Bailey® infi 90®

## Operator Interface Station (IIOIS12)
Hardware Manual
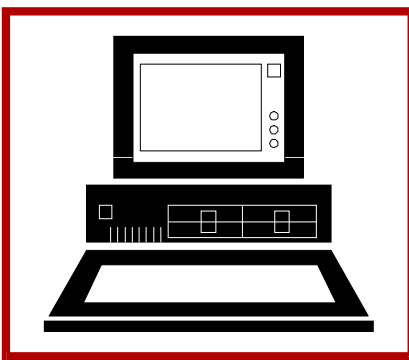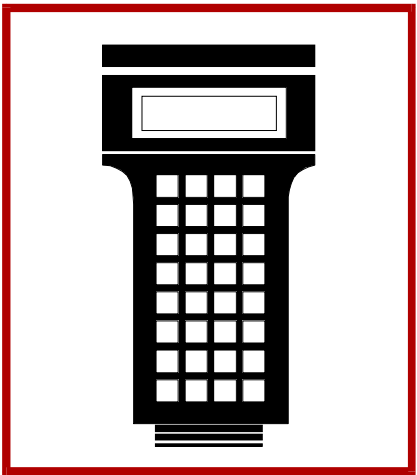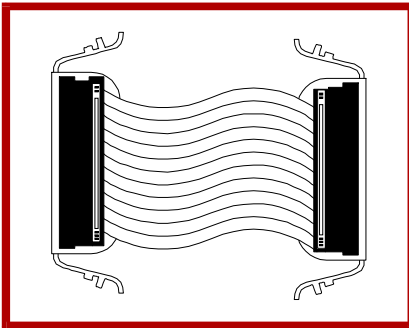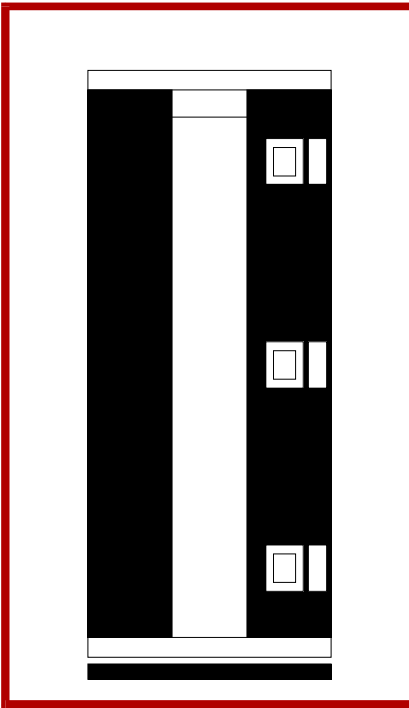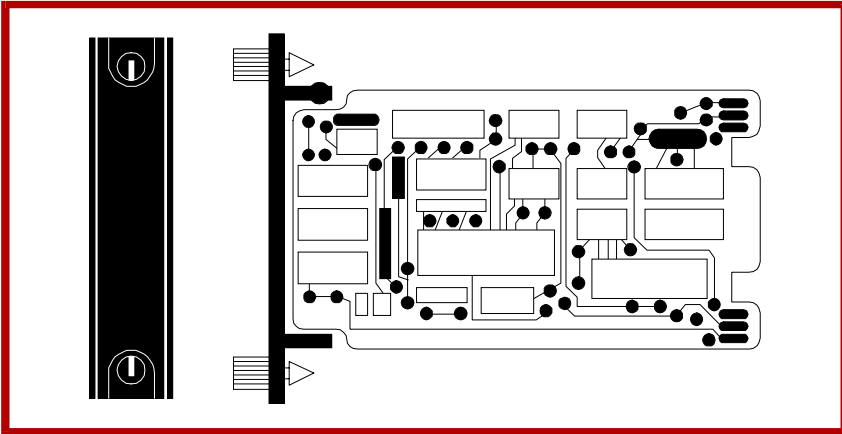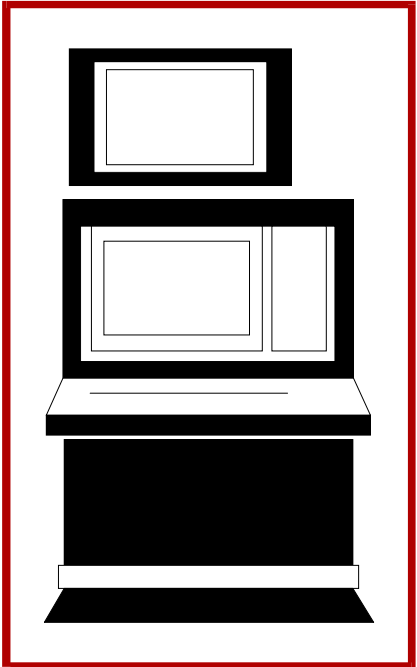
WARNING notices as used in this instruction apply to hazards or unsafe practices that could result in personal injury or death.

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.

Preface

The Operator Interface Station (IIOIS12) provides the INFI 90 $^{®}$ OPEN Strategic Process Management System with integrated operations interface and data acquisition and reporting capabilities. The OIS12 permits monitoring and control of the process through dynamic, interactive color graphics displays.

This manual explains how to install and maintain the OIS12 through supportive text and diagrams. It provides introductory information and specific instructions for installation, maintenance and troubleshooting for the station.

List of Effective Pages

Total number of pages in this instruction is 169, consisting of the following:

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iii through xii	Original
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When an update is received, insert the latest changed pages and dispose of the super-seded 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.

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Safety Summary

GENERAL WARNINGS	**Equipment Environment** All components, whether in transportation, operation or storage, must be in a noncorrosive environment. **Electrical Shock Hazard During Maintenance** Disconnect power or take precautions to insure that contact with energized parts is avoided when servicing.

SPECIFIC WARNINGS	If changing the power source from 120 VAC to 240 VAC, make sure main power breaker is off before changing operating voltage setting. Make sure that all labels on the power supply and the power entry panel are changed to show 240 VAC operation. (p. 3-9) The switch settings on the Keyboard Interface Panel must be open. Any other setting may cause damage to the keyboard interface on the PC. (p. 4-19, 5-9, 5-14) The CRT will slide out the rear of the cabinet by itself when the mounting bolts are removed. Support the CRT before removing the rear two bolts. (p. 8-2) If you forget to power down even one node you will experience problems. (p. A-31)

SPECIFIC CAUTIONS	Do not plug modules or peripherals such as an optical disk drive or printer into the OIS with power applied. A current surge or voltage spike could damage sensitive components on the unit. (p. 3-10) Do not operate the OIS with doors or covers opened or removed. Figure 5-1 and Figure 4-1 is only for illustrative purposes. (p. 4-3, 5-2) Failure to turn off the main power circuit breaker before removing or inserting modules into the chassis may result in equipment failure. (p. 4-6, 4-25, 5-3, 5-4) Disconnect the system from electrical supply before attempting repair or replacement. (p. 8-1) Before installing any software, verify that the revision level of the software on the disks matches the revision level stated in the section describing the installation of the software. (p. A-1)

SPECIFIC CAUTIONS (continued)	If you are upgrading an OIS12 system, you must back up your configuration and data before you begin. If you have stored any other files, you should also back them up. The OIS12 will only back up its own files. (p. A-12)
	QNX must be installed on each computer on the network that has its own hard disk. (p. A-12)
	Ensure that the same time zone is used on all computers. (p. A-14)
	You MUST choose to make every node a "Network Boot Server" in order for the installation program to properly configure the network. (p. A-15)
	Do not press <Esc> unless you want to abort the installation. After aborting, you will need to re-install QNX and OIS12 software so that the software is correctly installed. (p. A-20)
	Before installing or removing the security key, the computer MUST be turned off and proper anti-static safety precautions must be followed. (p. A-20)
	Before connecting or disconnecting a printer to the security key, the printer MUST be turned off. (p. A-20)
	Never use the "vedit" editor to modify system files. Use of this editor can result in system corruption. Instead use the "qed" editor. (p. D-2)

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SECTION 1 - INTRODUCTION

OVERVIEW

This document contains procedures for installing and servicing the IIOIS12 Operator Interface Station and the IIOIC12 Operator Interface Console.

Read all of this manual 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 IIOIS12.

INTENDED USER

This manual is a reference for installers with installation and maintenance experience in process monitoring equipment. It is not a tutorial.

APPLICATIONS

The Operator Interface Station IIOIS12 is an integrated operator console providing a window into the process. The IIOIS12 provides the INFI 90 OPEN Strategic Process Management system with an integrated operations interface, data acquisition and reporting capabilities.

The IIOIC12 Operator Interface Console is a remote operator interface for the IIOIS12. The OIS12 is used to process trend data and control the process.

Features of the IIOIS12 and IIOIC12 include:

- Monitoring and process control via flexible, dynamic, interactive colour graphics for 5000 tags.

- Advanced alarm management capabilities to optimize operator response.

- A trending package offering a historical perspective of process conditions for analysis of current operations.

- A logging function providing a paper history of process operations and customized operations summaries.

- An (optional) archiving function, using optical disk, providing a history of process operations for subsequent analysis and process improvement studies (IIOIS12 only).

- On-line troubleshooting and diagnostics for the process through process status displays.

OVERVIEW

- Process monitoring and tuning capabilities over the communication highway.

- A simplified mylar-style user keyboard that is small and lightweight for laptop use.

- A 32-key Annunciator Display Panel (ADP).

- A mouse as a pointing device for the operator.

- Optional Quality Analysis & Control software.

- Fast display call-up times.

- A video display that is a standard 1024x768 (or higher) VGA monitor.

- The IIOIS12 offers a computer using the Intel$^\circledR$ 586DX microprocessor, zero wait state 32 megabytes of RAM memory, built-in math coprocessor, 2 serial port and 1 parallel port on board, an AT style keyboard and an Intellicon 2-port serial card. A 340 Mbyte (minimum) SCSI hard disk drive is also included.

- The IIOIC12 offers a computer using the Intel 486DX microprocessor, zero wait state 16 megabytes of RAM memory, IDE hard drive, built-in math coprocessor, 2 serial ports, 1 parallel port on-board and an AT style keyboard. Early models did not include IDE hard disk drives.

- A double-sided 3.5-inches floppy disk drive that features 1.44-megabytes high density with 220-kilobytes read and formatted write capability.

- An optional Alta Ethernet^{TM} card for network communications.

IIOIS12 HARDWARE OVERVIEW

The IIOIS12 interfaces to INFI 90 OPEN, INFI-NET$^\circledR$ and Plant Loop communication highways. The IIOIS12 provides the INFI 90 OPEN strategic process management system with integrated operations interface, data acquisition and reporting capabilities.

IIOIS12 Console Hardware

NOTE: See also Appendix B.

The CRT, 3.5-inches disk and I/O panel for the keyboard are in the upper section of the console cabinet.

The lower section of the cabinet contains the computer, power entry panel and multibus chassis. Figure 1-1 shows the communication levels of the OIS.
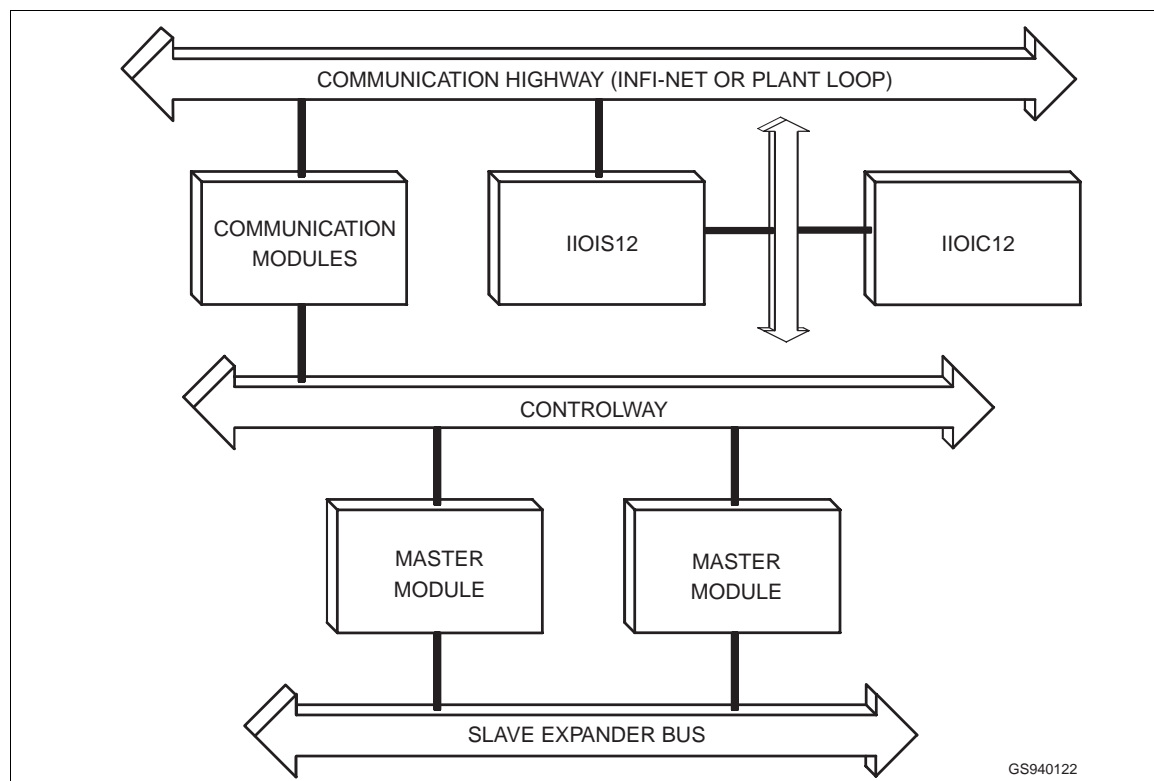
Figure 1-1. IIOIS12 Communication Levels

The IIOIS12 console cabinet contains:

- 1.44 megabytes, 3.5-inches floppy disk drive.

- 24 megabytes (minimum) of dynamic RAM memory.

- 19-inches colour CRT (1024 x 768 (or higher) pixel resolution).

- 60 MHz, 32-bit Intel 586 processor (minimum) with built-in, math coprocessor.

- SCSI hard disk drive.

- Battery-backed real-time clock.

- Adaptec 1540CF SCSI controller card.

- Graphics processor card.

- INFI-NET/Plant Loop Network Interface Unit (NIU).

- Ethernet Network Card.

- One 32-key ADP panel.

- One parallel port.

- One serial port (COM1).

- One mouse.

- Operator mylar style keyboard with 16 user-defined keys.

- Serial interface card (2-port) (CTI Intellicon-2).

- Engineering (AT style) keyboard.

The OIS12 console hardware is located in the operator console cabinet. The power entry panel, computer and multibus card cage are in the lower half of the cabinet. The CRT and operator keyboard interface panel with the 3.5-inches diskette drive are located in the upper half of the cabinet.

The keyboard interface panel is located beside the CRT on the front of the cabinet. It is made up of the diskette drive and connections for the operator OIS keyboard, mouse and an engineering keyboard. Refer to Section 3 for the installation dimensions. Refer to Section 4 for the layout of the multibus chassis, computer and the power entry panel.

IIOIC12 HARDWARE OVERVIEW

The IIOIC12 is a "slave" node which provides a remote operator interface for display graphics, alarm summaries, INFI 90 OPEN status, logs, trends and control stations. The OIC allows more than one operator to use a single "master" OIS.

The IIOIC12 is networked to the IIOIS12 "master" through a Network card and cable between the OIS master and the OIC slave.

Refer to Figure 1-1 for the communication layout.

IIOIC12 Console Hardware

The CRT, and I/O panel for the keyboard are in the upper section of the console cabinet. The lower section of the cabinet contains the computer, power entry panel and multibus keyboard controller card.

The IIOIC12 console cabinet contains:

- 1.44 megabytes 3.5-inches floppy disk drive.

- 16 megabytes (minimum) of dynamic RAM memory.

- 19-inches colour CRT (1024 x 768 pixel resolution).

- 66 MHz, 32-bit Intel 486 DX processor (minimum) with built-in math coprocessor.

- IDE hard disk drive (not included in early versions).

- Battery-backed real-time clock.

- Graphics processor card.

- Ethernet Network card.

- One 32-key ADP panel.

- One parallel port.

- Two serial ports.

- One mouse.

- Operator keyboard with 16 user-defined keys.

- Engineering (AT style) keyboard.

OIC12 console hardware is located in the operator console cabinet. The power entry panel, computer, and the multibus keyboard controller card are in the lower half of the cabinet. The CRT and operator keyboard interface panel are located in the upper half of the cabinet. The 3.5-inches diskette drive is located in the computer.

The keyboard interface panel is located beside the CRT on the front of the cabinet. It is made up of the connections for the operator OIS keyboard, mouse and engineering keyboard. Refer to Section 3 for the installation dimensions. Refer to Section 5 for the layout of the IIOIC12 hardware.

STANDARD AND OPTIONAL HARDWARE

NOTE: See also Appendix B.

Table 1-1 lists the hardware used in the Operator Interface Station (OIS) and Operator Interface Console (OIC). The optional hardware is listed in Table 1-2.

Table 1-1. Standard OIS/OIC Hardware

Nomenclature	Description
1948623A6/A9	Colour monitor.
6638353A_	Power entry panel.
6638554A_	Keyboard interface panel.
6639514A_	Operator mylar keyboard.
—	QWERTY auxiliary (engineering) AT type keyboard.
L700796_11	Computer with an Intel 60 MHz, 32-bit 586 Pentium processor (minimum) (IIOIS12 only).
L700796_13	Computer with an Intel 66 MHz, 32-bit, 486DX processor (minimum) (IIOIC12 only).
L700806_1	Six slot multibus card cage (IIOIS12 only).
IIADP02	Annunciator Display Panel.
IIMCL01	Multibus Communication Loop Module (IIOIS12 only).
IIMCP01	Multibus Communications Processor Module (IIOIS12 only).
IIMKM01	Multibus Keyboard Module.
IIMLM01	Multibus Loop Module (IIOIS12 only).

Table 1-2. Optional OIS/OIC Hardware

Nomenclature	Description
IIATB	Trackball
IIPRT02	Printer (text)
L700794_1	Sony Optical Disk Drive (IIOIS12 only)
L700906_1	PostScript® graphics printer
L750069D2	Network card (Ethernet)

INSTRUCTION CONTENT

Introduction Presents an overview of the IIOIS12/IIOIC12 and associated hardware. It also provides a list of system specifications.

Description and Operation Describes the physical attributes of the IIOIS12/IIOIC12 and related hardware.

Installation Gives instructions on installation and wiring AC power to the power entry panel.

IIOIS12 Hardware Describes the available hardware components and their configuration and installation procedures. Be sure to read and follow all warnings and cautions.

IIOIC12 Hardware Describes the available hardware components and their configuration and installation procedures. Be sure to read and follow all warnings and cautions.

Troubleshooting Lists troubleshooting steps and information.

Maintenance Contains preventive maintenance information.

Repair/Replacement Procedures Contains procedures to replace components.

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

Appendix A   Contains the instructions on how to load the OIS12 system software.

Appendix B   Describes the other computers that are used in the OIS12/OIC12 consoles.

Appendix C   Provides a sample form for designing an OIS/OIC console network.

Appendix D   Provides some background information with regards to the QNX Operating System.

GLOSSARY OF TERMS AND ABBREVIATION

Table 1-3. Glossary of Terms and Abbreviation

Term	Definition
Communication Highway	The data communication path that links nodes together; 63 node capacity for Plant Loop, or 250 node INFI-NET.
CTI	Computer Serial Interface card.
Dipswitch	A dual in-line package containing single-pole switches.
ESD	Electrostatic Sensitive Devices; electronic components subject to damage or failure when exposed to an electrostatic charge; require special handling.
INFI-NET	Advanced data communication highway.
NIU	Network Interface Unit; allows the OIS to communicate over the plant communication loop.
OIC	Operator Interface Console.
OIS	Operator Interface Station.
PEP	Power Entry Panel.
QNX	Multitasking, multi-user, real-time operating system.
RAM	Random Access Memory.
SCSI	Small Computer System Interface.
SSD	Static Susceptible Devices.
Tag	An analog or digital process value defined in the OIS as a control and/or monitor point. A tag is any piece of information from the communication highway.
Trend Data	Values collected from INFI 90 OPEN modules used in plotting trends.

REFERENCE DOCUMENTS

References are made in this manual to the following Elsag Bailey publications:

The information contained in these instructions reflects the IIOIS12 hardware at the time of printing. However, Elsag Bailey reserves the right to revise the design of the hardware without notification.

Table 1-4. Reference Documents

Number	Document
I-E96-102-6.1	IIOIS12 Configuration Manual
I-E96-102-6.2	IIOIS12 Operation Manual
I-E96-500	Network 90 Site Planning, Preparation and Equipment Installation Instructions

RELATED EQUIPMENT

- INFI 90 OPEN Multi-Function Processor Modules.

- Plant Loop and INFI-NET Communication Highways.

SPECIFICATIONS FOR THE IIOIS12 AND IIOIC12

Table 1-5. Specifications for the IIOIS12 and IIOIC12

Characteristics	Value
Power	
Line Voltage	120 V nominal (102 VAC to 130 VAC RMS) or, 240 V nominal (204 VAC to 250 VAC RMS)
Line Frequency	47 to 63 Hz
Power Consumption	2.2 A at 120 VAC (IIOIS12); 1.7 A at 120 VAC (IIOIC12) 1.1 A at 240 VAC (IIOIS12); 0.8 A at 240 VAC (IIOIC12)
AC In-Rush Current:	
IIOIS12	at 120 VAC: 76.6 A peak at 240 VAC: 64.1 A peak
IIOIC12	at 120 VAC: 81 A peak at 240 VAC: 74 A peak
Hardware (see also Appendix B)	
CPU	Intel 32-bit, 60 MHz, Pentium processor (minimum) (IIOIS12) Intel 32-bit, 66 MHz, 486DX processor (minimum) (IIOIC12)
Memory	24 Mb (minimum) (IIOIS12), 16 Mb (IIOIC12)
Floppy Disk	3.5 in., 1.44 Mb
Hard Disk	EIDE or SCSI (IIOIS12 only) IDE (IIOIC12 only, Release 5.1)
CRT Resolution	1024 x 768 pixels (or greater)
Keyboards	1 OIS and 1 QWERTY engineering AT type (6 output relays and 5 alarm tones per Elsag Bailey Controls mylar keyboard) <table><tr><td>Alarm Relays</td><td>Typical</td><td>Maximum</td></tr><tr><td>Contact voltage</td><td>24 VDC</td><td>100 VDC</td></tr><tr><td>Contact current</td><td>0.25 A</td><td>0.5 A</td></tr><tr><td>Contact power</td><td>6 W</td><td>10 W</td></tr></table>
ADP	A 32-key annunciator display panel
Configuration	Nonvolatile RAM and EIDE or SCSI hard disk storage (IIOIS12) Nonvolatile RAM (IIOIC12) and IDE hard disk

RELATED EQUIPMENT

Table 1-5. Specifications for the IIOIS12 and IIOIC12

Characteristics	Value
Environment	
Temperature:	
Operating	10°C to 35°C (50°F to 95°F)
Storage	-40°C to 66°C (-8°F to 140°F)
Transportation	-30°C to 60°C (-22°F to 140°F)
Relative Humidity:	
Operating	20% to 80% R.H. (±5%) at 25°C noncondensing 5% to 40% R.H. (±5%) at 40°C noncondensing
Storage	10% to 90% noncondensing
Transportation	5% to 95% noncondensing
Altitude	-1,000 ft to +10,000 ft operating
Cooling Requirements	OIS12: 950 BTU/hr OIC12: 800 BTU/hr
Weight	OIS12: 114 Kg (250 lbs.) OIC12: 110 Kg (240 lbs.)
Certification	CSA certification for use in an ordinary (nonhazardous) location.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

SECTION 2 - DESCRIPTION AND OPERATION

INTRODUCTION

This section explains the inputs, control logic and communication for the IIOIS12 Operator Interface Station. An operator uses the OIS to monitor and control the process. The OIS shows equipment status and process states with interactive colour graphic displays.

The display is 1024 x 768 pixels with any of the available colours. 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.

IIOIS12 FUNCTIONAL OPERATION

Figure 2-1 shows a block diagram of the IIOIS12. This block diagram shows the signal flow for the IIOIS12. Refer to this figure when reading the description.

Process data from the Plant Loop or INFI-NET enters the OIS through the Network Interface Unit (NIU).

Three cards in the six-slot multibus chassis make up the NIU. They are the Multibus Communication Loop Termination Module (IIMCL01), Multibus Loop Module (IIMLM01) and Multibus Communication Processor Module (IIMCP01). The MCL module in slot three of the multibus chassis connects to the loop. Front edge connectors on the MCL terminate redundant coaxial or twin axial cable of the loop. A ribbon cable connects the MCL to the MLM module in slot five. The MLM allows the MCL and the MCP to communicate together. A ribbon cable connects the MLM to the MCP module. A cable connects the MCP to the NIU connector on the cable connector panel.

The computer contains the Intel 60-MHz, 32-bit, 586 Pentium processor (minimum) and 24 megabytes (minimum) of dynamic RAM memory.

The NIU modules are powered from the multibus chassis backplane. Multibus NIU cards communicate to the computer over a serial cable from the MCP to the computer serial card.

The computer's serial interface card allows the processor to communicate with the communication loop interface (first port) and OIS mylar keyboard (second port).

The Multibus Keyboard Module (IIMKM01), mounted in slot one of the multibus chassis, connects the keyboard interface panel

to the serial card through an RS-232-C serial link. The processor reads and processes keyboard data from the serial card. A cable connects the MKM to the serial card.

The graphics card sends video signals to the CRT. A cable connects the graphics card to the "video in" connector on the back of the CRT.

Refer to Section 4 for more information on multibus modules, computer cards and OIS hardware.

