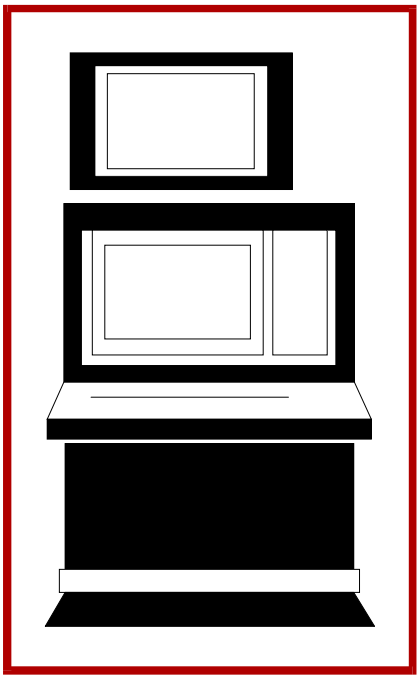
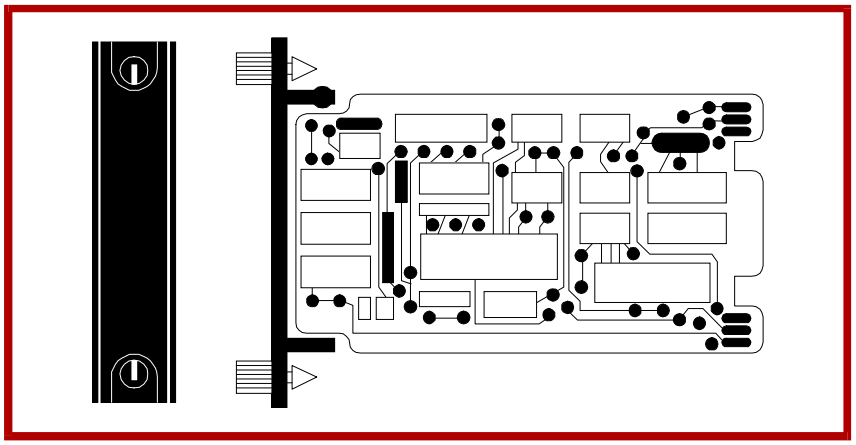
Bailey® infi 90®

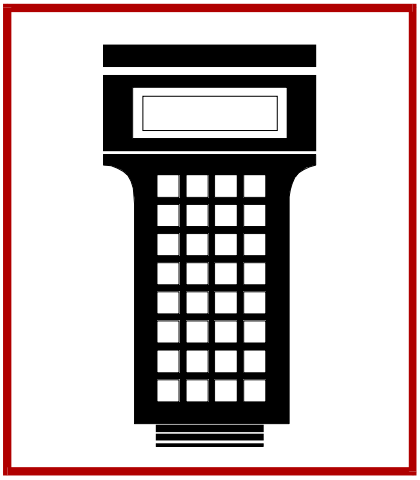
IIOIS43

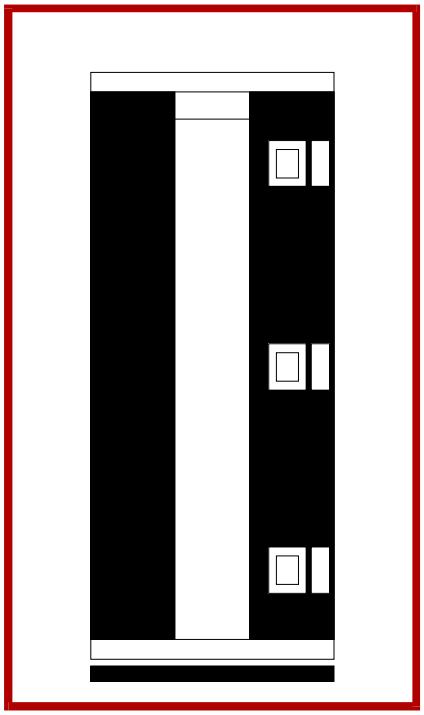
Instruction

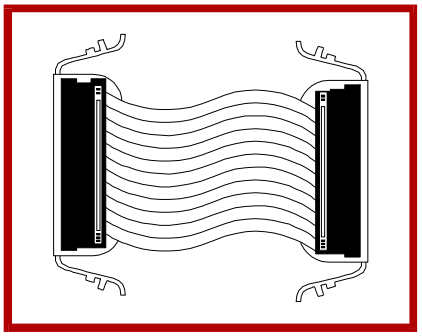
Operator Interface Station (40 Series) Hardware Manual

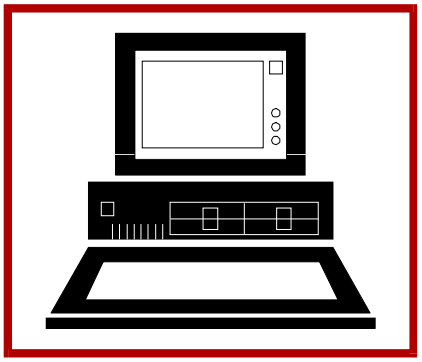












Bailey Process Control and Automation Solutions from Elsag Bailey Group

WARNING notices as used in this instruction apply to hazards or unsafe practices that could result in personal injury or death.

CAUTION notices apply to hazards or unsafe practices that could result in property damage.

NOTES highlight procedures and contain information that assists the operator in understanding the information contained in this instruction.

WARNING

INSTRUCTION MANUALS

DO NOT INSTALL, MAINTAIN, OR OPERATE THIS EQUIPMENT WITHOUT READING, UNDERSTANDING, AND FOLLOWING THE PROPER **Elsag Bailey** INSTRUCTIONS AND MANUALS; OTHERWISE, INJURY OR DAMAGE MAY RESULT.

RADIO FREQUENCY INTERFERENCE

MOST ELECTRONIC EQUIPMENT IS INFLUENCED BY RADIO FREQUENCY INTERFERENCE (RFI). CAUTION SHOULD BE EXERCISED WITH REGARD TO THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT IN THE AREA AROUND SUCH EQUIPMENT. PRUDENT PRACTICE DICTATES THAT SIGNS SHOULD BE POSTED IN THE VICINITY OF THE EQUIPMENT CAUTIONING AGAINST THE USE OF PORTABLE COMMUNICATIONS EQUIPMENT.

POSSIBLE PROCESS UPSETS

MAINTENANCE MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL AND ONLY AFTER SECURING EQUIPMENT CONTROLLED BY THIS PRODUCT. ADJUSTING OR REMOVING THIS PRODUCT WHILE IT IS IN THE SYSTEM MAY UPSET THE PROCESS BEING CONTROLLED. SOME PROCESS UPSETS MAY CAUSE INJURY OR DAMAGE.

AVERTISSEMENT

MANUELS D'OPÉRATION

NE PAS METTRE EN PLACE, RÉPARER OU FAIRE FONCTIONNER L'ÉQUIPEMENT SANS AVOIR LU, COMPRIS ET SUIVI LES INSTRUCTIONS RÉGLEMENTAIRES DE **Elsag Bailey**. TOUTE NÉGLIGENCE À CET ÉGARD POURRAIT ÊTRE UNE CAUSE D'ACCIDENT OU DE DÉFAILLANCE DU MATÉRIEL.

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LA PLUPART DES ÉQUIPEMENTS ÉLECTRONIQUES SONT SENSIBLES AUX PERTURBATIONS PAR FRÉQUENCE RADIO. DES PRÉCAUTIONS DEVRONT ÊTRE PRISES LORS DE L'UTILISATION DU MATÉRIEL DE COMMUNICATION PORTATIF. LA PRUDENCE EXIGE QUE LES PRÉCAUTIONS À PRENDRE DANS CE CAS SOIENT SIGNALÉES AUX ENDROITS VOULUS DANS VOTRE USINE.

PERTURBATIONS DU PROCÉDÉ

L'ENTRETIEN DOIT ÊTRE ASSURÉ PAR UNE PERSONNE QUALIFIÉE EN CONSIDÉRANT L'ASPECT SÉCURITAIRE DES ÉQUIPEMENTS CONTRÔLÉS PAR CE PRODUIT. L'AJUSTEMENT ET/OU L'EXTRACTION DE CE PRODUIT PEUT OCCASIONNER DES À-COUPS AU PROCÉDÉ CONTRÔLE LORSQU'IL EST INSÉRÉ DANS UNE SYSTÈME ACTIF. CES À-COUPS PEUVENT ÉGALEMENT OCCASIONNER DES BLESSURES OU DES DOMMAGES MATÉREILS.

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Preface

This instruction provides specific hardware installation, troubleshooting, maintenance, and replacement procedures information necessary for the IIOIS43 Operator Interface Station. There are three additional instructions that explain how to set up and use the console. These instructions include:

File Utilities - Provides software load, upgrade and maintenance procedures, and save and restore configuration procedures.

Operation - Gives a brief overview of the console and INFI 90® OPEN system to familiarize the reader. It then explains the operations that can be performed after configuring the console.

Configuration - Gives the procedures to configure the console as a system for proper operation with its peripherals and the INFI 90 OPEN system. It also explains each function of the console, and gives configuration procedures and requirements.

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. The instruction explains console interaction with the INFI 90 OPEN Strategic Process Management System only.

List of Effective Pages

Total number of pages in this instruction is 136, consisting of the following:

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Preface	Original
List of Effective Pages	Original
iii through xii	Original
1-1 through 1-9	Original
2-1 through 2-3	Original
3-1 through 3-43	Original
4-1 through 4-9	Original
5-1 through 5-6	Original
6-1 through 6-33	Original
7-1 through 7-3	Original
A-1 through A-12	Original
B-1 through B-3	Original
Index-1 through Index-3	Original

When an update is received, insert the latest changed pages and dispose of the superseded pages.

NOTE: On an update page, the changed text or table is indicated by a vertical bar in the outer margin of the page adjacent to the changed area. A changed figure is indicated by a vertical bar in the outer margin next to the figure caption. The date the update was prepared will appear beside the page number.

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	Verify all covers are installed and all doors are closed before operating the console. Exposed electrical connections present a shock a hazard that can cause injury or death. (p. 3-2) 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. 4-1) Never clean electrical parts or components with the power on. Doing so exposes you to a fatal electrical shock hazard. (p. 5-3) 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. 5-3) Replace the fuse with one of the same type and rating. Using an improper fuse could lead to injury to personnel and equipment damage from fire or electrical shock. (p. 6-14, 6-25) The monitor will slide out the rear of the cabinet by itself when the mounting bolts are 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 rear two bolts. (p. 6-26)
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 setting or equipment damage may result. (p. 3-24, 6-32) Remove power from all peripheral equipment and the console before installing or removing peripheral equipment. Equipment damage may result. (p. 3-24, 3-35, 6-32)

Safety Summary (continued)

SPECIFIC CAUTIONS *(continued)*	Plug in the tape drive cable and verify that the supply voltage requirement of the tape drive matches the power supplied by the power entry panel before turning on the tape drive. Equipment damage may result. A notice on the front of the power entry panel states the operating voltage. (p. 3-35) Never connect the tape drive to the CPU with the CPU or tape drive power on. Failure to comply may result in damage to both the CPU busses and the tape drive. (p. 3-35) Failure to turn off the main power circuit breaker before removing or inserting modules into the card cage may result in equipment failure. (p. 6-5)

Sommaire de Sécurité

AVERTISSEMENTS D'ORDRE GÉNÉRAL	**Environnement de l'équipement** Ne pas soumettre les composants à une atmosphère corrosive lors du transport, de l'entreposage ou l'utilisation. **Possibilité de chocs électriques durant l'entretien** Débrancher l'alimentation ou prendre les précautions pour éviter tout contact avec des composants sous tension durant l'entretien.
AVERTISSEMENTS D'ORDRE SPÉCIFIQUE	Assurez-vous que tous les couvercles sont installés et toutes les portes fermées avant de faire fonctionner la console. L´exposition à des connexions électriques presénte un risque de blessure ou d´électrocution fatale. (p. 3-2) Cette armoire comporte des connexions c.a. et c.c. dénudées. Ces connexions électriques présentent un danger d'électrocution pouvant entraîner des blessures ou la mort. (p. 4-1) Il ne faut jamais nettoyer des piècesou des composants électriques lorsqu'ils sont sous tension. Ceci présente un risque d'électrocution fatale. (p. 5-3)

AVERTISSEMENTS D'ORDRE SPÉCIFIQUE *(suite)*	Portez toujours des lunettes de protection lorsque vous utilisez des solvants de nettoyage. L'aircomprimé servant à enlever le solvant des cartes de circuits imprimés provoque des éclaboussures qui risquent d'atteindre les yeux. (p. 5-3) Remplacer le fusible avec un fusible du même type et de la même capacité. L'utilisation d'une fusible du mauvais type/capacité pourrait causer des blessures au personnel et des dommages à l'équipement résultant d'un incendie ou de choc électrique. (p. 6-14, 6-25) Supportez le moniteur avant de retirer les deux boulons d'ancrange à l'arriér. Lorsque ces boulons d'ancrage sont retirés, l'e moniteur glissera et sorta à l'arriér de l'armoire. l'e moniteur pése environ 27 kilograms (60 pounds) et pourrait entrainer des blessures si on le laisse glisser de l'armoire. (p. 6-26)
ATTENTIONS D'ORDRE SPÉCIFIQUE	Assurez-vous que toutes les indications de tension et tous les réglages de tension sur les périphériques, le bloc d´alimentation et le panneau d´entrée des alimentations correspondent bien à la tension de service. Une tension incorrecte risque d´endommager l´equipment. Assures-vous que le disjoncteur d´alimentation principal de la console est étient avant de modifier les réglages de tension de service afin d´éviter d´endommager l´équipment. (p. 3-24, 6-32) Coupez l´alimentation des périphériques et de la console avant d´installer ou de retirer des périphériques, sinon l´équipment risque de subir des dommages. (p. 3-24, 3-35, 6-32) Avant de mettre le dérouleur de bande sous tension, branchez le câble du dérouleur et vérifiez les exigences de tension de l'appareil correspondent au niveau de tension de la sortie du panneau d'entree des alimentations. Sinon, l'equipment risque de subir des dommages. (p. 3-35) Ne branches jamais le derouleur de bande au CPU lorsque l'un ou l'autre de ces appreils est sous tension. Sinon, les bus du CPU et le derouleur pourrait etre endommages. (p. 3-35) Si l'on omet d'eteindre l'interrupteur du circuit d'alimentation principal avant de retirer les cartes ou de les inserer dans le porte-cartes, l'equipment pourrait faire default. (p. 6-5)

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™ AlphaStation	Trademark of DEC (Digital Equipment Corporation)
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® INFI-NET	Registered trademark of Elsag Bailey Process Automation
® Plant Loop	Registered trademark of Elsag Bailey Process Automation
™ Velcro	Trademark of Velcro U.S.A. Incorporated

SECTION 1 - INTRODUCTION

OVERVIEW

The IIOIS43 main console generates eight windows that can be displayed on itself or other main or auxiliary consoles. A given console can only drive two monitors electrically. A main console connects to the Plant Loop® or INFI-NET® communication highway.

In this document, main console refers to an IIOIS43X1, IIOIS43X2, or IIOIS43X3 console or an IIOIS43XA or IIOIS43XD driver cabinet. Any references to auxiliary terminal refers to an IIOIC421, IIOIC4221, IIOIC4222, IIOIC423, or IIOIC424 console. Refer to ***REFERENCE DOCUMENTS*** in this section for the IIOIC42 instruction manual number. Read all of this instruction to get the greatest benefit of the information it contains. Read each procedure before doing the task. Call the local Elsag Bailey sales office for answers to any questions.

This section contains an overview of the main console. This document contains directions and cautions for installing and servicing the operator interface station (OIS).

INTENDED USER

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 console into operation until you read and thoroughly understand this instruction. This instruction is a reference for installers with installation and maintenance experience on process control equipment. This is not a tutorial.

OIS DESCRIPTION

The OIS console is an integrated operator console that provides a window into the process. It provides the INFI 90® OPEN Strategic Process Management System with an interface for integrated operations, data acquisition and report generation. The OIS console processes trend data and interfaces the operator with the process.

The console interfaces to INFI-NET and Plant Loop communication highways. It can monitor and allow the operator to control a process through color graphics displays which show equipment status and process state. Table 1-1 lists the OIS models. Figure 1-1 shows the main components of the OIS console. Figure 1-2 shows the main components of the OIS driver cabinet. Both figures show the units with doors open.

Table 1-1. IIOIS43 Models

Model	Description
IIOIS43X1	Console with lower monitor
IIOIS43X2	Console with upper monitor
IIOIS43X3	Console with upper and lower monitor
IIOIS43XA	Driver cabinet with one set of electronics
IIOIS43XD	Driver cabinet with dual electronics

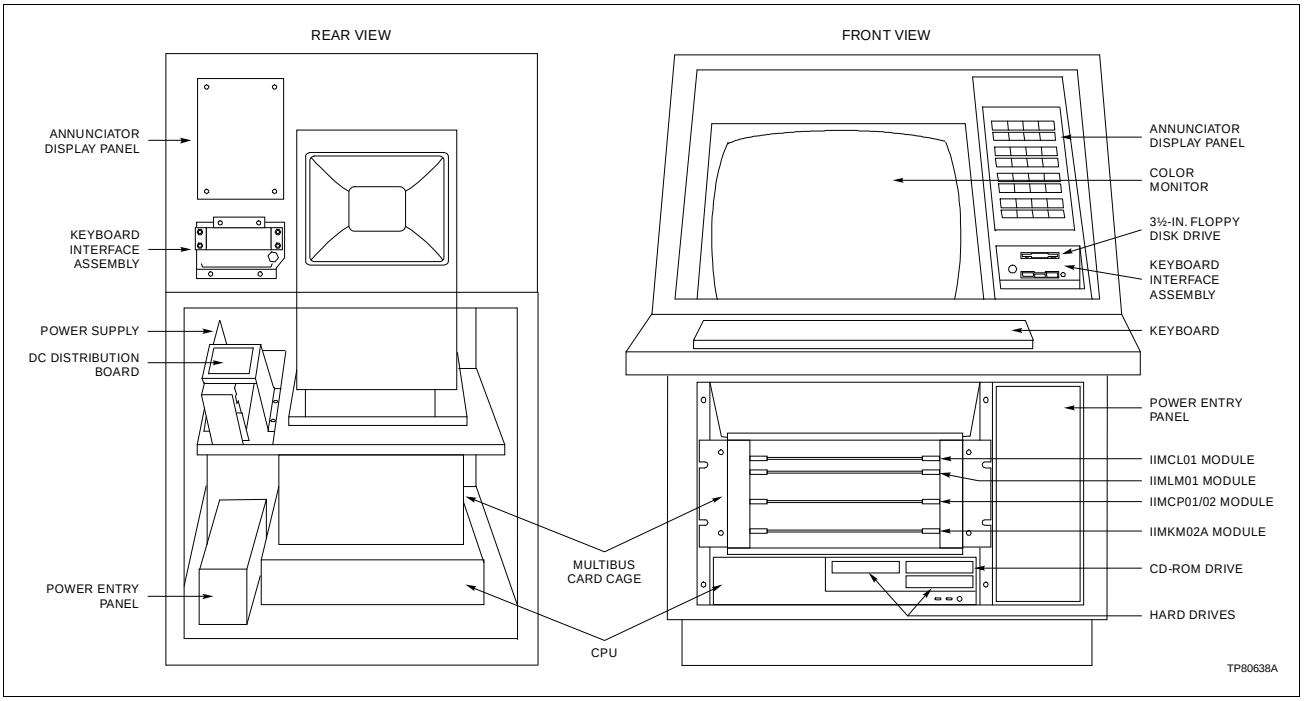

Figure 1-1. Console Front and Rear Views

Refer to Section 3 for hardware installation information. Refer to Section 6 for additional hardware information.

Console Hardware

A console cabinet may have a lower monitor, an upper monitor or both with the required power supply, card cage and interface hardware (Fig. 1-1). The monitor, annunciator display panel (ADP) and keyboard interface panel are in the upper half of the cabinet. The lower half of the console cabinet contains the power supply, CPU, power entry panel with cable connector panel and multibus card cage.

The console cabinet has front and rear swing-out doors with individual locks. The front door has slotted openings for air intake to cool the inside of the cabinet. The console cabinet has a stabilizer, which must be fastened to the front of the cabinet when the console is not secured to the floor. A 63.5-millimeter

(2.5-inch) diameter cable entry is located at the rear of the weldment.

Driver Cabinet Hardware

The IIOIS43XA driver cabinet has one set of OIS driver cabinet hardware located in the middle of the cabinet. The IIOIS43XD (Fig. 1-2) driver cabinet has two sets of OIS electronics; the second set of hardware is located in the bottom of the driver cabinet.

The driver cabinet contains the power entry panel with power supply, CPU and multibus card cage. There is no annunciator display panel or keyboard interface panel in the driver cabinet.

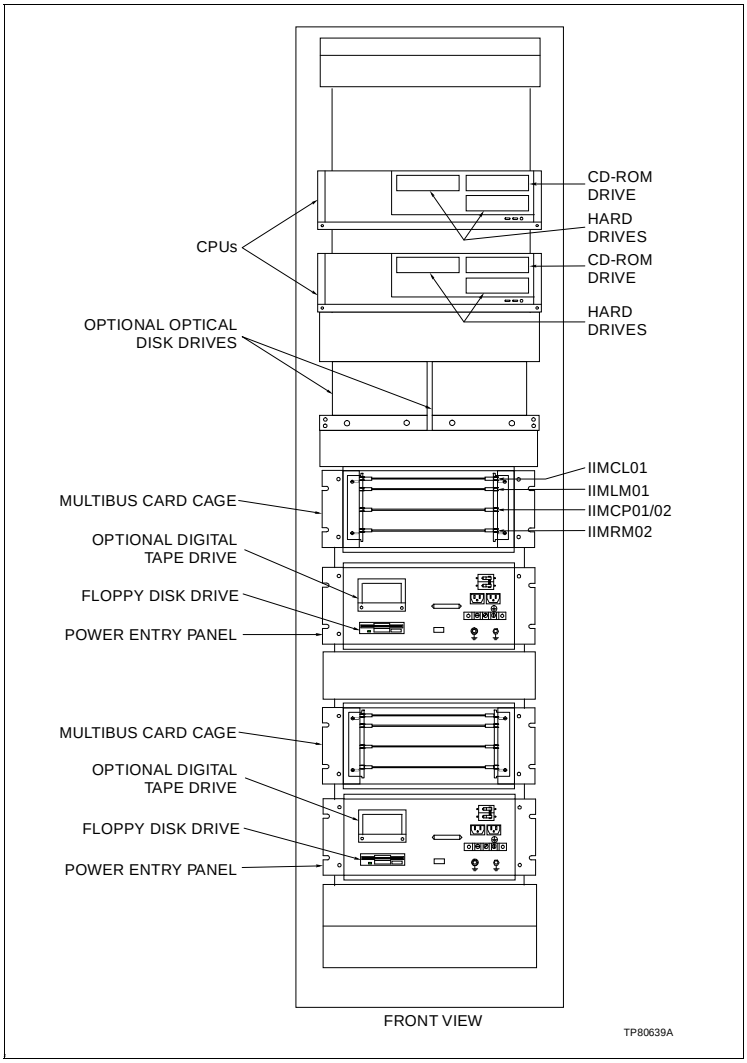

Figure 1-2. Driver Cabinet Front View (IIOIS43XD)

The power entry panel has a connection for input AC, alarm contact outputs, and cable connectors for peripheral devices.

> **NOTE:** When using a driver cabinet, an alternate console capability is necessary to perform maintenance and configuration requirements. Refer to Section 3 for IIVTE0□ video terminal information.

INSTRUCTION CONTENT

Introduction — Presents an overview of the OIS console and related hardware. It also provides a complete list of system specifications.

Description and Operation — Describes the theory of operation of the OIS console and related hardware.

Installation — Describes the installation and wiring. It also describes the jumper settings of the multibus modules and peripherals. Be sure to read and follow all warnings and cautions.

Troubleshooting — Provides basic troubleshooting procedures, diagnostic AC/DC power test procedures, module failure LED codes and techniques for gathering information on software faults.

Maintenance — Contains a schedule and procedures for maintenance.

Component Description and Replacement — Describes how to replace hardware and the printed circuit boards in the multibus card cage.

Support Services — Includes a spare parts list and ordering instructions.

Quick Reference Information — Contains jumper, switch and fuse locations for quick reference.

Redundant Ethernet Networks — Explains how to set up redundant ethernet networks. It also contains examples of ethernet connections.

HOW TO USE THIS INSTRUCTION

Read this entire instruction in sequence before attempting to install or use the console. It is important to become familiar with the entire content of the instruction prior to installing and operating the console to attain maximum system efficiency.

The instruction is organized into seven sections and two appendices. Its organization enables finding specific information quickly, and using this instruction as a reference after becoming fully familiar with the console. Be sure to read the notes which provide:

- Additional information.
- Information that should be considered before performing a certain operation or function.

DOCUMENT CONVENTIONS

Part numbers in tables and parts lists contain a □ within the number (i.e., 1949207□1). The □ replaces the alpha revision level of the part. The □ in a nomenclature item indicates variables for that position.

GLOSSARY OF TERMS AND ABBREVIATIONS

Table 1-2 contains those terms and abbreviations that are unique to Elsag Bailey or have a definition that is different from standard industry usage.

Table 1-2. Glossary of Terms and Abbreviations

Term	Definition
ADP	Annunciator display panel.
INFI-NET	Advanced data communication highway.
MFP	Multi-function processor module. A multiple-loop controller with data acquisition and information processing capabilities.
OIS	Operator interface station. Integrated operator console with data acquisition and reporting capabilities providing a digital access into the process for flexible control and monitoring.
PEP	Power entry panel.
PFI	Power fail interrupt. A signal that causes active controller or processor modules (MFCs or MFPs) to reset and the communication system to be bypassed, when generated in the INFI 90 OPEN system by an out of tolerance bus voltage.
Plant Loop	Network 90 data communication highway.

REFERENCE DOCUMENTS

Table 1-3 lists Elsag Bailey instructions referenced in this instruction.

Table 1-3. Reference Documents

Number	Document
I-E96-192-5	Hardware, Operator Interface Console (40 Series) IIOIC42
I-E96-500	Site Planning and Preparation
WBPEEUI220756A0	Operation, Operator Interface Station (40 Series) IIOIS43
WBPEEUI220757A0	Configuration, Operator Interface Station (40 Series) IIOIS43
WBPEEUI220758A0	File Utilities, Operator Interface Station (40 Series) IIOIS43

NOMENCLATURE

Table 1-4 contains the nomenclature used in this instruction.

Table 1-4. Hardware Nomenclature

Nomenclature	Description
IIAKB03A	QWERTY style auxiliary (engineering) keyboard
IIAMS04A	Mouse cursor controller
IIATB05	Trackball cursor controller
IIDOP04A	Optical disk (tabletop)
IIDOP05A	Optical disk (driver cabinet)
IIDMT03A	Digital tape (console or driver cabinet)
IIMCL01	Multibus communication loop module
IIMCP01	Multibus communications processor module for Plant Loop system (10,000 tags)
IIMCP02	Multibus communications processor module for INFI-NET system (30,000 tags)
IIMKM02A	Multibus keyboard module
IIMLM01	Multibus loop module
IIMRM02	Multibus reset module (driver cabinet)
IIOIS43X1	Operator interface station integrated unit with console mount (lower) monitor and keyboard
IIOIS43X2	Operator interface station integrated unit with monitor (upper) with tilt/swivel base and keyboard
IIOIS43X3	Operator interface station integrated unit with dual monitors (one console mount and one tilt/swivel base mount) and keyboard
IIOIS43XA	Driver cabinet style operator interface station with one set of electronics
IIOIS43XD	Driver cabinet style operator interface station with dual electronics
IIPRS02	Printer terminal server
IIPRT02	Genicom 3410 XLS black and white printer
IIPRT03	Genicom 3410 XCQ color printer (up to 64 colors)
IIPRT05	Genicom 4440 high speed black and white printer
IIPRT08B□	Hewlett Packard 660C screen copy printer (color - black and white)
IIPRT08C□	Hewlett Packard 680C screen copy printer (color - black and white)
IIPRT09□	Okidata 395C line printer
IIPRT10□	Hewlett Packard XL 300 color screen copy printer (11-in. by 17-in. paper)
IIVTE0□	Video terminal for configuration and diagnostics (driver cabinet)
NNIU01	Network interface unit

OIS CONSOLE SPECIFICATIONS

Table 1-5 contains the specifications for the OIS consoles.

Table 1-5. IIOIS43 Console Specifications

<table>
<tr><th>Property</th><th>Characteristic/Value</th></tr>
<tr><td>Power
Line voltage

Line frequency
Circuit breaker size</td><td>
240 V nominal (180 VAC to 264 VAC RMS)
120 V nominal (90 VAC to 132 VAC RMS)
Overvoltage category: III
47 to 63 Hz
20 A</td></tr>
<tr><td>Power consumption</td><td>
<table>
<tr><th>Model</th><th>Voltage</th><th>Typical Amps</th><th>Maximum Amps</th><th>Typical Watts</th><th>Maximum Watts</th></tr>
<tr><td>IIOIS43X1</td><td>120</td><td>2.93</td><td>3.78</td><td>250</td><td>335</td></tr>
<tr><td></td><td>240</td><td>1.54</td><td>2.08</td><td>250</td><td>335</td></tr>
<tr><td>IIOIS43X2</td><td>120</td><td>2.93</td><td>3.78</td><td>250</td><td>335</td></tr>
<tr><td></td><td>240</td><td>1.54</td><td>2.08</td><td>250</td><td>335</td></tr>
<tr><td>IIOIS43X3</td><td>120</td><td>4.39</td><td>5.68</td><td>418</td><td>537</td></tr>
<tr><td></td><td>240</td><td>2.33</td><td>3.01</td><td>418</td><td>537</td></tr>
<tr><td>IIOIS43XA</td><td>120</td><td>2.01</td><td>2.59</td><td>173</td><td>223</td></tr>
<tr><td></td><td>240</td><td>1.13</td><td>1.45</td><td>173</td><td>223</td></tr>
<tr><td>IIOIS43XD</td><td>120</td><td>4.02</td><td>5.08</td><td>346</td><td>438</td></tr>
<tr><td></td><td>240</td><td>2.26</td><td>2.90</td><td>346</td><td>438</td></tr>
</table>
</td></tr>
<tr><td>Power characteristics</td><td>
<table>
<tr><th>Model</th><th>Inrush Current Amps Typical</th><th>Crest Factor</th><th>Power Factor Typical</th></tr>
<tr><td>IIOIS43X1</td><td>41.58</td><td>2.60</td><td>0.685</td></tr>
<tr><td>IIOIS43X2</td><td>41.58</td><td>2.60</td><td>0.685</td></tr>
<tr><td>IIOIS43X3</td><td>63.32</td><td>2.16</td><td>0.702</td></tr>
<tr><td>IIOIS43XA</td><td>57.00</td><td>2.29</td><td>0.718</td></tr>
<tr><td>IIOIS43XD</td><td>114.00</td><td>2.29</td><td>0.718</td></tr>
</table>
</td></tr>
<tr><td>Power supply</td><td>+5 VDC at 20 A
+12 VDC at 4 A
-12 VDC at 4 A</td></tr>
<tr><td>CPU RAM</td><td>96 Mbytes</td></tr>
<tr><td>Floppy disk</td><td>1.44 Mbytes/2.88 Mbytes</td></tr>
<tr><td>Hard disk
OIS application
VMS operating system</td><td>2
1.08 Gbytes
1.08 Gbytes</td></tr>
<tr><td>Monitor resolution</td><td>1280 x 1024 pixels at 72 Hz refresh, 0.28 dot pitch, DAF, 52% transmissivity.</td></tr>
<tr><td>Monitors supported</td><td>Two monitors. The DEC AlphaStation™ 255 model 233 outputs eight windows. The windows can be sent to a main console and any number of auxiliary consoles.</td></tr>
</table>

Table 1-5. IIOIS43 Console Specifications (continued)

<table>
<tr><th>Property</th><th>Characteristic/Value</th></tr>
<tr><td>Optical disk</td><td>1.2 Gbytes (600 Mbytes per side) or 594 Mbytes (297 Mbytes per side)</td></tr>
<tr><td>Digital audio tape (magnetic)</td><td>Up to 2 Gbytes</td></tr>
<tr><td>Keyboard Interface</td><td>Operator keyboard output relays rated at 250 mA 29.9 VDC maximum per IIMKM02A module
<table><tr><th>Alarm Relays</th><th>Rating</th></tr><tr><td>Nominal Contact Voltage</td><td>24 VDC</td></tr><tr><td>Contact Current</td><td>0.25 A</td></tr><tr><td>Contact Power</td><td>6 W</td></tr></table></td></tr>
<tr><td>Alarm relays</td><td>6 per keyboard</td></tr>
<tr><td>Alarm tones</td><td>5 per keyboard</td></tr>
<tr><td>Keyboards</td><td>1 Mylar (operator)
1 Engineering (QWERTY)</td></tr>
<tr><td>Trackball or mouse</td><td>1</td></tr>
<tr><td>Annunciator display panels</td><td>4 (per IIMKM02A module) 32 pushbuttons and LEDs per panel</td></tr>
<tr><td>Printers per unit</td><td>4 (Logging)
4 (Copy screen)</td></tr>
<tr><td>Data archiving media</td><td>DAT magnetic tape/optical disk</td></tr>
<tr><td>Maximum trend storage</td><td>Three months (refer to the Configuration, Operator Interface Station (40 Series) IIOIS43 instruction).</td></tr>
<tr><td>Configuration</td><td>Nonvolatile ROM and hard disk memory</td></tr>
<tr><td>Environment</td><td></td></tr>
<tr><td>Temperature</td><td>Operating: 10° to 40°C (50° to 104°F)
Storage: -20° to 60°C (-4° to 140°F)</td></tr>
<tr><td>Relative humidity</td><td>Operating: 20% to 80% noncondensing. Recommended minimum 40%.
Storage: 10% to 90% noncondensing.</td></tr>
<tr><td>Altitude</td><td>-0.3 to +2.4 km (-0.2 to 1.5 mi)</td></tr>
<tr><td>Cooling requirements (Heat dissipation)</td><td><table><tr><th>Model</th><th>BTU/Hr Nominal</th><th>BTU/Hr Maximum</th></tr><tr><td>IIOIS43X1</td><td>853</td><td>1,145</td></tr><tr><td>IIOIS43X2</td><td>853</td><td>1,145</td></tr><tr><td>IIOIS43X3</td><td>1,427</td><td>1,767</td></tr><tr><td>IIOIS43XA</td><td>590</td><td>710</td></tr><tr><td>IIOIS43XD</td><td>1,181</td><td>1,457</td></tr></table></td></tr>
</table>

Table 1-5. IIOIS43 Console Specifications (continued)

<table>
<tr><th>Property</th><th>Characteristic/Value</th></tr>
<tr><td>Dimensions</td><td>
<table>
<tr><th rowspan="2">Model</th><th colspan="2">Height</th><th colspan="2">Width</th><th colspan="2">Depth</th></tr>
<tr><th>cm.</th><th>in.</th><th>cm.</th><th>in.</th><th>cm.</th><th>in.</th></tr>
<tr><td>IIOIS43X1</td><td>107.27</td><td>42.23</td><td>71.12</td><td>28.00</td><td>109.01</td><td>42.92</td></tr>
<tr><td>IIOIS43X2</td><td>156.94</td><td>61.78</td><td>71.12</td><td>28.00</td><td>109.01</td><td>42.92</td></tr>
<tr><td>IIOIS43X3</td><td>156.94</td><td>61.78</td><td>71.12</td><td>28.00</td><td>109.01</td><td>42.92</td></tr>
<tr><td>IIOIS43XA</td><td>221.28</td><td>87.12</td><td>60.96</td><td>24.00</td><td>76.20</td><td>30.00</td></tr>
<tr><td>IIOIS43XD</td><td>221.28</td><td>87.12</td><td>60.96</td><td>24.00</td><td>76.20</td><td>30.00</td></tr>
</table>
</td></tr>
<tr><td>Weight</td><td>
<table>
<tr><th rowspan="2">Model</th><th colspan="2">Weight</th></tr>
<tr><th>kg</th><th>lbs</th></tr>
<tr><td>IIOIS43X1</td><td>178</td><td>390</td></tr>
<tr><td>IIOIS43X2</td><td>206</td><td>450</td></tr>
<tr><td>IIOIS43X3</td><td>240</td><td>525</td></tr>
<tr><td>IIOIS43XA</td><td>247</td><td>544</td></tr>
<tr><td>IIOIS43XD</td><td>274</td><td>604</td></tr>
</table>
</td></tr>
<tr><td>Electrical noise</td><td>Keep cabinet doors closed. Do not use portable transmitting equipment within 2 meters (6.56 feet) of a cabinet.</td></tr>
<tr><td>Certification (pending)</td><td>CSA certified for use in an ordinary (nonhazardous) controlled environment.</td></tr>
</table>

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

SECTION 2 - DESCRIPTION AND OPERATION

INTRODUCTION

This section explains the theory of operation for the operator interface station. An operator uses the OIS console to monitor and control the process. The OIS console shows equipment status and process states with interactive color graphics displays. Each display can use 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 OIS operating procedures, refer to the ***Operation*** instruction (Table 1-3).

Figure 2-1 is a block diagram of the communication process.

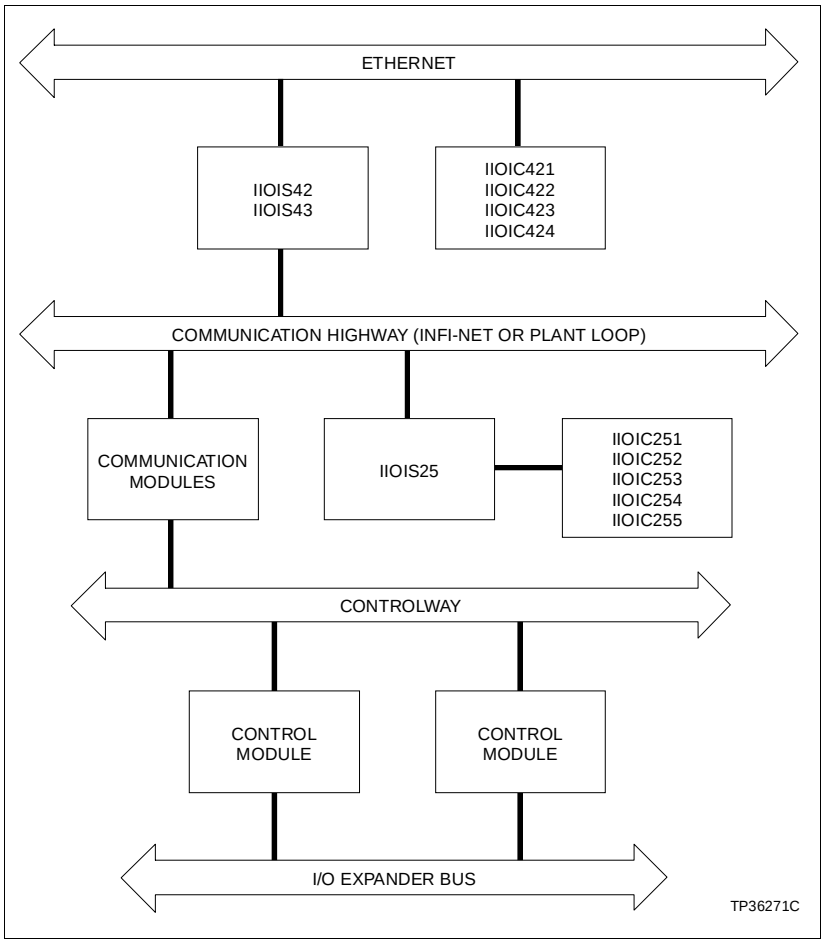

Figure 2-1. Communication Levels

CONSOLE FUNCTIONAL OPERATION

The OIS console is an operator interface with state of the art CPU technology, a user friendly operator interface and a high performance INFI 90 OPEN system interface.

The CPU is the key component in the OIS console. It is a DEC AlphaStation 255 model 233. It contains memory, SCSI and graphics cards. It also has two hard disk drives and a CD-ROM.

The multibus cards use the backplane only for power, ground and reset connections. Refer to Figure 2-2 for a block diagram of the functions and connections of the OIS console and driver cabinet.

