailey may require changes.

NOTE: Be sure the auxiliary terminals and any remote monitors are powered using the same power source and ground as the main terminal to reduce the chance of communication problems on the Ethernet. Failure to do so may cause data to be changed or lost.

The recommended minimum size for power wiring is that it be copper wire with a 2.1 square millimeter cross sectional area (14-AWG) with a 600-volt, 75-degree Celsius (167-degree Fahrenheit) rating and thermoplastic insulation. Wire with a 300-volt or 150-volt rating may be used if it is accepted by local wiring codes. Wiring must be protected by cable trays or conduit and suited for the service voltage.

Power wiring to the auxiliary terminal must include a third-wire grounding conductor. This grounding conductor must not be a smaller gauge than the power wiring and must be bare, green colored or green/yellow colored if insulated. The grounding conductor must be terminated at the system safety ground connection on the front of the PEP.

Over-current protection provided for the AC distribution must be sized to allow for the inrush current required by the hardware. Refer to Table 1-3 for the inrush current.

For more information on power wiring, grounding, line conditioning and EMI (electromagnetic interference), refer to the **Site Planning and Preparation** instruction.

Table Top Model

- ☐  1. Disconnect power from the operating branch circuits that power the auxiliary terminal.
- ☐ 2. The table top model has an IEC style connector on the rear of the keyboard interface assembly. Connect the AC power to the AC IN connector. Figure PR5-1 shows the location of the AC IN connector.

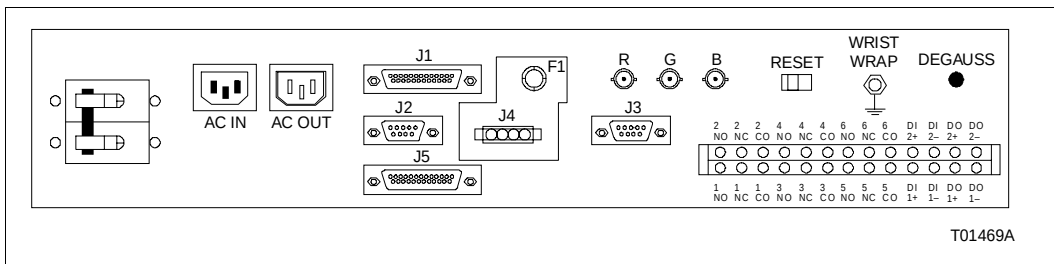


Figure PR5-1. Table Top Model AC Power Wiring

Console Model

- ☐  1. Disconnect power from the operating branch circuits that power the auxiliary terminal.
- ☐ 2. Bring the power wiring from the service in through one of the cable entry cutouts in the console. Figure PR5-2 shows the location of the cable entry cutouts.

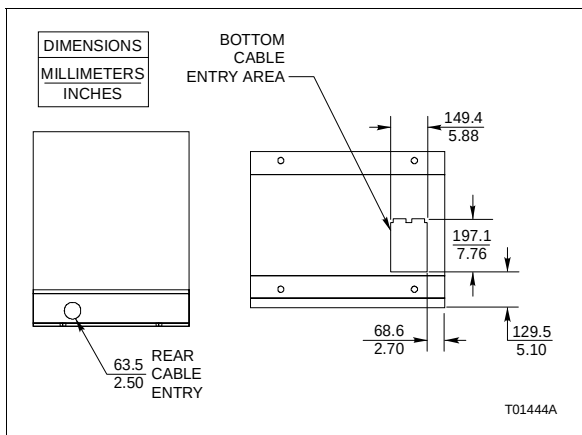


Figure PR5-2. Console Model Cable Entry Cutouts

- ☐ 3. Use the bladed screwdriver to connect the power wires to the appropriate locations on the terminal block as shown in Figure PR5-3.
- ☐ 4. Cables may be brought up through the floor under one unit and routed to the others in the array via a 395.5 by 711.2-millimeter (15.57 by 28.00-inch) cable run.

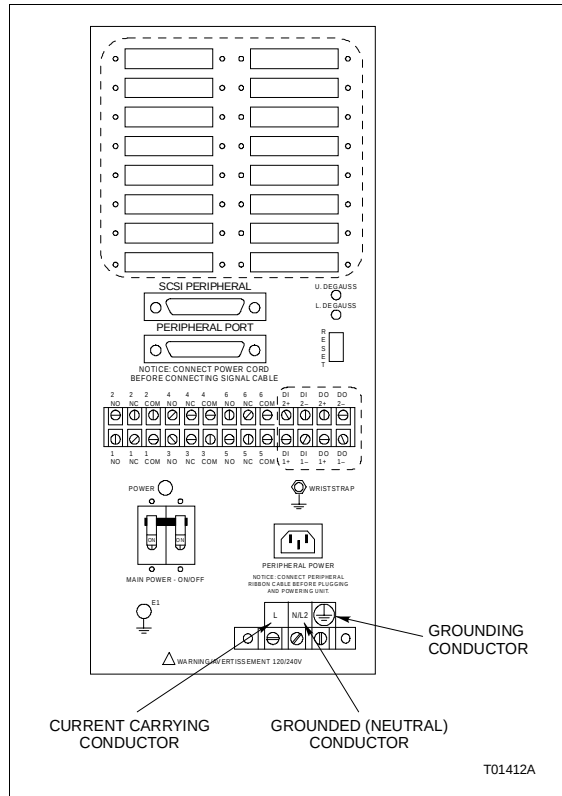


Figure PR5-3. Console Model Power Wiring

Environmental Model

- ☐  1. Disconnect power from the operating branch circuits that power the auxiliary terminal.
- ☐ 2. Bring the power wiring from the service in through the cable entry cutout in the bottom of the unit. Be sure to use conduit.
- ☐ 3. Use the bladed screwdriver to connect the power wires to the appropriate locations on the terminal block as shown in Figure PR5-4.
- ☐ 4. Verify that the 120/240 VAC switch is in the proper position.

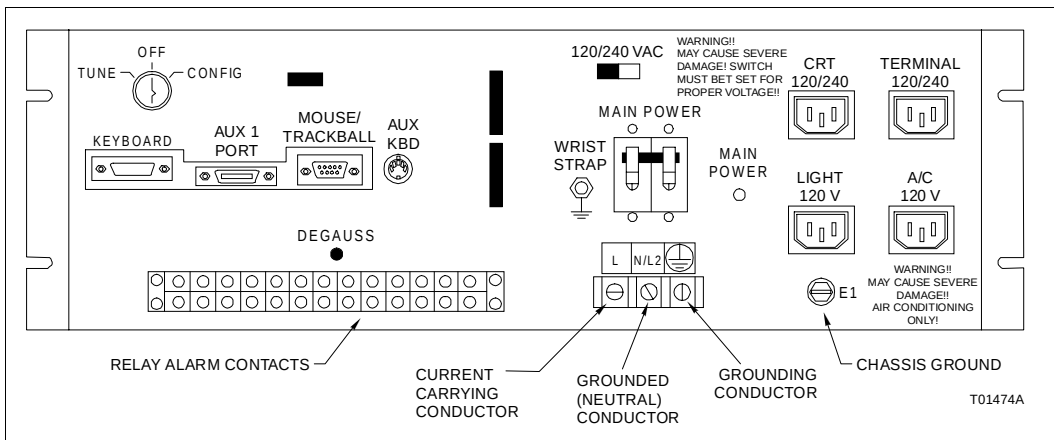


Figure PR5-4. Environmental Model Power Wiring

Panel Mount Model

- ☐  1. Disconnect power from the operating branch circuits that power the auxiliary terminal.
- ☐ 2. Connect the AC power into the IEC style PEP INPUT POWER connector on the rear of the PEP. Figure PR5-5 shows the rear of the PEP.

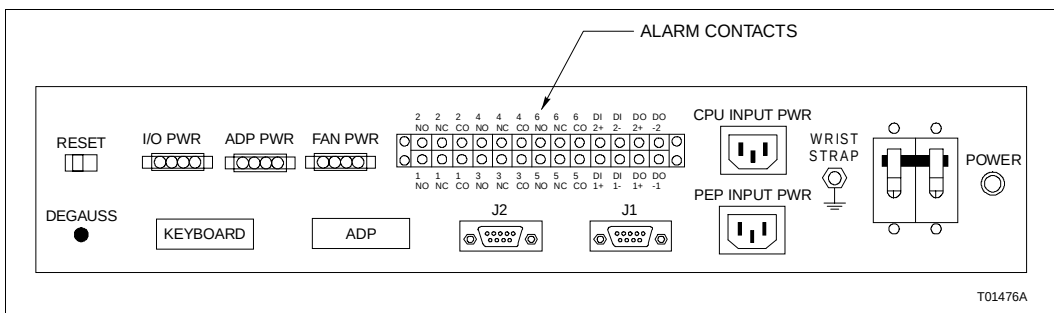


Figure PR5-5. Panel Mount Model Power Wiring





Purpose/Scope

5 min.

This procedure explains how remove the module from the multibus card cage.

Parts None.

Tools • Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure

NOTE: Follow the proper procedures for working with static sensitive devices when performing this procedure.

Console Model



1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.



2. Remove the clear polycarbonate shield from the front of the multibus card cage.



3. There is a card retainer on each edge of the multibus card cage. Use the bladed screwdriver to loosen the two screws on each retainer. Do not remove the screws.



4. Slide the card retainers out away from the center of the multibus card cage.



5. Figure **PR6-1** shows the location of the module in the multibus card cage.

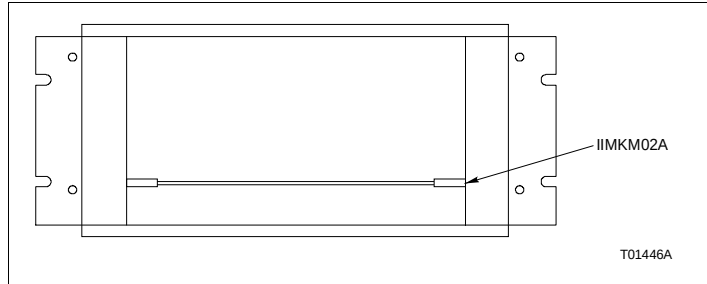


Figure PR6-1. Module Location

- ☐ 6. Remove and label all cables from the module.
- ☐ 7. Pull out on the two tabs on each side of the module to release it.
- ☐ 8. Remove the module.

All Other Models

- ☐  1. Verify that the main power switch is in the off position. Check the main power indicator to see if power is removed.
- ☐ 2. Label and remove all cables from the IIMKM02A module.
- ☐ 3. The IIMKM02A module has four retaining screws. Use the bladed screwdriver to remove the screws.



Purpose/Scope

5 min.

This procedure explains how to verify or change the settings on the IIMKM02A module. It applies when removing the module to set it up during installation or when replacing it due to failure.

Parts • IIMKM02A module (only if replacing with a new one).

Tools None.

Procedure

NOTES:

1. Follow the proper procedures for working with static sensitive devices when performing this procedure.
2. If setting up the IIMKM02A module during installation, perform this procedure with the original module. If replacing it, perform this procedure on the new module.

- ☐ 1. Refer to Table PR7-1 and Figure PR7-1 and set the jumpers as desired, filling in the customer settings in Table PR7-1 and Figure PR7-1.

NOTE: The bold entries in Table PR7-1 and the settings shown in Figure PR7-1 indicate factory settings.

Table PR7-1. IIMKM02A Module Jumper Settings¹

Jumper	Setting	Description	Customer Setting
J1	All horizontal	Serial port data transmitted on pin 3 of P9 and received on pin 2 of P9	
	All vertical	Serial port data transmitted on pin 2 of P9 and received on pin 3 of P9	
J2	All horizontal	Serial port data transmitted on pin 3 of P8 and received on pin 2 of P8	
	All vertical	Serial port data transmitted on pin 2 of P8 and received on pin 3 of P8	

**Table PR7-1. IIMKM02A Module Jumper Settings¹** *(continued)*

Jumper	Setting	Description	Customer Setting
J3	1-2	Resets multibus card cage when IIMKM02A module watchdog timer circuit times out	
	2-3	Does not reset multibus card cage when IIMKM02A module watchdog timer circuit times out	
J4	1-2	Disables power supply out-of-tolerance (OOT) signal to reset the IIMKM02A module	
	2-3	Enables power supply out-of-tolerance (OOT) signal to reset the IIMKM02A module	
J5	2-3	Do not change	2-3
J6	2-3	Do not change	2-3
J7	2-3	Do not change	2-3
J8	2-3	Do not change	2-3
J9	2-3	Do not change	2-3

NOTE:

1. Bold items indicate factory settings.

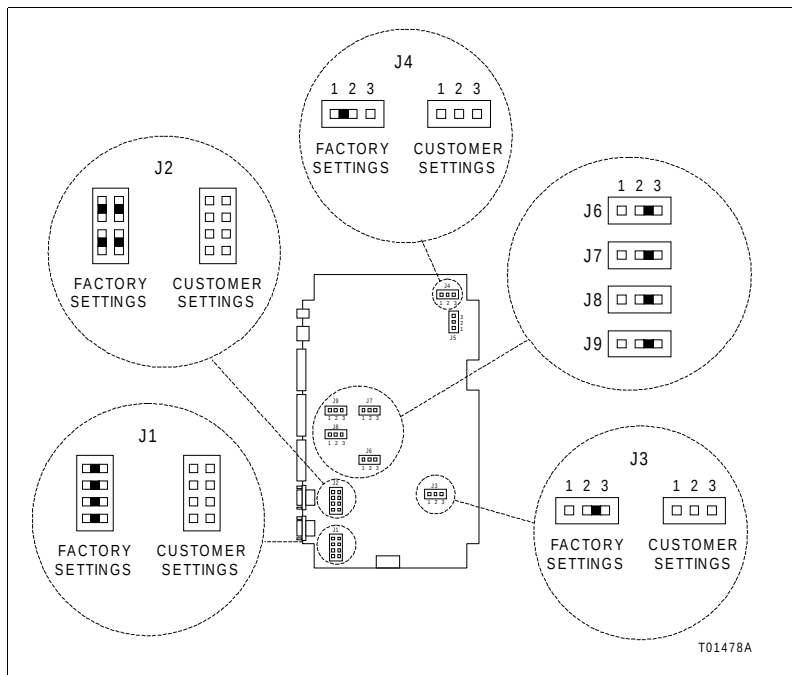


Figure PR7-1. IIMKM02A Module





Purpose/Scope

5 min.

This procedure explains how install the module into the multi-bus card cage.

Parts None.

Tools • Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure

NOTE: Follow the proper procedures for working with static sensitive devices when performing this procedure.

Console Model



1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.



2. Figure **PR8-1** shows the location of the module in the multi-bus card cage.

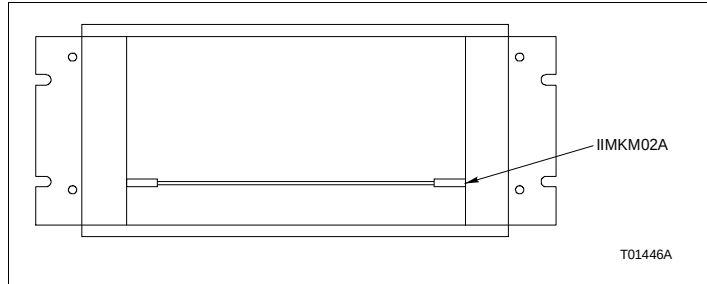


Figure PR8-1. Module Location

- ☐ 3. Place the module in the proper rails.
- ☐ 4. Push gently on the module until the edge connector on the module is firmly seated in the connector on the backplane.
- ☐ 5. Press on the tabs at the side of the module to secure it in the multibus card cage.
- ☐ 6. Connect the appropriate cables to the module.
- ☐ 7. Slide the card retainers toward the center of the multibus card cage until they are stopped by the screws.
- ☐ 8. Use the bladed screwdriver to tighten the screws on each of the card retainers.
- ☐ 9. Install the clear polycarbonate shield onto the front of the multibus card cage.

All Other Models

- ☐  1. Verify that the main power switch is in the off position. Check the main power indicator to see if power is removed.
- ☐ 2. The IIMKM02A module has four retaining screws. Use the bladed screwdriver to install the screws.
- ☐ 3. Install all cables onto the IIMKM02A module.

Keyboard Interface Device Installation



PR9

Purpose/Scope

10 min.

This procedure explains how install keyboard interface devices. This includes the engineering (QWERTY) keyboard, the operator (Mylar) keyboard, the pointing device (mouse or trackball), joystick, and the table top ADP panel (IIADP01).

Parts

Number	Qty	Description
6638514?1	1	Keyboard, operator (Mylar) for table top, console and panel mount models
6638514?2		Keyboard, operator (Mylar) for environmental model
IIAKB04 ¹	1	Keyboard, QWERTY (auxiliary engineering)
IIAMS04	1	Mouse for all models except environmental
IIATB05	1	Trackball for all models except environmental
IIADP01	A/R	Annunciator display panel, table top
1948803?2	1	Joystick for environmental model
1948978?1	A/R	Cable, ADP

NOTE:

1. The environmental model requires the IIAKB04 without adapter.

Tools None.

Procedure

- ☐ 1. Plug the Mylar (operator) keyboard into the port marked KEYBOARD on the keyboard interface assembly. Figure PR9-1 shows the keyboard interface assembly for the table top model, Figure PR9-2 shows the keyboard interface assembly for the console and panel mount models, and Figure PR9-3 shows the keyboard interface assembly for the environmental model. The keyboard interface assembly for the environmental model is part of the PEP.

