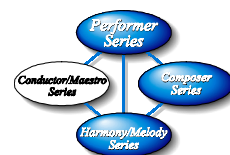


Conductor VMS Series 43 Auxiliary Terminal





This instruction provides specific hardware installation, troubleshooting, maintenance, and repair and replacement procedures information necessary for the Conductor VMS Series 43 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-CV43C auxiliary terminals.



List of Effective Pages

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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. PR7-1, PR9-1, PR10-1, PR12-1, PR16-1, PR17-1, PR26-1, PR27-1, PR28-1, PR33-1, PR34-1, PR35-1, PR36-1, PR40-1, PR41-1)

Disconnect power before attempting these procedures. Failure to do so could result in severe or fatal shock, or equipment damage. (p. PR18-1, PR20-1, PR22-1, PR23-1, PR25-1)

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. PR6-1, PR18-1, PR22-1, PR28-1)

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. PR20-1)

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. PR35-1, PR36-1, PR40-1, PR41-1)

Safety Summary (continued)

**SPECIFIC
CAUTIONS**

Make sure that all voltage labels and voltage switch settings on the peripheral devices, power supply, and power entry panel show the correct operating voltage. Equipment damage may result if the incorrect voltage is connected. Make sure the console main power circuit breaker is off before changing operating voltage settings or equipment damage may result. (p. PR6-1, PR12-1)



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 DEC	Trademark of Digital Equipment Corporation.
TM DECnet	Trademark of Digital Equipment Corporation.
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TM Ethernet	Trademark of Xerox Corporation.
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® INFI-NET	Registered trademark of Elsas Bailey Process Automation.
TM Lexmark	Trademark of Lexmark International, Inc.
® Mylar	Registered trademark of E.I. DuPont de Nemours Company, Incorporated.
® Pink Pearl	Registered trademark of Eberhard Faber Incorporated.
TM VMS	Trademark of Digital Equipment Corporation.





Overview

The Conductor VMS™ Series 43 Auxiliary Terminal is a remote dual 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-CV43C 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 43 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 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. Figures 1-1 and 1-2 show the main components of the auxiliary terminal. Both figures show the unit with doors open.

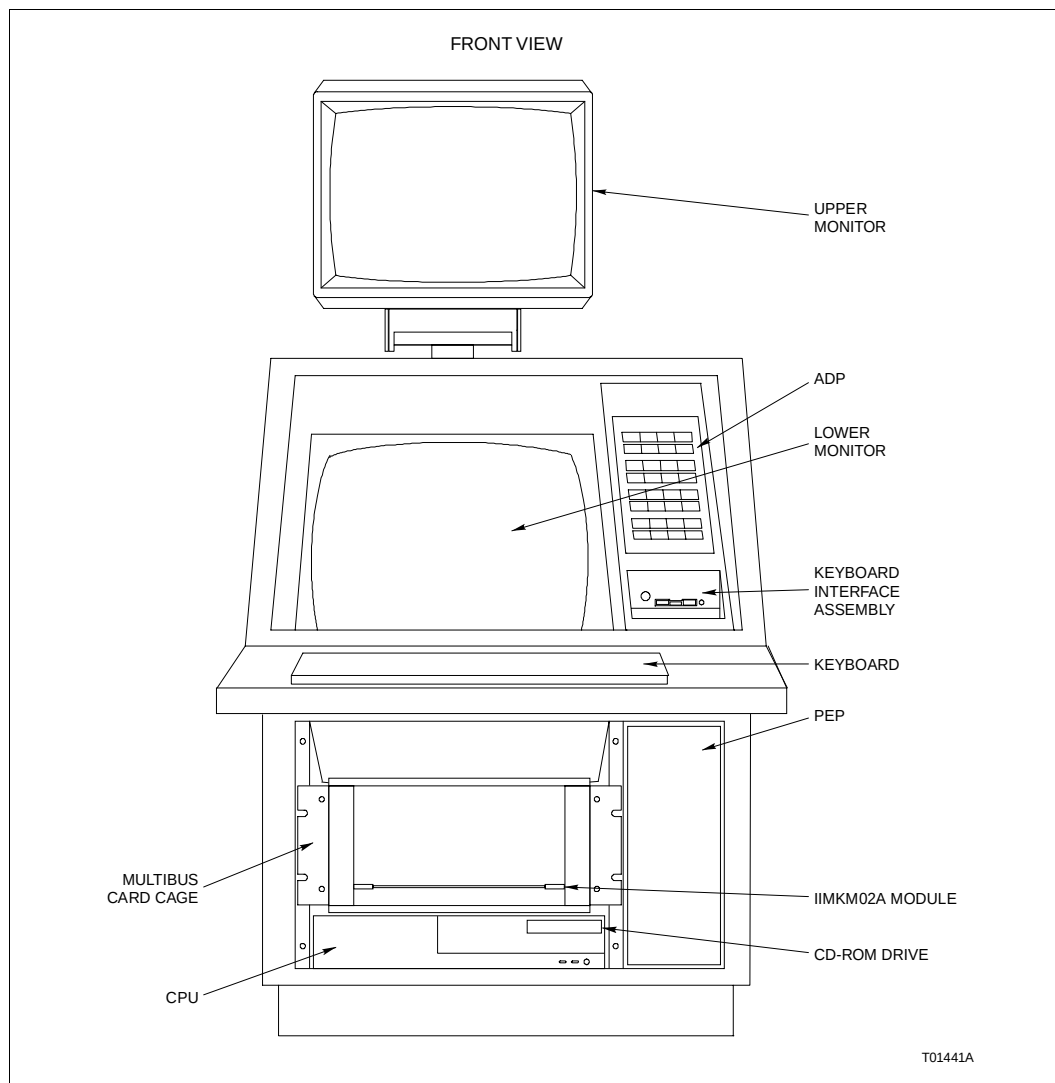


Figure 1-1. Auxiliary Terminal Components - Front View

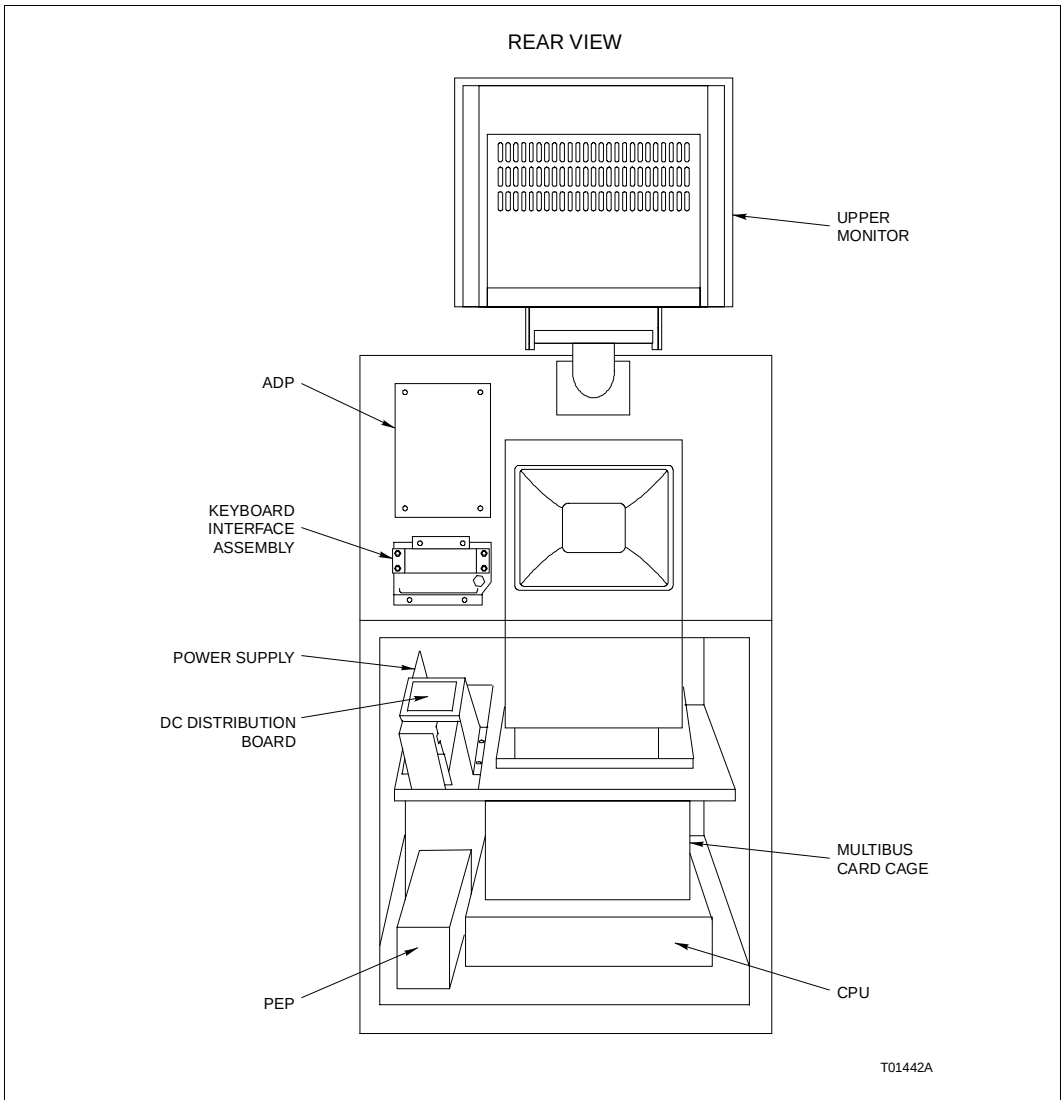


Figure 1-2. Auxiliary Terminal Components - Rear View

Central Processing Unit (CPU)

The CPU described in this instruction is a DEC™ AlphaStation™ 255, Model 233. Specifications for the CPU are listed in the **DEC User Information** manual shipped with the auxiliary terminal.



Hardware

The auxiliary terminal hardware is very similar to that of a dual monitor main workstation. The auxiliary terminal has different hardware in the CPU (one hard 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.

The auxiliary terminal 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.

Instruction Content

This instruction contains information on C-I-CV43C 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 an installation sequence flowchart that directs 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 a factory wiring diagram and table.
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 PR42	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.

Document Conventions

This document uses standard text conventions to represent keys, display items and user data inputs:



Key Identifies a keyboard key.

Example:

Press **ENTER**.

Display item Any item displayed on a screen appears as italic text.

Example:

Running

User data input **Bold** - Identifies any part of a command line that is **not** optional or variable and must be entered exactly as shown.

Italic - Identifies a variable parameter entered in a command line.

[] - Indicates an optional parameter; text within the brackets follows the previously described conventions.

Examples:

ei 108,87,key1,key2,x-coord,y-coord

ELE *volume filename.exe*

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
WBPEEU220770A0	Conductor VMS Series 43 Workstation
WBPEEU220773A0	Operation, Conductor VMS
WBPEEU220774A0	Configuration, Conductor VMS
WBPEEU220775A0	File Utilities, Conductor VMS
WBPEEU220776A0	Display Builder Reference
WBPEEU220777A0	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-CV43C-3	Auxiliary terminal with monitor in both upper and lower positions

Specifications

Table 1-3 contains the specifications for the C-I-CV43C auxiliary terminals.

Table 1-3. Specifications

Property	Characteristic/Value																			
Power																				
Line voltage	240 VAC nominal (180 VAC to 264 VAC RMS) 120 VAC nominal (90 VAC to 132 VAC RMS) Overvoltage category: III																			
Line frequency	47 to 63 Hz																			
Circuit breaker size	20 A																			
Power consumption	<table><tr><th>Voltage</th><th>Typical Amps</th><th>Maximum Amps</th><th>Typical Watts</th><th>Maximum Watts</th></tr><tr><td>120</td><td>3.79</td><td>5.04</td><td>323</td><td>429.6</td></tr><tr><td>240</td><td>2.61</td><td>3.47</td><td>3.21</td><td>426.9</td></tr></table>					Voltage	Typical Amps	Maximum Amps	Typical Watts	Maximum Watts	120	3.79	5.04	323	429.6	240	2.61	3.47	3.21	426.9
Voltage	Typical Amps	Maximum Amps	Typical Watts	Maximum Watts																
120	3.79	5.04	323	429.6																
240	2.61	3.47	3.21	426.9																
Power characteristics	<table><tr><th>Voltage</th><th>Inrush Current Amps (Typical)</th><th>Crest Factor</th><th>Power Factor (Typical)</th></tr><tr><td>120</td><td>53.3</td><td>2.49</td><td>0.704</td></tr><tr><td>240</td><td>64.8</td><td>4.66</td><td>0.510</td></tr></table>					Voltage	Inrush Current Amps (Typical)	Crest Factor	Power Factor (Typical)	120	53.3	2.49	0.704	240	64.8	4.66	0.510			
Voltage	Inrush Current Amps (Typical)	Crest Factor	Power Factor (Typical)																	
120	53.3	2.49	0.704																	
240	64.8	4.66	0.510																	
Power supply	+5 VDC at 20 A, +12 VDC at 4 A, -12 VDC at 4 A																			
Keyboards	1 Mylar® (operator) 1 Engineering (QWERTY)																			
Annunciator display panels	4 (per IIMKM02A module) 32 pushbuttons and 64 LEDs per panel																			

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

Property	Characteristic/Value								
Keyboard interface	Operator keyboard output relays rated at 250 mA 24-28 VDC per IIMKM02A module. <table border="1"> <thead> <tr> <th>Alarm Relays</th><th>Rating</th></tr> </thead> <tbody> <tr> <td>Contact voltage</td><td>24 VDC Overvoltage category: III</td></tr> <tr> <td>Contact current</td><td>0.25 A</td></tr> <tr> <td>Contact power</td><td>6 W</td></tr> </tbody> </table>	Alarm Relays	Rating	Contact voltage	24 VDC Overvoltage category: III	Contact current	0.25 A	Contact power	6 W
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								
Environment									
Temperature	Operating: 15° to 40° C (59° to 104°F) Nonoperating ¹ : -40° to 66°C (-40° to 151°F) Storage: 5° to 50°C (41° to 122°F)								
Relative humidity	Operating: 20% to 80% noncondensing. Recommended minimum 40%. Nonoperating: 95% ² Storage: 10% to 95% noncondensing								
Altitude	Operating: 0 to 3,048 m (0 to 10,000 ft) Nonoperating: 0 to 12,192 m (0 to 40,000 ft) Storage: 0 to 12,192 m (0 to 40,000 ft)								
Cooling requirements (Heat dissipation)	1,103 BTU/hr nominal, 1,467 BTU/hr maximum								
Dimensions	568.3 cm high x 711.2 cm wide x 1096.1 cm deep (61.74 in. high x 28.00 in. wide x 42.92 in. deep)								
Weight	240 kg (525 lbs)								
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								

NOTES:

1. Nonoperating environment is defined as a transportation or storage period of less than 60 days.
2. The value of 95% is at a reference temperature of 66°C (151°F) and the humidity may condense.

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
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 43 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 two monitors and keyboards 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 CPU, a DEC AlphaStation 255 model 233, is the key component in the auxiliary terminal. It sends video signals to the monitors. A cable connects the CPU to the VGA connectors on the monitors.

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

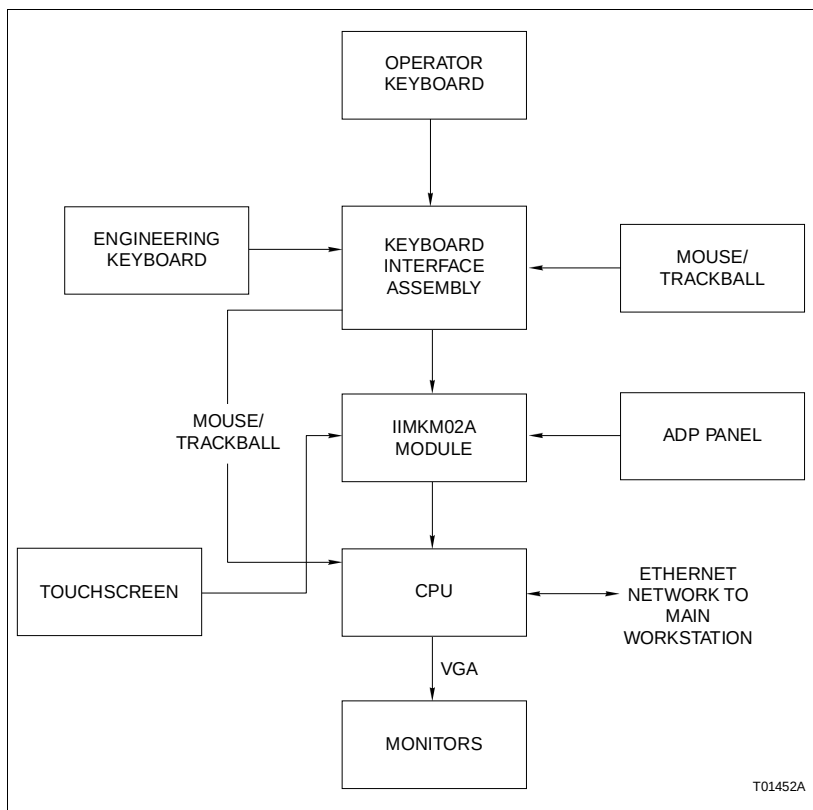


Figure 2-1. Block Diagram



Introduction

This section contains information needed when installing the Conductor VMS Series 43 Auxiliary Terminal. It includes information on special handling, unpacking and inspection, safety considerations and wiring considerations.

Following these topics is an installation sequence flowchart that guides 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 flowchart 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	Protective earth (ground)
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 auxiliary terminal operates from 120/240 VAC, 50/60 hertz. The PEP provides line filtering, transient suppression and a 20-amp circuit breaker.

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 that the voltage selector switch on the CPU be in the proper position. Refer to Procedure **PR6** for more AC power wiring information. The color monitor is autosensing and needs no changes for

240-VAC operation. Monitors other than those supplied by Elsag Bailey may require changes.

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

Procedure PR6 shows physical footprints of the wiring access cutouts.

Connections

There are five AC outlets on the PEP. Four are located on the rear; two for color monitors, one for the power supply, and one for the blower or auxiliary connection. The outlet on the front is marked peripheral power and is for a magnetic tape drive or other peripheral devices.

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

Procedure **PR14** shows physical footprints of the wiring access cutouts.

Connections

Ethernet connections are made directly at the CPU. Refer to the procedures for specific instructions.

Grounding

A system safety ground connection is located on the front of the PEP. Use one of the studs on the inside of the auxiliary terminal to connect to the building ground.

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

Refer to Figure **3-1** for the installation sequence. 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.