The interface unit modules give the OIS console access to system process data and communication data by interfacing it to an INFI-NET or Plant Loop system. Three cards in the multibus card cage make up the interface unit. They are the IIMCL01 Multibus Communication Loop Termination Module,

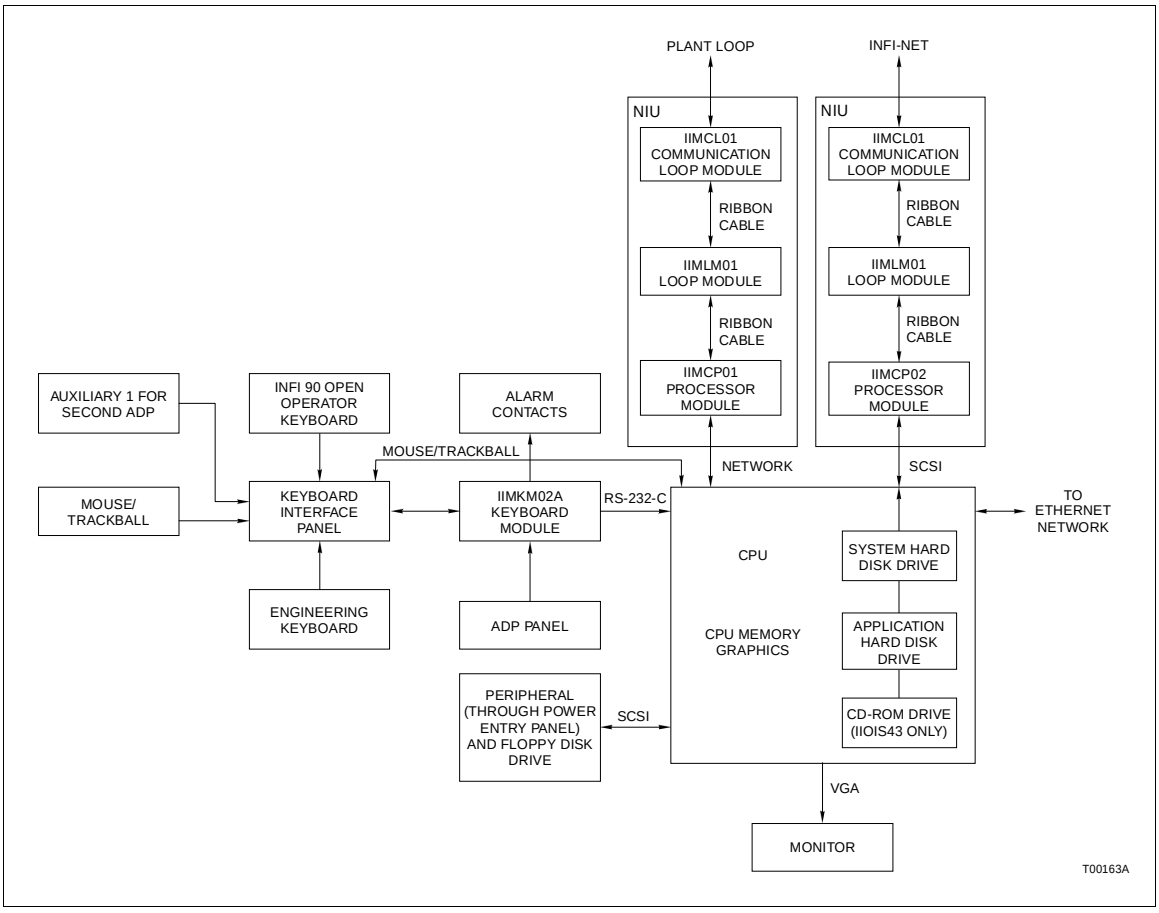

Figure 2-2. Block Diagram

IIMLM01 Multibus Loop Module and IIMCP01 (Plant Loop system) or IIMCP02 (INFI-NET system) Multibus Communication Processor Module.

The MCL module of the multibus card cage connects to the loop. Front edge connectors on the MCL module terminate a redundant coaxial or twinaxial cable of the loop. A ribbon cable connects the MCL module to the MLM module in slot two. The MLM module converts analog loop signals to digital format for the MCP module. A ribbon cable connects the MLM module to the MCP module. The MCP module is located in slot three. It is the network interface unit (NNIU01) processor card. A cable connects the MCP module to the SCSI bus.

The IIMKM02A keyboard interface provides a connection for the keyboard, all user interfaces, and the system reset signal. A cable connects the MKM module to the keyboard connector on the CPU. The IIMRM02 reset module (for driver cabinets, used in place of IMKM02A) provides module bus reset and is located in slot four.

The CPU in the OIS console may control up to two monitors on the OIS console. Monitor cable(s) plug into the connectors on the back of the monitor. The CPU also allows communications with the printers on the ethernet network cable.

The OIS has a 3.5-inch, 2.88-megabyte floppy disk drive with controller. The CPU has two 1.08 gigabyte hard disk drives; one for the VMS operating system, the other for OIS applications. A SCSI connection is provided for data storage and retrieval on DAT tape or optical disk. Commands between the OIS and the auxiliary OIC consoles pass through an ethernet network cable using either DECnet or TCP/IP protocol. Refer to Section 6 for more information on OIS43 modules and units. An internal CD-ROM drive located in the front of the CPU provides for software installation and start-up. It provides the means to load both disk drives using current software release CDs.

SECTION 3 - INSTALLATION

INTRODUCTION

This section explains how to install and prepare the OIS consoles and the OIS driver cabinets. This section is a guide for the system engineer or technician. Follow the procedures in this instruction carefully to install, maintain and use the system properly. Elsag Bailey recommends reading the entire instruction before beginning the installation and powering up the system.

For other installation information, refer to the ***Site Planning and Preparation*** instruction. Refer to Table 1-3 for the instruction number.

SPECIAL HANDLING

Observe these steps when handling electronic circuitry:

> **NOTE:** Always use the Elsag Bailey Field Static Kit (part number 1948385□1) consisting of two wrist straps, ground cord assembly, alligator clip, and static dissipating work surface when working with static sensitive devices. The kit is designed to connect the technician and the static dissipating work surface to the same ground point to prevent damage to the static sensitive devices by electrostatic discharge.

Use the static grounding wrist strap when installing and removing modules. Static discharge may damage static sensitive devices on modules in the cabinet. Use grounded equipment and static safe practices when working with static sensitive devices.

1. ***Use Static Shielding Bag***. Keep the modules in the static shielding bag until you are ready to install them in the system. Save the bag for future use.

2. ***Ground Bags before Opening***. Before opening a bag containing an assembly with static sensitive devices, touch it to the equipment housing or ground to equalize charges.

3. ***Avoid Touching Circuitry***. Handle assemblies by the edges; avoid touching the circuitry.

4. ***Avoid Partial Connection of Static Sensitive Devices***. Verify that all devices connected to the modules are properly grounded before using them.

5. ***Ground Test Equipment***.

6. ***Use an Antistatic Field Service Vacuum***. Remove dust from the cards if necessary.

7. ***Use a Grounded Wrist Strap***. Connect the wrist strap to the appropriate grounding plug on the power entry panel. The grounding plug on the power entry panel is connected to the cabinet chassis ground.

8. ***Do Not Use Lead Pencils to Set Dipswitches***. To avoid contamination of switch contacts that can result in circuit board malfunction, do not use a lead pencil to set a dipswitch.

UNPACKING AND INSPECTION

Follow these steps for general handling:

1. Examine the console or driver cabinet to make sure that no damage has occurred in transit.

2. Notify the nearest Elsag Bailey sales office of any damage.

3. File a claim for any damage with the shipping company that handled the shipment.

4. Use the original packing material or container to store the console.

5. Store the console in a place with clean air; free of extremes of temperature and humidity. Refer to Section 1 for the console specifications.

WARNING	**Verify all covers are installed and all doors are closed before operating the console. Exposed electrical connections present a shock a hazard that can cause injury or death.**
AVERTISSEMENT	**Assurez-vous que tous les couvercles sont installés et toutes les portes fermées avant de faire fonctionner la console. L´exposition à des connexions électriques presénte un risque de blessure ou d´électrocution fatale.**

Do not remove or install circuit boards with power applied to the console. The circuit board may be damaged. Remove power to all AC wiring when removing or connecting AC wires to prevent personal injury and equipment damage. Remove DC power to all DC wiring when removing or connecting DC wires or circuit boards to prevent personal injury and equipment damage.

GENERAL INSTALLATION PROCEDURES

The following steps outline the required procedure to complete the installation of the OIS console. Follow all related safety procedures when doing these steps.

> **NOTE:** Before removing a module from the multibus card cage or doing maintenance on equipment containing static sensitive devices, read ***SPECIAL HANDLING***.

1. Install the cabinet. Refer to the dimension drawings and instructions in the ***CONSOLE CABINET INSTALLATION*** and ***OIS DRIVER CABINET INSTALLATION*** and ***WIRING CONNECTIONS AND CABLING*** found later in this section.

2. Open the front door of the cabinet. This provides access to the terminals needed for wiring to the INFI-NET or Plant Loop communication highway and AC power.

3. Vibration during shipping and handling may unseat modules and connections, causing problems. Verify that modules are seated and that terminal block screws and stud fasteners are tight.

4. Check the placement of modules in the multibus card cage. Refer to ***MULTIBUS CARD CAGE*** in Section 6 to compare the module placement and to check the switch settings.

5. Connect the Plant Loop or INFI-NET communication highway; either coaxial or twinaxial cable, to the multibus communication loop module (IIMCL01). The REMOTE/LOCAL switch on the board selects the power source for the board. The switch is factory set to LOCAL. The external power through the switch passes through the 1-amp fuse. Terminating jumpers J1 through J6 are set for the communication loop type.

6. Connect any auxiliary OIC consoles to the ethernet. Refer to the IIOIC42 or appropriate instruction manual.

7. Make certain the voltage selector switch on the CPU is set for the proper input, 120 or 240 VAC.

8. Verify that no power is present to the OIS or to any auxiliary OIC when making power wiring connections. Wire AC power according to the procedures in ***AC POWER WIRING GUIDELINES*** and ***WIRING CONNECTIONS AND CABLING***. Refer to the ***Site Planning and Preparation*** instruction and the power requirements in Section 1.

> **NOTE:** Verify that the incoming voltage meets the rating on the label of TB1 on the power entry panel and Table 1-5.

9. After completing the wiring:

- Check that the peripherals have the correct voltage settings and are connected to the correct port. Refer to ***WIRING CONNECTIONS AND CABLING*** and ***PERIPHERALS***.
- Ethernet network cable requires a terminator at each end of the cable.
- Check the AC voltage sources for proper voltage and current values. Refer to the specifications in Section 1 and ***AC Power Test*** in Section 4.
- Apply power. If problems occur, refer to Section 4 for troubleshooting information.

CONSOLE CABINET INSTALLATION

Before the OIS console cabinet is set into place in a control room, insure that the floor is level in the area where the cabinets will be set. Make sure the location can accommodate the console. Figure 3-1 shows the console cabinet and anchoring dimensions.

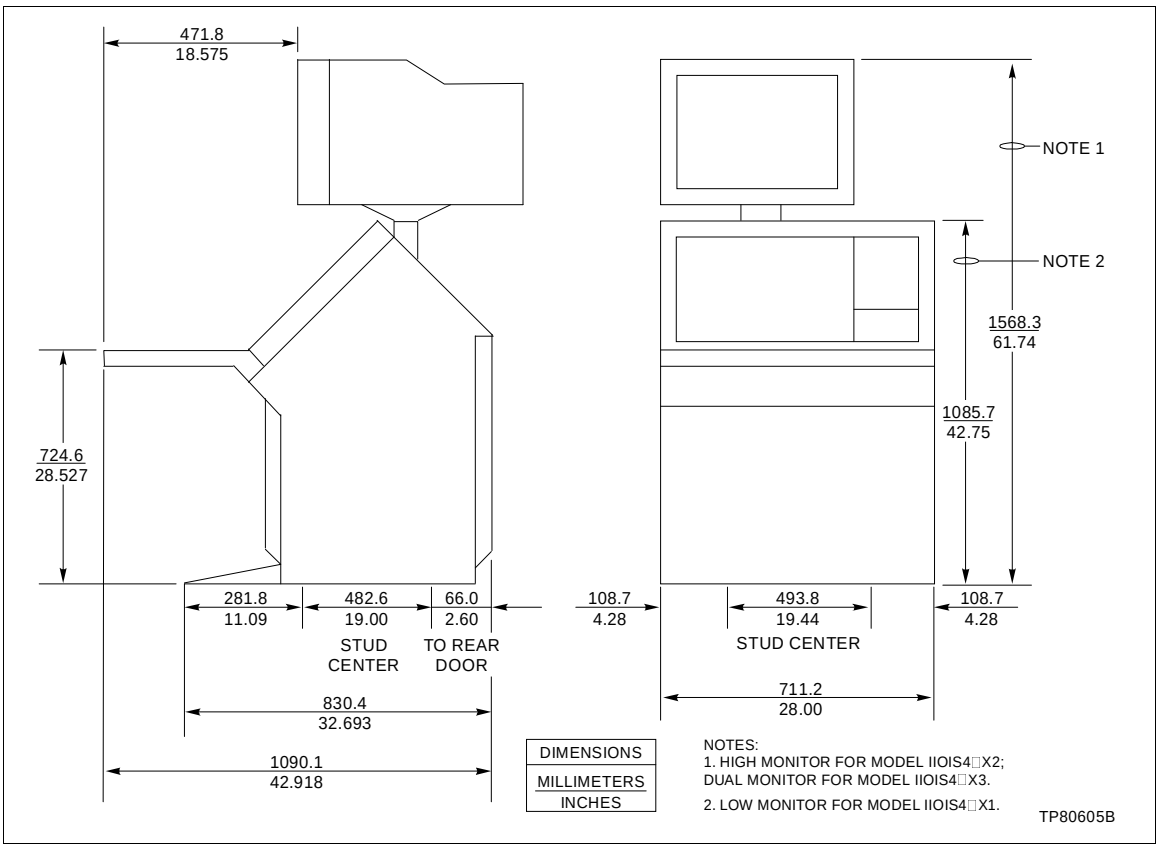

Figure 3-1. OIS Console and Anchoring Dimensions

To install the console cabinet:

1. Adjust the leveling screws on all cabinets and connecting tables until the monitor bezel of each cabinet lines up. The leveling screws adjust 26.70 millimeters (1.05 inches).

2. After securing the cabinets, put the tables on the cabinets and lock them into place by pushing the red handle above the front access door to the right until it stops at the bottom of the slot.

3. The tabletops are adjustable. The brackets supporting the tabletops are bolted through oversize holes. Loosen the bolts and move the top up to 6.35 millimeters (0.25 inches) up, down, forward or back toward the cabinet to line up the tabletop.

4. Two steel table alignment pins are shipped inside the brass bushings located on each side of each tabletop. When two tabletops are lined up, push the pins outward into the bushing of the table to the right of the cabinet. Tighten the three bolts on each tabletop support bracket.

Figure 3-2 shows the keyboard table. Figure 3-3 shows the 15-degree wedge table dimensions, and Figure 3-4 shows the 45-degree wedge table dimensions.

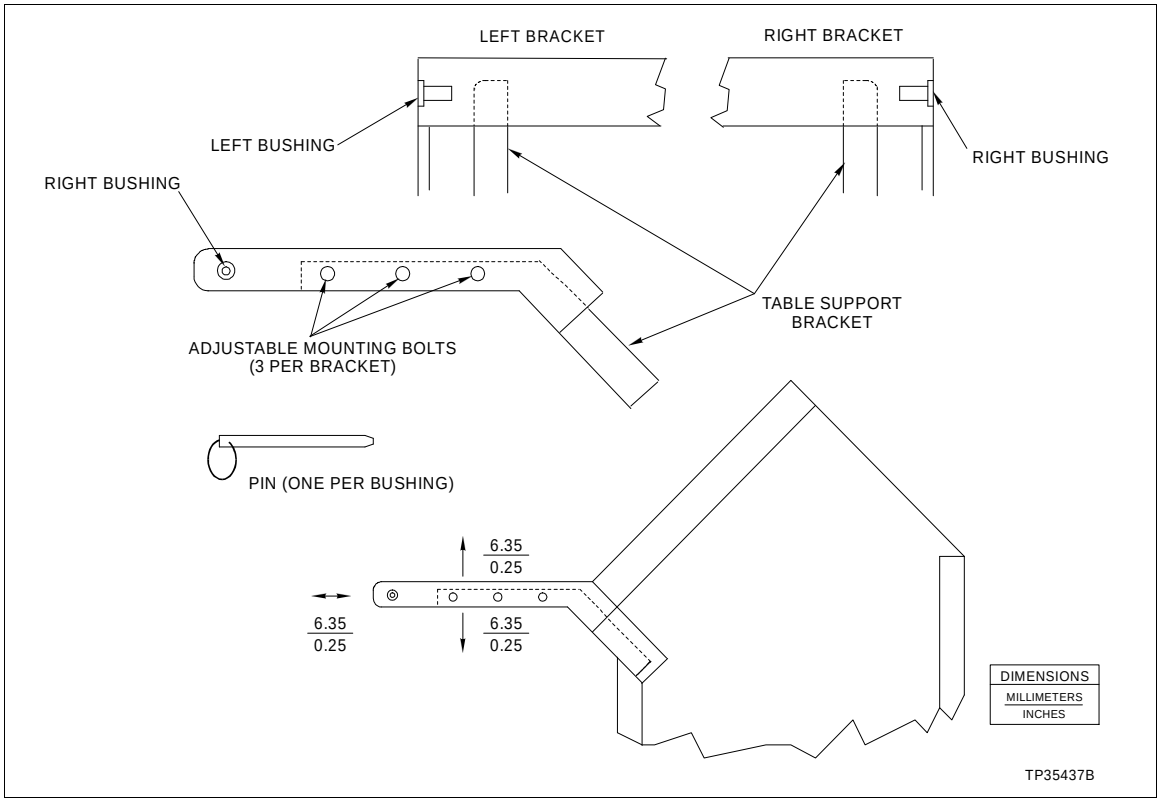

Figure 3-2. Keyboard Table

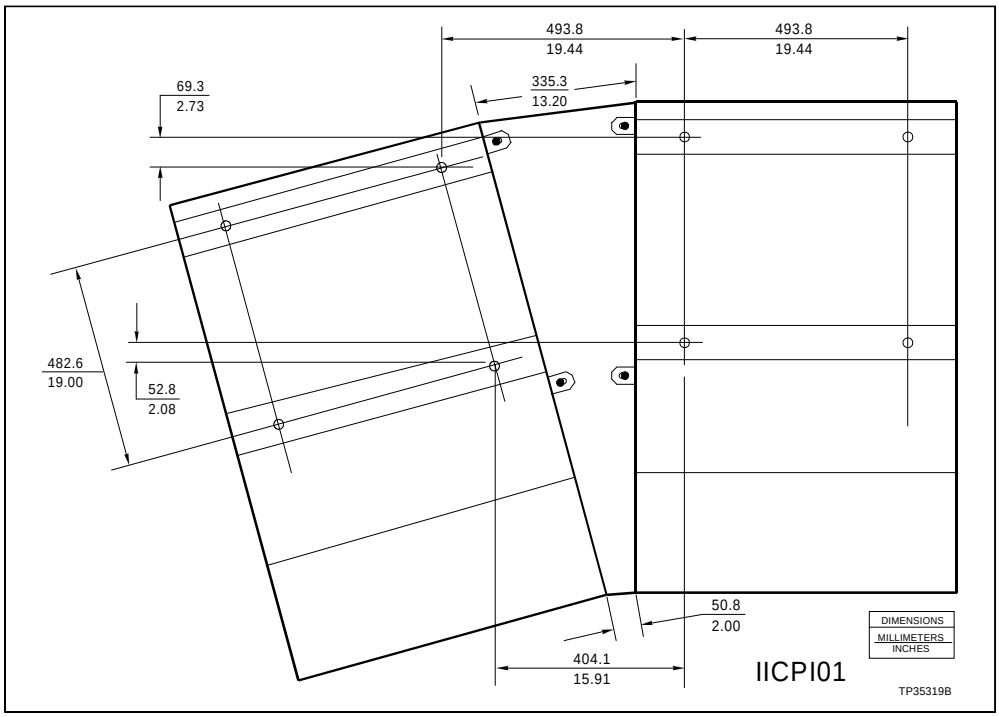

Figure 3-3. 15-Degree Wedge Dimensions

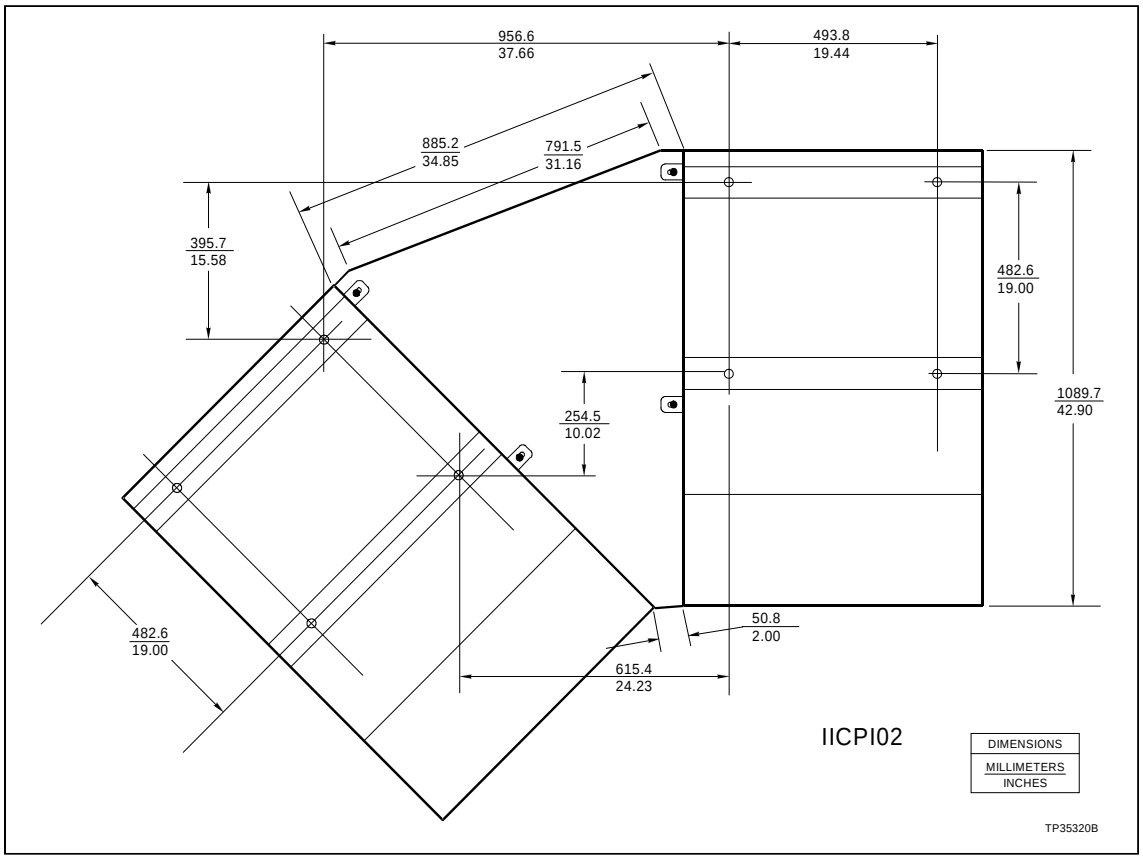

Figure 3-4. 45-Degree Wedge Dimensions

Protect the wires and cabling going to the OIS console. Run cabling through conduit to the rear of the cabinet or under the floor through the bottom of the cabinet. Follow local wiring codes when wiring and installing cableways or conduit. Refer to the ***Site Planning and Preparation*** instruction for more information.

OIS DRIVER CABINET INSTALLATION

The hardware in an IIOIS43 driver cabinet consists of the same hardware as the OIS console. Note that the optical disk is an optional archiving device in the driver cabinet.

Before the driver cabinet is set into place, ensure that the floor is level in the area where the cabinet will be set. The unit must be secured to the floor before it is wired or operated. The cabinet dimensions are shown in Figure 3-5. The dimensions for locating the mounting screws are shown in Figure 3-6.

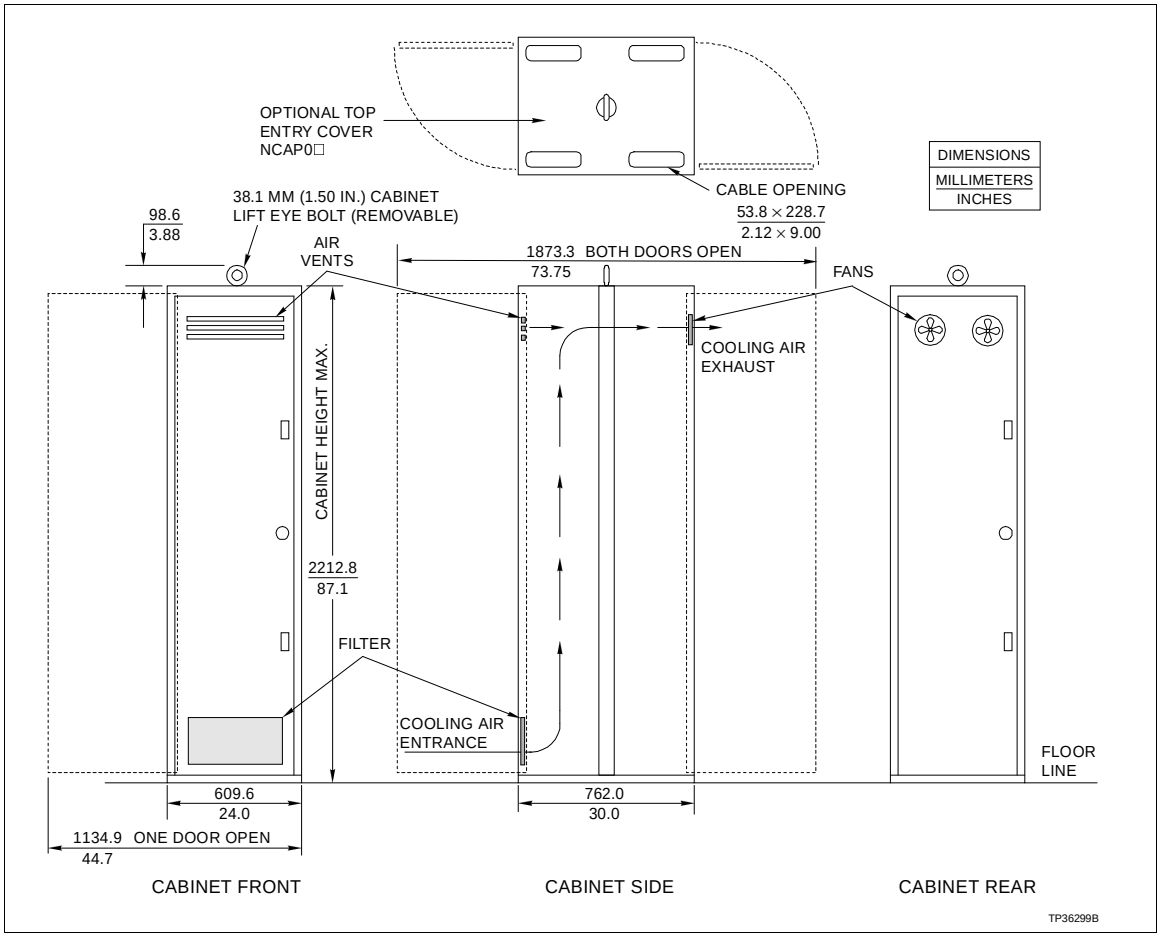

Figure 3-5. Driver Cabinet Dimensions

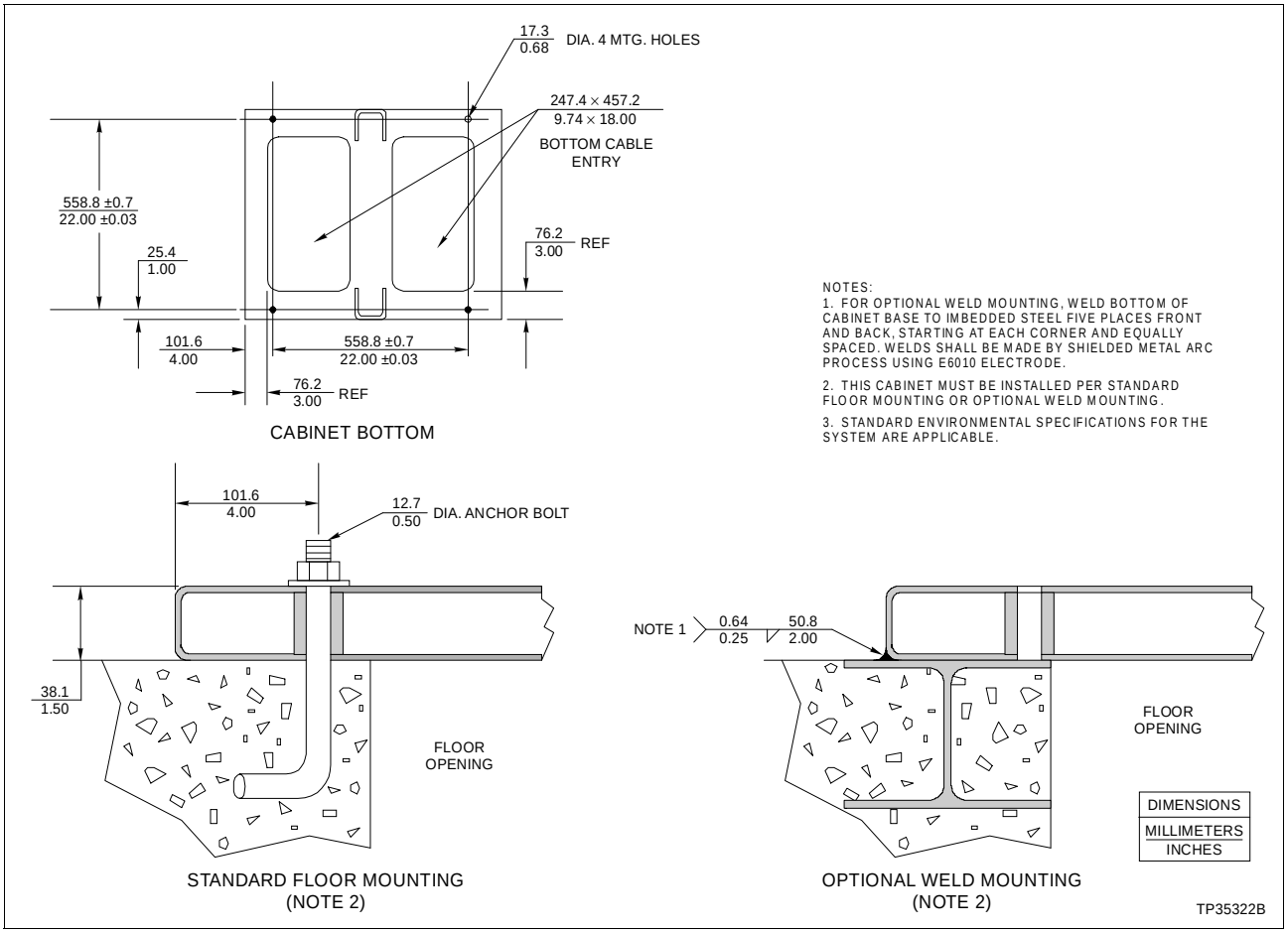

Figure 3-6. Driver Cabinet Anchoring Dimensions

The driver cabinet has a front and rear swing-out door with individual locks. Two cable entries are located at the bottom of the unit. Protect the wires and cabling going to the driver cabinet. Run cabling through conduit to the rear of the cabinet or under the floor through the bottom of the cabinet. Follow local wiring codes when wiring and installing cableways or conduit. For more information, refer to the ***Site Planning and Preparation*** instruction.

AC POWER WIRING GUIDELINES

IIOIS43 AC power input connects to a terminal block on the power entry panel. The IIOIS43 console or driver cabinet can operate from 120/240 VAC, 50/60 hertz. The power entry panel provides line filtering, transient suppression and a 20-amp circuit breaker.

In addition to AC input terminals, the power entry panel 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 IIOIS43 console or driver cabinet for 240-VAC requires that the voltage selector switch on the CPU be in the proper position. The power supply is autosensing. Refer to Section 6 for more power supply 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:** If remote OICs are being installed, be sure they are powered using the same power source and ground as the OIS console to reduce the chance of communication problems on the ethernet network. Failure to do so may cause data to be changed or lost.

The recommended minimum size for power wiring is 14-AWG copper wire with a 600-volts, 75-degrees Celsius (167-degrees Fahrenheit) rating and thermoplastic insulation. Wire with a 300-volts or 150-volts 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 console or driver cabinet 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 power entry panel.

Over-current protection provided for the AC distribution must be sized to allow for the inrush current required by the OIS hardware. Refer to specifications in Section 1 for peak inrush current and duration for the OIS console or driver cabinet.

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

AC OUTLETS

There are two power entry panels used for the OIS. One is for the OIS console, the other is for the OIS driver cabinet.

On the OIS console models, there are five AC outlets on the power entry panel. 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 the magnetic tape drive.

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

On the OIS driver cabinet models, there are also five AC outlets on the power entry panel. Three are located on the rear of the

assembly and two are located on the front. They are all marked A/C OUTLET.

WIRING CONNECTIONS AND CABLING

The IIOIS43 console or driver cabinet is internally wired when it is shipped. Connect the communication loop cables, AC power and any peripheral devices. Communication loop cables connect to the IIMCL01 module in the multibus card cage. Refer to Figure 3-7 for IIMCL01 module location of communication loop cable connectors. Peripheral devices connect to the front of the power entry panel. Refer to ***PERIPHERALS*** for specific instructions on installing and configuring peripheral devices.

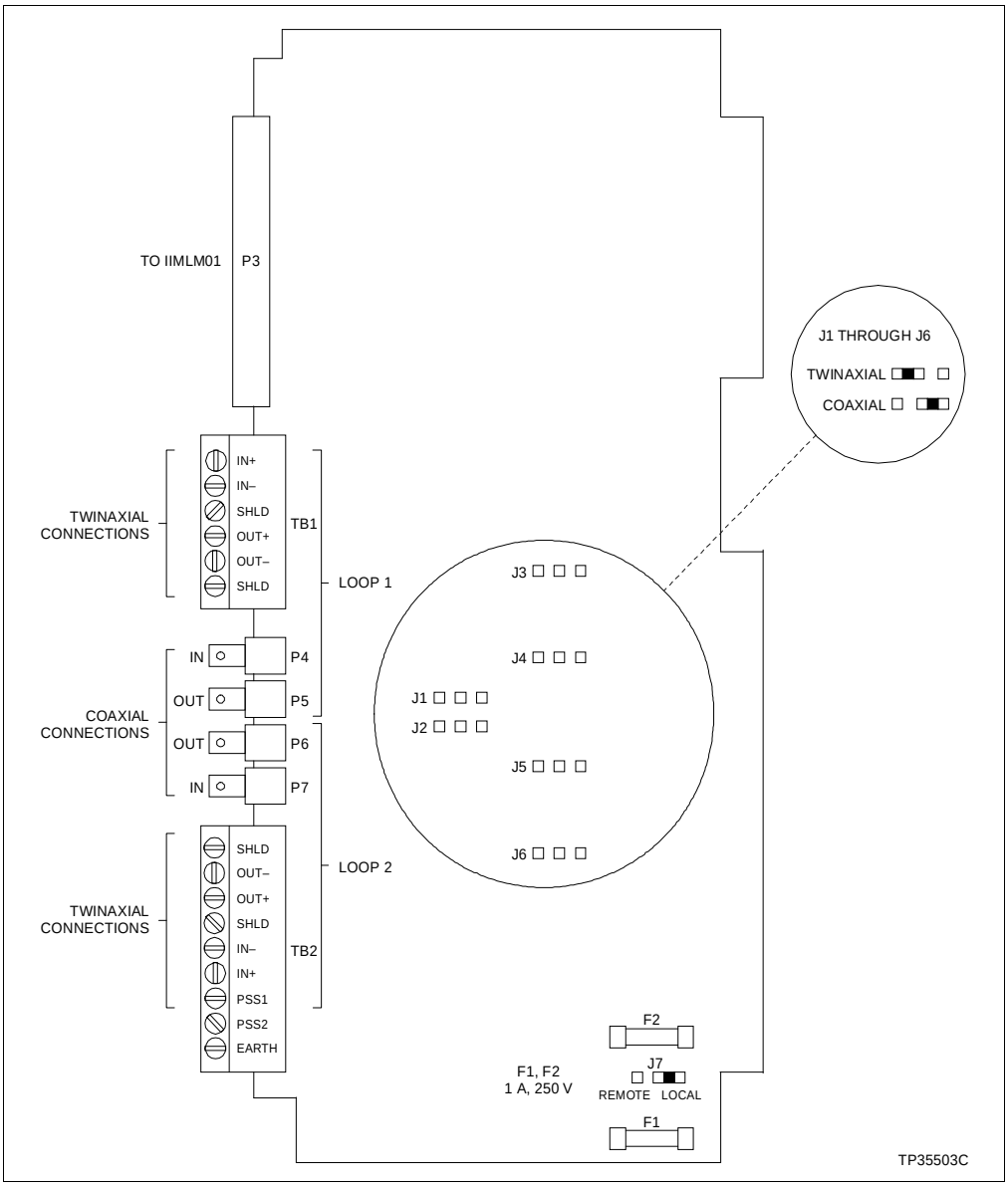

Figure 3-7. IIMCL01 Module Communication Loop Connections

Table 3-1 contains the color codes for the wiring in the OIS console or driver cabinet.

Table 3-1. Wiring Color Codes

Color	Function
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

Follow local wiring codes when wiring and installing cableways or conduit. For more information, refer to the ***Site Planning and Preparation*** instruction manual.

1. Wire AC power to the proper terminals at the front of the power entry panel. Refer to Figure 3-8 for AC input terminal location for OIS43 driver cabinets. Refer to Figure 3-9 for AC input terminal location for OIS43 consoles.

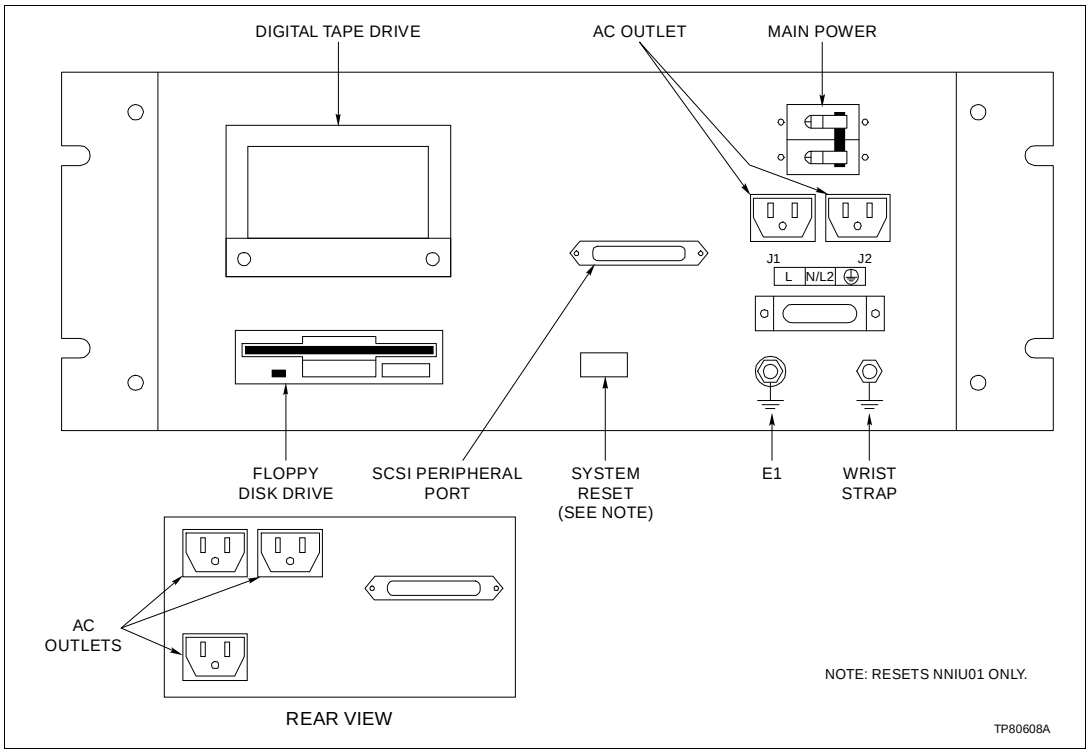

Figure 3-8. Driver Cabinet Power Entry Panel

2. Connect only 120/240 VAC at 50/60 hertz into the terminal block below the circuit breaker on the power entry panel.

> **NOTE:** Verify that the incoming voltage meets the rating on the label of TB1 on the power entry panel. Refer to ***AC POWER WIRING GUIDELINES*** in this section.

Figure 3-10 shows the IIOIS43 console cable connection diagram. Figure 3-11 shows the IIOIS43 driver cabinet cable connection diagram. Table 3-2 lists a description of the cable connections shown in Figures 3-10 and 3-11.