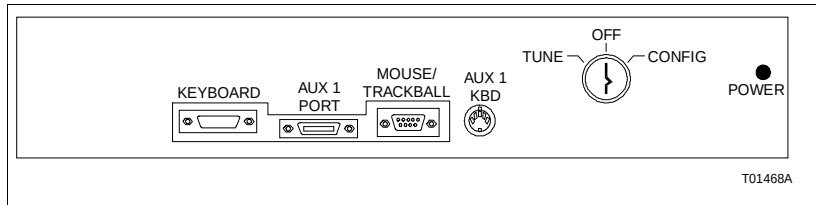


Figure PR9-1. Table Top Model Keyboard Interface Assembly

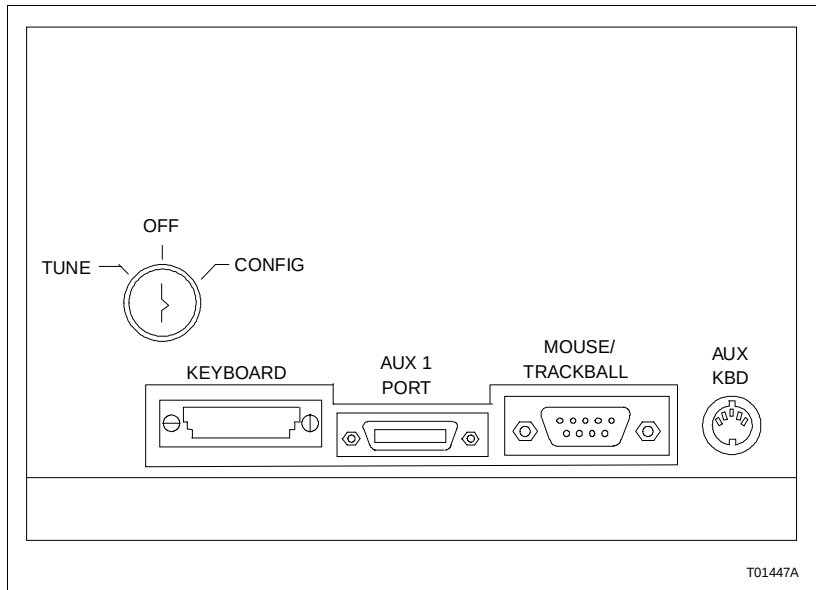


Figure PR9-2. Console and Panel Mount Model Keyboard Interface Assembly

- ☐ 2. Plug the QWERTY (engineering) keyboard into the port marked AUX KBD on the keyboard interface assembly.
 - ☐ 3. Plug the pointing device into the port marked MOUSE/ TRACKBALL on the keyboard interface assembly.
- NOTE:** The environmental model does not support a mouse or trackball.
- ☐ 4. The environmental model supports a joystick. Plug the joystick into the port marked MOUSE PORT on the rear of the CPU (Fig. PR9-4).

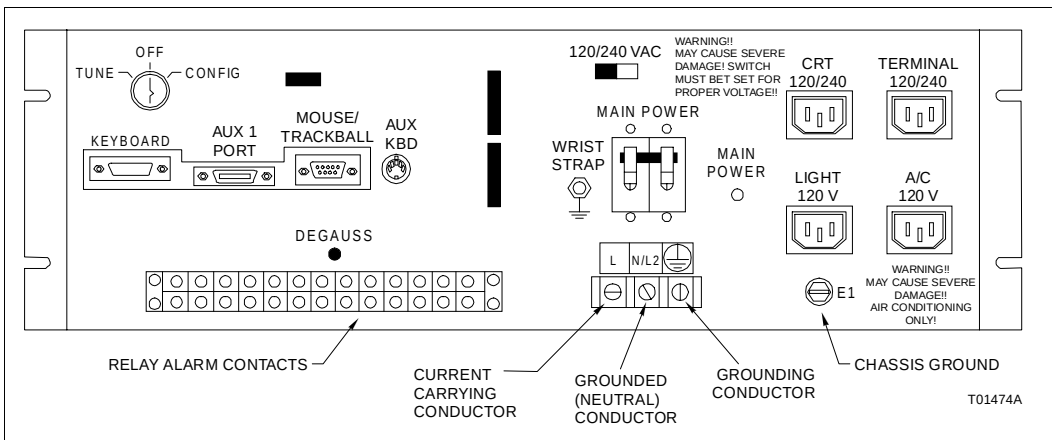


Figure PR9-3. Environmental Model Keyboard Interface Assembly

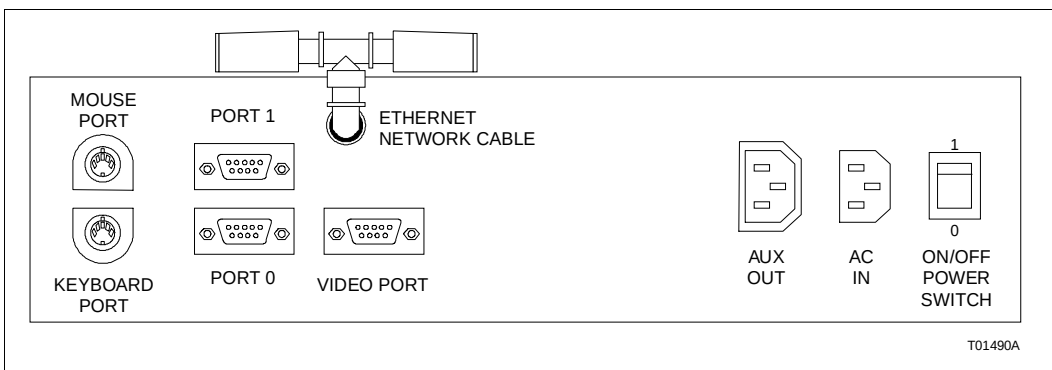


Figure PR9-4. Environmental Model Joystick Connection

- ☐ 5. Plug the table top ADP panel into the port marked AUX 1 PORT on the keyboard interface assembly using the ADP cable.
- ☐ 6. Refer to Figure PR9-5 and connect additional ADP panels as shown, using additional ADP cables to do so.

NOTE: The ADP panels are sequential. An ADP panel cannot be assigned an address of two without a previous ADP panel being assigned an address of one. For example, the console mounted ADP panel is assigned an address of one, so the first table top ADP panel must be assigned an address of two.

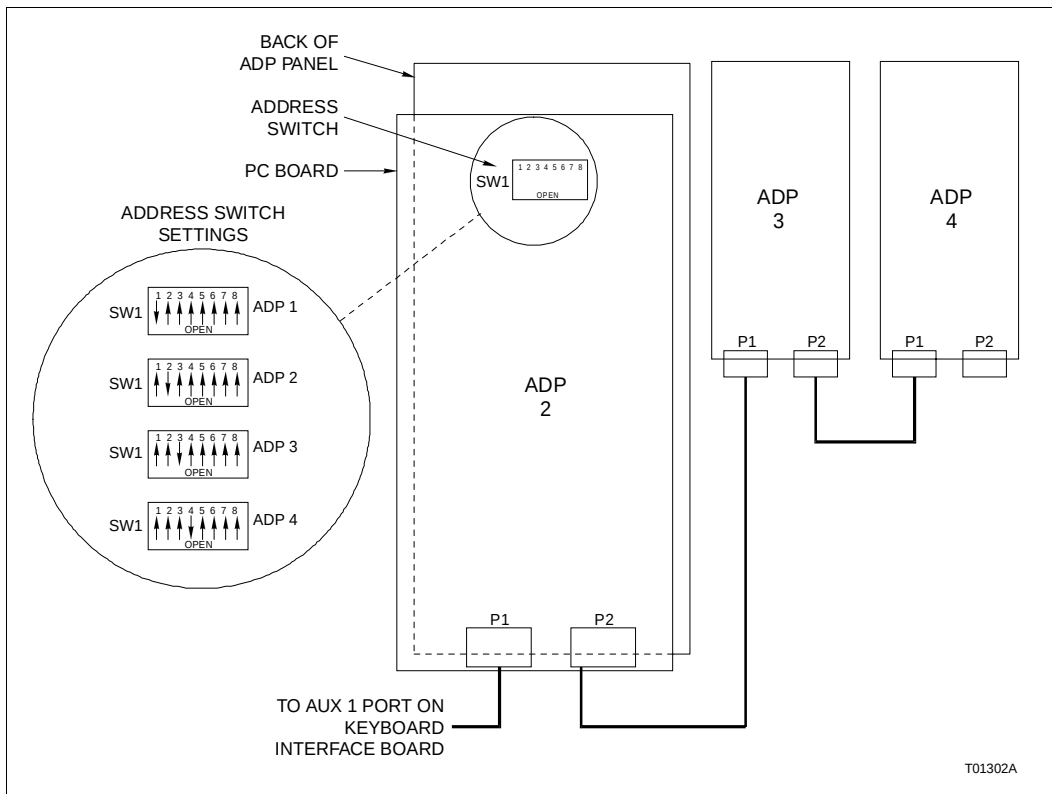


Figure PR9-5. IIADP01 Installation



Purpose/Scope

60 min.

This procedure explains how to connect Ethernet wiring.

Parts None.

Tools None.

Procedure

Ethernet is a network protocol complying with IEEE Standard 802.3. It is a CSMA/CD protocol (with no token). All devices on the Ethernet network listen to the data transmissions. When the line is open, a device with a message to send can transmit at a rate of up to ten megahertz. The Ethernet link supports DECnet and TCP/IP protocol. Refer to the CPU documentation for more information.

Follow these Ethernet configuration rules closely to correctly set up the network.

- An Ethernet message can pass through up to two repeaters or network bridges before it reaches its destination.
- Ethernet networks require a terminator at each end of the cable.

NOTES:

1. Be careful using hardware from more than one manufacturer. Similar parts can have different specifications that can limit performance.
2. This procedure is a general procedure. Its intention is to indicate where the cables connect and how they run between bays and arrays. Detailed information can be found in the **Conductor VMS Series 43 Workstation** instruction.

- ☐ 1. Connect the Ethernet cable directly to the tee that is connected to the Ethernet port on the back of the CPU.
- ☐ 2. The cable entry cutouts for the table top cabinet and console model are shown in **PR10-1**. The location of the cable entry cutout for the environmental model is shown in Figure **PR10-2**.



Use the cable entry cutouts to go from component to component.

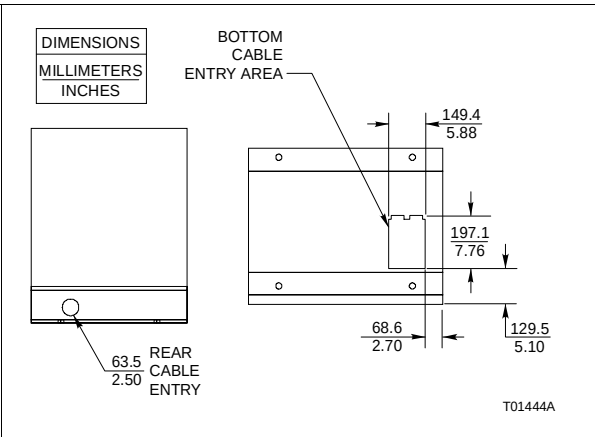


Figure PR10-1. Table Top and Console Model Cable Entry Cutouts

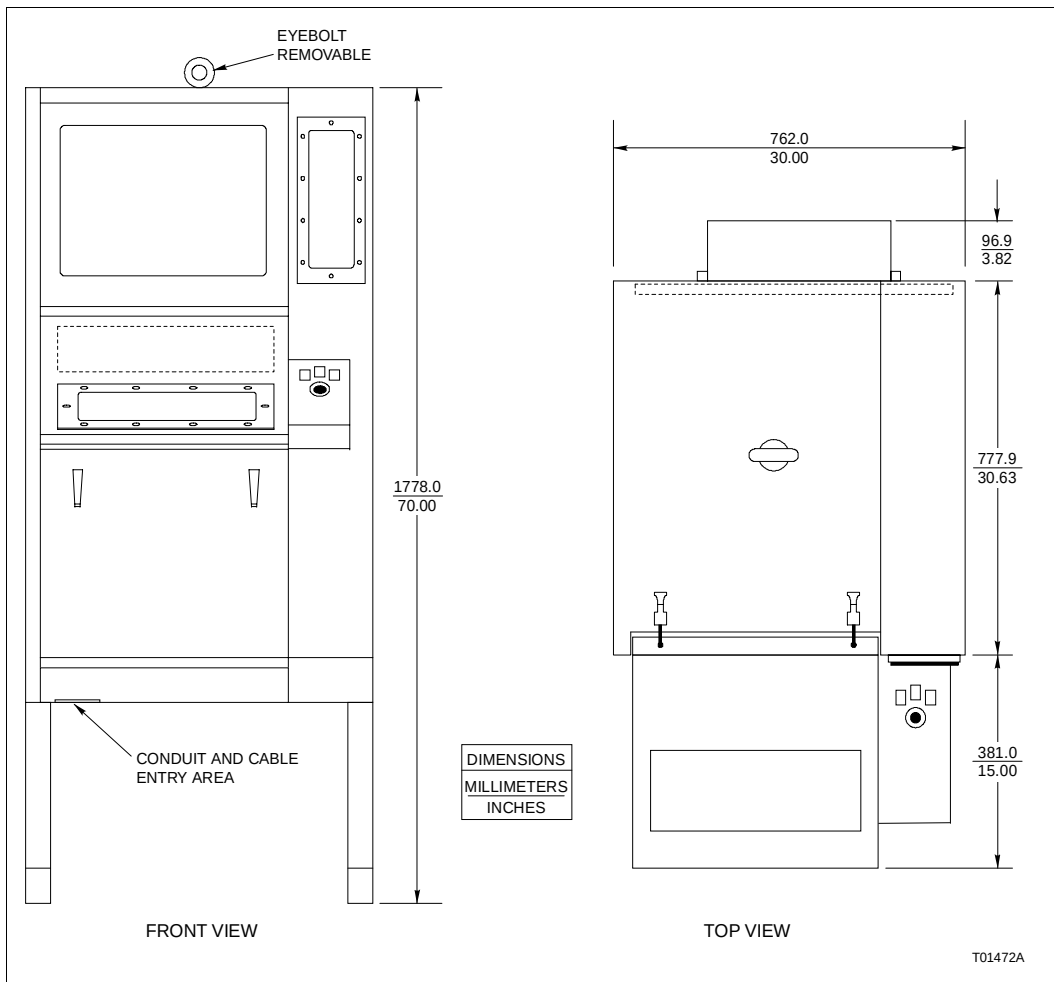


Figure PR10-2. Environmental Model Cable Entry Cutout





Purpose/Scope

20 min.

This procedure is for information only. It provides a listing of printers that can be used with the auxiliary terminal either through direct connection to the printer port on the rear of the CPU or through a DEC™ server.

Parts

Number	Qty	Description
6642555?1	1	Printer cable (only if connecting directly to printer port on CPU)

Tools None.

Procedure

Table **PR11-1** lists the printers available for use with the auxiliary terminal. Included in this table are columns indicating whether or not the printer can be connected directly to the printer port on the rear of the CPU or to a DEC server. Refer to the **Conductor VMS Series 43 Workstation** instruction for detailed installation and setup instructions.

Table PR11-1. Printers

Printer	Description	CPU Port	DEC Server
4079002 ¹	Lexmark Color JetPrinter 4079 PLUS 11 in. by 17 in. color printer		•
C3540A ¹	HP 1600C 8.5 in. by 11.0 in. color printer		•
IIPRT02	Black and white printer	•	•
IIPRT03	Color printer (up to 64 colors)	•	•
IIPRT05	High speed black and white printer	•	•
IIPRT08C	Color/black and white screen copy printer		•
IIPRT09	24-pin color printer	•	•

NOTE:

1. Manufacturer part number.





Purpose/Scope

10 min.

This procedure explains how to install the work surface.

Parts

Number	Qty	Description
6638625?1	1	Work surface assembly

Tools None.

Procedure

- ☐ 1. Adjust the leveling screws on all main and auxiliary terminals, and connecting tables until the monitor bezels are even. The leveling screws adjust 26.7 millimeters (1.05 inches).
- ☐ 2. Once a unit is secure, insert the table support brackets into the cabinet (Fig. **PR12-1**).
- ☐ 3. Lock the work surfaces into place by pushing the red handle above the front door to the right until it stops at the bottom of the slot.

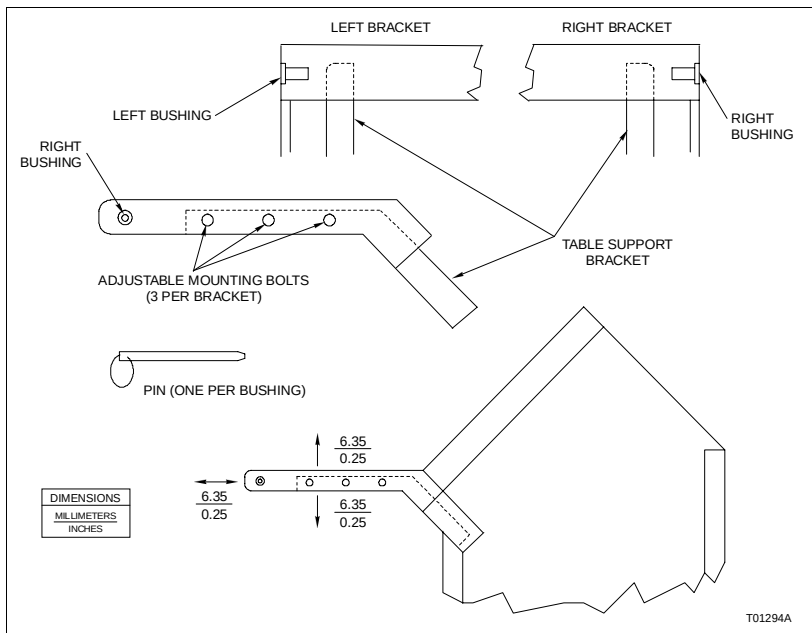


Figure PR12-1. Work Surface Installation



Purpose/Scope

5 min.

This procedure explains how install the panel mount model.

Parts None.

Tools

- Bladed screwdriver.
- Torque screwdriver for 39.8 Nm (40.0 in.-lbs).
- Tools to make panel cutouts are dependent on the installation.

Procedure

The panel that supports the panel mount model must be strong enough to support the monitor.

- ☐ 1. Prepare the cutouts for the monitor and associated keyboard interface assembly. Figure **PR13-1** shows the panel mount dimensions.

NOTE: Locate the keyboard interface assembly within 1.8 m (6.0 ft) of the monitor.

- ☐ 2. Use the bladed screwdriver to remove the two cover mounting screws and remove the top cover.
- ☐ 3. Label and disconnect the brightness/contrast cable from the monitor.
- ☐ 4. Label and disconnect the degauss cable from the degauss switch on the CPU.
- ☐ 5. Label and disconnect all cables from the PEP.
- ☐ 6. Remove the PEP.
- ☐ 7. Use the bladed screwdriver to remove the four monitor mounting screws and slide the monitor forward to expose the bezel.