Refer to Section 5 for more information on computer cards and OIC hardware.
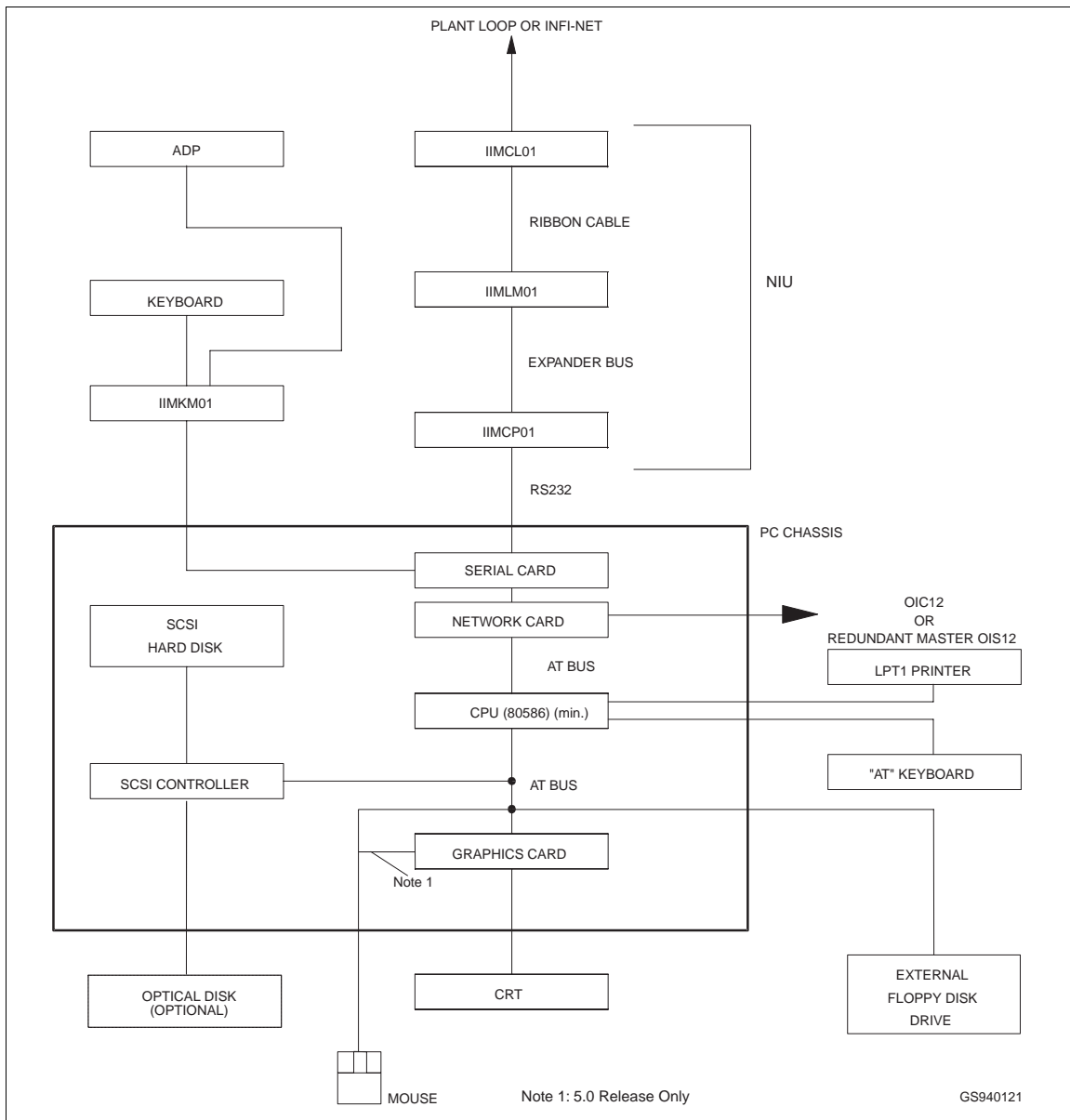
Figure 2-1. IIOIS12 Block Diagram

Logic Power

An internal power supply converts the AC input to the DC voltages needed to power the IIOIS12 electronics (+5, ±12 VDC).

Multibus Chassis

The INFI 90 OPEN six-slot multibus chassis provides housing and power for the Multibus Network Interface Unit (NIU) cards and Multibus Keyboard Module card.

```
                        ┌──────────┐
                        │   ADP    │
                        └──────────┘

                        ┌──────────┐
                        │ KEYBOARD │
                        └──────────┘

                        ┌──────────┐
                        │ IIMKM01  │
                        └──────────┘

                          RS 232
```

ADP

KEYBOARD

IIMKM01

RS 232

PC CHASSIS

NETWORK CARD → OIS12

AT BUS

LPT1 PRINTER

IDE HARD DISK   CPU (486) (min.)

Note 2   'AT' KEYBOARD

AT BUS

GRAPHICS CARD

Note 1

DRIVE FLOPPY DISK

Note 1: 5.0 Release Only

Note 2: 5.1 Release

CRT   MOUSE

GS940120
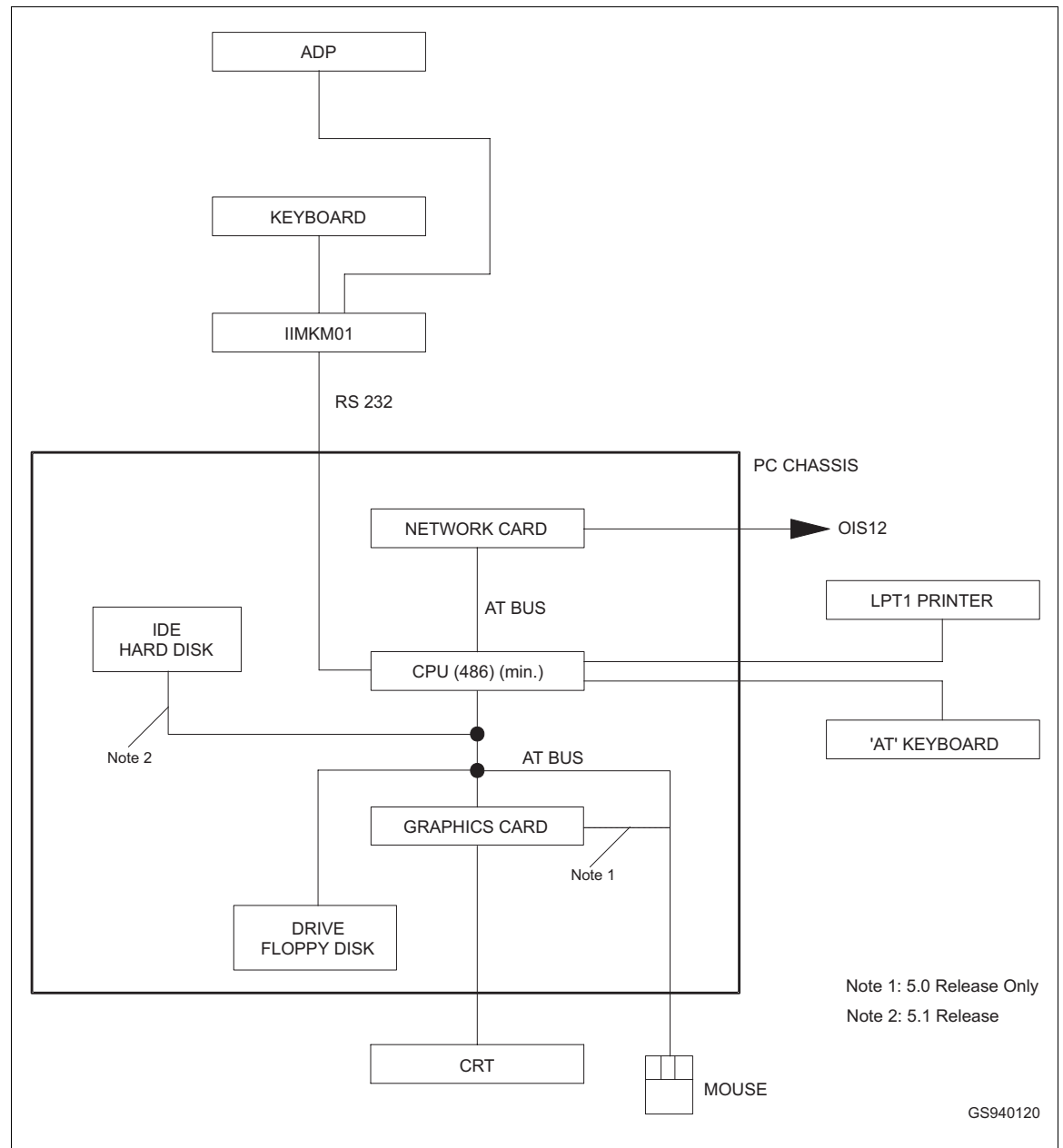
Figure 2-2. IIOIC12 Block Diagram

IIOIC12 FUNCTIONAL OPERATION

Figure 2-2 shows a block diagram of the IIOIC12. This block diagram shows the signal flow for the IIOIC12. Refer to this figure when reading the description.

The IIOIC12 controls and monitors a process through the IIOIS12 station. The IIOIC12 is an operator station controlled by an Intel 66-MHz, 486DX (minimum) computer that contains 16 megabytes of dynamic RAM memory. Communications between the master OIS12 and slave OIC12 units are accomplished via the Ethernet network connections. Up to three OIC12 units may be daisy-chained via coaxial cable to the OIS12.

Refer to Section 5 for more information on OIC hardware.

SECTION 3 - INSTALLATION

INTRODUCTION

This section explains how to install and prepare the IIOIS12 (OIS) and IIOIC12 (OIC) for operation. Read and understand these steps before installing the IIOIS12 or IIOIC12. Call the local Elsag Bailey sales office if you have any questions about installing or setting up either the IIOIS12 or IIOIC12.

SPECIAL HANDLING

The IIOIS12/IIOIC12 weighs about 114 kg (250 lbs). Be sure to move the cabinet with equipment rated for this weight.

HARDWARE SETUP ELECTROSTATIC DISCHARGE (ESD) CONTROL

The OIS contains circuit boards using CMOS components. Before removing a module from the multibus chassis or the computer or doing maintenance on equipment having static sensitive devices read this section.

Static Susceptible Devices (SSD) are likely to be damaged from contact with potential static charges greater than 6.25 volts. This potential, when placed across the leads of a SSD can damage the oxide layers within the package. Latent or immediate damage may result. Latent damage may not be detectable under normal circuit check-out, but may result in a reduced life of equipment or reduced system functions.

Methods for preventing damage involve equalizing the potentials across all SSD terminals and across the SSD working area, tooling and operator. The most common method is to connect tools, assembly equipment and the operator electrically to earth ground. This procedure should be followed at all stages of handling.

Special handling procedures help avoid damage to the printed circuit boards.

1. Personnel working with or handling printed circuit boards need to be grounded by wearing conductive wrist ground straps.

   NOTE: Always use the Elsag Bailey Field Static Kit (P/N 1948385A2 - consisting of a wrist strap, ground cord assembly and alligator clip) when working with the OIS/OIC. The kit is designed to connect the technician and the static dissipating work surface to the same ground point to prevent damage to the modules by electrostatic discharge.

2. Personnel wearing silk, wool or synthetic clothing shall wear a conductive material smock. Personnel shall keep all plastic and textiles which are not antistatic away from SSD and workstations.

3. Use antistatic containers and bags. Store ESD sensitive equipment in these containers/bags when they are not in the system.

4. Ground containers and bags before opening.

5. Ground test and assembly equipment.

6. Workstations need to be constructed or covered with conductive materials.

7. Keep the work area free of plastic, styrofoam, cellophane, vinyl materials (e.g., coffee cups, cup holders, cigarette packages, combs, books, folders).

8. Be sure the tools that come into contact with SSD are made of conductive materials and provide a means for connection to ground.

9. Use soldering irons with a grounded tip that are approved for use on SSD.

UNPACKING AND INSPECTION

Compare the shipment to the invoice upon receiving the OIS/OIC. Examine the shipping crate for damage. Report any damage immediately to the carrier. If immediate repair or replacement is necessary, notify the nearest Elsag Bailey Sales/Service office.

If the OIS/OIC is not put into service immediately, store it in its original shipping package. If the OIS/OIC is to be stored, maintain the storage environment defined in the environmental specifications in Section 1 of this manual.

PLANNING AND INSTALLATION

Refer to the *Site Planning, Preparation and Equipment Installation Manual, (I-E96-500)* for site selection, preparation and hardware installation of the INFI 90 OPEN control system. This document includes requirements and recommendations of load bearing for floors, space around equipment, temperature, humidity, shock and vibration, AC power wiring, power and DC signal common grounding, line conditioning, uninterrupted power supplies, radio frequency and electromagnetic interference, electrostatic discharge, lighting, equipment protection, equipment handling and storage.

SAFETY CONSIDERATIONS

Do not remove or install circuit boards with power applied to the OIS/OIC. The circuit board may be damaged. Remove AC 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 damage to equipment.

IIOIS12/IIOIC12 PHYSICAL DESCRIPTION

The dimensions of the Operator Interface Station (OIS) and Operator Interface Console (OIC) are approximately 110-centimeters (43-inches) high, by 72-centimeters (28-inches) wide, by 118-centimeters (46-inches) deep. It has front and rear swing-out doors with individual locks. The front door has slotted openings to accommodate the air intake for the unit's internal cooling system. The unit has a stabilizer which must be fastened to the front of the cabinet when the OIS/OIC is not secured to the floor. The 6.4-centimeters (2.5-inches) diameter cable entry is located at the bottom right rear of the unit. The cabinet dimensions are shown on Figure 3-1.
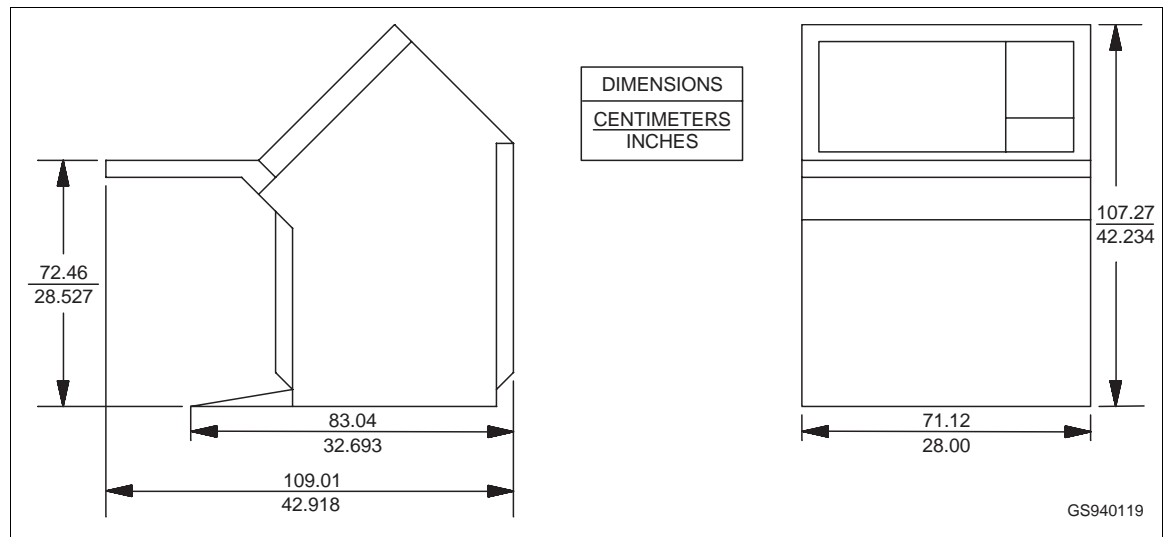
Figure 3-1. IIOIS12/IIOIC12 Cabinet Dimensions

IIOIS12/IIOIC12 SETUP AND PHYSICAL INSTALLATION

Before the OIS/OIC is set into place in a control room application, insure that the floor is level in the area where the cabinets will be set.

1. Adjust the leveling screws on all cabinets and connecting tables until the CRT bezel of each cabinet lines up. The leveling screws adjust 2.65 centimeters (1.05 inches). The dimensions for the leveling studs are shown on Figure 3-2.

DIMENSIONS
CENTIMETERS
INCHES

28.18 / 11.09   48.26 / 19.00   6.60 / 2.60

STUD CENTER   TO REAR DOOR

10.87 / 4.28   49.38 / 19.44   10.87 / 4.28

STUD CENTER   GS940118
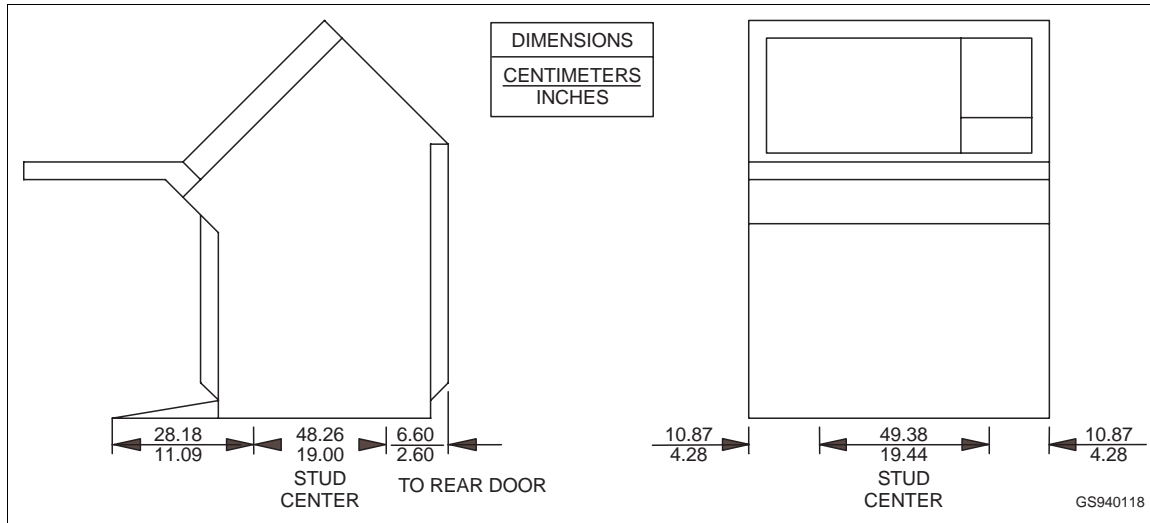
Figure 3-2. IIOIS12/IIOIC12 Anchoring Dimensions

2. After the cabinets are secured to the floor, 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.

The tabletops are adjustable. The brackets supporting the tabletops are bolted through oversize holes. Loosen the bolts and move the top 0.25 inches up, down, forward or back toward the cabinet.

3. There are two chrome table alignment pins 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 six bolts on the support brackets.

4. Protect the wires and cabling going to the cabinet. Run cabling through conduit to the back of the cabinet or under the floor through the bottom of the cabinet. Follow local wiring codes when wiring and installing cableways or conduit.

Figure 3-1 and Figure 3-2 shows the OIS/OIC cabinet dimensions. Figure 3-3 shows the keyboard table. Figure 3-4 shows the 15-degree wedge table dimensions. Figure 3-5 shows the 45-degree wedge table dimensions.

IIOIS12 /IIOIC12 WIRING CONNECTIONS AND CABLING

Table 3-1 contains the colour codes for wiring the IIOIS12/ IIOIC12. Table 3-2 contains a list of cables and their connections. IIOIS12 wiring connections are shown in Figures 3-6 and 3-7. IIOIC12 wiring connections are shown in Figure 5-18.
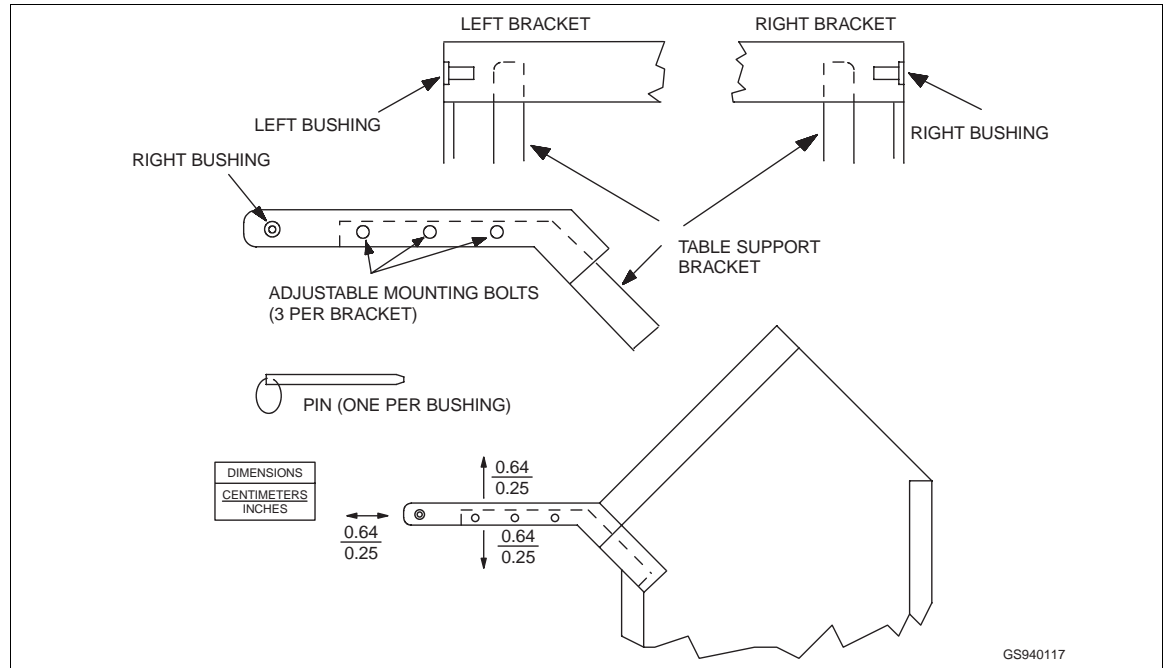
Figure 3-3. IIOIS12/IIOIC12 Keyboard Table
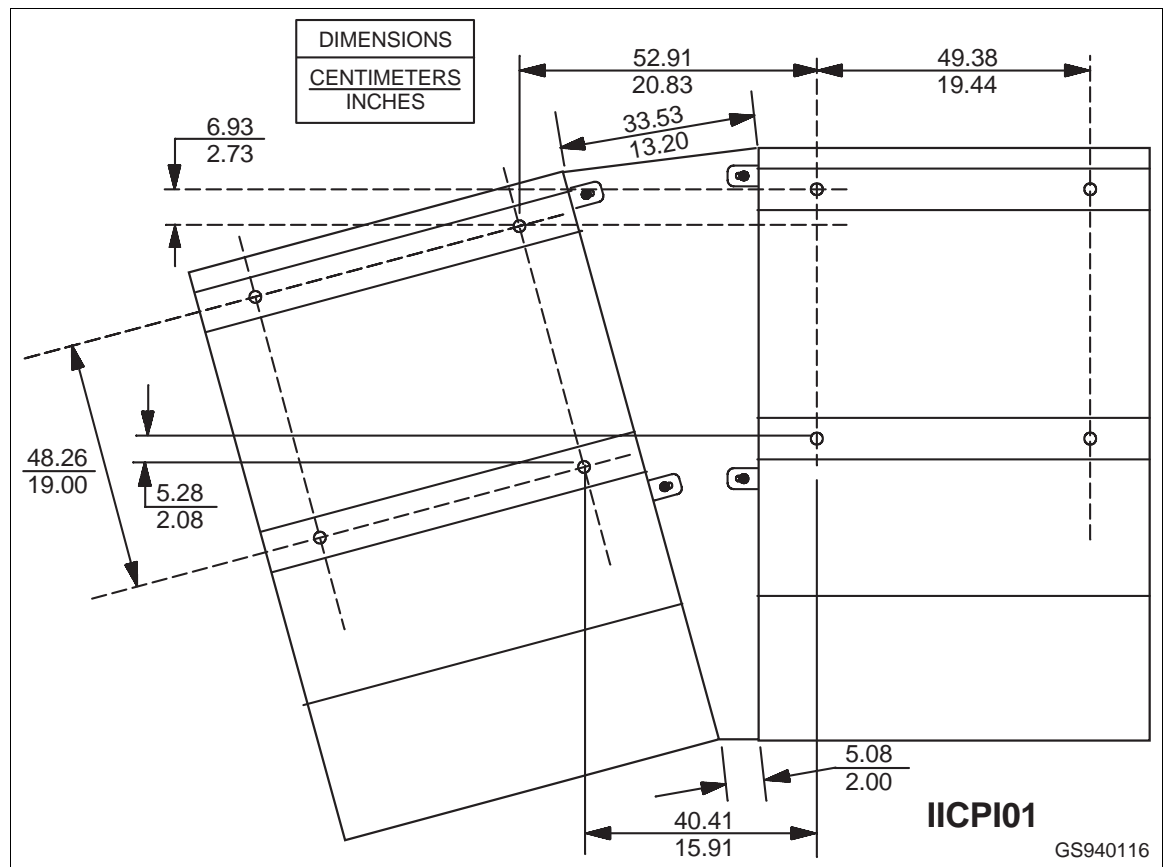
Figure 3-4. IIOIS12/IIOIC12 (15-Degree) Wedge Table Dimensions
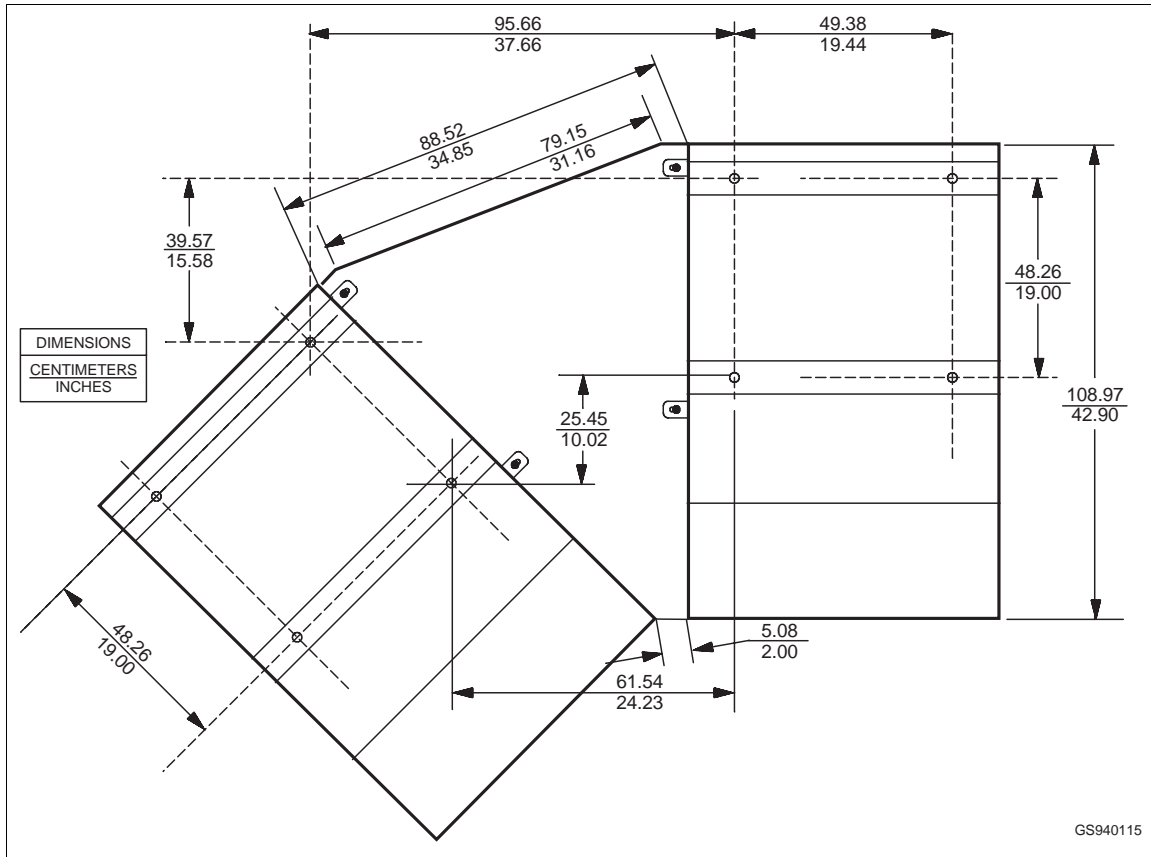
Figure 3-5. IOIS12/IIOIC12 (45-Degree) Wedge Table Dimensions

Table 3-1. OIS Wiring Colour Codes

Colour	Function
Brown	AC Hot
Blue	AC Neutral
Green/Yellow	AC Common
Brown	+5 VDC
White/Green	DC Common
Violet	-12 VDC
White/Violet	+12 VDC

The OIS/OIC is internally wired when it is shipped. Connect the communication loop cables, AC power and any peripheral devices. AC power is connected to TB1 on the power entry panel (PEP). Communication loop cables connect to the IIMCL01 module in the multibus chassis. Peripheral devices connect to the front of the PEP or to the keyboard interface panel located beside the CRT. Refer to Section 4 for specific instructions on installing and configuring peripheral devices and replacement components.