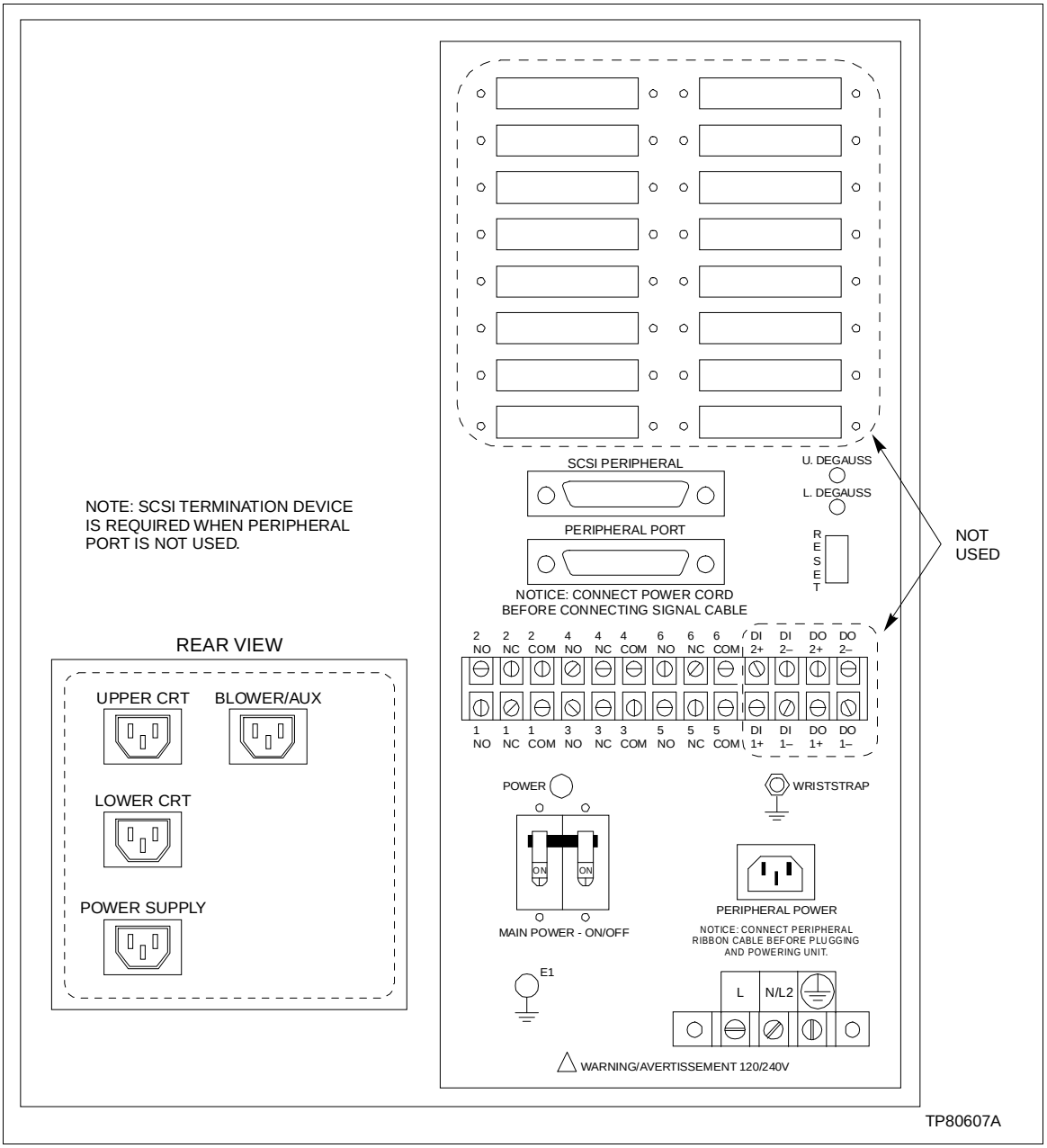

Figure 3-9. Console Power Entry Panel

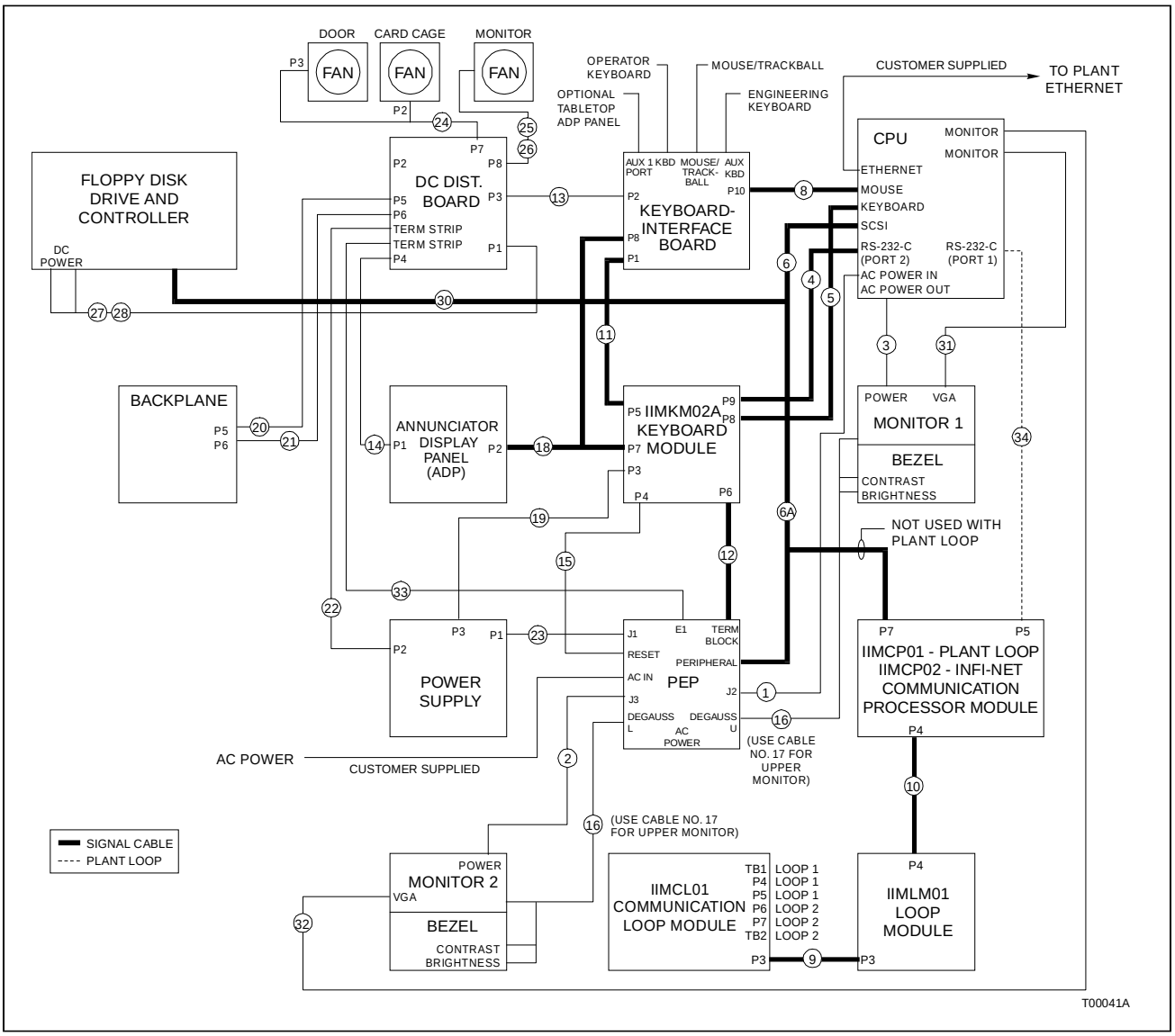

Figure 3-10. Console Cable Connections

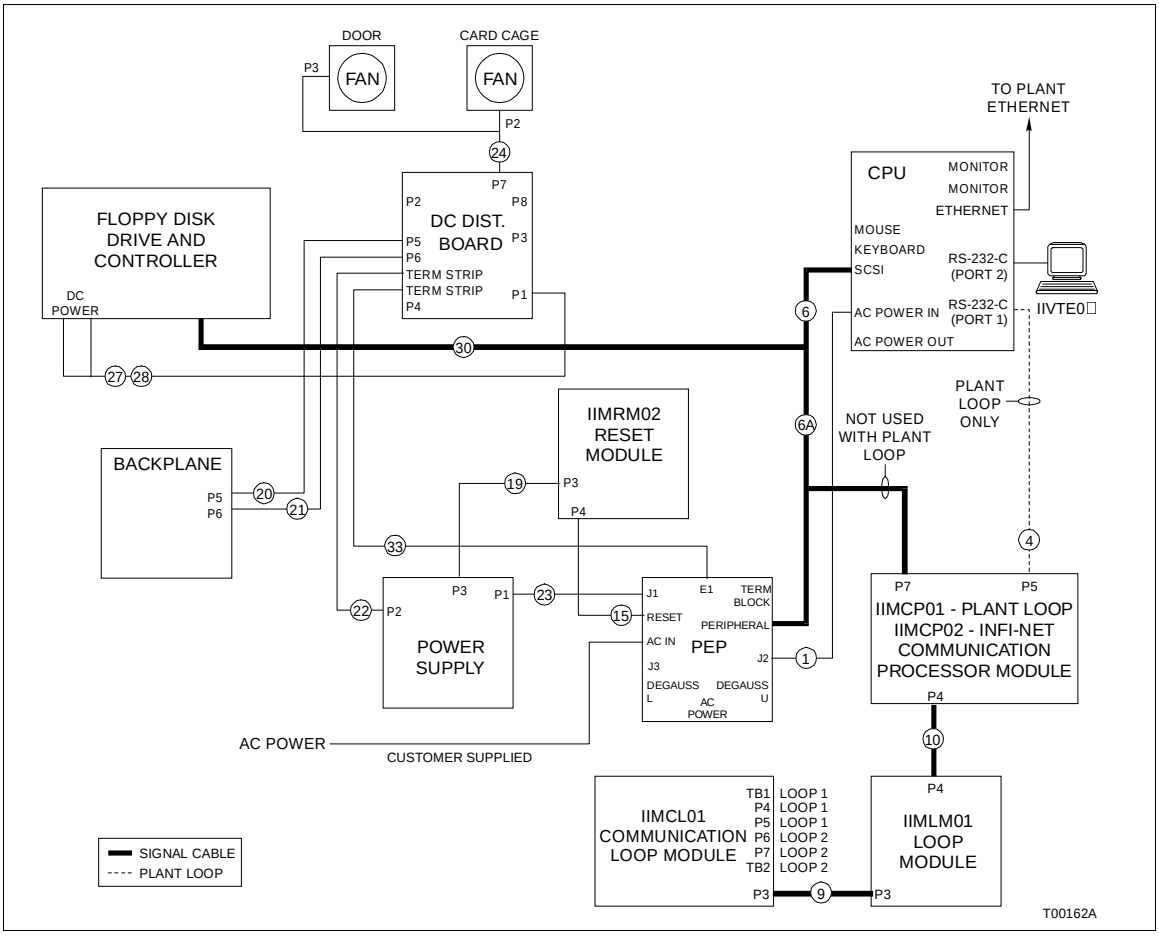

Figure 3-11. Driver Cabinet Cable Connections

Table 3-2. Console and Driver Cabinet Cable Connections

Figure 3-10 and 3-11 Cable No.	Part Number	Name	Connect From	Connect To
1	1947950□1	AC power	J2 on power entry panel	AC power in on CPU
2	1947950□5	AC power	J3 on power entry panel	To power connector on monitor 2
3	1947950□	AC power	AC power out on CPU	AC power connector on monitor
4	6639637□4	I/O signal (console)	P9 on IIMKM02A	RS-232-C (Port 2) on CPU
		I/O signal (driver cabinet)	P5 on IIMCP01	RS-232-C (Port 1) on CPU
5	6642339□1	Keyboard signal	P8 on IIMKM02A	Keyboard port on CPU
6	1949207□5	SCSI cable adapter	SCSI port on CPU	SCSI cable (6A) (6641230□1)
8	6642341□1	Mouse signal	P10 on keyboard interface board	Mouse port on CPU through adapter
9	6634512□26N4	Internal I/O	P3 on IIMCL01	P3 on IIMLM01
10	6634512□26N4	Internal I/O	P4 on IIMCP01/02	P4 on IIMLM01

Table 3-2. Console and Driver Cabinet Cable Connections (continued)

Figure 3-10 and 3-11 Cable No.	Part Number	Name	Connect From	Connect To
11	6634512□26N72	I/O distribution	P5 on IIMKM02A	P1 on keyboard interface board
12	6634512□26N72	I/O distribution	P6 on IIMKM02A	Rear terminal block on power entry panel
13	6638713□1	Peripheral power	P2 on keyboard interface board	P3 on DC distribution board on main power supply
14	6638713□2	Power	P1 on annunciator display panel board (ADP02)	P4 on DC distribution board
15	6638719□1	Reset cable	Reset switch on power entry panel	P4 on IIMKM02A
16	6638720□4	Lower monitor bright	Bezel brightness and contrast Degaussing switch on power entry panel	9-pin connector on rear of monitor
17	6638720□5	Upper monitor bright	Bezel brightness and contrast Degaussing switch on power entry panel	9-pin connector on rear of monitor
18	6638849□1	Annunciator display panel signal	P7 on IIMKM02A	P8 on keyboard interface board P2 on ADP panel
19	6640113□4	PFI sense	P3 on power supply	P3 on IIMKM02A
20	6640368□1	DC Power	P5 on DC distribution board	P5 on backplane
21	6640368□1	DC Power	P6 on DC distribution board	P6 on backplane
22	6640369□1	DC Power	P2 on power supply	Terminal strip on DC distribution board
23	6640371□1	AC power	J1 on power entry panel	P1 on power supply
24	6640640□1	DC Power	P7 on DC distribution board	Cable P2 to fan on card cage Cable P3 to fan on back door
25	6640640□3	DC Power	P8 on DC distribution board	IIOIS43X1 (lower monitor) Cable P2 to fan on lower monitor Cable P3 to fan on lower monitor Cable P4 to fan on lower monitor IIOIS43X2 (upper monitor) Cable P2 to fan on upper monitor Cable P3 to fan on upper monitor Cable P4 not used
26	6640640□4	DC power	P8 on DC distribution board	IIOIS43X3 (dual monitors) Cable P2 to fan on lower monitor Cable P3 to fan on lower monitor Cable P4 to fan on lower monitor Cable P5 to fan on upper monitor Cable P6 to fan on upper monitor Cable P7 not used
27	6641228□1	DC peripheral power	Floppy disk drive (Y cable P3)	P1 on DC distribution board
28	6641228□1	DC peripheral power	Floppy disk drive controller (Y cable P2)	

Table 3-2. Console and Driver Cabinet Cable Connections (continued)

Figure 3-10 and 3-11 Cable No.	Part Number	Name	Connect From	Connect To
30	6641230□1	SCSI cable	SCSI peripheral port on power entry panel	Floppy disk controller P7 on IIMCP02 SCSI adapter cable (1949207A5)
31	1949138□1	VGA cable	Monitor port on CPU as applicable	VGA on monitor 1
32	1949138□2	VGA cable	Monitor port on CPU as applicable	VGA on monitor 2
33	6638710□19	DC grounding cable	E1 port on power entry panel	Terminal strip on DC distribution board
34	1948768□1	Communication (console)	P5 on the IIMCP01	RS-232 port 1 on CPU

MONITOR INSTALLATION

1. Plug the monitor cable into the appropriate monitor port on the back of the CPU.

2. Connect the appropriate VGA cable to the back of the monitor. Use only supplied cables because of length limitations.

3. Plug the monitor power line into the proper socket on the back of the CPU.

VGA cables connect the lower monitor, the upper monitor or dual monitors of the IIOIS43 console to the correct monitor port on the CPU.

A 9-pin D subconnector connects an external brightness, contrast and degauss control at AUX 1 of the monitor connection panel.

Screen brightness, contrast, width and height controls are mounted on the monitor back connection panel for all models. There are three degauss reset switches; one is located on the monitor connection panel and two are located on the power entry panel.

Monitor wiring connector location may be slightly different for each OIS console.

> **NOTE:** The monitor is autosensing and does not need to be switched if the power to the cabinet is 120 or 240 VAC. However, if other monitors are used, they may need to be switched to prevent damage from over or under voltage.

Figure 3-12 identifies the color monitor connections.

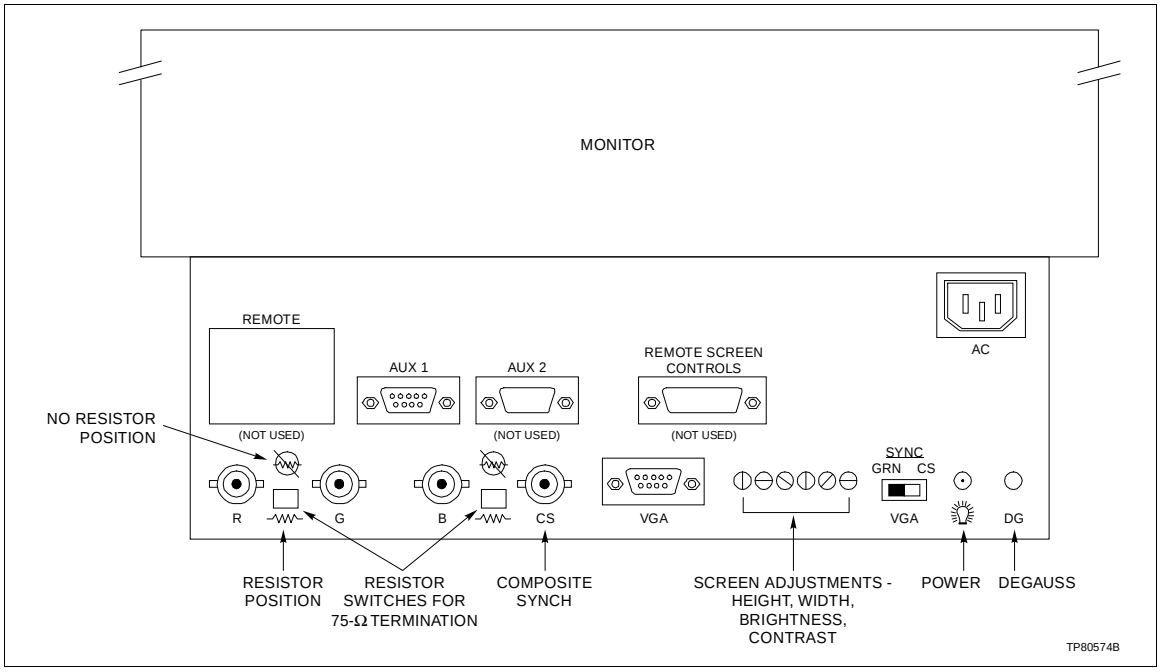

Figure 3-12. Color Monitor Connections and Adjustments

OPERATOR INTERFACE DEVICES

This section contains information and the installation instructions for the operator and engineering keyboards, mouse/trackball and the annunciator display panels.

Operator Keyboard

Plug the keyboard (Fig. 3-13) into the KEYBOARD port on the keyboard interface board. The 0.9-meters (3-feet) long coiled cord can be stretched to 2.4 meters (8.0 feet).

IIAKB03A Engineering Keyboard

Each IIOIS43 console supports an additional IIAKB03A engineering keyboard (QWERTY) (Fig. 3-14). A 6-pin mini DIN to 5-pin DIN adapter is supplied with the keyboard. All consoles have a five-pin DIN connector on the keyboard interface panel. Plug in the keyboard at the AUX KBD connector. Power does not have to be removed from the console before plugging in or unplugging the keyboard. Initializing the system is not needed after plugging in or unplugging the keyboard. If necessary, keyboard mapping information is in the ***Operation*** instruction. Refer to Table 1-3 for instruction number.

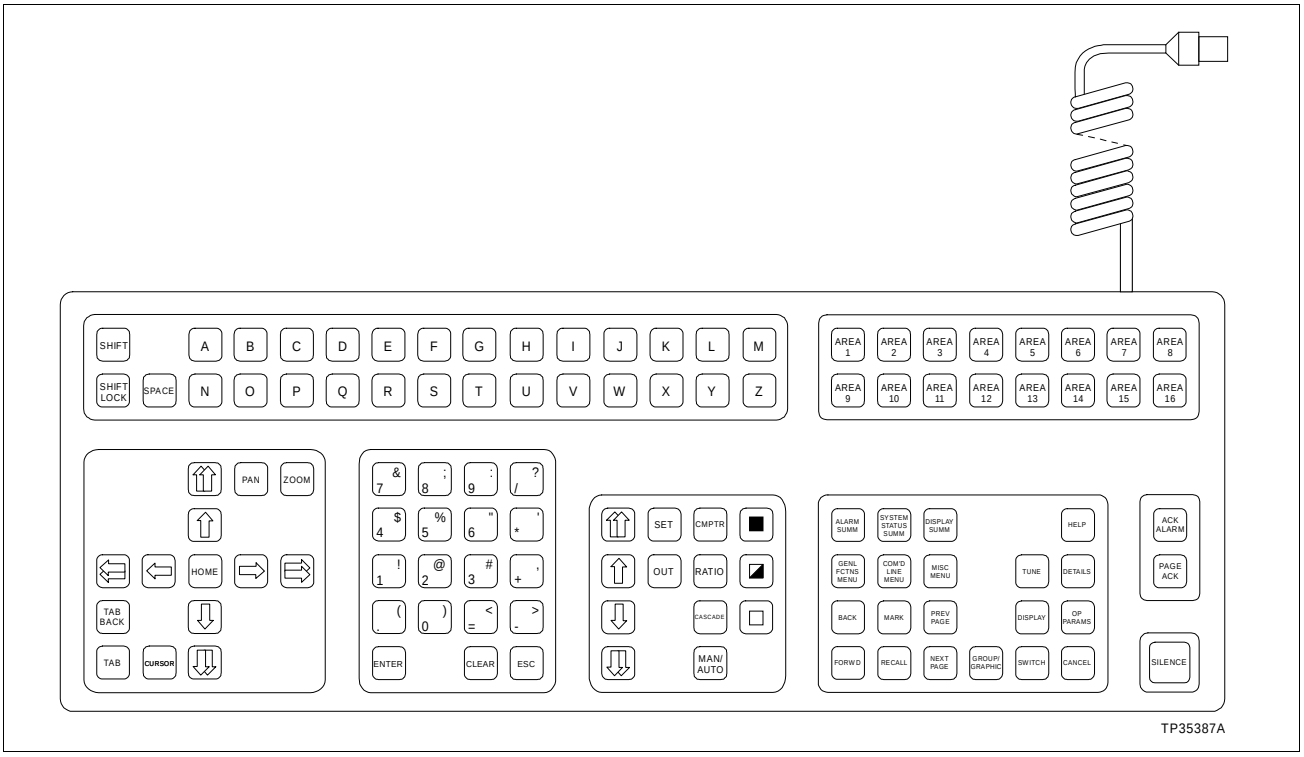

Figure 3-13. Operator Keyboard

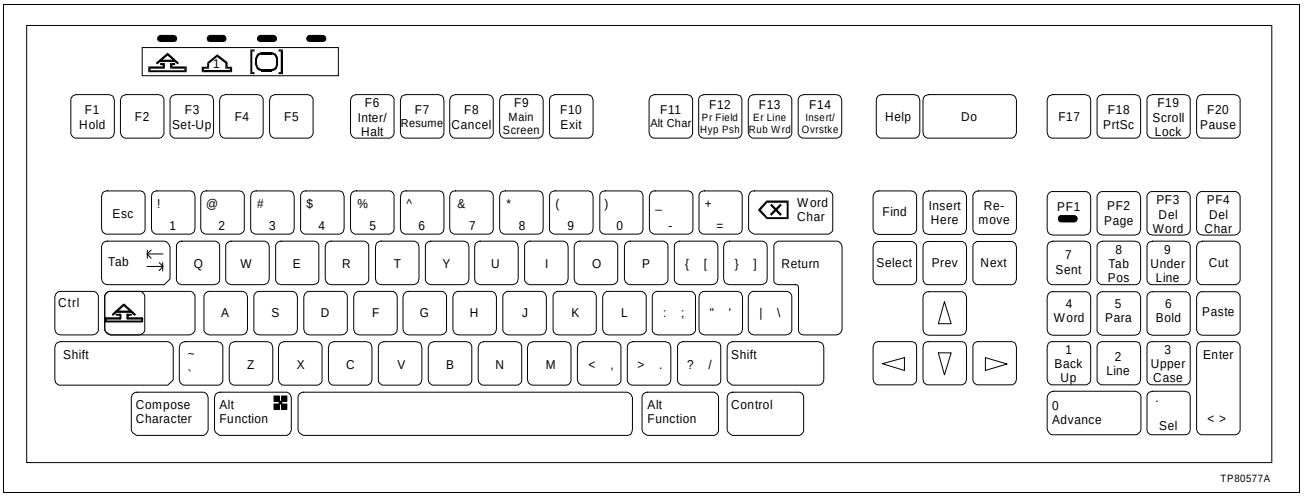

Figure 3-14. Engineering Keyboard

IIATB05 Trackball and IIAMS04A Mouse

The trackball and mouse permit faster cursor positioning during normal operator control or configuration. The trackball or mouse plugs into the keyboard interface panel (Fig. 3-15) at the MOUSE/TRACKBALL port.

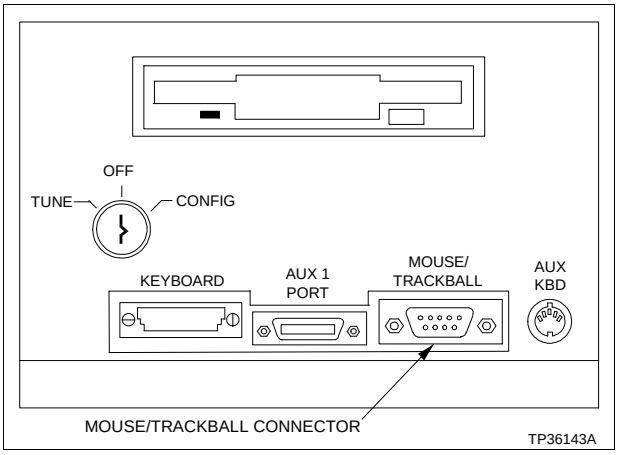

Figure 3-15. Trackball/Mouse Connection

IIADP01 Annunciator Display Panel

The IIADP01 annunciator display panel is a tabletop unit that provides 32 LEDs and pushbuttons. Each LED is assigned to a tag. Each pushbutton may be assigned to a display or a key macro. When a tag goes into an alarm condition, the assigned LED turns on. Press the pushbutton to call the display or key macro assigned to it.

Up to four annunciator display panels can be driven from an MKM module. Maximum cable length is 4.5 meters (15 feet). Refer to Figure 3-16 for the address dipswitch configuration. Refer to Table 3-3 for cable connections when using multiple ADPs.

Table 3-3. IIADP01 Board Connections for Multiple ADPs

Cable Number	Connect From	Connect To
1948978□1	P1 or P2 on ADP 2	AUX 1 port on keyboard interface panel or to P1 or P2 on ADP 3 board

IIADP02 Annunciator Display Panel

The IIADP02 annunciator display panel provides an additional 32 LEDs and pushbuttons. Each LED is assigned to a tag. Each pushbutton may be assigned to a display or a key macro. When a tag goes into an alarm condition, the assigned LED turns on. Press the pushbutton to call the display or key macro assigned to it. Refer to Figure 3-17 for the address dipswitch configuration.

Up to four annunciator display panels can be driven from an MKM module. Maximum cable length is 4.5 meters (15 feet).

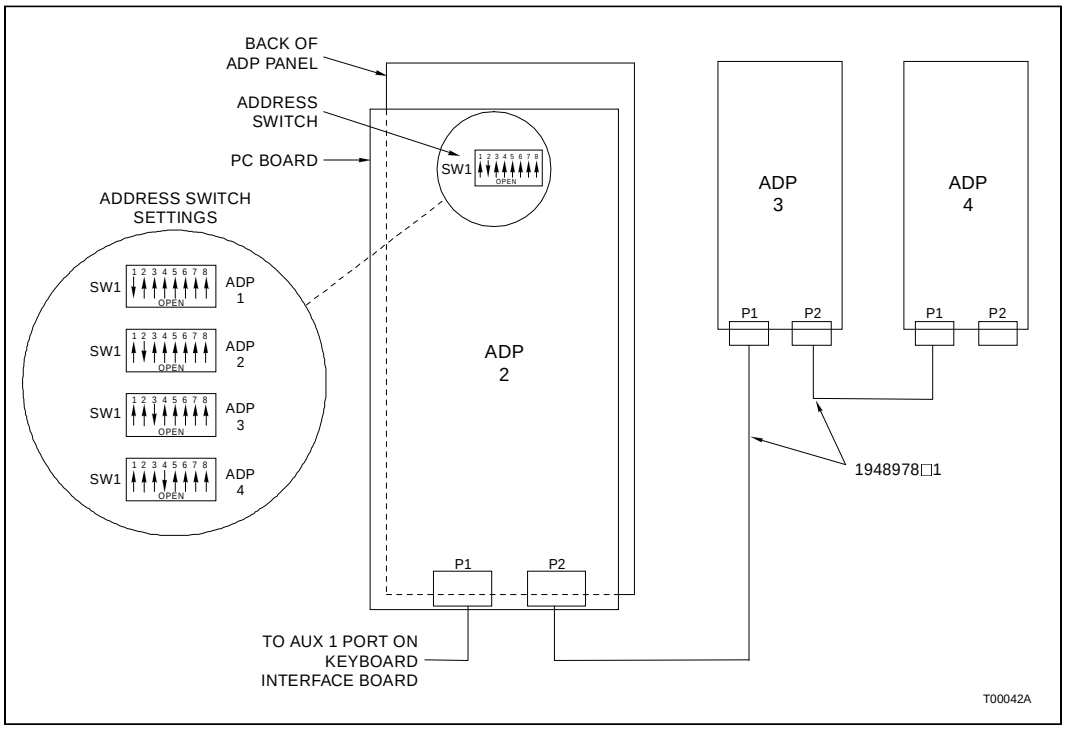

Figure 3-16. IIADP01 Annunciator Display Panel

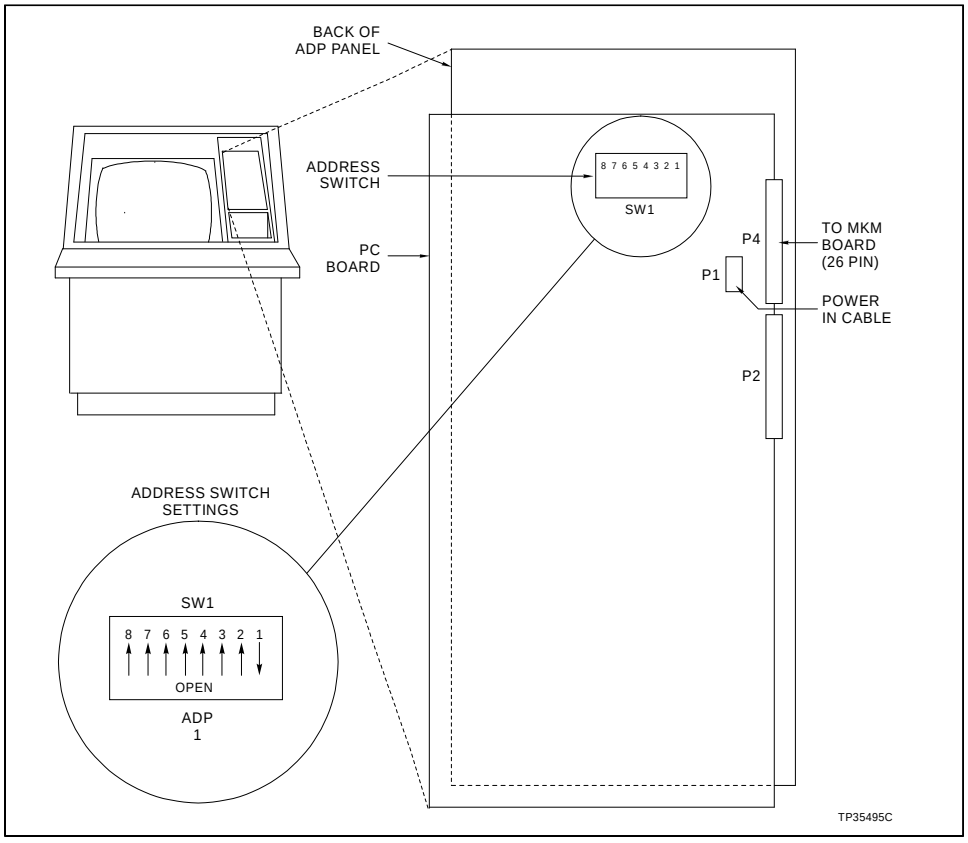

Figure 3-17. IIADP02 Annunciator Display Panel

Touch Screen

A touch screen accessory provides a means of selecting display options by touching the desired area on the monitor screen. Up to two touch screen controller cards can be mounted onto the IIMKM02A module. The first touch screen controller card mounts onto the component side of the MKM module. The second touch screen controller card is identical to the first and mounts onto the solder side of MKM module. The touch screen card interprets signals from the touch screen monitor overlay and sends them to the MKM board. This accessory can be used on all console models and is ordered by nomenclature (Table 3-4). One touch screen may be installed per color monitor. This accessory requires the addition of a touch screen and touch screen controller card.

Table 3-4. Touch Screen Nomenclature

Nomenclature	Description
AOHOIS42TS1	IIOIS43X1 single lower console
AOHOIS42TS2	IIOIS43X2 upper monitor
AOHOIS42TS3	IIOIS43X3 dual monitor

CONTROLLER CARD INSTALLATION

Figure 3-18 shows the wiring connections. Figure 3-19 shows the dipswitch settings and jumper positions of the touch screen controller card and the jumpers on the IIMKM02A board. Before attaching the touch screen ribbon cable to the controller board, ground the capacitive charge on the touch screen to the monitor case ground:

1. Insert one end of a 24-AWG wire into either outside touch screen cable connector contact.

2. Press the other end of the wire to the monitor case ground.

NOTE: Failure to perform this may damage the electronic components on the controller by the stored charge from the 25 kV anode during picture tube operation.

TOUCH SCREEN INSTALLATION

Follow the directions in the touch screen installation kit.

1. Remove the monitor. Follow the instructions earlier in this section. Follow all cautions and warnings.

2. Follow the directions in the installation kit to attach the touch screen to the face of the monitor. Use the Velcro™ supplied in the kit.

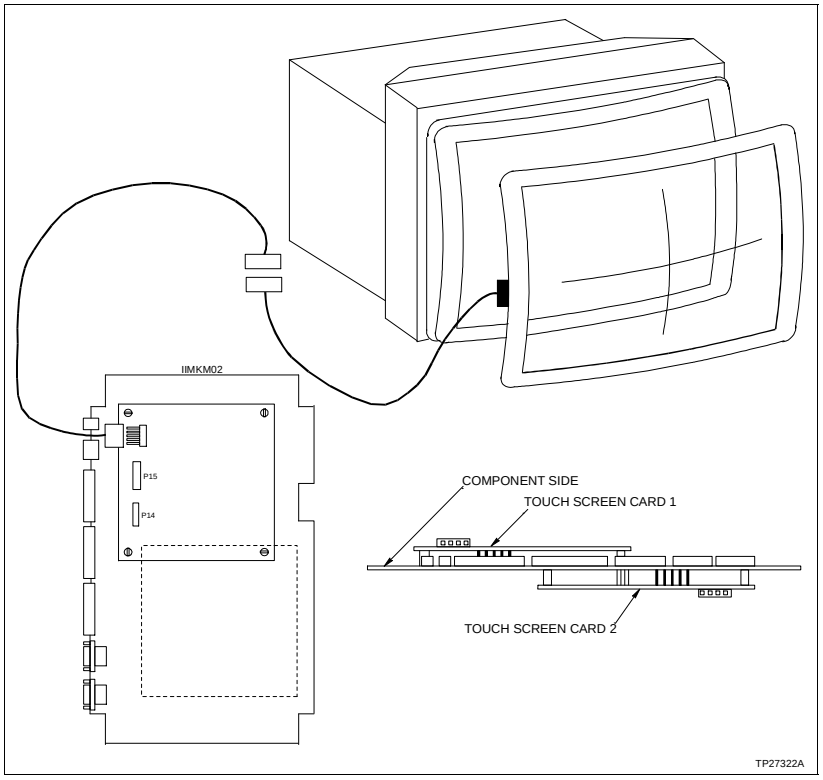

Figure 3-18. Touch Screen Controller Card Connections

3. Connect the cable to the touch screen controller card. Note that pin one on the cable has the red stripe.

4. Attach the touch screen controller card to the MKM card with the four nylon spacers and screws.

5. Repeat the procedure if installing a second kit.

CALIBRATING THE TOUCH SCREEN

On-line calibration can be done from the console. For operating information, refer to the ***Operation*** and ***Configuration*** instructions (Table 1-3).

TOUCH SCREEN JUMPER SETTINGS

Jumpers J6 through J9 on the IIMKM02A keyboard module control the touch screen accessory (Fig. 3-19).

1. For OIS consoles with upper or lower monitors, set jumpers J6 and J8 at 1 to 2.

2. For OIS consoles with dual monitors, set jumpers J6 through J9 at 1 to 2.

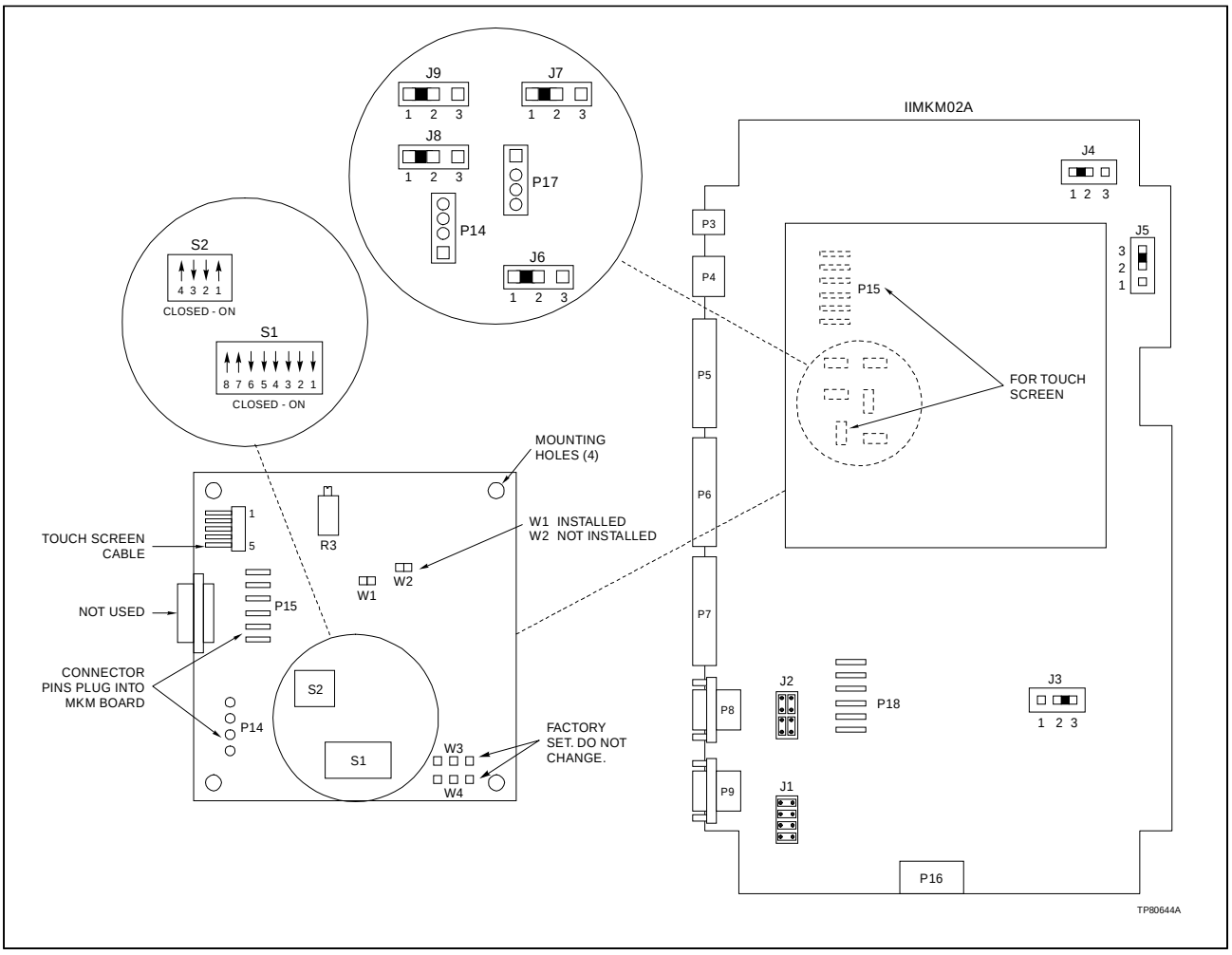

Figure 3-19. Touch Screen Controller Card Switch/Jumper Settings

PERIPHERALS

CAUTION	**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 setting or equipment damage may result.** **Remove power from all peripheral equipment and the console before installing or removing peripheral equipment. Equipment damage may result.**
ATTENTION	**Assurez-vous que toutes les indications de tension et tous les réglages de tension sur les périphériques, le bloc d´alimentation et le panneau d´entrée des alimentations correspondent bien à la tension de service. Une tension incorrecte risque d´endommager l´equipment. Assures-vous que le disjoncteur d´alimentation principal de la console est étient avant de modifier les réglages de tension de service afin d´éviter d´endommager l´équipment.** **Coupez l´alimentation des périphériques et de la console avant d´installer ou de retirer des périphériques, sinon l´équipment risque de subir des dommages.**

This section provides general instructions on how to install the peripherals. Peripheral devices are the printers, data storage devices (DAT tape and optical disk) and IIVTE0□ video terminal that connect to the console and or driver cabinet. This section contains the cabling information and switch settings required for installation.

Refer to the manufacturer's documentation for more information on peripheral devices. Figure 3-9 shows the SCSI peripheral port location on the OIS console power entry panel and Figure 3-8 shows SCSI peripheral port location on the OIS driver cabinet.

SCSI Bus Hardware

The archiving or disk backup devices, CPU, MCP module, and CD-ROM drive require address settings. Refer to Table 3-5 for the SCSI bus hardware addresses.