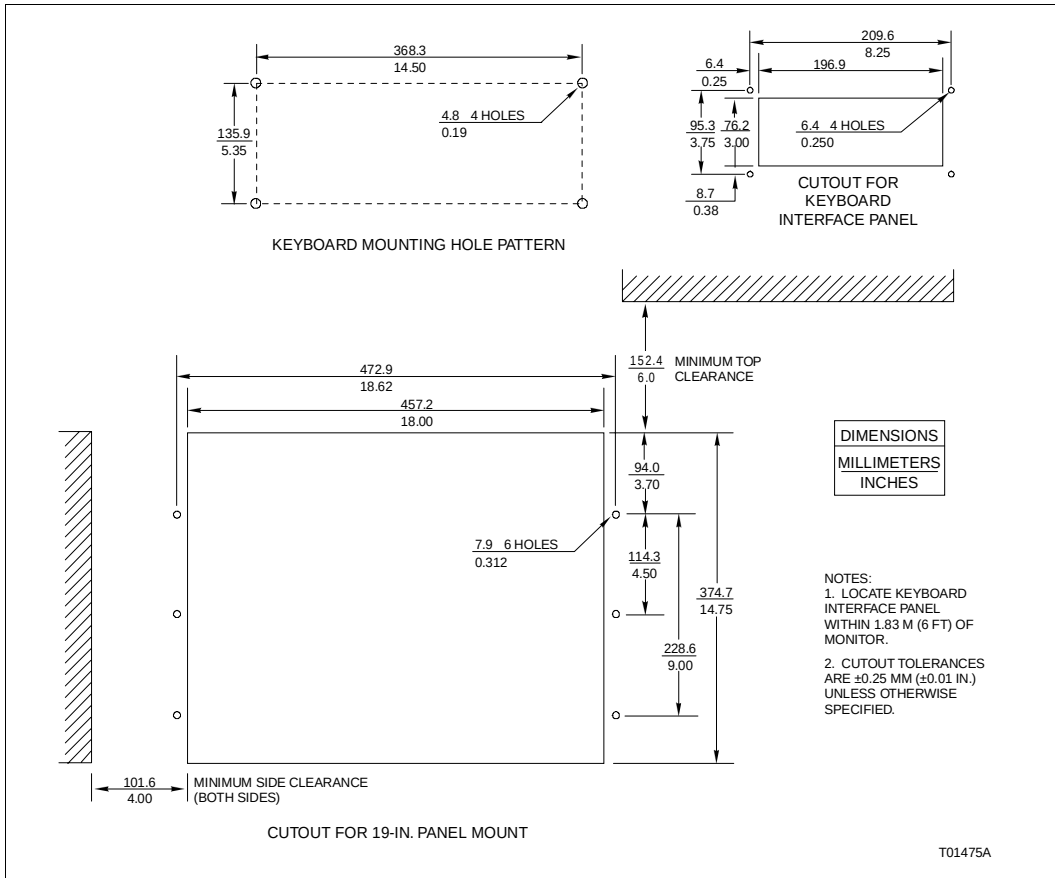


Figure PR13-1. Panel Mount Dimensions

- ☐ 8. Use the bladed screwdriver to remove the four bezel mounting screws and remove the bezel.
- ☐ 9. Reverse the procedure to install the monitor into the panel, torquing all fasteners to 39.8 Nm (40.0 in.-lbs).



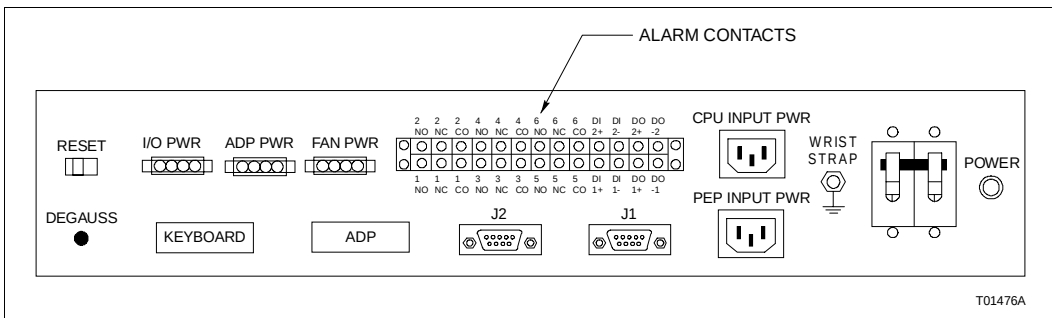


Figure PR14-4. Panel Mount Model PEP

- ☐ 2. Unplug all of the line cords from the AC outlets.
- ☐ 3. Switch the main power switch to the ON position.
- ☐ 4. Use the DMM, set to measure AC RMS voltage, to measure the voltage at each of the AC outlets. The line voltage should be 90 to 132 VAC RMS for a 120-VAC input and 180 to 264 VAC RMS for a 240-VAC input.
- ☐ 5. Use the DMM to check each AC outlet to insure that neutral, live and ground are correctly wired, and that there are no ground faults.
- ☐ 6. Switch the main power switch to the OFF position.
- ☐ 7. Use the DMM to verify that there is no power to any of the AC outlets.





Purpose/Scope

10 min.

This procedure explains how to check the DC power supplies.

Parts None.

Tools • Digital multimeter (DMM).

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure



1. Switch the on/off switch to the OFF position.

NOTE: Do not disconnect power wiring from the multibus card cage for the console model.



2. Label and disconnect the DC power distribution cables from all peripheral devices (disconnect the cables at the distribution end).



3. Make certain the power line cord for the power supply is plugged into the PEP (keyboard interface assembly for the table top model).



4. Insure that all power wiring is correct.



5. Switch the on/off switch to the ON position.



6. Use the DMM to measure the DC voltages at the multibus card cage backplane for the console model (Fig. **PR15-1**) and at P16 on the IIMKM02A module for all other models.

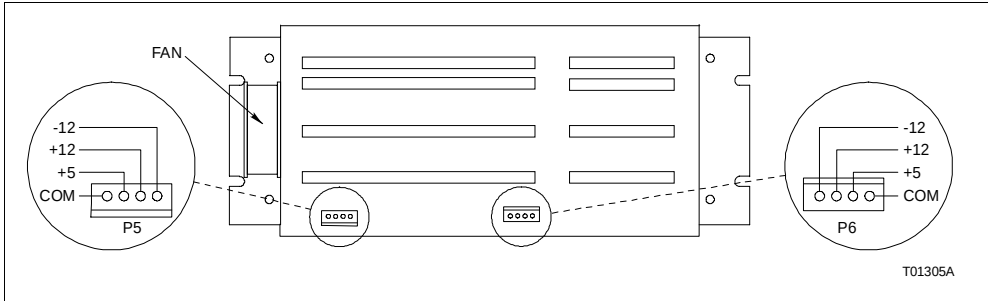


Figure PR15-1. DC Power Test (Console Model)

- ☐ 7. Take the voltage measurements with the power supply under load. The voltage measurements should read +5.00 VDC (+0.25 VDC, -0.00 VDC), +12.00 VDC (+1.5 VDC, -1.00 VDC), and -12.00 VDC (+1.00 VDC, -1.50 VDC).

NOTE: Unstable operation may result if the power supply voltages are not within tolerance.

- ☐ 8. Switch the on/off switch to the OFF position.
- ☐ 9. Connect all cables removed in Step 2.
- ☐ 10. Switch the on/off switch to the ON position.
- ☐ 11. Use the DMM to check the voltage measurements again.
- ☐ 12. Adjust the power supply to obtain the voltage levels to within a tolerance of +0.05 VDC.



Purpose/Scope

5 min.

This procedure explains how to clean the monitor.

Parts None.

Tools

- Soft lint-free cloth.
- Mild all-purpose commercial spray cleaner.

Procedure

- ☐ 1. Spray the mild all-purpose commercial spray cleaner on the soft lint-free cloth.
- ☐ 2. Use the soft lint-free cloth to remove dirt, fingerprints or grease from the monitor window and enclosure.





Purpose/Scope

1 hr

This procedure explains how to clean the printed circuit boards.

Parts None.

- Tools
- Clean, dry, filtered compressed air.
 - Antistatic vacuum.
 - Isopropyl alcohol (99.5 percent electronic grade).
 - Foam-tipped swab.
 - Distilled water.
 - Eberhard Faber® (400A) Pink Pearl® eraser.
 - Fiberglass or nylon burnishing brush.
 - Piece of scrap printed circuit board.
 - Soft lint-free cloths.

Safety Considerations

WARNING

1. Disconnect power before attempting these procedures. Failure to do so could result in severe or fatal shock, or equipment damage.
2. Wear eye protection whenever working with cleaning solvents. When removing solvents from printed circuit boards using compressed air, injury to the eyes could result from splashing solvent as it is blown off the printed circuit board.

Procedure

There are several printed circuit board cleaning procedures. These procedures cover printed circuit board cleaning and cleaning edge connectors. Use the procedures that meet the needs of each printed circuit board. Remove all dust, dirt, oil, corrosion or any other contaminant from the printed circuit board.



Perform all cleaning and handling of the printed circuit boards at static safe workstations. Always observe electrostatic sensitive device handling precautions when handling printed circuit boards.

- ☐  Be sure to disconnect power to the workstation before accessing the printed circuit boards.

General Cleaning and Washing

- ☐ 
 1. Remove dust and residue from the printed circuit board surface using clean, dry, filtered compressed air or an anti-static field service vacuum.

or

 - ☐ 1. Spray or wipe the printed circuit board with isopropyl alcohol (99.5% electronic grade).
 - ☐ 2. Use a foam-tipped swab to wipe the printed circuit board.
 - ☐ 3. When the printed circuit board is clean, remove excess solvent using clean, dry, filtered compressed air.

Edge Connector Cleaning (General)

- ☐ 
 1. Make a solution of 80% isopropyl alcohol (99.5% electronic grade) and 20% distilled water.
 - ☐ 2. Soak a soft lint-free cloth in the solvent mixture.
 - ☐ 3. Work the soft lint-free cloth back and forth parallel to the edge connector contacts.
 - ☐ 4. Repeat Steps 2 and 3 with a clean soft lint-free cloth.
 - ☐ 5. Dry the edge connector contact area by wiping with a clean soft lint-free cloth.

Edge Connector Cleaning (Tarnished or Deeply Stained)

- ☐ 1. Use the Eberhard Faber (400A) pink pearl eraser, or equivalent to remove tarnish or stains. Fiberglass or nylon burnishing brushes may also be used.

NOTES:

1. Minimize electrostatic discharge by using the 80% to 20% isopropyl alcohol to distilled water solution during burnishing.
2. Do not use excessive force while burnishing. Use only enough force to shine the contact surface. Inspect the edge connector after cleaning to assure no loss of contact surface.

Female Edge Connector Cleaning

- ☐  1. Soak a soft lint-free cloth that is wrapped around the piece of scrap printed circuit board, or the foam-tipped swab in the 99.5% electronic grade isopropyl alcohol.
- ☐ 2. Insert the foam-tipped swab or cloth-covered printed circuit board into the edge connector and work it back and forth.
- ☐ 3. Rinse the edge connector contacts by spraying with 99.5% electronic grade isopropyl alcohol.
- ☐ 4. Remove excess alcohol and dry using dry, clean, filtered compressed air.





Purpose/Scope

5 min.

This procedure explains how to clean the keyboards.

Parts None.

Tools

- Soft lint-free cloth.
- Mild all-purpose commercial spray cleaner.
- Antistatic vacuum.

Procedure

There are two keyboards. Cleaning procedures differ depending on the keyboard.

Operator (Mylar) Keyboard

- ☐ 1. Wipe away dust with the soft lint-free cloth.
- ☐ 2. Spray the mild all-purpose commercial spray cleaner on the soft lint-free cloth.
- ☐ 3. Clean the dirt and film from the keyboard.

Engineering (QWERTY) Keyboard

- ☐ 1. Use the antistatic vacuum to remove dust from the keyboard.
- ☐ 2. Spray the mild all-purpose commercial spray cleaner on the soft lint-free cloth.
- ☐ 3. Clean the key caps and keyboard enclosure.





Purpose/Scope

1 hr

This procedure explains how to check connections.

Parts None.

Tools Individual tools cannot be listed due to the numerous connections involved.

Safety Considerations

WARNING

1. Disconnect power before attempting these procedures. Failure to do so could result in severe or fatal shock, or equipment damage.

Procedure

Check all signal wiring, power and ground connections within the auxiliary terminal to verify their integrity. When checking connections, always turn a screw, nut or other fastening device in the direction to tighten only. If the connection is loose, it will be tightened. If the connection is tight, the tightening action will verify that it is secure. There must not be any motion to loosen the connection.



1. Disconnect power from the auxiliary terminal.



2. Check and verify that all phase, neutral and grounding conductor connections on the PEP are secure.



3. Check and verify that the ground nut on the inside of the PEP is secure and tightened to the specified torque value.



4. Check and verify that all other power connections within the auxiliary terminal, including connections to the power supplies are secure.





Purpose/Scope

1 hr

This procedure explains how to check and clean the PEP.

Parts None.

Tools • Flat blade torque screwdriver for zero to 1.6 Newton meters (zero to 14 inch-pounds).

Safety Considerations

WARNING

1. Disconnect power before attempting these procedures. Failure to do so could result in severe or fatal shock, or equipment damage.

Procedure



1. Remove power from the auxiliary terminal.



2. Check the tightness of all power wiring screws within the auxiliary terminal.



3. If they are loose, use the flat blade torque screwdriver to tighten them to 1.6 Newton meters (14 in.-lbs).



4. Inspect and clean all PEP and DC distribution board connections.





Purpose/Scope

5 min.

This procedure explains how to remove the multibus card cage.

Parts None.

Tools • Phillips head screwdriver.

Safety Considerations

WARNING

1. Disconnect power before attempting these procedures. Failure to do so could result in severe or fatal shock, or equipment damage.

Procedure



1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.



2. Remove the clear polycarbonate shield that covers the multibus card cage.



3. Disconnect and label all cables from the multibus card cage.



4. Support the front and rear of the multibus card cage while using the Phillips head screwdriver to remove the four screws (Fig. **PR21-1**) that secure it to the auxiliary terminal.

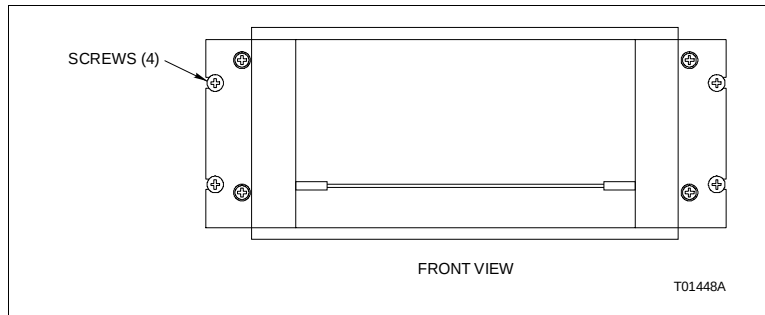


Figure PR21-1. Multibus Card Cage Removal

- ☐ 5. Slide the multibus card cage out of the auxiliary terminal.



Purpose/Scope

5 min.

This procedure explains how to replace the multibus card cage fan.

Parts

Number	Qty	Description
1947419??	1	Fan, 11.43 cm (4-½ in.)

Tools

- Bladed screwdriver.

Procedure

- ☐ 1. Cut and remove the cable ties that secure the fan power cable.
- ☐ 2. Use the bladed screwdriver to remove the four long screws around the fan.
- ☐ 3. Slide the fan out around the multibus card cage.
- ☐ 4. Disconnect the fan power cable.
- ☐ 5. Connect the fan power cable to the new fan, making sure the red striped conductor is connected to the positive (+) terminal of the fan.
- ☐ 6. Use the bladed screwdriver and four long screws to install the new fan. Make sure when installing the new fan that the arrow on the fan points in the direction of the air flow.





Purpose/Scope

5 min.

This procedure explains how to install the multibus card cage.

Parts

Number	Qty	Description
6640300?1 ¹	1	Multibus card cage

NOTE:

1. This part not needed if this procedure is part of fan replacement.

Tools • Phillips head screwdriver.

Safety Considerations

WARNING

1. Disconnect power before attempting these procedures. Failure to do so could result in severe or fatal shock, or equipment damage.

Procedure



1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.



2. Slide the multibus card cage into the auxiliary terminal.



3. Support the front and rear of the multibus card cage while using the Phillips head screwdriver to install the four screws (Fig. **PR23-1**) to secure it to the auxiliary terminal.

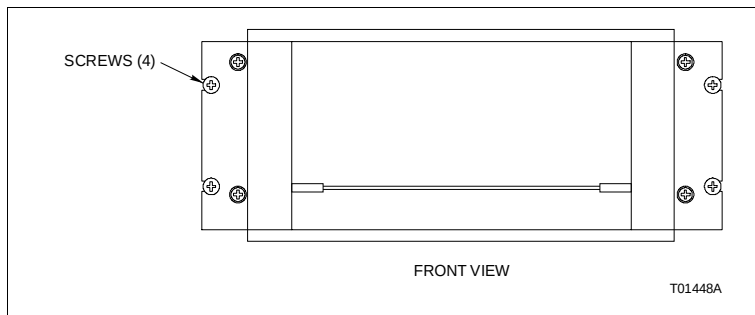


Figure PR23-1. Multibus Card Cage

- ☐ 4. Install the clear polycarbonate shield that covers the multi-bus card cage.
- ☐ 5. Install all cables that were removed from the multibus card cage.



Purpose/Scope

5 min.

This procedure explains how remove the power supply.

Parts None.

Tools • Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure

The location of the power supply varies depending on the model.

Table Top Model



1. Verify that the main power switch on the keyboard interface assembly is in the off position. Check the main power indicator to see if power is removed.



2. Remove the cover from the top of the monitor by using the bladed screwdriver to remove the eight screws and remove the split cover (Fig. [PR24-1](#)). Do not remove the monitor.



3. Label and remove all wires and cables from the power supply.



4. Carefully tip the monitor and chassis on one side or tip it to the left and support it.



5. Use the bladed screwdriver to remove the four screws that hold the power supply to the chassis from the outside bottom of the chassis.



- ☐ 6. Set the monitor and chassis back upright.