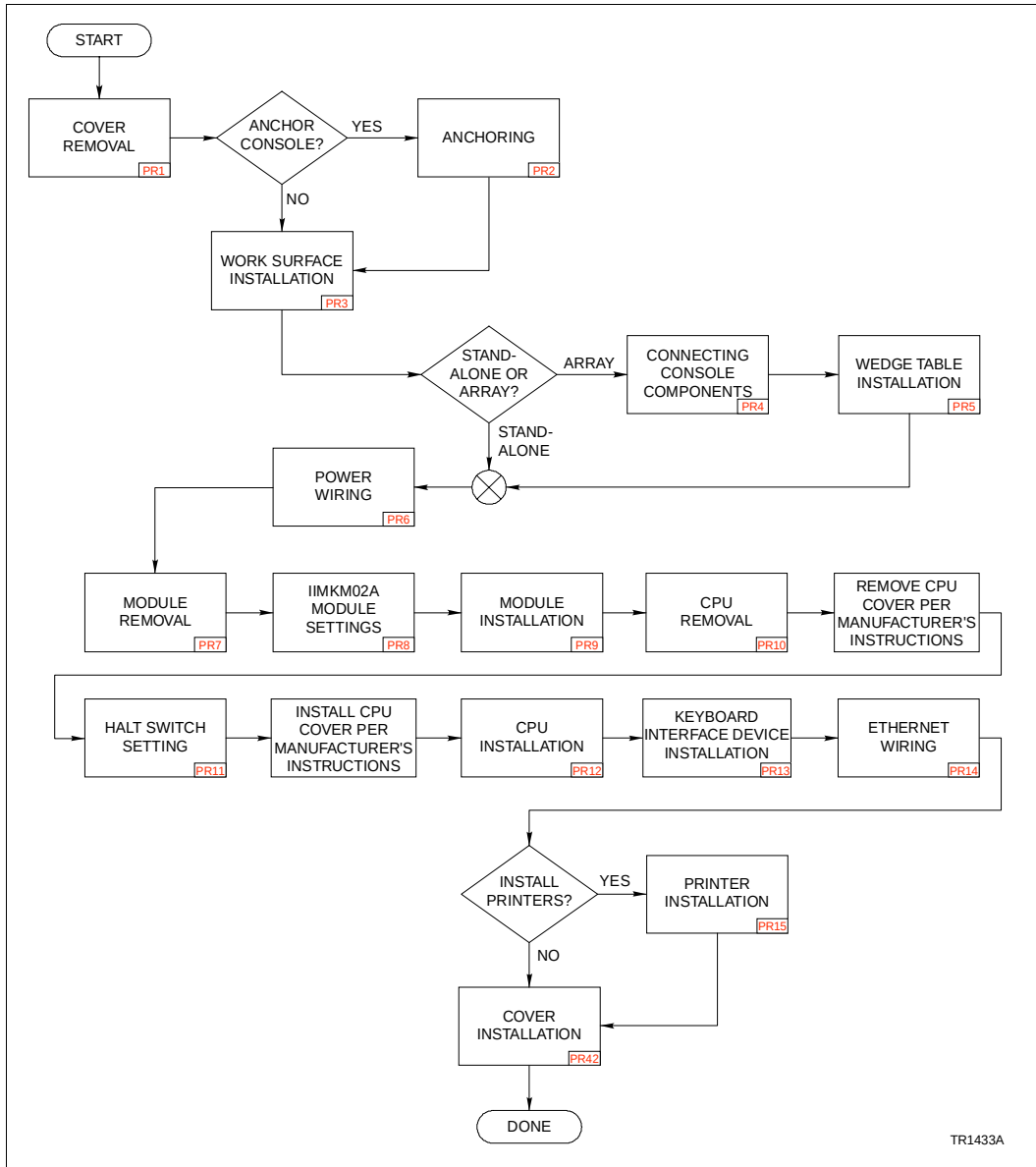


Figure 3-1. Installation Sequence Flowchart



Introduction

This section provides some basic troubleshooting guidelines for the Conductor VMS Series 43 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. Check breaker light on PEP.
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).
Start-up OK but no monitor picture	Check monitor AC power. Check VGA cable. Check monitor SYNC switch (set on VGA). 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.

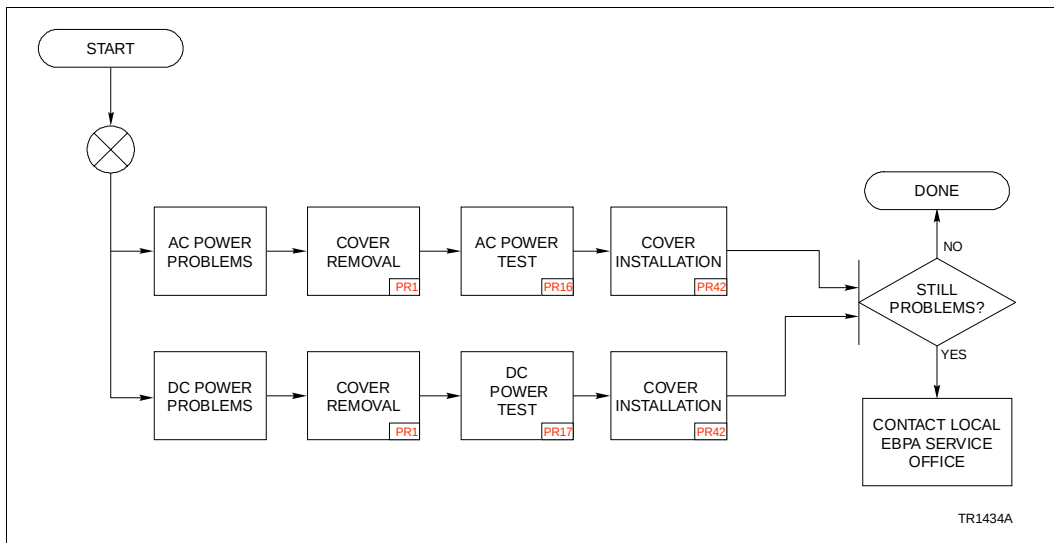


Figure 4-1. Troubleshooting Sequence





Introduction

This section contains a preventive maintenance schedule for the Conductor VMS Series 43 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 workstation, 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 43 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	PR19 PR20 PR21	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.	PR17	
Clean CD ROM drive ¹	N/A	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.	PR18	12 months
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	
Inspect and check the PEP. In high vibration environments testing may be necessary at shorter intervals.	PR22	2 years
Replace power supplies. Call Elsag Bailey sales and service for information.	Figure 6-1	5 years
Complete all appropriate tasks in this table.	N/A	Shutdown

NOTE:

1. Perform this procedure by following the manufacturer's instructions.



Introduction

This section provides repair and replacement procedures for the Conductor VMS Series 43 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.

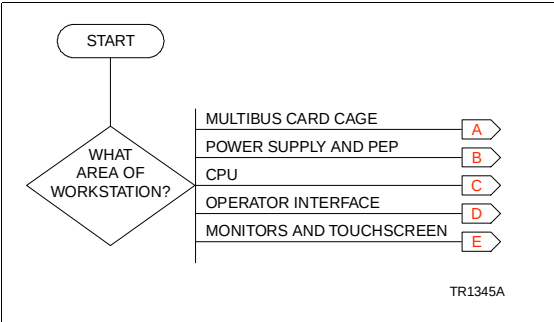


Figure 6-1. Repair and Replacement Sequence Flowchart

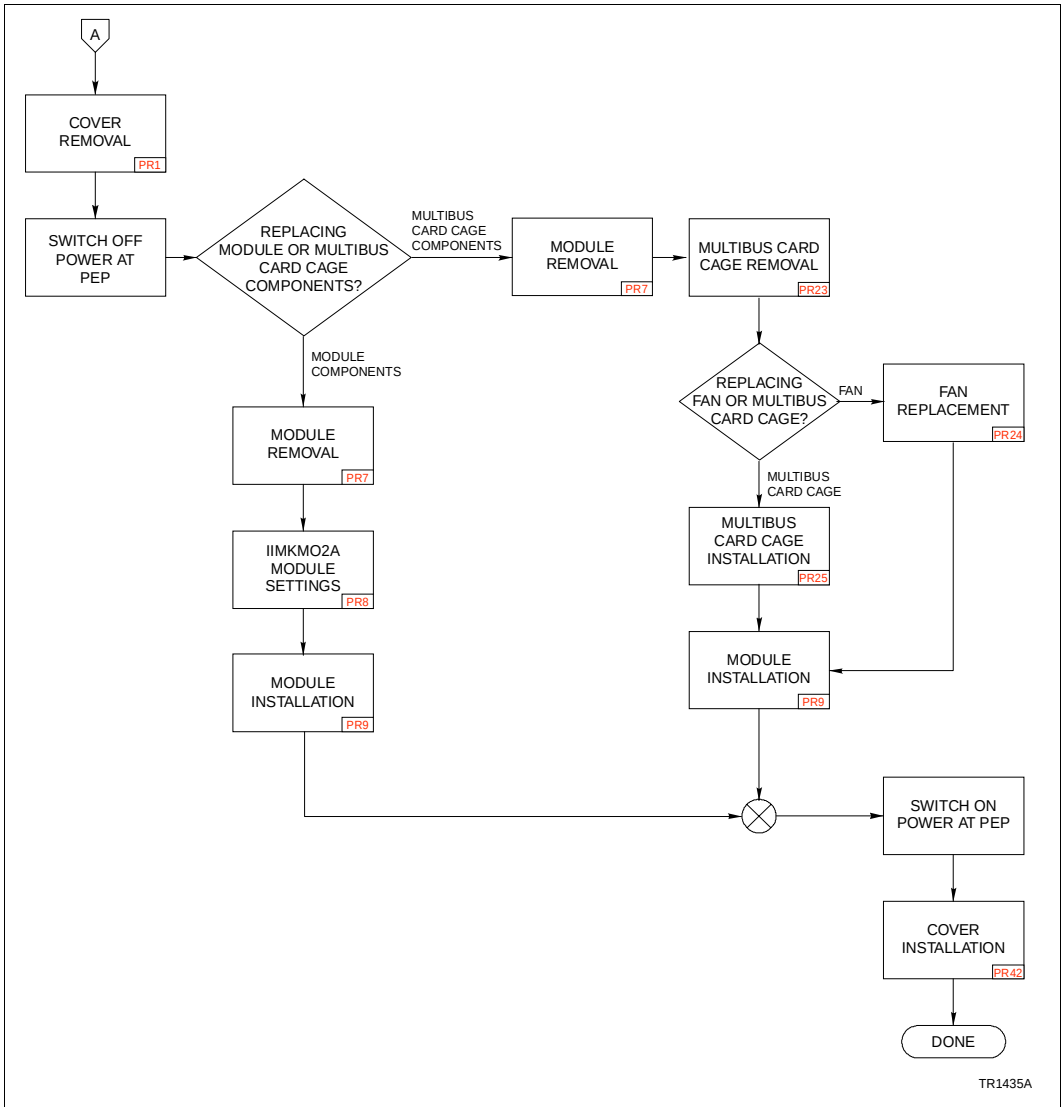


Figure 6-2. Multibus Card Cage

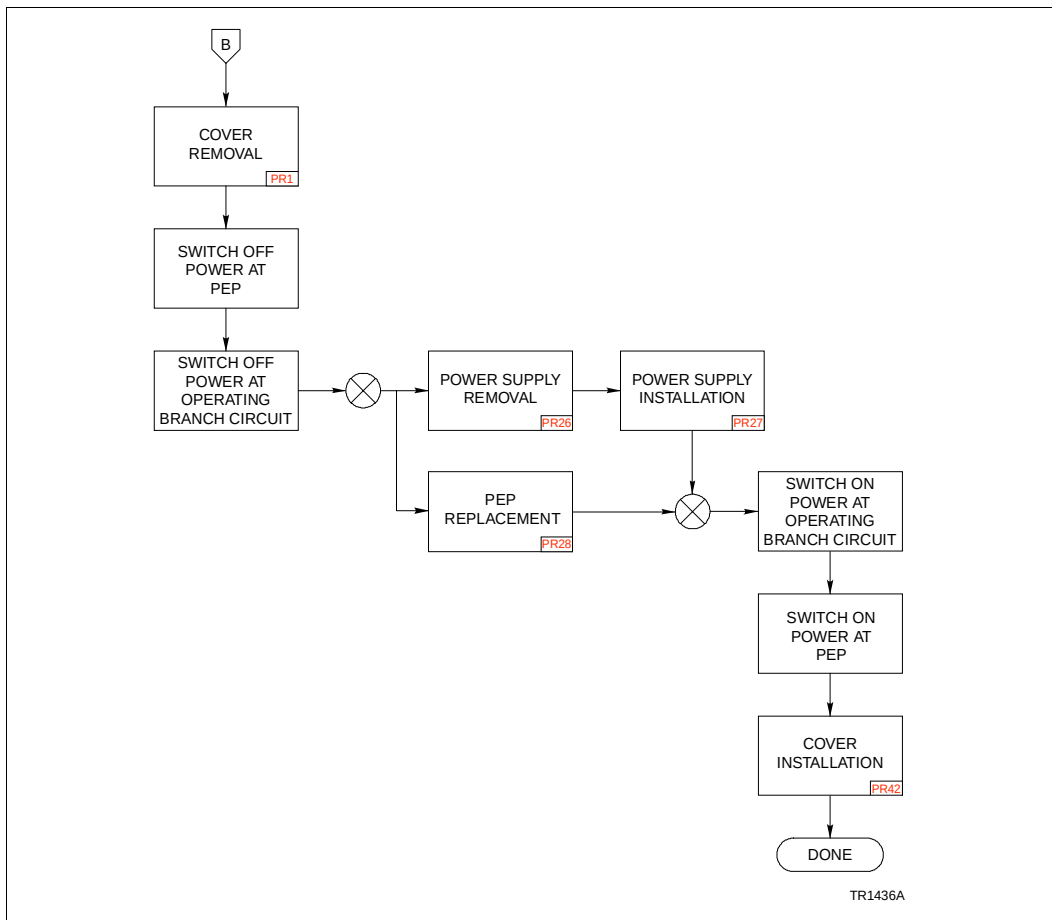
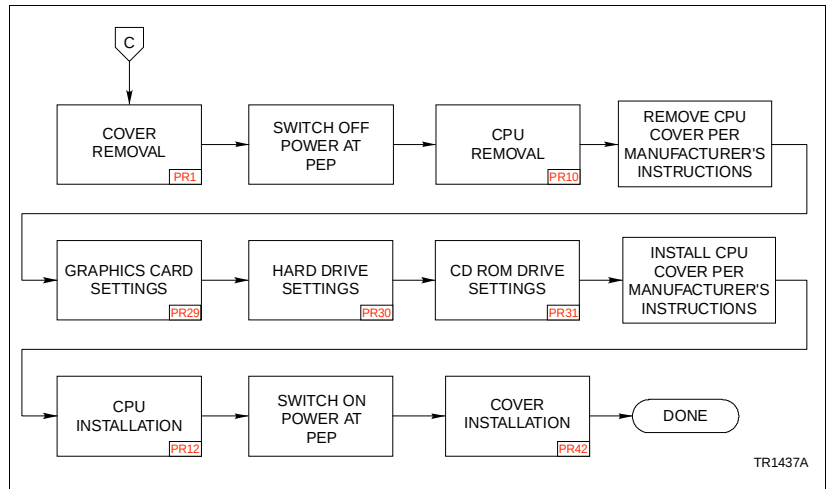


Figure 6-3. Power Supply and PEP

**Figure 6-4. CPU**

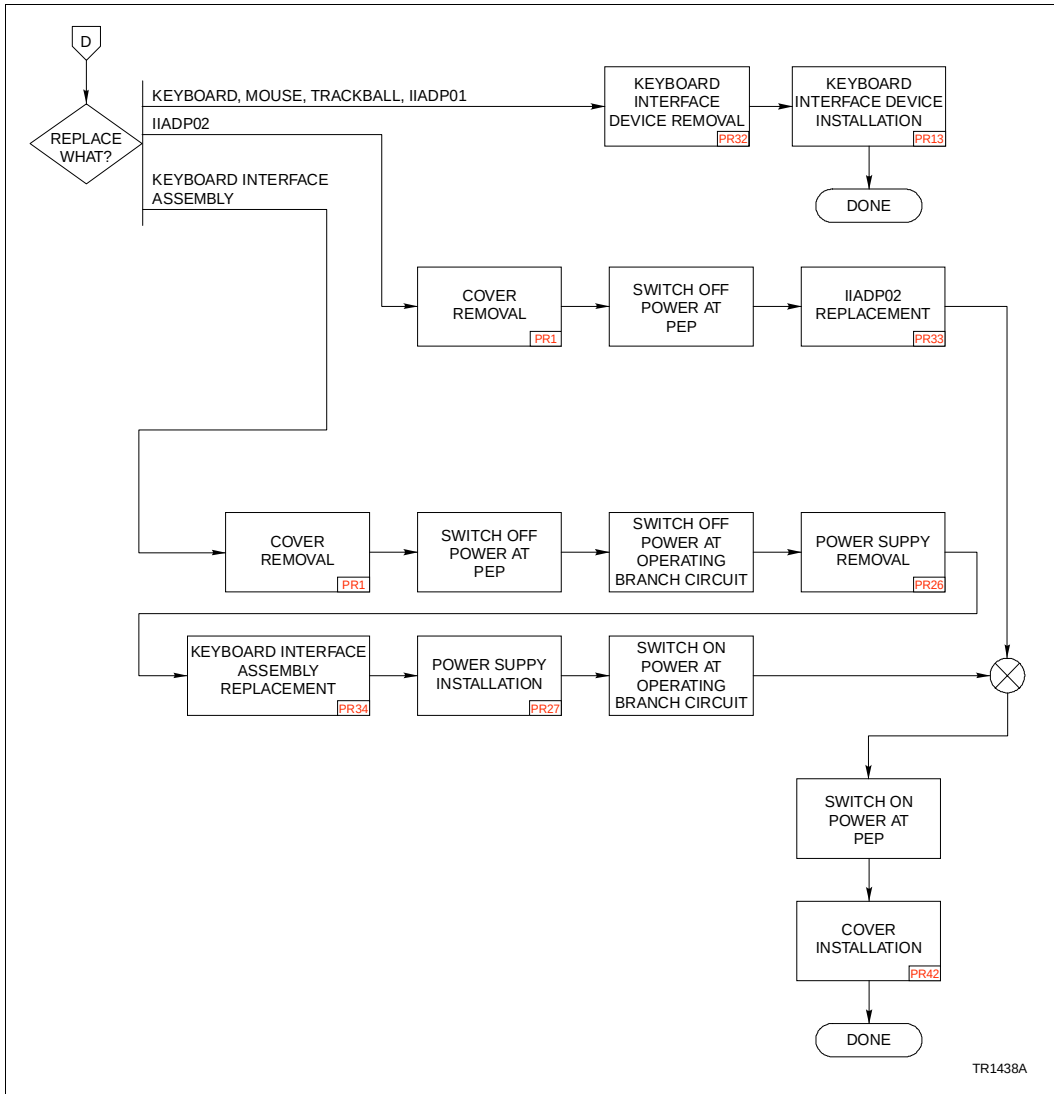


Figure 6-5. Operator Interface



Figure 6-6. Monitors and Touchscreen





Spare Parts

Table 7-1 lists the recommended spare parts for the Conductor VMS Series 43 Auxiliary Terminal.