Table 3-2. IIOIS12/IIOIC12 Cable Connections

Cable No.	Cable Name	Connect From	Connect To
1947950_1	AC power	AC on PEP	CRT AC power connector
6634512_26N2	Internal I/O	P3 on IIMCL01	P3 on IIMLM01 (OIS only)
6634512_26N2	Internal I/O	P4 on IIMCP0_	P4 on IIMLM01 (OIS only)
6634512_26N54	Terminal block	PEP terminal block	P6 on IIMKM01
6634512_26N72	I/O distribution	P5 on IIMKM01	P1 on keyboard-I/O dist. board
6637599_1	AC power	J1 on PEP	AC HI on main power supply AC LO on main power supply Ground on main power supply
6637776_2	Wrist ground	User Wrist Strap	Wrist connection on PEP
6638720_	Brightness control	9 pin connector on rear of monitor labelled "video out"	CRT bezel brightness CRT bezel contrast Degaussing Sw. on PEP
6639105_1	Reset	Reset switch on PEP	P4 on IIMKM01
6641136A2	DC power	P6 on OIS Pwr. Dist.	P2 on rear of card chassis
6641136B1	DC power	P5 on OIS Pwr. Dist.	P1 on rear of card chassis
L700579V19-04	NIU RS-232-C cable	9-pin connector on IIMCP01 (P5)	P1 connector on serial card or COM2 in computer (OIS only)
L700579V19-04	Keyboard RS-232- C cable	9-pin connector on IIMKM01 (P9)	P2 connector on serial card or COM1 in computer
L700804-_	I/O distribution	P9 on keyboard-I/O dist. board	Keyboard connector on rear of computer
L700912A2	Mouse cable	P10 on keyboard - I/O dist. board	Mouse port on PC

Communication Loop Connections

Redundant communication loops connect to the IIMCL01 module in the multibus chassis. Run coaxial cables, for INFI-NET, with BNC connectors or twin axial cables, for Plant loop, to the front connections on the IIMCL01 module. Cables can enter the cabinet from the floor-level opening on the rear of the cabinet or through the hole in the bottom of the cabinet under the power entry panel.

Peripheral Device Connections

There are peripheral device ports on the cable connector panel located above the power entry panel (PEP) and on the keyboard interface panel located beside the CRT. The keyboard port on the keyboard interface panel connects to the keyboard shipped with the OIS/OIC. The AUX KBD port connection is for a supplied engineering (AT style) keyboard. This AT 101-key keyboard must be available for setup changes. Refer to Section 4 and Section 5 for more information on peripheral devices.

AC Power

IIOIS12/IIOIC12 AC power input connects to a terminal block on the bottom front of the power entry panel. The OIS/OIC can operate from 120/240 VAC, 50/60 Hz. The PEP provides line filtering, transient suppression and a 10-Amp circuit breaker.

NOTE: Figure 3-6 applies when DC Power Supply P/N 6638553A6 is installed in the console. Figure 3-7 applies when DC Power Supply P/N 6638553V5 is installed.
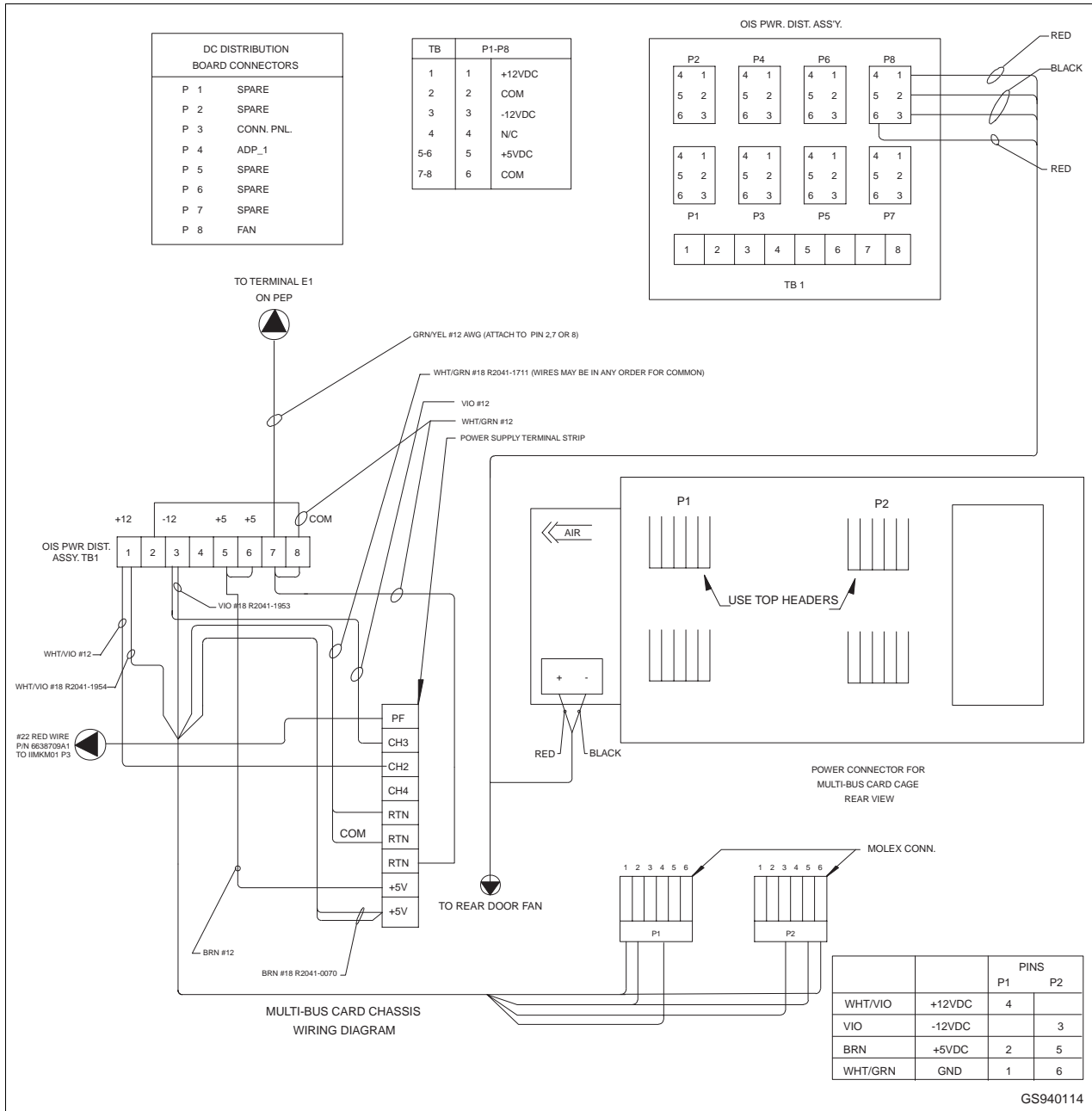
Figure 3-6. IIOIS12 Wiring Connections, Power Supply P/N 6638553A6
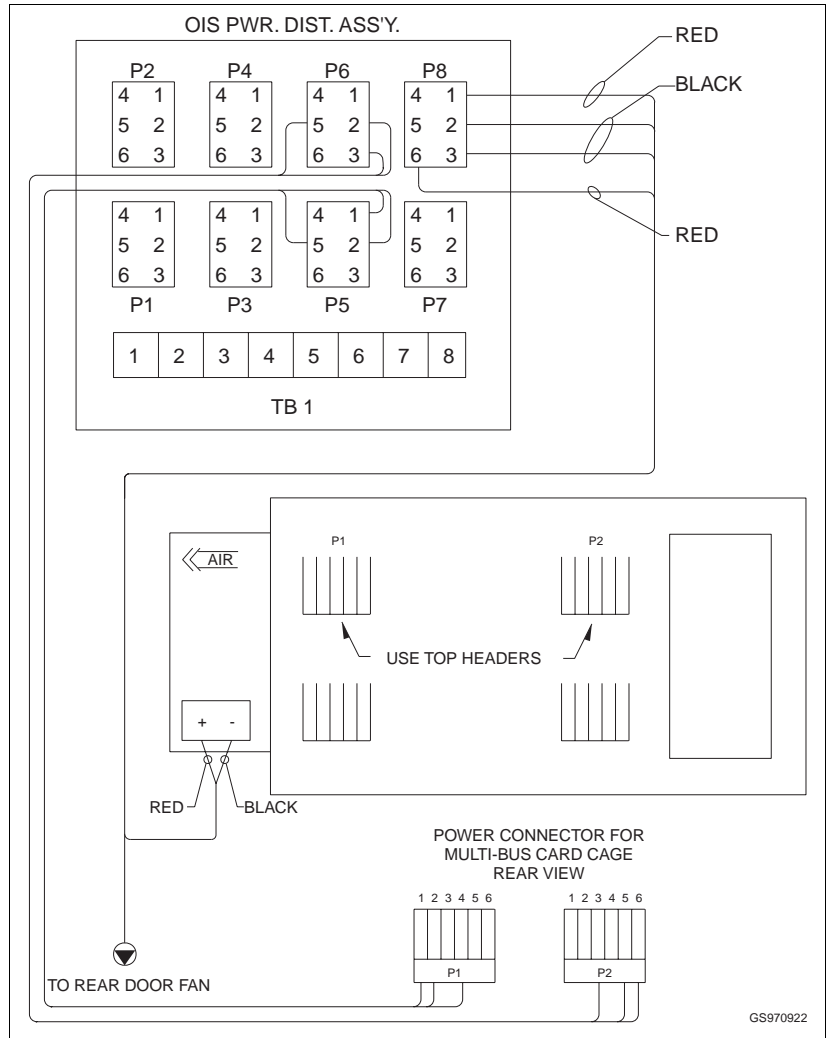
Figure 3-7. IIOIS12 Wiring Connections, P/N 6638553V5

Setup for 240 VAC

Setting up the OIS/OIC for 240 VAC operation may require the console's main power supply be jumpered for 240 VAC (Section 4). The computer may require its power supply to be switched for 240-VAC operation. Refer to the computer user manual. The power selection switch is located on the back of the PC for selection of 120 or 240 VAC. The monitor has an auto-sensing power supply and does not need to be configured for 240-VAC operation.

WARNING	**If changing the power source from 120 VAC to 240 VAC, make sure main power breaker is off before changing operating voltage setting. Make sure that all labels on the power supply and the power entry panel are changed to show 240-VAC operation.**

AC Outlets

There are four AC outlets on the OIS/OIC power entry panel. Three are located on the rear for the colour monitor, the computer, and the main power supply.

> **NOTES:**
> 1. The AC outlets on the OIS/OIC are wired for 120 VAC or 240 VAC. Make sure that the devices using these outlets are wired for the correct voltage.
>
> 2. Do not connect motors, lights, or test equipment to the AC outlets. Electrical noise may cause data to be lost or changed.

AC Wiring

The following steps outline the required procedure to install and power up the IIOIS12/IIOIC12. Observe and follow all related safety procedures when doing these steps (Figure 3-8).

CAUTION	**Do not plug modules or peripherals such as an optical disk drive or printer into the OIS with power applied. A current surge or voltage spike could damage sensitive components on the unit.**

> **NOTES:**
> 1. Turn power off before installing or removing NIU modules (IIOIS12 only).
>
> 2. Before removing a module from the multibus chassis or performing maintenance on equipment containing static sensitive devices, read *HARDWARE SETUP ELECTROSTATIC DISCHARGE (ESD) CONTROL* in this section.

1. Turn off the breakers for the AC supply power and verify that no power is present to the OIS/OIC when making wiring connections.

2. Open the front door of the OIS/OIC cabinet. This provides access to the terminals needed for wiring to the INFI 90 OPEN communication highway and AC power.

3. Wire AC power to the terminals at the bottom front of the power entry panel.

> **NOTE:** Verify that the incoming voltage is the same as the rating on the label of TB1 on the PEP.

The recommended minimum size for power wiring is 18-AWG copper wire with a 600-V, 75°–Celsius rating and thermoplastic insulation. Wire with a 300-V or 150-V 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.
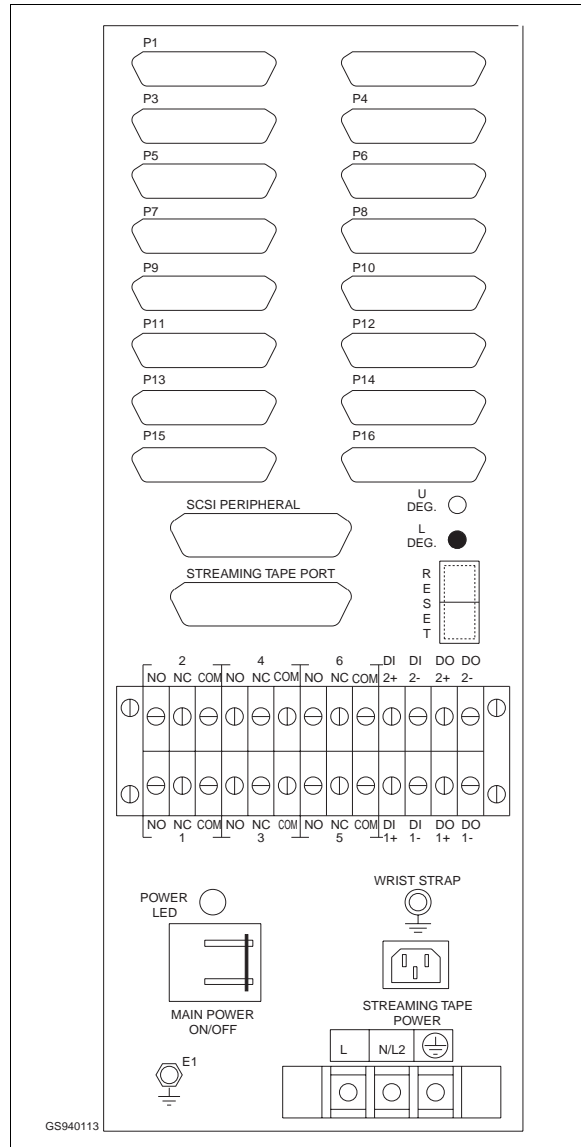
Figure 3-8. IIOIS12/IIOIC12 Power Entry Panel (PEP) AC Input Terminal

The power wiring to the OIS/OIC must include a third-wire grounding conductor. This grounding conductor must not be a smaller gauge than the power wiring and must be either bare, green coloured or green/yellow coloured 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/OIC hardware. Refer to Section 1 for the peak inrush current and duration for the OIS/OIC.

For more information on power wiring and grounding, such as line conditioning and EMI (electromagnetic interference), refer to manual *I-E96-500, Site Planning, Preparation and Equipment Installation.*

The power entry panel (PEP) and cable connector panel is located in the front of the cabinet in the bottom right corner. Connect 120/240 VAC at 50/60 Hz into the terminal block below the circuit breaker on the PEP. Follow all national and local codes. Figure 3-9 shows the AC wiring inside the power entry panel for the OIS/OIC.
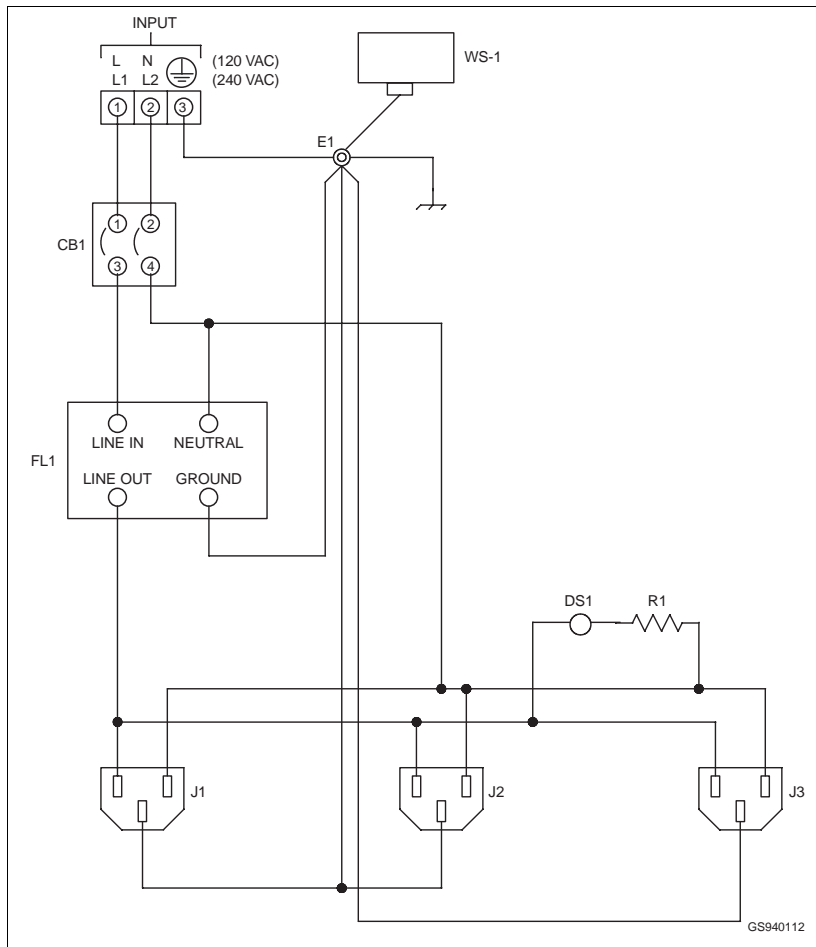
Figure 3-9. IIOS12/IIOC12 Power Entry Panel AC Wiring

Refer to *IIOIS12 POWER ENTRY PANEL* in Section 4 of this manual for further information. If other power is present, a compensating transformer is required.

4. Vibration during shipping and handling may unseat modules and connections, causing problems. Before applying power, do the AC and DC power up tests in Section 6 of this manual.

5. After AC wiring is completed, check the placement of the multibus modules. Compare module placement and check the switch settings against the boards shown in Section 4 and Section 5.

6. Connect the Plant Loop or INFI-NET Communication Link. Refer to *Multibus Communication Loop Module* in Section 4 of this manual for further information (IIOIS12 only).

7. After completing the wiring, and checking the AC voltage sources, apply power.

PRE-OPERATING ADJUSTMENTS

Each OIS/OIC is powered up and tested before shipment. All necessary power supply adjustments, CRT adjustments and jumper connections have been made. Install the OIS/OIC by following these instructions.

• Set it into place according to the *Site Preparation Manual, I-E96-500*.

• Connect the incoming AC, equipment ground.

• Connect the communication highway connections to the Network Interface Unit (NIU) (IIOIS12 only).

• Check connections.

• Check power supply voltages.

• Check indicators.

• Check system configuration.

• Refer to the troubleshooting information in Section 6 to correct any problems.

SECTION 4 - IIOIS12 HARDWARE

INTRODUCTION

This section describes the standard and optional hardware used by the IIOIS12 operator interface. Each entry contains jumper and switch configurations for the particular component.

> **NOTE:** The components in the OIS are configured at the factory with the settings shown in this section. This information is given in case settings are changed or hardware needs to be replaced.

The location of components and the wire and cable connections are also given. This information is a reference for standard and optional equipment.

IIOIS12 HARDWARE

> **NOTE:** See also Appendix B.

Standard hardware in the OIS consists of the multibus chassis, computer, operator interface equipment and power entry panel. Each of these is made up of multiple components which are listed in Table 4-1 and 4-2.

Table 4-1 lists the standard hardware used in the operator interface station. Table 4-2 lists the optional hardware that can be used.

Table 4-1. Standard OIS Hardware

Nomenclature	Description
1948623A6/A9	Colour monitor.
6638353A_	Power entry panel.
6638554A_ 6639514A_	Keyboard interface panel. Operator Mylar keyboard assembly.
IIADP02	ADP Panel.
IIMCL01 IIMCP01 IIMKM01 IIMLM01	Multibus Communication Loop Module. Multibus Communications Processor Module. Multibus Keyboard Module. Multibus Loop Module.
L700796_11	Computer with an Intel 60 MHz, 32-bit, 586 Pentium processor (minimum).
L700806_1	6-slot multibus card cage.

IIOIS12 CONSOLE COMPONENT LOCATIONS

IIOIS12 console hardware is located in the operator console cabinet. The power entry panel, computer and multibus

chassis are in the lower half of the cabinet. The CRT and oper-
ator keyboard interface panel with the 3.5-inches diskette
drive are located in the upper half of the cabinet.

Table 4-2. Optional OIS Hardware

Nomenclature	Description
IIATB06	Trackball
IIPRT02	Standard printer (text)
L700906_1	Colour PostScript graphics printer
L700794_	Optical Disk Drive

The keyboard interface panel is located beside the CRT on the
front of the cabinet. It is made up of the diskette drive and
connections for the OIS mylar keyboard, mouse and an engi-
neering keyboard.

The power entry panel has terminals for input AC, alarm con-
tact outputs and power connections for a peripheral device.

Figure 4-1 shows the front and rear views of the OIS console
with the doors removed. This figure shows the physical rela-
tionship between the subassemblies. See Figure 4-1 for the
location of the multibus chassis, computer and the power
entry panel.
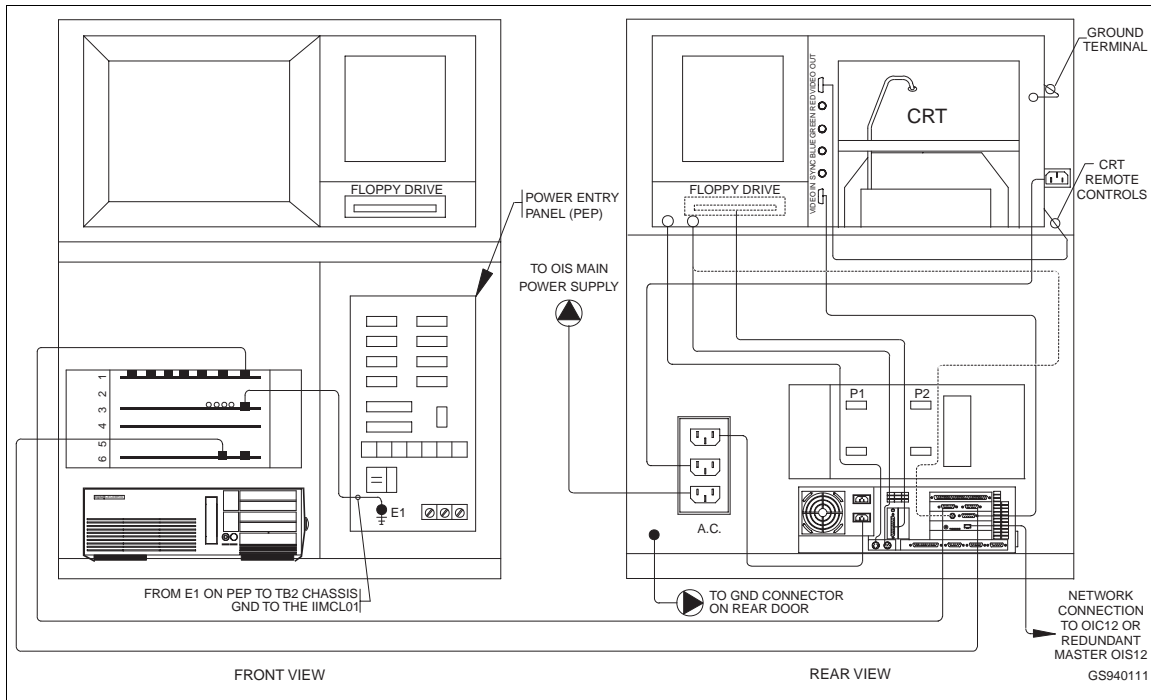
Figure 4-1. IIOIS12 Console Front and Rear View

CAUTION	**Do not operate the OIS with doors or covers opened or removed. Figure 4-1 and Figure 5-1 are only for illustrative purposes.**

MULTIBUS CHASSIS HARDWARE

The multibus hardware consists of the multibus chassis and the Network Interface Unit (NIU) modules. The modules are discussed in this section.

Multibus Chassis

- Elsag Bailey Part Number - L700806_1.

The multibus chassis provides the power and communication paths for the multibus NIU and keyboard modules listed in Table 4-3. Connect the modules into the slots as shown in Figure 4-2.

Table 4-3. Multibus Modules

Multibus Module	Slot	NIU	Nomenclature
Multibus Keyboard Module	1		IIMKM01
Multibus Communications Processor Module	6	X	IIMCP01
Multibus Loop Module	4	X	IIMLM01
Multibus Communication Loop Termination Module	3	X	IIMCL01
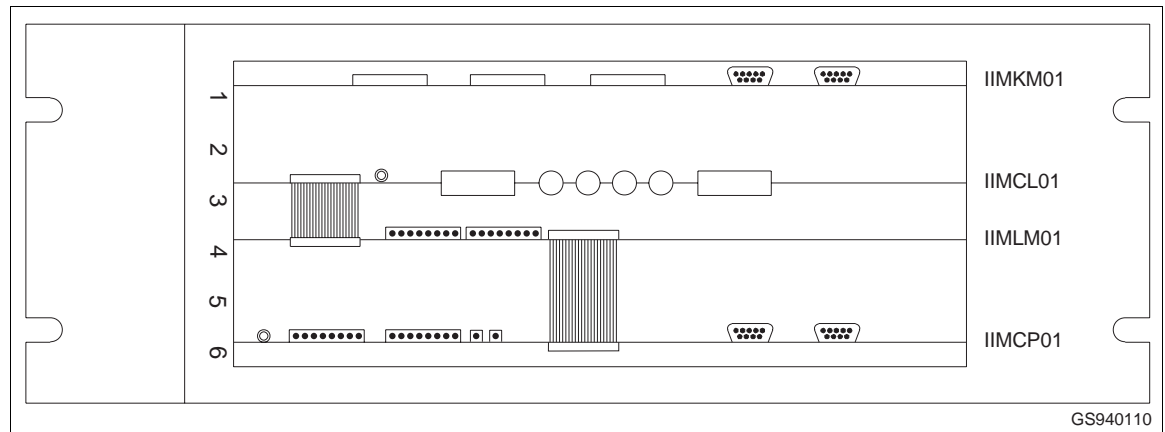
Figure 4-2. Multibus Chassis

The OIS communicates with the INFI 90 OPEN system through the Network Interface Unit (NIU), and is connected to the NIU. The NIU hardware dipswitch settings are factory set and should not require further configuration. Table 4-3 lists the multibus modules in the IIOIS12 multibus chassis. The wiring for the multibus chassis is shown in Figures 4-3. and 4-4.

Table 4-4 lists the multibus chassis wiring connections for the molex connectors P1 and P2 shown in Figure 4-3 and 4-4.