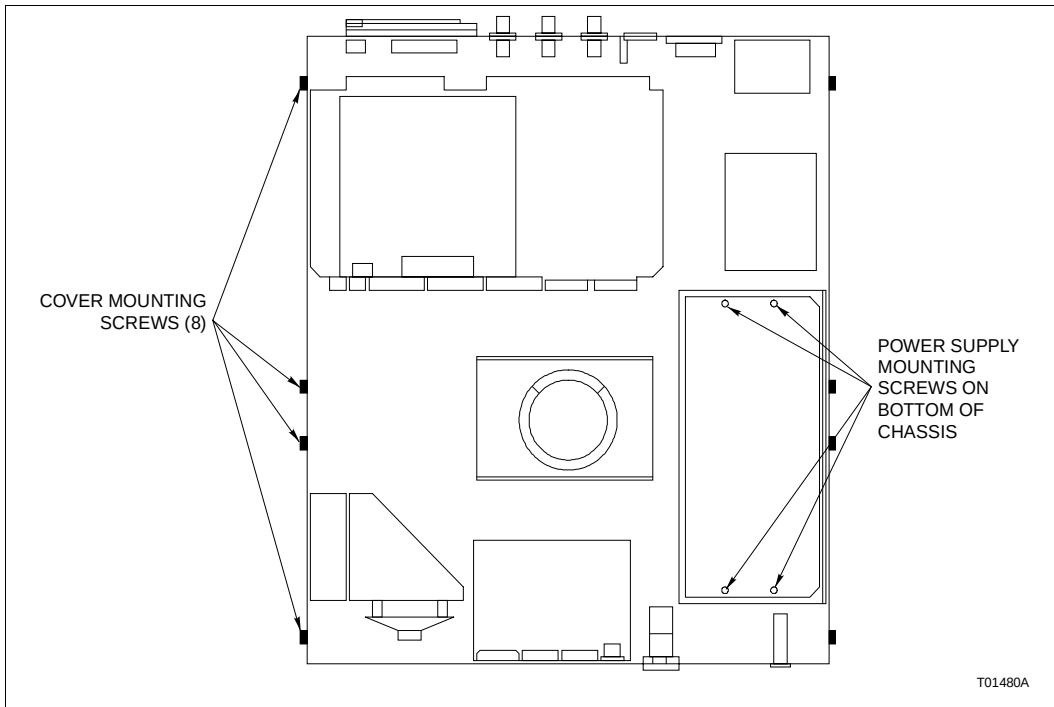


Figure PR24-1. Table Top Model Power Supply Removal

Console Model

- ☐  1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.
- ☐ 2. Remove the power supply plug from its socket on the PEP.
- ☐ 3. Label and remove all wires and cables from the power supply.
- ☐ 4. Use the bladed screwdriver to remove the two screws that secure the power supply bracket to the monitor mounting platform (Fig PR24-2).
- ☐ 5. There is a metal tab on the bottom of the power supply that sets into a slot on the monitor mounting platform. Lift up on

the rear of the power supply to clear the tab and then slide the power supply out of the rear of the auxiliary terminal.

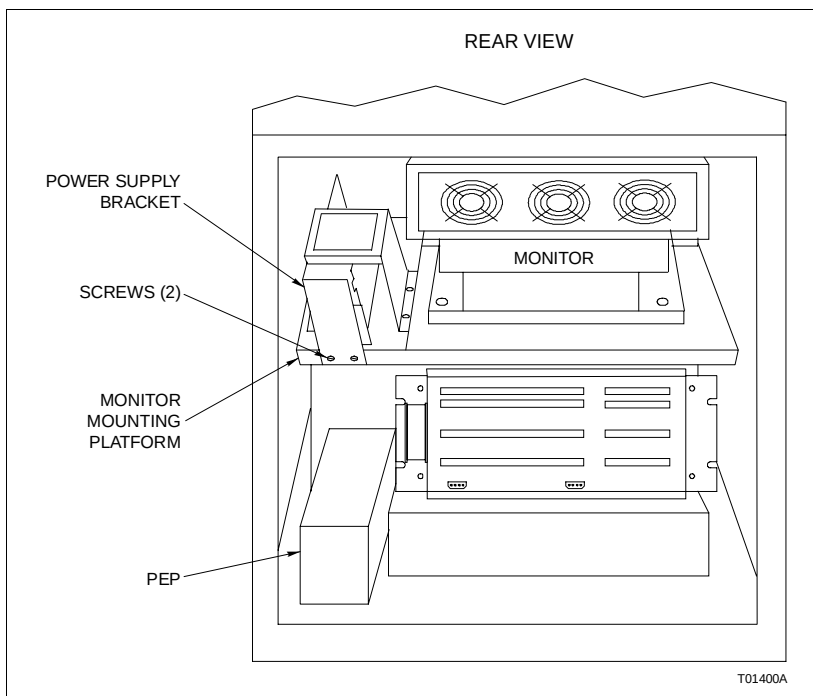


Figure PR24-2. Console Model Power Supply Removal

Environmental Model

- ☐  1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.
- ☐ 2. The PEP must be removed before removing the power supply. Shut down the AC line power (plant breaker) so that the AC line to the PEP may be disconnected safely.
- ☐ 3. Label and remove all wires and cables from the PEP.
- ☐ 4. Use the bladed screwdriver to remove the two screws from the PEP end of the bracket supporting the front of the PEP.
- ☐ 5. Use the bladed screwdriver to remove the four screws from around the PEP. (Fig [PR24-3](#)).

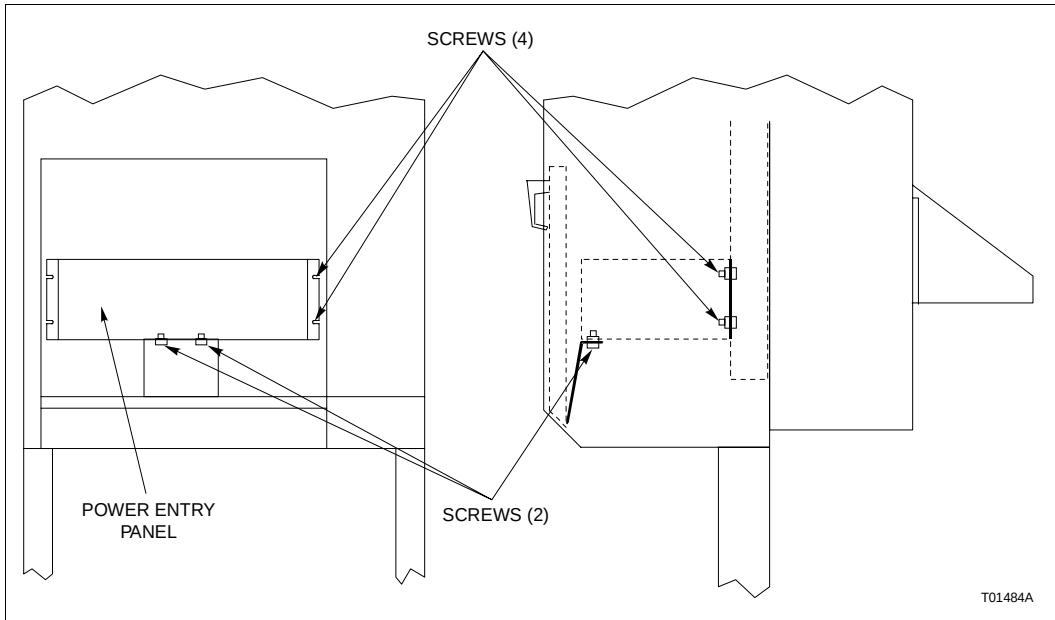


Figure PR24-3. Environmental Model PEP Removal

- ☐ 6. Slide the PEP out of the front of the cabinet. Use caution as the PEP weighs approximately 23 kg (50 lbs).
- ☐ 7. Use the bladed screwdriver to remove the four screws that secure the IIMKM02A module to the PEP (Fig. [PR24-4](#)). Be sure not to lose the two nonconductive washers for each standoff
- ☐ 8. Remove the cover from the top of the PEP by using the bladed screwdriver to remove the nine screws (Fig. [PR24-5](#)).
- ☐ 9. Disconnect the DC distribution board connector.
- ☐ 10. Label and disconnect the wires between the power supply and the incoming AC power.
- ☐ 11. Use the bladed screwdriver to remove the four screws that hold the power supply to the center support wall of the PEP.

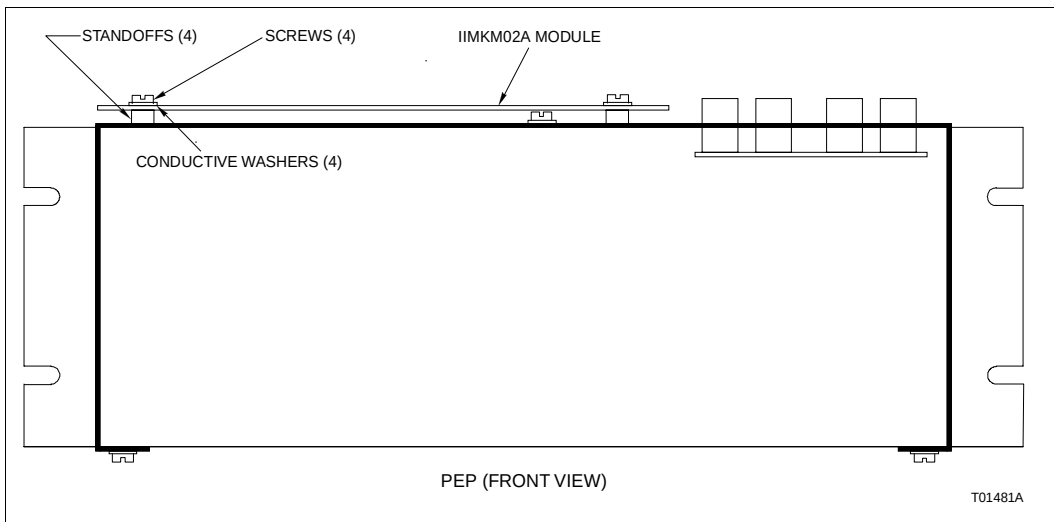


Figure PR24-4. Environmental Model IIMKM02A Module Removal

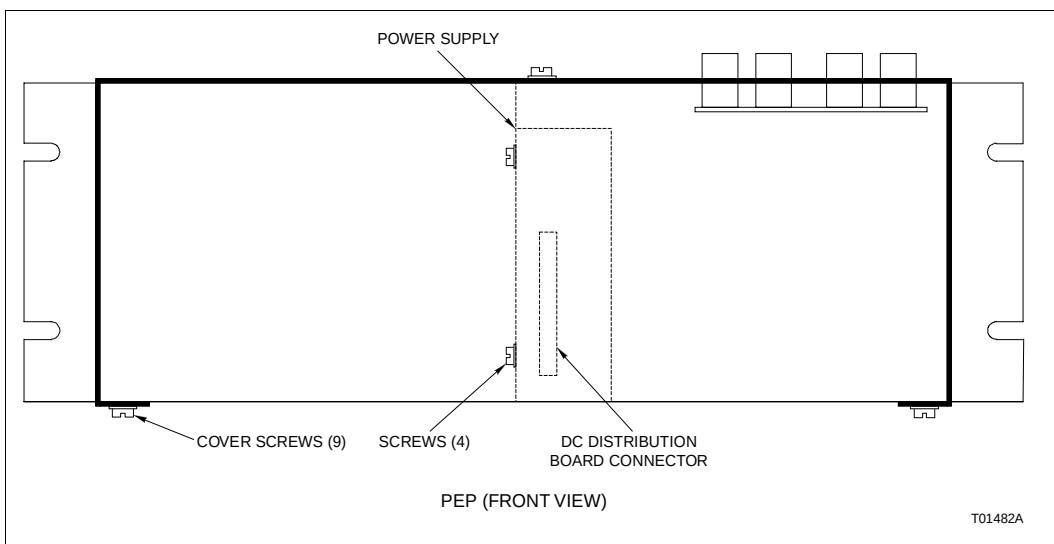


Figure PR24-5. Environmental Model Power Supply Removal

Panel Mount Model



1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.



- ☐ 2. Remove the two chassis screws on the upper edge of the back panel and carefully slide the unit out far enough to access the power supply mounting screws. It is not necessary to remove the monitor (Fig. PR24-6).

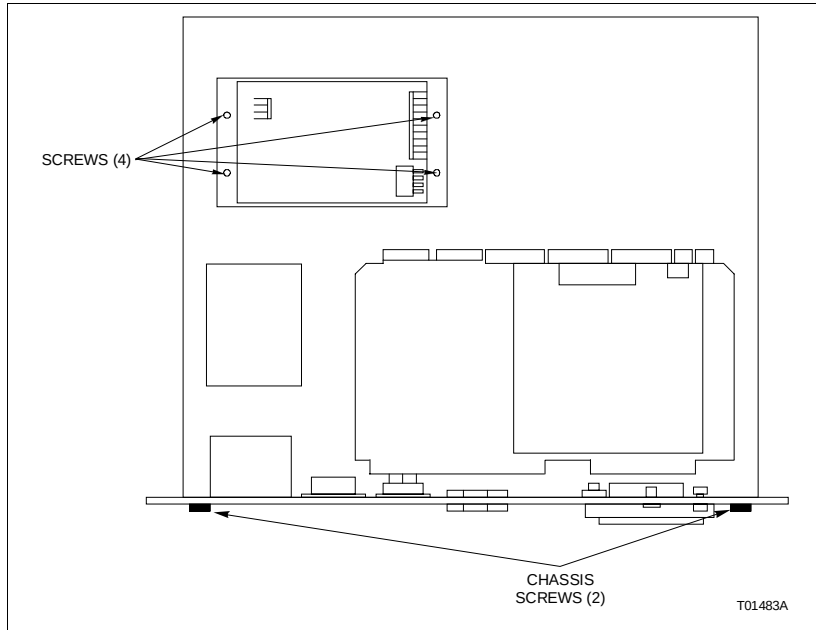


Figure PR24-6. Panel Mount Model Power Supply Removal

- ☐ 3. Label and remove all wires and cables from the power supply.
- ☐ 4. Use the bladed screwdriver to remove the four screws that fasten the power supply to the chassis from the outside bottom of the chassis.



Purpose/Scope

10 min.

This procedure explains how install the power supply.

Parts

Number	Qty	Description
663855375 ¹	1	Power supply, console model
664003871		Power supply, table top, environmental and panel mount models

NOTE:

1. This part not needed if this procedure is part of keyboard interface assembly replacement.

Tools

- Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure

The 130-Watt power supply provides power to the auxiliary terminal. The power supply operates on both 120 VAC and 240 VAC. It is autosensing and has no voltage select jumpers. The procedure varies depending on the model.

Table Top Model



1. Verify that the main power switch on the keyboard interface assembly is in the off position. Check the main power indicator to see if power is removed.



2. Carefully tip the monitor and chassis on one side or tip it to the left and support it.



- ☐ 3. Use the bladed screwdriver to install the four screws that hold the power supply to the chassis from the outside bottom of the chassis (Fig. PR25-1).

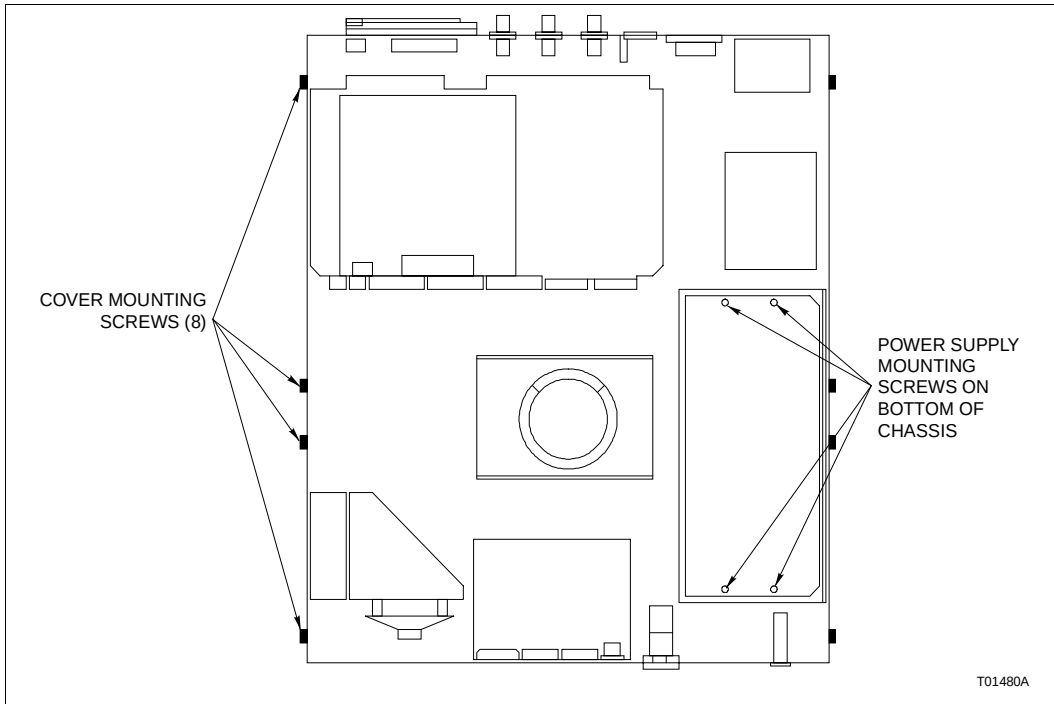


Figure PR25-1. Table Top Model Power Supply Installation

- ☐ 4. Install all wires and cables onto the power supply.
- ☐ 5. Install the split cover onto the top of the monitor by using the bladed screwdriver to install the eight screws that hold the split cover.
- ☐ 6. Set the monitor and chassis back upright.

Console Model

- ☐  1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.

- ☐ 2. There is a metal tab on the bottom of the power supply that sets into a slot on the monitor mounting platform. Slide the power supply into the console so that the tabs fit into the slots.
- ☐ 3. Use the bladed screwdriver to install the two screws that secure the power supply bracket to the monitor mounting platform (Fig PR25-2).