Table 7-1. Spare Parts (Recommended)

Nomenclature or Part Number	Description
IIADP01	Annunciator display panel, table top
IIADP02	Annunciator display panel, panel mount
IIAKB03A	Keyboard, QWERTY (auxiliary engineering)
IIAMS04A	Mouse
IIATB05	Trackball
IIMKM02A	Multibus keyboard module
1947419?7	Fan 11.43 cm (4-1/2 in)
1948623?9	Monitor (19-inch)
1949009?1	50-Ω thinwire terminator
1949207?5	SCSI cable, 2.5 ft.
1949514?2	Hard disk drive, 1.08 Gbytes
1949514?3	5.25 in., 600 MB CD ROM drive
1949514?4	Graphics board
1949514?5	32-Mbyte SIMM memory
6638353?8	Power entry panel
6638514?1	Keyboard, operator (Mylar)
6638553?5	Power supply
6638554?2	Keyboard interface assembly
6638720?4	Monitor brightness cable (lower monitor)
6638720?5	Monitor brightness cable (upper monitor)
6640639?1	Fan assembly (3-inch)
6642865?3H	CPU - DEC AlphaStation 255, Model 233
1948182?22001	Fuse 2 A, 250V fast acting (keyboard interface board)





Introduction

This appendix contains installation and dimension drawings for various Conductor VMS Series 43 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	Auxiliary terminal installation drawing
A-2	Anchoring dimensions
A-3	Anchoring scheme (typical)
A-4	Cable entry cutouts
A-5	Array installation drawing (typical)
A-6	IICPI01 15° wedge installation drawing
A-7	IICPI02 45° wedge installation drawing
A-8	IICWS01 work and printer surface installation drawing
A-9	IICUC01 utility console installation drawing

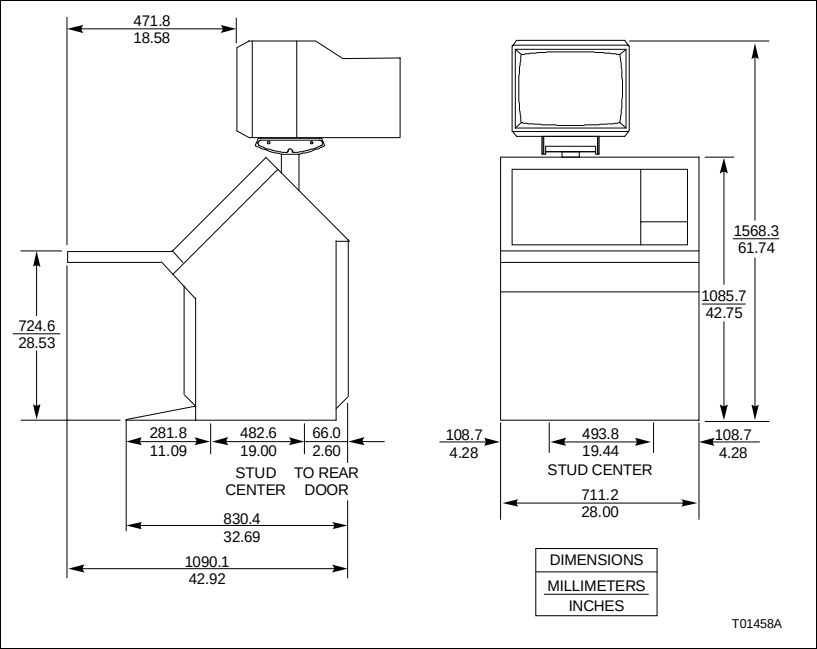


Figure A-1. Auxiliary Terminal Installation Drawing

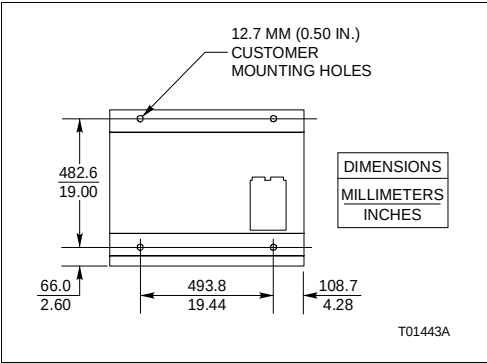


Figure A-2. Anchoring Dimensions

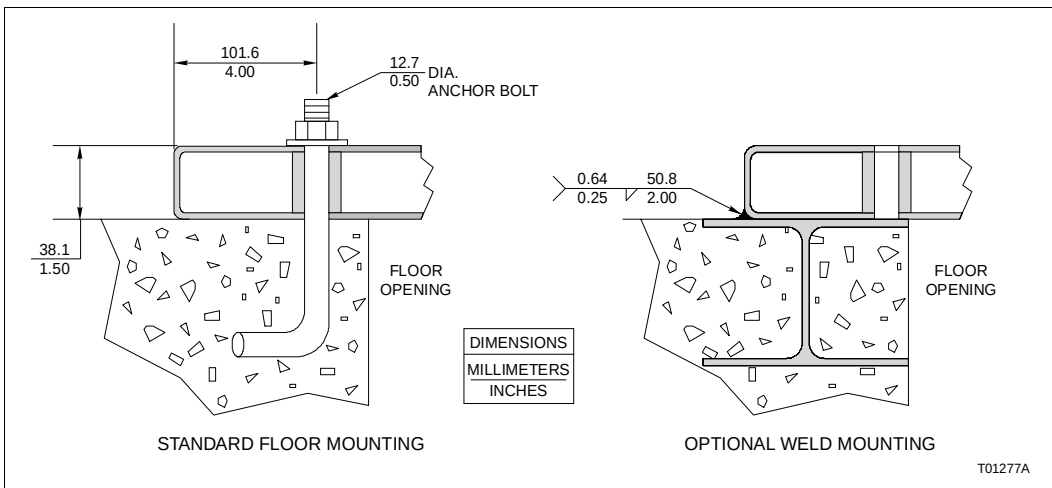


Figure A-3. Anchoring Scheme (Typical)

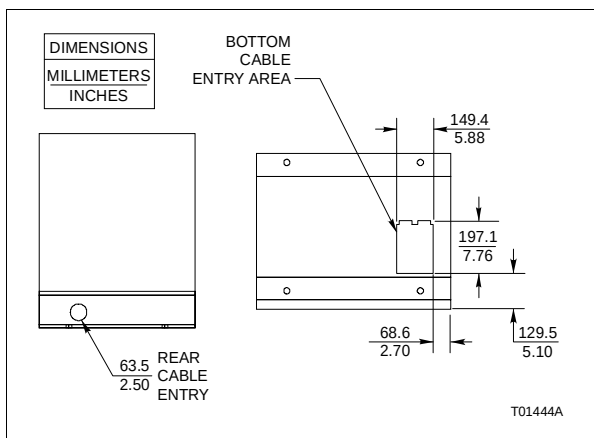


Figure A-4. Cable Entry Cutouts

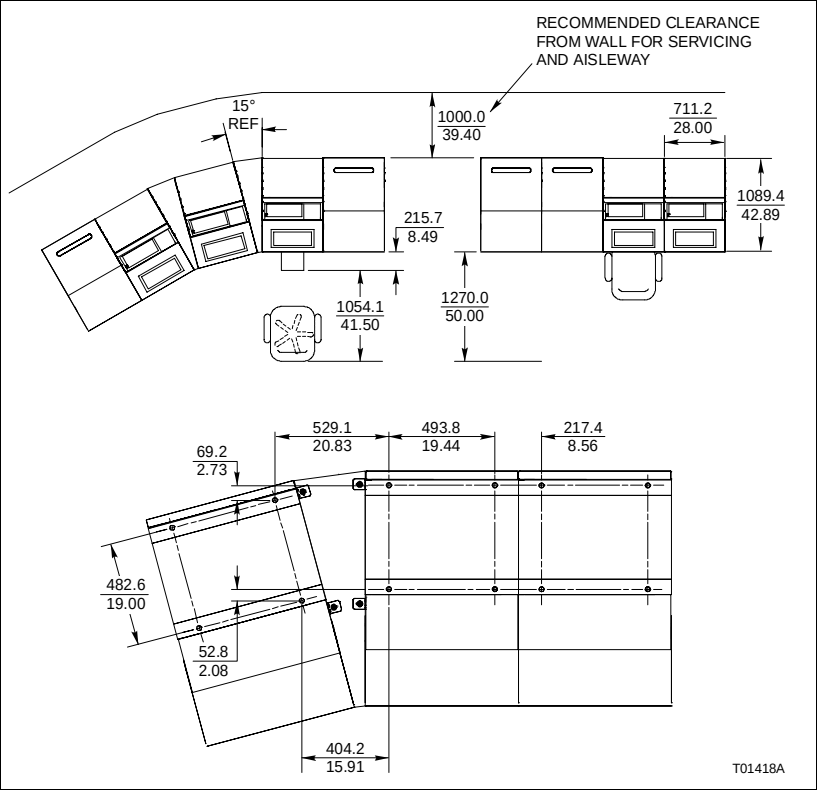
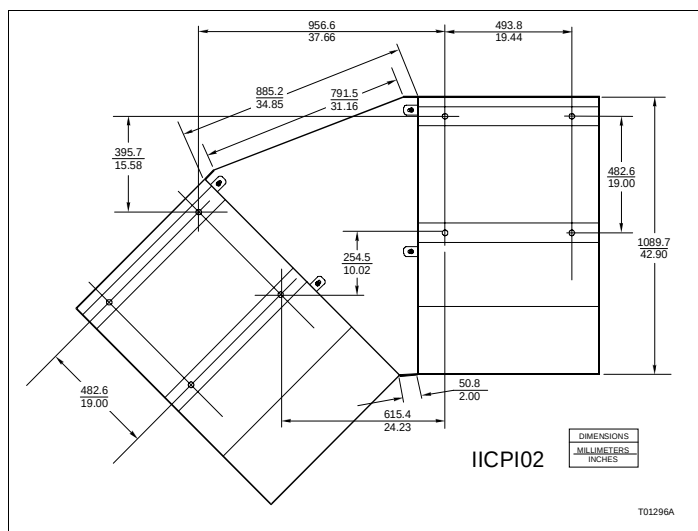
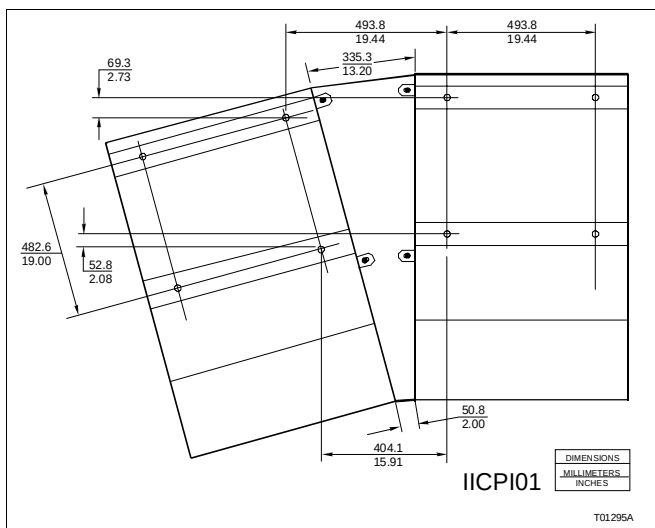


Figure A-5. Array Installation Drawing (Typical)



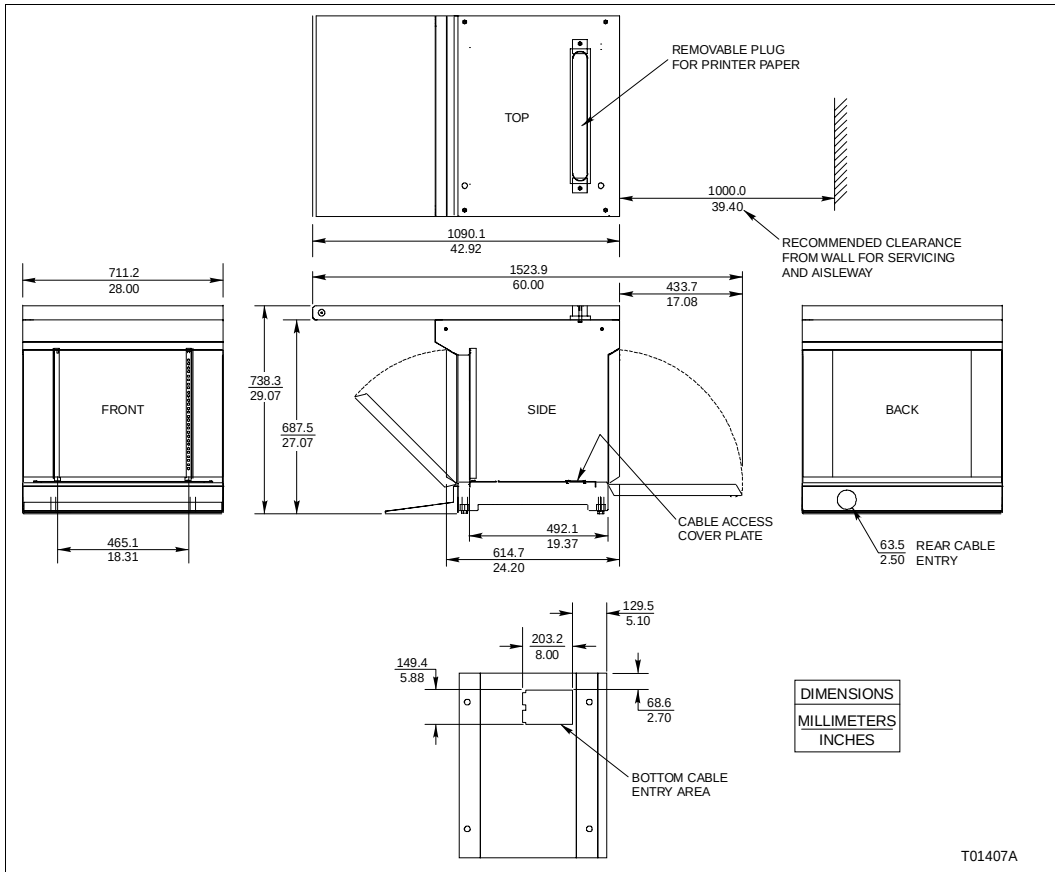


Figure A-8. IICWS01 Work and Printer Surface Installation Drawing

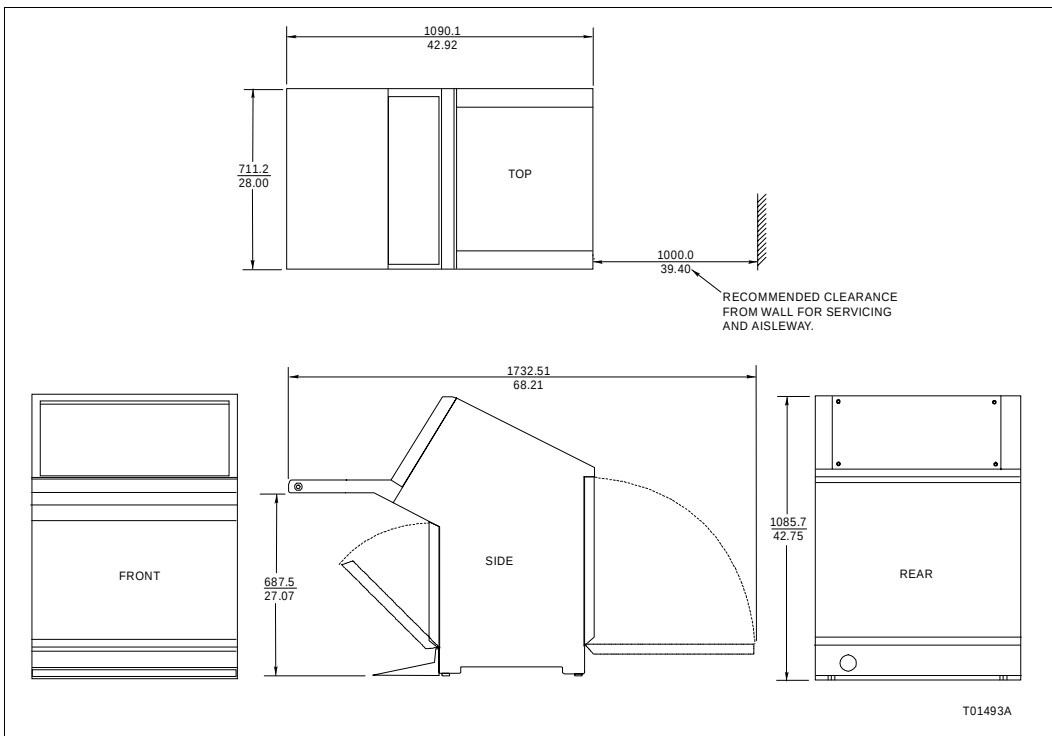


Figure A-9. IICUC01 Utility Console Installation Drawing





Introduction

This appendix contains a factory cabling table and diagram for the Conductor VMS Series 43 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.

Table B-1. Factory Cabling

Cable No. (Fig. B-1)	Part No.	Connect From	Connect To
1	1947950?1	J2 on PEP	AC power in on CPU
2	1947950?5	J3 on PEP	Power connector on monitor 2
3	1947950?	AC power out on CPU	AC power connector on monitor 1
4	6639637?4	P9 on IIMKM02A module	RS-232-C port (Port 2) on CPU
5	6642339?1	P8 on IIMKM02A module	Keyboard port on CPU
6	1949207?5	SCSI port on CPU	SCSI cable (7)
7	6641230?1	Item 6	Peripheral port on PEP
8	6641230?1	P10 on keyboard interface assembly	Mouse port on CPU through adapter
11	6634512?26N72	P5 on IIMKM02A module	P1 on keyboard interface assembly
12	6634512?26N72	P6 on IIMKM02A module	Rear terminal block on PEP
13	6638713?1	P2 on keyboard interface assembly	P3 on DC distribution board
14	6638713?2	P1 on IIADP02 panel	P4 on DC distribution board
15	6638719?1	Reset switch on PEP	P4 on IIMKM02A module
16	6638720?4	Degauss L on PEP	9-pin connector on rear of monitor 1
17	6638720?5	Degauss U on PEP	9-pin connector on rear of monitor 2

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

Cable No. (Fig. B-1)	Part No.	Connect From	Connect To
18	6638849?1	P7 on IIMKM02A module	P8 on keyboard interface assembly and P2 on IIADP02 panel
19	6640113?4	P3 on power supply	P3 on IIMKM02A module
20	6640368?1	P5 on DC distribution board	P5 on multibus card cage backplane
21	6640368?1	P6 on DC distribution board	P6 on multibus card cage backplane
22	6640369?1	P2 on power supply	Terminal strip on DC distribution board
23	6640371?1	J1 on PEP	P1 on power supply
24	6640640?1	P7 on DC distribution board	Cable P2 to fan on multibus card cage, Cable P3 to fan on back door
26	6640640?4	P8 on DC distribution board	Cables P2, P3 and P4 to fan on monitor 2; cables P5 and P6 to fan on monitor 1; cable P7 not used
31	1949138?1	Monitor port on CPU as applicable	VGA port on monitor 1
32	1949138?2	Monitor port on CPU as applicable	VGA port on monitor 2
33	6638710?19	E1 port on PEP	Terminal strip on DC distribution board

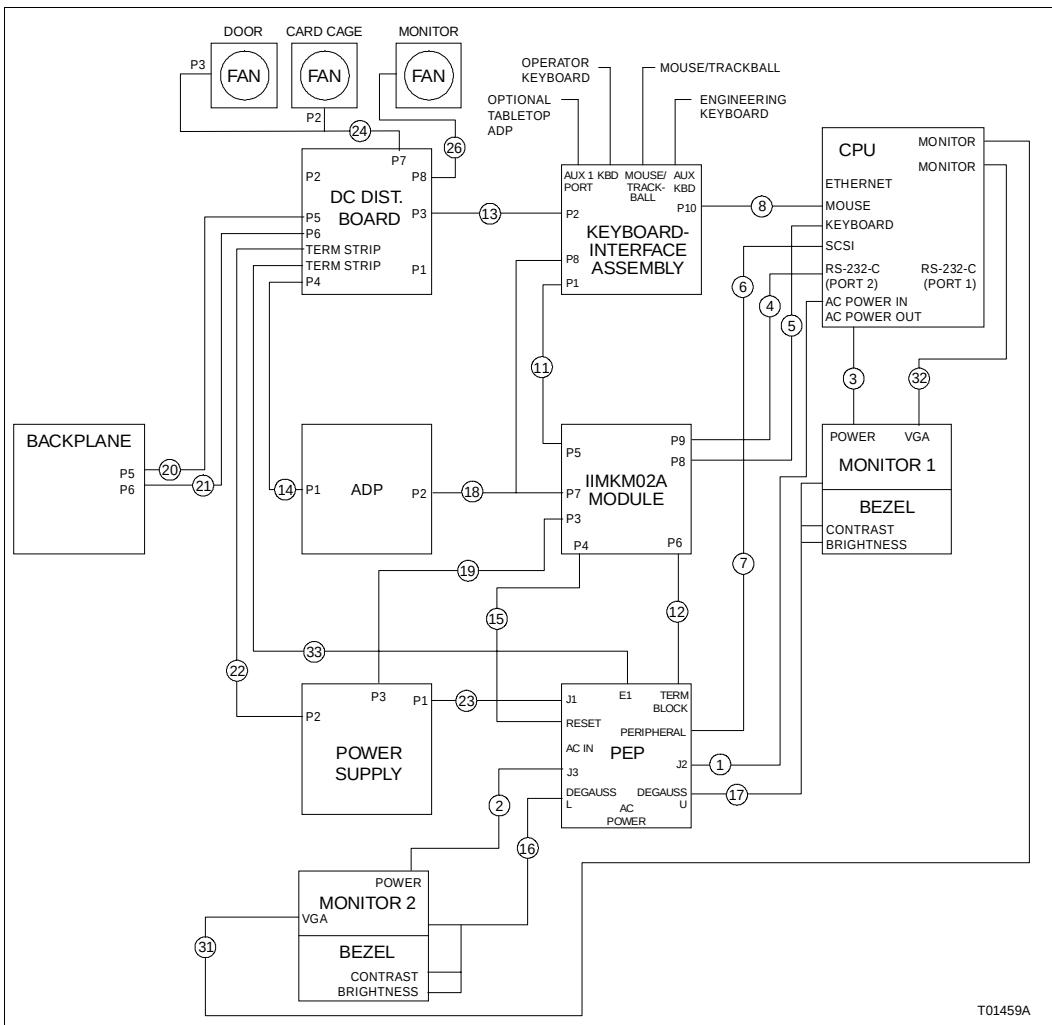


Figure B-1. Factory Cabling





Introduction

This section contains figures providing information at a glance. It is intended for those completely familiar with the Conductor VMS Series 43 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	Auxiliary terminal components - front view
C-2	Auxiliary terminal components - rear view
C-3	IIMKM02A module
C-4	Touchscreen controller card
C-5	Multibus card cage backplane
C-6	CPU halt switch settings
C-7	Graphics card settings
C-8	Hard disk drive settings
C-9	CD ROM drive settings
C-10	Keyboard interface assembly
C-11	IIADP01 panel
C-12	IIADP02 panel
C-13	PEP
C-14	Monitor