NOTE: Figure 4-3 applies when DC Power Supply P/N 6638553A6 is installed in the console. Figure 4-4 applies when DC Power Supply P/N 6638553V5 is installed
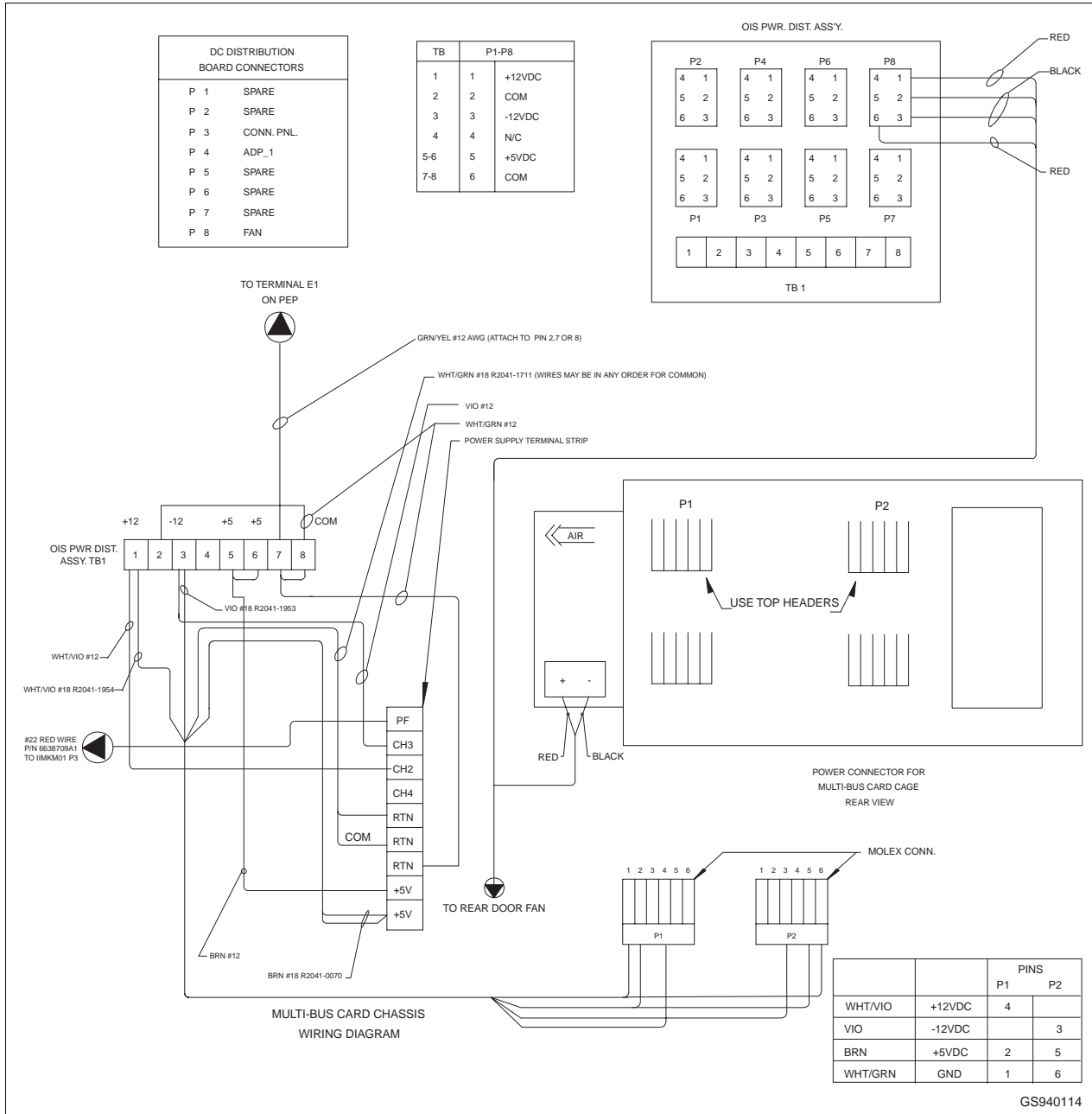

Figure 4-3. Multibus Card Chassis Wiring P/N 6638553A6

Table 4-4. Multibus Wiring Connections

Wire Colour	Voltage	Pins	
		P1	P2
WHT/VIO	+12 VDC	4	
VIO	-12 VDC		3
BRN	+5 VDC	2	5
WHT/GRN	GND	1	6
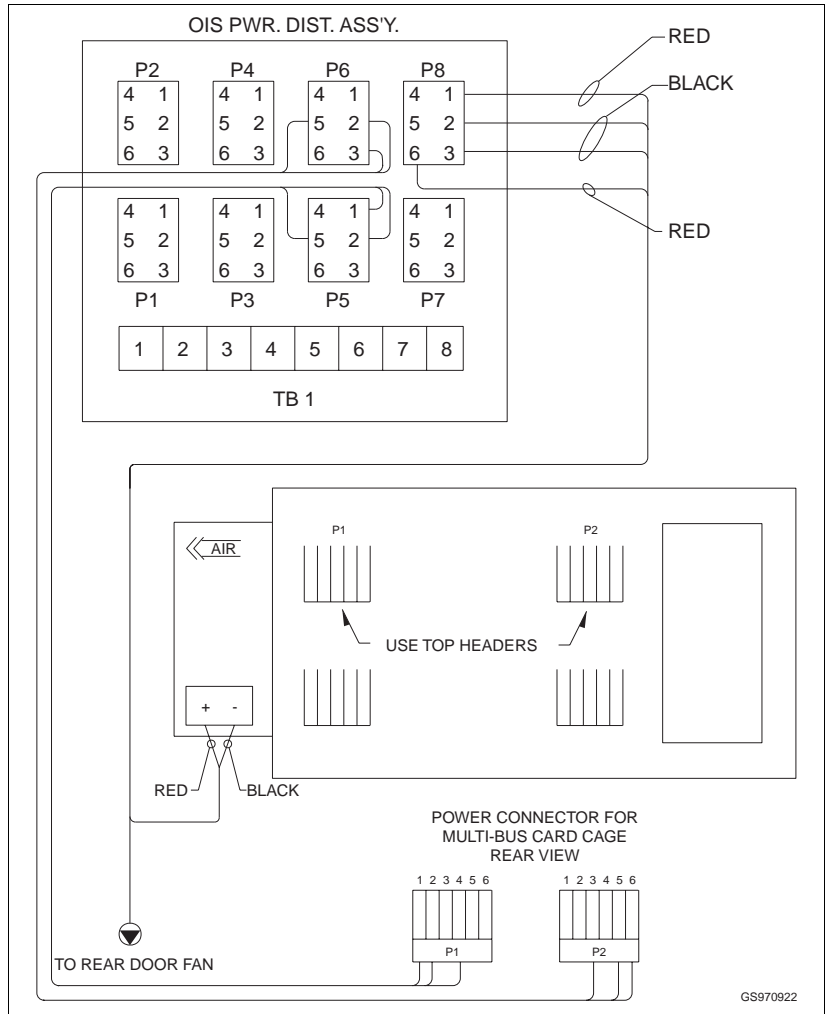
Figure 4-4. Multibus Card Chassis Wiring P/N 6638553V5

Multibus Module Installation

Insert the multibus modules into the chassis along the left and right guide rails. Slide the module into the desired position, being careful to align it with the slot number. Press on the module removal tabs at the left and right of the card front to fully insert the module into the multibus backplane (Figure 4-5).

CAUTION	Failure to turn off the main power circuit breaker before removing or inserting modules into the chassis may result in equipment failure.
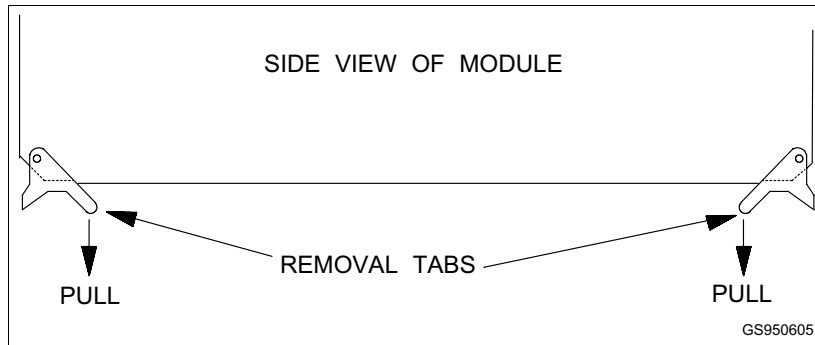
Figure 4-5. Removing Multibus Chassis Cards

Multibus Module Removal

CAUTION	Failure to turn off the main power circuit breaker before removing or inserting modules into the chassis may result in equipment failure.

Remove the modules by pulling the removal tabs on the ends of the card toward you and gently sliding the module out of the chassis. Be sure not to loosen cables from the modules next to the one you are removing.

Multibus Loop Module

- Elsag Bailey Nomenclature - IIMLM01.

The Multibus Loop Module, shown in Figure 4-6, allows communication between the Multibus Communication Processor Module (IIMCP01) and the INFI-NET or Plant Loop communication highway through the termination module (IIMCL01). Refer to Table 4-5 for jumper and dipswitch settings. Use two ribbon cables numbered 6634512_26N2 to connect the loop module to the communication processor and to the termination module.

NOTE: Dipswitch SW1 and SW2 selects the loop address and ring number of this OIS and depends on your individual system.
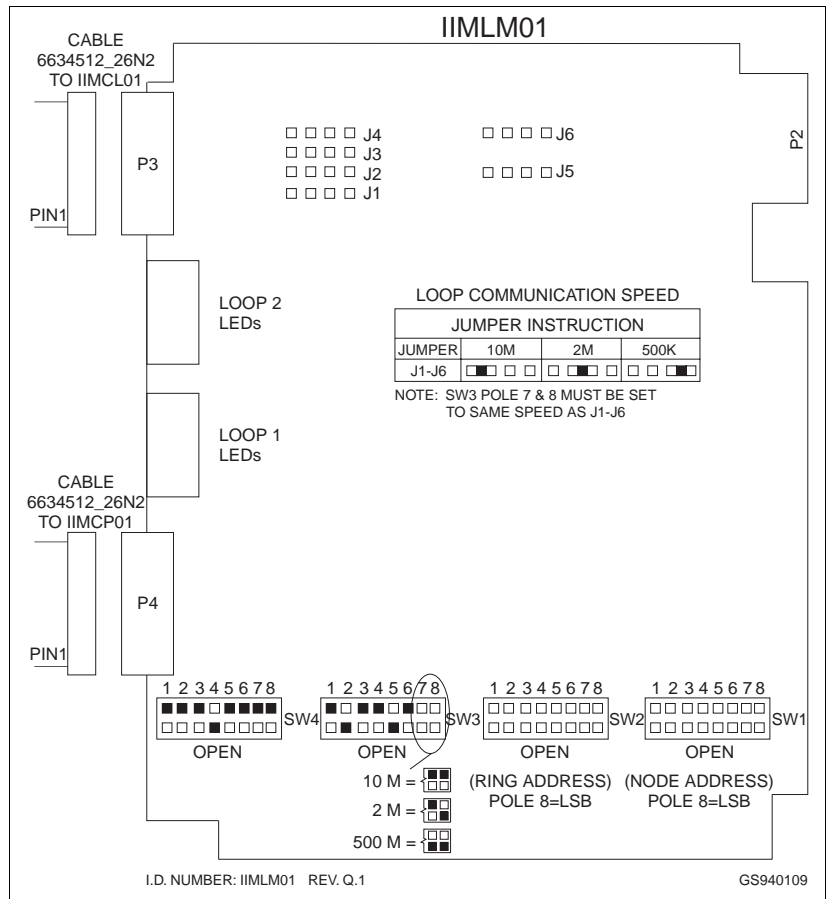
Figure 4-6. IIMLM01 Multibus Loop Module

Multibus Communication Processor Module

•   Elsag Bailey Nomenclature - IIMCP01.

The Multibus Communication Processor Module (Figure 4-7) contains a library of commands which send and retrieve data from other process control units and operator consoles. The OIS sends commands to the Multibus Communication Processor Module requesting it to send or retrieve required data. Configure the Multibus Communication Processor Module by configuring jumpers and setting dipswitches. The same hardware is used for both Plant Loop and INFI-NET. However, firmware in sockets U23 and U24 must be changed to IIST01 for INFI-NET or IIPST01 for Plant Loop. The IIMLM01 board jumpers J1-J6 and SW3 poles 7 and 8 must be modified to reflect INFI-NET or Plant Loop. For the IIMLM01 module see Figure 4-6. Refer to Table 4-6 through Table 4-8 for the standard module dipswitch settings. Configure the serial port P5 by modifying jumper J6 as shown in Figure 4-7.

Table 4-5. Loop Module Configuration

SW 4   **SW 3**   **SW 2**   **SW 1**

1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8   1 2 3 4 5 6 7 8

└─ Ring No.
    (1-0FA) hex

└─ Node No.
    (1-0FA) hex

Pole 7-8: Loop Type:
    00 - 10 MHz INFI-NET.
    01 -   2 MHz INFI-NET.
    10 - Undefined.
    11 - Plant Loop Mode.

Pole 6: Diagnostic Enable.
    *0 - Normal operating mode (default).
    1 - MLM diagnostics enabled.
        Normal operating mode disabled.

Pole 5: Broken Loop Indication.
    0 - Disable Flashing of LED.
    *1 - Enable flashing of LEDs to indicate idle channel
        condition: broken loop (default).

Pole 4: Busy Test.
    *0 - Normal MLM operating mode.
    1 - Busy NAK all loop messages if Run Mode switch set
        to 1 (below).

Pole 3: Run Mode.
    *0 - Normal MLM operating mode cache enabled.
    1 - Test - No timeout for handshake failure.
        - Cache disabled.
        - Enable expanded transmit/receive error classification.

Pole 2: ROM Checksum Enable.
    0 - No ROM checksumming.
    *1 - ROM checksumming enabled.

Pole 1: Device Compatibility.
    *0 - MCP.
    1 - NOT USED

Pole 4-8: Faceplate LED Display Select (0 - 1F) hex.

Pole 1-3: Slave Bus Address Select (0-7).

NOTES:
* = Normal setting
Closed = 0 = on = up
Open = 1 = off = down

GS950602

Figure 4-7. IIMCP01 Multibus Communication Processor Module

Table 4-6. Multibus Communication Processor
Configuration - Switch 0

Poles	Function	Description
1	ROM checksumming	* 0 = ROM checksum enabled 1 = ROM checksum disabled
2-3	Port A characteristics	00 = 8 data, 1 stop, no parity * 10 = 8 data, 1 stop, odd parity 01 = 8 data, 1 stop, even parity 11 = 8 data, 2 stop, 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 data, 1 stop, no parity 10 = 8 data, 1 stop, odd parity 01 = 8 data, 1 stop, even parity 11 = 8 data, 2 stop, no parity
7	Command checksumming	0 = command checksum disabled * 1 = command checksum enabled
8	Unused	

NOTES:
* = Normal setting.
Closed = 0 = on = up.
Open = 1 = off = down.
N/U = Not used.

Table 4-7. Multibus Communication Processor
Configuration - Switch 1

Baud Rates				
Poles 1-4 Port A	0000 = N/U	0001 = 1800	1000 = 75	1001 = 2000
	0100 = 110	0101 = 2400	1100 = 134.5	1101 = N/U
	0010 = 150	0011 = 4800	1010 = 300	1011 = N/U
	0110 = 600	0111 = 9600	1110 = 1200	*1111 = 19.2K
Poles 5-8 Port B	0000 = N/U	0001 = 1800	1000 = 75	1001 = 2000
	0100 = 110	0101 = 2400	1100 = 134.5	1101 = N/U
	0010 = 150	0011 = 4800	1010 = 300	1011 = N/U
	0110 = 600	*0111 = 9600	1110 = 1200	1111 = 19.2K

NOTES:
* = Normal setting.
Closed = 0 = on = up.
Open = 1 = off = down.
N/U = Not used.

Table 4-8. Multibus Communication Processor
Configuration - Switch 2

Poles	Function	Description
1	Firmware test mode	*0 = disabled 1 = enabled
2	MLM diagnostic mode	*0 = disabled 1 = enabled
3	INFI-NET diagnostics	*0 = disabled 1 = enabled
4-6	Unused	
7	NVRAM installed	0 = NVRAM not installed *1 = NVRAM installed
8	RAM component size	0 = 32 kb × 8 (512 kb) *1 = 128 kb × 8 (2 Mb)

NOTES:
* = Normal setting.
Closed = 0 = on = up.
Open = 1 = off = down.
N/U = Not used.

Multibus Communication Loop Module

- Elsag Bailey Nomenclature - IIMCL01.

The Multibus Communication Loop Module is the termination unit that interfaces the OIS12 to the communication highway. See Figure 4-8 for wiring instruction.

NOTE: The jumpers J1 through J6 are user-configurable.

Set jumpers J1-J6 for the type of cable used in the INFI 90 OPEN; either coaxial or twin axial cable.

J1-J6 - set for TWINAX or COAX, see silk screen for jumper position. J7 - set to LOCAL for DC power.
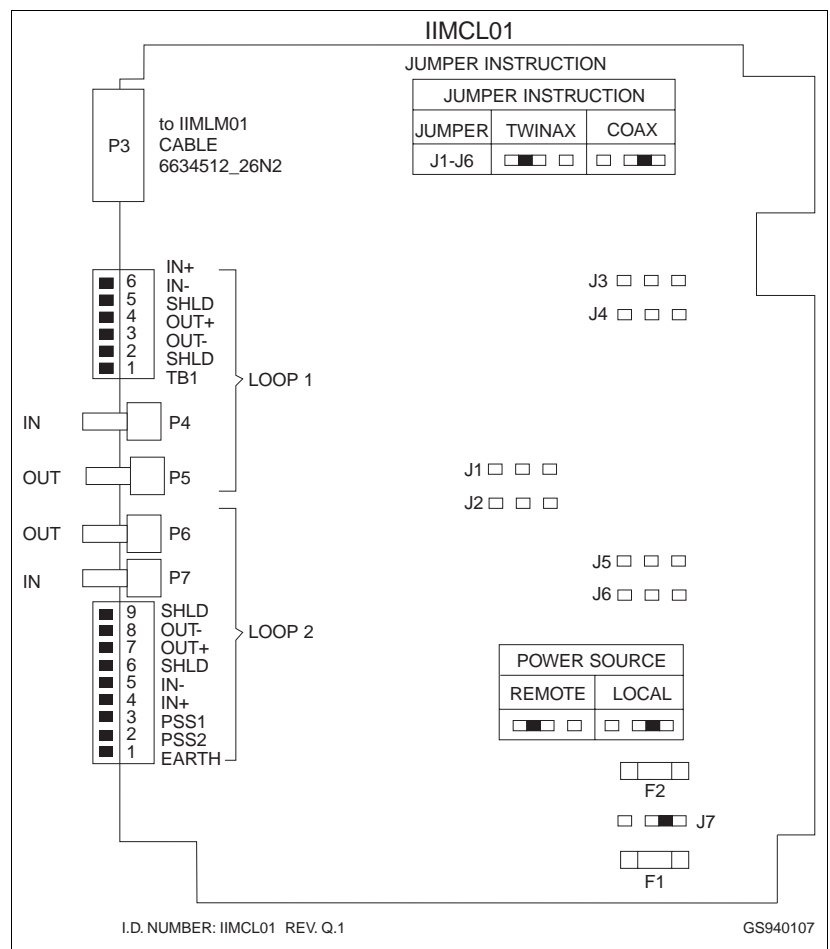
Figure 4-8. IIMCL01 Multibus Communication Loop Module

Bailey®

Multibus Keyboard Module

• Elsag Bailey Nomenclature - IIMKM01.

The Multibus Keyboard Interface Module interfaces the keyboard and other operator input devices to the OIS12. The Multibus Keyboard Module is mounted in slot one of the multibus card cage. There are four jumpers on the MKM board to set for proper operation. J1 controls serial port two (P9). Connecting the eight pins horizontally configures the serial port as data communication equipment (DCE). For DCE, data is transmitted from the MKM on pin three of the connector and received from the connected device on pin two of the connector. Connecting the eight pins for P9 vertically configures the serial port as data terminal equipment (DTE). For DTE, data is transmitted from the MKM on pin two of the connector and received from the connected device on pin three of the connector.

The default is to connect the eight pins for P9 horizontally to configure the serial port as data communication equipment (Figure 4-9).
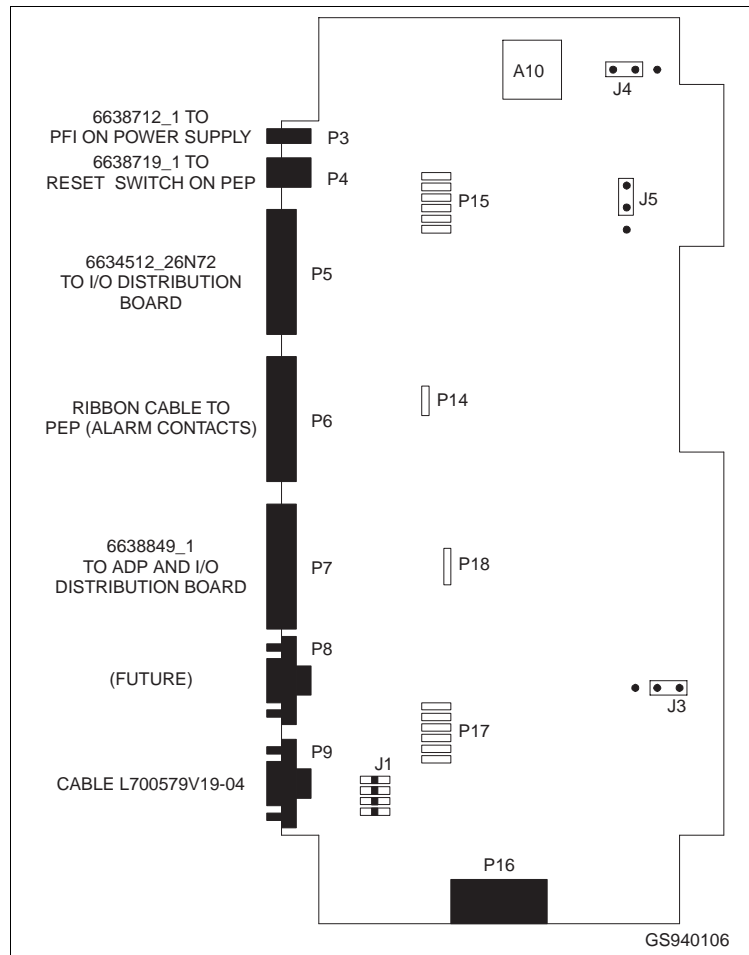
Figure 4-9. IIMKM01 Multibus Keyboard Module

COMPUTER HARDWARE

NOTE: See Also Appendix B.

Computer hardware consists of the chassis, power supply, hard disk drive, serial interface card, graphics controller card and disk controller card.

NOTE: The **RESET** button on the front of the computer resets the computer only, it does not reset the NIU. Press **RESET** on the power entry panel to reset the NIU and keyboard controller.

Figure 4-10 shows the front view of the computer. Figure 4-11 shows the back view of the computer.
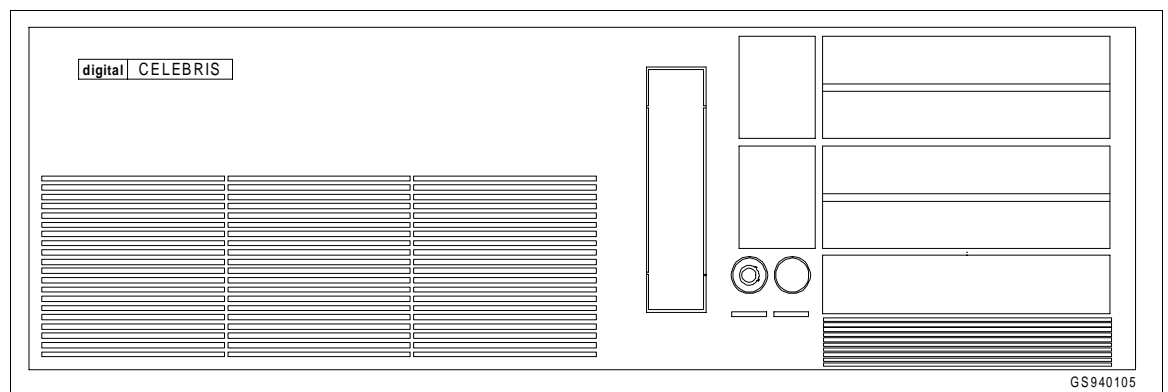
Figure 4-10. Computer Front View
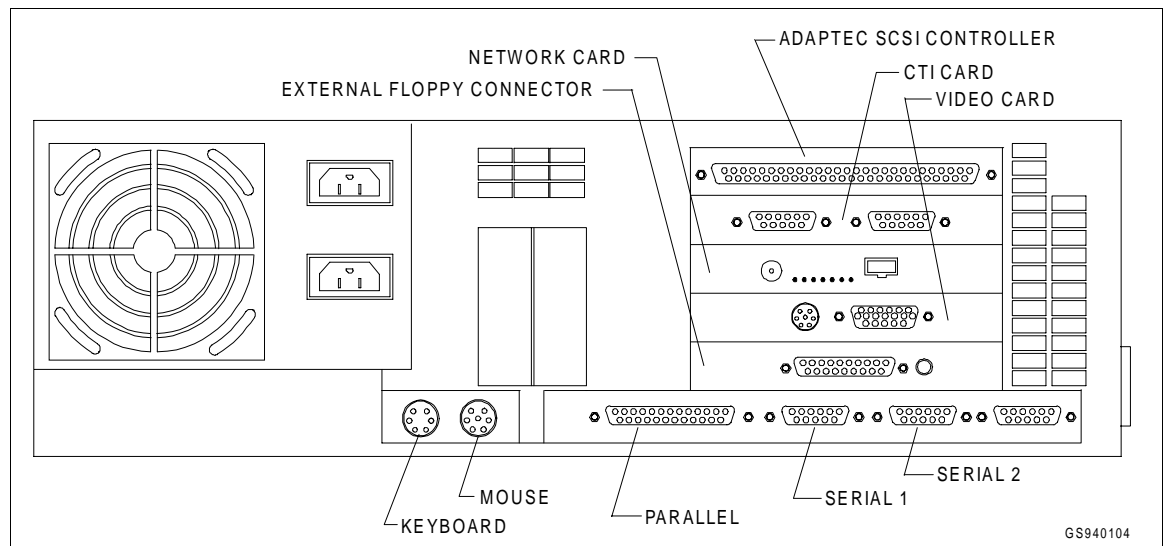
Figure 4-11. Computer Back View

HARDWARE SETTINGS

Many of the cards you insert in you computer's expansion slots require hardware settings. These settings are:

- ROM addresses.
- I/O port addresses.
- Interrupts.
- DMA channels.

These settings are usually made using jumper pins or dipswitches on the card.

The settings you make for each adapter card must not conflict with the settings on any other card.

Follow Tables 4-9 through 4-12 to choose the settings for the adapter cards of peripherals installed with OIS12/OIC12 consoles.

Refer to Appendix B for the computer slots assigned to the adapter cards.

> **NOTE:** Until recently, the Adaptec AHA1540CF SCSI controller was used with a SCSI hard disk drive. Currently, EIDE hard disk drives are used, requiring no Adaptec SCSI controller.