Table 3-5. SCSI Bus Hardware Addresses

Address	SCSI Bus Device
0	Hard disk drive (1.08 Gbyte system)
1	Hard disk drive (1.08 Gbyte application)
2	Floppy disk drive

Table 3-5. SCSI Bus Hardware Addresses (continued)

Address	SCSI Bus Device
3	IIMCP02 module
4	CD-ROM
5	DAT tape drive
6	Optical disk drive
7	CPU

Insert a 50-pin SCSI terminator into the SCSI peripheral connector of the power entry panel when it is not used. Remove the terminator in the power entry panel to connect peripheral hardware.

NOTES:

1. A SCSI terminator must always be connected to the last device on the external SCSI bus.

2. Address settings and procedures for all non-Elsag Bailey external hardware are located in the manufacturer's instructions. The SCSI address for the hard drive and floppy drive are factory set. The address setting for the IIMCP02 Multibus Communication Processor is located in Table 3-5. All SCSI switches and/or jumpers must be properly set.

Printers

The **DEFINEDEVICES** command sequence must be completed for the software to recognize a printer. Refer to the ***File Utilities*** instruction (Table 1-3) for that sequence. Table 3-6 lists the printer cable part numbers and cable lengths. Table 3-7 lists the printers used by the serial interface.

Table 3-6. Printer Cable Description

Part Number	Length
1947422□21001	0.3 m (1 ft)
1947422□21010	3.1 m (10 ft)
1947422□21025	7.6 m (25 ft)
1947422□21050	15.2 m (50 ft)

Table 3-7. Printers

Nomenclature	Description
IIPRT02	Genicom 3410 XLS black and white printer
IIPRT03	Genicom 3410 XCQ color printer (up to 64 colors)
IIPRT05	Genicom 4440 high speed black and white printer
IIPRT08B□	Hewlett Packard 660C screen copy printer (color/ black and white)
IIPRT08□C	Hewlett Packart 680C screen copy printer (color/ black and white)

Table 3-7. Printers (continued)

Nomenclature	Description
IIPRT09□	Okidata 395C 24-pin color printer
IIPRT10□	Hewlett Packard XL300 screen copy printer (color)

Printers can be connected to either a terminal server (IIPRS02) for the OIS consoles or the printer port (Port 1) on the auxiliary OIC CPU. Screen copy printers must connect to a terminal server.

The terminal server has DB-25 style connectors. A null modem cable connects the printer to any of the terminal server ports for the IIPRT02, IIPRT03, IIPRT05 and IIPRT09□ printers.

A maximum of four logging printers can be accessed by the IIOIS43 console. Connect the printers to a terminal server (IIPRS02) on the ethernet link.

The line cord must have isolated safety ground referenced to the same point as the OIS electronics safety ground, without connection to conduit/structural ground. The AC receptacle must be an isolated ground duplex type (i.e., Pass and Seymour IG6200 or equivalent).

This section gives the steps to connect the printer. Printer installation consists of configuring the printer through the menu and connecting cables. Connect the power and communication cables at the back of the printer. Connect the power cable into a local AC outlet. For more information, refer to the manufacturer's documentation.

> **NOTE:** Step 1 applies only to IIPRT02, IIPRT03, IIPRT05 and IIPRT09□ printers. For cabling information on the IIPRT08B□, IIPRT08C□ and IIPRT10□ printers, refer to Figure 3-21 and the appropriate section.

1. Attach one end of the printer cable (Table 3-6) to the DB25 serial connector of the printer. Attach the other end to the terminal server. Tighten the connector hood screws.

2. Turn printer power on.

3. Press **ON LINE** to get local *(Lo)* mode.

4. Press and hold **PRG** to print the current setup.

5. Select the applicable printer from the following list. If the setup values in the text do not agree with the printed listing for the printer, select item 1 through 9 for the GENICOM printers or the line to be changed for the OKIDATA printer and make the appropriate changes.

IIPRT02, IIPRT03, IIPRT05 AND IIPRT09□ PRINTERS

Figure 3-20 shows the printer cable configuration for IIPRT02, IIPRT03, IIPRT05 and IIPRT09□ printers.

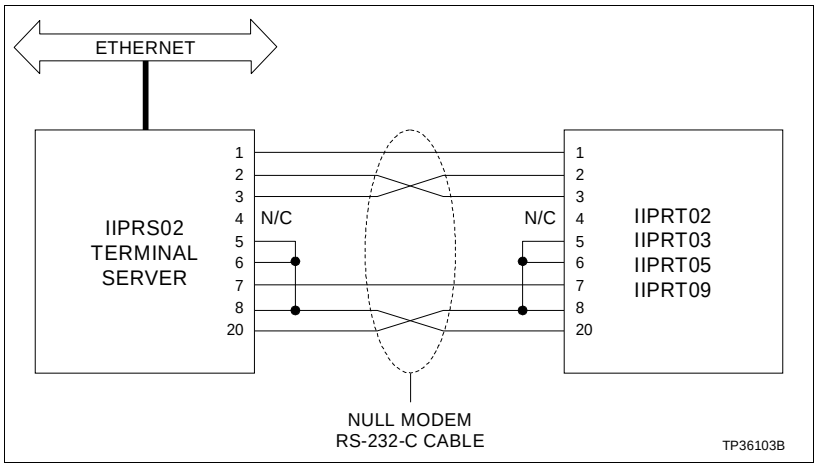

Figure 3-20. IIPRT02, IIPRT03, IIPRT05, IIPRT09□ Printer Cable Configuration

Refer to Table 3-8 for IIPRT02 (GENICOM 3410 XLS) printer setup values.

Table 3-8. IIPRT02 Printer Setup Values

Item	Control	Description	Setting
The present configuration is: Firmware: 512621, Resolution: MED, Printhead: 18P			
1	Font	Style	(507339) DP 400 CPS 2/144
		CPI	10
		Country	USA
		Mode	Normal
2	LPI	Lines per inch	6 LPI
3	Forms control (inches)	Form length	11.0"
		Top margin	0.0"
		Bottom margin	0.0"
4	Interface control	Interface type	Serial
		Input buffer length	2048
		Interface straps A:	0 1 2 3 12345678901234567890123456789012 00001000000010100000101000001000
		Interface straps B:	0 1 2 3 12345678901234567890123456789012 11000000000000000000000000000000
		Speed	9600
		Parity	Even

Table 3-8. IIPRT02 Printer Setup Values (continued)

Item	Control	Description	Setting
5	Margin settings	Left margin	None
		Right margin	13.6"
6	Horizontal tabs	—	None
7	Vertical tab stops	—	None
8	Printer control straps	Printer straps A:	0 1 2 3 12345678901234567890123456789012 10001000101100110000000010001000
		Printer straps B:	0 1 2 3 12345678901234567890123456789012 00000100000000000010000010000000
9	Emulation mode	—	Genicom: ANSI X3.64

Press the number 0 to return to normal operation. To continue modification, select item 1 through 9.

Refer to Table 3-9 for IIPRT03 (GENICOM 3410 XCQ) printer set up values.

Table 3-9. IIPRT03 Printer Setup Values

Item	Control	Description	Setting
The present configuration is: Firmware: 512623, Resolution: MED, Printhead: 18P			
1	Font	Style	(507339) DP 400 CPS 2/144
		CPI	10
		Country	USA
		Mode	Normal
		Ribbon type	Process - 4 color
2	LPI	Lines per inch	6 LPI
3	Forms control	Form length	11.0"
		Top margin	0.0"
		Bottom margin	0.0"
4	Interface control	Interface type	Serial
		Input buffer length	2048
		Interface straps A:	0 1 2 3 12345678901234567890123456789012 00001000000010100000101000001000
		Interface straps B:	0 1 2 3 12345678901234567890123456789012 11000000000000000000000000000000
		Speed	9600
		Parity	Even
5	Margin settings	Left margin	None
		Right margin	13.6"
6	Horizontal tabs	—	None

Table 3-9. IIPRT03 Printer Setup Values (continued)

Item	Control	Description	Setting
7	Vertical tab stops	—	None
8	Printer control straps	Printer straps A:	0 1 2 3 12345678901234567890123456789012 10001000111100110000000010001000
		Printer straps B:	0 1 2 3 12345678901234567890123456789012 00000100010010000010000010000000
9	Emulation mode	—	Genicom: ANSI X3.64

Press the number 0 to return to normal operation. To continue modification, select item 1 through 9.

Refer to Table 3-10 for the IIPRT05 (GENICOM 4440) printer setup values.

Table 3-10. IIPRT05 Printer Setup Values

Item	Control	Description	Setting
The present configuration is: Firmware: 44A513152 SY - 44A5131531M			
1	Font	Style	44A513153 Data Processing
		CPI	12.0
		Country	USA
		Mode	Normal
		Horizontal expansion	X1
		Vertical expansion	X1
2	LPI	Lines per inch	6 LPI
3	Forms control (in.)	Form length	11.0"
		Form is -	-007
		Offset from top of form	0.0"
		Top margin	0.0"
		Bottom margin	0.0"
4	Interface control	Interface type	Serial
		Input buffer length	11008
		Interface straps A:	0 1 2 3 12345678901234567890123456789012 00001011000010110000101100000000
		Interface straps B:	0 1 2 3 12345678901234567890123456789012 11000100000000000000000000000000
		Speed	9600
		Parity	Even
5	Margin settings (columns)	Left margin	None
		Right margin	132"

Table 3-10. IIPRT05 Printer Setup Values (continued)

Item	Control	Description	Setting
6	Horizontal tabs (columns)	—	None
7	Vertical tab stops (in.)	—	Default
8	Printer control straps	Printer straps A:	0 1 2 3 12345678901234567890123456789012 00000000000000000011000001001010
		Printer Straps B:	0 1 2 3 12345678901234567890123456789012 00000000000000000000000000000000
9	Emulation mode	—	ANSI X3.64

Press the number 0 to return to normal operation. To continue modification, select item 1 through 9.

The IIPRT09□ (Okidata 395C) is a 24-pin dot matrix color printer with 360 by 360 DPI. The printer connects through an asynchronous serial interface at 9600 baud. The last digit of the nomenclature determines the operating voltage of the printer; 1 - 120 VAC or 2 - 220 VAC.

NOTE: The IIPRT09□ printer is a color line printer and cannot be used for screen copies.

Refer to the manufacturer's instruction for complete details on printer operation.

If the setup values in the following list (Table 3-11) do not match those of the IIPRT09□ printer when checked, select the data to be changed and make the appropriate corrections. Follow the manufacturer's instructions for changing setup values.

Table 3-11. IIPRT09□ Printer Setup Values

Control	Description	Setting
Printer control	Emulation mode	Epson Lq
Font	Print mode	LQ
	Type style	Courier
	Pitch	10 CPT
	Style	Normal
	Size	Single
	Smoothing	No

Table 3-11. IIPRT09□ Printer Setup Values (continued)

Control	Description	Setting
General control	Graphics	Uni-directional
	Paper out override	No
	Print registration	0
	Operator panel functions	Full Operation
	Ribbon selection	Magenta
	Reset inhibit	No
	Page width	13.6"
	Auto Lf	No
	Auto Cr (Ibm)	No
	Form tear-off	Off
	Menu line	6
Rear feed	Line spacing	6 LPT
	Skip over perforation	No
	Page length (in.)	11"
Bottom feed	Line spacing	6 LPT
	Skip over perforation	No
	Page length (in.)	11"
Cut sheet	Line spacing	6 LPT
	Page length	11"
	Paper/transparency	Paper
Symbol sets	Character set	Set I
	Code page	USA
	Language set	American
	Zero character	Slashed
General interface	Max receive buffer	SK
	Print suppress effective	Yes
	Auto feed XT (Epson)	Valid
	CPU compensation	Standard
Serial interface	Parity	None
	Serial data 7/8 bits	8
	Protocol	X-ON/X-OFF
	Diagnostic test	No
	Busy line	DTR
	Baud rate	9600 BPS
	DSR signal	Valid
	DTR signal	Ready on Power Up
	Busy time	200 ms

IIPRT08B□ and IIPRT08C□ PRINTERS

Figure 3-21 shows the printer cable configuration for the IIPRT08B□, IIPRT08C□ and the IIPRT10□ printers.

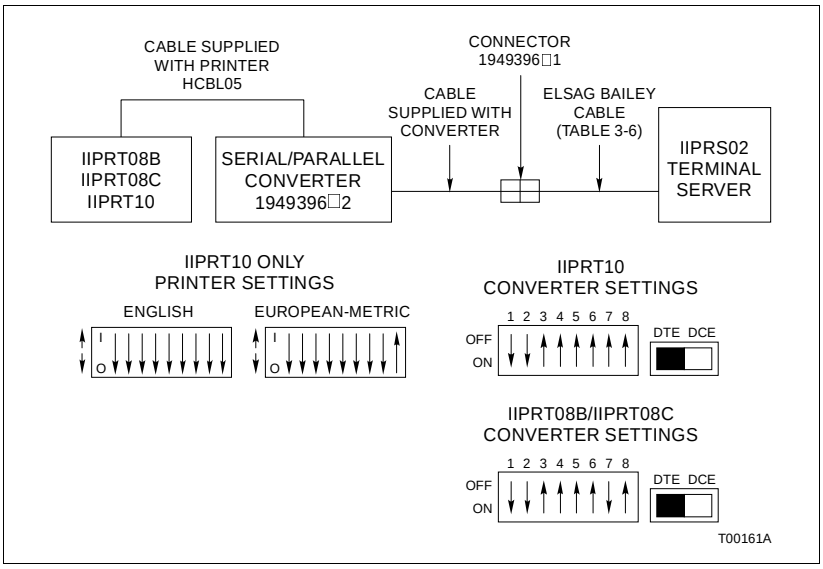

Figure 3-21. IIPRT08B□, IIPRT08C□ and IIPRT10□ Printer Cable Configuration and Dipswitch Settings

The IIPRT08B□ DeskJet 660C and the IIPRT08C□ DeskJet 680C are Hewlett Packard color/black and white printers. They are high resolution color inkjet printers. The last digit of the nomenclature determines the operating voltage of the printer; 1-120 VAC, 2-220 VAC, 3-240 VAC, 4-100 VAC.

Use the buttons and indicators on the control panel to operate the printer. For more information, refer to the manufacturer's documentation.

1. Load the print media.

2. Press the power switch. The READY indicator lights.

The printer prints on 8-½ x 11-inch and European (A4) size transparencies and copies. This printer offers both color and black and white printing. Note that the black and white is monochrome and not gray scale.

The printer will print a full size window display from the OIS console on a single page. CX JetSeries CutSheet Paper is recommended for color copies. A good quality photocopier paper should be used for black and white copies.

HP glossy media and HP transparency media require a ten-minute drying time, during which time nothing should be

placed on top of it. Remove these sheets from the printer so that other printouts do not stack on them.

The printer can have two optional expansion RAM cartridges added. These cartridges have very little effect on performance during graphics output and are not recommended for printers used with the OIS consoles.

The IIPRT08B□ printer connects through a parallel cable, HCBL05, which connects to a serial/pair adapter. The serial/pair adapter connects RJ45 to an adapter that converts it to a DB-25. The DB-25 connector connects to the asynchronous serial cable which connects to the IIPRS02 terminal server at 9600 baud. Printer installation consists of connecting cables. Refer to manufacturer's documentation for more information.

IIPRT10□ COLOR SCREEN PRINTER (HP XL300)

The IIPRT10□ is a Hewlett Packard HP PaintJet XL300 color printer (LaserJet IIISI) compatible with PCL5.

The last digit of the nomenclature determines the operating voltage of the printer; 1-120 VAC, 2-220 VAC.

Use the buttons and indicators on the control panel to operate the printer. For more information, refer to the manufacturer's documentation.

1. Load the print media.

2. Press the power switch. The READY indicator lights.

3. It prints on English A and B and European B3 and A4 size transparencies and copies.

> **NOTE:** Printer dipswitch settings are different for English media (A and B) and European metric media (A4 and B3). Refer to Figure 3-21.

HP glossy media and HP transparency media require a ten-minute drying time, during which time nothing should be placed on top of it. Remove these sheets from the printer so that other printouts do not stack on them.

Refer to the manufacturer's instructions shipped with the printer.

IIPRT10□ printer installation consists of configuring the printer dipswitches, serial/pair converter dipswitches and connecting cables. Refer to the manufacturer's documentation for more information.

Refer to Figure 3-21 for cabling requirements and dipswitch settings for both the IIPRT10□ printer and the serial/pair converter. The printer connects through a parallel cable, HCBL05, which connects to a serial/pair adapter. The serial/pair adapter connects RJ45 to an adapter that converts it to a DB-25. The DB-25 connector connects to the asynchronous serial cable which connects to the IIPRS02 terminal server at 9600 baud. Three cables are required: one between the printer and the serial/pair converter (supplied with the printer), one between the serial/pair converter and the null modem cable (supplied with the converter), and one between the converter cable connector and the terminal server (Table 3-6).

IIDMT03A DAT Tape Drive

The IIDMT03A unit (TLZ07) can be used in the console or the driver cabinet. The tape drive is a SCSI compatible storage device that reads and writes to digital audio tape.

The tape drive has two SCSI ports. The other port is for another SCSI device or terminator. Related products for the tape drive are listed in Table 3-12.

Table 3-12. Tape Drive Related Products

Part Number	Description
1947950□5	Power cord
1949011□3	Tape drive
1949012□1	Blank cartridge
1949134□50	External SCSI cable[1]

NOTE:
1. External SCSI cable not used when rack mounting the IIDMT03A tape drive.

When power is turned on to the tape drive, and no cassette is in the drive, the tape and activity and write protect indicators light for approximately one to five seconds. This indicates that the power on self-test is running. Both indicators turn off when the self-test completes successfully. If both indicators stay on for 30 seconds, there is a hardware failure. If a cassette is in the drive, the tape and activity indicator will continue flashing until the cassette is loaded (about 20 seconds) and then remain on.

The amber write protect light stays on to indicate that a tape is running with write protect enabled.

NOTE: Remember to clean the heads after 50 hours of tape drive operation.

TAPE DRIVE INSTALLATION

CAUTION	**Remove power from all peripheral equipment and the console before installing or removing peripheral equipment. Equipment damage may result.** **Plug in the tape drive cable and verify that the supply voltage requirement of the tape drive matches the power supplied by the power entry panel before turning on the tape drive. Equipment damage may result. A notice on the front of the power entry panel states the operating voltage.** **Never connect the tape drive to the CPU with the CPU or tape drive power on. Failure to comply may result in damage to both the CPU busses and the tape drive.**
ATTENTION	**Coupez l'alimentation des périphériques et de la console avant d'installer ou de retirer des périphériques, sinon l'équipment risque de subir des dommages.** **Avant de mettre le dérouleur de bande sous tension, branchez le câble du dérouleur et vérifiez les exigences de tension de l'appareil correspondent au niveau de tension de la sortie du panneau d'entree des alimentations. Sinon, l'equipment risque de subir des dommages. La tension de service figure sur l'avis à l'avant du panneau d'entrée.** **Ne branches jamais le derouleur de bande au CPU lorsque l'un ou l'autre de ces appreils est sous tension. Sinon, les bus du CPU et le derouleur pourrait etre endommages.**

NOTE: Plugging in the tape drive power cord first connects the tape reader ground to the OIS console or driver cabinet.

Tape drive installation consists of configuring the switches and connecting cables.

Before installing the tape drive, set the SCSI address on the SCSI address switch located on the back of the tape drive case next to the power and cable connections. Refer to Table 3-5 for the address.

NOTE: The tape drive must be powered down and then up for new switch settings to take effect.

To install a tape drive, follow these steps:

1. Insure that the power to both the tape drive and the OIS or driver cabinet is OFF.

2. Remove the terminator on the power entry panel to connect a DAT tape drive. The DAT tape drive requires a terminator.

3. For consoles, the IIDMT03A is used as a tabletop unit. Attach the external SCSI cable (Table 3-12), one end to the tape drive SCSI port and the other end to the peripheral port on the power entry panel.

4. For driver cabinets, remove the cover plate from the front of the power entry panel. The power entry panel has a support tray that enables mounting the IIDMT03A into the rack. Remove the hook velcro strip from the support tray: the loop strip will remain on the tray. Remove the adhesive backing from the strip of velcro and apply the strip to the underside of the tape drive. Position the tape drive in the tray. There is an internal SCSI cable with multiple connectors in the driver cabinet. Connect to the SCSI port on the tape drive.

5. Connect the supplied power cable from the tape drive to a local power source.

6. Verify that the green LED is ON.

7. Apply power to the OIS.

IIDOP04A and IIDOP05A Optical Disk Drive

Two optical disk archiving units are available. The console uses the tabletop IIDOP04A optical disk. The driver cabinet uses the rack mounted IIDOP05A optical disk. If an additional IIDOP05A is required, order part number 1949017□1 and 1947950□2 (power cord) to receive the optical disk unit without duplicate mounting brackets and hardware.

The RWZ52 optical disk drive is a SCSI compatible storage device that reads and writes to removable disks. Next to the EJECT button is the emergency eject hole for removing disks without power. An eject tool is provided with the unit.

> **NOTE:** The OIS43 only supports the rewritable media format at 1,024 bytes per sector.

There are two hardware settings that must be made to the optical disk drive; the SCSI address setting and operation mode setting. Set the SCSI address using the following steps.

1. Make sure the power to the optical disk drive is off.

2. Locate the SCSI ID switch on the rear panel of the disk drive.

3. Set the SCSI ID by pushing in on the button on the rear panel that is directly above or below the address window with a small screwdriver or the point of a pen. A small screwdriver is shipped with the unit. The button above the window decreases

the number by one; the button below the window increases the number by one. Set the address to 1.

> **NOTE:** If the SCSI ID is changed, it will be necessary to power cycle the optical disk drive so that the drive recognizes the new ID. It may also be necessary to reboot the host system.

To set the operation mode, use the following procedure.

1. Locate the operation mode switch on the rear panel of the disk drive.

2. To set the operation mode, push in on the button directly above or below the operation mode window with a small screwdriver or the point of a pen. A small screwdriver is shipped with the unit.

3. The button above the window decreases the number by one; the button below the window increases the number by one. Set the operation mode to 0.

> **NOTE:** If the operation mode is changed, it will be necessary to power cycle the optical disk drive so that the drive recognizes the new mode. It may also be necessary to reboot the host system.

Read the instruction manual shipped with the unit. It contains important installation, connection and troubleshooting information.

IIVTE0□ Video Terminal

When using a driver cabinet, a VT100 compatible dumb terminal, personal computer, etc. is required as an alternate console capability to perform configuration requirements and maintenance. The IIVTE0□ video terminal provides this alternate console capability. The IIVTE01 is 120 VAC, the IIVTE02 is 220/240 VAC.

Refer to Figure 3-22 for IIVTE0□ video terminal location and connections. Refer to ***ETHERNET CONFIGURATIONS*** for additional information. Complete the proper connections. Refer to the ***File Utilities*** and ***Configuration*** instruction manuals (Table 1-3) for configuration information.

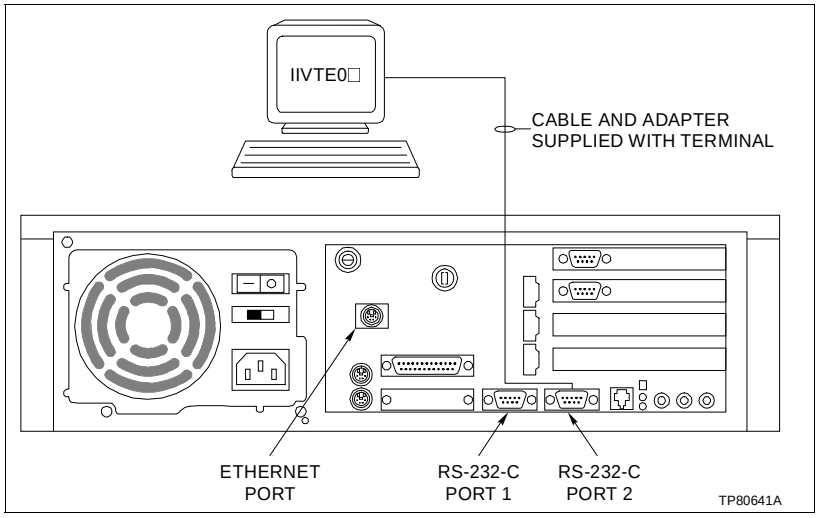

Figure 3-22. IIVTE0□ Video Diagnostics and Start-Up Terminal

ETHERNET PROTOCOL

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 DEC AlphaStation 255 model 233 ***User Information*** instruction shipped with the OIS console and to Appendix B in this instruction for more information.

ETHERNET CONFIGURATIONS

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.
- The figures in this section are guidelines. Each network may require changes due to hardware or application.

  NOTE: Be careful using hardware from more than one manufacturer. Similar parts can have different specifications that can limit performance.

Standard Ethernet Configurations

Figures 3-23 and 3-24 show standard ethernet connections for the IIOIS43 console. The maximum total length of the console thinwire is 185 meters (607 feet).

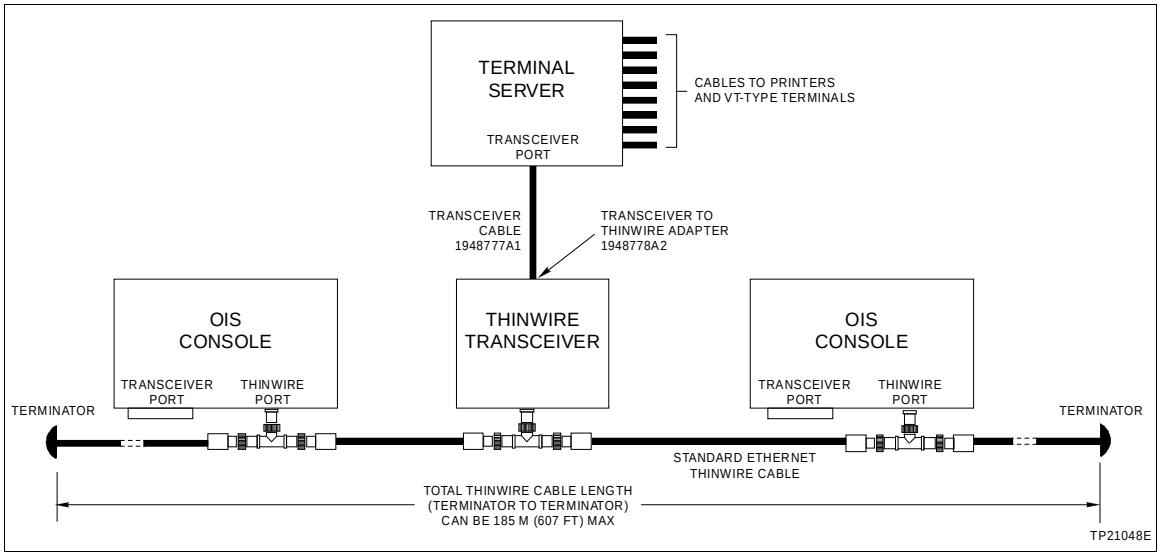

Figure 3-23. Standard Ethernet Thinwire for Isolated Network Console

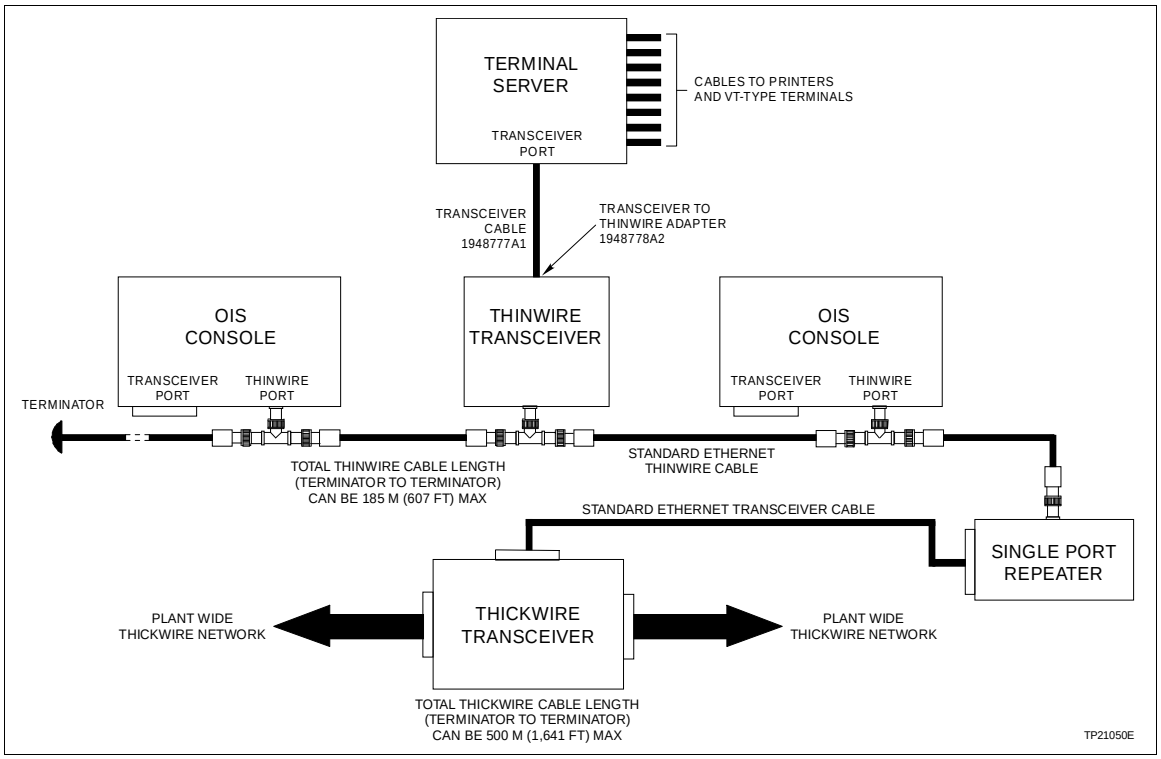

Figure 3-24. Standard Thinwire to Plant Wide Thickwire Network

Alternative Connections to Plant Wide Networks

In general, network bridges connect one network with another. Although a repeater can be used, a bridge provides better performance and security because it can be programmed to pass all or some of the message signals. A repeater will pass all of the message signals.

The direct barrel connection is another type of connection. Direct barrel connections between thinwire and thickwire are not permitted. Note that direct transceiver-to-transceiver connections are not permitted. Figure 3-25 shows connections to a plant wide thickwire network.

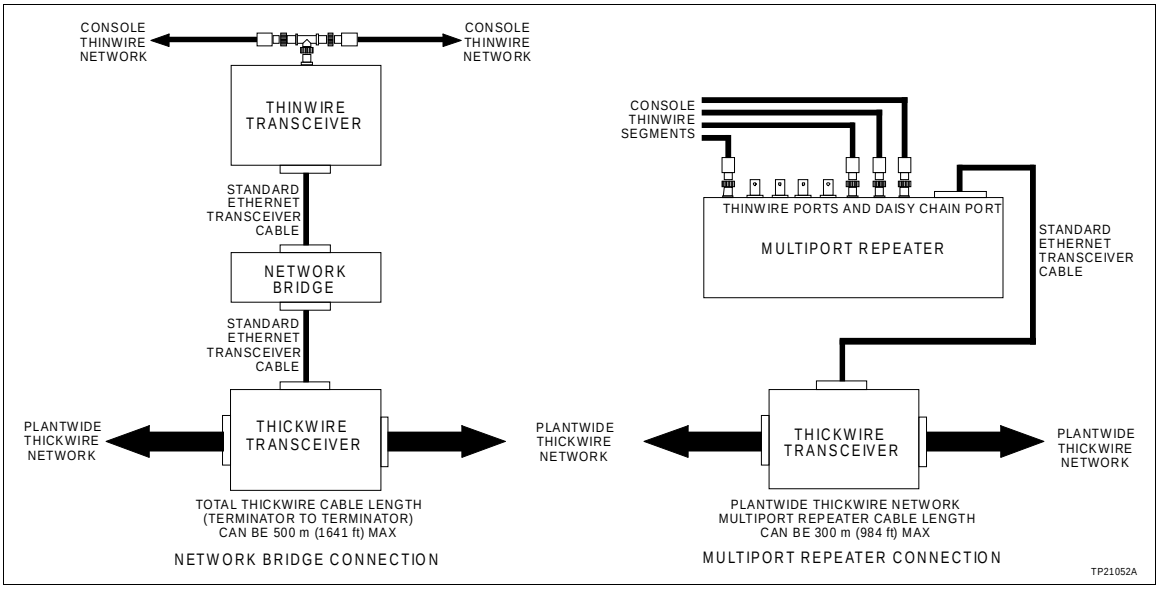

Figure 3-25. Alternative Thinwire Connection to Plant Wide Thickwire Network

Alternative Console Connections (Thickwire)

Although thinwire is usually used, thickwire can be used to connect various pieces of an OIS system. Figure 3-26 shows an alternative example thickwire network. Figure 3-27 shows thickwire connections to a plant wide thickwire network.

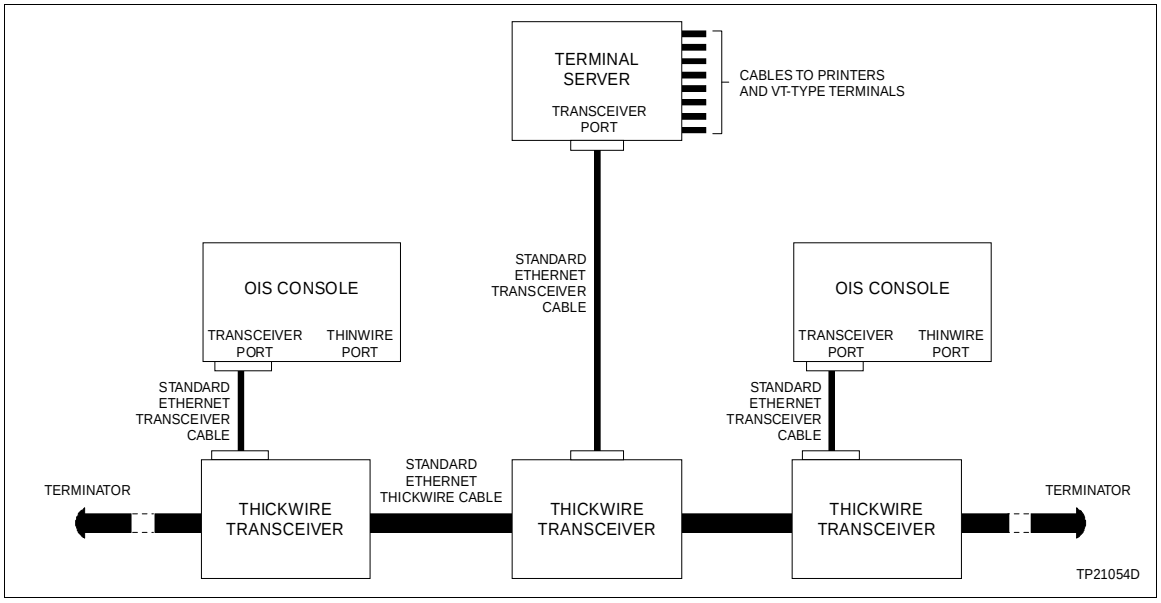

Figure 3-26. Alternative Ethernet Thickwire Configuration

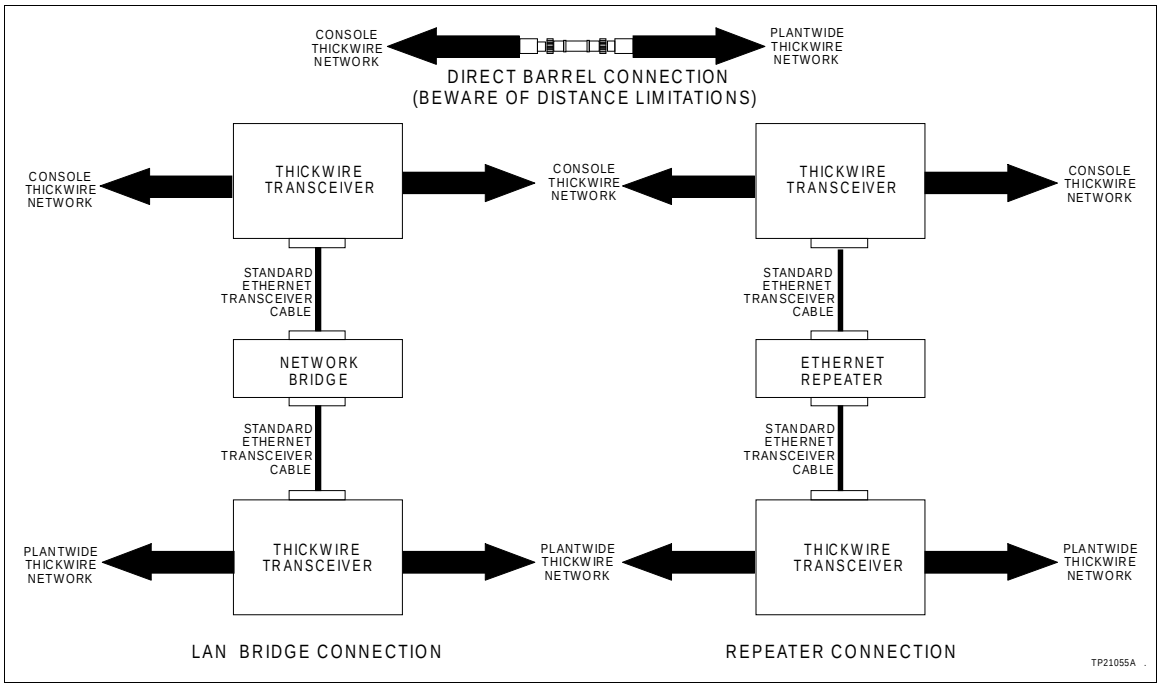

Figure 3-27. Alternative Console Thickwire to Plant Wide Thickwire

Concentrator Configuration

A concentrator replaces a thickwire segment and several (the exact number depends on manufacturer and model) transceivers with a single box. This box allows several devices (OIS consoles, terminal servers, etc.) to connect to the plant wide network through only one device as opposed to multiple trans-

ceivers and cable segments. Refer to Figure 3-28 for an example.

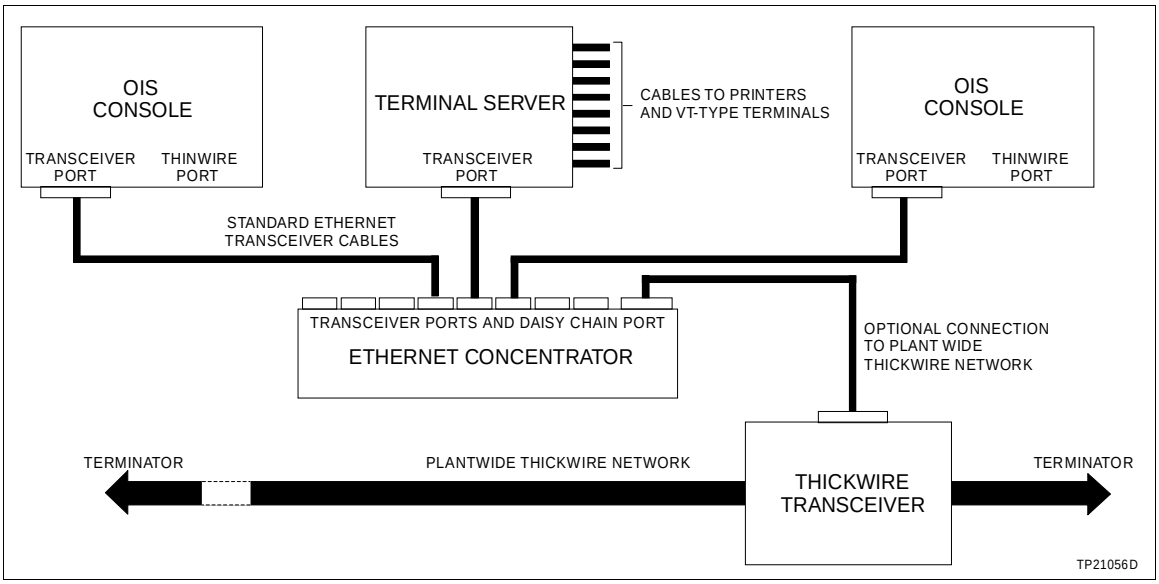

Figure 3-28. Alternative Concentrator Configuration for OIS Console

SOFTWARE INSTALLATION AND START-UP

The OIS console uses two hard disk drives (identified as DKA0 and DKA100). They are located in the CPU. The OpenVMS operating system and its files use drive DKA0. The IIOIS43 application (console code) and its files use the DKA100 drive. Prior to installing the software, jumpers should be checked on the hard drives and on the CD-ROM drive. Refer to ***Hard Drive Settings*** and ***CD-ROM Drive Settings*** in Section 6 for correct jumper settings. Installing software involves setting several boot parameters, setting the SCSI speed and loading both disk drives from the CD-ROM using current software release CDs.

NOTE: The console must be powered off to make changes.

After the main console and all auxiliary consoles are installed and powered up, install the software and configure the system. Refer to the ***File Utilities*** instruction (Table 1-3) for software loading, boot parameters and setting the SCSI speed. Refer to the ***Operation*** instruction (Table 1-3) for complete operating information. Refer to the ***Configuration*** instruction for complete configuration information (Table 1-3).

SYSTEM OPERATION

The procedure for booting up the OIS console may vary with the software version. Upon power up, the system runs through a series of diagnostics for approximately two minutes. After

passing the diagnostics, the system automatically continues to boot up into an OIS window.