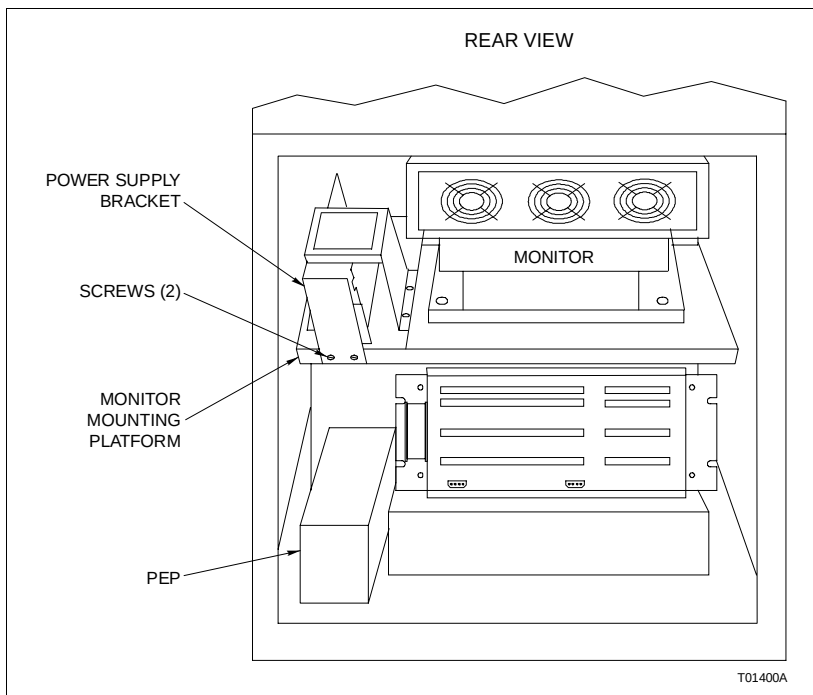


Figure PR25-2. Console Model Power Supply Installation

- ☐ 4. Install all wires and cables onto the power supply.
- ☐ 5. Install the power supply plug into its socket on the PEP.

Environmental Model

- ☐  1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.



- ☐ 2. Use the bladed screwdriver to install the four screws that hold the power supply to the center support wall of the PEP (Fig. PR25-3).

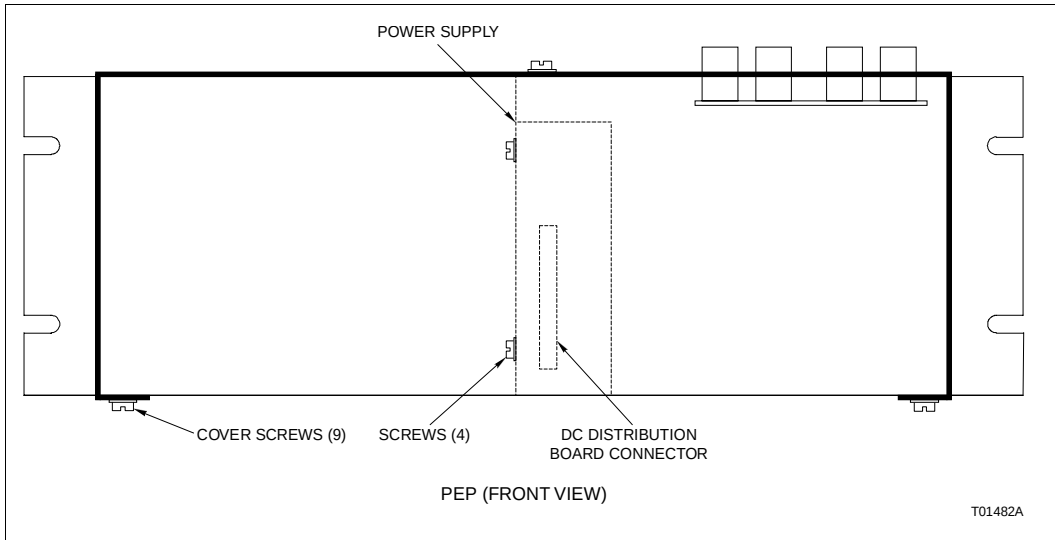


Figure PR25-3. Environmental Model Power Supply Installation

- ☐ 3. Connect the DC distribution board connector.
- ☐ 4. Connect the wires between the power supply and the incoming AC power.
- ☐ 5. Install the cover onto the top of the PEP by using the bladed screwdriver to install the nine screws.
- ☐ 6. Use the bladed screwdriver to install the four screws that secure the IIMKM02A module to the PEP (Fig. PR25-4). Be sure to install the two nonconductive washers for each standoff.
- ☐ 7. Slide the PEP into the front of the cabinet. Use caution as the PEP weighs approximately 23 kg (50 lbs).
- ☐ 8. Use the bladed screwdriver to install the four screws around the PEP. (Fig PR25-5).
- ☐ 9. Install all wires and cables onto the PEP.
- ☐ 10. Use the bladed screwdriver to install the two screws into the PEP end of the bracket supporting the front of the PEP.

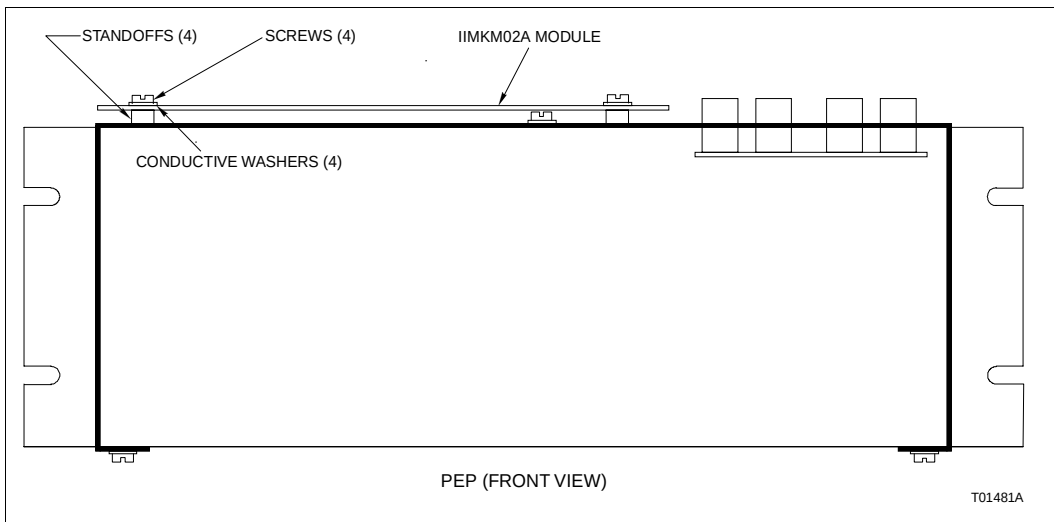


Figure PR25-4. Environmental Model IIMKM02A Module Installation

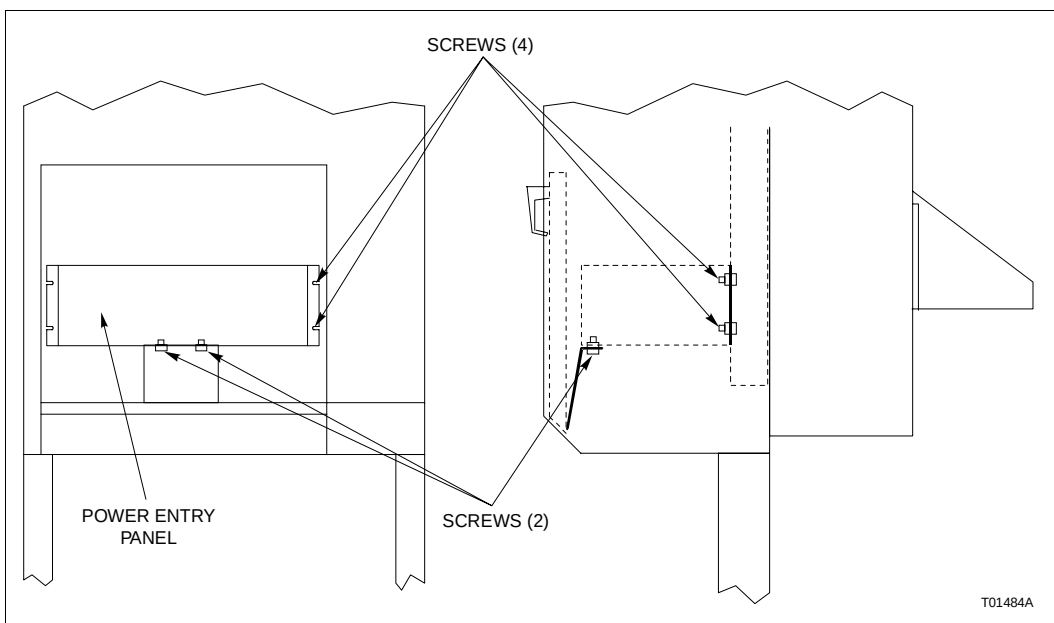


Figure PR25-5. Environmental Model PEP Installation



Panel Mount Model

- ☐  1. Verify that the main power switch on the PEP is in the off position. Check the main power indicator to see if power is removed.
- ☐ 2. Use the bladed screwdriver to install the four screws that fasten the power supply to the chassis from the outside bottom of the chassis (Fig. PR25-6).

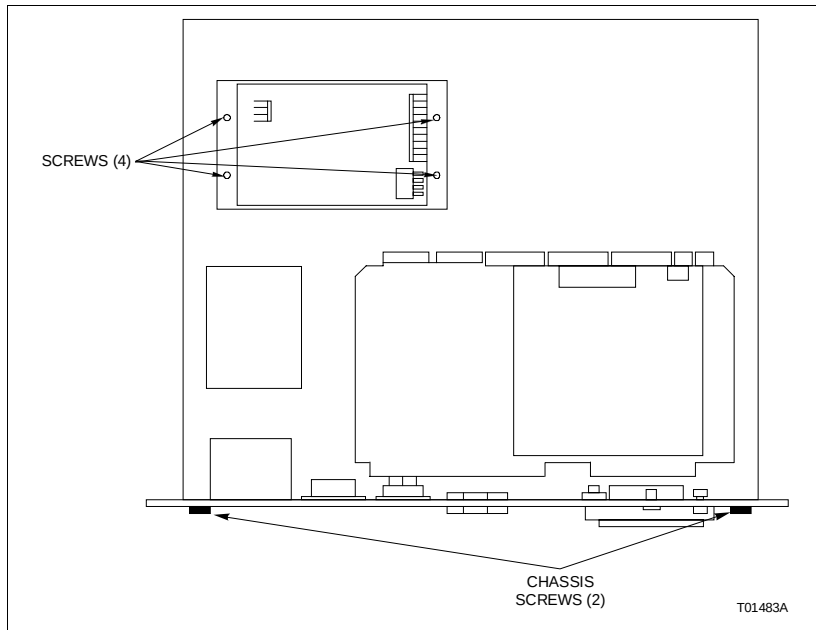


Figure PR25-6. Panel Mount Model Power Supply Installation

- ☐ 3. Install all wires and cables onto the power supply.
- ☐ 4. Install the two chassis screws on the upper edge of the back panel.
- ☐ 5. Carefully slide the unit into its operating position.



Purpose/Scope

20 min.

This procedure explains how replace the PEP.

Parts

Number	Qty	Description
6638353?7	1	PEP, console model
6639503?5		PEP, environmental model
6640851?2		PEP, panel mount model

Tools • Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure

NOTES:

1. Use the AC outlets only for peripheral devices listed in this instruction. Check to make certain the peripheral device has the same power requirements.
2. Refer to the appropriate procedures for wiring and cabling connections.
3. The table top model does not have a PEP.

Console Model



1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.



2. Verify that the AC line power (plant circuit breaker) to the auxiliary terminal is shut down so that the AC line can be safely disconnected.



- ☐ 3. Label and remove all cables from the front of the PEP (Fig. PR26-1).

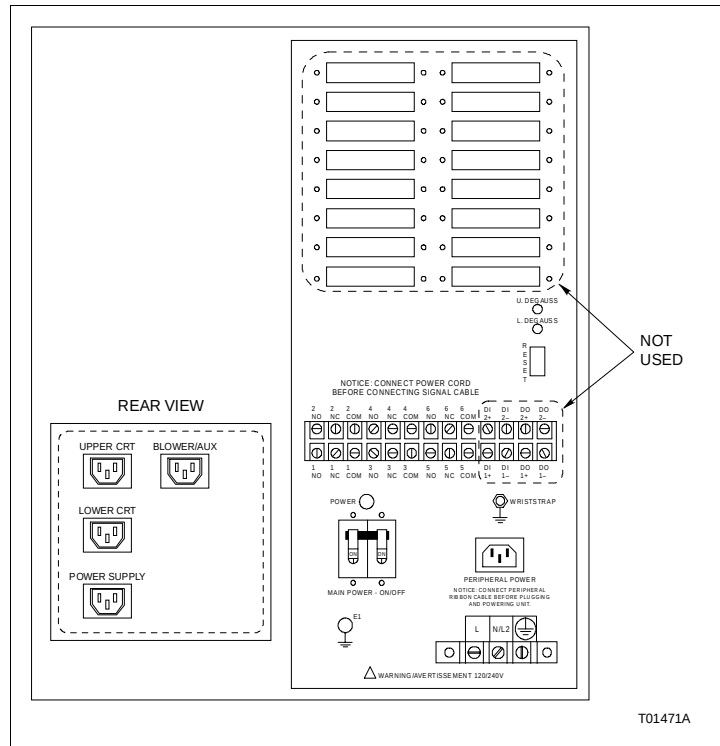


Figure PR26-1. Console Model PEP

- ☐ 4. Label and remove all AC cables from the outlets in the front and rear of the PEP.
- ☐ 5. Label and remove the signal cable from the multibus module that goes to the PEP. Do not remove the cable from the PEP. The new PEP comes with the cable.
- ☐ 6. Use the bladed screwdriver to remove the five screws from around the front of the PEP (Fig. PR26-2).
- ☐ 7. Slide the PEP out of the front of the auxiliary terminal.
- ☐ 8. Slide the new PEP into the front of the auxiliary terminal.
- ☐ 9. Align the five holes around the outside of the PEP with the mounting holes in the auxiliary terminal frame.

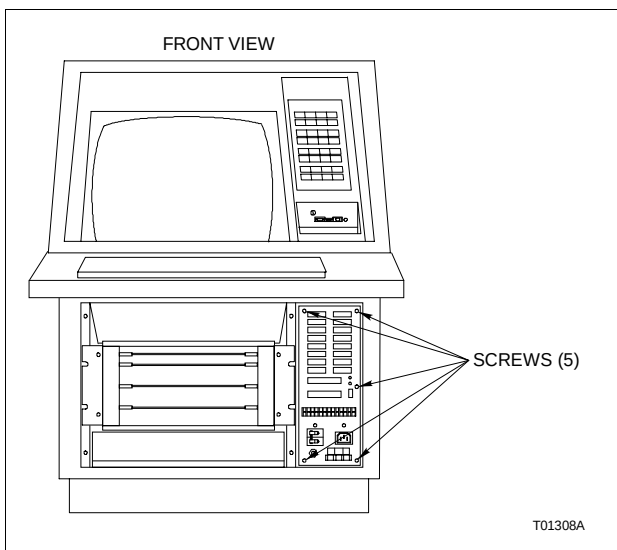


Figure PR26-2. Console Model PEP Replacement

- ☐ 10. Use the bladed screwdriver to install the five screws.
- ☐ 11. Using the old PEP as a guide, connect the cable on the PEP to the proper place on the multibus module.
- ☐ 12. Connect the AC cables to the outlets on the front and rear of the PEP.
- ☐ 13. Connect the remaining cables to the front of the PEP.

Environmental Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐ 2. Verify that the AC line power (plant circuit breaker) to the auxiliary terminal is shut down so that the AC line can be safely disconnected.
- ☐ 3. Label and remove all cables from the front of the PEP (Fig. **PR26-3**).

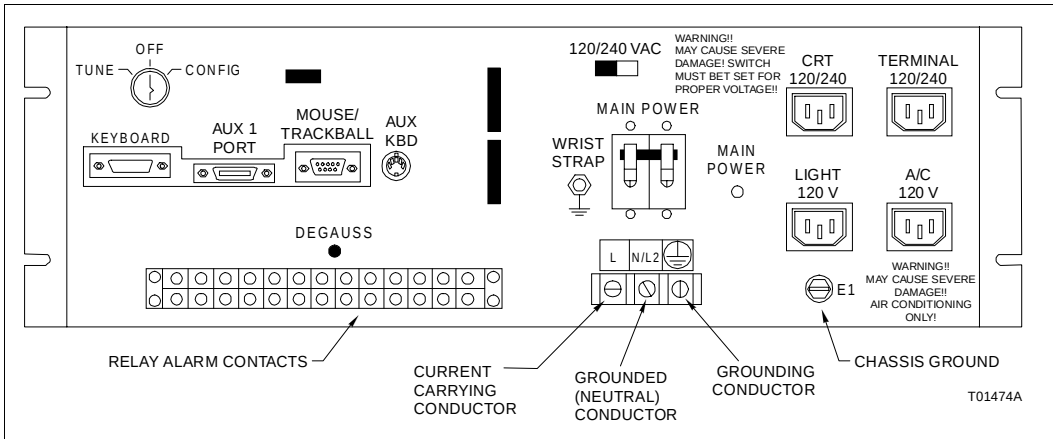


Figure PR26-3. Environmental Model PEP

- ☐ 4. Use the bladed screwdriver to remove the two screws from the PEP end of the bracket supporting the front of the PEP.
- ☐ 5. Use the bladed screwdriver to remove the four screws from around the PEP. (Fig [PR26-4](#)).

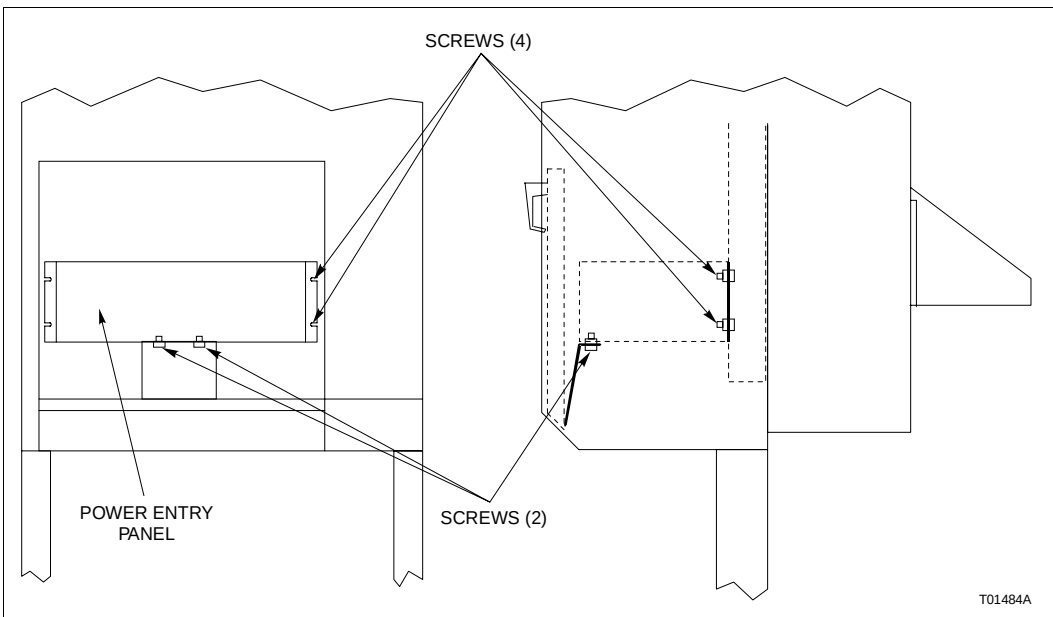


Figure PR26-4. Environmental Model PEP Replacement

- ☐ 6. Slide the PEP out of the front of the cabinet. Use caution as the PEP weighs approximately 23 kg (50 lbs).
- ☐ 7. Slide the new PEP into the front of the cabinet.
- ☐ 8. Use the bladed screwdriver to install the four screws around the PEP.
- ☐ 9. Install all wires and cables onto the PEP.
- ☐ 10. Use the bladed screwdriver to install the two screws into the PEP end of the bracket supporting the front of the PEP.