Table 4-9. ROM Address

Adapter Card	Factory Setting	Notes
CTI Intellicon Serial Card	d0000-dffff	OIS12 only (if supplied, see NOTE)
Video Adapter Cards	—	Not set by user
Adaptec AHA1540CF SCSI Host Adapter	cc000	OIS12 only (if supplied, see NOTE)
Alta NE2000 Ethernet Adapter	c8000	OIS12 and OIC12
Alta NE2000 Ethernet Adapter	cc000	OIC12, diskless version

Table 4-10. I/O Port Addresses

Adapter Card	Factory Setting	Notes
CTI Intellicon Serial Communications Card	300-303	OIS12 only (if supplied, see NOTE)
Video Adapter Cards	—	Not set by user
Adaptec AHA1540CF SCSI Host	234-237	OIS12 only (if supplied, see NOTE)
Alta NE2000 Ethernet Adapter	340	OIS12 and OIC12
Alta NE2000 Ethernet Adapter	320	OIC12, diskless version

Table 4-11. Interrupts

Adapter Card	Factory Setting	Notes
CTI Intellicon Serial Communications Card	3	Disable COM2 (OIS12 only) (if supplied, see NOTE)
Video Adapter Cards	—	—
Adaptec AHA1540CF SCSI Host Adapter	11	Set via menu (OIS12 only) (if supplied, see NOTE)
Alta NE2000 Ethernet Adapter	10	—

Table 4-12. DMA Channels

Adapter Card	Factory Setting	Notes
CTI Intellicon Serial Card	—	OIS12 only (if supplied, see NOTE)
Video Adapter Cards	—	—
Adaptec AHA1540CF SCSI Host Adapter	5	— (if supplied, see NOTE)
Alta NE2000 Ethernet Adapter	—	—

COMPUTER DISK CONTROLLER

The Adaptec 1540CF SCSI disk drive controller card interfaces the hard disk drive to the IIOIS12. Refer to Figure 4-12 for the hardware setting required for the OIS12.

	SWITCH		
	1	OFF	CABLE TERMINATION SWITCH CONTROLLED
	2	ON	
	3	ON	I/O PORT ADDRESS 234-237H
	4	OFF	
	5	ON	DISABLE FLOPPY
	6	OFF	
	7	OFF	BIOS ADDRESS CC000H
	8	ON	GS970303
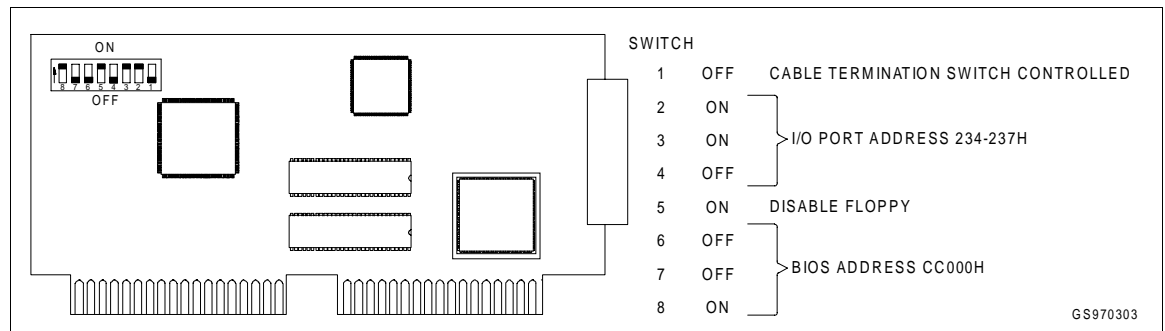
Figure 4-12. Adaptec 1540CF Computer Disk Controller

COMPUTER GRAPHICS CONTROLLER CARD

• Elsag Bailey Part Number - 1948938A83.

The computer graphics controller card, shown in Figure 4-13, can drive one OIS monitor and the ATI inboard mouse. The card uses a graphics processor which provides for very fast graphics draw and update times.

CONNECT TO CRT VIDEO CABLE

CONNECT TO MOUSE CABLE

(5.0 RELEASE ONLY)

GS940103
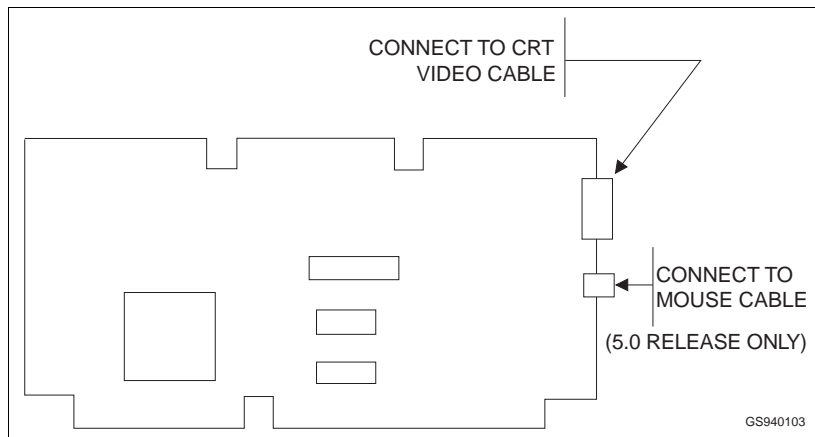
Figure 4-13. Computer Graphics Controller Card

An internal cable from the mouse port to the keyboard inter-face panel, allows the mouse to be connected to the front of the keyboard interface panel.

NOTES:
1. In OIS12 Software Release 5.1, the mouse is connected to the mouse connector on the rear of the PC using cable P/N L700912A2 (see Appendix B for mouse assembly part numbers).

2. Recent models of OIS12 use P/N L750058_1 video cards, or built-in video in the PC.

INTELLICON-2 SERIAL PORT CARD

- Elsag Bailey Part Number - L750021A3.

The IIOIS12 interfaces with the NIU and the OIS mylar keyboard through the Connect Tech Intellicon (CTI) Card.

NOTES:

1. COM2 must be disabled via the computer's setup program (IIOIS12 consoles only).

2. Use only the peripherals recommended by Elsag Bailey. If you have questions, contact your Elsag Bailey sales or service office.

3. More recent versions of the IIOIS12 Consoles do not include the CTI serial port card. Instead, the serial ports in the PC are used (COM1 for keyboard and COM2 for CIU/NIU).

The serial interface card is an intelligent serial card with two RS-232-C serial ports. This card is factory set and should not require any further configuration. The required settings are shown in Figure 4-14.

The card uses the COM2 interrupt. See Figure 4-14 for card configuration and refer to Table 4-14 for port assignments.

Table 4-13. Intellicon-2 Serial Card
Port Assignments

Port	Assignment
1	NIU
2	Mylar keyboard, ADP panel
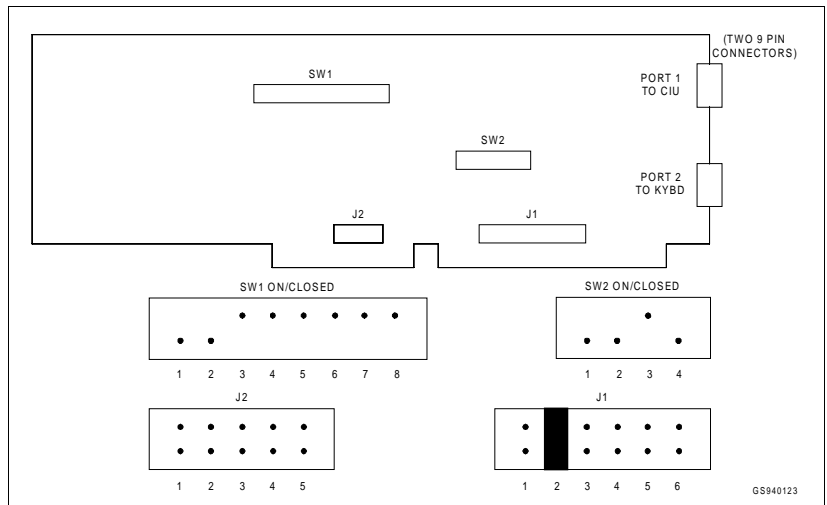
Figure 4-14. Computer Serial Interface Card

NETWORK CONTROLLER CARD

- Elsag Bailey Part Number - L750067B2.

The network card provides for one OIS12 master and up to three OIC12 slave consoles (see Section 5) to be networked together via Ethernet. The network card is installed in the computer (Figure 4-11) and connected to an OIC12 Console via coax cable, P/N L700691-[L], length per application requirement. The network card is shown in Figure 4-15.

NOTES:
1. A "T" connector (Elsag Bailey Part Number L750096_1) and termination resistors (Elsag Bailey Part Number L750095_1) must be installed.

2. Recent models of OIS12 use a similar network card which has no jumpers to set up.
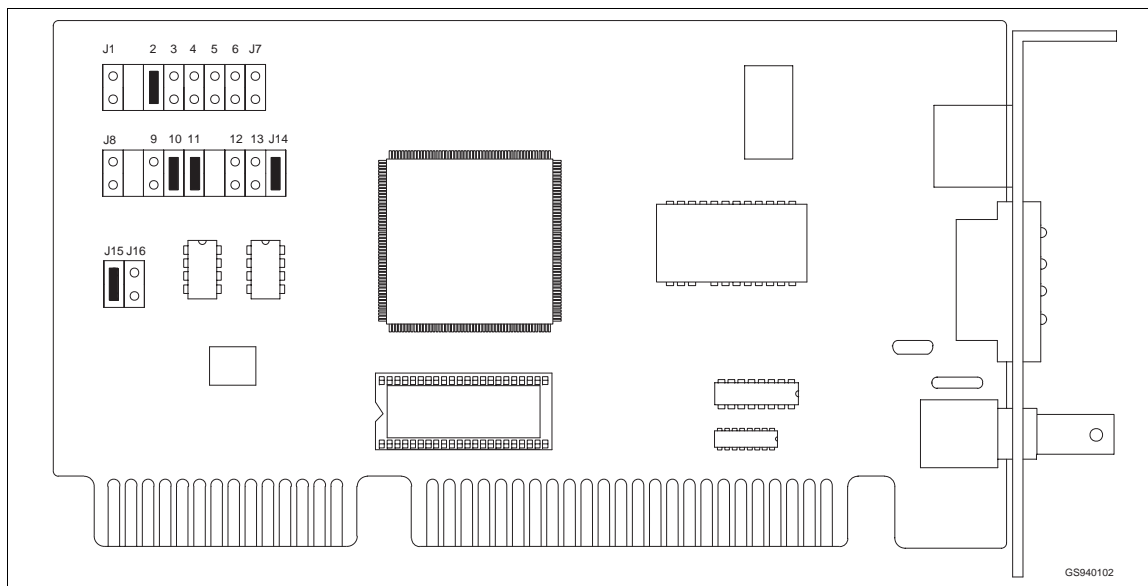
Figure 4-15. OIS12 Network Card

OPERATOR INTERFACE HARDWARE

Keyboard Interface Panel

- Elsag Bailey Part Number - 6638554A4.

The keyboard interface panel (Figure 4-16) is located on the IIOIS12 cabinet front panel next to the CRT behind a polycarbonate door. The keyboard socket is for the mylar operator keyboard supplied with the IIOIS12. The MOUSE/TRACKBALL connector is for the mouse supplied with the IIOIS12. The AUX KBD connector is for an engineering (AT type) keyboard. The keyboard interface panel connections are listed in Table 4-14.
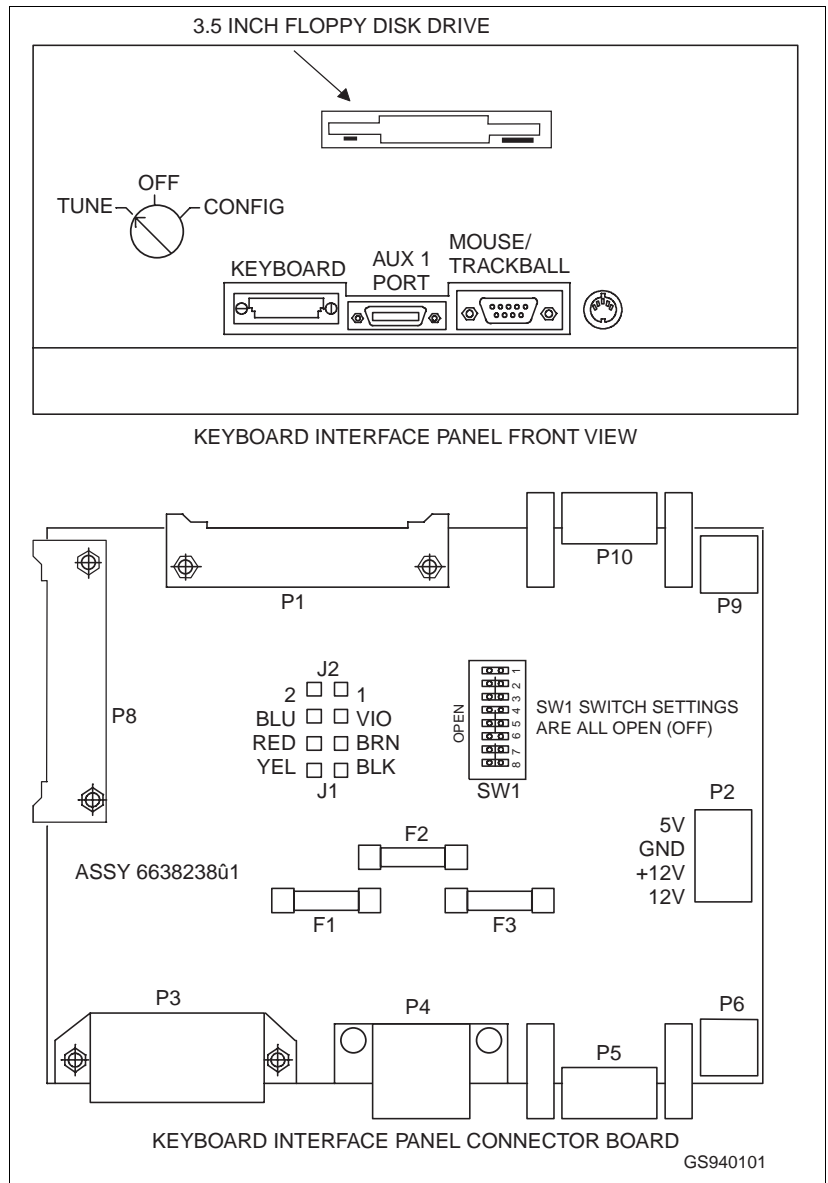
Figure 4-16. Keyboard Interface Panel

Operator Engineering Keyboard

WARNING	The switch settings on the Keyboard Interface Panel must be open. Any other setting may cause damage to the keyboard interface on the PC.

• Elsag Bailey Nomenclature - IIAKB01.

Each IIOIS12 console supports an AT style QWERTY (engineering) keyboard. The IIOIS12 keyboard plugs into a five pin DIN connector on the keyboard interface panel located to the right of the CRT. Figure 4-17 shows the keyboard connector. Figure 4-18 shows the operator keyboard.
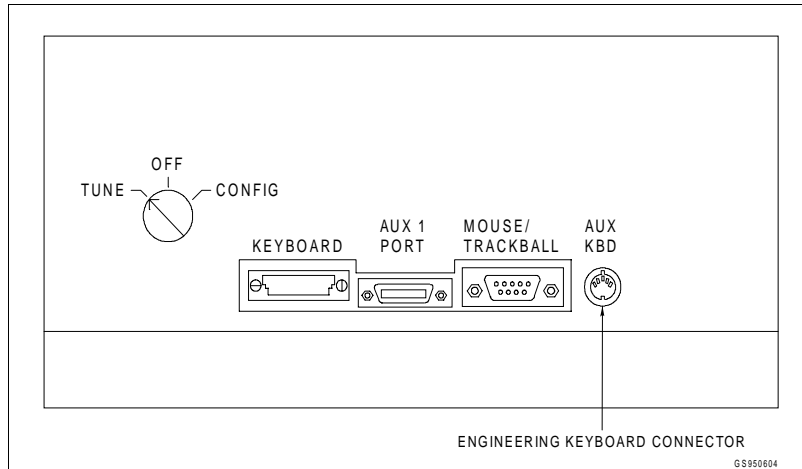
Figure 4-17. Engineering Keyboard Connector
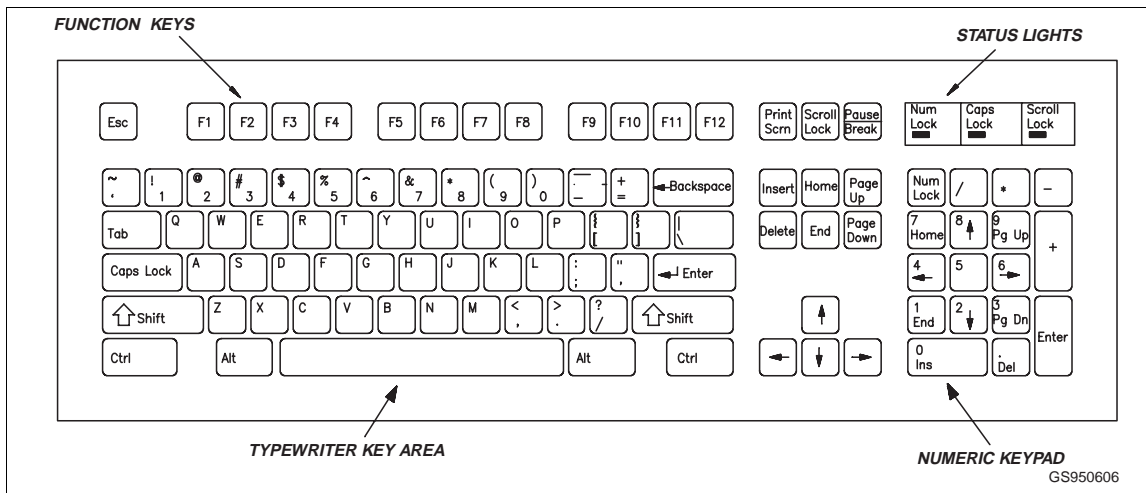
Figure 4-18. Operator Engineering Keyboard

Do not remove power from the IIOIS12 before connecting the engineering keyboard. Do not Initialize the system after plugging in or unplugging the engineering keyboard.

NOTE: OIS12 AT-style Qwerty (engineering) keyboards may differ in appearance from the one shown in Figure 4-17, but function the same.

Table 4-14. Connection to Keyboard Interface Panel

Connector P1	Connector P2	Connector P8	Connector P9	Connector P10
Connect cable no. 6634512_26N72 to P5 on IIMKM01 module.	Connect cable no. 6638713-_ to P3 on DC distribution board.	Connect cable no. 66388491_1 to P7 on IIMKM01 module and to P2 on ADP panel.	Connect cable no. L700804-1 to the keyboard connector on back of computer.	Connect cable no. L700884-2 to ATI card on back of computer.

Operator Mylar Keyboard

- Elsag Bailey Part Number - 6639514A_ .

A mylar keyboard is used to operate the IIOIS12. Connect the mylar keyboard to the keyboard connector on the keyboard interface panel. The three-foot long coiled cord can be stretched to eight feet. The mylar keyboard is available in French or English versions. See Figure 4-19.

Figure 4-19. Operator Keyboard (English Above, French Below)

Trackball (Option)

- Elsag Bailey Part Number - L700945A1 (IIATB06).

The trackball is an optional device which can be connected to the Keyboard Interface Panel instead of a mouse. It is interchangeable with the mouse supplied.

Colour Monitor

- Elsag Bailey Part Number - 1948623A6/A9.

The colour monitor used in the IIOIS12 is an Intecolor 2154-20B or E20FFA-BC1 VGA monitor with 30.5-kHz horizontal/60-vertical noninterlaced scan. It is used to display a 1024x768 pixel image. Figure 4-20 shows a rear view of the colour monitor and the CRT connections. See Figure 4-21 for cabling information

NOTES:
1. The cable (Elsag Bailey part number 1949138A1) that connects the monitor to the graphics controller board is supplied by the manufacturer of the monitor.

2. A nine pin D-sub connector connects an external brightness, contrast and degauss control. Use cable number 6638720A3/A4 for the monitor. Brightness and contrast controls are mounted on the bezel. The degauss switch is mounted on the PEP.
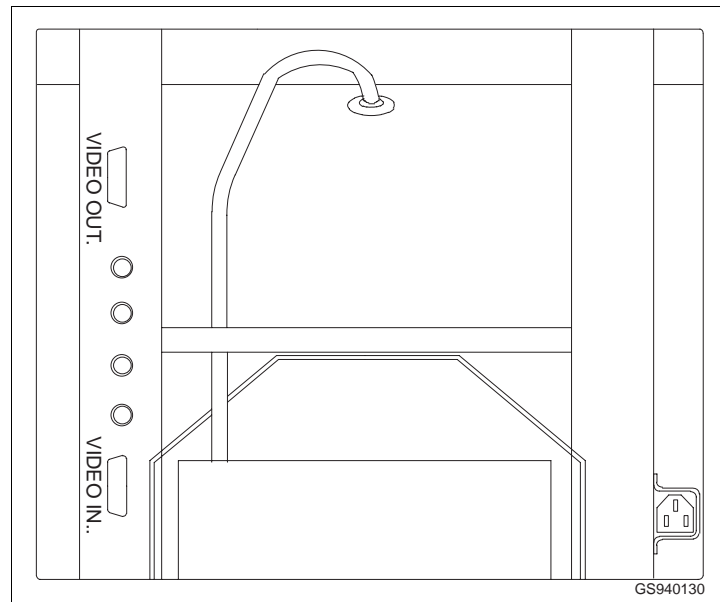
Figure 4-20. Colour Monitor (Rear View)
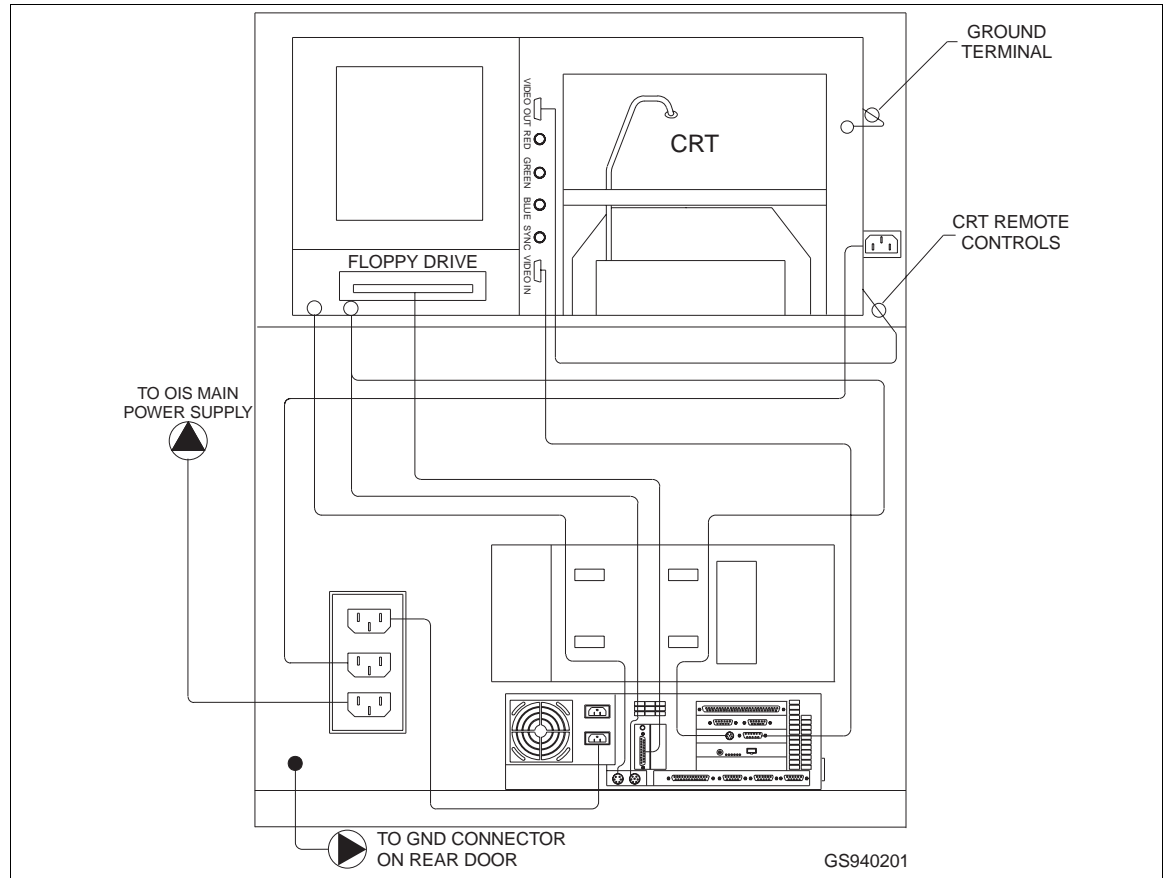
Figure 4-21. Colour Monitor Cabling

Printer

• Elsag Bailey Nomenclature - IIPRT02 or L700906_1.

Table 4-15 lists the nomenclature of the printers used by the parallel interface. A parallel printer may be connected to the OIS12/OIC12. See the rear view of the computer (Figure 4-11 and Figure 5-5) for connector placement. Printers supported are the current version IIPRT02 and L700906_1. The parallel port may be connected to either an alarm/logging (text) printer or to a PostScript printer for graphic screen hard-copies.

Refer to *OIS12 Configuration* manual, Section 8, for printer configuration.

Table 4-15. OIS12 Printers

Nomenclature	Description
IIPRT02	Standard printer
IIPRT05	High speed printer
L700075G4-[ ]	Printer cable
L700906A1	Color PostScript printer

1200 C/PS PostScript Graphics Printer

- Elsag Bailey Part Number L700906_1.

The PostScript printer provides high-quality, black and white or colour graphic screen hard-copies. It is a thermal ink jet 600 x 300 DPI black and white, or 300 x 300 DPI colour printer. It connects to the computer parallel port and uses plain paper. Print cartridges are part number L700907_1. If a text printer is connected to the OIS12 parallel port, the Post-Script graphics printer may be connected to the OIC12 parallel port.

IIOIS12 POWER ENTRY PANEL

- Elsag Bailey Part Number - 6638353A_.

The power entry panel (PEP) shown in Figure 4-22, contains the incoming AC power terminals and system circuit breakers and terminals for alarm contact outputs.

Use the **L.DEGAUSS** switch to correct picture distortion due to magnetic fields on the screen of the CRT.

A terminal block with six alarm relay outputs connects annunciators to user-defined alarms. Each relay has three terminals: normally open (N.O), normally closed (N.C.), and common (COM). Each relay is rated at 24 VDC and 0.25 A switching/carrying current (typical). Refer to Table 4-16 for the alarm relay typical and maximum electrical specifications.

The six terminals are configured via OIS12 software (refer to OIS12 Operation and Configuration manuals). The terminal designation is printed on the panel beside the terminal.

On the terminal block there are also two digital inputs (DI) and two digital outputs (DO). These are not configurable and thus not available for use.

The power indicator is lit when the AC power is connected to the PEP and the main power circuit breaker is on.

Connect your static ground wrist strap into the wrist strap connector before removing modules from the multibus chassis or computer.

The AC outlet on the IIOIS12 PEP is an auxiliary outlet for either 120/240-VAC devices. Check the label on the front of the PEP before connecting anything to this outlet.