If the power up diagnostics fail, the screen displays the **>>>** prompt with an error code. The OIS CPU DEC AlphaStation 255 ***User Information*** instruction contains details of possible diagnostics and error codes.

The CPU SCSI bus connects the two hard disks. The bus also connects the floppy controller/floppy disk drive, IIMCP02 (INFI-NET), CPU and power entry panel peripheral connector.

The red multibus reset switch on the OIS power entry panel resets the modules in the multibus card cage and the keyboard (for INFI 90 keyboard and network interface unit). Use the multibus reset if the keyboard does not respond.

If SW-4 on the CPU motherboard is set to OFF (Fig. 3-31), the reset button on the front of the CPU will become a HALT button. Use the CPU HALT switch if the console does not respond.

NOTE: Pressing the HALT switch 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 OIS window. A system boot takes approximately 15 minutes.

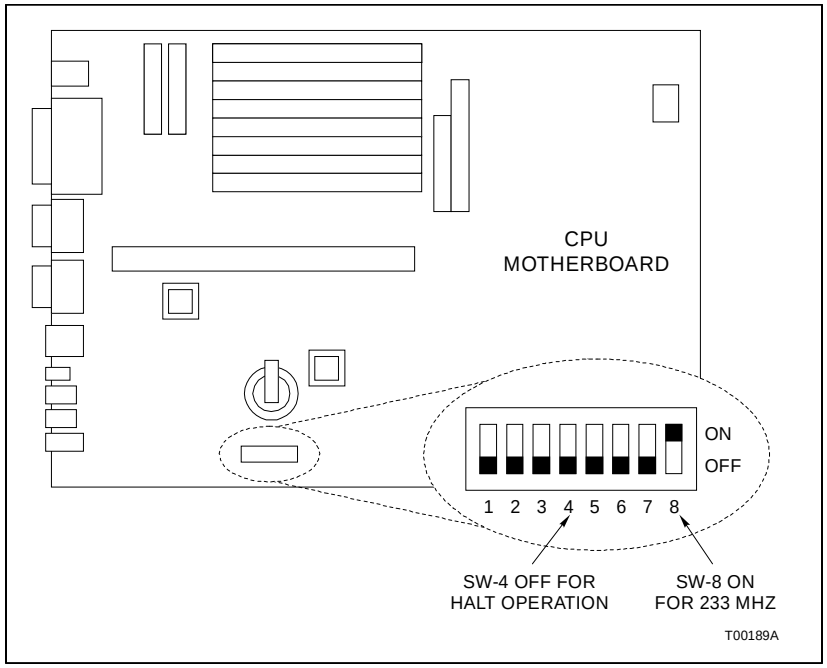

Figure 3-29. Setting CPU Switch SW-4 for HALT Operation

SECTION 4 - TROUBLESHOOTING

INTRODUCTION

This section provides some very basic troubleshooting guidelines for the OIS43 console. It is not meant to be all inclusive. Make certain all the manufacturer's documentation on non Elsag-Bailey OIS43 components is accessible. Three other instruction manuals (Elsag-Bailey) should be on hand; ***Operation***, ***Configuration*** and ***File Utilities***. Those instruction numbers are listed in Table 1-3. Many of these documents provide troubleshooting information. If problems exist which are not covered in any of the provided documentation, contact Elsag-Bailey technical services personnel for assistance.

WARNING	**There are exposed AC and DC connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.**
AVERTISSEMENT	**Cette armoire comporte des connexions c.a. et c.c. dénudées. Ces connexions électriques présentent un danger d'électrocution pouvant entraîner des blessures ou la mort.**

This section contains a general troubleshooting table, diagnostic AC/DC power test procedures, module failure LED codes and techniques for gathering information on software faults.

Close and secure cabinet doors after troubleshooting and before returning the system to normal operation.

> **NOTE:** Put circuit boards containing MOS devices 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.

TROUBLESHOOTING

The general troubleshooting guide in Table 4-1 may help to identify problems and suggest solutions.

Table 4-1. Troubleshooting Guide

Symptom	Possible Problem or Solution
No power indicator on circuit	No AC power at console. Check AC wiring on input. Check AC on power entry panel. Check breaker light on power entry panel. Check fuse on power supply.
Breaker off but indicator on	Check breaker contacts. Check breaker wiring. Check AC input wiring.
Improper/ incomplete start-up	Refer to diagnostic message at start-up for possible problems. Refer to the CPU instruction shipped with the console.

Table 4-1. Troubleshooting Guide (continued)

Symptom	Possible Problem or Solution
Start-up OK but no network interface unit (NIU) response (for Plant Loop only)	Check NIU settings (baud rate on port A should be 19.2 kilobytes). Check NIU cables. Try using NIU diagnostic port to test IIMCL01, IIMLM01, IIMCP02 or IIMCP01 modules (refer to ***NNIU01 NETWORK INTERFACE UNIT TEST UTILITY*** in this section).
Start-up OK but no keyboard response	Check keyboard assignment. Check all cables. Check caps lock position. Check IIMKM02A module seating and jumpers. Check OIS configuration (keyboards/printers).
Start-up OK but no CRT picture	Check monitor AC power. Check VGA cable. Check monitor switch (sync on green). Check 75-ohm termination. Check brightness and contrast controls.
No printer response	Check AC power. Check cables. Check printer setup. Check configuration (printers).

DIAGNOSTIC POWER UP TESTS

If the troubleshooting guide fails to identify a problem in the OIS console, follow the AC and DC power test procedures. Check AC voltages at the line input to the power entry panel.

AC Power Test

NOTE: When the instructions state to apply power to the OIS console, switch the main circuit breaker to the ON position. To turn off the power, switch the main circuit breaker to the OFF position.

1. Turn off power to the console. Disconnect AC power to all equipment inside the console by unplugging the line cords from the back of the power entry panel.

2. Apply power to the console by switching on the line circuit breaker located at the front of the power entry panel.

3. Use a digital voltmeter to measure the AC power at each of the five AC outlets on the power entry panel.

   a. The five outlets on the power entry panel used with the driver cabinet are all marked AC OUTLET.

   b. The four outlets on the rear of the power entry panel used with the consoles are marked: UPPER CRT, LOWER CRT, BLOWER/AUX, POWER SUPPLY. The fifth AC outlet is located on the front on the power entry panel and is marked PERIPHERAL POWER.

4. The line voltage should be 90 to 132 VAC RMS for a 120-VAC input and 180 to 264 VAC for a 240-VAC input. Refer to the ***Site Planning and Preparation*** instruction (Table 1-3) for specific AC voltages.

5. Use the digital voltmeter to check each outlet and insure that neutral, live and ground are wired correctly, and there are no ground faults.

6. Turn off the power to the console. Verify that it removes power from all outlets.

7. Plug the color monitor power cord into the AC socket in the rear of the power entry panel. ***Do not*** plug in the main power supply yet. Apply power to the console. Nothing will be displayed on the color monitor until the system software is loaded.

DC Power Test

Follow these steps to test the DC power supply. The necessary test equipment consists of a digital voltmeter. Figure 6-10 and Figure 6-11 show the location of the main power supply.

1. Turn off power to the console.

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

2. Unplug DC power distribution cables from all peripheral devices (disk drives, disk drive controller module and ADP panel). Disconnect the power cables at the distribution side of the cables.

> **NOTE:** Turn power off before removing or inserting multibus modules.

3. Unplug all multibus modules from the card cage. The modules do not have to be pulled all the way out. Pull them out only a few inches from the module edge connectors.

4. Plug the power line cord for the power supply into the power entry panel.

5. Insure that ***all*** power supply wiring is correct.

6. Apply power to the console.

7. Measure the DC voltages at the multibus card cage backplane.

8. Take the voltage measurements with the power supply under load. Measure the +5.00 VDC; the voltage should be +0.25 VDC and -0.0VDC of the value. Measure the +12.00 VDC and -12.00 VDC; the voltage should be +1.5 VDC and -1.00 VDC of the value.

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

9. Turn off the power to the console. Plug in all multibus modules.

10. Connect all DC power distribution cables removed in Step 2.

11. Apply power to the console and check the DC voltage levels again. Adjust the power supply to obtain the voltage within a tolerance of +0.05 V.

DIAGNOSTIC LEDS

If the troubleshooting guide fails to identify a problem in the console, follow the procedures in the vendor documentation.

Table 4-2 lists the IIMCP01 and IIMCP02 module failure LED codes. Table 4-3 lists the IIMLM01 module failure LED codes.

Table 4-2. IIMCP01/02 Module Failure LED Code

MCP Module Code	LED Number Top Bottom 1 2 3 4 5 6 7 8	Condition
12	0 0 0 1 0 0 1 0	MLM module not responding to MCP commands.
13	0 0 0 1 0 0 1 1	ROM checksum error (socket U23 or U24).
14	0 0 0 1 0 1 0 0	Expander bus message failure.
15	0 0 0 1 0 1 0 1	Loop failure - check for break in circuit.
16	0 0 0 1 0 1 1 1	MLM module loop-back test failure.
2n[1]	0 0 1 0 n n n n	Internal software error.
31	0 0 1 1 0 0 0 1	Memory or CPU failure.
32	0 0 1 1 0 0 1 0	Address or bus error.
33	0 0 1 1 0 0 1 1	Illegal instruction.
35	0 0 1 1 0 1 0 1	Spurious exception.
36	0 0 1 1 0 1 1 0	Divide by 0/check/format error.
38	0 0 1 1 1 0 0 0	MLM module not configured for MCP module operation. (MLM switch 2, pole 1 needs to be ON)
39	0 0 1 1 1 0 0 1	Duplicate node number on loop (MLM switch 4).
3E	0 0 1 1 1 1 1 0	MLM to MCP handshake failure.
3F	0 0 1 1 1 1 1 1	Stop pushbutton actuated.

NOTES:
1. n = any module code beginning with a 2 and regardless of status of LEDs 1 through 4, the error condition will be due to internal software.
2. The LED representing the least significant bit is the bottom LED on the MCP and MLM modules.

Table 4-3. IIMLM01 Module Failure LED Code

MLM Module Code	LED Number Top Bottom 1 2 3 4 5 6 7 8	Error Condition
13	0 0 0 1 0 0 1 1	ROM checksum error (socket U23 or U24).
31	0 0 1 1 0 0 0 1	Memory or CPU failure.
32	0 0 1 1 0 0 1 0	Address or bus error.

Table 4-3. IIMLM01 Module Failure LED Code (continued)

MLM Module Code	LED Number Top Bottom 1 2 3 4 5 6 7 8	Error Condition
33	0 0 1 1 0 0 1 1	Illegal instruction.
34	0 0 1 1 0 1 0 0	Trace/privilege violation.
35	0 0 1 1 0 1 0 1	Spurious exception.
36	0 0 1 1 0 1 1 0	Divide by 0/check/format error.
37	0 0 1 1 0 1 1 1	Any trap instruction.
38	0 0 1 1 1 0 0 0	MLM module not configured for MCP module operation (MLM switch 2, pole 1 needs to be ON).
3E	0 0 1 1 1 1 1 0	MLM module to host handshake failure.

ERROR CODES

Table 4-4 lists the NNIU01 network interface unit error codes in decimal format. Table 4-5 lists the NNIU01 error codes (internal console checking) and these codes will appear on the yellow operator message portion of the monitor.

Table 4-4. NNIU01 Network Interface Unit Error Codes

Decimal Error Code	Error Description
0	No error.
1	Waiting for loop.
2	Improper format.
3	Illegal command.
4	Index already established.
5	Block already established at another index (Loop, PCU, MOD, and block are all the same as another tag).
6	Command too long.
7	Bad reply from NIS/BTM module.
8	Export used as Import.
9	Repeat NIU restart command.
10	Undefined index.
11	Memory full.
12	Host communication error.
13	NIS/BTM module not responding.
14	Import used as export.
15	Time-out of loop response.
16	Number out of range.
17	Illegal key.
18	Need a restart command.
19	Module status used as import.
20	Message active on loop.
21	Import or export used as module status.

Table 4-4. NNIU01 Network Interface Unit Error Codes (continued)

Decimal Error Code	Error Description
22	Exception report specifications lost.
23	No message queued, dequeue received.
24	Reply too large.
25	Illegal station mode command.
26	Illegal module number in command.
27	Time out between bytes in command.
28	Index already established by another node.
29	Point type incompatible with command.
30	Watchdog time-out.
31	Checksum compare error.
32	Destination node off-line.
33	Callup command required.
34	NIU error.
35	NIU busy.
36	NIS/BTM module off-line.
37	Conflict with monitor mode.
38	Point type incorrect.
39	Destination ring off-line.
40	Destination node busy.
41	Destination ring busy.
100	Undefined message type for target module.
101	Busy - cannot respond at this time.
102	Mode for command does not agree with current module mode.
103	Message data out of range.
104	Invalid block number.
105	Undefined block number - block is valid but not configured.
106	Block not readable - block number is valid but has no readable parameters.
107	Invalid function code for target module.
108	Function code and block number not compatible in target module.
109	Insufficient memory to write block in NVRAM and/or RAM.
110	Module not responding.

Table 4-5. NNIU01 Network Interface Unit Error Codes (Internal Console Error Checking)

Decimal Error Code	Error Description
300	Invalid logical unit.
301	Invalid index or CIU.
302	Correct configuration. Invalid CIU restart option.
303	Invalid watchdog/delay count.

Table 4-5. NNIU01 Network Interface Unit Error Codes (Internal Console Error Checking) (continued)

Decimal Error Code	Error Description
304	Correct configuration. Invalid PCU, module or block number.
305	Correct configuration. Invalid point type.
306	Invalid index range.
307	Invalid engineering units code.
308	Invalid logical alarm specifications.
309	Invalid module operations code.
310	Invalid function code.
311	Invalid block data count.
312	Invalid number of reports.
313	Plant Loop specific function called on a SuperLoop system.
314	SuperLoop specific function called on a Plant Loop system.

NNIU01 NETWORK INTERFACE UNIT TEST UTILITY

An off-line NNIU01 network interface unit test allows restarting the network interface unit and testing loop communications. This may be required if there is a problem bringing the console on-line, and a network interface unit or loop problem is suspected.

NOTES:

1. Care should be taken when using this utility. It causes a network interface unit restart. If the network interface unit is restarted while the OIS console is on-line, normal operation is interrupted.

2. Access the utility from the OISENGR account.

To access the utility, use the following procedure.

1. Open a terminal window and type **CIUTEST** at the *$* prompt, and press **Return**.

2. Refer to the ***File Utilities, Operator Interface Station (40 Series) IIOIS43***. Table 1-3 contains the instruction number.

3. After specifying the loop type to which the console connects, a menu of network interface unit commands appears. The commands allow resetting the network interface unit, testing loop communications through the **Demand Module Status** command or querying the network interface unit for additional information about itself.

4. To further isolate the problem, refer to ***NNIU01 NETWORK INTERFACE UNIT (TALK 90) DIAGNOSTIC TEST***.

NNIU01 NETWORK INTERFACE UNIT (TALK 90) DIAGNOSTIC TEST

If the network interface unit fails to come on-line, the problem may be in the network interface unit or console. The Talk 90 utility can isolate the problem. Use the following procedure.

1. Connect a 9-pin to 25-pin D connector serial cable (NKMR02□10 cable or equivalent) between a dumb terminal and port P6 on the IIMCP02 module (or IIMCP01 module).

2. Set the terminal to 9600 baud and 8 data, 1 stop, 0 start and no parity bits.

3. Press the lower red button (reset) on the IIMCP01 module, or press the red button (reset) twice on the IIMCP02 module.

4. The diagnostic menu will appear on the terminal.

5. Select Talk 90 by typing **1** and pressing Return.

6. Enter **19** to select *CIU RESTART* from the menu and press Return.

7. Answer the prompts:

   Key= **0** Return.

   Watchdog= **0** Return.

   Options= **10** (for Plant Loop) or **255** for INFI-NET) Return.

   Reply Delay = **0** Return.

   Interrupt = **0** Return.

8. Check that the top row of LEDs on the MCP module will turn on solid, then off. The green light on the MCL module will turn off, then on (off-line to the loop, then on-line to the loop).

9. On the terminal, enter a **1** to return to Talk 90.

10. Check that the terminal displays a response of *0* errors. The terminal will also display the node address.

No errors indicates that the problem is in the OIS console or in the cable between the OIS console and the network interface unit.

Any indicated errors shows that the problem is in the NNIU01 network interface unit. Substitute modules and run the test again to isolate the problem to the MCP, MCL or MLM module.

NOTES:

1. A message referring to the LIS module indicates a problem on the IIMLM01 module.

2. A message referring to the SSM module indicates a problem on the IIMCP02 module.

SECTION 5 - MAINTENANCE

INTRODUCTION

This section contains a preventive maintenance schedule for the OIS43 console. 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 reliability of any stand alone product or control system is affected by the maintenance of the equipment. Elsag Bailey recommends that all equipment users practice a preventive maintenance program that will keep the equipment operating at an optimum level.

This section presents procedures that the customer should be able to perform on site. These preventive maintenance procedures should be used as a guideline to assist you in establishing good preventive maintenance practices. Select the minimum steps required to meet the cleaning 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 OIS console, have experience working with process control systems, and know what precautions to take when working on live AC.

PREVENTIVE MAINTENANCE SCHEDULE

Table 5-1 is the preventive maintenance schedule for the OIS console. The table lists the preventive maintenance tasks in groups according to their specified maintenance interval. Some tasks in Table 5-1 are self explanatory. Instruction for tasks that require further explanation are covered under ***STANDARD PREVENTIVE MAINTENANCE PROCEDURES*** or in the manufacturer's documentation supplied with the console.

Table 5-1. Preventive Maintenance Schedule

Task	Frequency
Check printer, clean and lubricate.[1]	1 month
With power on, be sure fans are turning. With power off, wipe dust off all fan blades.	
Check cabinet and modules for dust. Clean as necessary using an antistatic vacuum.	3 months
Clean DAT tape drive heads after 50 hours of operation.[1]	
Check floppy disk drive. Clean inspect and check alignment.[1]	
Adjust printer per manufacturer's instructions.	
Check power supply output. Adjust power supply if needed (***DC Power Test*** in Section 4).	
Check alarm and display LEDs.	
Check the cabinet air filters. Clean or replace them as necessary. Check the air filter more frequently in excessively dirty environments.	6 months
Check all signal, power and ground connections within the cabinet and verify that they are secure. Refer to procedure.	
Check power supply outputs. Refer to procedure.	
Check the quality of the plant power and grounding system. Follow the power and grounding system verification procedures in the INFI 90 OPEN ***Site Planning and Preparation*** instruction.	12 months
Inspect and check the power entry panel. In high vibration environments testing may be necessary at shorter intervals. Refer to procedure.	2 years
Replace power supply. Call Elsag Bailey sales and service for information.	5 years
Complete all appropriate tasks in this table.	Shutdown

NOTE:
1. Adjust the floppy disk drive and printer using the procedures in the manufacturer's documentation. Clean the floppy disk drive, DAT tape drive and printer according to manufacturer's instructions.

EQUIPMENT AND TOOLS REQUIRED

Following are tools and equipment required for maintenance procedures. Check the procedure for items required.

- Antistatic vacuum.
- DAT cleaning kit 1949139□1 or equivalent.
- Commercially available head cleaning kit.
- Digital multimeter (true RMS) for DC power test.
- Bladed torque screwdriver (0 to 2.7 Newton meters - 0 to 24 inch-pounds).
- Mild all-purpose commercial spray cleaner.
- Lint-free cloths.
- Foam-tipped swabs.
- Distilled water.

- Four-inch bladed screwdriver.
- 16-inch bladed screwdriver.
- Isopropyl alcohol (99.5 percent electronic grade).
- Eberhard Faber (400A) pink pearl eraser or equivalent.
- Fiberglass burnishing brush.

STANDARD PREVENTIVE MAINTENANCE PROCEDURES

These preventive maintenance procedures cover standard procedures for the console preventive maintenance requirements. Read through them before beginning the procedure.

WARNING	**Never clean electrical parts or components with the power on. Doing so exposes you to a fatal electrical shock hazard.** **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.**
AVERTISSEMENT	**Il ne faut jamais nettoyer des piècesou des composants électriques lorsqu'ils sont sous tension. Ceci présente un risque d'électrocution fatale.** **Portez toujours des lunettes de protection lorsque vous utilisez des solvants de nettoyage. L'aircomprimé servant à enlever le solvant des cartes de circuits imprimés provoque des éclaboussures qui risquent d'atteindre les yeux.**

Checking Connections

Check all signal wiring, power and ground connections within the cabinet 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.

> **NOTE:** Power to the cabinet must be off while performing this preventive maintenance task.

1. Check and verify that all phase, neutral and grounding conductor connections on the power entry panel are secure.

2. Check and verify that all other power connections within the cabinet, including connections to the power supplies are secure.

3. Check and verify that all field wiring connections to the communication modules are secure.

Cleaning the Monitor

To clean the monitor window, remove dirt, finger prints or grease with a commercial glass cleaner and a soft lint-free cloth.

Cleaning the Operator Keyboard

To clean the operator keyboard:

1. Wipe away dust with a soft lint-free cloth.

2. Clean dirt and film from the keyboard using a mild all purpose commercial spray cleaner and lint-free cloth.

Cleaning the Engineering Keyboard

To clean the engineering keyboard:

1. Use a static safe vacuum cleaner to remove dust from the keyboard.

2. Clean the key caps and keyboard enclosure with an all purpose commercial spray cleaner and lint free cloth. Do not spray into the keyboard. Apply cleaner to the cloth only.

Cleaning the Printed Circuit Boards

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

Do all cleaning and handling of the printed circuit boards at static safe work stations. Always observe the proper electrostatic sensitive device handling precautions when handling printed circuit boards.

GENERAL CLEANING AND WASHING

If the printed circuit board needs minor cleaning:

Remove dust and residue from the printed circuit board surface using clean, dry, filtered compressed air or an antistatic field service vacuum cleaner.

Another method of washing the printed circuit board is:

1. Clean the printed circuit board by spraying or wiping the board with isopropyl alcohol (99.5% electronic grade). Use a foam tipped swab to wipe the circuit board.

2. When the circuit board is clean, remove excess solvent by using compressed air to blow it free of the circuit board.

CLEANING EDGE CONNECTOR

To clean edge connector contacts:

1. Use a solvent mixture of 80% isopropyl alcohol (99.5% electronic grade) and 20% distilled water.

2. Soak a lint-free cloth with the solvent mixture.

3. Work the cloth back and forth parallel to the edge connector contacts.

4. Repeat with a clean cloth that is soaked with the solvent mixture.

5. Dry the edge connector contact area by wiping with a clean lint-free cloth.

To clean tarnished or deeply stained edge connector contacts:

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

2. Minimize electrostatic discharge by using the 80% to 20% isopropyl alcohol to water solution during burnishing.

3. 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.

CLEANING FEMALE EDGE CONNECTORS

To clean the contacts on a female edge connector:

1. Use a foam tipped swab or a lint-free cloth wrapped over a piece of scrap circuit board. Soak the swab or cloth in electronic grade isopropyl alcohol.

2. Insert the swab of cloth covered circuit board into edge connector and work it back and forth to clean the contacts.

3. Rinse the edge connector contacts by spraying with isopropyl alcohol.

4. Remove excess alcohol and dry using compressed air.

Cleaning the Floppy Disk Drive Head

To clean the heads on the floppy disk drives, use a head cleaning kit. Use the head cleaning kit supplied or an equivalent commercially available head cleaning kit. Follow the directions in the kit to clean the heads on all floppy disk drives.

Cleaning the DAT Tape Drive Head

To clean the heads on the digital tape drive, use a head cleaning kit part number 1949139□1. Follow the directions in the kit to clean the heads on all digital tape drives.

Checking Power Supply Outputs

To check modular power supply outputs on the power entry panel, refer to the AC and DC power tests in Section 4.

Checking and Inspecting Power Entry Panel

This procedure applies to OIS console power entry panels. The system must be shutdown to perform this maintenance task.

1. Check the tightness of all power wiring screws within the console. Torque all screws connected to AC power to 1.58 Newton meters (14 in-lbs).

2. Inspect and clean the power entry panel and DC distribution board connections.

SECTION 6 - COMPONENT DESCRIPTION AND REPLACEMENT

INTRODUCTION

This section explains how to replace multibus card cage modules and various other components in the OIS console that might require replacement. It contains component descriptions and includes jumper and dipswitch settings. There are no special tools required.

> **NOTE:** Components in the OIS consoles are configured at the factory. This information is given in case settings are changed or hardware needs to be replaced.

Table 6-1 lists the CPUs used in the consoles and driver cabinet. Table 6-2 lists the hardware used in the OIS operator interface. Table 6-3 contains the SCSI bus addresses for the hardware.

Table 6-1. CPU Applications

Part Number	OIS			CPU Description
	43X1 43X2	43XA 43XD	43X3	
6642865□1	x	x		DEC AlphaStation 255 model 233 with two 1.08 gigabyte hard disk drives, a 233 MHz clock, an integral 5.25-inch CD-ROM drive and a single graphics board.
6642865□2			x	DEC AlphaStation 255 model 233 with two 1.08 gigabyte hard disk drives, a 233 MHz clock, an integral 5.25-inch CD-ROM drive and two graphics boards.
6642905□1		x		DEC AlphaStation 255 model 233 with two 1.08 gigabyte hard disk drives, a 233 MHz clock and an integral 5.25-inch CD-ROM drive.

Table 6-2. Hardware

Part Number	OIS		Description
	43X1 43X2 43X3	43XA 43XD	
1948623□9	x		19-inch color monitor
6638353□5	x		Power entry panel
6638514□1	x		Operator keyboard (mylar)
6638553□5	x	x	Power supply
6638554□8	x		Keyboard interface panel

Table 6-2. Hardware (continued)

Part Number	OIS		Description
	43X1 43X2 43X3	43XA 43XD	
6640300□1	x	x	Four slot multibus card cage
6641376□1		x	Power entry panel
IIADP01	x		Annunciator/display panel (tabletop - optional)
IIADP02	x		Annunciator/display panel
IIAKB03A	x		QWERTY engineering keyboard
IIAMS04A	x		Mouse
IIATB05	x		Trackball
IIDMT03A	x	x	Digital tape drive for archival storage
IIDOP04A	x		Tabletop optical disk
IIDOP05A		x	Rack mount optical disk
IIMCL01	x	x	Multibus communication loop module
IIMCP01	x	x	Multibus communications processor module for Plant Loop (10,000 tag) systems
IIMCP02	x	x	Multibus communications processor module for INFI-NET (30,000 tag) systems
IIMKM02A	x		Multibus keyboard module (consoles)
IIMLM01	x	x	Multibus loop module
IIMRM02		x	Multibus reset module (driver cabinet)
IIPRT02	x	x	Black and white printer
IIPRT03	x	x	Color printer
IIPRT05	x	x	Black and white printer (high speed)
IIPRT08□1 IIPRT08□2 IIPRT08□3 IIPRT08□4	x x x x	x x x x	120-V color/black and white printer 220-V color/black and white printer 240-V color/black and white printer 100-V color/black and white printer
IIPRT091 IIPRT092	x	x	120-V 24-pin line printer 240-V 24-pin line printer
IIPRT101 IIPRT102	x	x	120-V color screen printer 240-V color screen printer
IIVTE01 IIVTE02		x	120-V terminal for diagnostics and start-up 240-V terminal for diagnostics and start-up

Table 6-3. SCSI Bus Hardware Addresses

Address	SCSI Bus Device
0	System hard disk drive (1.08 Gbytes)
1	Application hard disk drive (1.08 Gbytes)
2	Floppy disk drive
3	IIMCP02 module
4	CD-ROM drive
5	DAT tape drive
6	Optical disk drive
7	CPU

MULTIBUS CARD CAGE

The multibus card cage is a four-slot chassis that provides power and mounting for the IIOIS43 multibus modules listed in Table 6-4. It is used in both the console and driver cabinet.

Table 6-4. Multibus Card Cage Modules

Card	Description
IIMCL01	The multibus communication loop termination module terminates the coaxial or twinaxial cable of the communication loop.
IIMCP02	The multibus communication processor module contains a library of commands which send and retrieve data from other process control units and consoles. **NOTE:** The IIMCP01 module is used for Plant Loop system (10,000 tag) installations only.
IIMKM02A	The multibus keyboard module connects the keyboard interface panel to the CPU.
IIMLM01	The multibus loop module allows the IIMCL01 and IIMCP01 or IIMCP02 modules to communicate with each other.
IIMRM02	This module replaces the IIMKM02A module when a driver cabinet is used. Provides power fault interrupt and a reset signal to the multibus backplane.

Figure 6-1 shows the front view and location of the modules in the multibus card cage. Figure 6-2 shows the rear view of the multibus card cage.

> **NOTE:** The IIMRM02 module replaces the IIMKM02A module when a driver cabinet is used. The IIMCP01 is for Plant Loop and the IIMPC02 is for INFI-NET.

To remove a multibus card cage, follow this procedure. The removal is the same for a driver cabinet.

1. Turn off the main circuit breaker on the power entry panel. Check the power indicator to see if power is removed. Remove the clear polycarbonate shield.

2. Disconnect and label all cables from the card cage.

3. Support the back and front of the card cage and remove the four screws at the front of the card cage (two on each side).

4. Carefully slide the cage out of the front of the cabinet.

FAN ASSEMBLY FOR THE MULTIBUS CARD CAGE

Figure 6-2 shows the fan in a multibus card cage. The fan mounting is the same on a driver cabinet. Refer to Table 6-2 for the part number for the 11.43 cm (4-½ in.) fan. Use this procedure to remove the fan from a console or driver cabinet.

1. Turn off the main circuit breaker on the power entry panel. Check the power indicator to see if power is removed.

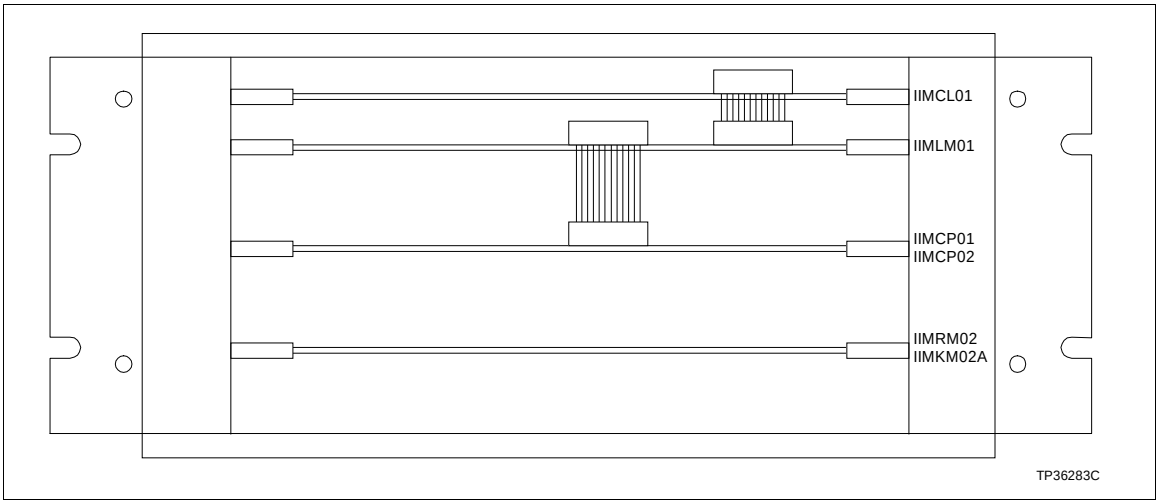

Figure 6-1. Multibus Card Cage (Front View)

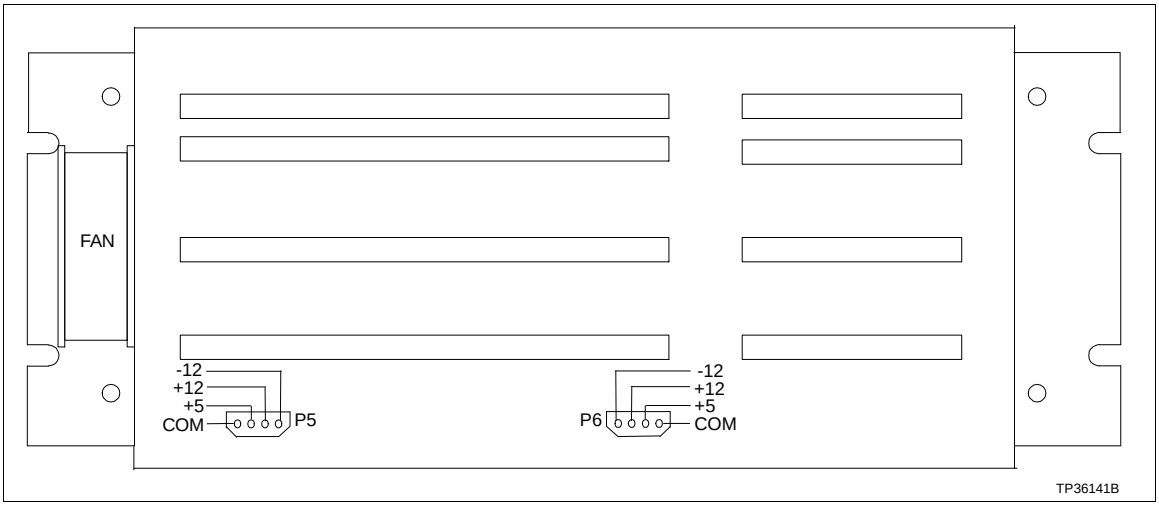

Figure 6-2. IIOIS43 Multibus Card Cage (Rear View)

2. Follow the procedure under ***MULTIBUS CARD CAGE*** and remove the cage.

3. Cut and remove cable ties securing the fan assembly power cord.

4. Remove the two long screws on either side of the fan assembly and slide the fan assembly out around the multibus card cage.

NOTES:

1. Be sure the arrow on the fan being installed points in the direction of the air flow.

2. Be sure the red striped conductor of the power cord is connected to the + (positive) terminal of the fan.

MULTIBUS MODULES

CAUTION	**Failure to turn off the main power circuit breaker before removing or inserting modules into the card cage may result in equipment failure.**
ATTENTION	**Si l'on omet d'eteindre l'interrupteur du circuit d'alimentation principal avant de retirer les cartes ou de les inserer dans le porte-cartes, l'equipment pourrait faire default.**

Remove a module from the multibus card cage by following these steps.

1. Open the door on the front of the cabinet and turn off the main power circuit breaker.

2. Remove the required cables.

3. Loosen (do not remove) the two screws in the left and right card retaining brackets.

4. Slide the left and right card retaining brackets out of the way to permit the module removal tabs on the cards to pass.

5. To unseat a module, lift the module removal tabs.

6. Carefully slide the module out of the multibus card cage. Be sure not to loosen cables from the adjacent modules.

IIMKM02A Multibus Keyboard Module

The multibus keyboard interface module interfaces the keyboard and other operator input devices to the OIS console. There are nine jumpers on the MKM board to set for proper operation (Fig. 6-3). Refer to Table 6-5 for jumper settings.

Jumpers J1 and J2 control serial ports P8 and P9.

Jumper J3 resets the multibus card cage when the MKM watchdog timer circuit times out. Factory default is no reset on time-out.

Jumper J4 allows the option of disabling the power supply out-of-tolerance (OOT) signal to reset the MKM module. Factory default is to disable OOT.

Jumper J5 must always be set to pins two to three.

Jumpers J6/J8 and J7/J9 are for consoles with the touch screen option. For IIOIS43X1 and IIOIS43X2 consoles (upper or lower monitors), one touch screen card (TS1) is used and is mounted on the component side of the MKM board. For

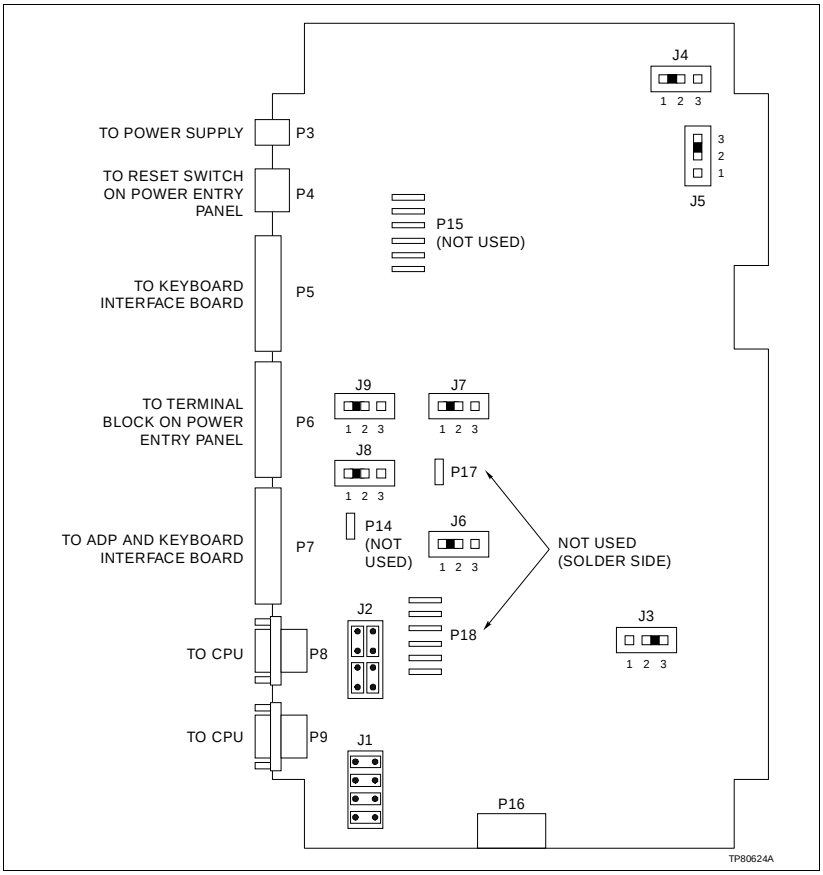

Figure 6-3. IIMKM02A Multibus Keyboard Module

Table 6-5. IIMKM02A Jumper Settings

Jumper	Setting	Description
J1 and J2	Connect 8 pins horizontally	Serial port data transmitted on pin 3 of connector and received from the connected device on pin 2
	Connect 8 pins vertically	Serial port data transmitted on pin 2 of connector and received from the connected device on pin 3
J3	1-2	OIS reset on time-out
	2-3	No OIS reset on time-out
J4	1-2	Disable OOT signal
	2-3	Enable OOT signal
J5	2-3	Factory setting - no selection
J6 and J8	1-2	Single touch screen board
J7 and J9	1-2	Two touch screen boards (dual monitors)

IIOIS43X3 consoles (dual monitors) an additional touch screen card (TS2) is mounted to the solder side of the MKM board for the touch screen option.

IIMRM02 Multibus Reset Module

This module replaces the IIMKM02A module when the driver cabinet is used. The reset module provides power fault interrupt and a reset signal to the multibus backplane. Refer to Figure 6-4 for jumper location. Refer to Table 6-6 for jumper settings.

Table 6-6. IIMRM02 Jumper Settings

Jumper	Setting	Description
J4	1-2	Disable OOT voltage detection
	2-3	Enable OOT voltage detection
J5	2-3	Factory setting - no selection

Jumper J4 on the MRM module enables or disables the out of tolerance voltage detection of the power supply. Default is to disable detection.

Jumper J5 on the MRM module changes polarity of the out of tolerance signal from the power supply. Leave jumper J5 in the default position (pin two to pin three).

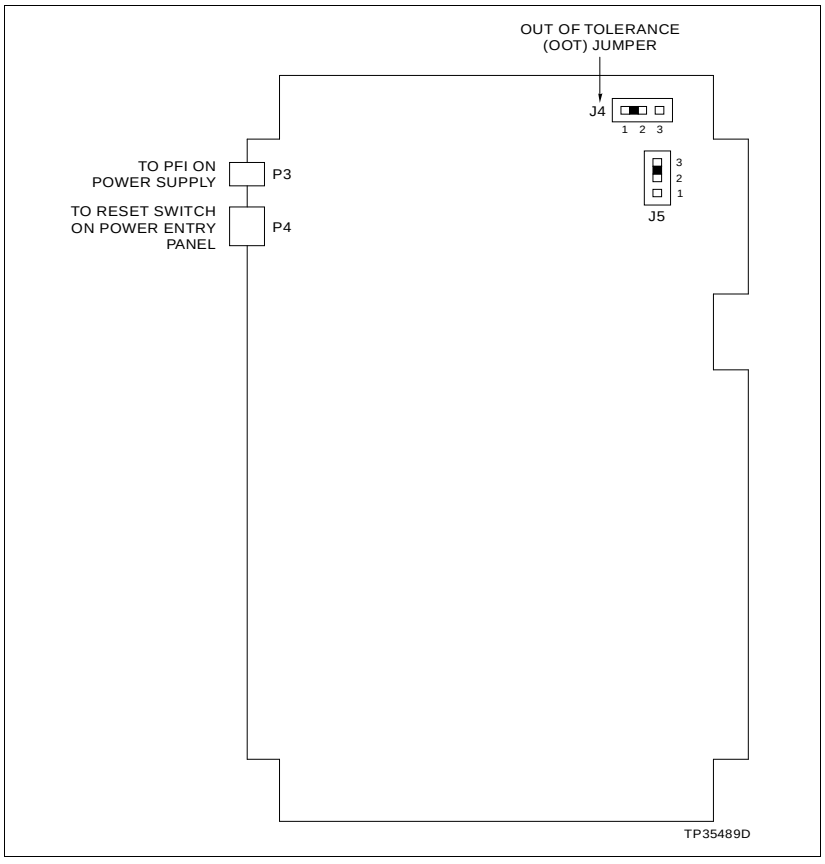

Figure 6-4. IIMRM02 Multibus Reset Module

IIMLM01 Multibus Loop Module

The IIMLM01 multibus loop module (Fig. 6-5), allows communication between the multibus communication processor module (IIMCP01 or IIMCP02) and the INFI-NET or Plant Loop communication highway through the termination module (IIMCL01). The dipswitch settings shown in the figure are default settings; refer to Table 6-7 for other settings.