Panel Mount Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐ 2. Verify that the AC line power (plant circuit breaker) to the auxiliary terminal is shut down so that the AC line can be safely disconnected.
- ☐ 3. Label and remove all cables from the front of the PEP (Fig. [PR26-5](#)).

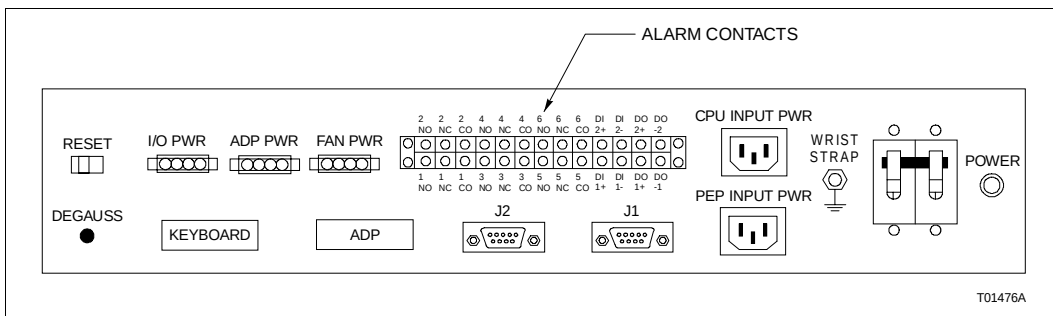


Figure PR26-5. Panel Mount Model PEP

- ☐ 4. There are two screws, accessible from the rear of the panel in which the auxiliary terminal is mounted, that secure the PEP and mounting tray. Use the bladed screwdriver to remove the two screws (Fig. [PR26-6](#)).
- ☐ 5. Slide the PEP and mounting tray out the rear of the panel.

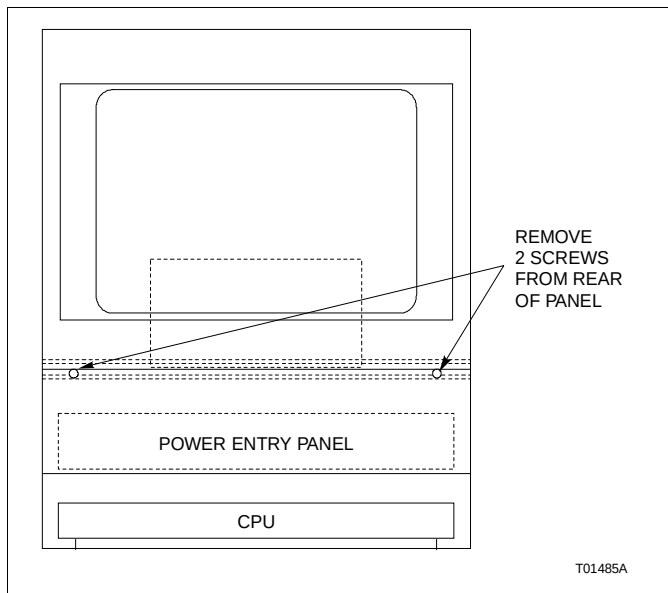


Figure PR26-6. Panel Mount Model PEP Replacement

- ☐ 6. Slide the new PEP and mounting tray into the rear of the panel.
- ☐ 7. Use the bladed screwdriver to install the two screws that hold the PEP and mounting tray to the panel.
- ☐ 8. Connect all wires and cables to the PEP.



Purpose/Scope

10 min.

This procedure explains how replace the CPU.

Parts

Number	Qty	Description
6642485?1	1	CPU, Tektronix model XP400

Tools • Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure

The location of the CPU varies depending on the model.

Table Top Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐ 2. Remove and label all cables from the CPU.
- ☐ 3. Remove the two screws that secure the mounting plate to the track on each side of the cabinet (Fig. [PR27-1](#)).
- ☐ 4. Slide the CPU and mounting plate completely out of the rear of the cabinet.
- ☐ 5. Place the CPU and mounting plate on a clean surface.
- ☐ 6. Remove the four screws that secure the CPU to the mounting plate.



- ☐ 7. Place the new CPU on the mounting plate.

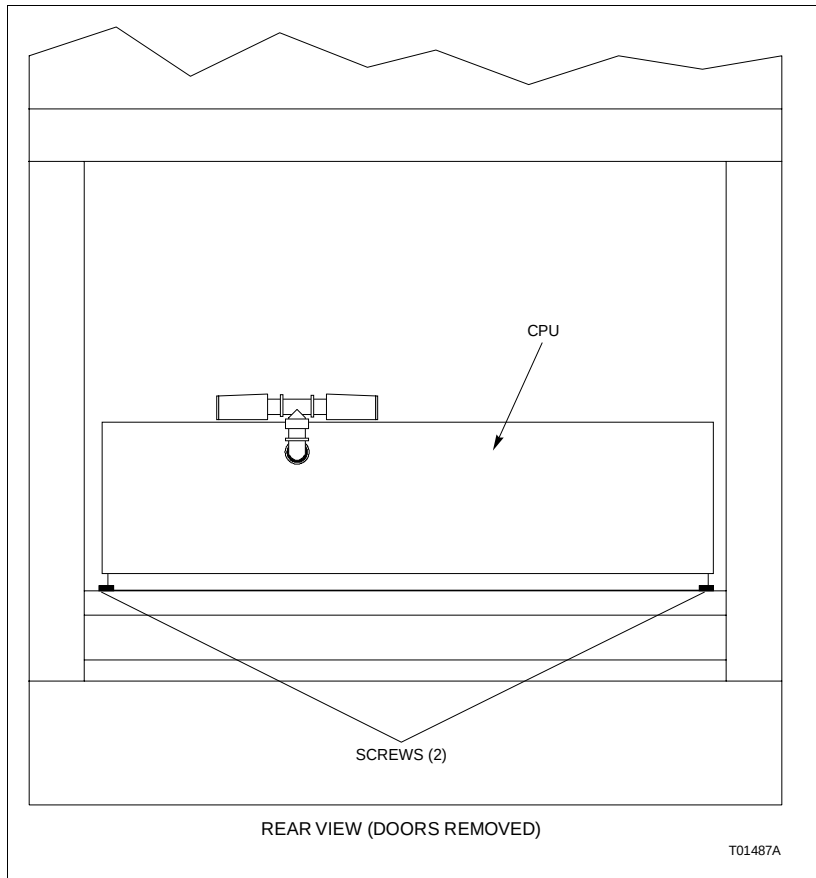


Figure PR27-1. Table Top Model CPU Replacement

- ☐ 8. Install the four screws that secure the CPU to the mounting plate.
- ☐ 9. Slide the CPU and mounting plate all the way into the cabinet.
- ☐ 10. Install the two screws that secure the mounting plate to the rails on each side of the cabinet.
- ☐ 11. Install all cables onto the CPU.

Console Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐ 2. Remove and label all cables from the CPU.
- ☐ 3. Remove the two screws that secure the front of the mounting plate to the shelf (Fig. PR27-2).

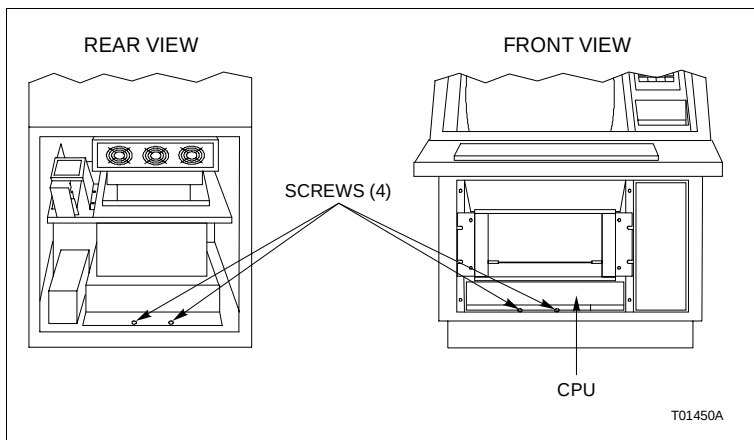


Figure PR27-2. Console Model CPU Removal

- ☐ 4. Remove the two screws that hold the rear of the mounting plate to the support bracket.
- ☐ 5. Slide the CPU and mounting plate out of the rear of the auxiliary terminal.
- ☐ 6. Remove the four screws that hold the CPU to the mounting plate.
- ☐ 7. Install the four screws to secure the new CPU to the mounting plate.
- ☐ 8. Slide the new CPU and mounting plate into the rear of the auxiliary terminal.
- ☐ 9. Install the two screws that hold the rear of the mounting plate to the support bracket.
- ☐ 10. Install the two screws that secure the front of the mounting plate to the shelf.



- ☐ 11. Install all cables onto the CPU.

Environmental Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐ 2. Remove and label all cables from the CPU.
- ☐ 3. Remove the four retaining screws that fasten the mounting plate to the shelf (Fig. **PR27-3**).

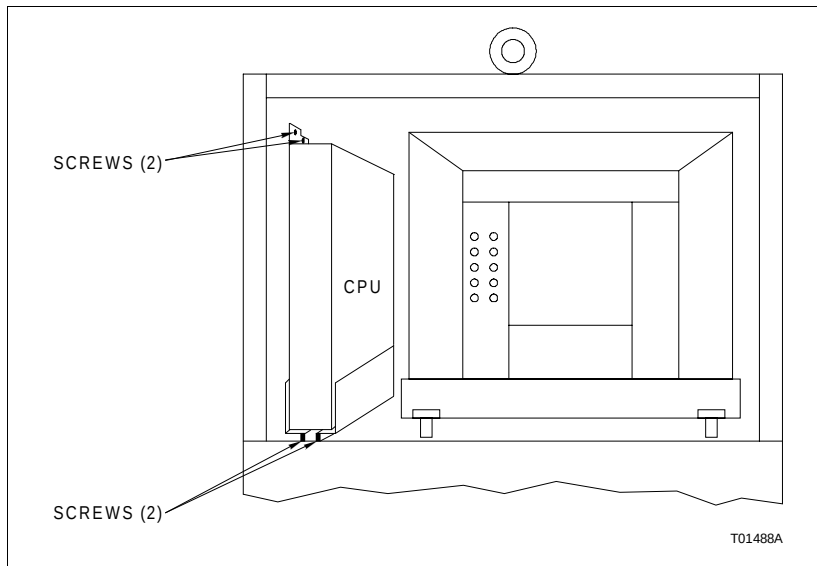


Figure PR27-3. Environmental Model CPU Removal

- ☐ 4. Carefully slide the CPU and mounting plate out of the cabinet.
- ☐ 5. Remove the four screws that hold the CPU to the mounting plate.
- ☐ 6. Install the four screws to secure the new CPU to the mounting plate.
- ☐ 7. Carefully slide the CPU and mounting plate into the cabinet.

- ☐ 8. Install the four retaining screws to secure the mounting plate to the cabinet.
- ☐ 9. Install all cables onto the CPU.

Panel Mount Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐ 2. Remove and label all cables from the CPU.
- ☐ 3. Remove the two screws that hold the CPU to the support bracket (Fig. PR27-4).

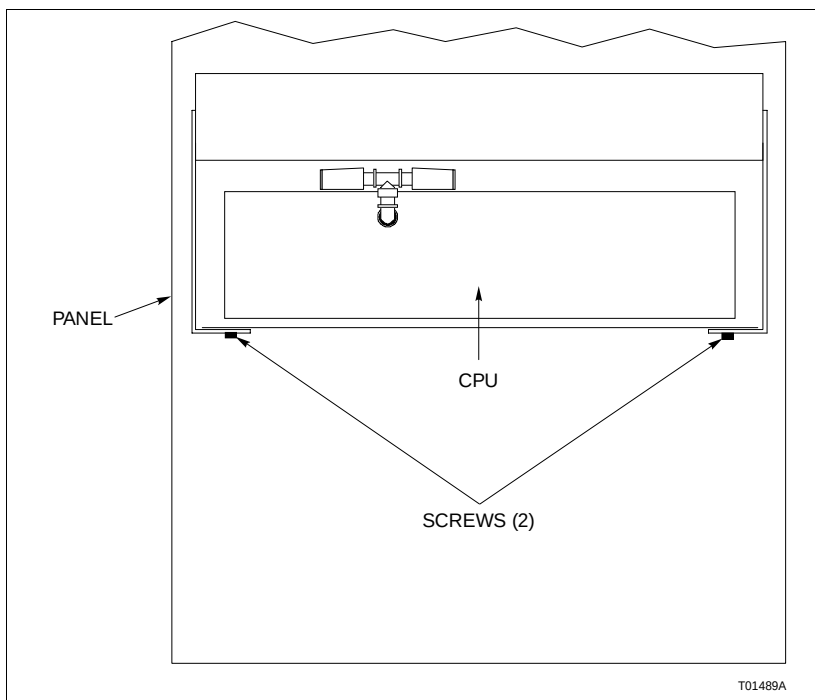


Figure PR27-4. Panel Mount Model CPU Removal

- ☐ 4. Slide the CPU out along the support bracket.
- ☐ 5. Slide the new CPU in along the support bracket.
- ☐ 6. Install the two screws to secure the CPU to the support bracket.



- ☐ 7. Install all cables onto the CPU.

Keyboard Interface Device Removal



PR28

Purpose/Scope

10 min.

This procedure explains how to remove keyboard interface devices. This includes the engineering (QWERTY) keyboard, the operator (Mylar) keyboard, the pointing device (mouse or trackball), the joystick, and the table top ADP panel (IIADP01).

Parts None.

Tools None.

Procedure

- ☐ 1. Unplug the Mylar (operator) keyboard from the port marked KEYBOARD on the keyboard interface assembly. Figure PR28-1 shows the keyboard interface assembly for the table top model, Figure PR28-2 shows the keyboard interface assembly for the console and panel mount models, and Figure PR28-3 shows the keyboard interface assembly for the environmental model. The keyboard interface assembly for the environmental model is part of the PEP.

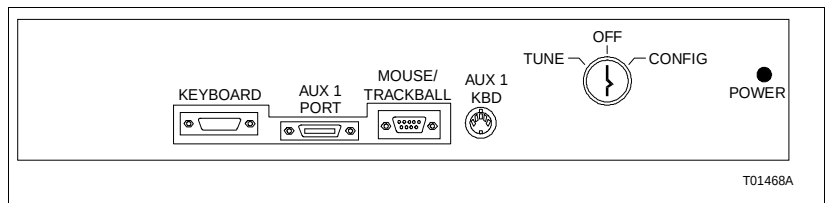


Figure PR28-1. Table Top Model Keyboard Interface Assembly

- ☐ 2. Unplug the QWERTY (engineering) keyboard from the port marked AUX KBD on the keyboard interface assembly.
- ☐ 3. Unplug the pointing device from the port marked MOUSE/ TRACKBALL on the keyboard interface assembly.

NOTE: The environmental model does not support a mouse or trackball.

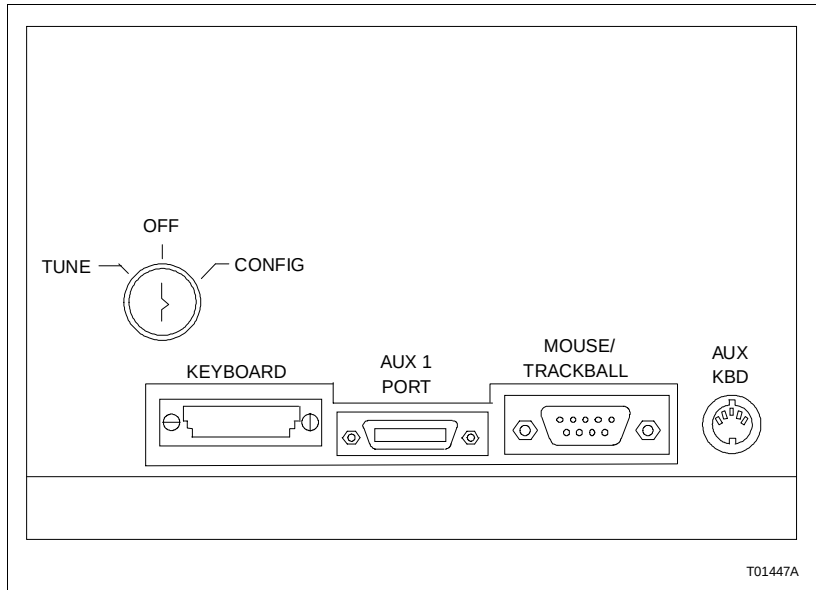


Figure PR28-2. Console and Panel Mount Model Keyboard Interface Assembly

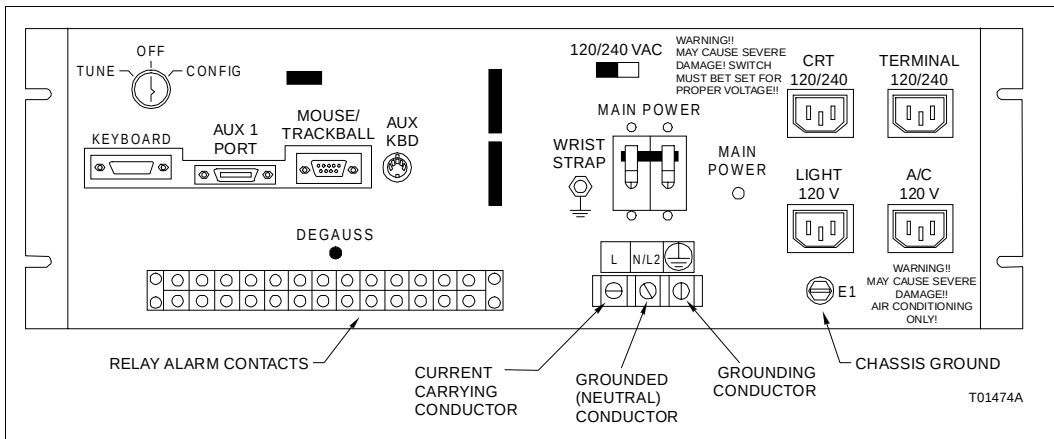


Figure PR28-3. Environmental Model Keyboard Interface Assembly

- ☐ 4. The environmental model supports a joystick. Unplug the joystick from the port marked MOUSE PORT on the rear of the CPU (Fig. [PR28-4](#)).
- ☐ 5. Unplug the table top ADP panel into the port marked AUX 1 PORT on the keyboard interface assembly.