E1 is the earth ground termination point for the IIOIS12 cabinet. Connect this point to a good earth ground as defined in the national and local electrical codes.
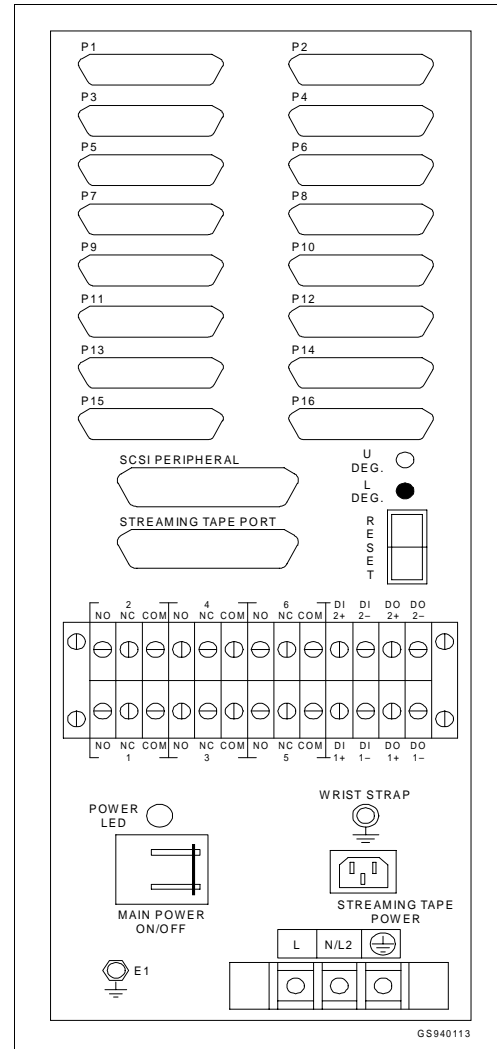
Figure 4-22. IIOS12 Power Entry Panel

Table 4-16. Alarm Relay Specifications

Alarm Relays	Typical	Maximum
Contact Voltage	24 VDC	100 VDC
Contact Current	0.25 A	0.5 A
Contact Power	6 W	10 W

CAUTION	**Failure to turn off the main power circuit breaker before removing or inserting modules into the chassis may result in equipment failure.**

The IIOIS12 can be ordered for 120-VAC or 240-VAC power. Connect the AC line inputs to the terminal block at the bottom of the panel front.

> **NOTE:** Be sure the IIOIS12 is set up to receive 240-VAC if you are connecting 240-VAC to the IIOIS12 power entry panel.

To change the IIOIS12 to operate on 240-VAC, set the slide switch (if present) on the back of the computer power supply to the 240-VAC setting. Also change main power supply jumper and fuse for 240-VAC operation (Figure 4-23), if required.

Wiring connectors are shown in Figure 4-22. Note that some of the connections are on the rear of the power entry panel and are accessed through the door on the back of the IIOIS12.)
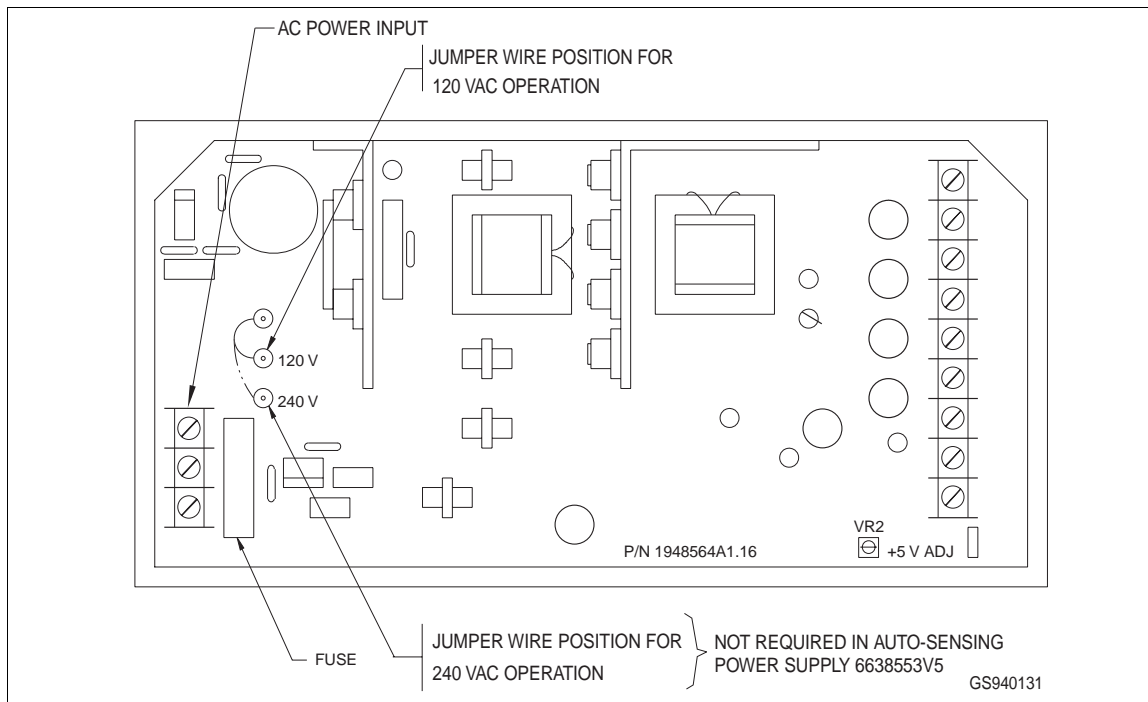
Figure 4-23. IIOIS12 Main Power Supply

AC POWER

See Figure 4-22 for the location of the AC connections for the unit being installed. Figure 3-9 shows the AC wiring inside the power entry panel for IIOIS12.

> **NOTE:** Figure 4-23 shows P/N 6638553A6. P/N 6638553V5 is similar, but does not have the jumper for 120 or 240-VAC. It is auto-sensing. AC power input terminals on 6638553V5 are connector pins.

IIOIS12 MAIN POWER SUPPLY

- Elsag Bailey Part Number - 6638553A6 or 6638553V5.

The IIOIS12 130-watts main power supply (Figure 4-23) provides power to the console. Figures 4-25 and 4-26 show the connections from the main power supply to the DC distribution board and to the backplane of the card chassis.

The table in Figure 4-24 lists the power supply connections to the DC distribution board and the backplane of the multibus card chassis in the console.

The DC distribution board is located at the top-rear of the supply. Each socket on the DC distribution board is wired identically. Any peripheral device using power cable (6638713_1) may be plugged into any socket on this board.

NOTES:

1.   The 6638553A6 power supply in the console operates on either 120 V or 240 V. When replacing this power supply, check to make sure it is set for the voltage rating of the console, per Figure 4-23. The fuse for 120-VAC should be rated for 5 Amps; 3 Amps for 240-VAC.

2.   Figure 4-25 applies when DC Power Supply P/N 6638553A6 is installed in the console. Figure 4-26 applies when DC Power Supply P/N 6638553V5 is installed.

TB	P1-P8	
1	1	+12
2	2	COM
3	3	-12
4	4	N/C
5-6	5	+5
7-8	6	COM

DC DISTRIBUTION BOARD CONNECTIONS

P 1   SPARE

P 2   SPARE

P 3   CONN. PNL.

P 4   ADP_1

P 5   ADP_2

P 6   SPARE OR CARD CHASSIS*

P 7   SPARE OR CARD CHASSIS*

P 8   FAN

* FOR 6638553V5 POWER SUPPLY

GS940202
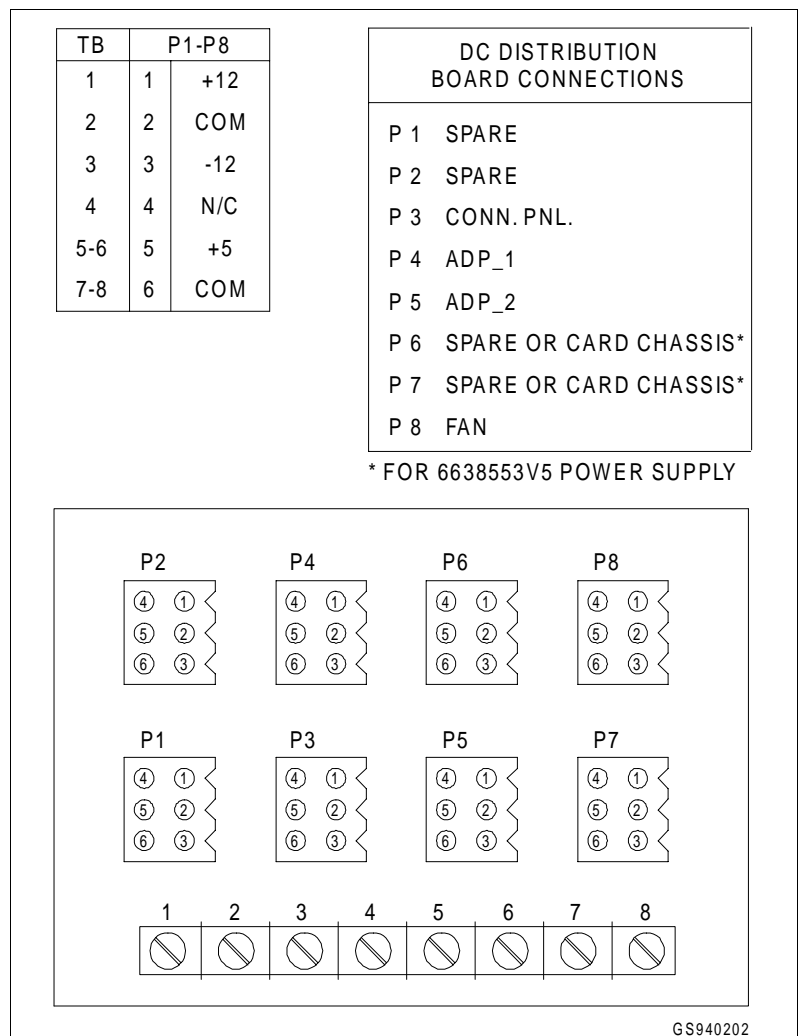
Figure 4-24. IIOS12 DC Distribution Board
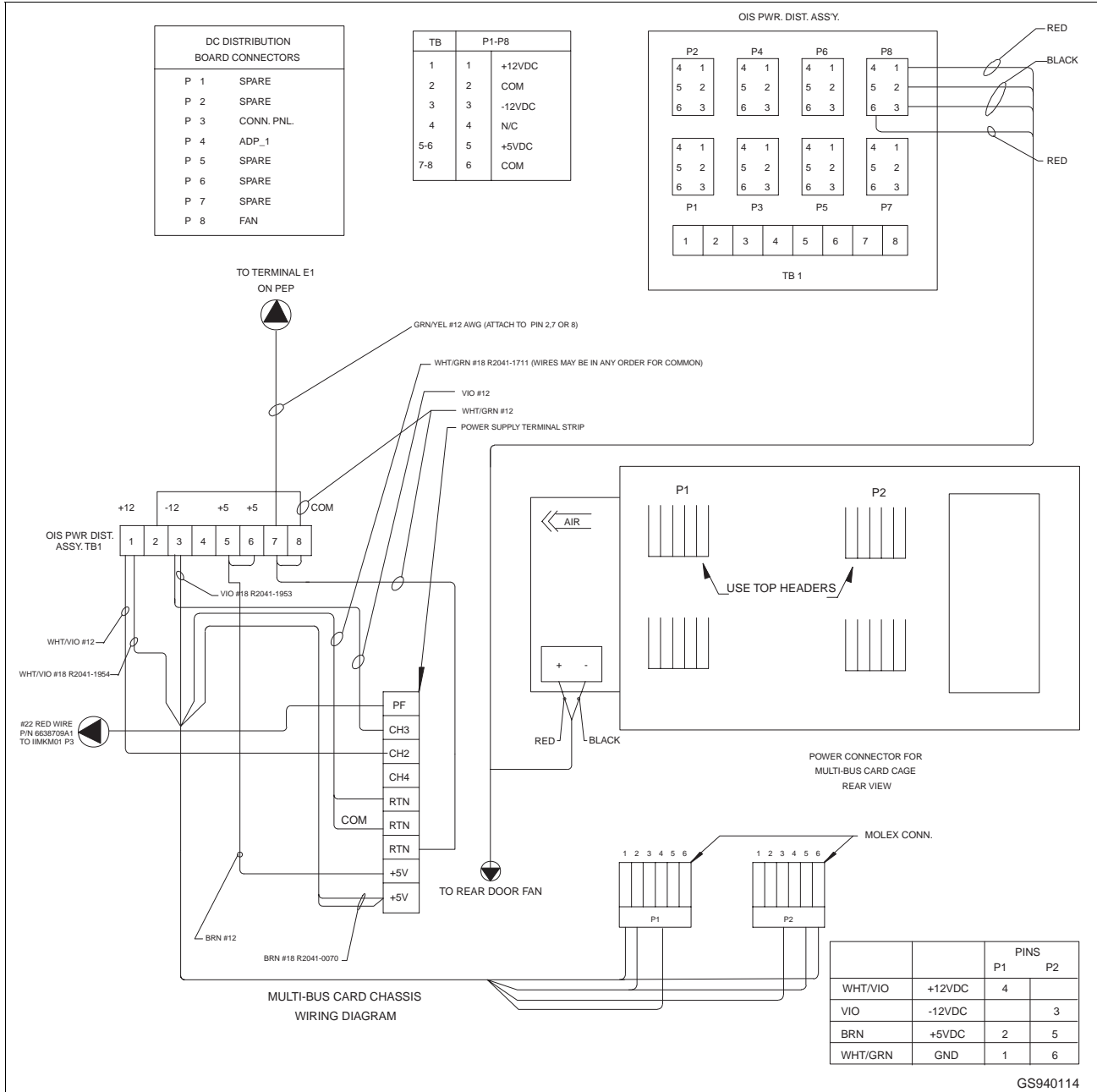
Bailey®

Figure 4-25. IIOIS12 Power Connections, Power Supply P/N 6638553A6
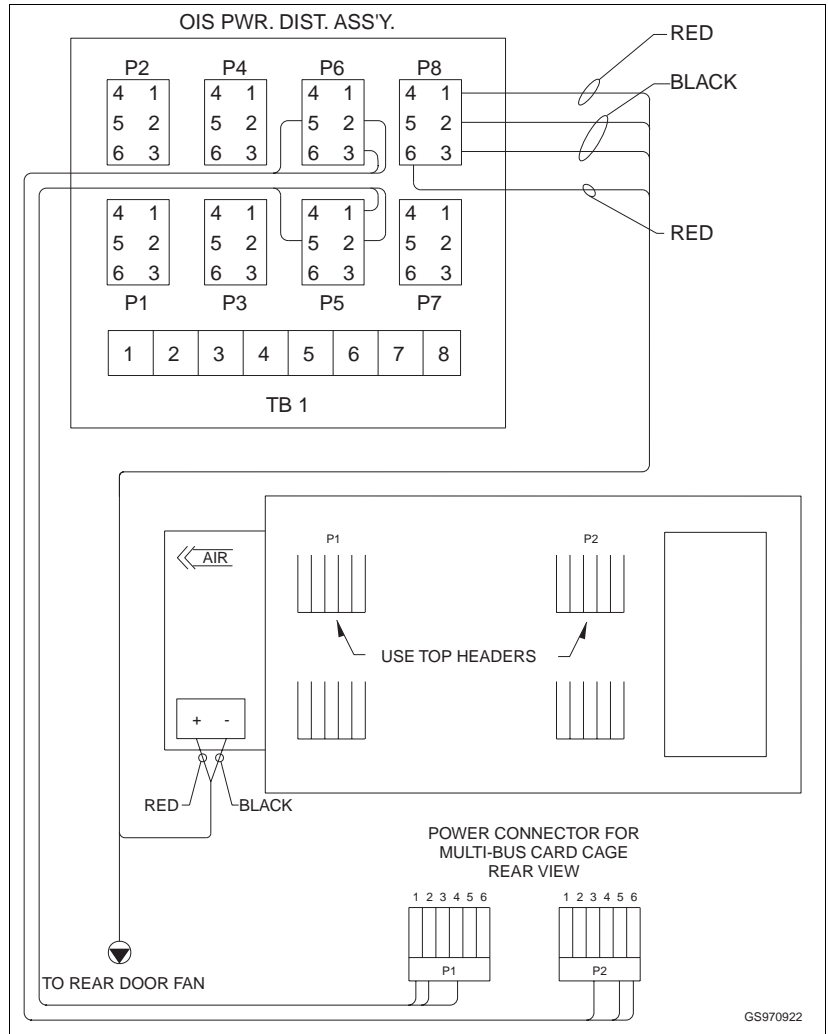
*Figure 4-26. IIOIS12 Power Connections,
Power Supply P/N 6638553V5*

ANNUNCIATOR DISPLAY PANEL

•   Elsag Bailey Nomenclature - IIADP02.

The Annunciator Display Panel (ADP) location in the OIS console, dipswitch settings and cabling are shown in Figure 4-27.

The Annunciator Display Panel provides a panel of 32 lamps and push buttons. Each lamp can be assigned to an alarm group and each push button can be assigned to an IIOIS12 display. When a tag goes into an alarm condition, the assigned ADP lamp turns on. Press the assigned push button to cause the assigned display to be output to the screen. Refer to the OIS12 Configuration and Operation manuals for details.
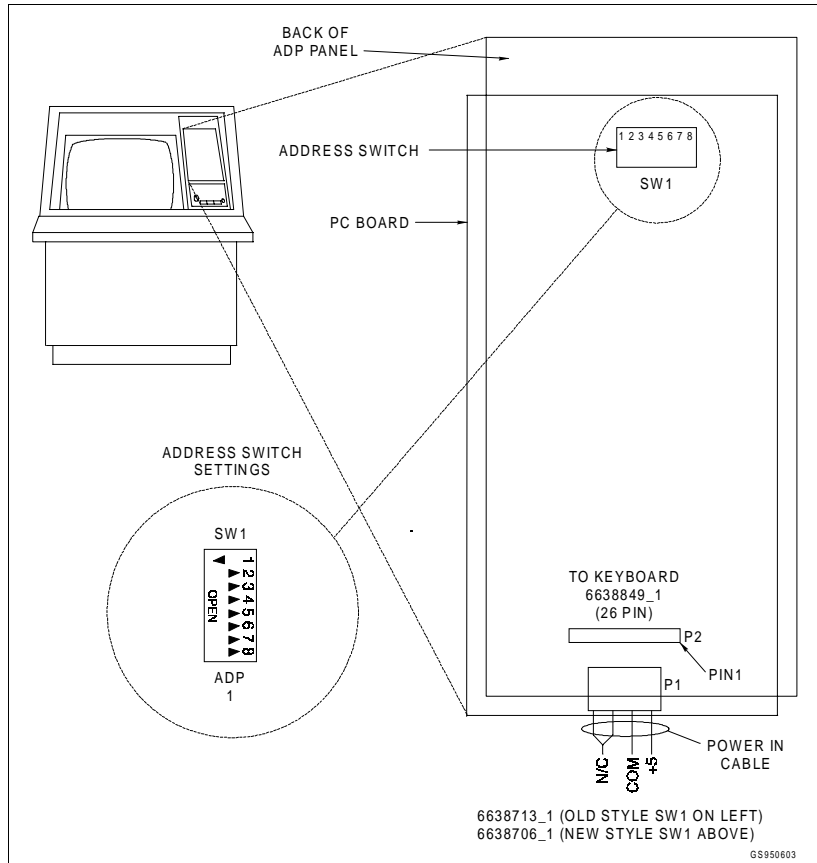
Figure 4-27. IIADP02 Annunciator Display Panel

Table 4-17. Connections to IIADP02 Board

From P1	From P1	From P2
to P4 socket on top of Main Power Supply. Use cable assembly number 6638713_2 if the signal cable connector is on the bottom of the board.	to P4 socket on top of Main Power Supply. Use cable assembly number 6639106_1 if the signal cable connector is on the side of the board.	to P7 connector on IIMKM01 Module. Use cable number 6638849_1.

COMPUTER

- Elsag Bailey Part Number - L700796_11 (see Appendix B).

The IIOIS12 uses an Intel-based computer with a 60-MHz, 32-bit 586 Pentium processor (minimum). Full contents of the computer are described in Appendix B.

OPTICAL DISK DRIVE OPTION

- Elsag Bailey Part Number - L700794_1.

The IIOIS12 console supports an optional optical disk drive. To install the drive you must install the SCSI terminator on the rear of the drive, and then connect the drive to the Adaptec SCSI controller. See Figure 4-11 for the location of the Adaptec SCSI controller. See also Appendix B for card location in different PCs. The controller does not require modifying. An external SCSI cable is supplied with the unit in order to connect it to the controller. The OIS12 system software must now be configured to recognize the optical disk drive. Refer to the Configuration manual for the steps necessary to have the OIS12 recognize the optical disk drive.

Recent versions of IIOIS12 consoles do not include the Adaptec 1540CF SCSI controller as shown in Figure 4-11 and 4-12. Instead, an Adaptec 2940 SCSI controller is used with the optical disk drive. Install this card in an available PCI card slot. See Appendix A for the BIOS setup instructions for the 2940 controller.

> NOTE: Set the drive's SCSI ID address to two. See the optical disk drive's setup manual on how to select the SCSI ID address. The rest of the settings should remain at their default.

Important things to remember when you are using an optical disk drive:

- The drive ***must*** be turned on and there ***must*** be a disk cartridge in the drive whenever the OIS12 console is started up, otherwise the optical disk drive will not be recognized as a valid drive.

- ***DO NOT "WARM BOOT"*** the OIS12 console when the optical drive is in use. ***BOOT THE OIS12 CONSOLE USING THE POWER SWITCH***. Failure to do so sometimes leaves the optical disk drive in a strange state, so that the drive is not recognized when the computer restarts.

SECTION 5 - IIOIC12 HARDWARE

INTRODUCTION

This section describes the standard and optional hardware used by the IIOIC12 operator interface console. Each entry contains jumper and switch configurations for the particular component.

> **NOTE:** The components in the OIC are configured at the factory. Settings shown in this section have already been made. This information is given in case settings are changed or hardware needs to be replaced.

The location of components and the wire and cable connections are also given. This information is a reference for standard and optional equipment.

IIOIC12 HARDWARE

> **NOTE:** See also Appendix B.

Standard hardware in the OIC consists of the multibus mylar keyboard card, computer, operator interface equipment and power entry panel.

Table 5-1 lists the standard hardware used in the operator interface console. Table 5-2 lists the optional hardware that can be used.

Table 5-1. Standard OIC Hardware

Nomenclature	Description
1948623A6/A9	Colour monitor.
6638353A_ 6638554A_ 6639514A_	Power entry panel. Keyboard interface panel. Operator mylar keyboard assembly.
IIADP02	ADP panel.
IIMKM01	Multibus keyboard module.
L700796_13	Computer with an Intel 66 MHz, 32-bit 486 DX processor (minimum).
L750067B2	Ethernet card.

IIOIC12 CONSOLE COMPONENT LOCATIONS

IIOIC12 console hardware is located in the operator console cabinet. The power entry panel, computer, 3.5-inch disk drive and the IIMKM01 card are in the lower half of the cabinet. The

CRT and operator keyboard interface panel are located in the upper half of the cabinet.

Table 5-2. Optional OIC Hardware

Nomenclature	Description
IIATB06	Trackball.
IIPRT02	Standard printer.
IIPRT05	High speed printer.
L700906_1	Color PostScript printer.

The keyboard interface panel is located beside the CRT on the front of the cabinet. It is made up of the connections for the OIC mylar keyboard, mouse and an engineering keyboard.

The power entry panel has terminals for input AC, alarm contact outputs and power connections for a peripheral device.

Figure 5-1 shows the front and rear views of the OIC console with the doors removed. This figure shows the physical relationship between the subassemblies. See Figure 5-1 for the location of the IIMKM01 card, computer and the power entry panel.

CAUTION	**Do not operate the console with doors or covers opened or removed. Figure 5-1 and Figure 4-1 are only for illustrative purposes.**
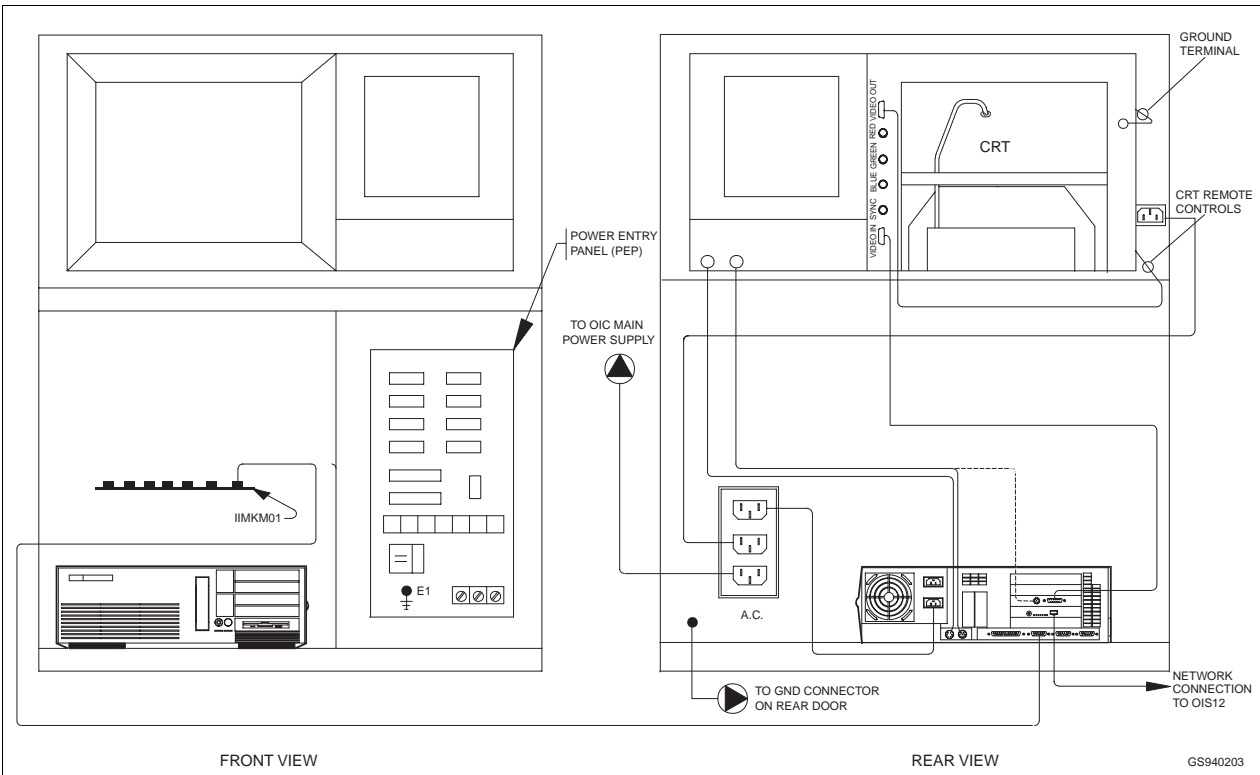
Figure 5-1. IIOIC12 Console Front and Rear Views

IIOIC12 CONSOLE COMPONENT LOCATIONS

KEYBOARD INTERFACE MODULE (IIMKM01)

The multibus hardware consists of the multibus IIMKM01 card. The module is discussed in the Multibus Keyboard Module section.
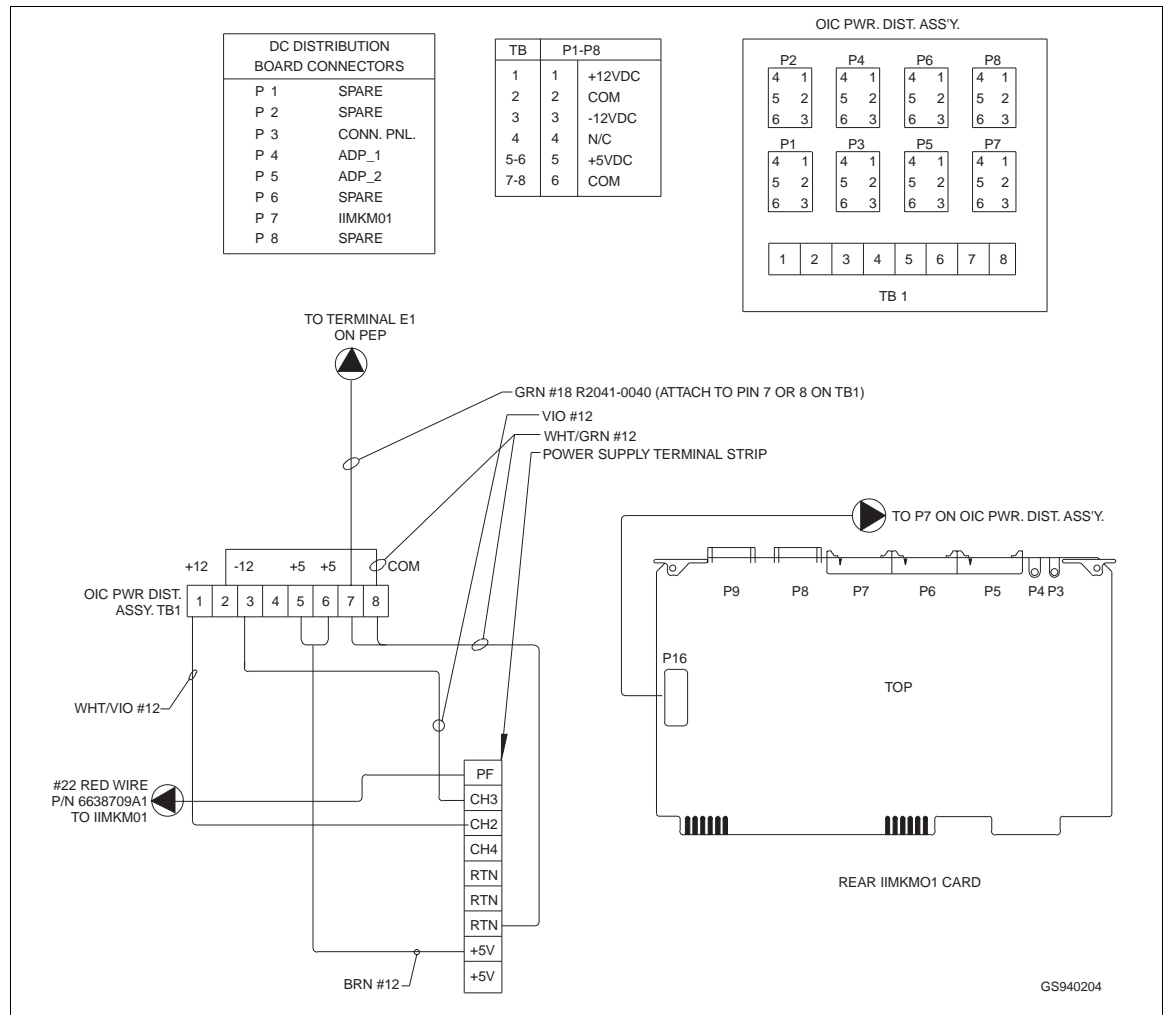
Figure 5-2. IIMKM01/01A Card Wiring Diagram

NOTE: In recent OIC consoles, the Power Supply Terminal Strip in Figure 5-2 is not installed. A direct cable assembly connects the output of the power supply to the OIC Pwr Dist. Ass'y TB1.