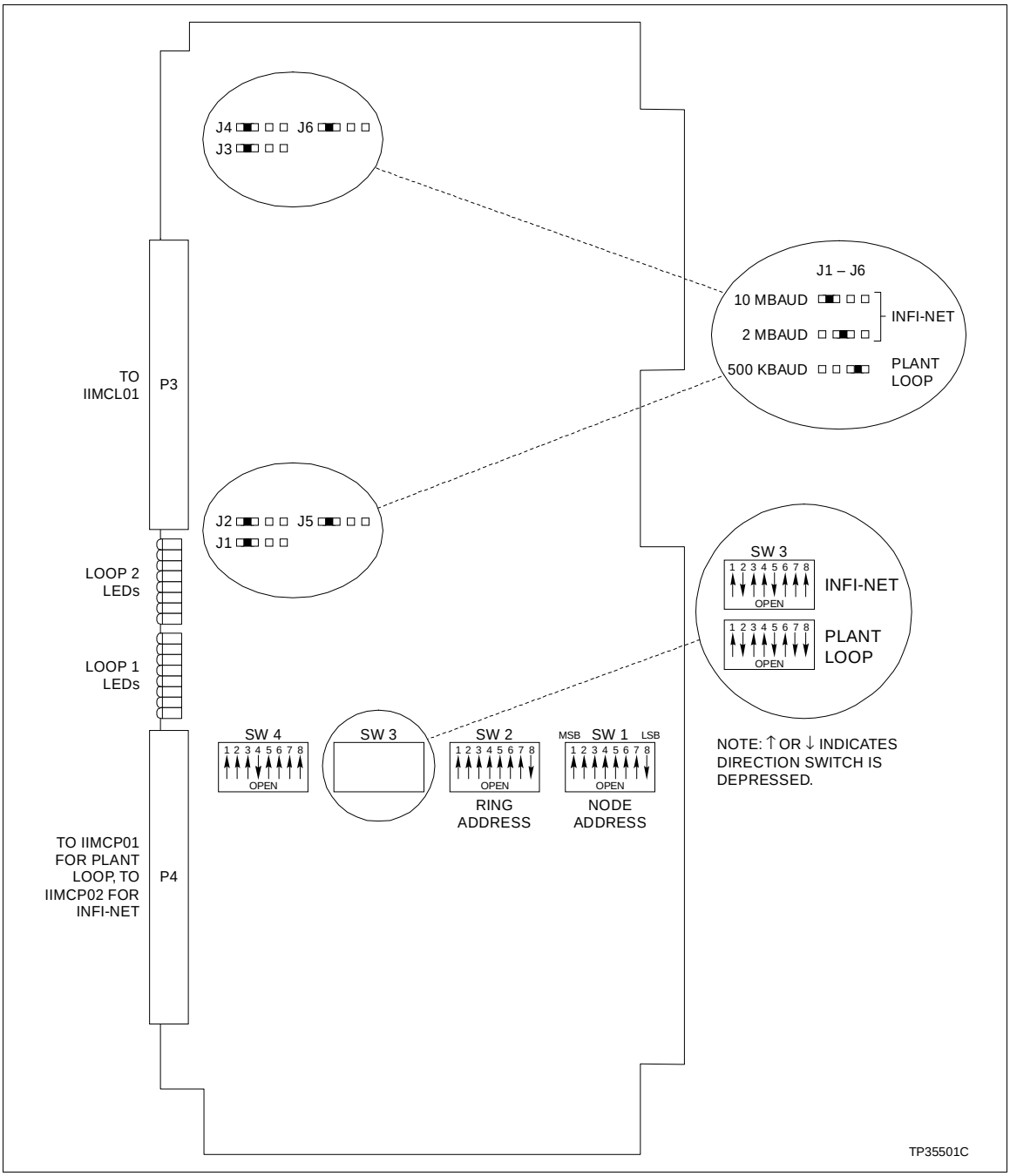

Figure 6-5. IIMLM01 Multibus Loop Module

Table 6-7. IIMLM01 Dipswitch Settings

Switch	Position	Description	Switch Setting
SW 1	1-8	Loop node number	1-0FA hex (pole 8 is LSB)
SW 2	1-8	Ring number	1-0FA hex (pole 8 is LSB)
SW 3	1	Device compatibility	0 = MCP
			1 = BCM
	2	ROM checksumming	0 = No checksumming
			1 = Checksumming enabled
	3	Run mode	**0 = Normal operation**
			1 = Test mode
	4	Busy test	**0 = Normal operation**
			1 = Busy NAK all loop messages if run mode switch set to 1
	5	Broken loop indication	0 = Disable flashing of LEDs
			1 = Flashing LEDs
	6	Diagnostic enable	**0 = Normal operation**
			1 = Diagnostics enabled - normal operation disabled
	7-8	Loop type	00 = 10-MHz INFI-NET system
			01 = 2-MHz INFI-NET system
			10 = Undefined
			11 = Plant Loop system
SW 4	1-3	I/O expander bus address select	0-7
	4-8	LED display select	0-1F hex

NOTE: 0 = CLOSED or ON, 1 = OPEN or OFF. Bold areas indicate default settings.

Two ribbon cables connect the loop module to the communication processor module and to the communication loop module terminations. Dipswitches SW1 and SW2 select the node address and ring number of the OIS console.

IIMCP01 Multibus Communication Processor Module

The multibus communication processor module (used for Plant Loop systems, 10,000 tags) contains a library of commands which send and retrieve data from other process control units and operator consoles. The OIS console sends commands to the multibus communication processor module requesting it to send or retrieve required data. Figure 6-6 shows dipswitch locations and settings. Refer to Table 6-8 for the module dipswitch settings.

Also located on the module board are jumpers J5, J6, and J7. Jumper J5 should not be changed from the factory setting. For correct operation, jumpers J6 and J7 must be set as shown in Figure 6-6 when using the IIMCP01 and the CPU (DEC AlphaStation 255 model 233 Open VMS).

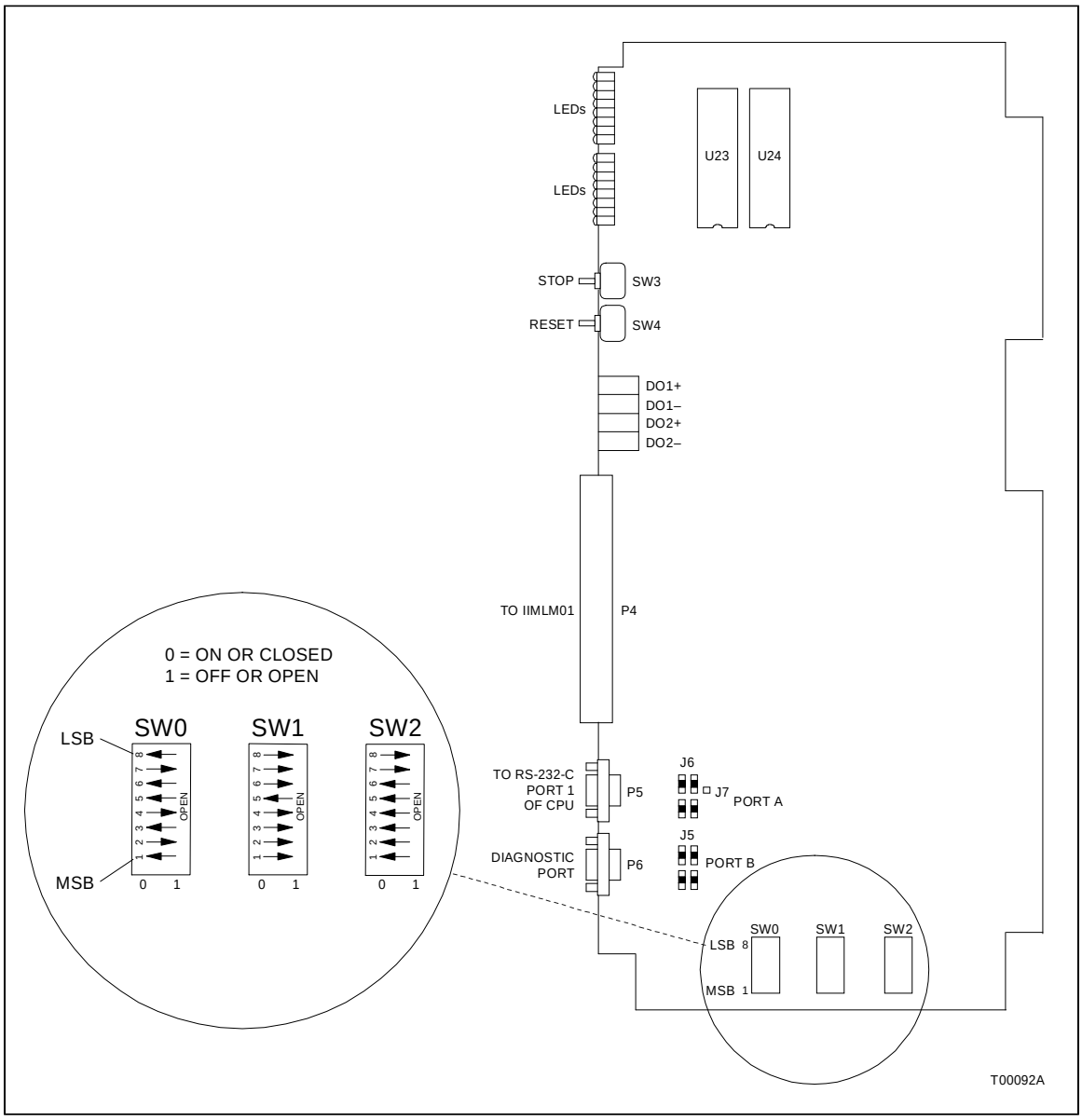

Figure 6-6. IIMCP01 Multibus Communication Processor

Table 6-8. IIMCP01 Switch Settings

Switch	Position	Description	Switch Setting
SW0	1	ROM checksumming	**0 = enabled**
			1 = disabled
	2-3	Port A characteristics	00 = 8 d, 1 s, no parity
			01 = 8 d, 1 s, even parity
			10 = 8 d, 1 s, odd parity
			11 = 8 d, 2 s, no parity
	4	Port B operation mode	0 = NIU command mode
			1 = NIU utility mode
	5 - 6	Port B data characteristics (Only if switch 4 = 0, otherwise defaults to 00).	00 = 8 d, 1 s, no parity
			01 = 8 d, 1 s, even parity
			10 = 8 d, 1 s, odd parity
			11 = 8 d, 2 s, no parity
	7	Command checksumming	0 = disabled
			1 = enabled
	8	Not used	—
SW1	1-4	Port A (P5) baud rate	1111 = 19200
	5-8	Port B (P6) baud rate	0111 = 9600
SW2	1	Firmware test mode	0 = enabled
			1 = disabled
	2	Diagnostic mode	0 = disabled
			1 = enabled
	3	INFI-NET system diagnostics	0 = disabled
			1 = enabled
	4-6	Not used	—
	7	NVRAM installed	0 = disabled
			1 = enabled
	8	RAM component size	0 = disabled
			1 = enabled

NOTE: 0 = CLOSED or ON, 1 = OPEN or OFF. Bold areas indicate default settings.

IIMCP02 Multibus Communication Processor Module

The multibus communication processor module (Fig. 6-7) contains a library of commands that send and retrieve data from process control units and other operator stations. The OIS console sends commands to the multibus communication processor module via a SCSI bus. The module is configured by setting dipswitches. All the jumpers on the board are factory set and should not be changed (Table 6-9). Refer to Table 6-10 for the dipswitch settings. The IIMCP02 module is required for INFI-NET systems with up to 30,000 tags.

NOTE: Make certain termination resistors RN2, RN3 and RN4 for console installation are removed.

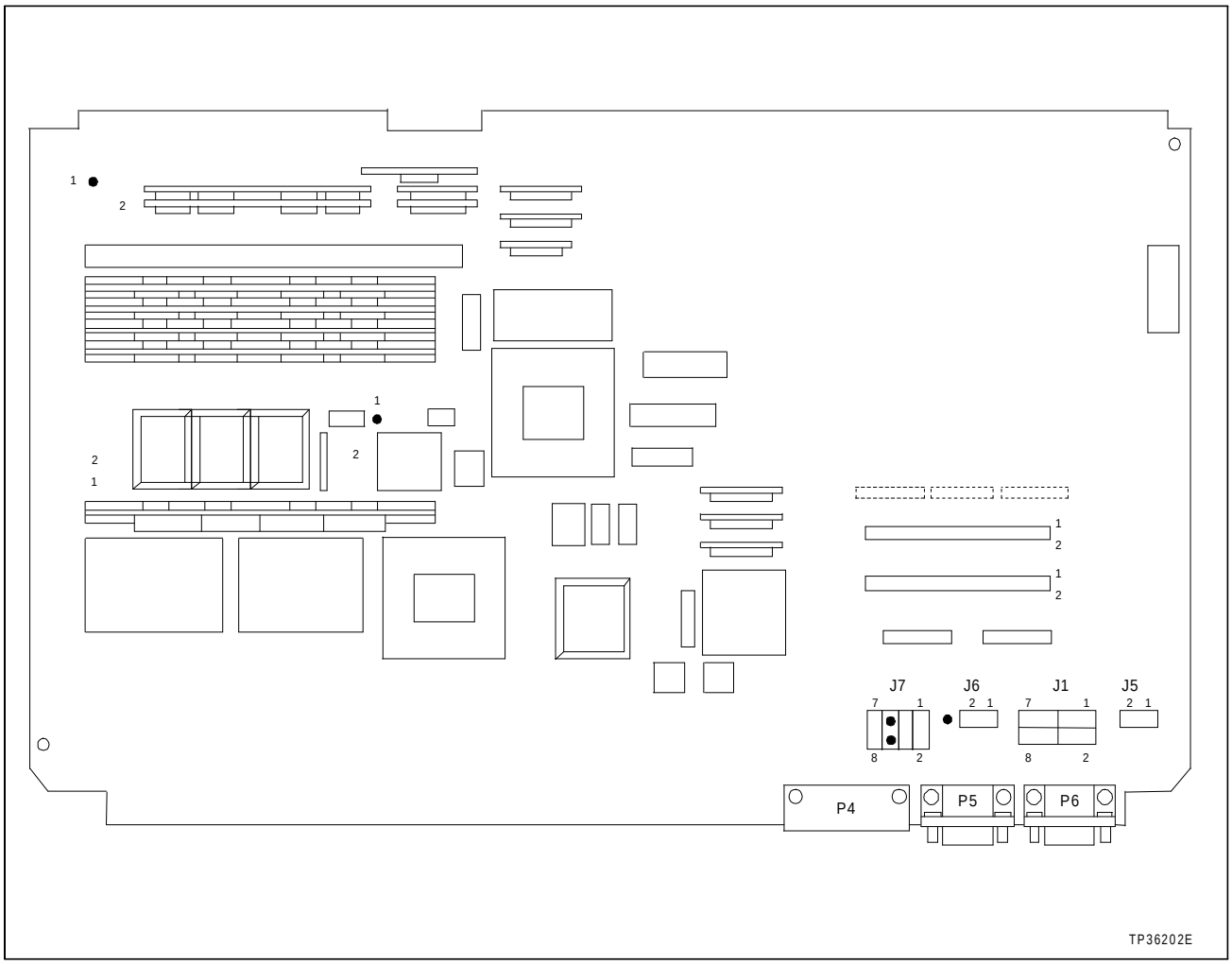

Figure 6-7. IIMCP02 Multibus Communication Processor

Table 6-10. IIMCP02 Communications Processor Configuration

Switch	Position	Description	Switch Setting
SW1	1-4	Port A (P5) baud rate	**1111 = 19200**
	5-8	Port B (P6) baud rate	**0111 = 9600**
SW2	1	MLM handshake timeout	**0 = enabled**
			1 = disabled
	2	MLM diagnostics	**0 = disabled**
			1 = enabled
	3	Diagnostic utilities	**0 = disabled**
			1 = enabled
	4	Hardware diagnostics	**0 = disabled**
			1 = enabled
	5-8	Not used	—
SW3	1	SCSI port	0 = disabled
			1 = enabled
	2-4	SCSI address	**011 = 3**
	5	SCSI parity checking	0 = disabled
			1 = enabled
	6-8	Not used	111
SW4	1	ROM checksumming	**0 = enabled**
			1 = disabled
	2-3	Serial port settings	00 = 8 d, 1 s, no parity
			01 = 8 d, 1 s, even parity
			10 = 8 d, 1 s, odd parity
			11 = 8 d, 2 s, no parity
	4	Port B (P6) mode	0 = NIU command mode
			1 = NIU utility mode
	5	Modem password protection	**0 = disabled**
			1 = enabled
	6	Port addressing mode	**0 = disabled**
			1 = enabled
	7	Command checksumming	0 = disabled
			1 = enabled
	8	Not used	—

NOTE: 0 = CLOSED or ON, 1 = OPEN or OFF. Bold areas indicate default settings.

IIMCL01 Multibus Communication Loop Module

The multibus communication loop module is the termination unit that interfaces the OIS console to the communication highway. Refer to Figure 6-8 for wiring connections. Set jumpers J1 through J6 for the type of cable used in the Plant Loop or INFI-NET system; use either coaxial or twinaxial cable..

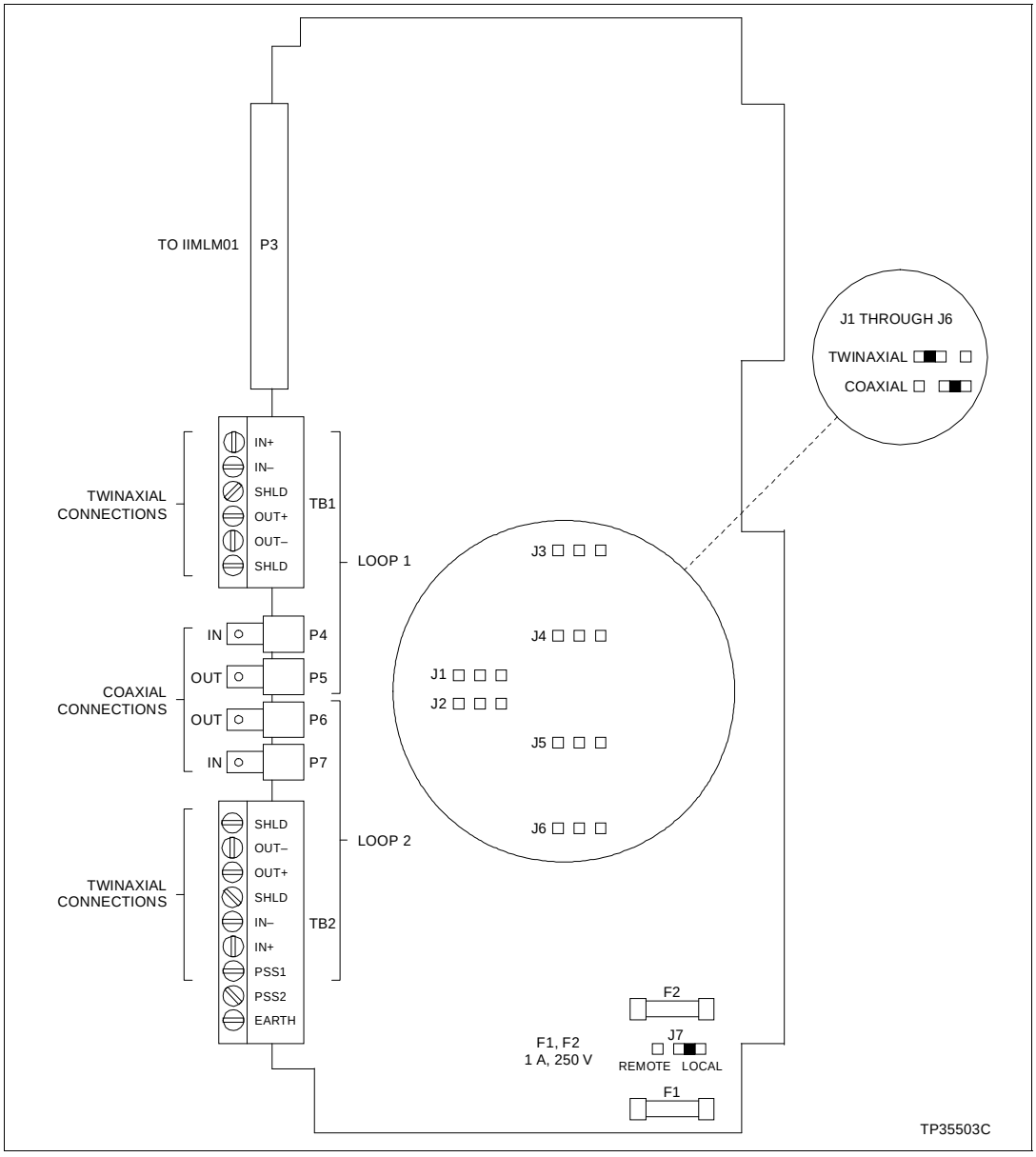

Figure 6-8. IIMCL01 Multibus Communication Loop Module

Replacing Fuses

Replace fuse F1 and F2 with one of the same type and rating (1 amp, 250 volt). Refer to Section 7 for part numbers.

WARNING	**Replace the fuse with one of the same type and rating. Using an improper fuse could lead to injury to personnel and equipment damage from fire or electrical shock.**

AVERTISSEMENT	**Remplacer le fusible avec un fusible du même type et de la même capacité. L'utilisation d'une fusible du mauvais type/ capacité pourrait causer des blessures au personnel et des dommages à l'équipement résultant d'un incendie ou de choc électrique.**

POWER SUPPLY

The OIS 130-watt main power supply provides power to the console and driver cabinet. The power supply for the driver cabinet is part of the power entry panel.

Figure 6-9 shows the wiring from the DC distribution board in the console or driver cabinet to the main power supply. The DC distribution board is located at the top rear of the supply.

Table 6-11 lists connections to the DC distribution board socket connections. Each socket on the DC distribution board is wired identically. Table 6-12 lists the pin outs to the DC distribution board sockets. Peripheral devices using power cable 6638713□1 may be plugged into any socket on this board.

The power supply operates on both 120 volts and 240 volts. The power supply is voltage autosensing and has no voltage select jumpers

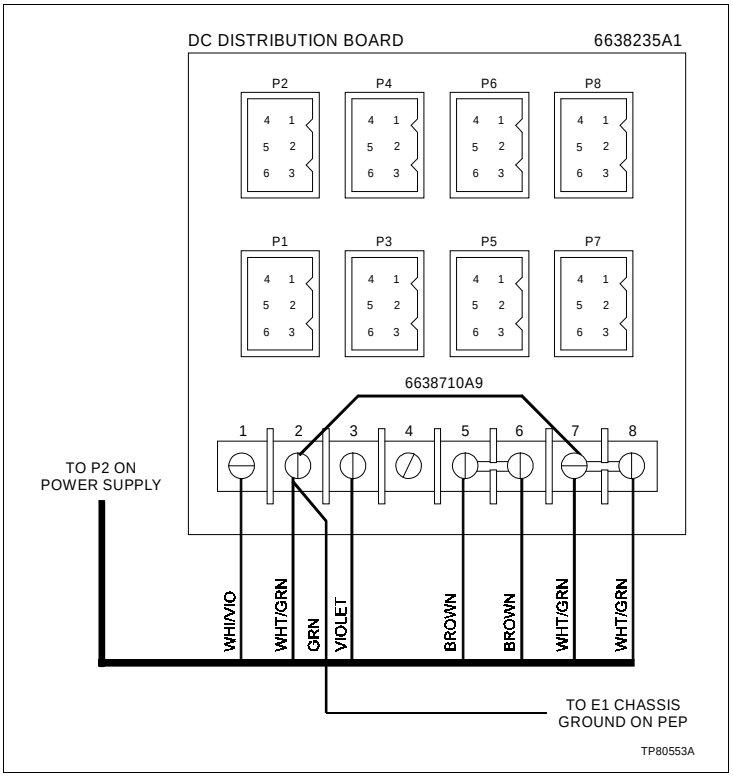

Figure 6-9. Connections to DC Distribution Board

Table 6-11. DC Distribution Board Socket Connections

Socket	Console	Driver Cabinet
P1	Floppy disk drive and disk controller	Floppy disk drive and disk controller
P2	Ethernet converter	Ethernet converter
P3	Keyboard interface panel	Spare
P4	ADP02	Card cage fan
P5	Backplane	Backplane
P6	Backplane	Backplane
P7	Fans (card cage and door)	Door fan
P8	Fan (monitor)	Door fan

Table 6-12. DC Distribution Board Pin Outs

Terminal	Pin	Description
1	1	+12 V
2	2	Common
3	3	-12 V
4	4	No connection
5-6	5	+5 V
7-8	6	Common

Console Power Supply Removal

To remove the power supply from an IIOIS43 console refer to Figure 6-10 and follow these steps.

1. Turn off the main circuit breaker on the power entry panel. Check the main power indicator to see if power is removed.

2. Remove the power supply plug from the socket on the power entry panel.

3. Mark and disconnect the wires between the power supply, DC distribution board and multibus card cage backplane.

4. Remove the two screws holding the power supply bracket to the monitor mounting platform and slide the unit out of the rear of the cabinet.

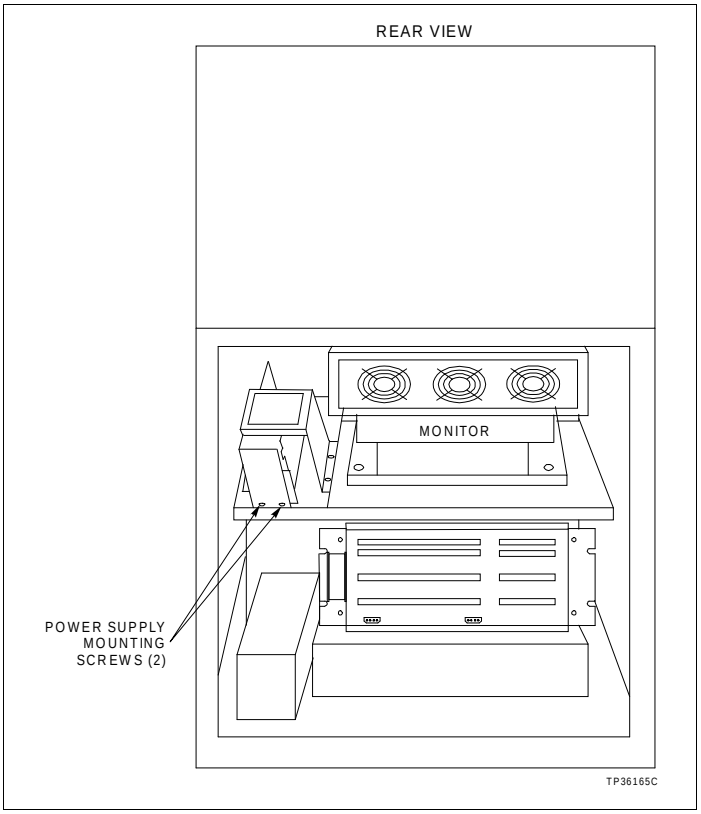

Figure 6-10. Main Power Supply Removal for Consoles

Driver Cabinet Power Supply Removal

To remove the power supply from an IIOIS43XA or IIOIS43XD driver cabinet refer to Figure 6-11 and follow these steps.

1. Turn off the main circuit breaker on the power entry panel. Check the main power indicator to see if power is removed1.

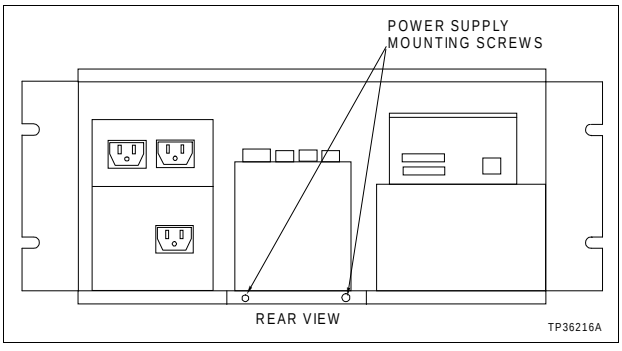

Figure 6-11. Main Power Supply Removal for Driver Cabinets

2. Disconnect the AC power cable from the power entry panel.

3. Remove and label the four cables from the DC distribution board.

4. Remove the two screws holding the power supply to the shelf.

5. Note that a metal tab on the bottom of the power supply sets into a slot in the shelf. Carefully lift up the rear of the unit to clear the tab and slide the unit out of the cabinet.

CONSOLE POWER ENTRY PANEL

The power entry panel contains the incoming AC power terminals and system circuit breakers along with ports for connecting peripheral devices and a system reset switch.

The power entry panel for the OIS consoles also contains terminals for alarm contact outputs and the degaussing switches for the monitors. Refer to Figure 3-9 to view the power entry panel.

The PERIPHERAL PORT connection is for an IIDMT03A DAT tape drive (tabletop unit) used for rapid reloading of system and user configuration files for the OIS console.

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) corrects picture distortion due to magnetic fields on the screen of the lower monitor. The RESET pushbutton resets the OIS multibus cards to an initial power up condition when pressed.

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 power entry panel and the main power circuit breaker is on.

The AC outlet marked SCSI PERIPHERAL is an outlet for one of the 120 or 240 VAC peripheral devices listed in this instruction manual. Check the notice on the front of the power entry panel before connecting anything into this outlet.

NOTES:

1. Use the AC outlet only for peripheral devices listed in this instruction manual. Check to make certain the peripheral device has the same power requirements.

2. Refer to Section 3 for wiring and cable connections. Some of the connections are on the back of the power entry panel and are accessed through the door on the back of the OIS console.

CONSOLE POWER ENTRY PANEL REMOVAL

To remove the power entry panel from an IIOIS43 console refer to Figure 6-12 and follow these steps.

1. Turn off the main circuit breaker on the power entry panel. Check the power indicator to see if power is removed.

2. Shut down AC line power to cabinet (plant breaker) so that the AC line may be disconnected safely.

3. Remove all cables from the front of the power entry panel (RS-232-C, SCSI, alarm contact wires and AC input).

4. Remove AC cables from the outlets on the power entry panel.

5. Remove all signal cables from the multibus modules that go to the rear of the power entry panel. Leave the cables on the power entry panel. The new power entry panel comes with cables.

6. Remove the five screws from around the front of the power entry panel. Slide the power entry panel out the front of the cabinet.

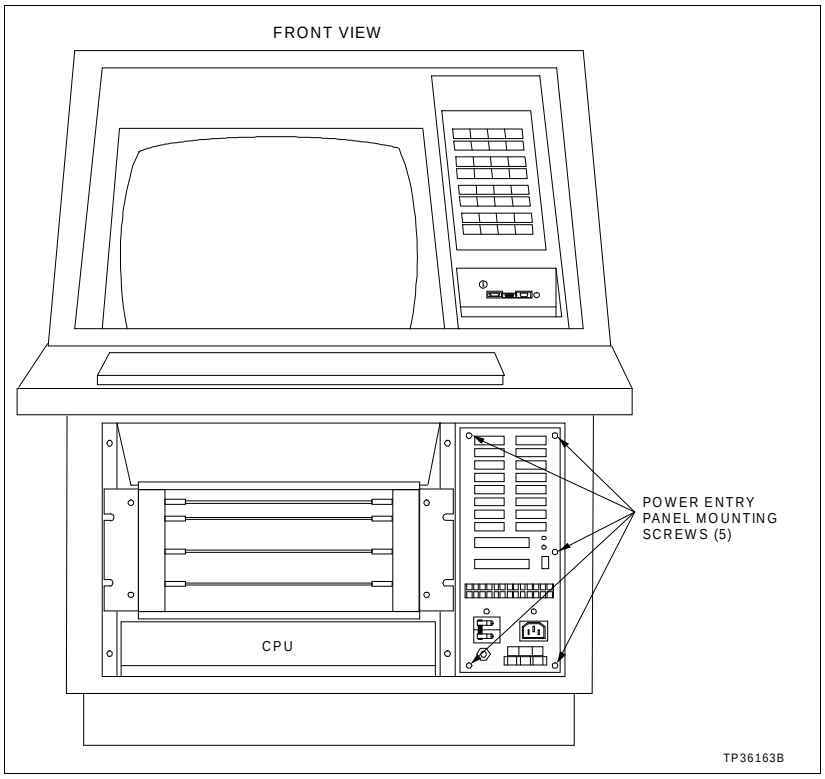

Figure 6-12. Console Power Entry Panel (PEP) Removal

DRIVER CABINET POWER ENTRY PANEL

The power entry panel contains the incoming AC power terminals and system circuit breakers along with ports for connecting peripheral devices and a system reset switch.

The power entry panel for the OIS driver cabinet also contains a floppy disk drive and floppy controller board and a support tray for an IIDMT03A tape drive. Refer to Figure 3-8 to view the power entry panel.

The SCSI PERIPHERAL port connection is for a IIDMT03A DAT tape drive (tabletop unit) used for rapid reloading of system and user configuration files for the OIS console.

The SYSTEM RESET pushbutton resets the OIS multibus cards to an initial power up condition when pressed.

The MAIN POWER indicator is lit when the AC power is connected to the power entry panel and the main power circuit breaker is on.

The AC outlets marked AC OUTLETS are outlets for either 120 or 240-VAC peripheral devices listed in this instruction manual.

NOTES:

1. Use the AC outlets only for peripheral devices listed in this instruction manual. Check to make certain the peripheral device has the same power requirements.

2. Refer to Section 3 for wiring and cable connections. Some of the connections are on the back of the power entry panel and are accessed through the door on the back of the driver cabinet.

DRIVER CABINET POWER ENTRY PANEL REMOVAL

To remove the power entry panel from an IIOIS43XA or IIOIS43XD driver cabinet refer to Figure 6-13 and follow these steps.

1. Turn off the main circuit breaker on the power entry panel. Check the power indicator to see if power is removed.

2. Shut down AC line power to cabinet (plant breaker) so that the AC line may be disconnected safely.

3. Remove all cables from the front of the power entry panel (SCSI and AC input).

4. Remove AC cables from the power entry panel.

5. Remove all signal cables from the multibus modules that go to the rear of the power entry panel. Leave the cables on the

power entry panel. The new power entry panel comes with cables.

6. Remove and label all cables to the DC distribution board.

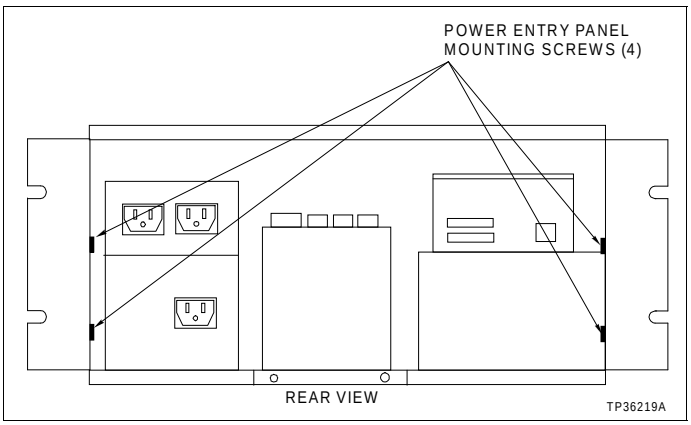

Figure 6-13. Driver Cabinet Power Entry Panel (PEP) Removal

7. Support the rear of the power entry panel.

8. Support the front of the power entry panel.

9. Remove the four screws from the front of the power entry panel.

10. Remove the four screws from the rear sides of the power entry panel.

11. Carefully support the power entry panel and slide it out the front of the cabinet.

NOTE: The power entry panel weighs about 16 kg (35 lbs).

OPERATOR INTERFACE DEVICES

This section contains descriptions and removal instructions for the operator and engineering keyboards, mouse/trackball, annunciator display panel, the keyboard interface assembly, floppy disk drives, color monitor, and the CPU.

Operator and Engineering Keyboards, Mouse, Trackball

This equipment is only used on the OIS43 console. It does not apply to the driver cabinet. The mylar operator keyboard plugs into the KEYBOARD port on the keyboard interface assembly. The engineering keyboard plugs into the AUX KBD port on the keyboard interface assembly. Keyboard mapping information is in the ***Operation*** and ***Configuration*** instructions (Table 1-3). The IIAMS04A mouse and IIATB05 trackball plug into the key-

board interface assembly at the MOUSE/TRACKBALL port. Unplug these devices to remove them.

Annunciator Display Panel

There are two types of annunciator display panels available for the OIS consoles. They are the IIADP01 and the IIADP02. The IIADP01 annunciator display panel is a tabletop unit, the IIADP02 mounts in the cabinet on the front of the console. They provide 32 LEDs and pushbuttons. Each LED may be assigned to a tag. When a tag goes into an alarm condition, the assigned LED flashes until acknowledged and then turns solid. Ribbon cable maximum length is 4.5 meters (15 feet).

IIADP01/02 Removal

The console comes with the IIADP02 mounted in the console. To remove the ADP refer to Figure 6-14 and follow these steps:

1. Turn off the main circuit breaker on the power entry panel. Check the main power indicator to see if power is removed.

2. Turn the two screws 90 degrees to remove the ADP panel from the bezel. Remove the ADP panel.

> **NOTE:** If it is necessary to remove the bezel, remove the four screws securing the bezel to the console.

3. Disconnect all the cables.

The ADP01 tabletop unit can be added to the OIS console in addition to the ADP02.

4. To remove an IIADP01 tabletop unit, unplug the cable.

Refer to ***OPERATOR INTERFACE DEVICES*** in Section 3 for installation information that includes access switch settings for the new ADP panel.

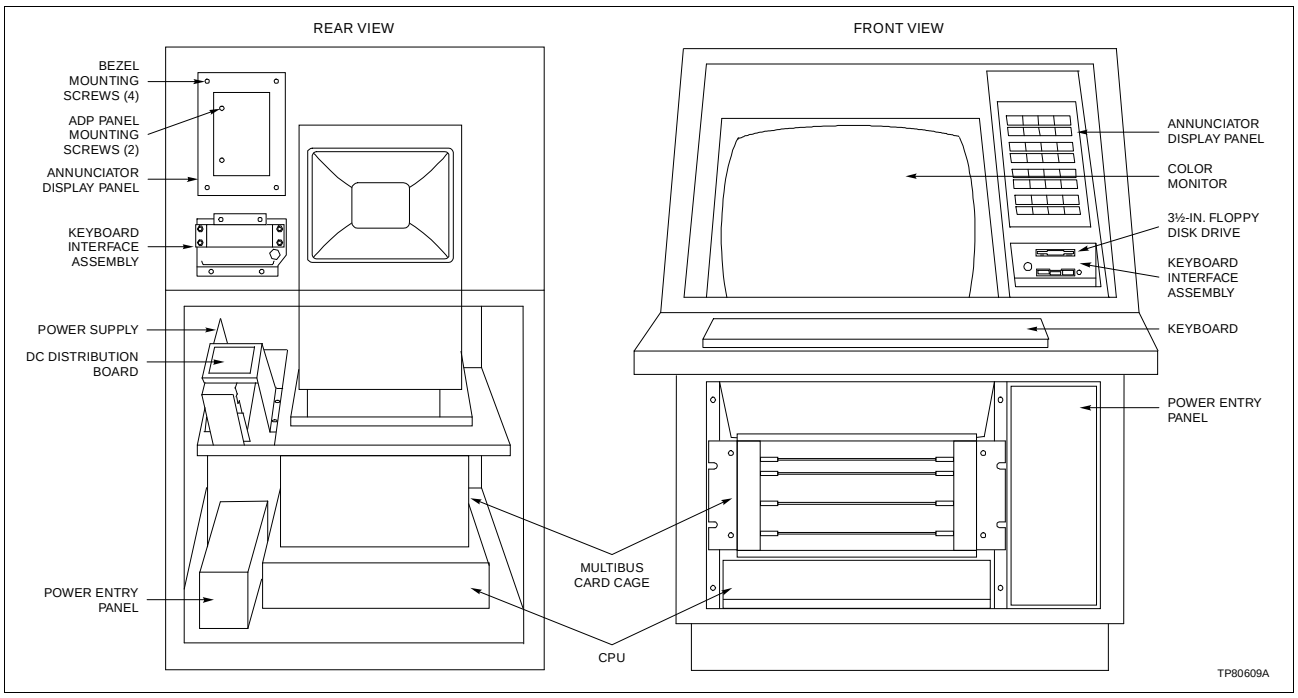

Figure 6-14. IIADP02 Annunciator Display Panel Removal

Keyboard Interface Assembly

The keyboard interface board is only used on the console and is located on the front panel next to the monitor behind a polycarbonate door.