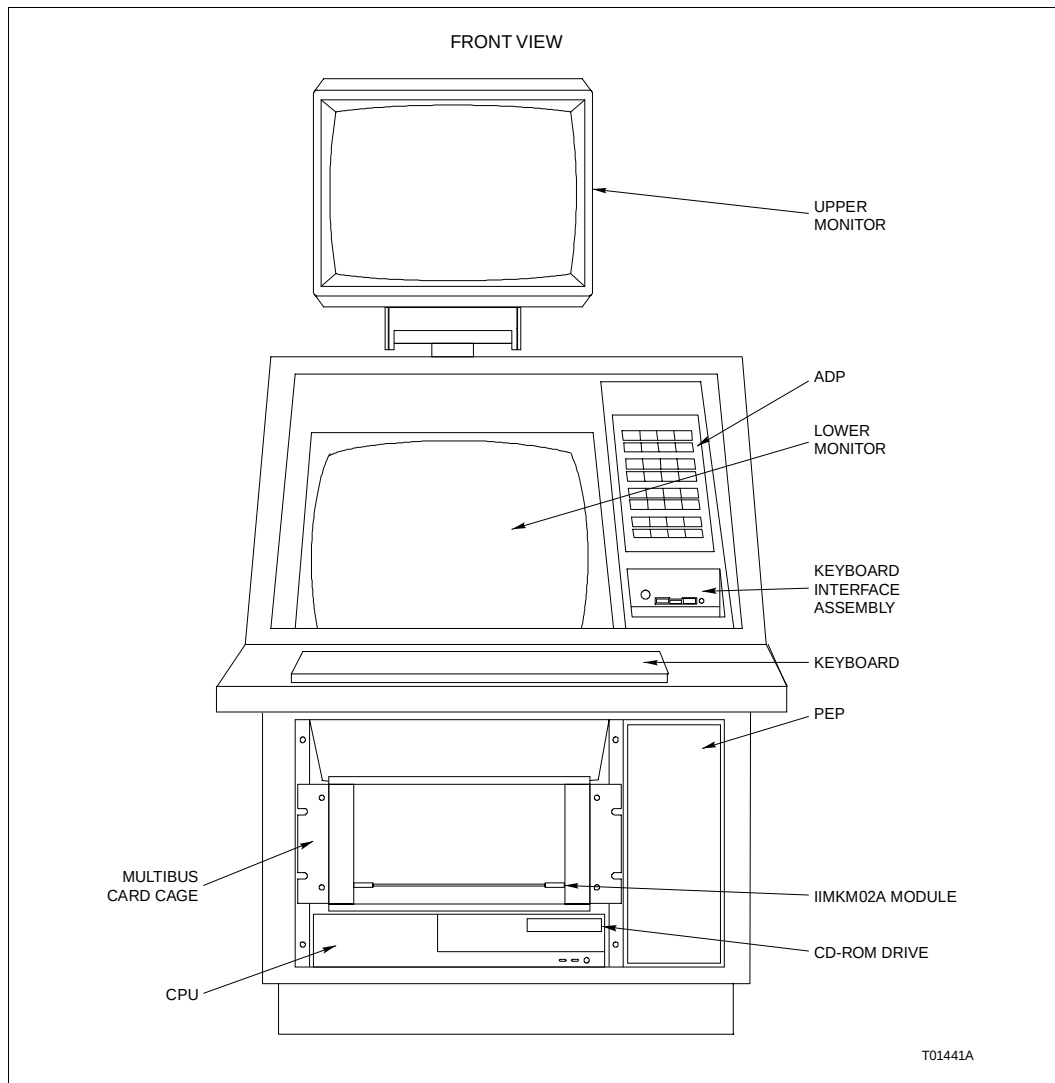


Figure C-1. Auxiliary Terminal Components - Front View

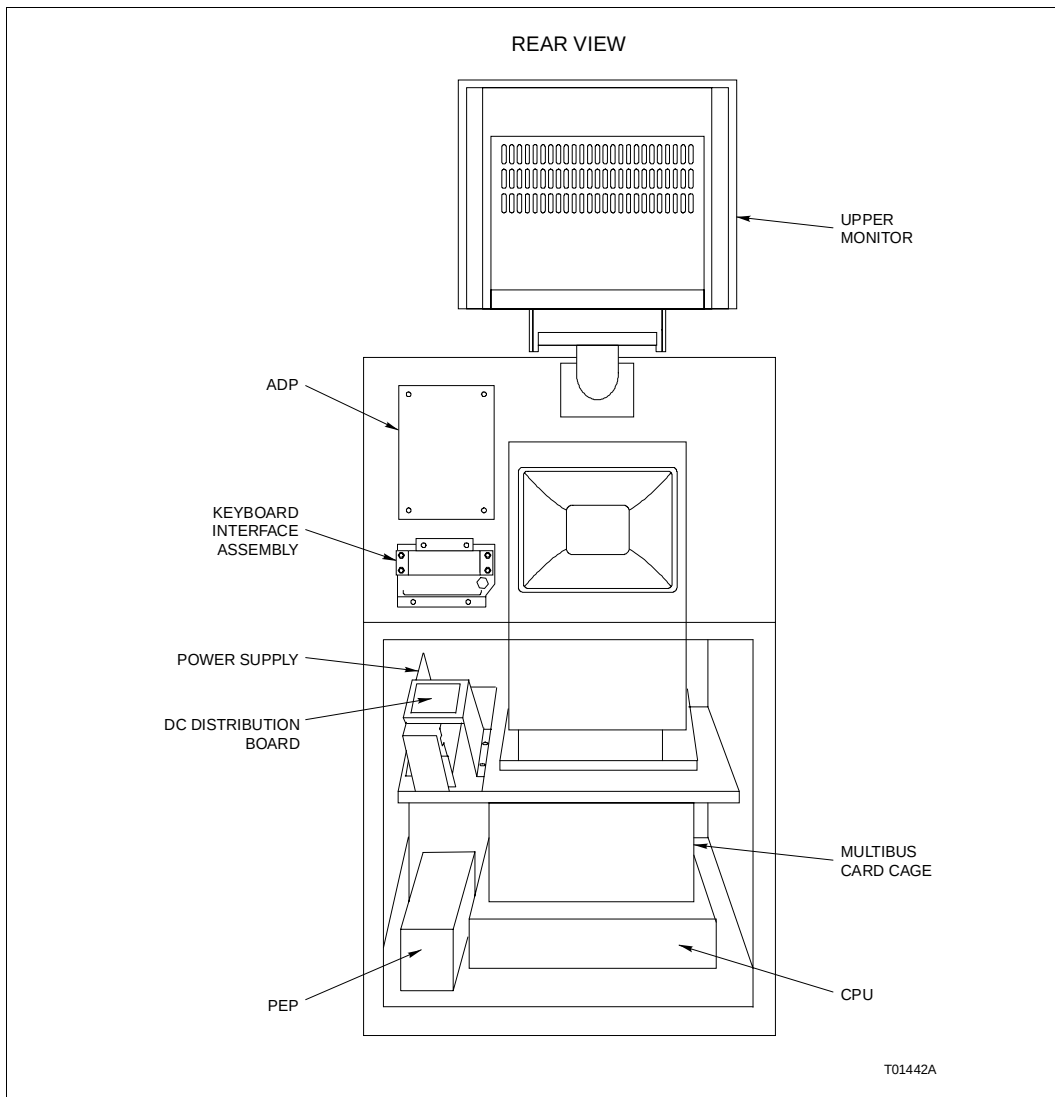


Figure C-2. Auxiliary Terminal Components - Rear View

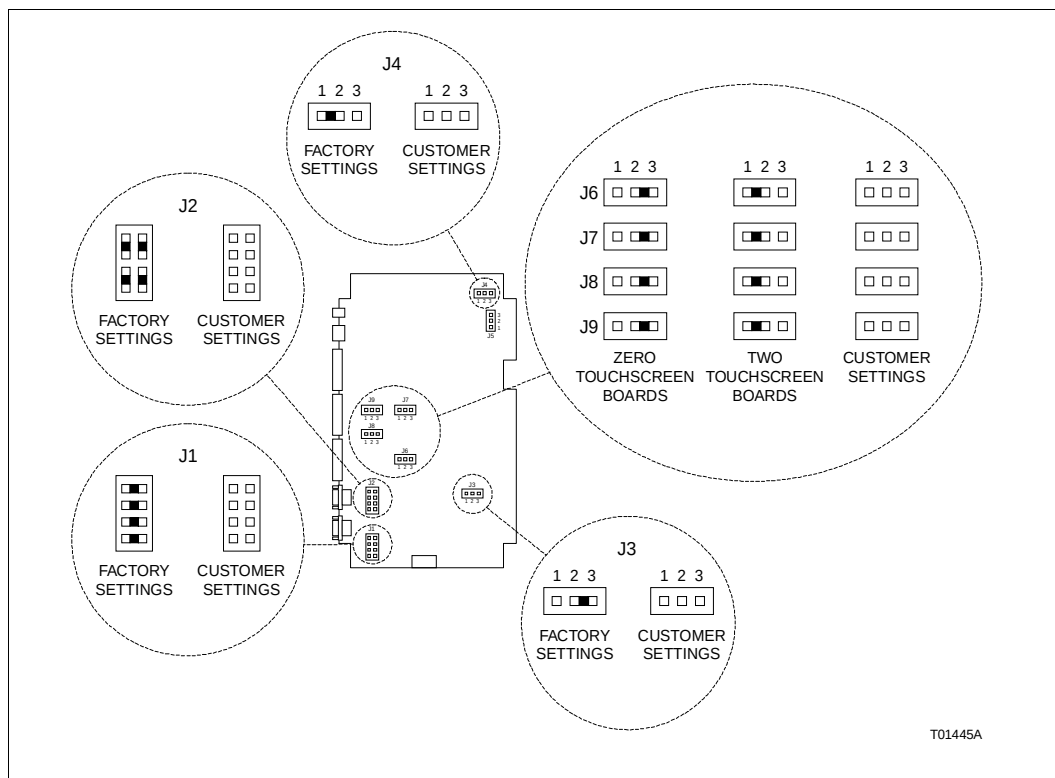


Figure C-3. IIMKM02A Module

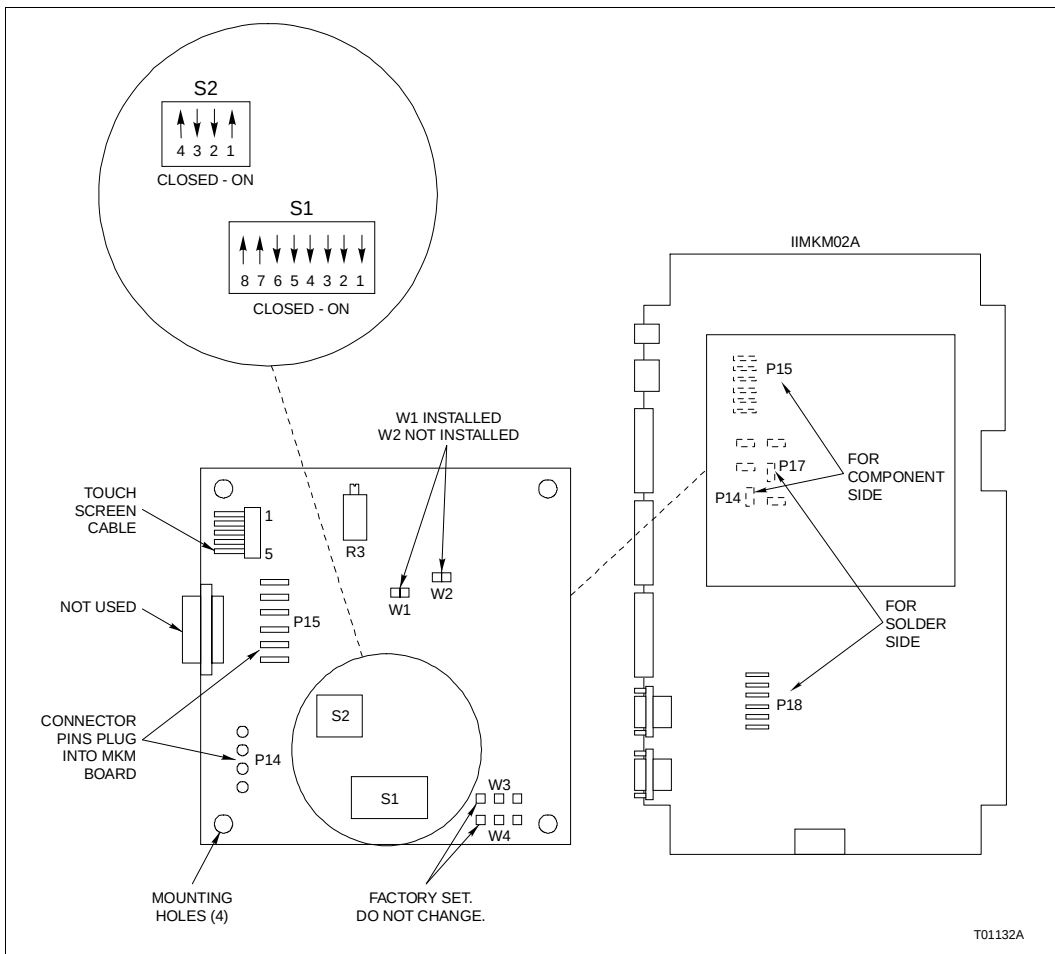


Figure C-4. Touchscreen Controller Card

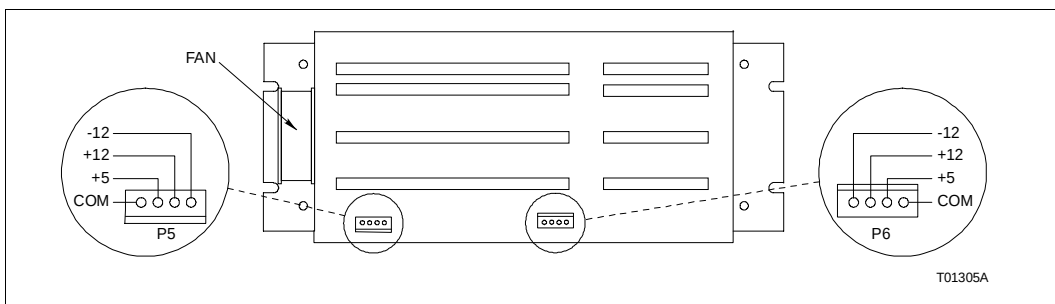


Figure C-5. Multibus Card Cage Backplane

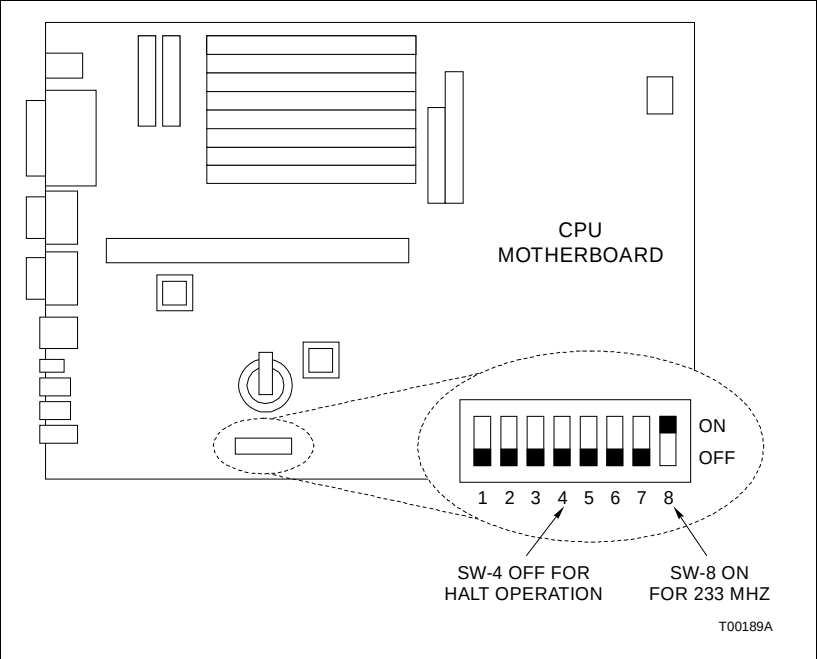


Figure C-6. CPU Halt Switch Settings

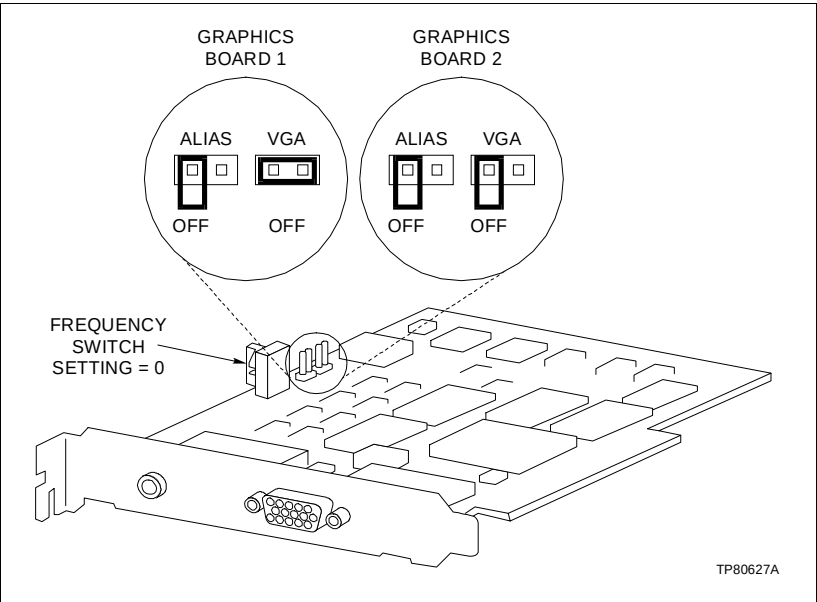


Figure C-7. Graphics Card Settings

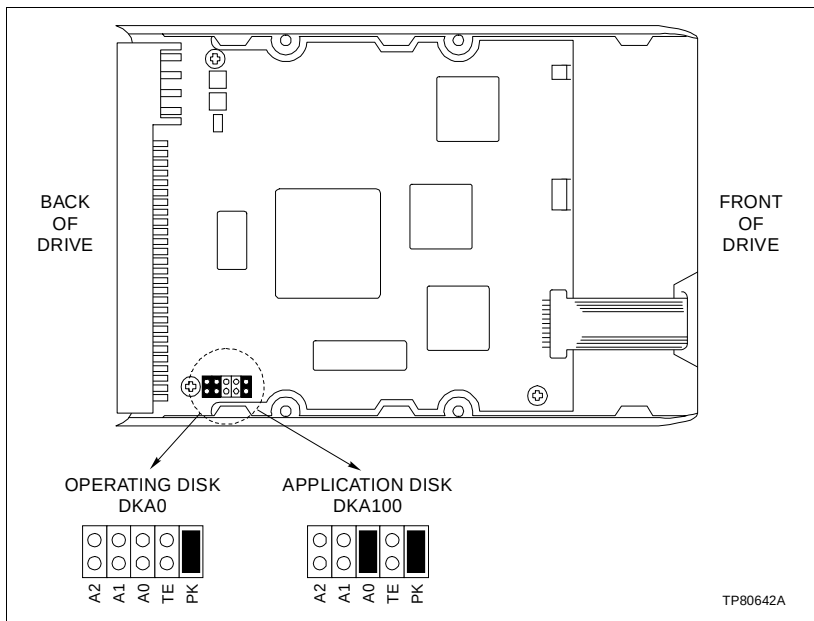


Figure C-8. Hard Disk Drive Settings

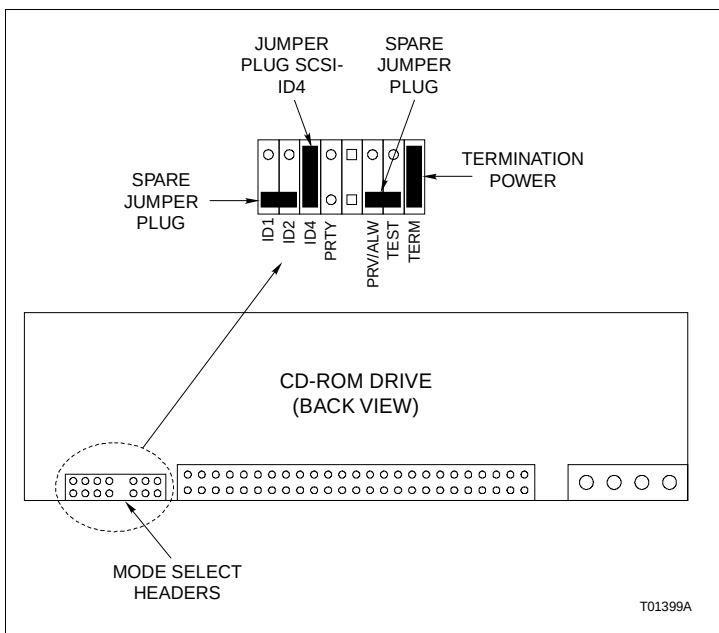


Figure C-9. CD ROM Drive Settings

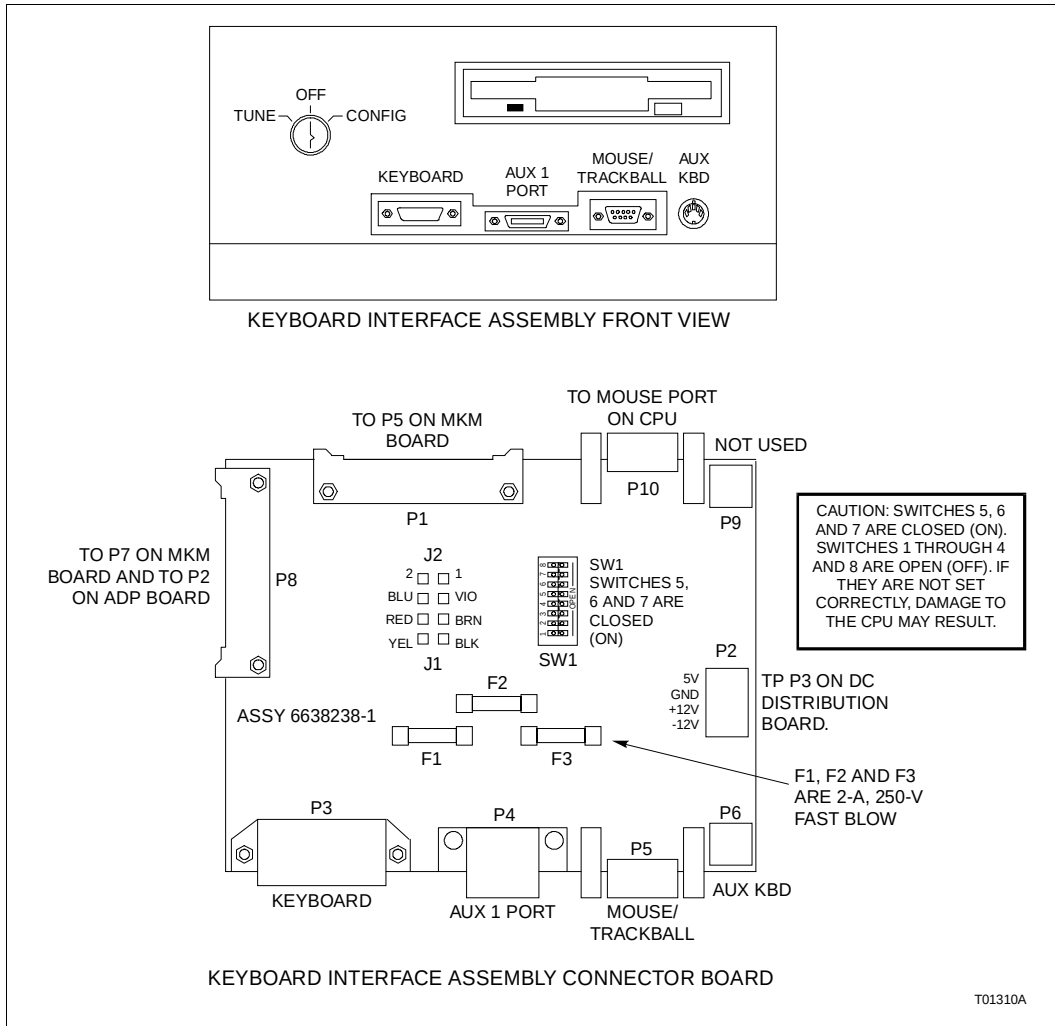
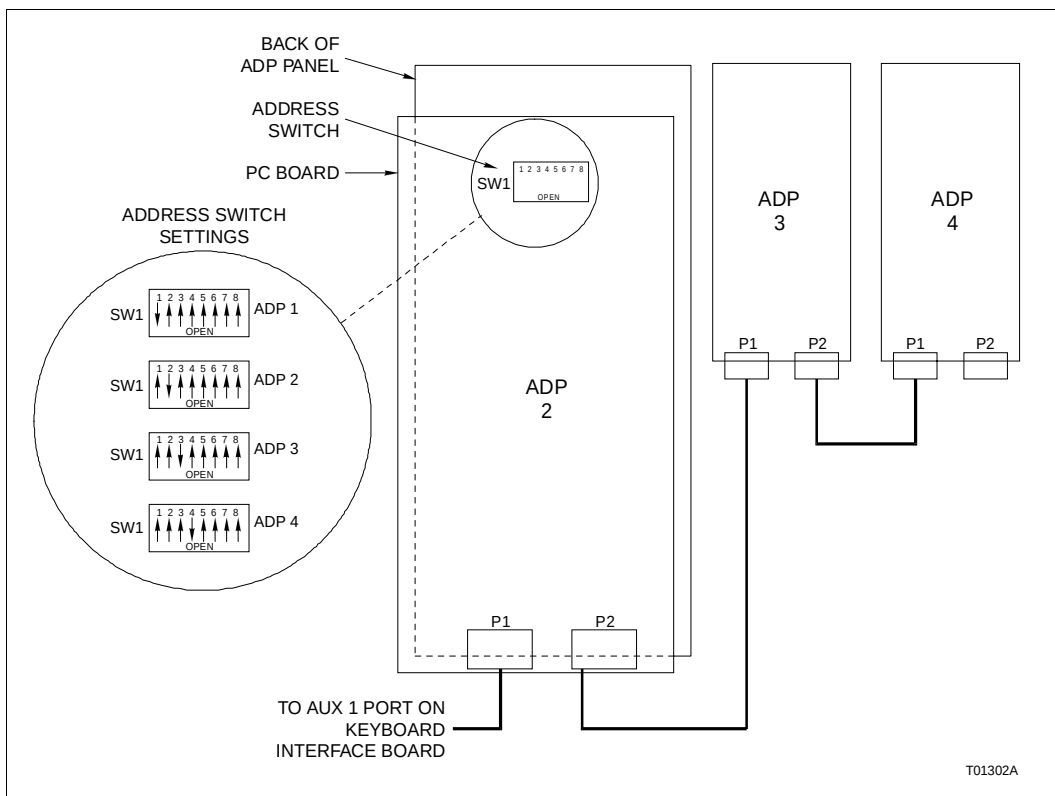


Figure C-10. Keyboard Interface Assembly

**Figure C-11. IIADP01 Panel**

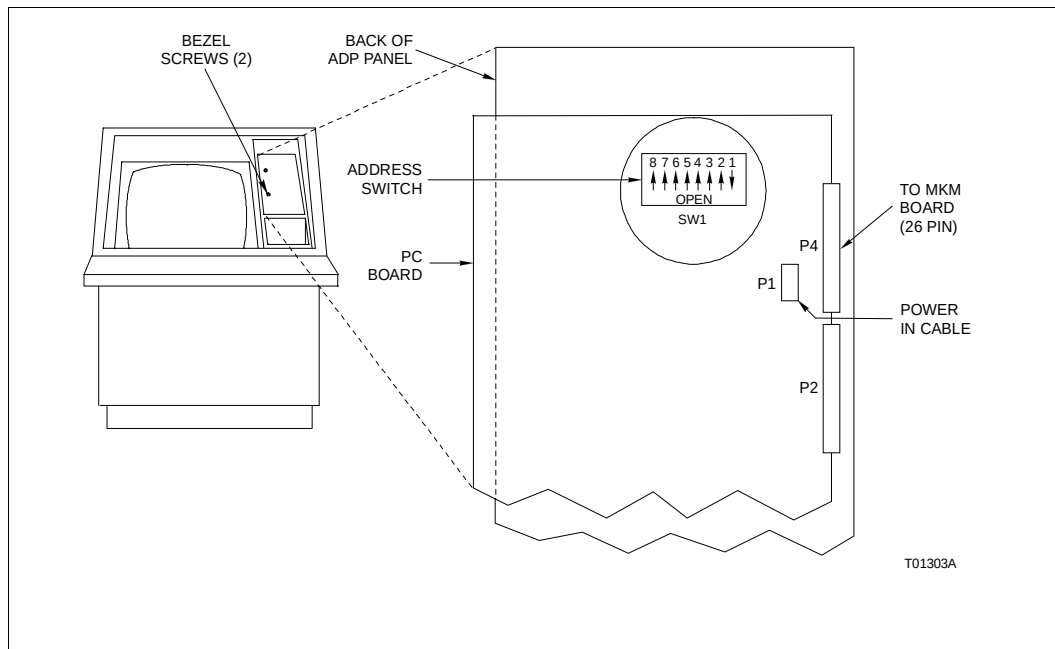
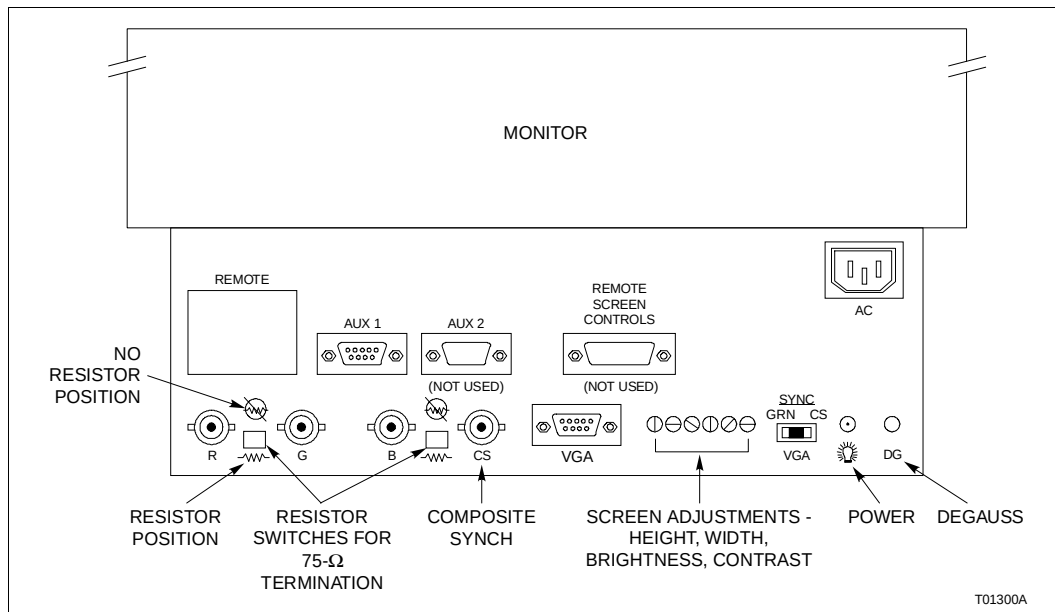


Figure C-12. IIADP02 Panel

**Figure C-14. Monitor**



Purpose/Scope

5 min.

This procedure explains how to remove the doors and top cover from the auxiliary terminal.

Parts None.

Tools

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

Procedure

There are two doors and a top cover on the auxiliary terminal.

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.





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 **PR2-2** 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 auxiliary terminal at the installation site. If supplied with stabilizers, no further securing methods are required. If there are not stabilizers, the auxiliary terminal must 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. The auxiliary terminal dimensions are the same for the auxiliary terminal itself, the work and printer surface, and the utility console. Figure **PR2-2** shows a typical anchoring scheme. This is an example only and may or may not reflect the actual installation.

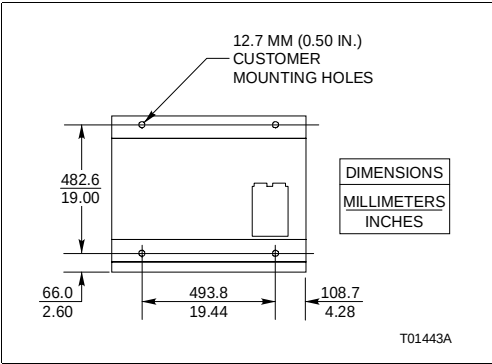


Figure PR2-1. Anchoring Dimensions

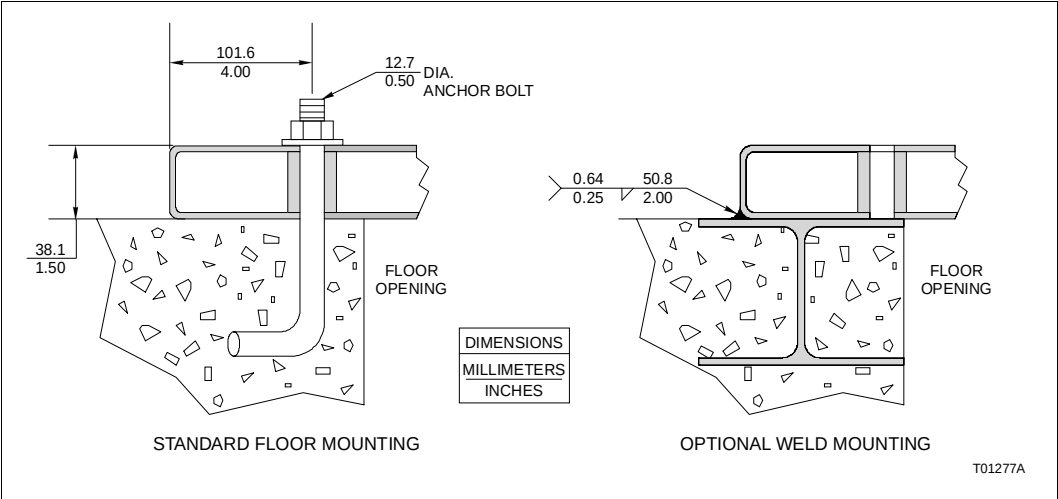