KEYBOARD MODULE INSTALLATION

CAUTION	**Failure to turn off the main power circuit breaker before removing or inserting modules may result in equipment failure.**

The OIC console contains an IIMKM01 multibus card. The card is fastened to the standoff bolts that are, in turn, fastened to the bottom of the CRT mounting plate.

KEYBOARD INTERFACE MODULE (IIMKM01)

Bailey®

KEYBOARD MODULE REMOVAL

CAUTION	**Failure to turn off the main power circuit breaker before removing or inserting modules may result in equipment failure.**

To remove the OIC's IIMKM01 multibus card, remove the four nuts that hold the card to the bottom of the CRT mounting plate.

NOTE: Remove all wiring to the card before loosening the nuts.

MULTIBUS KEYBOARD MODULE

- Elsag Bailey Nomenclature - IIMKM01.

The Multibus Keyboard Interface Module (MKM) interfaces the keyboard and other operator input devices to the OIC12. The MKM is mounted under the CRT mounting plate. There are four jumpers on the MKM board to set for proper operation. J1 controls serial port two (P9). Connecting the eight pins horizontally configures the serial port as data communication equipment to the default shown in Figure 5-3. For DCE, data is transmitted from the MKM on pin three of the connector and received from the connected device on pin two of the connector. Connecting the eight pins for P9, vertically configures the serial port as data terminal equipment (DTE). For DTE, data is transmitted from the MKM on pin two of the connector and received from the connected device on pin three of the connector.
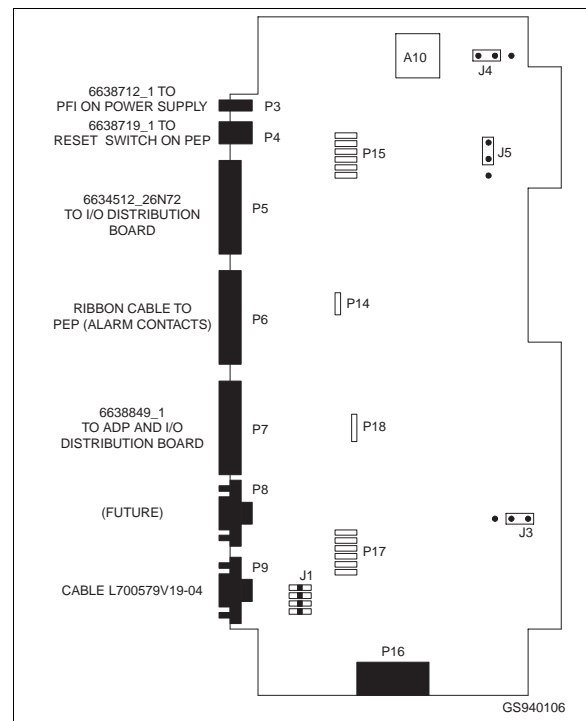
Figure 5-3. IIMK01/01A Multibus Keyboard Module

IIOIC12 COMPUTER HARDWARE

> **NOTE:** See also Appendix B.

The IIOIC12 computer hardware consists of the chassis, a computer with an Intel 486DX microprocessor, graphics controller card, hard disk (Release 5.1 only), network card and 3.5-inches floppy disk drive.

> **NOTE:** The **RESET** button on the front of the computer resets the computer only. Press **RESET** on the power entry panel to reset the IIMKM01 and keyboard controller.

Figure 5-4 shows the front view of the computer. Figure 5-5 shows the back view of the computer.
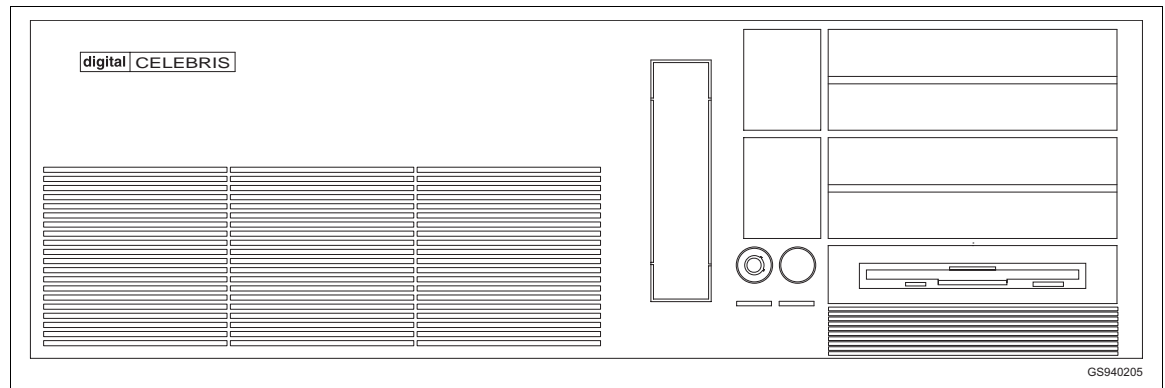
Figure 5-4. Computer Front View
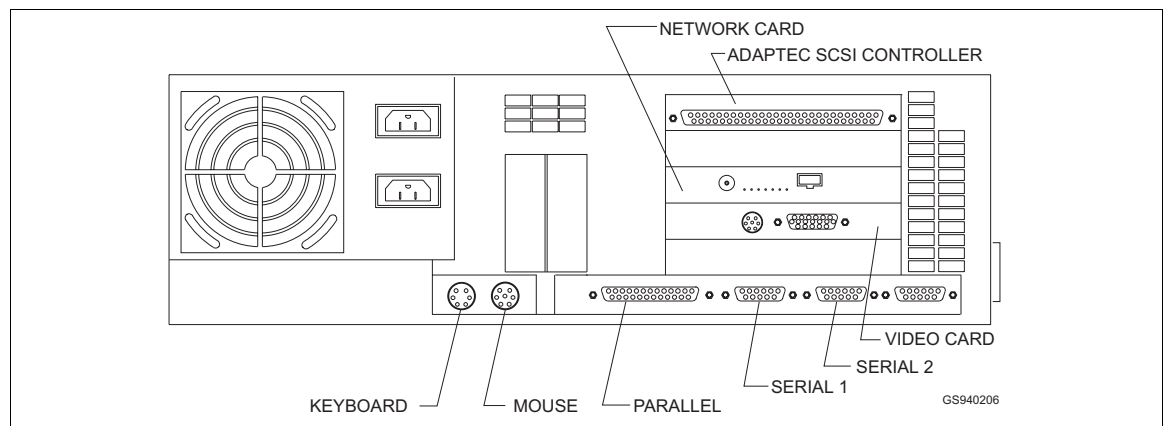
Figure 5-5. Computer Back View

HARDWARE SETTINGS

Refer to the ***IIOIS12 Hardware, Hardware Settings*** section for a summary of the card settings for the OIC12. Refer to Appendix B for the computer slots assigned to the adapter cards.

Computer Graphics Controller Card

- Elsag Bailey Part Number - 1948493A83.

The computer graphics controller card, shown in Figure 5-6, can drive one OIC monitor and the ATI inboard mouse. The card uses a graphics processor which provides for very fast graphics draw and update times.
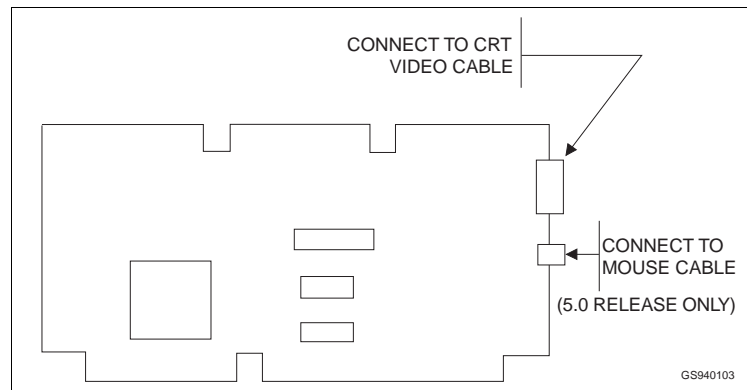
Figure 5-6. Computer Graphic Controller Card

An internal cable from the mouse port to the keyboard interface panel, allows the mouse to be connected to the front of the keyboard interface panel.

NOTES:
1.   In OIC12 Software Release 5.1, the mouse is connected to the mouse connector on the rear of the PC using cable P/N L700912A2 (see Appendix B for mouse assembly part numbers).

2.   Recent models of OIC12 use P/N L750058-1 video cards, or built-in video in the PC.

Network Controller Card

- Elsag Bailey Part Number - L750067B2.

The network card, shown in Figure 5-7, provides communication with the master OIS12 Console via Ethernet.

The network cable to connect the OIC12 to the OIS12 is Elsag Bailey P/N L700691-[L], length per application requirements. One end of the network cable is fastened to the network card in the OIC12. The other end is fastened to the OIS12 master.

Note that a "T" connector (Elsag Bailey part number L750096_1) and termination resistor (Elsag Bailey part number L750095_1) must be installed. For an overview of a typical network configuration see Figure 5-9.

NOTE: Recent models of OIC12 use a similar network card which has no jumpers to set up.
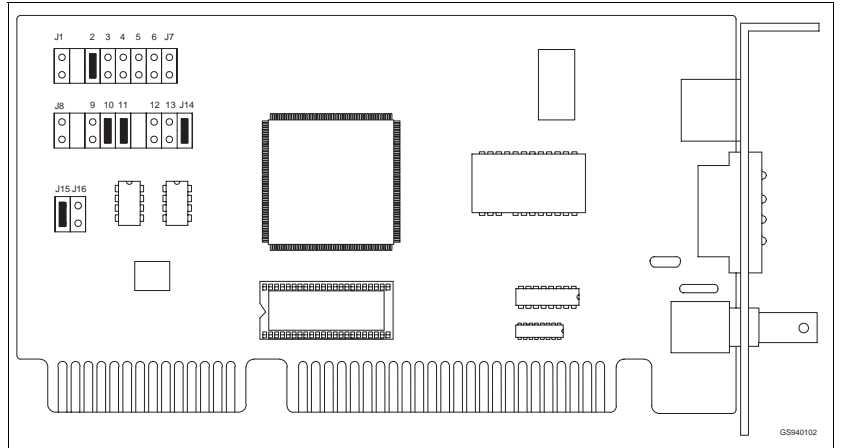
Figure 5-7. OIC12 Network Card
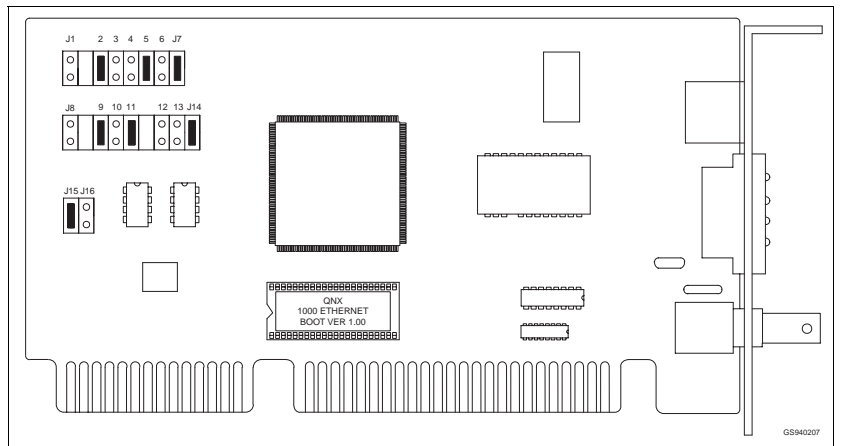
*Figure 5-8. OIC12 Network Card (For Diskless
DEC LPV 4100 PC Only)*

NOTE: MAXIMUM LENGTH BETWEEN TERMINATION RESISTORS (WITH NO REPEATERS)
185M (607 Ft.) MINIMUM LENGTH BETWEEN NODES IS 0.5M (1.6 Ft.)

ITEM	QTY	PART NUMBER	DESCRIPTION
3	2	L750095A1	50 OHMS TERMINATOR
2	3	L700691-[ ]	THIN ETHERNET COAX CABLE 50 OHMS
1	4	L750096A1	"T" CONNECTOR
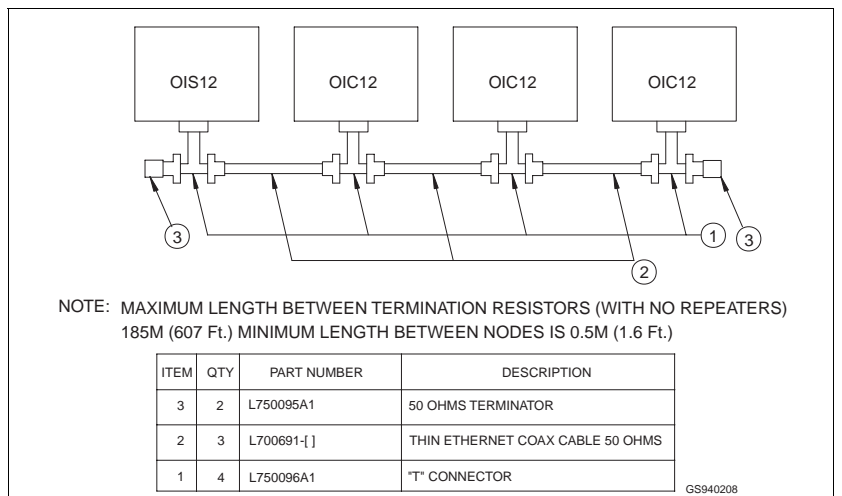
Figure 5-9. Ethernet Network (Typical)

OPERATOR INTERFACE HARDWARE

Keyboard Interface Panel

- Elsag Bailey Part Number - 6638554A4.

The keyboard interface panel (Figure 5-10) is located on the IIOIC12 cabinet front panel next to the CRT behind a polycarbonate door. The keyboard socket is for the mylar operator keyboard supplied with the console. The MOUSE/TRACKBALL connector is for the ATI Bus mouse supplied with the IIOIC12. The AUX KBD connector is for an engineering (AT type) keyboard. The keyboard interface panel connections are listed in Table 5-4.
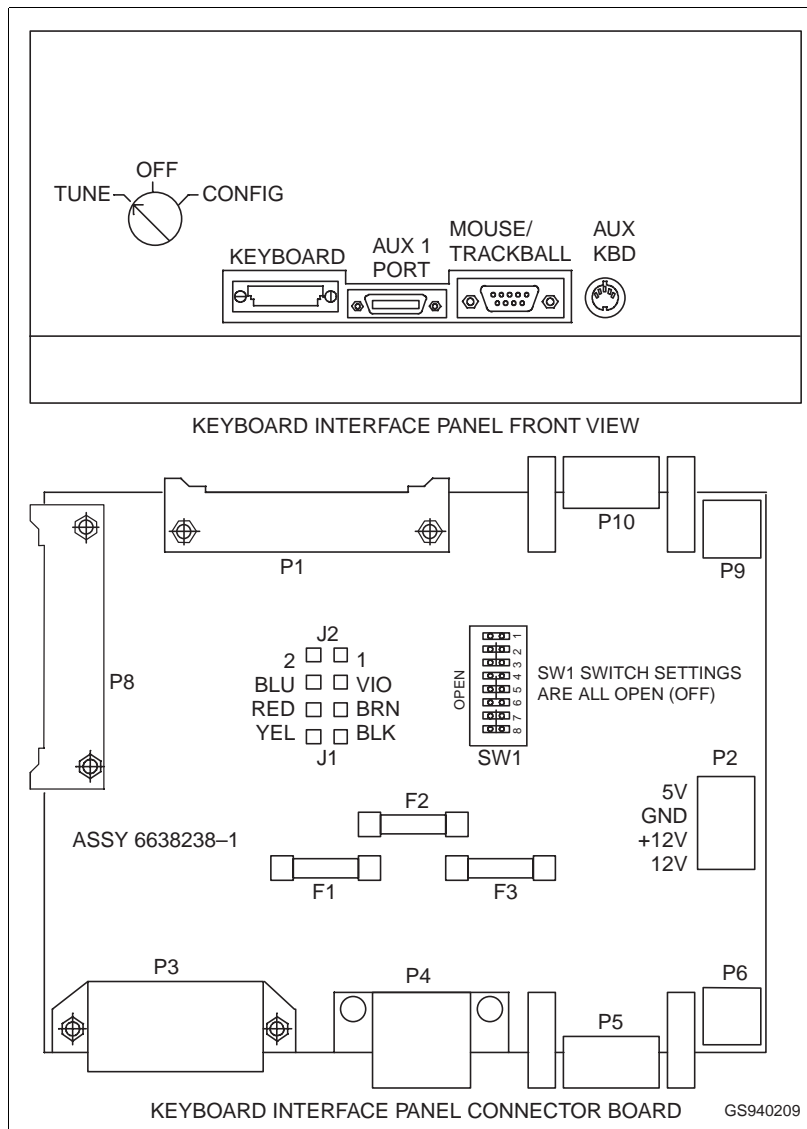
Figure 5-10. Keyboard Interface Panel

Operator Engineering Keyboard

WARNING	The switch settings on the Keyboard Interface Panel must be open. Any other setting may cause damage to the keyboard interface on the PC.

- Elsag Bailey Nomenclature - IIAKB01.

Each IIOIC12 console supports an AT style QWERTY (engineering) keyboard. The IIOIC12 keyboard plugs into a five pin DIN connector on the keyboard interface panel located to the right of the CRT. Figure 5-11 shows the keyboard connector. Figure 5-12 shows the operator keyboard.

Power does not have to be removed from the IIOIC12 before plugging in or unplugging the engineering keyboard.
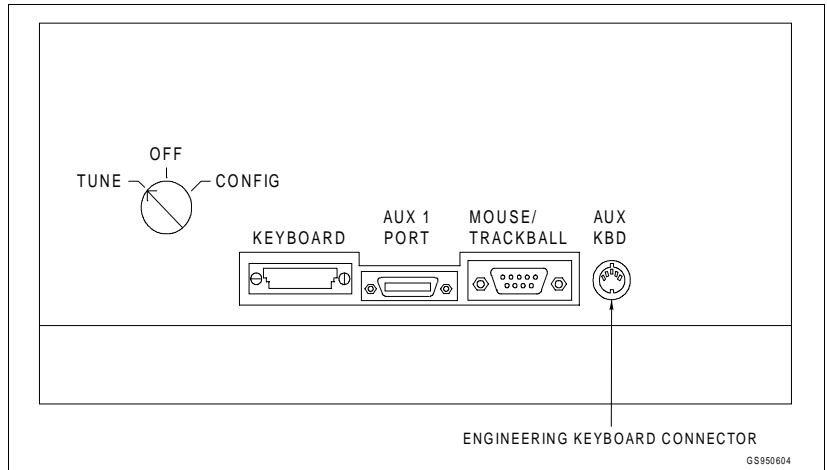
Figure 5-11. Engineering Keyboard Connector
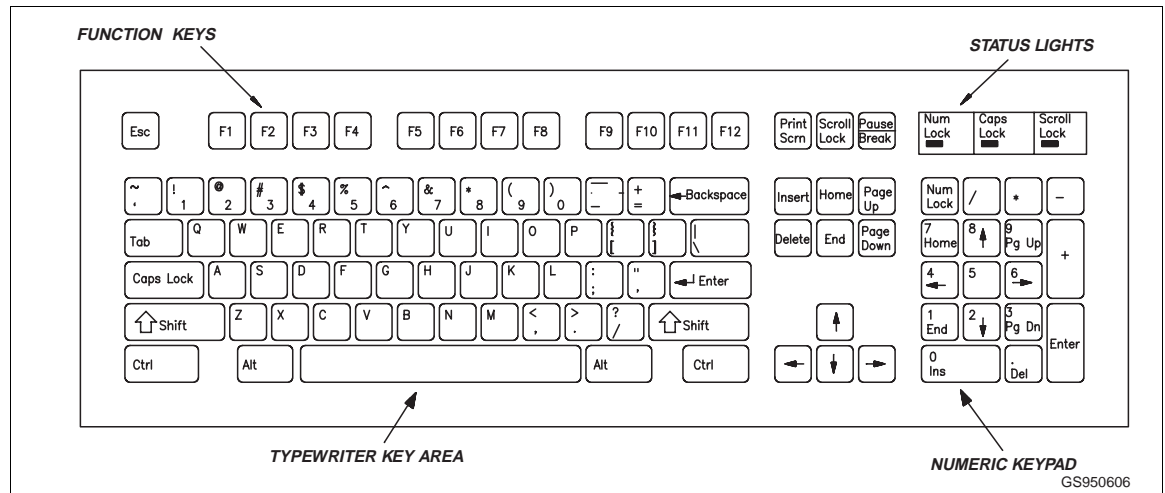
Figure 5-12. Operator Engineering Keyboard

Initializing the system is not needed after plugging in or unplugging the engineering keyboard.

NOTE: Some OIC12 AT-style QWERTY (engineering) keyboards may differ in appearance from the one shown in Figure 5-11. However, they are functionally the same.

A mylar keyboard is used to operate the IIOIC12. Connect the mylar keyboard to the keyboard connector on the keyboard interface panel. The three foot long coiled cord can be stretched to eight feet. The mylar keyboard is available in French or English versions. See Figure 5-13. The Keyboard Interface Module obtains DC power from the OIC power supply as shown in Figure 5-2.
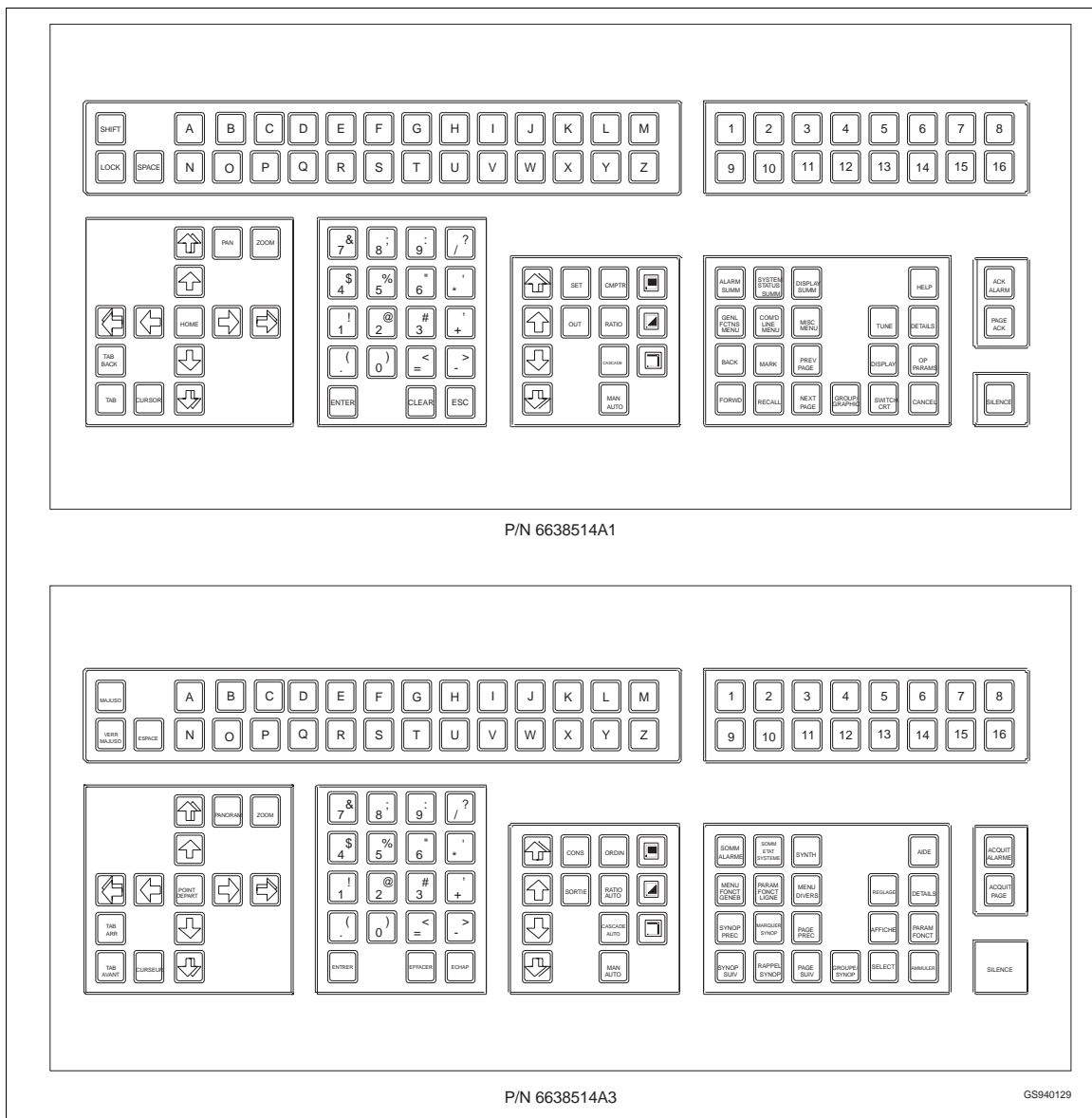
Figure 5-13. Operator Keyboard (English Above, French Below)

Trackball *(Option)*

- Elsag Bailey Part Number - L700945A1 (IIATB06).