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

The KEYBOARD connector (Fig. 6-15) is for the operator keyboard supplied with the OIS consoles. The AUX 1 port is for a tabletop annunciator display panel. The AUX KBD connector is for an IIAKB03A engineering keyboard. Connector P9 on the board is not used.

To remove the keyboard interface assembly from the console refer to Figure 6-16 and follow these steps.

1. Turn off the main circuit breaker on the power entry panel to shut off power to the console. Verify power is removed.

2. At the rear of the cabinet, remove the two screws on the bottom of the power supply and slide it out of the cabinet. Cut the cable ties as needed to set the supply on the floor out of the way.
3. Unplug the operator keyboard, mouse and units connected to the front of the keyboard interface panel.

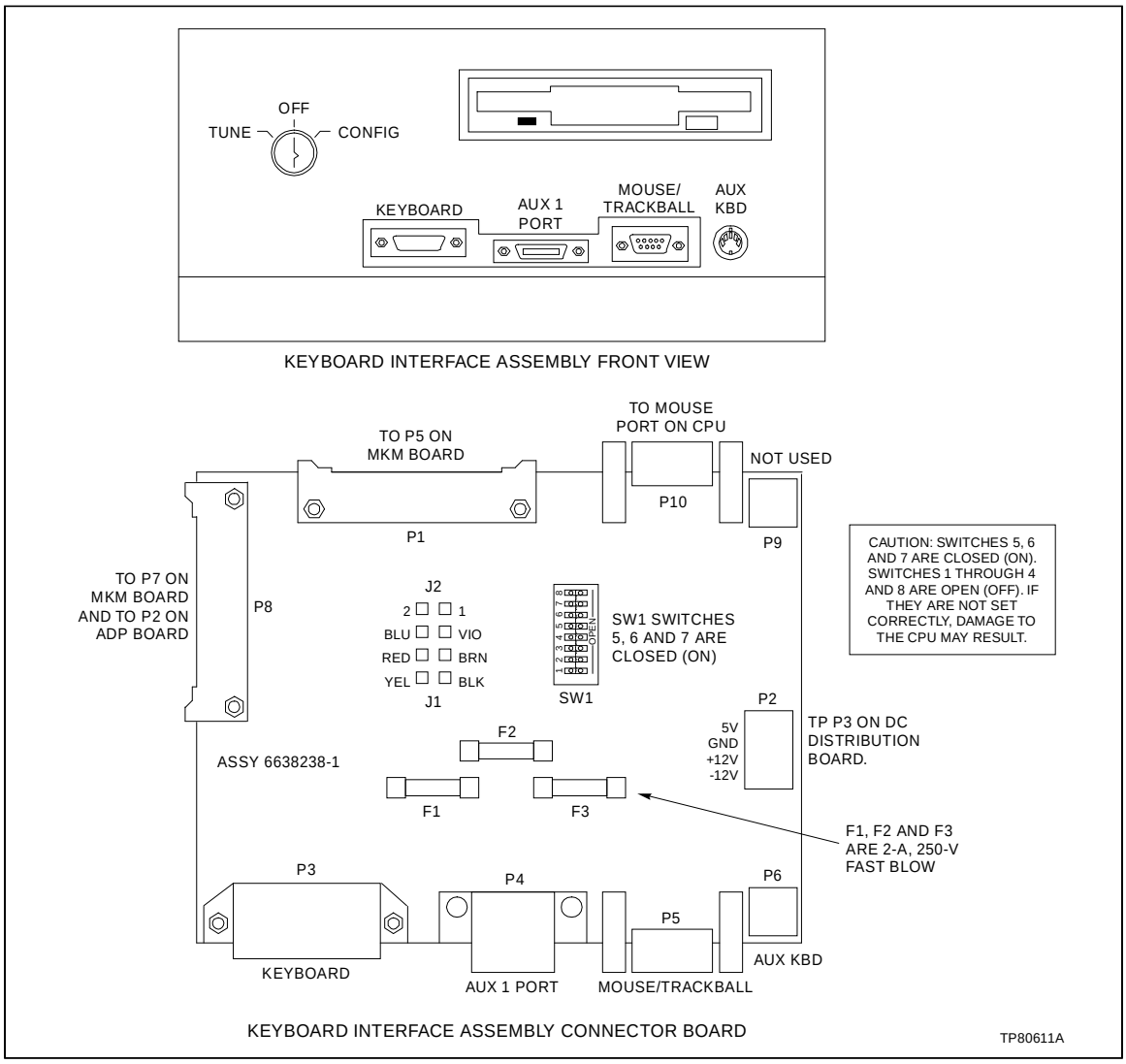

Figure 6-15. Keyboard Interface Assembly

4. Remove the power cables to the floppy disk drive from the DC distribution board.

5. Remove all of the cables from the rear of the keyboard interface board and floppy disk drive unit.

6. Remove the two screws holding the bottom on the keyboard interface board to the rear side of the monitor bezel. There are no screws on top or on the sides of the board.

7. Carefully remove the keyboard interface board containing the floppy disk drive out of the cabinet.

8. Verify that the floppy disk drive signal and power cables are moved and labeled.

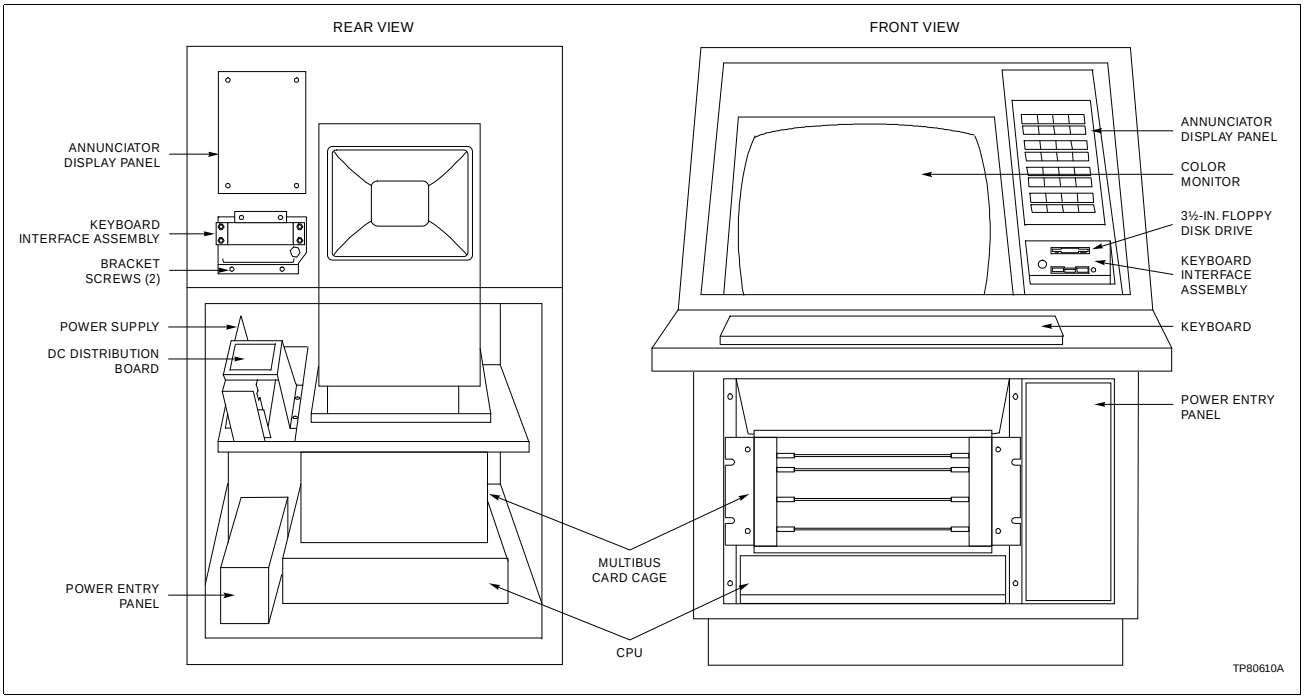

Figure 6-16. Keyboard Interface Assembly Removal

Replacing Fuses

WARNING	**Replace the fuse with one of the same type and rating. Using an improper fuse could lead to injury to personnel and equipment damage from fire or electrical shock.**
AVERTISSEMENT	**Remplacer le fusible avec un fusible du même type et de la même capacité. L'utilisation d'une fusible du mauvais type/ capacité pourrait causer des blessures au personnel et des dommages à l'équipement résultant d'un incendie ou de choc électrique.**

When replacing fuses F1, F2 and F3 (Fig. 6-15) be certain the replacement is the same type and rating. These are 2 amp fast-blow, 250 volt rating. Refer to Section 7 for part number.

Floppy Disk Drive

The floppy disk drive can be removed from the cabinet with or without removing the keyboard interface board. To remove the floppy disk drive and keyboard interface board from the console, refer to ***Keyboard Interface Assembly***. To remove the floppy disk drive without removing the keyboard interface board, follow these steps:

1. Turn off the main circuit breaker on the power entry panel to shut off power to the console. Verify power is removed.

2. Remove the SCSI cable and the two power cables from the rear of the floppy drive. Carefully pull the floppy disk drive out the front of the console.

Refer to Figure 6-17 for the correct SCSI switch setting.

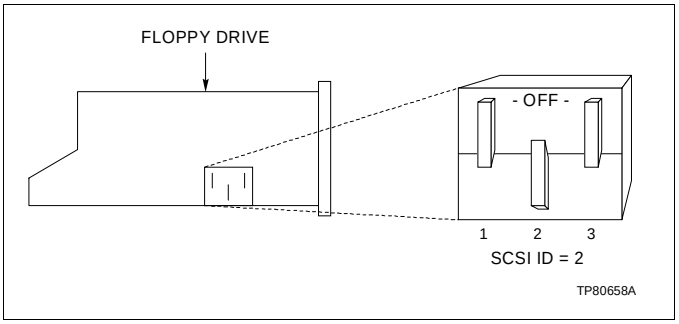

Figure 6-17. Floppy Drive SCSI Switch Setting

Color Monitor

Resolution for the OIS high resolution color monitor is 1280 x 1024 pixels. Adding additional color monitors is model dependent. Refer to Figures 3-10 and 3-11 and to Table 3-2 for the OIS console and driver cabinet monitor cable connections.

To remove a lower monitor from a console, follow these steps.

1. In the front of the cabinet, turn off the main circuit breaker on the power entry panel to shut off power to the console. Check the power indicator to see if power is removed from the system.

2. Remove the power cord and VGA cable from the rear of the monitor. Secure the VGA cable out of the way.

WARNING	**The monitor will slide out the rear of the cabinet by itself when the mounting bolts are 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 rear two bolts.**
AVERTISSEMENT	**Supportez le moniteur avant de retirer les deux boulons d'ancrange à l'arriér. Lorsque ces boulons d'ancrage sont retirés, l'e moniteur glissera et sorta à l'arriér de l'armoire. l'e moniteur pése environ 27 kilograms (60 pounds) et pourrait entrainer des blessures si on le laisse glisser de l'armoire.**

3. Remove the bolt on each side of the monitor mounting tray at the rear of the monitor. These bolts attach the tray to the cabinet shelf.

4. Slide the monitor out of the cabinet.

5. After removal, place the monitor and tray onto a solid, flat surface.

6. Protect the screen of the monitor and set the screen down on the protective surface.

7. Remove the monitor from the mounting tray by removing the four screws under the tray. Refer to ***MONITOR INSTALLATION*** in Section 3 for installation procedures.

To remove an upper monitor from a console, follow these steps:

1. Remove the four 10-32 Phillips pan head screws from the rear and top of the rear cover. Remove the front cover mounting screws and carefully remove the front cover.

2. Disconnect the power cord connectors from the fans mounted in the rear cover. Remove the rear cover.

3. Refer to the warning stated for removal of the lower monitor. The monitor weighs 60 pounds (27 kilograms) and will slide forward if not restrained.

4. Remove the four screws holding the monitor to its mounting plate. Detach the VGA cable and slide the monitor forward.

5. If the VGA cable also needs to be replaced, attach the new VGA cable to the old VGA cable and carefully pull the old cable down and through the monitor mounting tube support.

> **NOTE:** It may be necessary to cut several tie wraps that hold the old cable to the OIS structure. To make access easier, remove the front support bracket for the fan/shroud assembly by removing four 10-32 SEMS pan head mounting screws.

6. Detach the new cable from the old one. Finish removing the old cable. Thread the new cable down the left inside of the console (as viewed from the rear).

7. Reverse steps 1 through 4 to install the new monitor. Make certain all cables are installed before assembling the covers. Replace the fan/shroud support. Refer to ***MONITOR INSTALLATION*** in Section 3 for installation procedures.

> **NOTE:** If the upper monitor has a touchscreen, realignment may be necessary to insure clearance between the screen and the upper bezel.

CPU

This section contains information and the removal instructions for the CPU inside the OIS console and driver cabinet. Read the

instructions before beginning. If a CPU hard drive or CD-ROM drive needs to be replaced, refer to the DEC ***User Information*** manual shipped with the OIS station. Refer to ***CD-ROM Drive Settings*** and ***Hard Drive Settings*** for the correct jumper settings before installing these components in the IIOIS43 station.

The CPU has a lithium battery located on the mother board. The battery supplies power to the real time clock while the system is off. Refer to the DEC ***User Information*** manual for important and cautionary information on replacing the battery. Suggested replacement is Panasonic BR2032 or CR2032. After replacement, system configuration and setup data must be verified.

Console and Driver Cabinet

The CPU is mounted horizontally in the console and in the driver cabinet. To remove the CPU, follow these steps. Refer to Table 6-1 for part numbers. Refer to Figure 6-18 for the console. Refer to Figure 6-19 for the driver cabinet.

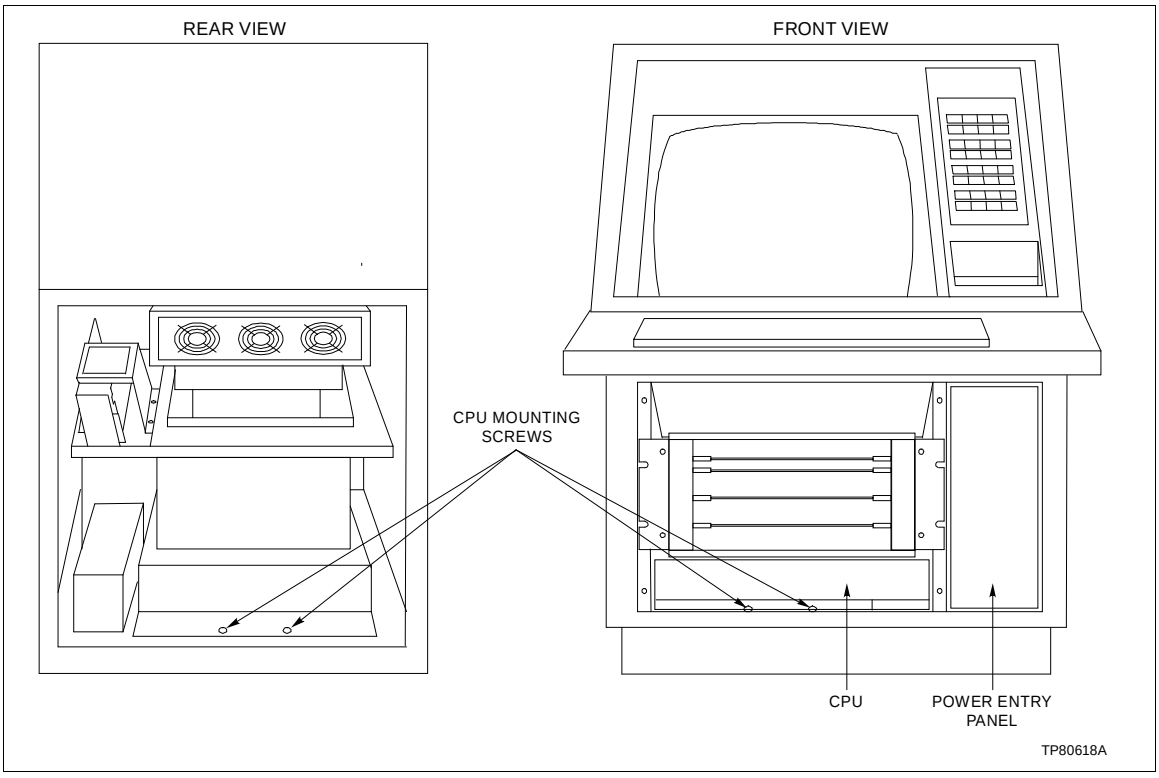

Figure 6-18. CPU Removal for Consoles

1. Turn off the main circuit breaker on the power entry panel. Check the power indicator to see if power is removed.

2. Remove and label all cables from the CPU.

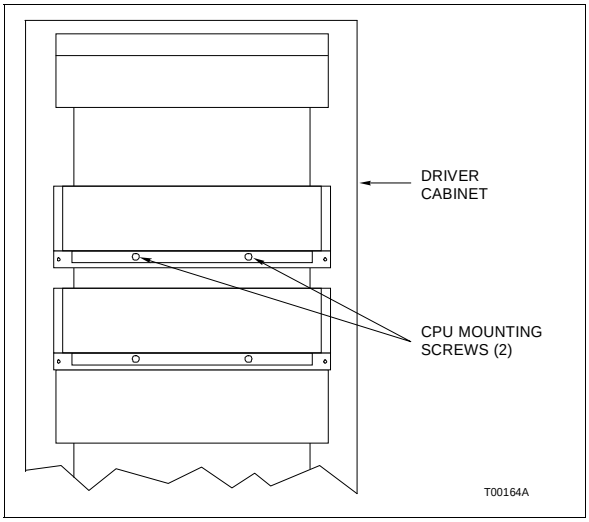

Figure 6-19. CPU Removal for Driver Cabinets

3. For consoles, remove the two screws that hold the front of the mounting plate to the shelf. Remove the two screws that hold the rear of the mounting plate to the support bracket.

4. For driver cabinets, remove the two screws that hold the CPU to the mounting plate.

5. Slide the CPU and mounting plate out the back of the console cabinet (the CPU slides out the front of the driver cabinet).

When assembling a new CPU, refer to Figure 6-20 for connector callouts and to Figure 3-10 and 3-11 for the cable connections for the console or driver cabinet.

NOTE: Make certain the voltage selector switch is in the correct position.

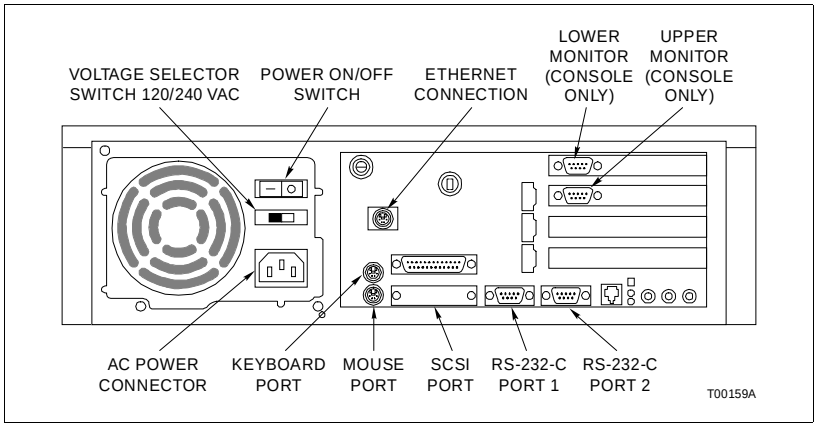

Figure 6-20. CPU Connector Identification

Graphics Card Settings

Figure 6-21 shows the location of CPU components. This figure shows the front access door of the CPU installed, normally it is removed. If a second graphics board is installed, make certain the settings are as shown in Figure 6-22. The figure also shows the settings for graphics board one.

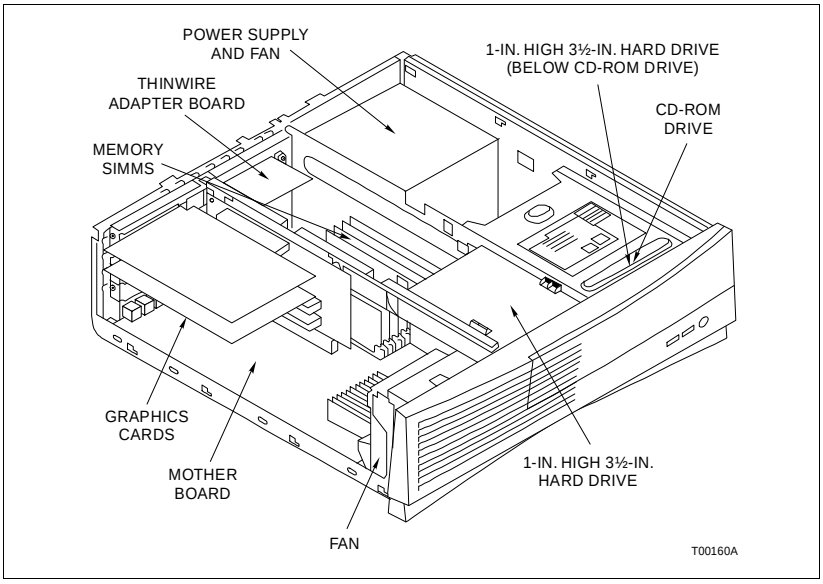

Figure 6-21. CPU Components

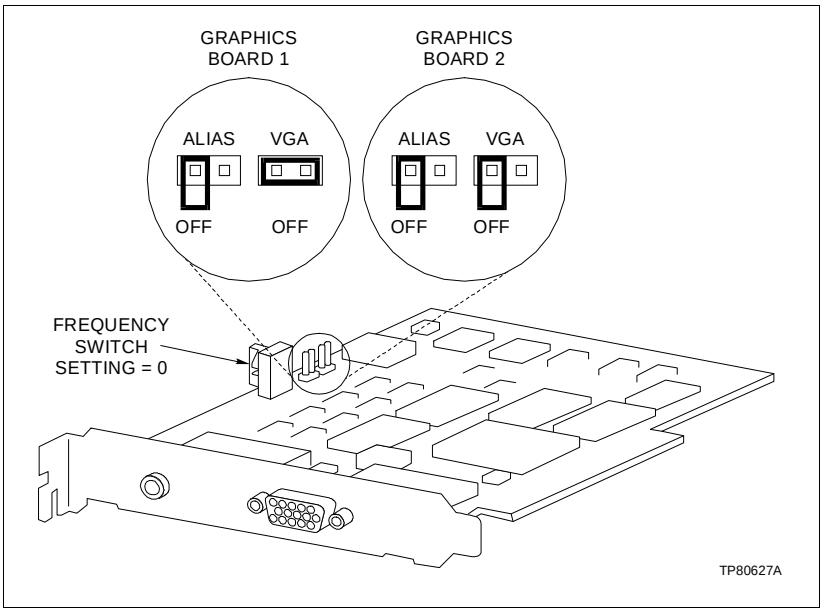

Figure 6-22. Graphics Board Settings

Hard Drive Settings

If a hard drive (operating or application) in the CPU is replaced, check to make certain the settings are as shown in Figure 6-23 prior to installation.

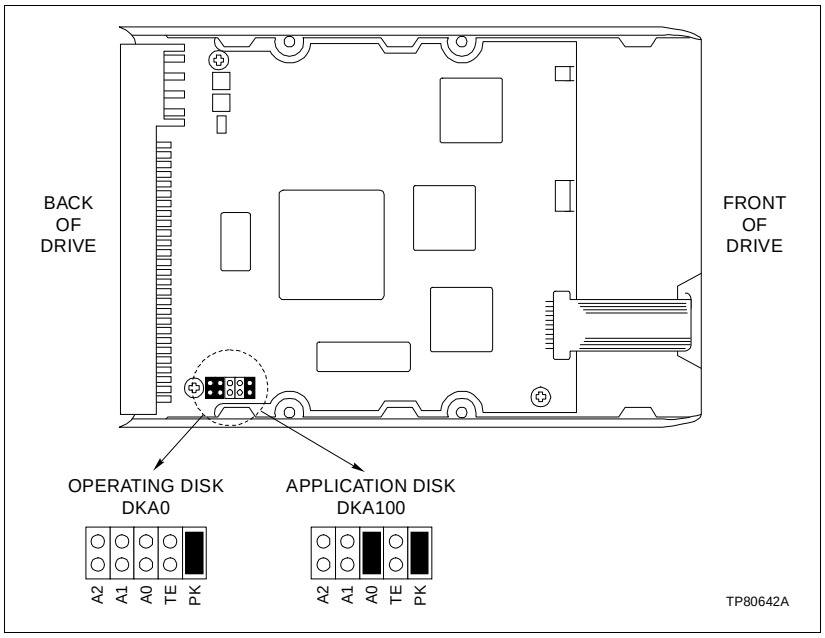

Figure 6-23. Hard Drive Settings

CD-ROM Drive Settings

If the CD-ROM drive in the CPU is replaced, before installing the new drive check to make certain the settings are as shown in Figure 6-24.

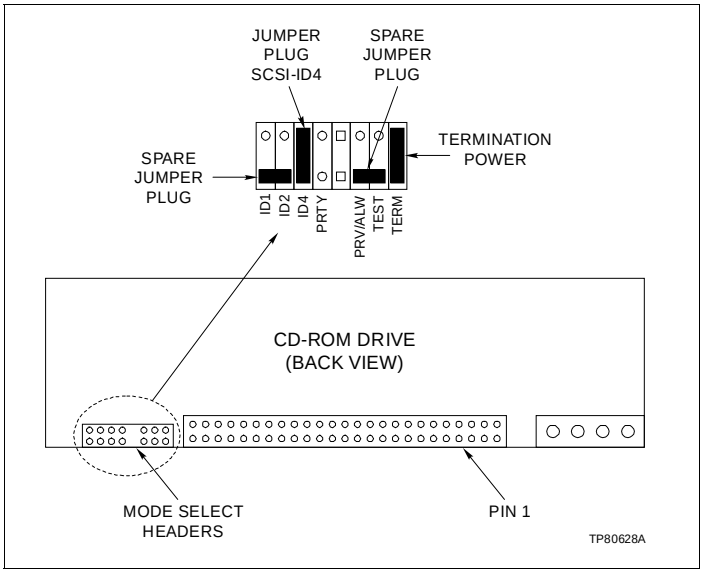

Figure 6-24. CD-ROM Drive Jumper Settings

DATA STORAGE DEVICES

The tabletop archiving storage devices used in the consoles are portable and require no replacement instructions. The rack mounted archiving storage devices used in the driver cabinet require some disassembly instructions. The archiving storage devices available for the OIS are the IIDMT03A tape archival storage, IIDOP04A tabletop optical disk archival storage, and the IIDOP05A rack mounted optical disk archival storage.

IIDOP05A OPTICAL DISK

To remove the optical disk drive from the driver cabinet, refer to Figure 6-25 and follow these steps.

NOTE: The right hand unit from the front of the cabinet is for the bottom card cage and bottom power entry panel.

1. Remove power by turning off breaker at the power entry panel.
2. Label and remove the cables from the unit.
3. Note the SCSI address on the switch on the back of the unit.
4. Remove the two screws fastening the front of the optical disk mounting plate to the shelf.
5. Carefully slide the optical disk out the front of the cabinet.

6. Remove the four screws mounting the optical disk to the mounting plate.

NOTE: When replacing the unit, verify that the SCSI bus address is the same as the address in Step 3.

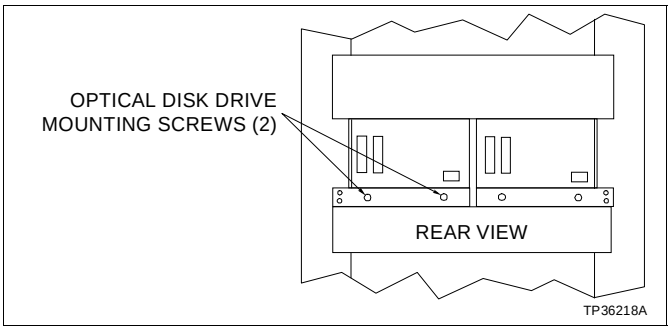

Figure 6-25. Driver Cabinet Optical Disk Drive Removal

PERIPHERALS

Refer to ***PERIPHERALS*** in Section 3 for a description of the peripheral equipment. Refer to the manufacturer's documentation for replacement information.

CAUTION	**Remove power from all peripheral equipment and the console before installing or removing peripheral equipment. Equipment damage may result.** **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.**
ATTENTION	**Coupez l´alimentation des périphériques et de la console avant d´installer ou de retirer des périphériques, sinon l´équipment risque de subir des dommages.** **Assurez-vous que toutes les indications de tension et tous les réglages de tension sur les périphériques, le bloc d´alimentation et le panneau d´entrée des alimentations correspondent bien à la tension de service. Une tension incorrecte risque d´endommager l´equipment. Assures-vous que le disjoncteur d´alimentation principal de la console est étient avant de modifier les réglages de tension de service afin d´éviter d´endommager l´équipment.**

SECTION 7 - SUPPORT SERVICES

INTRODUCTION

Elsag Bailey Process Automation is always ready to assist in the operation and repair of its products. Send requests for sales or application services to your nearest sales or service office. Elsag Bailey Process Automation can also provide installation, repair and maintenance contract services.

REPLACEMENT PARTS AND ORDERING INSTRUCTIONS

Order replacement parts through a Elsag Bailey sales or service office. Provide the following information when ordering parts:

1. Part description, part number and quantity.

2. Model and serial number (if applicable) and ratings of the assembly the part has been ordered for.

3. Publication number and reference used in identifying the part.

When ordering parts, use part numbers and part descriptions from equipment manuals. Parts with no commercial description must be ordered from your nearest sales or service office. Recommended spare parts lists, including prices, on standard assemblies are available through your nearest sales or service office.

TRAINING

Elsag Bailey Process Automation has a modern training facility available for training your personnel. On-site training is also available. Contact a Elsag Bailey sales office for specific information and scheduling.

TECHNICAL DOCUMENTATION

Price and delivery of additional copies of this publication can be obtained through your nearest sales or service office.

SPARE PARTS

Spare parts Table 7-1 lists the recommended spare parts for the OIS operator interface. Elsag Bailey Process Automation suggests stocking one item each to minimize the duration and cost of downtime.

Table 7-1. Recommended Spare Parts

Description	Part Number	OIS	
		43X1 43X2 43X3	43XA 43XD
50-ohm thinwire terminator	1949009□1	x	x
Annunciator display panel (tabletop)	IIADP01	x	
Annunciator display panel	IIADP02	x	
CPU assembly (AlphaStation 255, model 233) for consoles (comes with mounting plate attached) (□2 part number has 2nd graphics board)	6642865□1 6642865□2	x	
CPU assembly (AlphaStation 255, model 233) for driver cabinets (no graphics board)	6642905□1		x
Digital tape drive	IIDMT03A	x	x
Ethernet thinwire converter	1949514□7	x	x
Fan (door)	1949181□1		x
Fan 11.43 cm (4-½ in.)	1947419□7	x	
Fan assembly, (3-in.)	6640639□1	x	
Fan cable assembly for door and card cage	6640640□1	x	
Fan cable assembly for monitor	6640640□3	x	
Fan cable assembly for door	6640858□1		x
Fan cable assembly for door	6640859□1		x
Floppy disk drive	6641974□1	x	x
Floppy controller circuit board	6641974□2	x	x
Fuse, 1-A (for IIMCL01)	194776□11001	x	x
Fuse, 2-A fast acting (keyboard interface board)	1948182□22001	x	
Graphics board (only required if second monitor used)	1949514□4	x	
Hard disk drive (1.08 Gbytes)	1949514□2	x	x
Keyboard interface panel and floppy disk drive	6638554□8	x	
Keyboard, operator (mylar)	6638514□1	x	
Keyboard, QWERTY (auxiliary engineering)	IIAKB03A	x	
Memory, 16 Mbytes	1949207□6	x	x
Monitor, 19-in.	1948623□9	x	
Monitor brightness cable (lower monitor)	6638720□4	x	
Monitor brightness cable (upper monitor)	6638720□5	x	
Mouse	IIAMS04A	x	
Multibus communications processor module	IIMCP01/ IIMCP02	x	x
Multibus keyboard module	IIMKM02A	x	
Multibus loop module	IIMLM01	x	x

Table 7-1. Recommended Spare Parts (continued)

Description	Part Number	OIS	
		43X1 43X2 43X3	43XA 43XD
Multibus reset module	IIMRM02		x
Optical disk (unit only) requires 1947950□5 (power cord)	1949017□1	x	x
Optical disk cartridge	1949414□1	x	x
Optical cleaning cartridge	1949133□1	x	x
Power entry panel	6638353□5	x	
Power entry panel	6641376□1		x
Power supply	6638553□5	x	x
Printer server	IIPRS02	x	x
Trackball	IIATB05	x	
Terminator (keyboard/mouse)	6641701□1		x

APPENDIX A - QUICK REFERENCE INFORMATION

INTRODUCTION

This section provides a source for reference information. It contains the jumper, switch and fuse locations for the IIOIS43 operator interface station and driver cabinet components. Refer to Section 3 and Section 6 for complete descriptions of jumper and switch settings.