Figure PR2-2. Anchoring Scheme (Typical)



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. PR3-1).

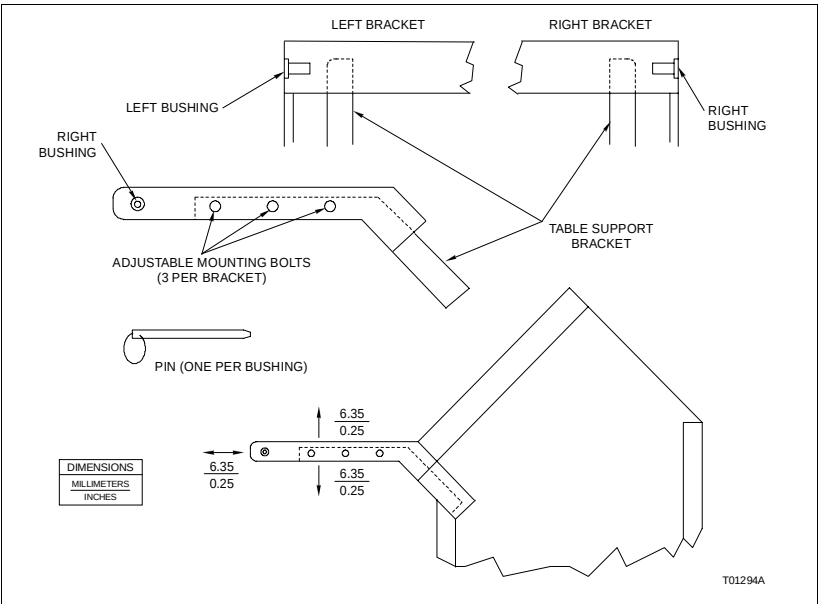


Figure PR3-1. Work Surface Installation



- ☐ 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.

Connecting Console Components



PR4

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 [PR5](#).

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. PR4-1](#)).

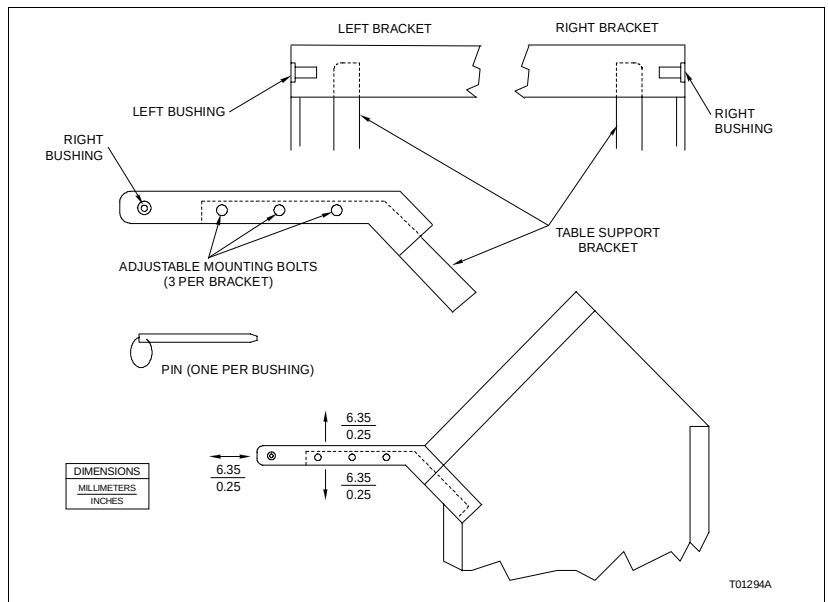


Figure PR4-1. Connecting Console Components



- ☐ 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



PR5

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 [PR5-1](#).
- ☐ 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.

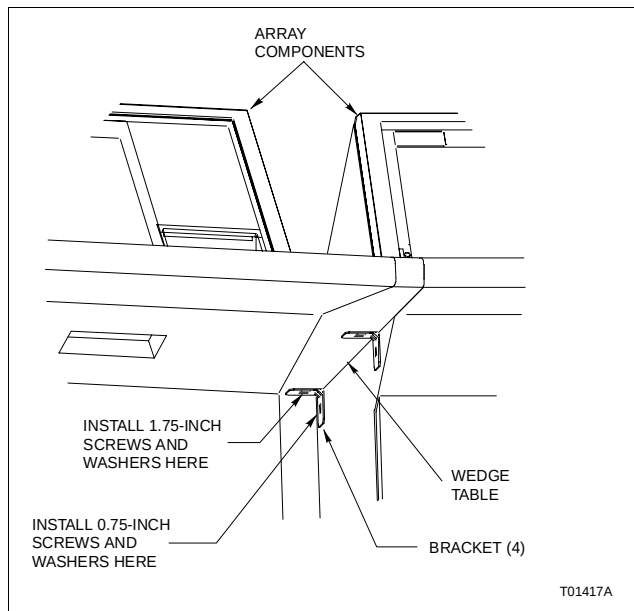


Figure PR5-1. Wedge Table Installation

- ☐ 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 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.

CAUTION

1. Make sure that all voltage labels and voltage switch settings on the peripheral devices, power supply, and power entry panel show the correct operating voltage. Equipment damage may result if the incorrect voltage is connected. Make sure the console main power circuit breaker is off before changing operating voltage settings or equipment damage may result.

Procedure

The AC power input connects to a terminal block on the PEP. The auxiliary terminal can operate on 120/240 VAC, 50/60 Hertz. The PEP provides line filtering, transient suppression and a 20-amp circuit breaker.

The power supply is autosensing as is the monitor; however, the CPU must be in the proper position depending on the input voltage.

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



The recommended minimum wire size is that with a 2.1 square millimeter cross section (14 AWG). It should be copper and have a 600-volt, 75-degree Celsius (167-degree Fahrenheit) rating with thermoplastic insulation. Wire with a rating of 300 volts or 150 volts 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 have 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 auxiliary terminal. The typical inrush current is 53.3 amps at 120 VAC and 64.8 amps at 240 VAC.