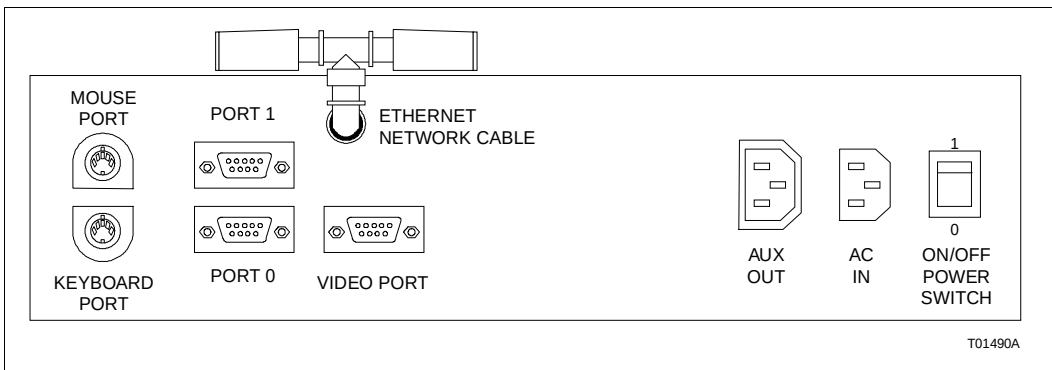


Figure PR28-4. Environmental Model Joystick Connection





Purpose/Scope

10 min.

This procedure explains how replace the IIADP02 ADP panel.

Parts

Number	Qty	Description
IIADP02	1	ADP panel

Tools

- Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure



1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.



2. Use the bladed screwdriver to turn the two bezel screws 90° to release the ADP panel from the bezel (Fig. [PR29-1](#)).



3. If it is necessary to remove the bezel, remove the four screws that secure the bezel to the auxiliary terminal (Fig. [PR29-2](#)).



4. Remove the ADP panel from the auxiliary terminal (or from the bezel if the bezel was removed).



5. Label and disconnect the cables.



6. Verify that SW1 on the new ADP panel is set as shown in Figure [PR29-1](#).



7. Connect the cables.



8. Install the ADP panel into the bezel.



- ☐ 9. Turn the bezel screws until the clip secures the ADP panel to the bezel.
- ☐ 10. If the bezel was removed from the auxiliary terminal, install it and use the bladed screwdriver to install the four screws.

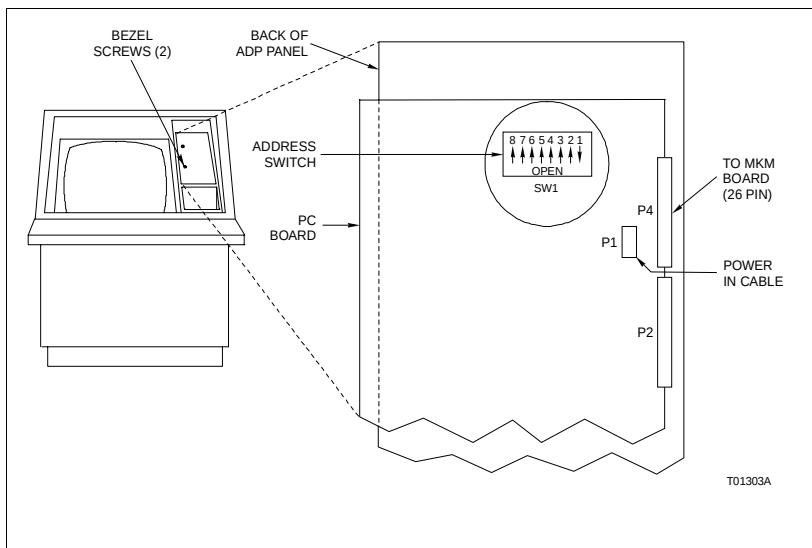


Figure PR29-1. IIADP02 Replacement

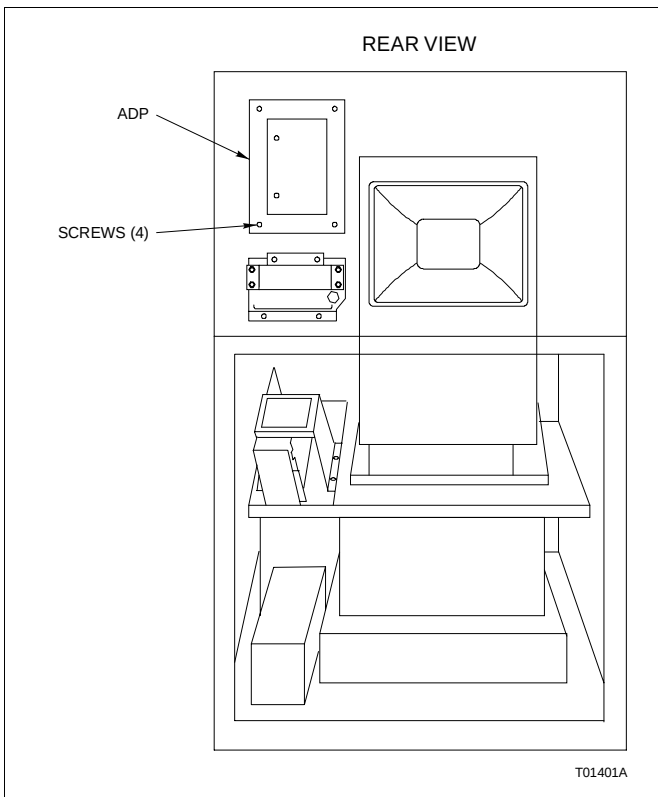


Figure PR29-2. IIADP02 Bezel Removal





Purpose/Scope

10 min.

This procedure explains how replace the NADS03 ADP panel.

Parts

Number	Qty	Description
NADS03	1	ADP panel

Tools

- Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

Procedure

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐ 2. Label and disconnect all cables from the ADP panel.
- ☐ 3. Use the bladed screwdriver to remove the ten screws that secure the sealing ring to the cabinet (Fig. [PR30-1](#)).
- ☐ 4. Use the bladed screwdriver to remove the four screws that secure the ADP panel to the cabinet and remove it.
- ☐ 5. Verify that SW1 on the new ADP panel is set as shown in Figure [PR30-2](#).
- ☐ 6. Install the ADP panel into the cabinet.
- ☐ 7. Use the bladed screwdriver to install the four screws.
- ☐ 8. Install the sealing ring and use the bladed screwdriver to install the ten screws.



- 9. Install all cables onto the ADP panel.

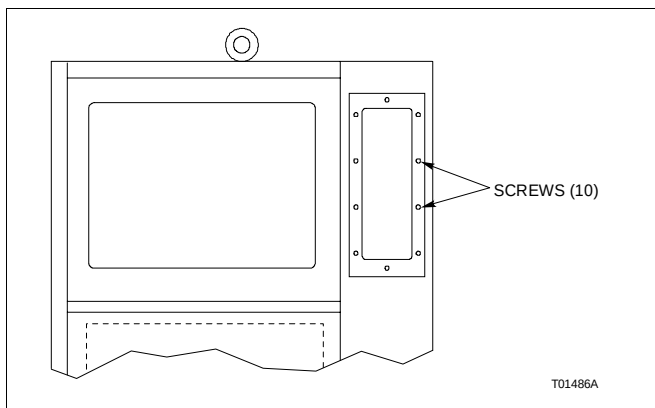


Figure PR30-1. NADS03 Replacement

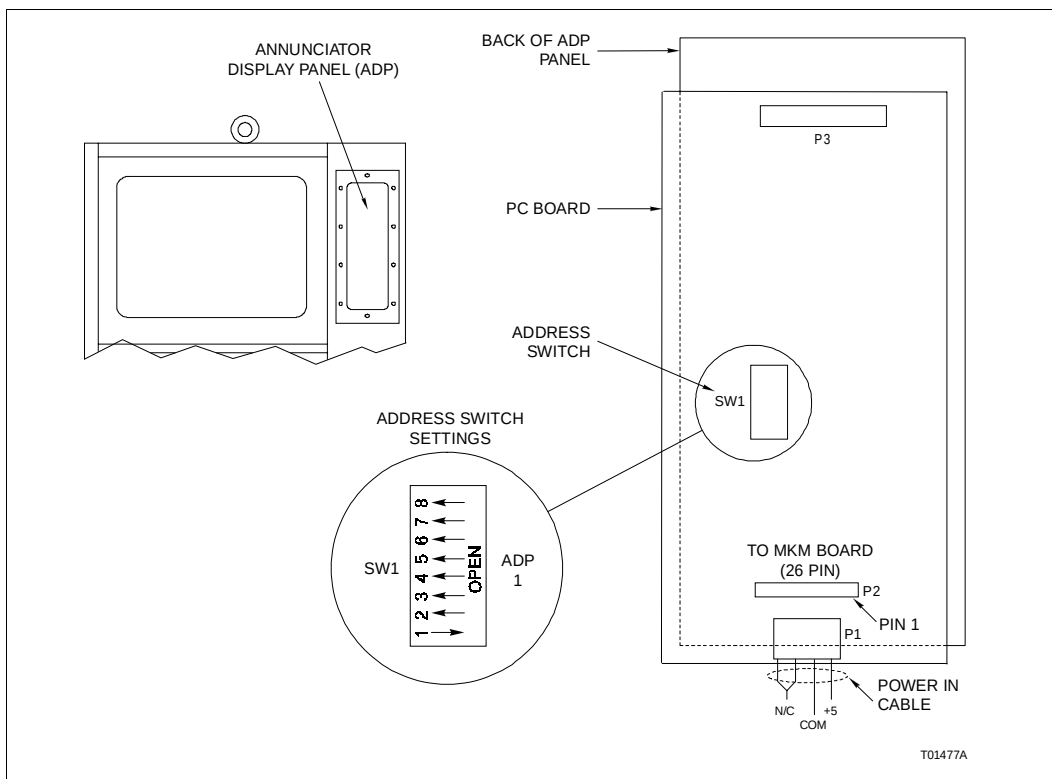


Figure PR30-2. NADS03 Switch Settings

Keyboard Interface Assembly Replacement



PR31

Purpose/Scope

10 min.

This procedure explains how replace the keyboard interface assembly.

Parts

Number	Qty	Description
6638554?2	1	Keyboard interface assembly, console, environmental and panel mount models
6639030?5		Keyboard interface assembly, table top model

Tools • Bladed screwdriver.

Safety Considerations

CAUTION

1. On the keyboard interface connector board, set positions 5, 6 and 7 of dipswitch SW1 to closed (on). Set positions 1 through 4 and 8 of dipswitch SW1 to open (off). Failure to configure dipswitch SW1 properly will damage the CPU.

Procedure

The keyboard interface assembly part number and location varies according to the model. The keyboard interface assembly on the table top model is on the front of the case below the monitor. The keyboard interface assembly is located on the console model front panel next to the monitor behind a polycarbonate door. The environmental model has the keyboard interface assembly on the front of the power entry panel behind the front door. The panel mount model has the keyboard interface assembly below the monitor and above the CPU.



1. Be sure to set the switches as shown in Figure **PR31-1** when replacing the keyboard interface assembly.

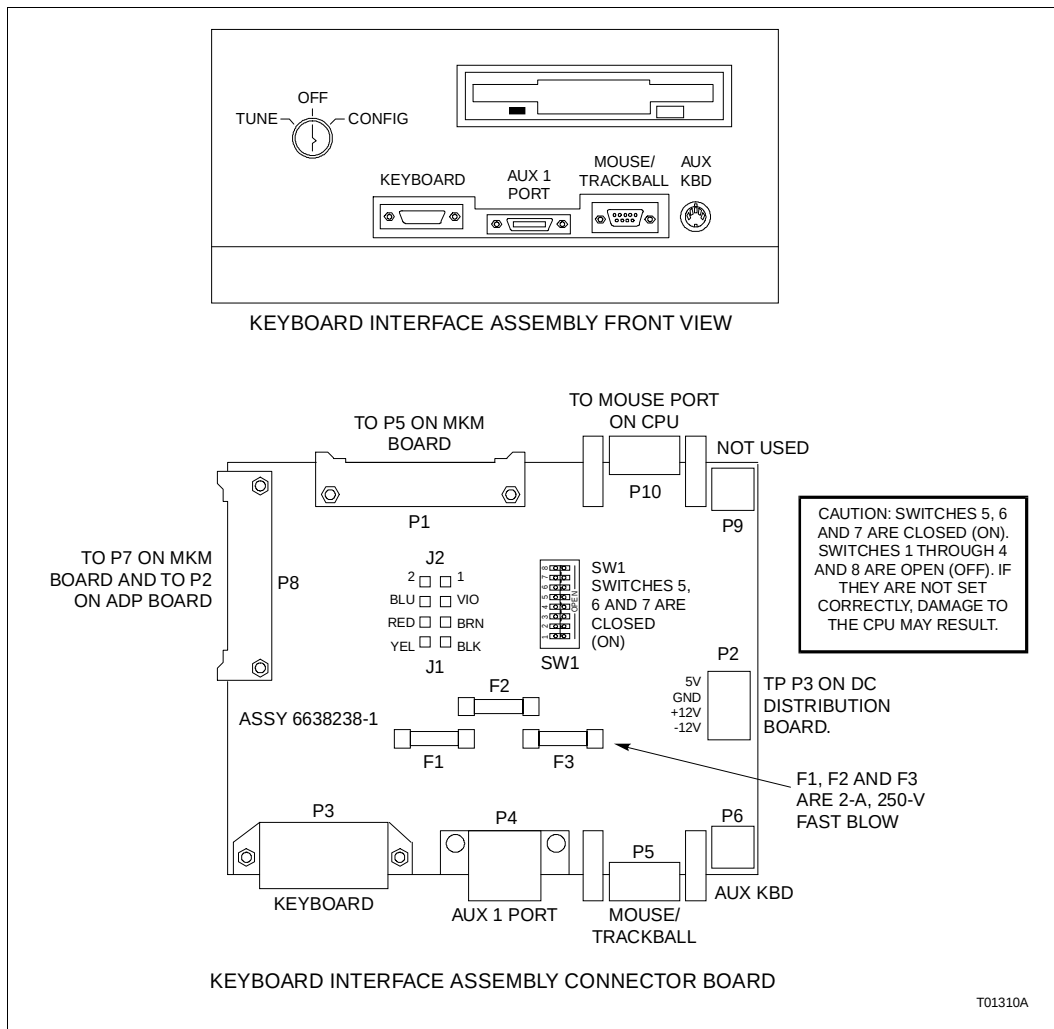


Figure PR31-1. Keyboard Interface Assembly



Purpose/Scope

10 min.

This procedure explains how remove the upper monitor.

Parts None.

Tools • Phillips head screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.
2. The monitor will slide out by itself when the mounting hardware is removed. The monitor weighs approximately 27 kilograms (60 pounds) and can cause bodily injury if it is allowed to slide out by itself. Support the monitor before removing the hardware.

Procedure

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐  2. Use the Phillips head screwdriver to remove the four screws from the rear and top of the rear cover.
 - ☐ 3. Remove the front cover mounting screws and remove the front cover.
 - ☐ 4. Disconnect the power cord connectors from the fans mounted in the rear cover.
 - ☐ 5. Remove the rear cover.
 - ☐ 6. If the monitor has a touchscreen, disconnect the touchscreen cable at the connector between the monitor and the IIMKM02A module.



- ☐ 7. Remove the four screws holding the monitor to its mounting plate.
- ☐ 8. Detach the VGA cable and slide the monitor forward.
- ☐ 9. If the VGA cable also needs to be replaced, complete this procedure. If not, go on to the next procedure in the sequence.
- ☐ 10. Attach the new VGA cable to the old VGA cable and carefully pull the old VGA cable down through the monitor mounting tube support.

NOTE: It may be necessary to cut several tie wraps that hold the old VGA cable to the auxiliary terminal. To make access easier, remove the front support bracket for the fan/shroud assembly by removing the four mounting screws.

- ☐ 11. Detach the new VGA cable from the old VGA cable and finish removing the old cable.
- ☐ 12. Thread the new VGA cable down the left inside of the auxiliary terminal (as viewed from the rear).



Purpose/Scope

10 min.

This procedure explains how remove the lower monitor. The console model is the only model with an upper monitor; however, for the purpose of this procedure, lower monitor refers to the monitor in all of the models.

Parts None.

Tools

- 3/4-inch open end wrench.
- Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.
2. The monitor will slide out by itself when the mounting hardware is removed. The monitor weighs approximately 27 kilograms (60 pounds) and can cause bodily injury if it is allowed to slide out by itself. Support the monitor before removing the hardware.

Procedure

The location of the lower monitor varies depending on the model.

Table Top Model



1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.



2. Remove the power cord and RGB cables from the rear of the monitor. Secure the RGB cables out of the way.



3. If the monitor has a touchscreen, disconnect the touchscreen cable from the IIMKM02A module.



- ☐  4. Remove the monitor.

Console Model

- ☐ 
 - 1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
 - ☐ 2. Remove the power cord and RGB cables from the rear of the monitor. Secure the RGB cables out of the way.
 - ☐ 3. If the monitor has a touchscreen, disconnect the touchscreen cable from the IIMKM02A module.
 - ☐ 4. Use the bladed screwdriver to remove the four screws that secure the fan assembly to the weldment.
 - ☐ 5. Remove the cables from the rear of the fan assembly.
 - ☐ 6. Remove the fan assembly.
- ☐ 
 - 7. Use the 3/4-inch open end wrench to remove the bolts and washers on each side of the monitor mounting tray at the rear of the monitor. These bolts attach the monitor mounting tray to the auxiliary terminal shelf.
 - ☐ 8. Slide the monitor out of the rear of the auxiliary terminal.
 - ☐ 9. Place the monitor and tray onto a solid, flat surface.
 - ☐ 10. Protect the monitor screen and set the screen on the protective surface.
 - ☐ 11. Use the bladed screwdriver to remove the four screws that attach the monitor mounting tray to the monitor.