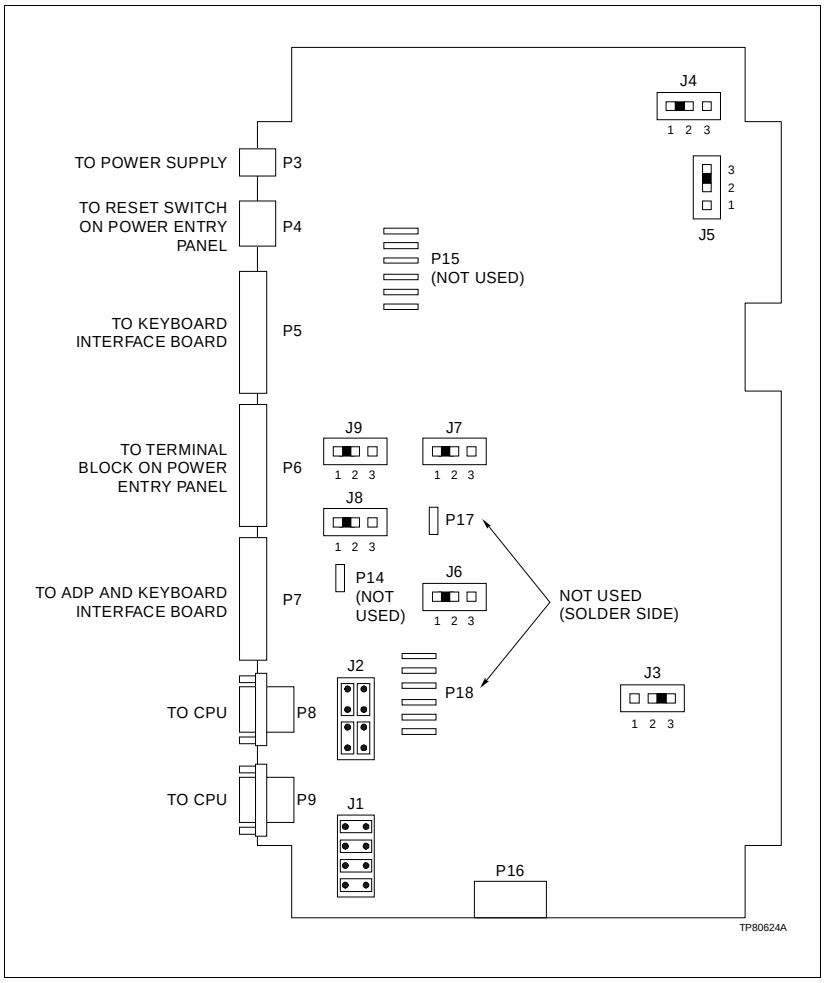

Figure A-1. IIMKM02A Multibus Keyboard Module

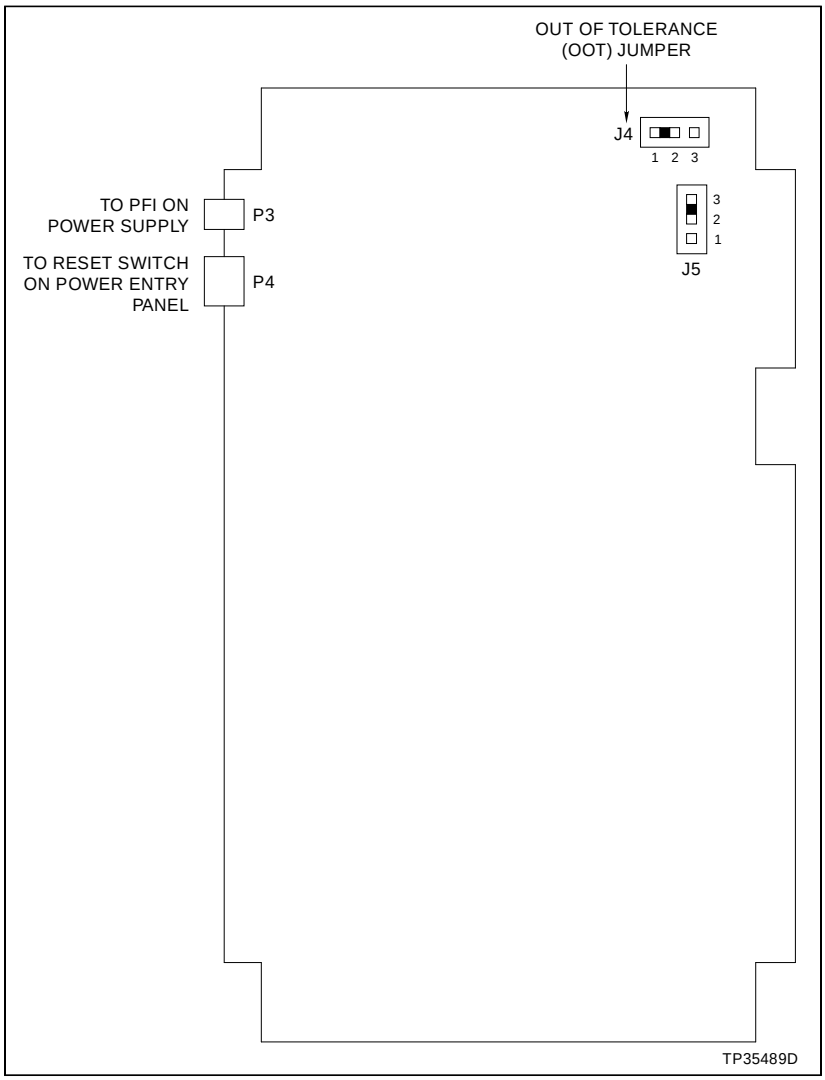

Figure A-2. IIMRM02 Multibus Reset Module

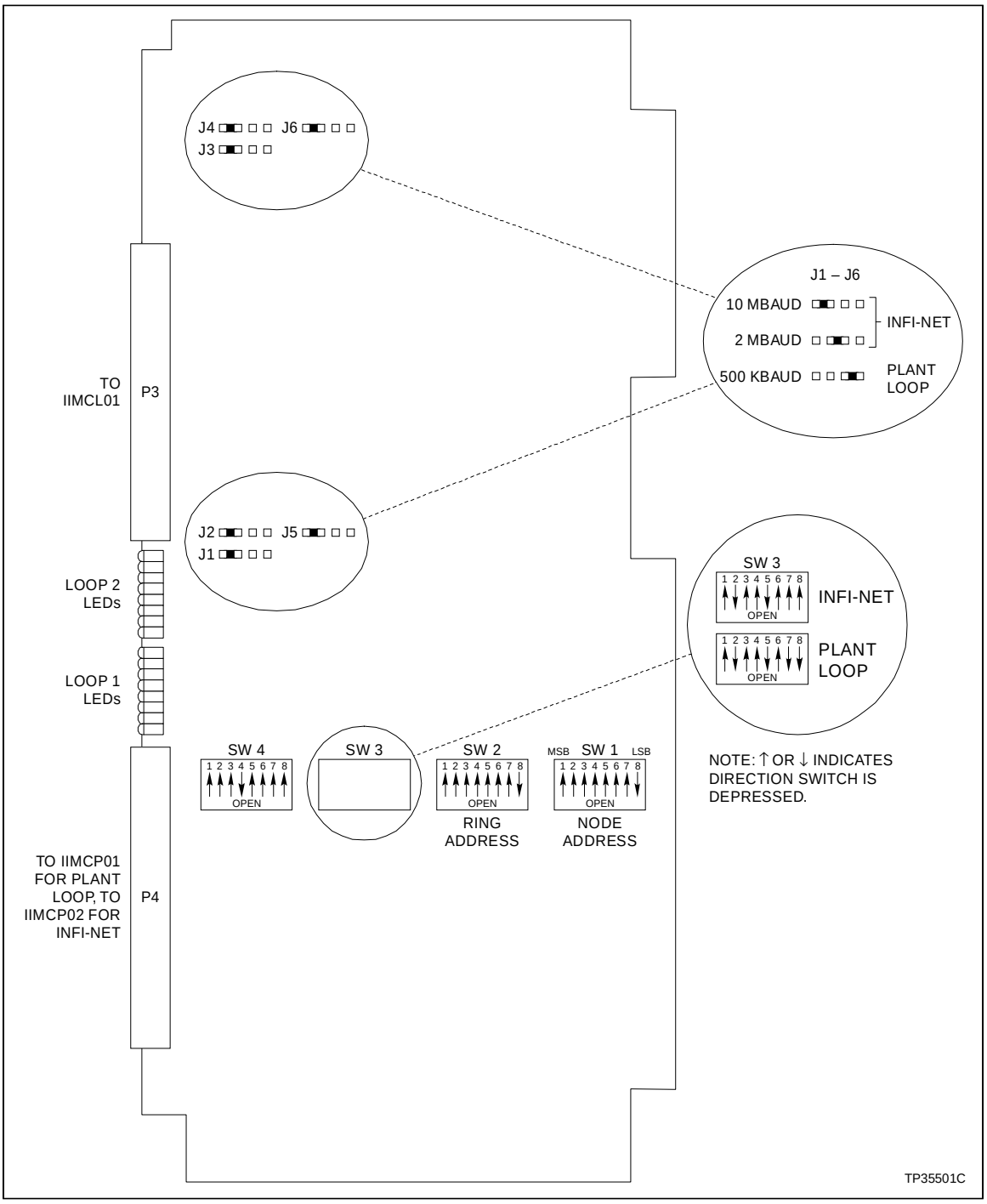

Figure A-3. IIMLM01 Multibus Loop Module

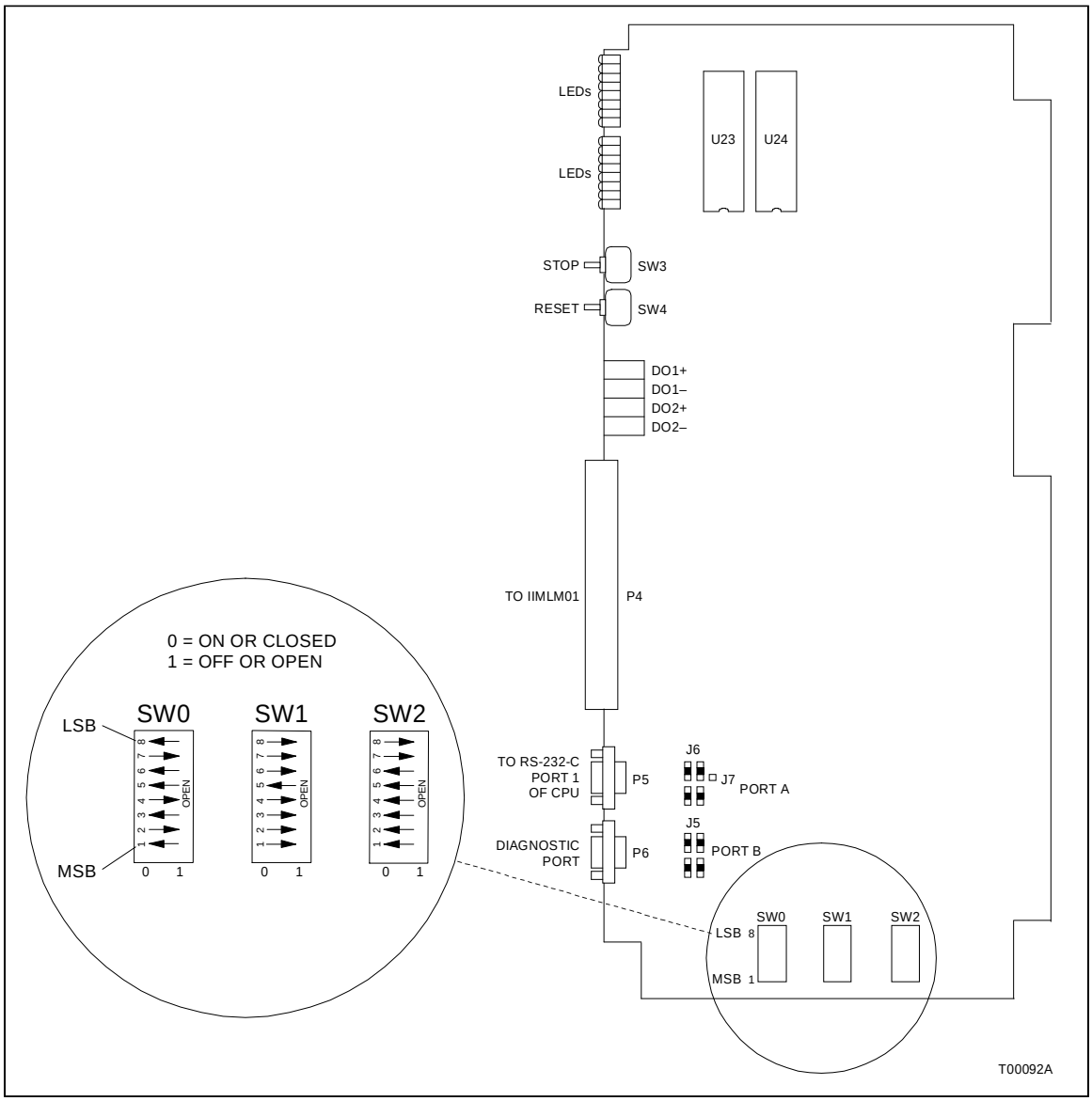

Figure A-4. IIMCP01 Multibus Communication Processor

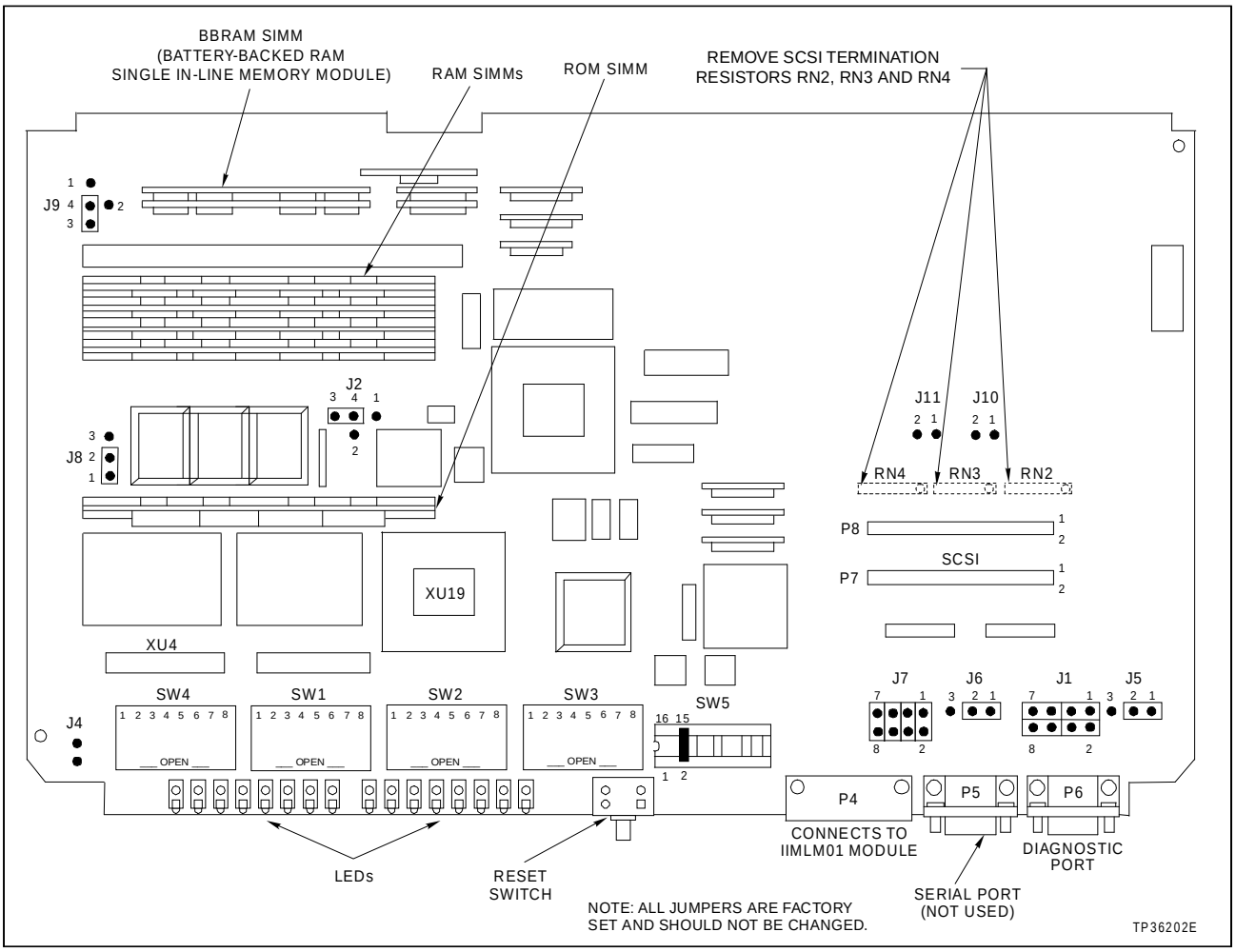

Figure A-5. IIMCP02 Multibus Communication Processor

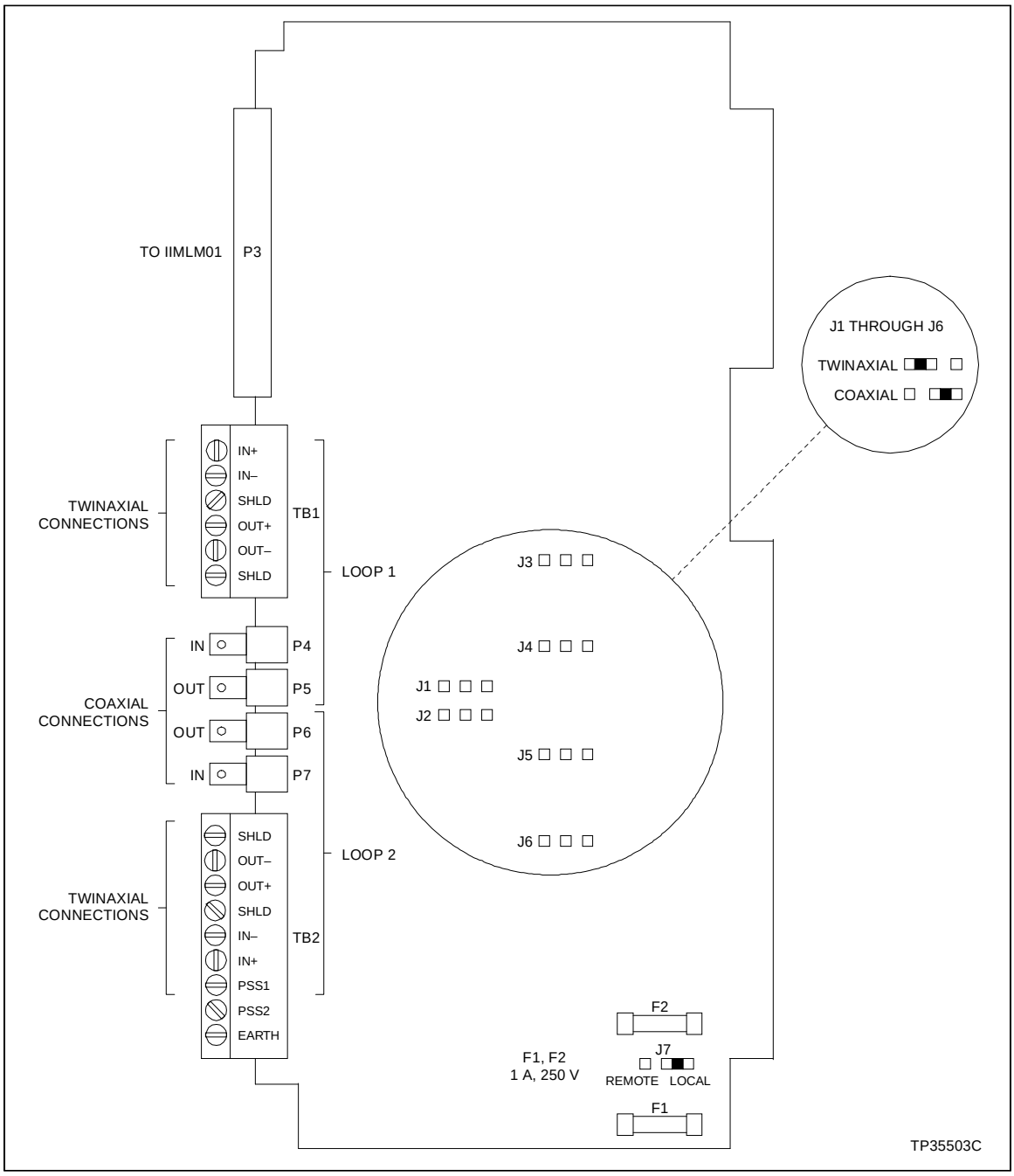

Figure A-6. IIMCL01 Multibus Communication Loop Module

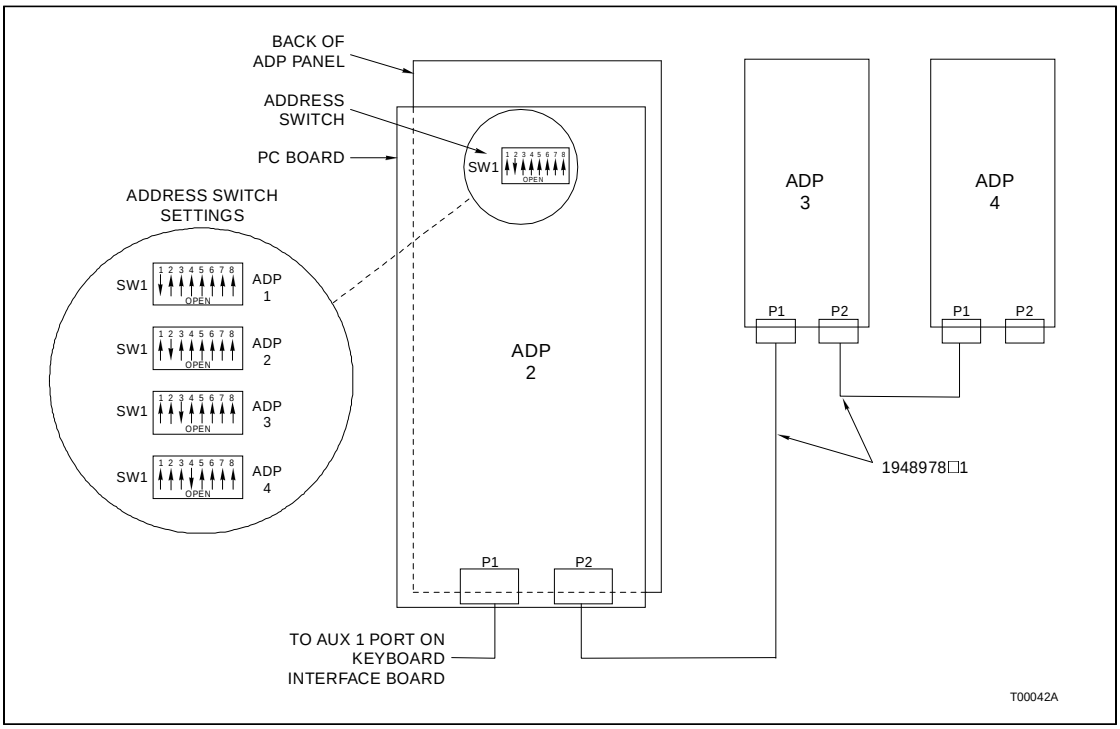

Figure A-7. IIADP01 Annunciator Display Panel

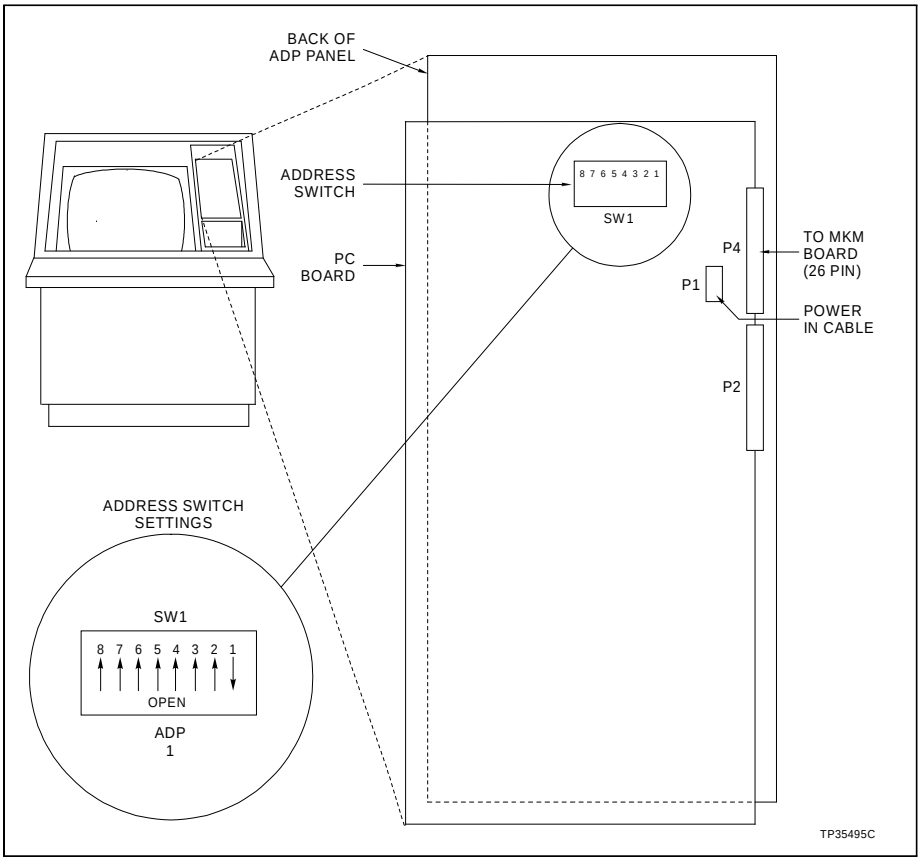

Figure A-8. IIADP02 Annunciator Display Panel

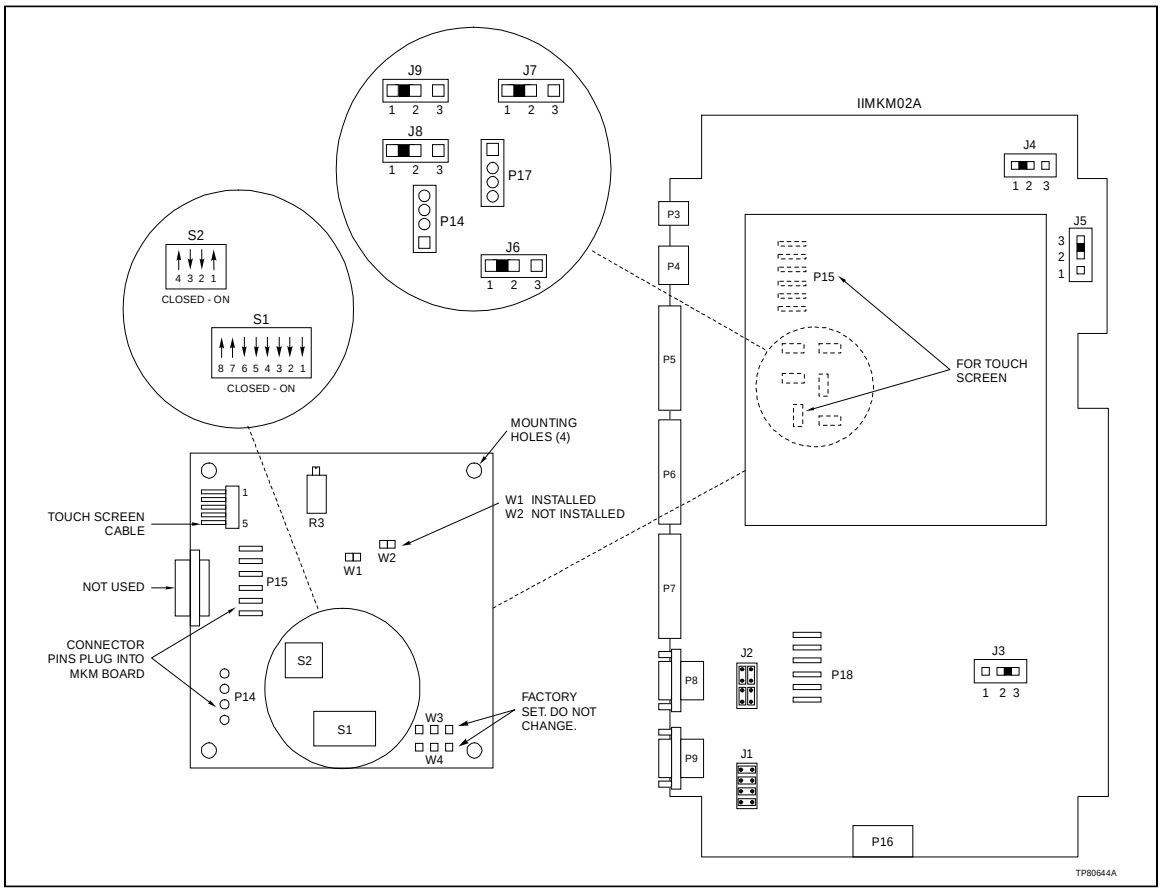

Figure A-9. Touch Screen Controller Board

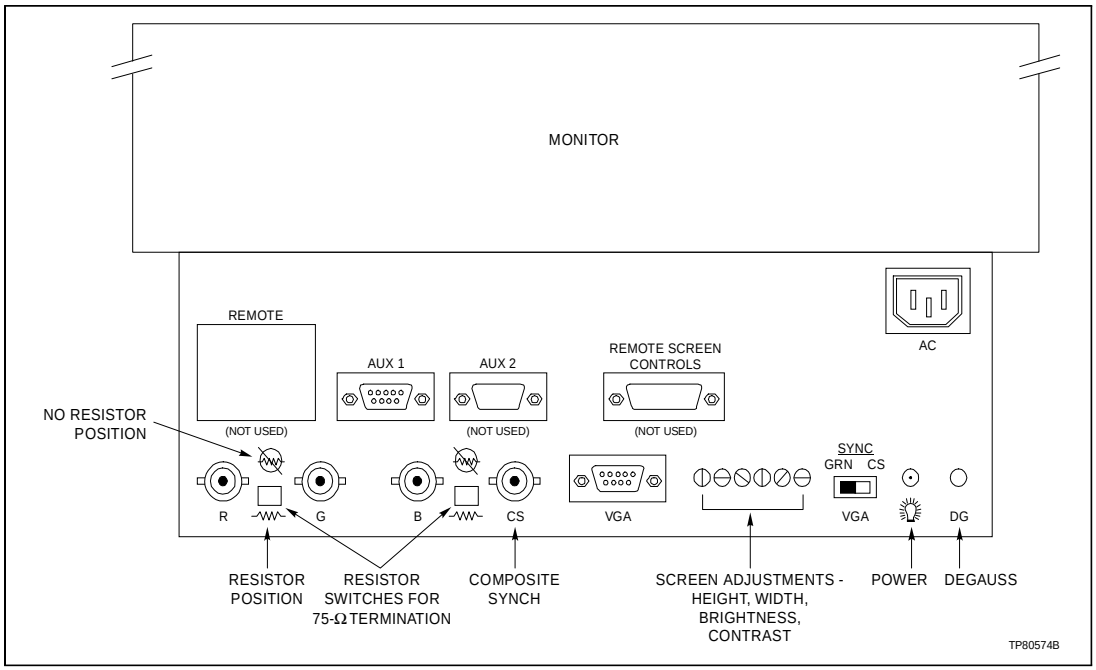

Figure A-10. Color Monitor

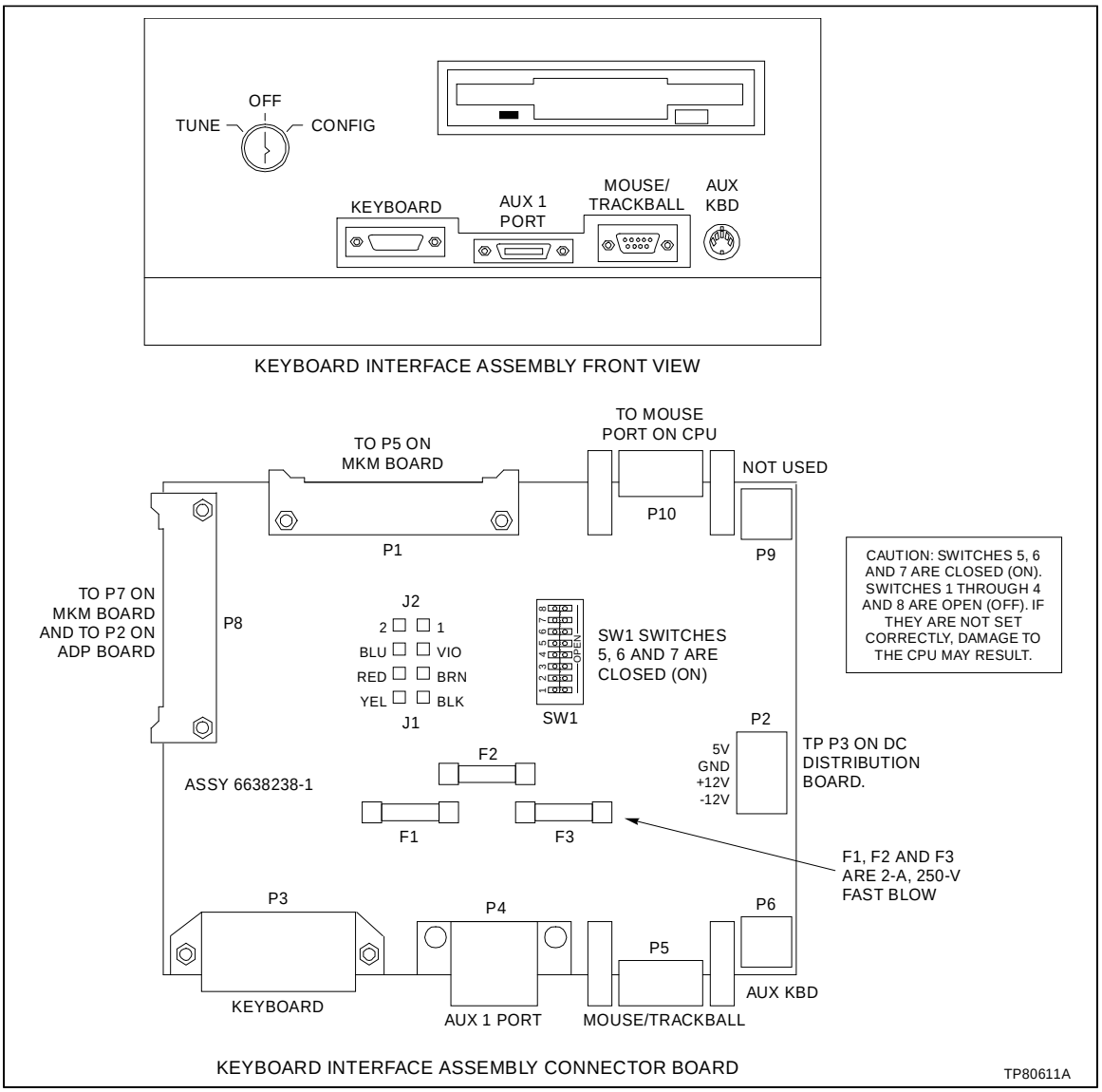

Figure A-11. Keyboard Interface Assembly

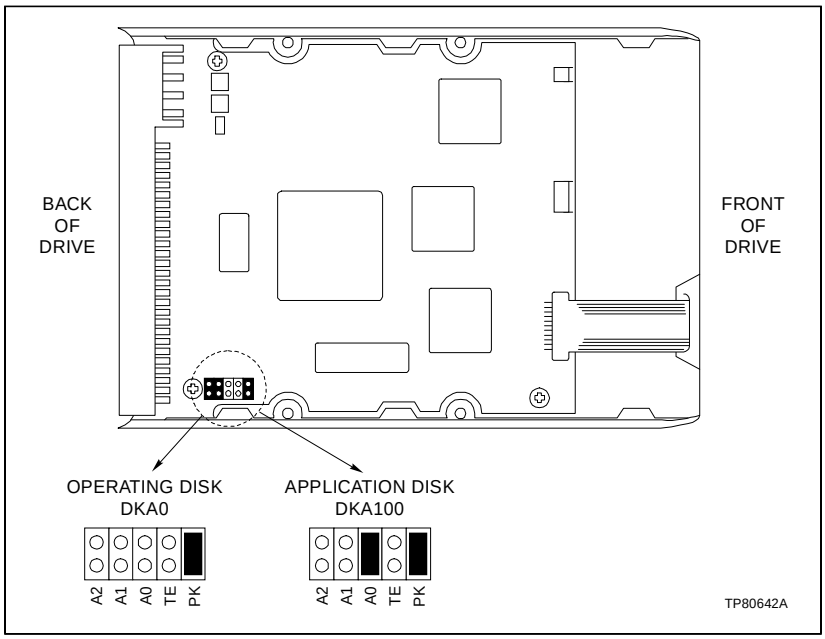

Figure A-12. CPU Hard Drive Settings

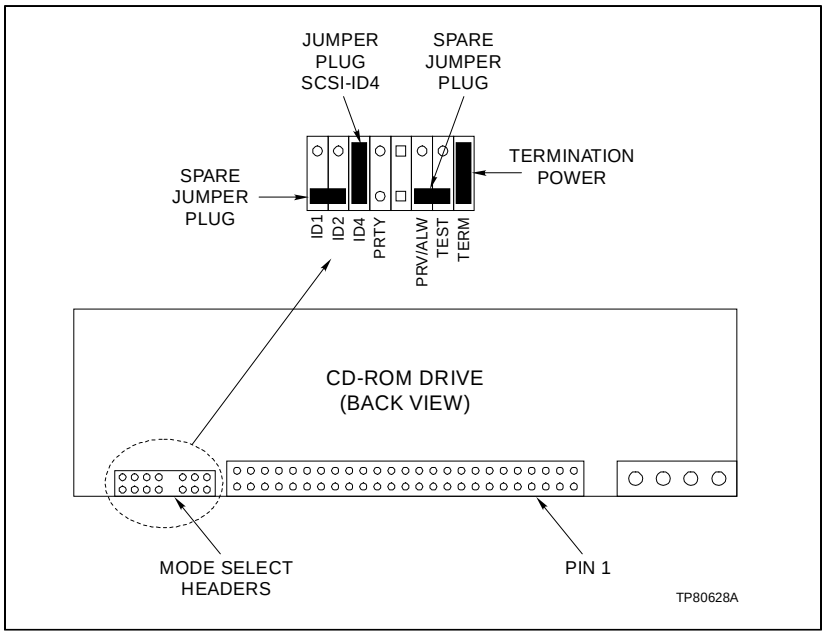

Figure A-13. CPU CD-ROM Drive Settings

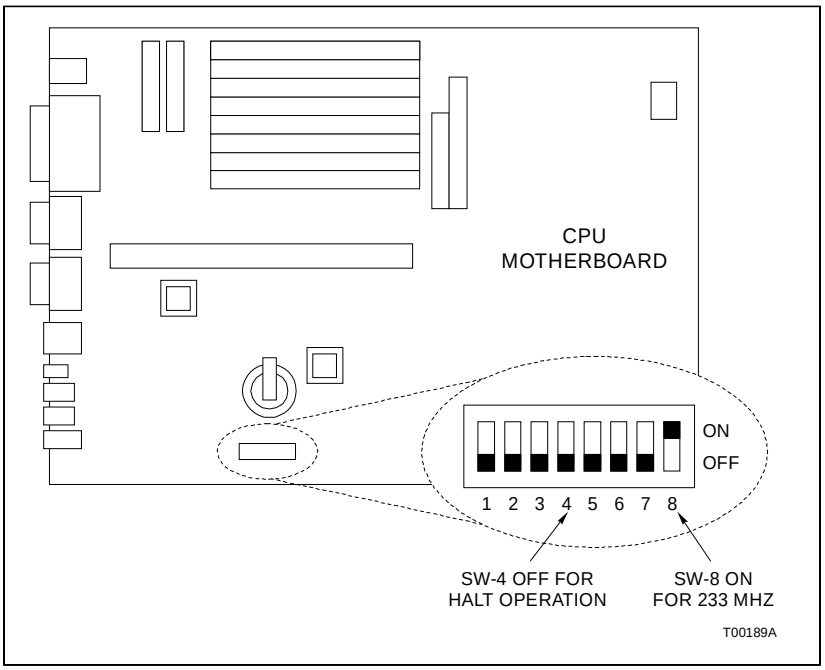

Figure A-14. CPU Motherboard SW-4 Switch Setting to OFF for HALT Operation

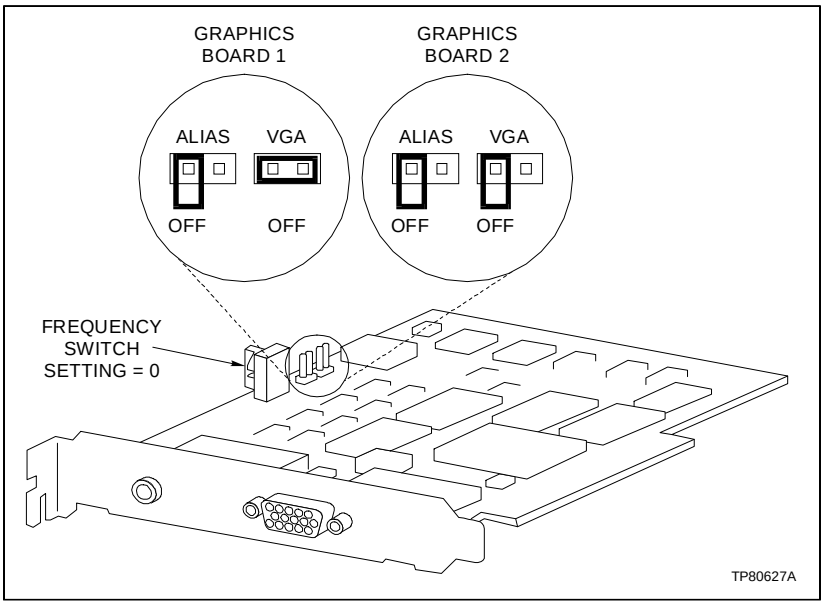

Figure A-15. CPU Graphics Board Settings

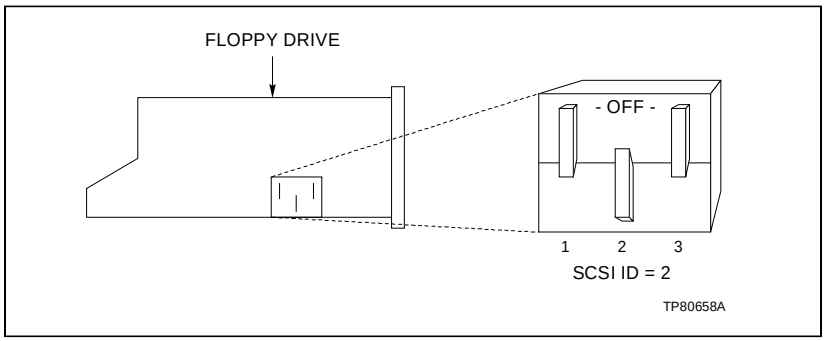

Figure A-16. Floppy Drive SCSI Address Setting

APPENDIX B - REDUNDANT ETHERNET NETWORKS

INTRODUCTION

This section explains how to set up redundant ethernet networks. It contains examples of ethernet connections for the main and auxiliary consoles. Refer to Section 3 for examples of thinwire, thickwire, and stand-alone configurations.

REDUNDANCY

Redundancy on the system requires a duplicate set of hardware and software that maintain control of the system if the primary hardware and software fail. The main console can access auxiliary consoles, and printers over the ethernet network making true redundancy not possible. However, partial redundancy is possible.

Redundant Configurations

Figure B-1 shows how redundancy could be set up. A second duplicate main console is installed on the same ethernet segment as the primary console, its auxiliary consoles and terminal servers. The duplicate main console could be running all the time as a hot standby.

Figure B-1 shows an example of how windows from the primary and duplicate main consoles could be assigned. If an auxiliary console fails, the windows assigned to that auxiliary console can be reassigned to the active auxiliary consoles. Note that primary and duplicate main consoles can send windows to each other. Figure B-2 shows a setup using driver cabinet hardware.

Duplicate terminal servers can also be installed. If the primary terminal server fails, devices connected to the server can be rewired to the backup. Also, the devices can connect to both servers through transfer switches. In either case, the ports must be reassigned through the software to activate the duplicate terminal server. Duplicate printers can also be used.

Redundant Ethernet Configurations

The only component in the system that cannot be made redundant is the ethernet interface. The need for a redundant ethernet can be reduced by preventing damage to the cable. Isolate the ethernet segment cabling from the main ethernet trunk by locating the cable in a separate conduit and keeping the cable within cabinets when possible.

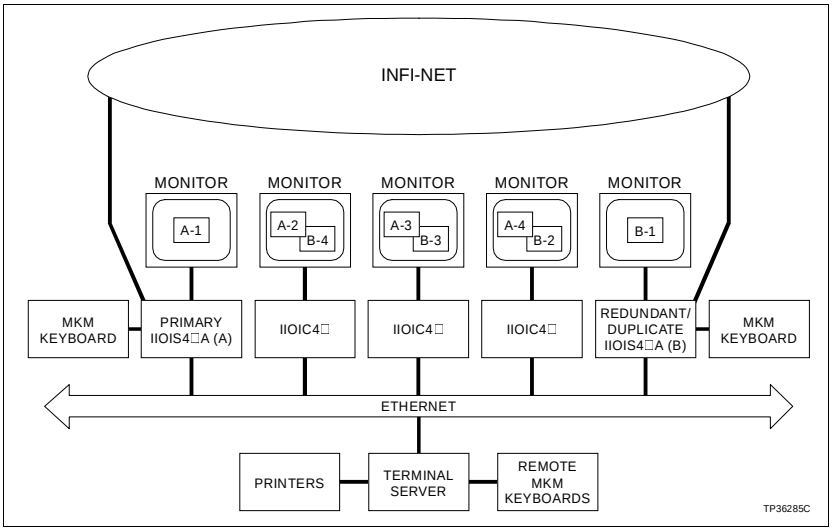

Figure B-1. Redundant OIS Configuration

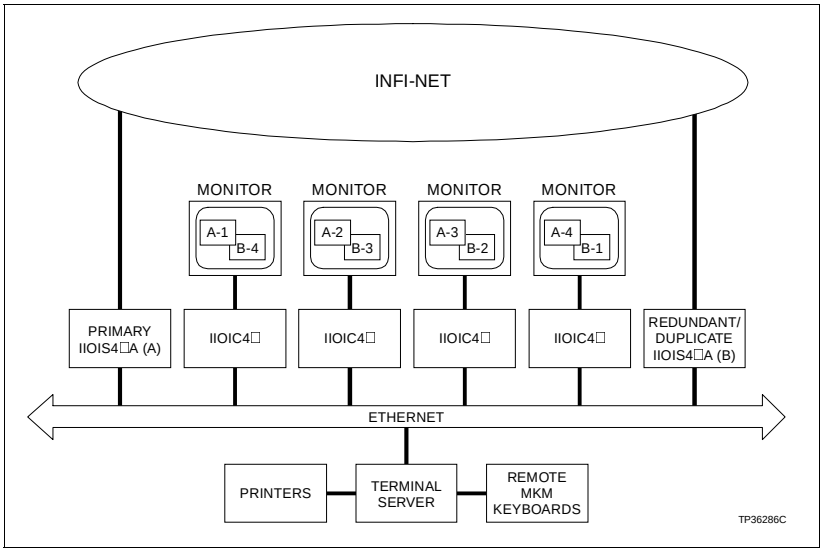

Figure B-2. Redundant OIS Driver Cabinet Configuration

Wiring two ethernet segments in parallel offers a degree of redundancy. Figure B-3 shows how a failure of any ethernet segment leaves at least half of the system up and running. The hardware needed to accomplish this will vary with the system.

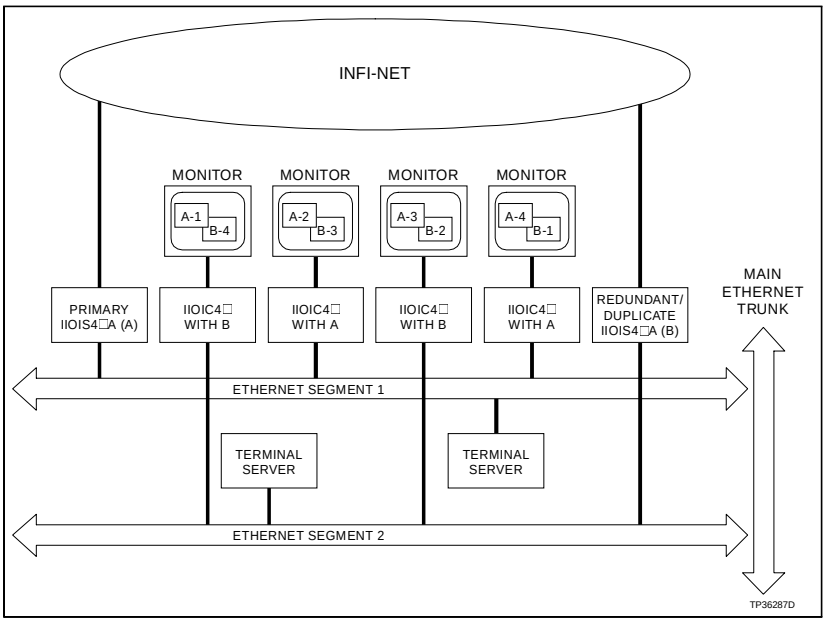

Figure B-3. Redundant Ethernet Configuration

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