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

- ☐  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 auxiliary terminal. Figure **PR6-1** shows the location of the 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 **PR6-2**.
- ☐ 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.
- ☐  5. Verify that the voltage setting on the rear of the CPU is set to the proper input voltage level (Fig. **PR6-3**).

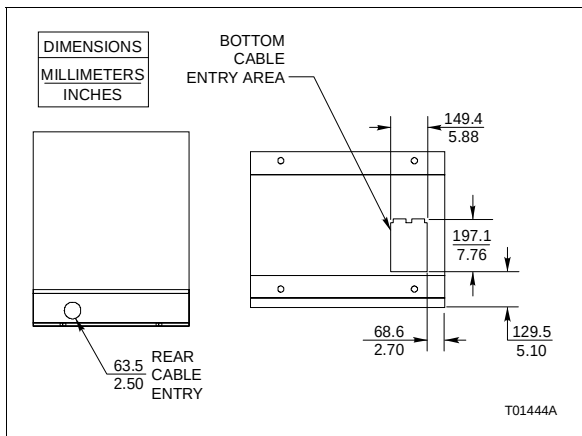


Figure PR6-1. Cable Entry Cutouts

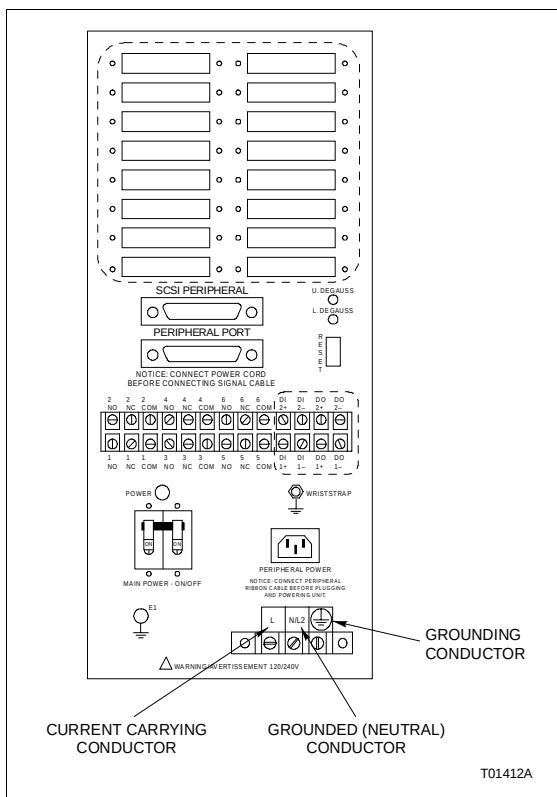


Figure PR6-2. Power Wiring

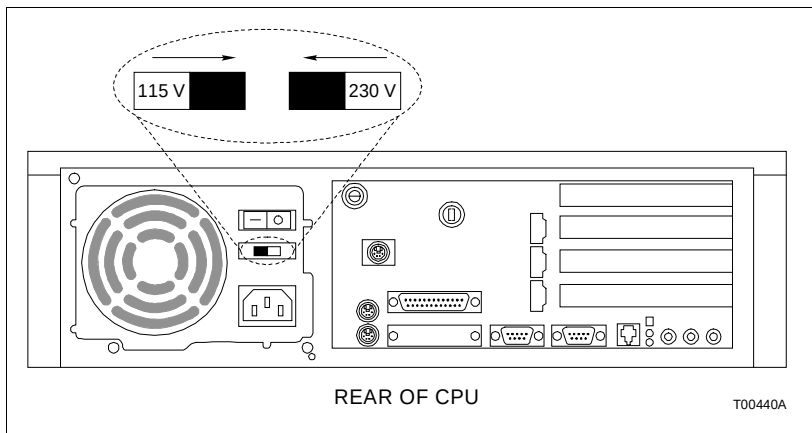


Figure PR6-3. CPU Input Voltage



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.



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 [PR7-1](#) shows the location of the module in the multibus card cage.



6. Remove and label all cables from the module.

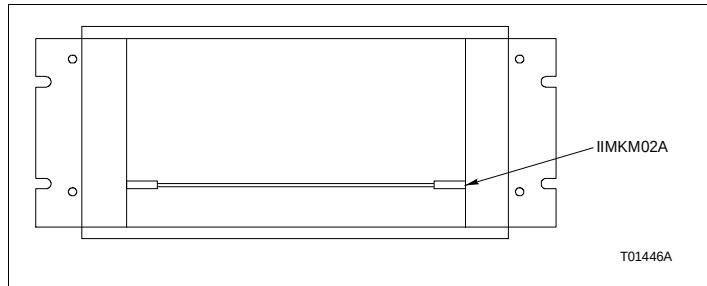


Figure PR7-1. Module Location

- ☐ 7. Pull out on the two tabs on each side of the module to release it.
- ☐ 8. Remove the module.



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 PR8-1 and Figure PR8-1 and set the jumpers as desired, filling in the customer settings in Table PR8-1 and Figure PR8-1.

NOTE: The bold entries in Table PR8-1 and the settings shown Figure PR8-1 indicate factory settings.

Table PR8-1. 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 PR8-1. 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	1-2	One or two touchscreen boards	
	2-3	Zero touchscreen boards	
J7 ²	1-2	Two touchscreen boards	
	2-3	One or zero touchscreen boards	
J8 ²	1-2	One or two touchscreen boards	
	2-3	Zero touchscreen boards	
J9 ²	1-2	Two touchscreen boards	
	2-3	One or zero touchscreen boards	

NOTE:

1. Bold items indicate factory settings.
2. Factory settings for J6 through J9 depend on whether or not touchscreens were ordered.

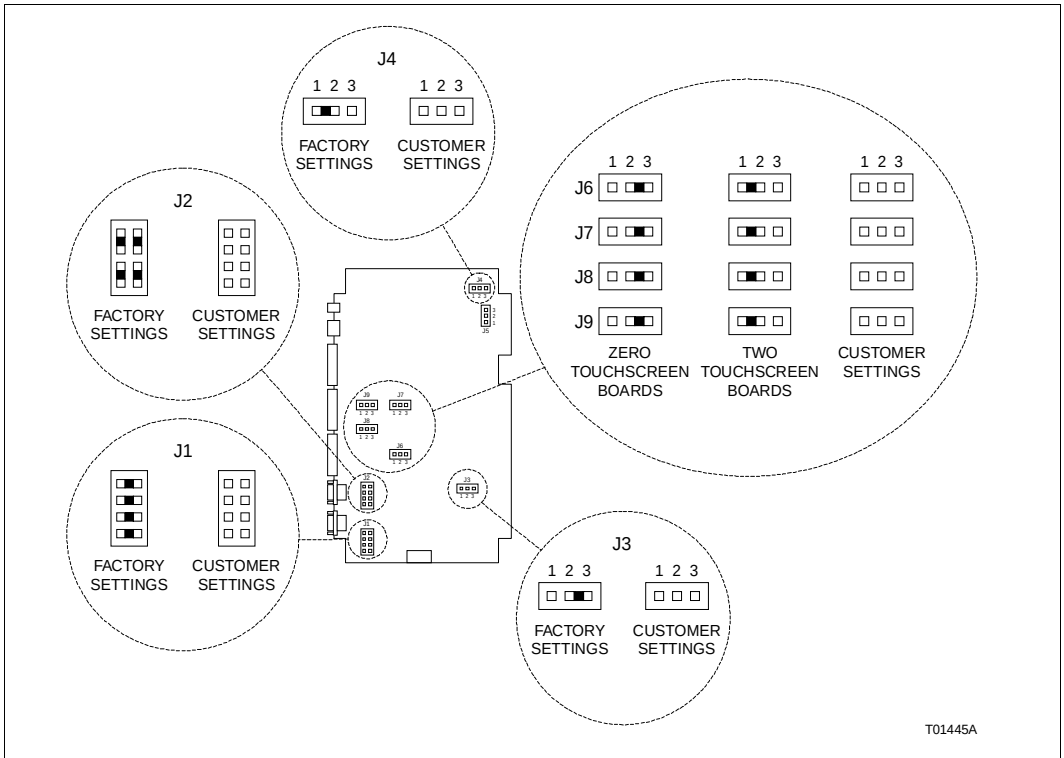


Figure PR8-1. IIMKM02A Module





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.



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 PR9-1 shows the location of the module in the multi-bus card cage.

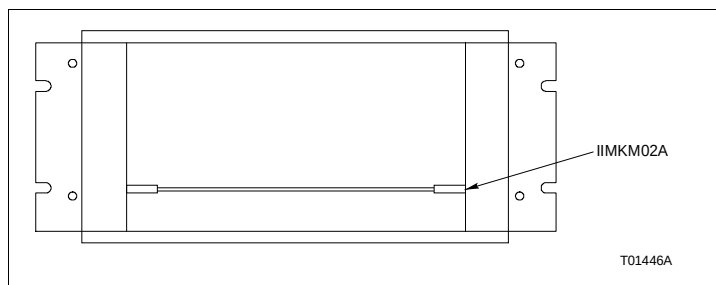


Figure PR9-1. Module Location



- ☐ 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.



Purpose/Scope

10 min.

This procedure explains how remove the CPU.

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

This procedure contains removal instructions for the CPU. If a hard drive or CD ROM drive needs replaced, refer to the **DEC User Information** manual shipped with the auxiliary terminal and to the appropriate procedures in this instruction.

The CPU has a lithium battery located on the mother board. This battery supplies power to the real time clock while the system is in the unpowered state. Refer to the **DEC User Information** manual for important and cautionary information on replacing the battery. System configuration and setup data must be verified after battery replacement.

The CPU is mounted horizontally in the auxiliary terminal and is attached to a mounting plate. To remove the CPU:



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. **PR10-1**).

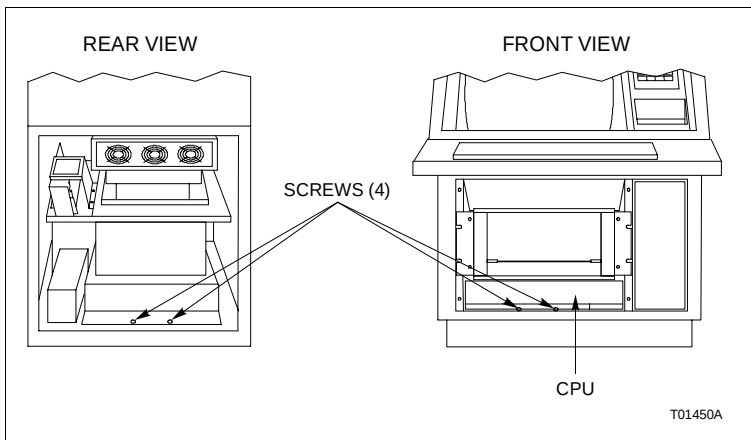


Figure PR10-1. CPU Removal

- ☐ 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.



Purpose/Scope

20 min.

This procedure explains how to verify or set the CPU HALT switch setting on the CPU motherboard. Before putting the auxiliary terminal into service, check the CPU HALT switch setting on the CPU motherboard to make certain it is correct. Use the CPU HALT button if the auxiliary terminal does not respond.

NOTE: Pressing the HALT button on the CPU halts the CPU and the screen displays the >>> prompt. This requires typing **B** and **RETURN** from the engineering or operator keyboard in order to boot the system into the main window. A system boot takes approximately ten minutes.

Parts None.

Tools As required per documentation supplied with CPU.

Procedure

- ☐ 1. Refer to the documentation supplied with the CPU to gain access to the CPU motherboard.
- ☐ 2. If SW-4 on the CPU motherboard is set to OFF, the reset button on the front of the CPU becomes a HALT button. Refer to Figure **PR11-1** and check or set switch SW-4 as shown.
- ☐ 3. Refer to the documentation supplied with the CPU and close the CPU case.

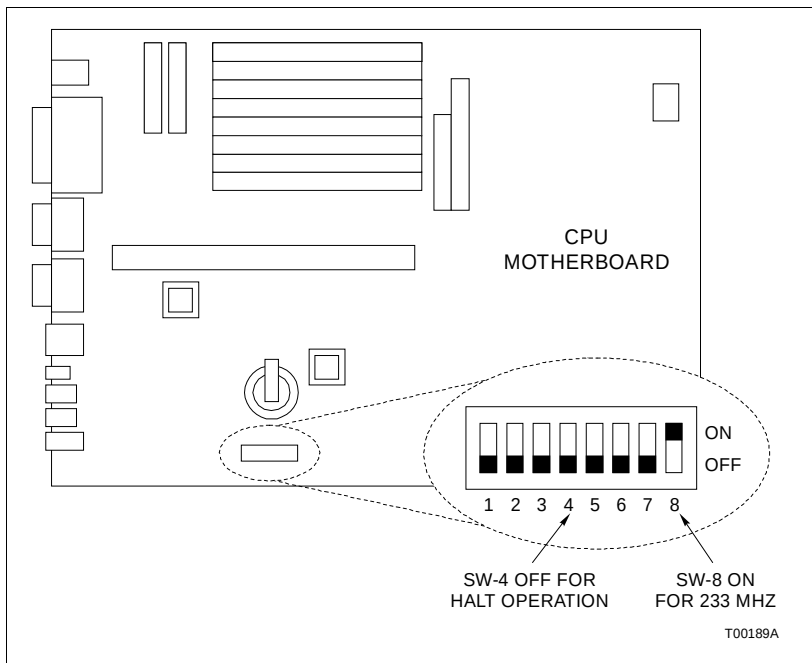


Figure PR11-1. HALT Switch Setting



Purpose/Scope

10 min.

This procedure explains how install the CPU.

Parts

Number	Qty	Description
6642865?3	1	CPU assembly, AlphaStation 255 model 233

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.

CAUTION

1. Make sure that all voltage labels and voltage switch settings on the peripheral devices, power supply, and power entry panel show the correct operating voltage. Equipment damage may result if the incorrect voltage is connected. Make sure the console main power circuit breaker is off before changing operating voltage settings or equipment damage may result.

Procedure

This procedure contains installation instructions for the CPU. If a hard drive, CD ROM drive or graphics card needs replaced, refer to the **DEC User Information** manual shipped with the auxiliary terminal and to the appropriate procedures in this instruction.

The CPU has a lithium battery located on the mother board. This battery supplies power to the real time clock while the system is in the unpowered state. Refer to the **DEC User Information** manual for important and cautionary information on



replacing the battery. System configuration and setup data must be verified after battery replacement.

The CPU mounts horizontally in the auxiliary terminal and is attached to a mounting plate. To install the CPU:

- ☐  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 input voltage switch setting on the rear of the CPU (Fig. **PR12-1**) is set to the proper input voltage level.

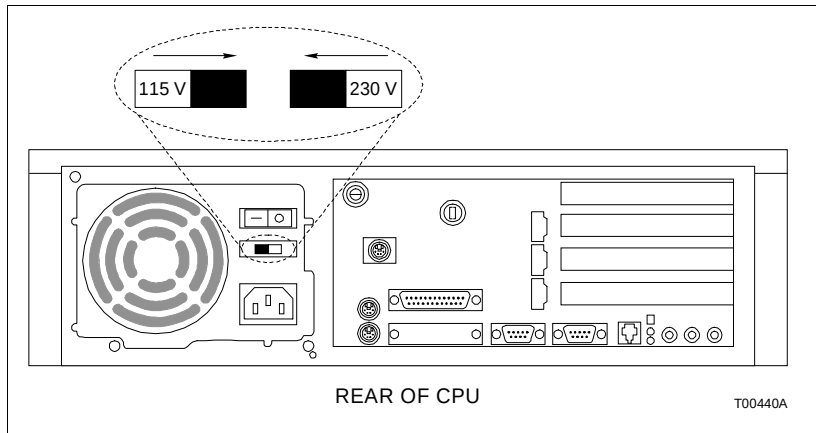


Figure PR12-1. Input Voltage Switch

- ☐ 3. Slide the CPU and mounting plate into the rear of the auxiliary terminal.
- ☐ 4. Install the two screws that hold the rear of the mounting plate to the support bracket (Fig. **PR12-2**).
- ☐ 5. Install the two screws that secure the front of the mounting plate to the shelf.
- ☐ 6. Install all cables onto the CPU.

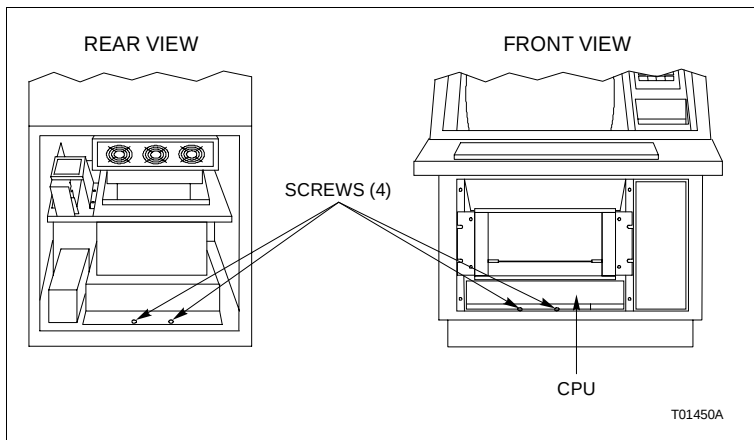


Figure PR12-2. CPU Installation



Keyboard Interface Device Installation



PR13

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) and the table top ADP panel (IIADP01).

Parts

Number	Qty	Description
6638514?1	1	Keyboard, operator (Mylar)
IIAKB03A	1	Keyboard, QWERTY (auxiliary engineering)
IIAMS04A	1	Mouse
IIATB05	1	Trackball
IIADP01	A/R	Annunciator display panel, table top
1948978?1	A/R	Cable, ADP

Tools None.

Procedure

- ☐ 1. Plug the Mylar (operator) keyboard into the port marked KEYBOARD on the keyboard interface assembly (Fig. PR13-1).
- ☐ 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.
- ☐ 4. Plug the table top ADP panel into the port marked AUX 1 PORT on the keyboard interface assembly using the ADP cable.
- ☐ 5. Refer to Figure PR13-2 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. 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.

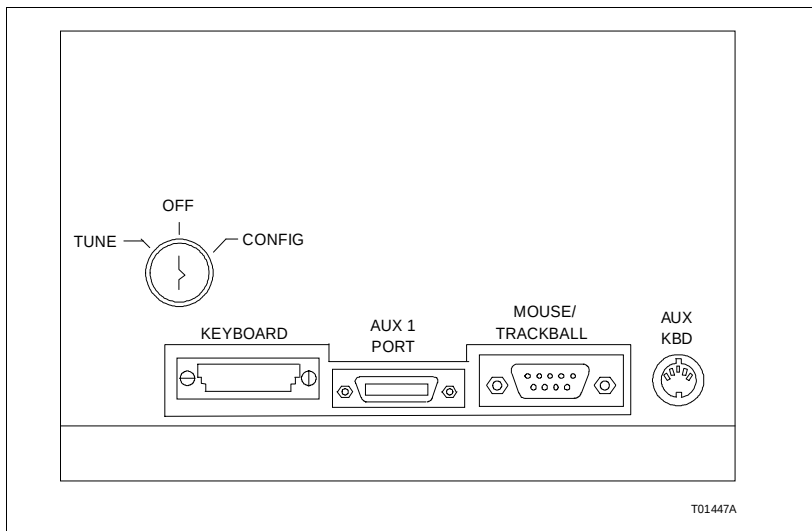


Figure PR13-1. Keyboard Interface Assembly

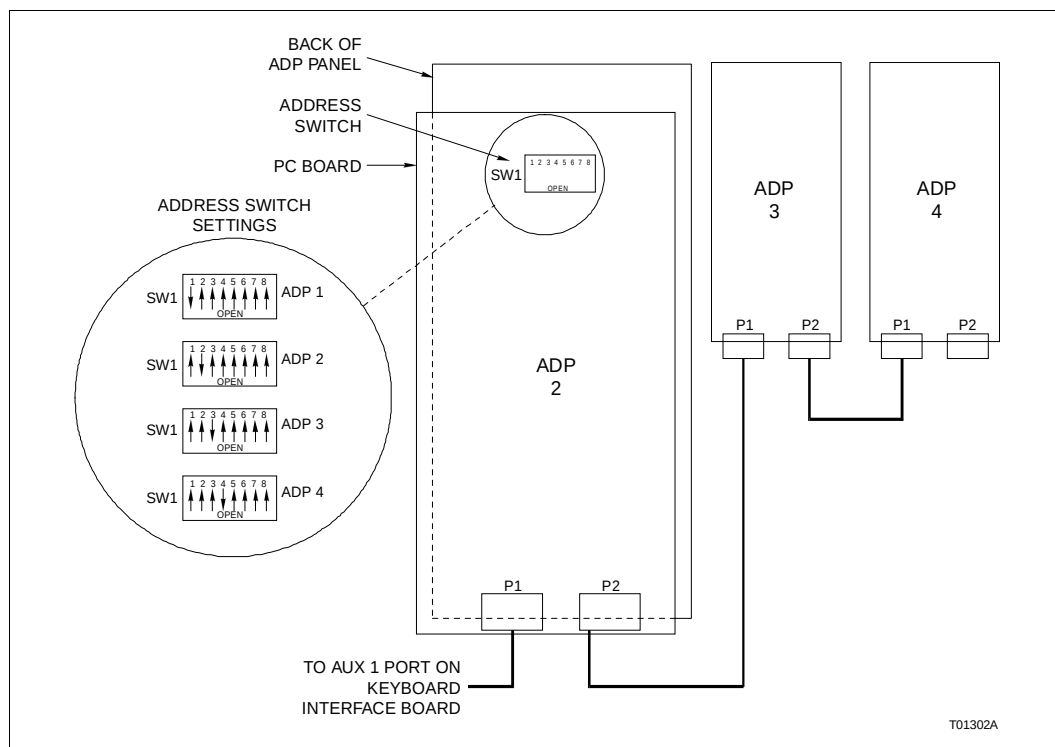


Figure PR13-2. IIADP01 Installation



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. Use the cable entry cutouts in the back or bottom of the auxiliary terminal (Fig. **PR14-1**) to go from component to component.