Environmental Model

- ☐ 
 - 1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
 - ☐ 2. Remove the power cord and RGB cables from the rear of the monitor. Secure the RGB cables out of the way.
 - ☐ 3. Remove the two screws that fasten the monitor mounting tray to the support rails.

- ☐  4. Slide the monitor out of the rear of the auxiliary terminal.

Panel Mount Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐ 2. Remove the bezel.
- ☐ 3. Remove the power cord and RGB cables from the rear of the monitor. Secure the RGB cables out of the way.
- ☐ 4. If the monitor has a touchscreen, disconnect the touchscreen cable from the IIMKM02A module.
- ☐  5. Slide the monitor out of the panel.





Purpose/Scope

1 min.

This procedure explains how remove the touchscreen.

Parts None.

Tools None.

Procedure

- ☐ 1. Firmly pull on the touchscreen to release it from the monitor.





Purpose/Scope

10 min.

This procedure explains how install the touchscreen.

Parts

Number	Qty	Description
1948026?3	1	Touchscreen, 19-in.
1948644?5	1	Extension cable for upper monitor
R9010-0040	22.4 cm (8.8 in.)	Tape, nylon hook
R9010-0045	11.2 cm (4.4 in.)	Tape, nylon loop
R9090-0020	A/R	Tape, vinyl

Tools

- Scissors.

Procedure

NOTE: The touchscreen is not supported on the environmental model.

- ☐ 1. Cut the hook tape into three pieces, one slightly longer than the top edge of the touchscreen and two the length of the side edges.
- ☐ 2. Apply the long piece of the hook tape to the inside face of the touchscreen, aligning the inner edge of the hook tape with the inner edge of the touchscreen border.
- ☐ 3. Apply the shorter pieces along the inside side edges of the touchscreen, butting one end of each against the edge of the long piece, and align them with the inner edge of the touchscreen border.
- ☐ 4. Trim off the excess hook tape.
- ☐ 5. Cut the loop tape into three pieces, one slightly longer than the top edge of the monitor face, and two the length of the side edges.



- ☐ 6. Apply the long piece of the loop tape to the top edge of the monitor tube, aligning the outer edge of the loop tape with the outer edge of the tube face.
- ☐ 7. Apply the shorter pieces along the side edges of the monitor tube, butting the edges against the edge of the long piece.
- ☐ 8. Trim off the excess loop tape.
- ☐ 9. Apply a strip of vinyl tape or equivalent along the bottom edge of the tube face to dust seal the gap between the touchscreen and the tube face.
- ☐ 10. Position the touchscreen on the monitor face so that the hook tape and loop tape meet and hold.



Purpose/Scope

10 min.

This procedure explains how to install the upper monitor.

Parts

Number	Qty	Description
194862379 ¹	1	Monitor, 19 in.

NOTE:

1. This part is not needed if this procedure is part of touchscreen replacement.

Tools • Phillips head screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.
2. The monitor will slide out by itself before the mounting hardware is installed. The monitor weighs approximately 27 kilograms (60 pounds) and can cause bodily injury if it is allowed to slide out by itself. Support the monitor before installing the hardware.

Procedure

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐  2. Slide the monitor into position on the upper monitor mounting plate.
 - ☐ 3. Install the four screws that secure the monitor to its mounting plate.
 - ☐ 4. Attach the RGB cables (Fig. [PR36-1](#)).

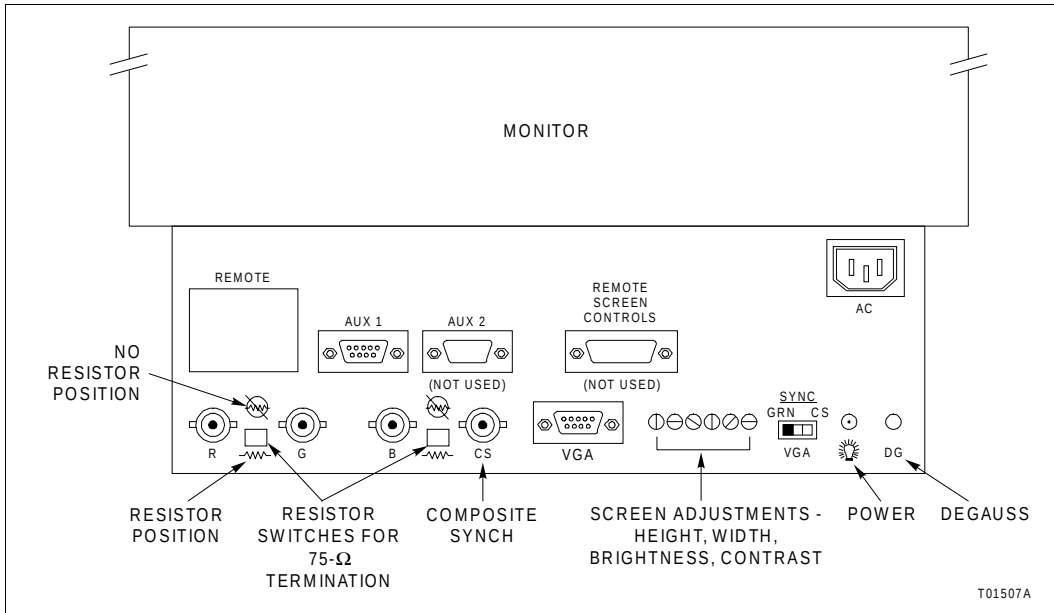


Figure PR36-1. Monitor Connections and Adjustments

- ☐ 5. Verify that the SYNC switch on the rear of the monitor is set to the GRN position and that the resistor switches are set to the resistor position.
- ☐ 6. If the monitor has a touchscreen, connect the touchscreen cable at the connector between the monitor and the IIMKM02A module.
- ☐ 7. Install the rear cover.
- ☐ 8. Connect the power cord connectors to the fans mounted in the rear cover.
- ☐ 9. Install the front cover using the front cover mounting screws.
- ☐ 10. If a touchscreen is installed on the monitor, refer to the **Operation, Conductor VMS** and **Configuration, Conductor VMS** instructions to perform an on-line calibration of the touchscreen.



Purpose/Scope

10 min.

This procedure explains how to install the lower monitor. The console model is the only model with an upper monitor; however, for the purpose of this procedure, lower monitor refers to the monitor in all of the models.

Parts

Number	Qty	Description
1948623?9 ¹	1	Monitor, 19 in.

NOTE:

1. This part is not needed if this procedure is part of touchscreen replacement.

Tools

- ¾-inch open end wrench.
- Bladed screwdriver.

Safety Considerations

WARNING

1. There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.

2. The monitor will slide out by itself when the mounting hardware is removed. The monitor weighs approximately 27 kilograms (60 pounds) and can cause bodily injury if it is allowed to slide out by itself. Support the monitor before removing the hardware.

Procedure

The procedure for changing the lower monitor varies depending on the model.

Table Top Model



1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.



- ☐  2. Place the monitor into position.
- ☐ 3. If the monitor has a touchscreen, connect the touchscreen cable to the IIMKM02A module.
- ☐ 4. Install the power cord and RGB cables to the rear of the monitor (Fig. PR37-1).

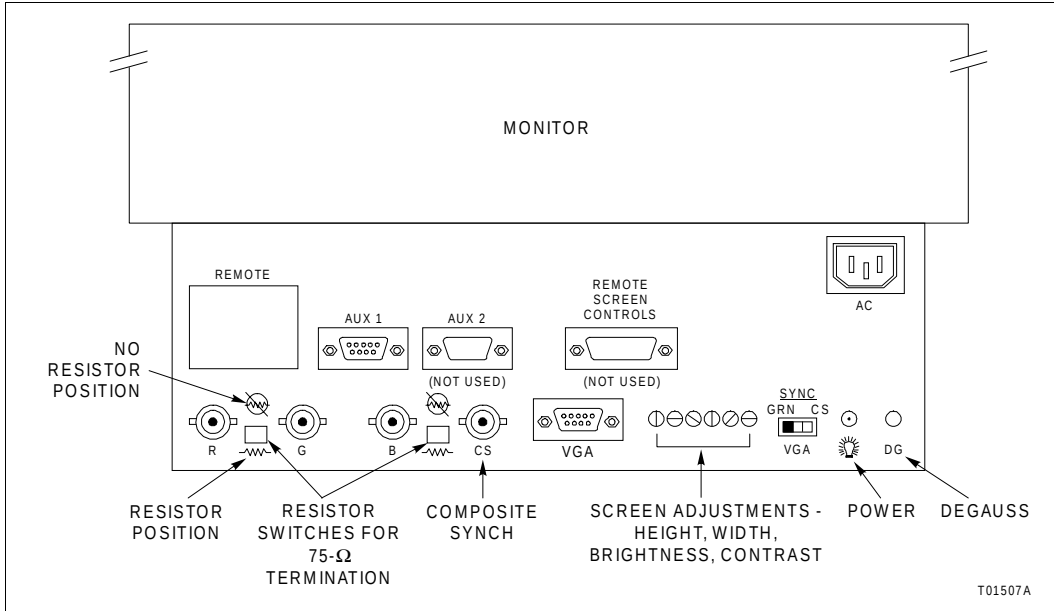


Figure PR37-1. Monitor Connections and Adjustments

- ☐ 5. Verify that the SYNC switch on the rear of the monitor is set to the GRN position and the resistor switches are set to the resistor position.
- ☐ 6. If a touchscreen is installed on the monitor, refer to the **Operation, Conductor VMS** and **Configuration, Conductor VMS** instructions to perform an on-line calibration of the touchscreen.

Console Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.

- ☐ 2. Protect the monitor screen and set the screen on a solid, flat, protective surface.
- ☐ 3. Use the bladed screwdriver to install the four screws that attach the monitor mounting tray to the monitor.
- ☐ 4. Install the fan assembly.
- ☐ 5. Install the cables to the rear of the fan assembly.
- ☐ 6. Use the bladed screwdriver to install the four screws that secure the fan assembly to the weldment.
- ☐  7. Slide the monitor into the rear of the auxiliary terminal.
- ☐ 8. Use the 3/4-inch open end wrench to install the bolts and washers on each side of the monitor mounting tray at the rear of the monitor. These bolts attach the monitor mounting tray to the auxiliary terminal shelf.
- ☐ 9. If the monitor has a touchscreen, connect the touchscreen cable to the IIMKM02A module.
- ☐ 10. Install the power cord and RGB cables to the rear of the monitor (Fig. [PR37-1](#)).
- ☐ 11. Verify that the SYNC switch on the rear of the monitor is set to the GRN position and the resistor switches are set to the resistor position.
- ☐ 12. If a touchscreen is installed on the monitor, refer to the **Operation, Conductor VMS** and **Configuration, Conductor VMS** instructions to perform an on-line calibration of the touchscreen.

Environmental Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐  2. Slide the monitor into the rear of the auxiliary terminal.
- ☐ 3. Use the bladed screwdriver to install the two screws that secure the monitor mounting tray to the support rails.



- ☐ 4. Install the power cord and RGB cables to the rear of the monitor (Fig. **PR37-1**).
- ☐ 5. Verify that the SYNC switch on the rear of the monitor is set to the GRN position and the resistor switches are set to the resistor position.
- ☐ 6. If a touchscreen is installed on the monitor, refer to the **Operation, Conductor VMS** and **Configuration, Conductor VMS** instructions to perform an on-line calibration of the touchscreen.

Panel Mount Model

- ☐  1. Verify that the main power on the PEP is in the off position. Check the power indicator to see if power is removed.
- ☐  2. Slide the monitor into the panel.
- ☐ 3. Install the bezel.
- ☐ 4. If the monitor has a touchscreen, connect the touchscreen cable to the IIMKM02A module.
- ☐ 5. Install the power cord and RGB cables to the rear of the monitor (Fig. **PR37-1**).
- ☐ 6. Verify that the SYNC switch on the rear of the monitor is set to the GRN position and the resistor switches are set to the resistor position.
- ☐ 7. If a touchscreen is installed on the monitor, refer to the **Operation, Conductor VMS** and **Configuration, Conductor VMS** instructions to perform an on-line calibration of the touchscreen.

Touchscreen Controller Card Replacement



PR38

Purpose/Scope

10 min.

This procedure explains how to replace the touchscreen controller card.

Parts

Number	Qty	Description
1948027?3	1	Controller card, touchscreen
197832?1	4	Spacer, nylon
6640640?3	1	Serial cable
NBZRG13004	4	Screw, nylon

Tools • Small bladed screwdriver.

Procedure

This procedure covers the replacement of the touchscreen controller card. The jumper settings for the IIMKM02A module are addressed in Procedure [PR7](#).

- ☐ 1. Remove the cable from the touchscreen controller card. Note the orientation of Pin 1.
- ☐ 2. Use the small bladed screwdriver to remove the four screws that secure the touchscreen controller card to the IIMKM02A module.
- ☐ 3. Verify that the jumpers and switches on the new touchscreen controller card are set as shown in Figure [PR38-1](#).
- ☐ 4. Mount the touchscreen controller card so that P14 and P15 on the touchscreen controller card mate with P14 and P15 on the IIMKM02A module.
- ☐ 5. Insert the four nylon spacers between the touchscreen controller card and the IIMKM02A module.
- ☐ 6. Install the four nylon screws and use the small bladed screwdriver to tighten them.

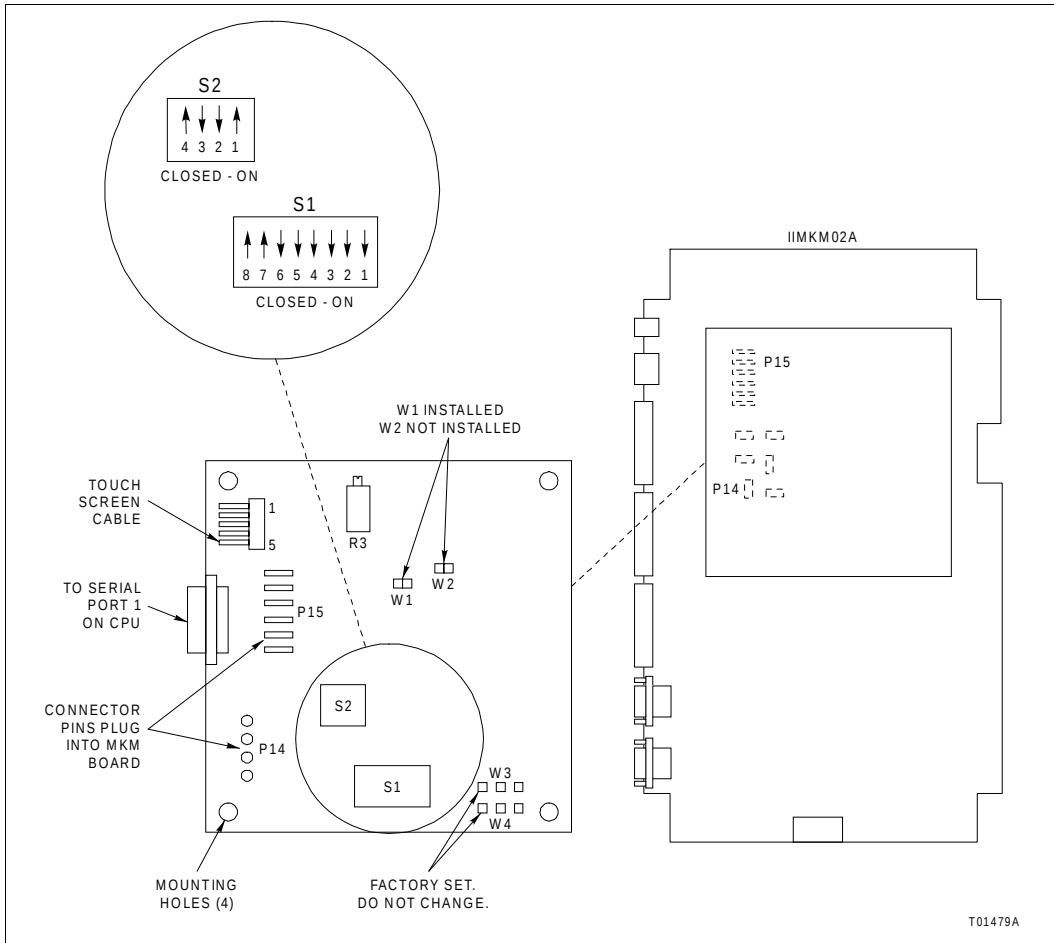


Figure PR38-1. Touchscreen Controller Card Installation

- ☐ 7. Connect the cable to the touchscreen controller card, noting the orientation of Pin 1.
- ☐ 8. Connect the serial cable from the DB25 connector on the touchscreen controller card to serial port 1 on the CPU.
- ☐ 9. Refer to the **Operation, Conductor VMS** and **Configuration, Conductor VMS** instructions to perform an on-line calibration of the touchscreen.



Purpose/Scope

5 min.

This procedure explains how to how to install the doors and top cover onto the console model and how to close the doors on the environmental model.

Parts None.

Tools

- Keys.
- $\frac{1}{8}$ -inch Allen wrench.

Procedure

There are two doors and a top cover on the console model.
There is a front and rear door on the environmental model.

Console Model

Front and Rear Doors

- ☐ 1. Insert the tabs on the door into the holes in the auxiliary panel frame.
- ☐ 2. Push up and in on the doors to install them.
- ☐ 3. Insert the key into the lock and turn it $\frac{1}{4}$ -turn clockwise.

Top Cover

- ☐ 1. Install the top cover so the five holes in the top cover align with the holes in the auxiliary terminal frame.
- ☐ 2. Use the $\frac{1}{8}$ -inch Allen wrench to install the five Allen screws that secure the top cover to the auxiliary terminal.

Environmental Model

There are three latches on each door on the environmental model.

- ☐ 1. Close the door.



- ☐ 2. Pull in on the handle of each end latch.
- ☐ 3. Turn each end latch $\frac{1}{4}$ -turn.
- ☐ 4. Use the $\frac{1}{8}$ -inch Allen wrench to turn the middle latch on the door to be closed $\frac{1}{4}$ -turn.



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