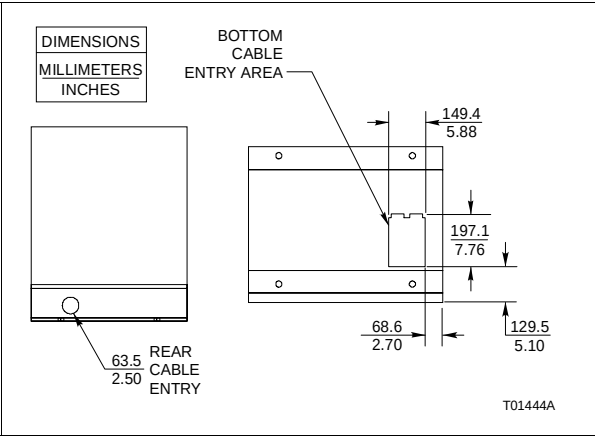


Figure PR14-1. Cable Entry Cutouts



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 **PR15-1** lists the printers available for use with the auxiliary terminal. Included in this table is a column 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 PR15-1. 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 check the AC power at the PEP.

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 main power switch on the PEP to the OFF position. Figure **PR16-1** shows the PEP.



2. Unplug all of the line cords from the AC outlets on the PEP.



3. Switch the main power switch on the PEP 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 on the PEP to the OFF position.



7. Use the DMM to verify that there is no power to any of the AC outlets.

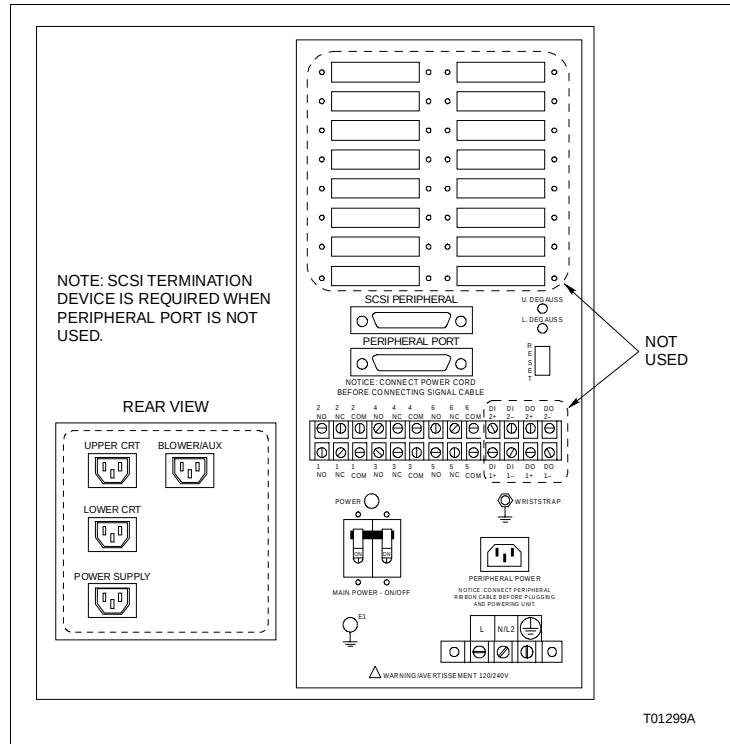


Figure PR16-1. PEP

- ☐ 8. Plug the console monitor into its associated AC outlet on the PEP. **Do not** plug in the power supply.
- ☐ 9. Turn on the console main power switch.
- ☐ 10. Nothing should display on the monitor until the software is loaded.



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 on the PEP to the OFF position.

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



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



3. Pull the module from the multibus card cage far enough out to disconnect it from the backplane.



4. Insure that all power wiring is correct.



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



6. Use the DMM to measure the DC voltages at the multibus card cage backplane (Fig. [PR17-1](#)).

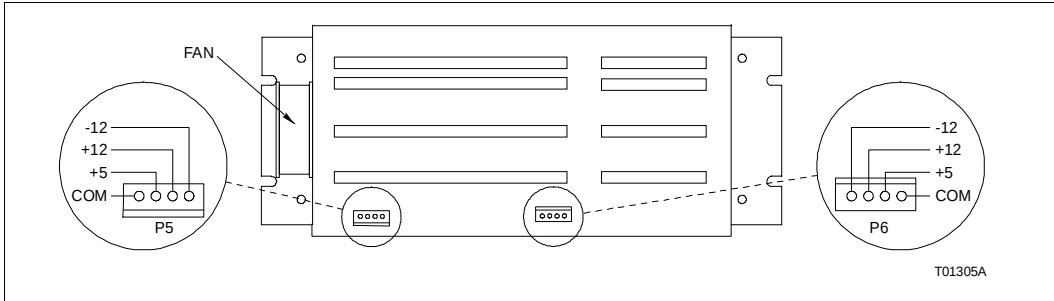


Figure PR17-1. DC Power Test

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



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.
2. 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

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. Disconnect power from the operating branch circuits that power the auxiliary terminal.



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



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



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 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.
2. 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

- ☐  1. Remove power from the auxiliary terminal.
- ☐  2. Disconnect power from the operating branch circuits that power the auxiliary terminal.
 - ☐ 3. Check the tightness of all power wiring screws within the workstation.
 - ☐ 4. If they are loose, use the flat blade torque screwdriver to tighten them to 1.6 Newton meters (14 in.-lbs).
 - ☐ 5. 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. **PR23-1**) that secure it to the auxiliary terminal.



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

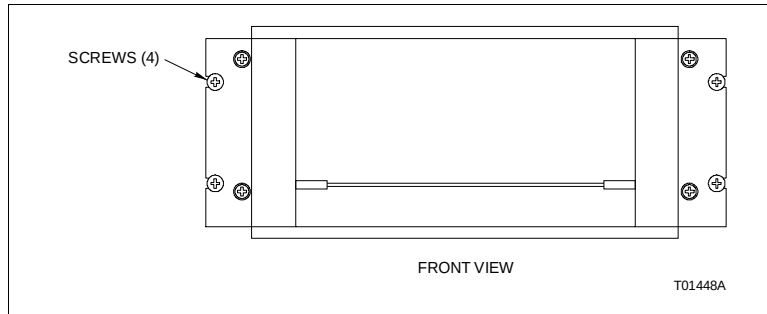


Figure PR23-1. Multibus Card Cage Removal



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. **PR25-1**) to secure it to the auxiliary terminal.



4. Install the clear polycarbonate shield that covers the multibus card cage.



5. Install all cables that were removed from the multibus card cage.

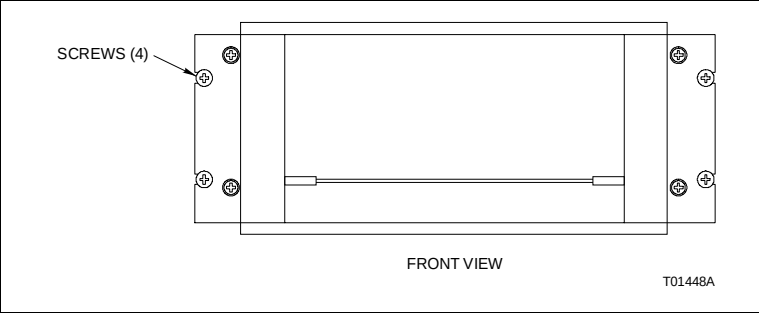


Figure PR25-1. Multibus Card Cage



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



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 [PR26-1](#)).



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.

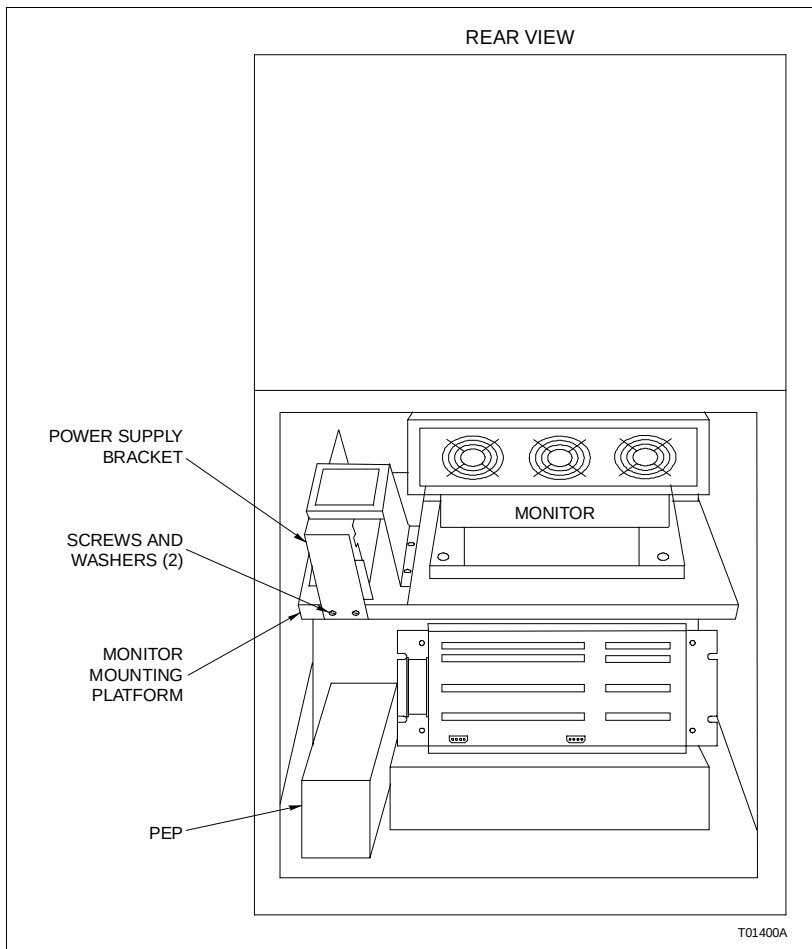


Figure PR26-1. Power Supply Removal



Purpose/Scope

10 min.

This procedure explains how install the power supply.

Parts

Number	Qty	Description
6638553?5 ¹	1	Power supply

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.



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. Install the power supply, from the rear of the auxiliary terminal, so that the tab fits into the slot and set the power supply on the monitor mounting platform.



3. Align the holes in the power supply bracket with those in the monitor mounting platform.



- ☐ 4. Use the bladed screwdriver to install the two screws that secure the power supply bracket to the monitor mounting platform (Fig PR27-1).

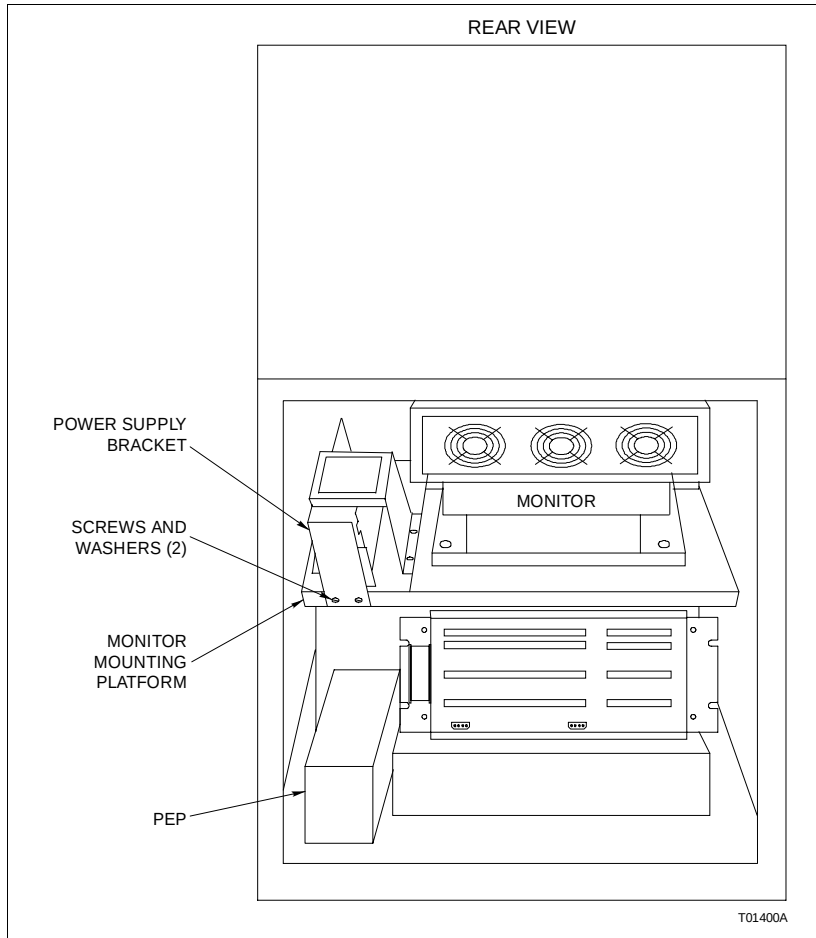


Figure PR27-1. Power Supply Installation

- ☐ 5. Install all cables.
- ☐ 6. Plug the power supply into its socket on the PEP.



Purpose/Scope

20 min.

This procedure explains how replace the PEP.

Parts

Number	Qty	Description
6638353?5	1	PEP

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.
2. 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 PEP contains the incoming AC power terminals and system circuit breakers. It also has ports for connecting peripheral devices and a system reset switch. Also included are terminals for alarm contact outputs and the degaussing switches for the monitors.

The SCSI PERIPHERAL port connection is for a DAT tape drive or optical disk drive. The upper degauss switch (U. DEGAUSS) corrects picture distortion due to magnetic fields on the screen of the upper (swivel mounted) monitor. The lower degauss switch (L. DEGAUSS) provides the same function for the lower monitor. The RESET pushbutton resets the multibus cards to an initial power up condition.



A terminal block with six alarm contact outputs connects annunciators to user-defined alarms. The digital in (DI) and digital out (DO) terminals are not used.

The MAIN POWER indicator is lit when the AC power is connected to the PEP and the main power switch is on.

The AC outlet marked SCSI PERIPHERAL is an outlet for one of the 120-VAC or 240-VAC peripheral devices listed in this instruction. Check the notice on the front of the PEP before connecting anything to this outlet.

NOTES:

1. Use the AC outlet 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.

- ☐  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. PR28-1).
- ☐ 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. PR28-2).
- ☐ 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.
- ☐ 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.

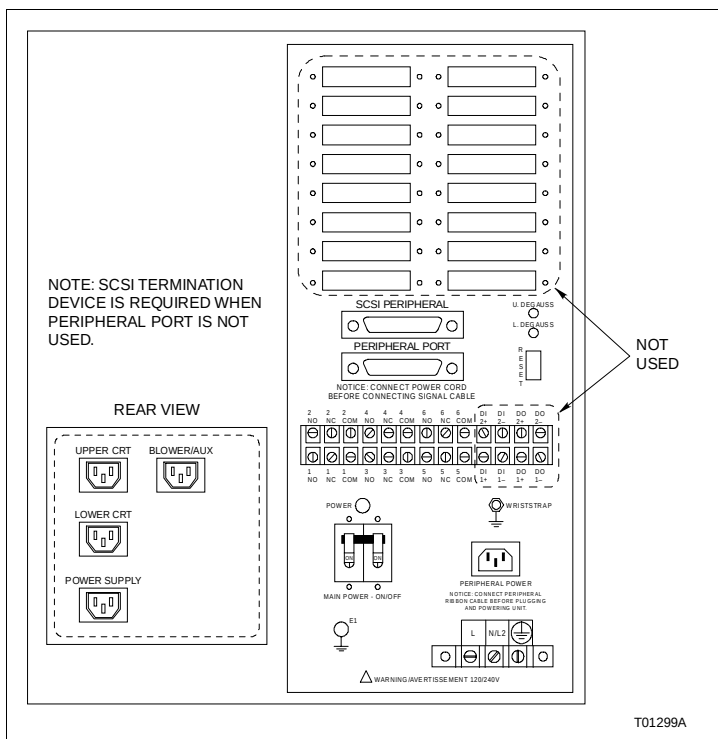


Figure PR28-1. PEP

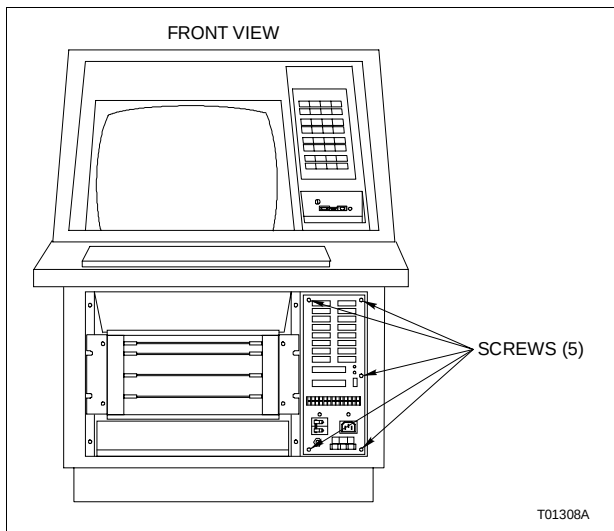


Figure PR28-2. PEP Replacement



Purpose/Scope

10 min.

This procedure explains how to verify or adjust the settings on the graphics card that is added to, replaced or already installed in the CPU.

Parts

Number	Qty	Description
1949514?4	1	Graphics card

Tools

- As required per documentation supplied with CPU.

Procedure

- ☐ 1. Refer to the documentation supplied with the CPU to gain access to the installed graphics card and slot for the graphics card to be added.
- ☐ 2. Refer to Figure **PR29-1** and set the jumpers as shown.
- ☐ 3. Refer to the documentation supplied with the CPU and close the CPU case.

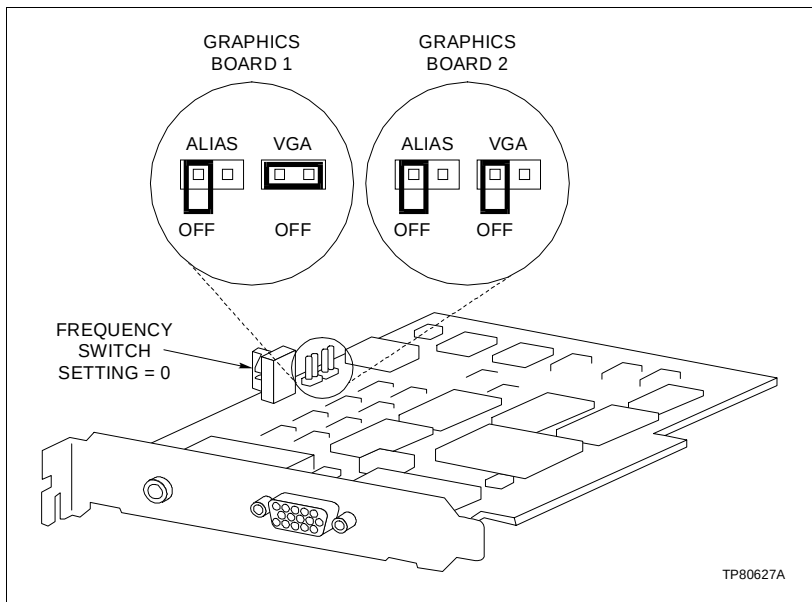


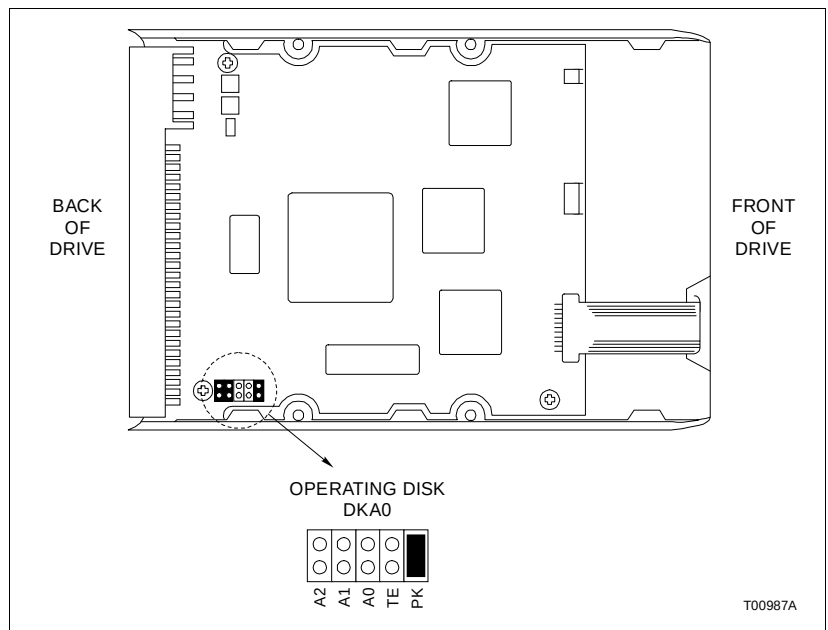
Figure PR29-1. Graphics Card Settings

10 min.

Parts

Number	Qty	Description
1949514?2	1	Hard drive, 1.08 Gbytes

- ☐ 1. Refer to the documentation supplied with the CPU to gain access to and remove the hard drive to be replaced.
- ☐ 2. Refer to Figure PR30-1 and set the jumpers as shown.



WBPEEUI220772A0



- ☐ 3. Refer to the documentation supplied with the CPU and install the hard drive.
- ☐ 4. Refer to the documentation supplied with the CPU and close the CPU case.



Purpose/Scope

10 min.

This procedure explains how to verify or adjust the settings on the CD ROM drive that is installed in the CPU.

Parts

Number	Qty	Description
1959514?3	1	5.25-inch, 600-Mbyte CD ROM drive, PBXRD-CB

Tools

- As required per documentation supplied with CPU.

Procedure

- ☐ 1. Refer to the documentation supplied with the CPU to gain access to and remove the CD ROM drive to be replaced.
- ☐ 2. Refer to Figure **PR31-1** and set the jumpers as shown.
- ☐ 3. Refer to the documentation supplied with the CPU and install the CD ROM drive.
- ☐ 4. Refer to the documentation supplied with the CPU and close the CPU case.

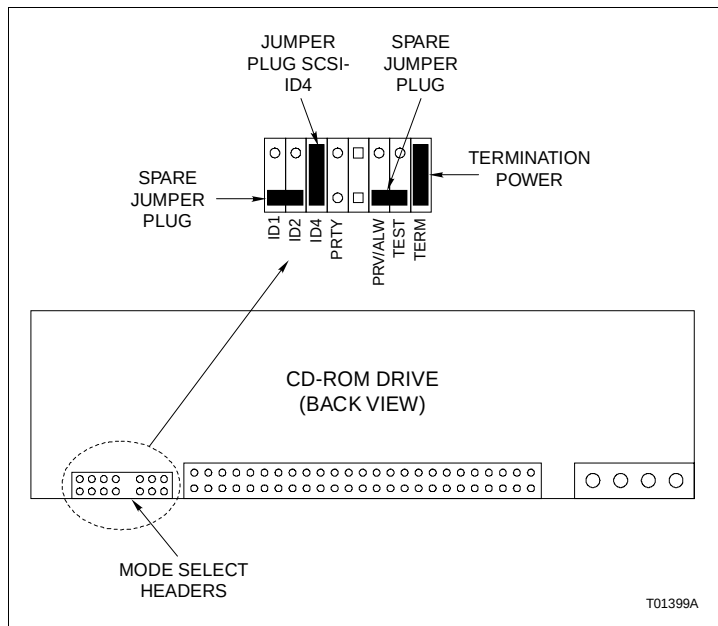


Figure PR31-1. CD ROM Drive Settings

Keyboard Interface Device Removal



PR32

Purpose/Scope

10 min.

This procedure explains how remove keyboard interface devices. This includes the engineering (QWERTY) keyboard, the operator (Mylar) keyboard, the pointing device (mouse or trackball) 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 (Fig. PR32-1).

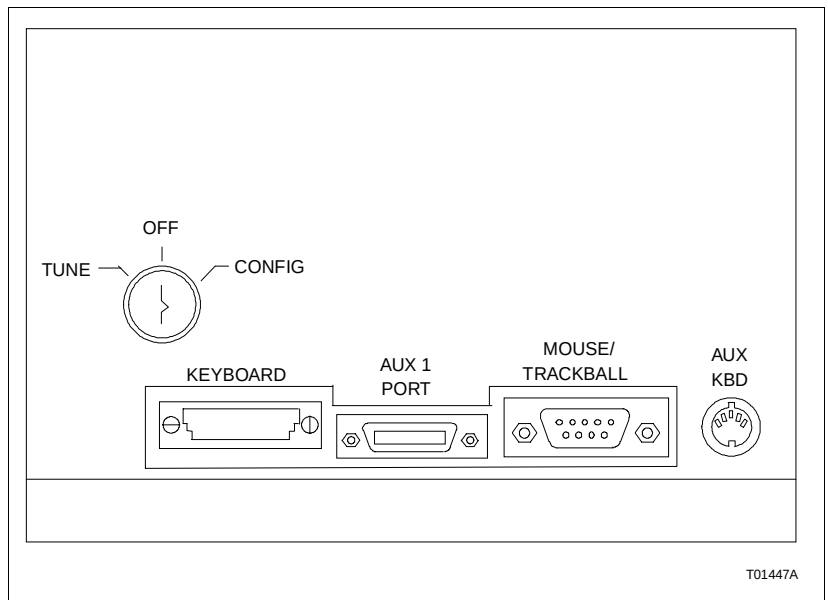


Figure PR32-1. Keyboard Interface Assembly



- ☐ 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.
- ☐ 4. Unplug the table top ADP panel from the port marked AUX 1 PORT on the keyboard interface assembly.



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. **PR33-1**).



3. If it is necessary to remove the bezel, remove the four screws that secure the bezel to the auxiliary terminal (Fig. **PR33-2**).



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 **PR33-1**.



7. Connect the cables.



8. Install the ADP panel into the bezel.

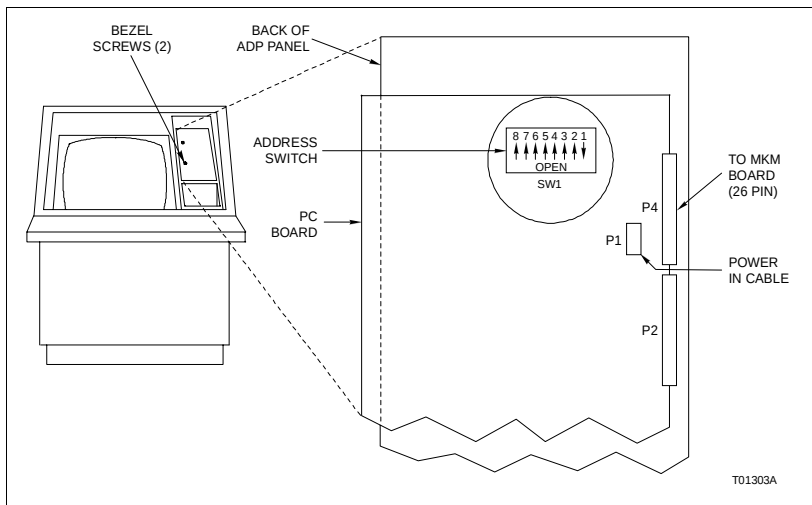


Figure PR33-1. IIADP02 Replacement

- ☐ 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.

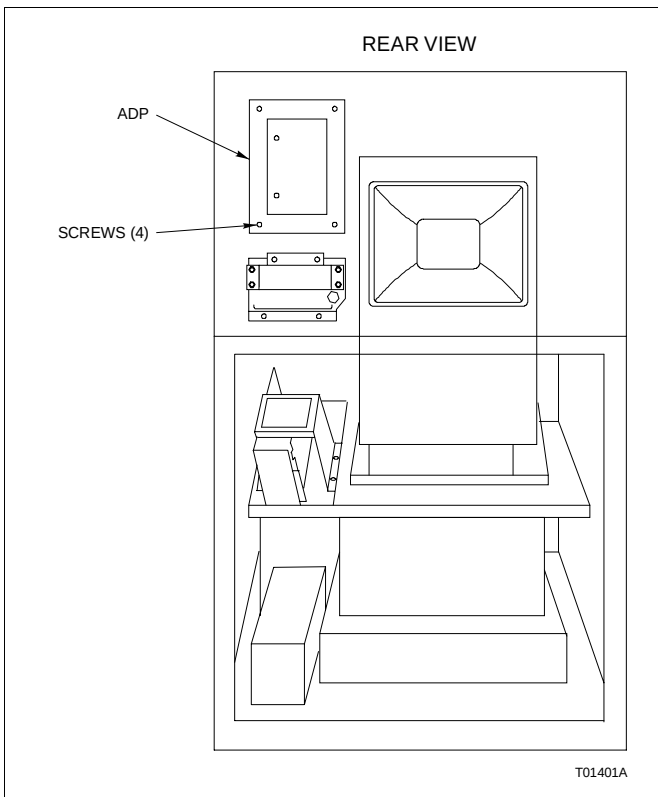


Figure PR33-2. IIADP02 Bezel Removal



Keyboard Interface Assembly Replacement



PR34

Purpose/Scope

10 min.

This procedure explains how replace the keyboard interface assembly.

Parts

Number	Qty	Description
6638554?2	1	Keyboard interface assembly

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 remove all cables from the rear of the keyboard interface assembly.



3. Use the bladed screwdriver to remove the two screws holding the keyboard interface assembly to the auxiliary terminal.



4. Slide the keyboard interface assembly out of the auxiliary terminal.



5. Install the new keyboard interface assembly.



6. Use the bladed screwdriver to install the two screws that hold the keyboard interface assembly to the auxiliary terminal.



7. Install all cables.





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.

Parts None.

- 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

- ☐  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 VGA cable from the rear of the monitor. Secure the VGA cable 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 $\frac{3}{4}$ -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.



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.
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

- ☐ 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.

Touchscreen Controller Card Replacement



PR39

Purpose/Scope

10 min.

This procedure explains how to replace the touchscreen controller card.

Parts

Number	Qty	Description
1948027?3	1 or 2 ¹	Controller card, touchscreen
197832?1	4 or 8 ¹	Spacer, nylon
NBZRG13004	4 or 8 ¹	Screw, nylon

NOTE:

1. The quantity depends on the number of touchscreen controller cards to be replaced (1 or 2).

Tools

- Small bladed screwdriver.

Procedure

This procedure covers the replacement of one or two touchscreen controller cards. There are two touchscreen controller cards — one on the component side of the IIMKM02A module and one on the solder side of the IIMKM02A module. The jumper settings for the IIMKM02A module are addressed in Procedure [PR8](#).

- ☐ 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 [PR39-1](#).
- ☐ 4. Mount the touchscreen controller card so that P14 and P15 on the touchscreen controller card mate with P14 and P15 (component side) or P17 and P18 (solder side) on the IIMKM02A module.

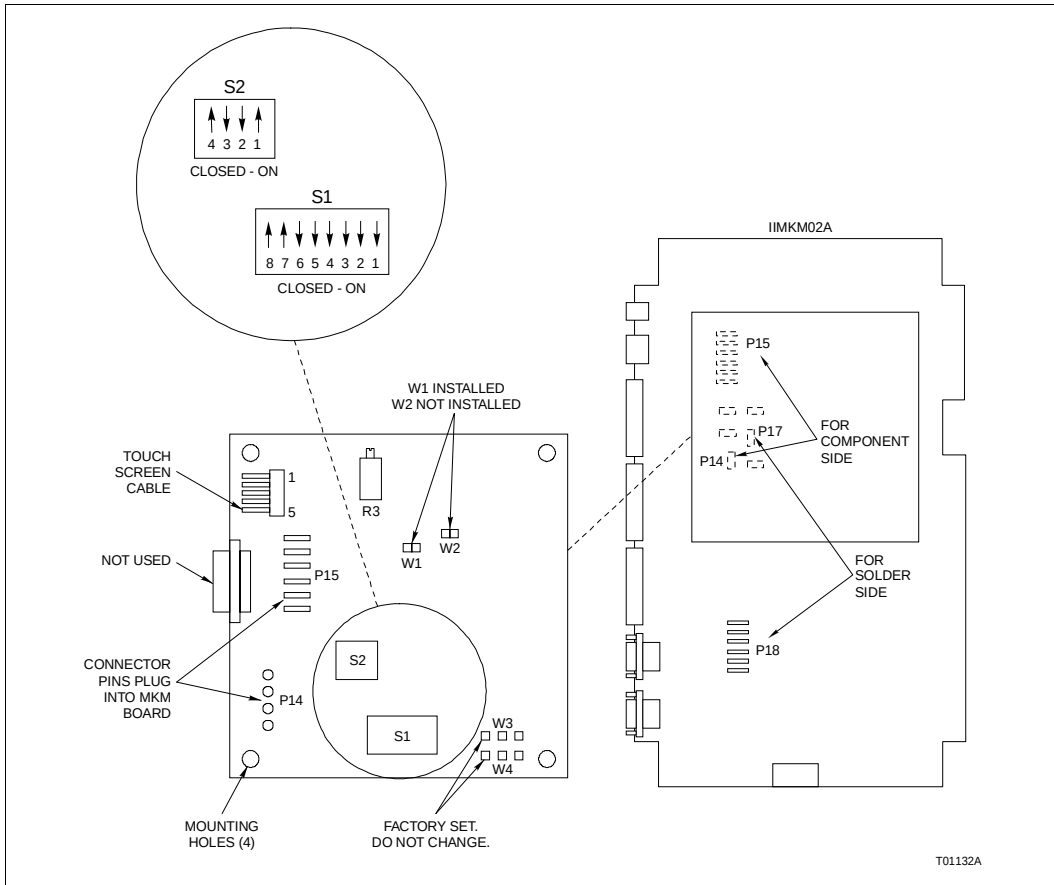


Figure PR39-1. Touchscreen Controller Card Installation

- ☐ 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.
- ☐ 7. Connect the cable to the touchscreen controller card, noting the orientation of Pin 1.
- ☐ 8. Repeat Steps 1 through 7 for the other touchscreen controller card (if required).
- ☐ 9. 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 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 VGA cable (Fig. [PR40-1](#)).

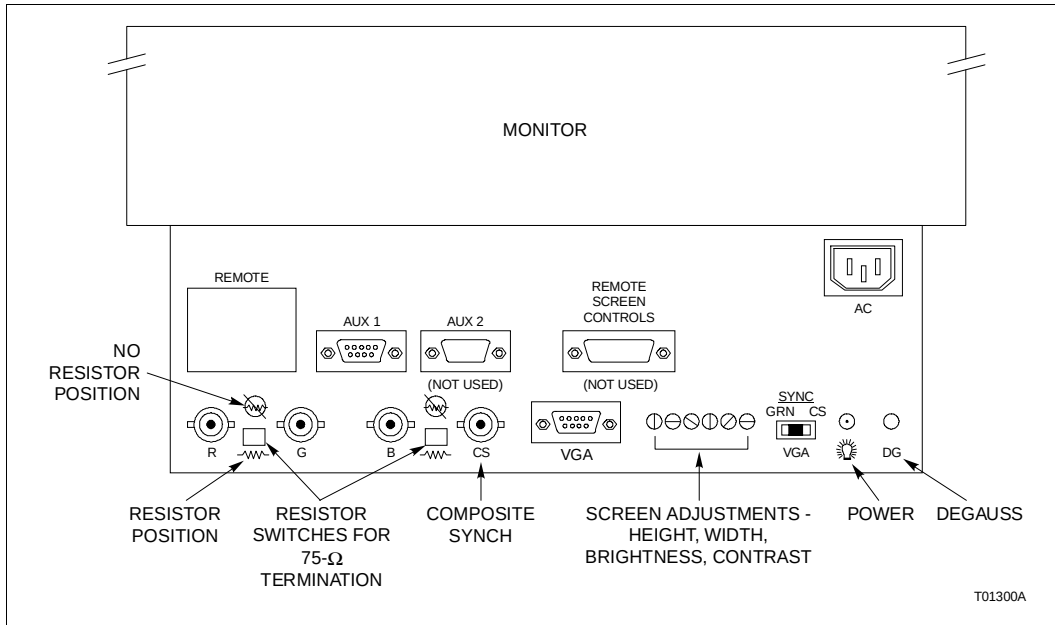


Figure PR40-1. Monitor Connections and Adjustments

- ☐ 5. Verify that the SYNC switch on the rear of the monitor is set to the VGA 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.

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

- ☐  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 VGA cable to the rear of the monitor (Fig. PR41-1).

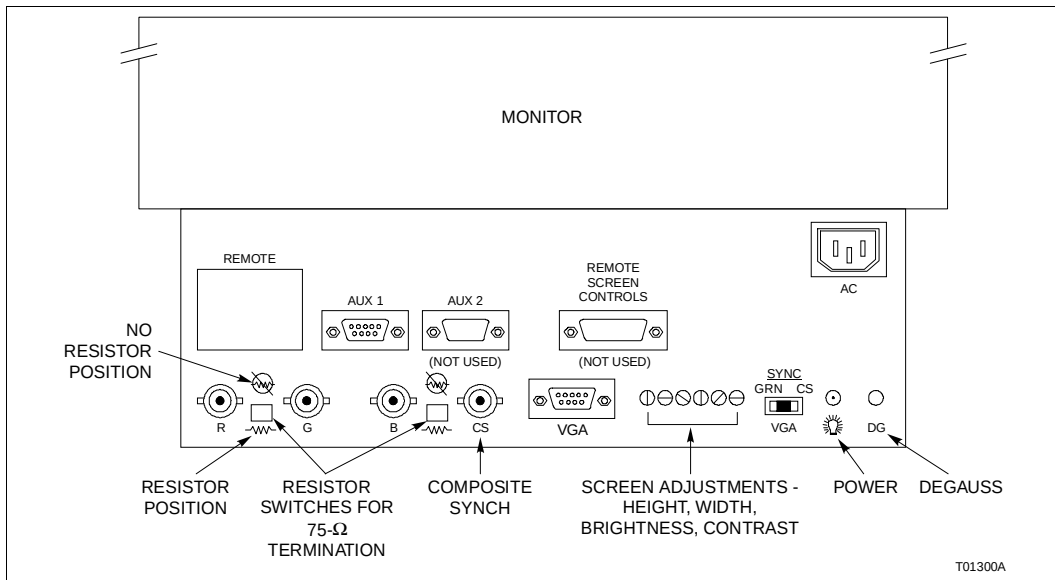


Figure PR41-1. Monitor Connections and Adjustments

- ☐ 11. Verify that the SYNC switch on the rear of the monitor is set to the VGA 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.



Purpose/Scope

5 min.

This procedure explains how to install the doors and top cover onto the auxiliary terminal.

Parts None.

Tools • Keys.
 • 1/8-inch Allen wrench.

Procedure

There are two doors and a top cover on the auxiliary terminal.

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 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 1/8-inch Allen wrench to install the five Allen screws that secure the top cover to the auxiliary terminal.





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