The trackball is an optional device which can be connected to the Keyboard Interface Panel instead of a mouse. It is interchangeable with the mouse supplied.

Colour Monitor

- Elsag Bailey Part Number - 1948623A6/A9.

The colour monitor used in the IIOIC12 is an Intecolor 2154-20B or E20FFA-BC1 VGA monitor with 30.5 kHz horizontal/60 vertical noninterlaced scan.

It is used to display a 1024 x 768 pixel image. Figure 5-14 shows a rear view of the colour monitor and the CRT connections.
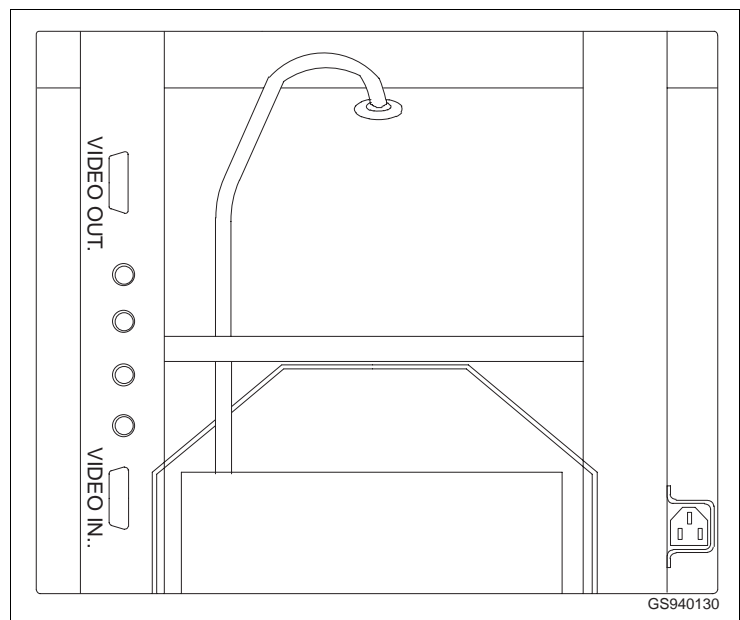
Figure 5-14. Colour Monitor (Rear View)

See Figure 5-15 for cabling information.

NOTES:
1.   The cable (Elsag Bailey part number 1949138A1) that connects the monitor to the graphics controller board is supplied by the manufacturer of the monitor.

A nine-pin D-sub connector connects an external brightness, contrast and degauss control. Use cable number 6638720A3/A4 for the monitor. Brightness and contrast controls are mounted on the bezel. The degauss switch is mounted on the PEP.
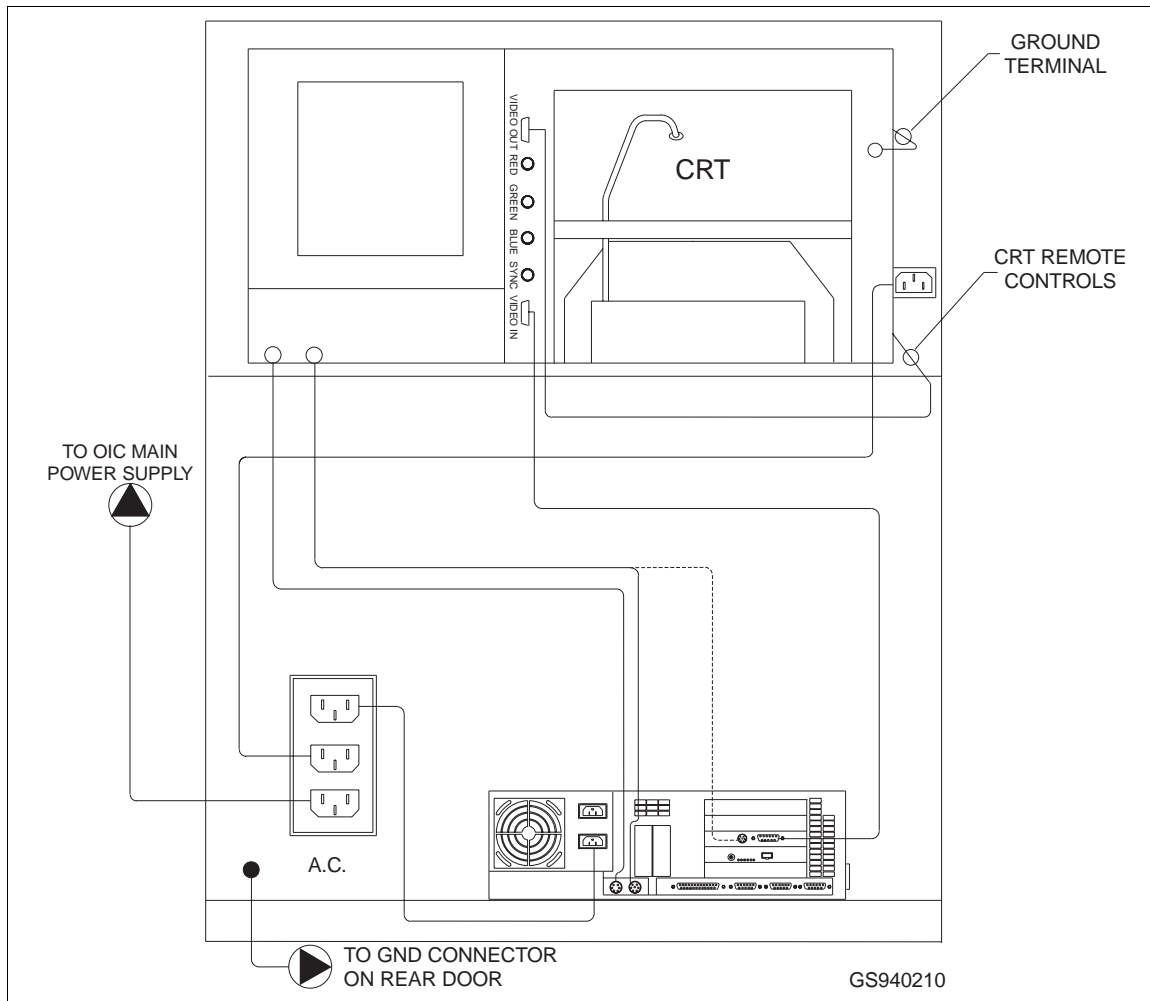
Figure 5-15. Colour Monitor Cabling

Printer

•   Elsag Bailey Nomenclature - IIPRT02/IIPRT05, L700906_1.

For printers, see Section 4, for further details.

IIOIC12 POWER ENTRY PANEL

•   Elsag Bailey Part Number - 6638353A_.

The power entry panel (PEP) shown in Figure 5-16, contains the incoming AC power terminals and system circuit breakers and terminals for alarm contact outputs.

Use the **L.DEGAUSS** switch to correct picture distortion due to magnetic fields on the screen of the CRT.
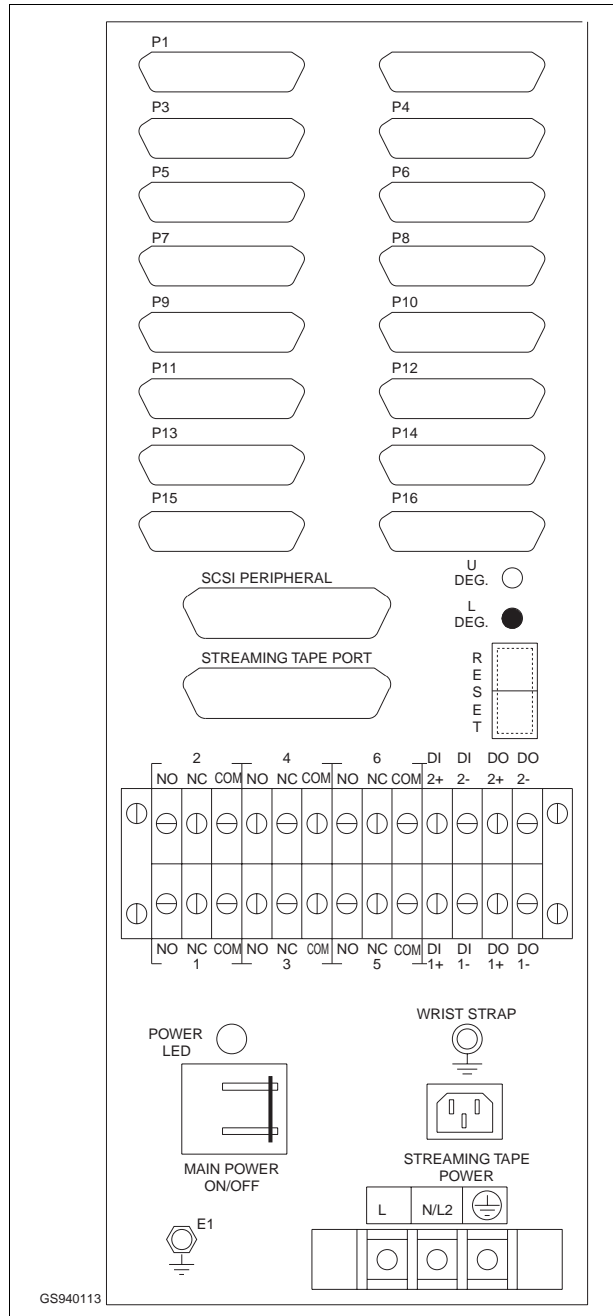
Figure 5-16. IIOIC12 Power Entry Panel

A terminal block with six alarm relay outputs connects annunciators to user-defined alarms. Each relay has three terminals: normally open (N.O.), normally closed (N.C.), and common (COM). Each relay is rated at 24-VDC and 0.25-A switching/carrying current (typical).

Refer to Table 5-3 for the alarm relay typical and maximum electrical specifications. The six terminals are configured via OIS12 software (refer to **OIS12 Operation** and **Configuration**

manuals). The terminal designation is printed on the panel beside the terminal.

On the terminal block there are also two digital inputs (DI) and two digital outputs (DO). These are not configurable and thus not available for use.

WARNING	The switch settings on the Keyboard Interface Panel must be open. Any other setting may cause damage to the keyboard interface on the PC.

Table 5-3. Alarm Relay Specifications

Alarm Relays	Typical	Maximum
Contact Voltage	24VDC	100VDC
Contact Current	0.25A	0.5A
Contact Power	6W	10W

The AC outlet on the IIOIC12 PEP is an auxiliary outlet for either 120/240 VAC devices. Check the voltage rating label on the front of the PEP before connecting anything into this outlet. E1 is the earth ground termination point for the IIOIC12 cabinet. Connect this point to a good earth ground as defined in the national and local electrical codes. The IIOIC12 can be ordered for 120 VAC or 240 VAC power. Connect the AC line inputs to the terminal block at the bottom of the panel front.

NOTE: Be sure the IIOIC12 is set up to receive 240 VAC if you are connecting 240 VAC to the IIOIC12 power entry panel.

To change the IIOIC12 to operate on 240 VAC, set the slide switch (if present) on the back of the computer power supply to the 240-VAC setting (Figure 5-5). Also change the main power supply jumper and fuse for 240-VAC operation (Figure 5-18), if required.

AC POWER

See Figure 5-16 for the location of the AC connections for the unit being installed. Figure 3-9 shows the AC wiring inside the power entry panel for IIOIC12.

IIOIC12 MAIN POWER SUPPLY

- Elsag Bailey Part Number - 6638553A6 or 6638553V5.

The IIOIC12 130 watt main power supply (Figure 5-17) provides power to the console. Figure 5-18 shows the connections from the main power supply to the DC distribution board and to the multibus mylar keyboard controller card. The table shown below

in Figure 5-18 lists the power supply connections to the DC distribution board.

> **NOTE:** Figure 5-17 shows P/N 6638553A6. P/N 6638553V5 is similar, but does not have the jumper for 120 or 240 VAC. It is auto-sensing. AC power input terminals on 6638553V5 are connector pins.
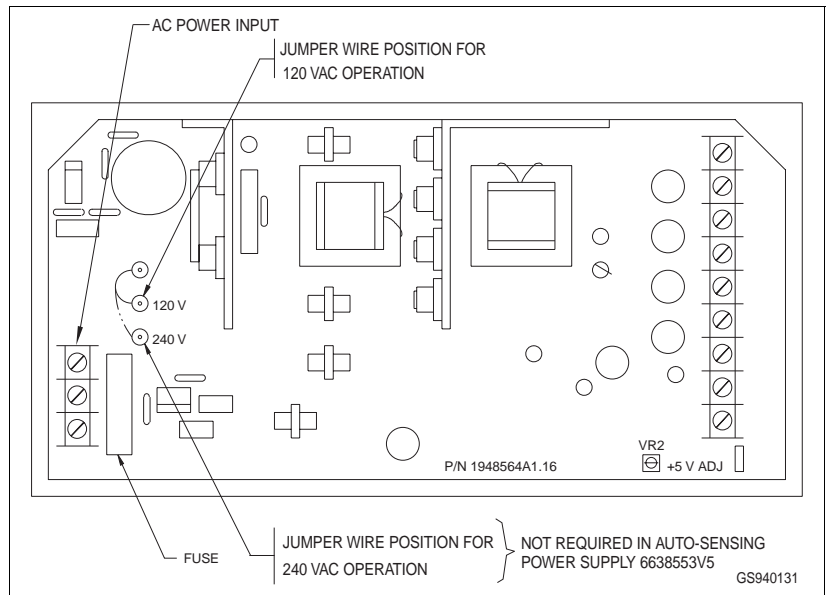
Figure 5-17. IIOIC12 Main Power Supply

The DC distribution board is located at the top-rear of the supply. Each socket on the DC distribution board is wired identically. Any peripheral device using power cable (6638713_1) may be plugged into any socket on this board.

> **NOTES:**
> 1. The 6638553V5 power supply in the console operates on either 120 V or 240 V. When replacing the power supply, check to make sure it is set for the voltage rating of the console, per Figure 5-17. The fuse for 120-VAC should be rated for 5 Amps; 3 Amps for 240-VAC.
>
> 2. In recent OIC consoles, the Power Supply Terminal Strip in Figure 5-2 is not installed. A direct cable assembly connects the output of the power supply to the OIC Pwr Dist. Ass'y TB1.
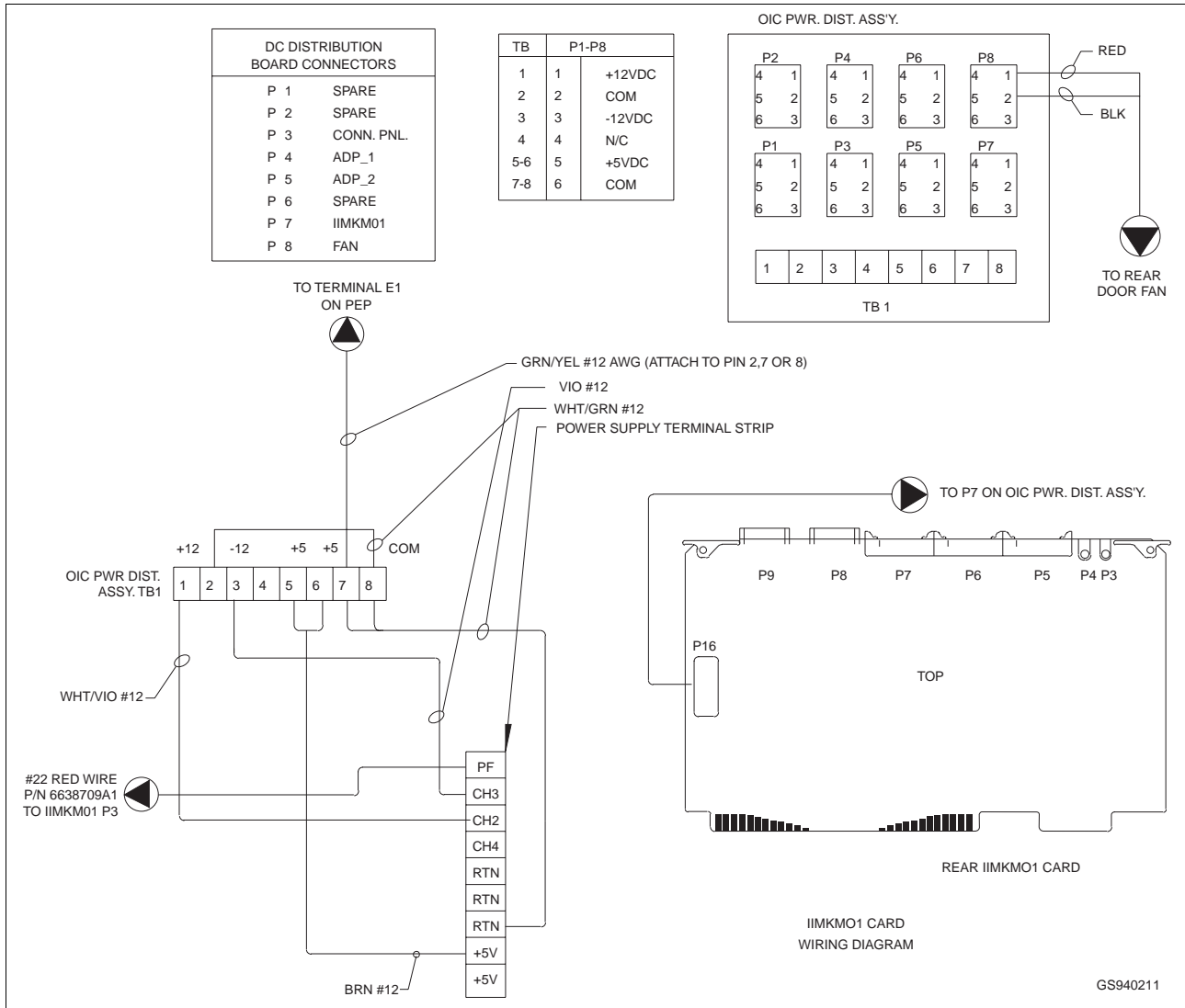
Figure 5-18. IIOIC12 Power Connections

ANNUNCIATOR DISPLAY PANEL

- Elsag Bailey Nomenclature - IIADP02.

The Annunciator Display Panel (ADP) location in the OIC console, dipswitch settings and cabling are shown in Figure 5-19.

The Annunciator Display Panel (ADP) provides a panel of 32-lamps and push buttons. Each lamp can be assigned to an alarm group and each push button can be assigned to an IIOIS12 display. When a tag goes into an alarm condition, the assigned ADP lamp turns on. Press the assigned push button to cause the assigned display to be output to the screen. Refer to the OIS12 Operation and Configuration manuals for details.
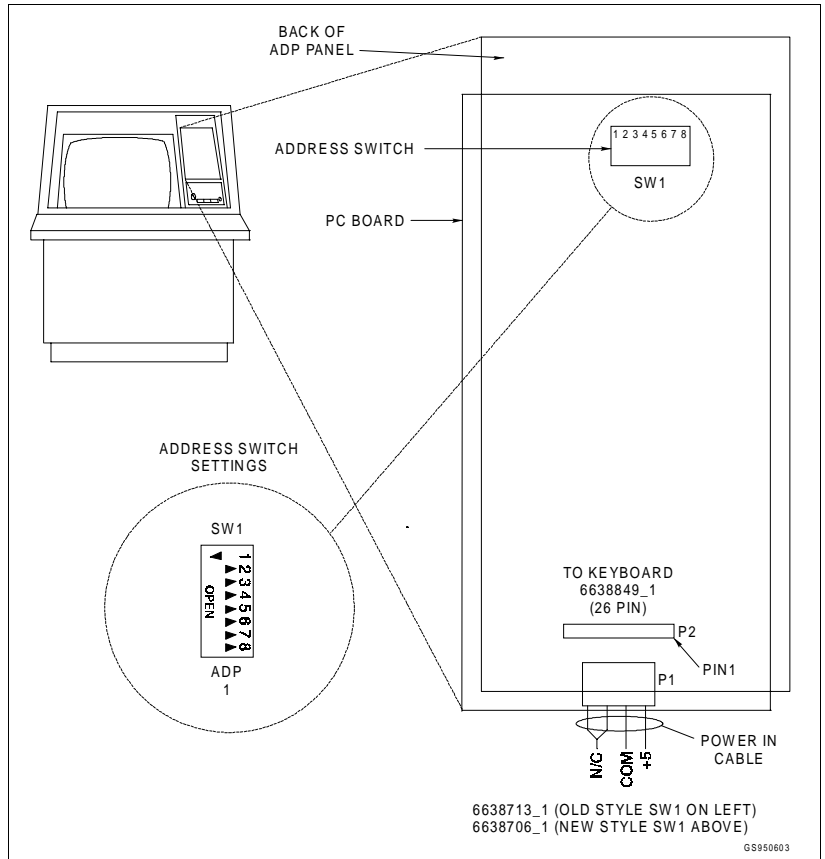
Figure 5-19. IIADP02 Annunciator Display Panel

Table 5-4. Connections to IIADP02 Board

From P1	From P1	From P2
To P4 socket on top of Main Power Supply. Use cable assembly number 6638713_2 if the signal cable connector is on the bottom of the board.	To P4 socket on top of Main Power Supply. Use cable assembly number 6639106_1 if the signal cable connector is on the side of the board.	To P7 connector on IIMKM01 Module. Use cable number 6638849_1.

COMPUTER

- Elsag Bailey Part Number - L700796_13.

The IIOIC12 uses an Intel-based computer with a 66-MHz 32-bit 486 DX processor (minimum).

Full contents of the computer are described in Appendix B.

SECTION 6 - TROUBLESHOOTING

This section explains troubleshooting and testing IIOIS12 and IIOIC12 components. It includes reference tables, component tests and firmware tests. Replace components by following the step-by-step procedures in Section 7.

Be sure to follow all warnings, cautions and notes. Put 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 console arrives ready for operation. After completing the instructions given in Section 3, prepare the unit for service. The troubleshooting guide in Table 6-1 will help identify some of the more common problems and suggest solutions.

Table 6-1. Troubleshooting Guide

Symptom	Possible Problem or Solution
No power indicator on circuit	No AC power at IIOIS12. Check AC wiring on input. Check AC on power entry panel. Check breaker light on power entry panel. Check power on indicator.
Breaker off but indicator on	Check breaker contacts. Check breaker wiring. Check AC input wiring. Check power switch on system unit.
No disk I/O	Check cable from hard disk to controller card (OIS12 only). Check that 3.5 inch disk drive latch is open and no disk is in the drive.
Improper/ incomplete start-up	See diagnostic message at start-up for possible problems.
Start-up OK but no NIU response (OIS12 only)	Check NIU cables. Diagnostics disabled, (port A at 19.2 Kbyte). Check PC set up options to disable COM 2 port. Try using NIU diagnostic port to test IIMCL01/IIMLM01/IIMCP0_ modules. Check configuration of NIU enabled. Check for duplicate node settings on the loop.
Start-up OK but no keyboard response	Check serial card and jumpers. Check all cables. Check caps lock position. Check console configuration; printers and mylar keyboard enabled. Check keyboard assignment.
Start-up OK but no CRT picture	Check CRT AC power. Check CRT fuse. Check cables. Check graphics card.

Table 6-1. Troubleshooting Guide

Symptom	Possible Problem or Solution
No printer response	Check AC power. Check cables (connection to parallel port). Check printer setup. Check IIOIS12 configuration (printers). Check printer directories (logging) for corruption.

DIAGNOSTIC POWER-UP TESTS

If the troubleshooting guide fails to identify a problem, follow this procedure: Troubleshoot the IIOIS12 or IIOIC12 computer with an established AT type, diagnostic program on 3.5-inches 1.44-megabytes media, such as Checkit Delux®.

AC POWER TEST

NOTE: For the remainder of this section, when the instructions state to apply power to the IIOIS12/IIOIC12, switch the main breaker (CB1 on the power entry panel shown in Figure 6-1) to the **ON** position. To turn off the power to the IIOIS12/IIOIC12, switch the main circuit breaker to the **OFF** position.

1. Disconnect AC power to all equipment inside IIOIS12 console by unplugging the line cords from the back of the power entry panel.
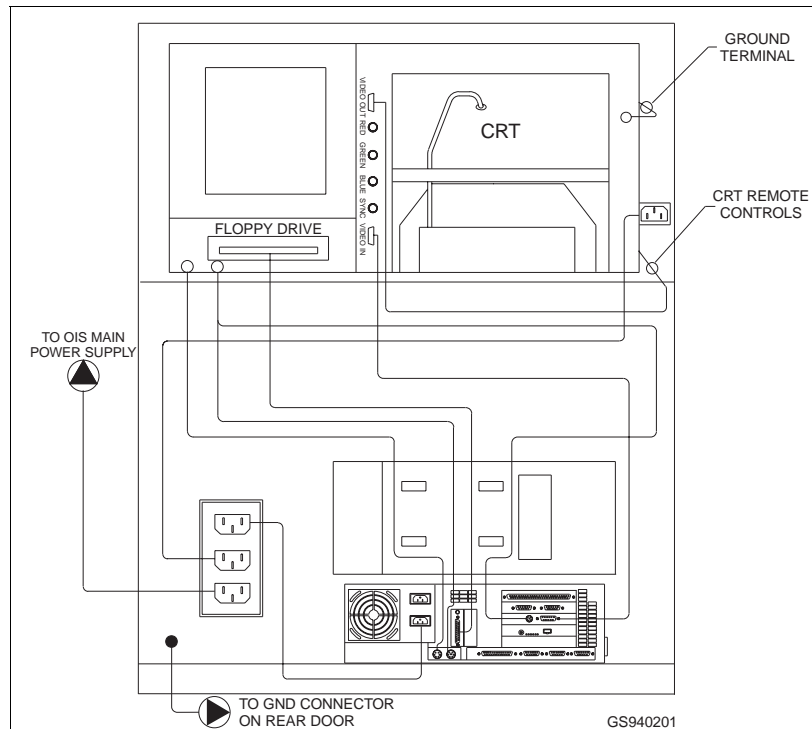
Figure 6-1. Main Circuit Breaker, CBI

2. Apply power to the IIOIS12/IIOIC12 by switching on the line circuit breaker located at the front of the power entry panel (PEP).

3. Use a digital voltmeter to measure the AC power at each of the outlets (J1 through J3) on the PEP. The line voltage should be 102-130 VAC RMS for a 120-VAC input and 204-250 VAC for a 240-VAC input.

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

5. Turn off the power to the IIOIS12. Verify that it removes power from all outlets.

6. Plug the color monitor power cord and the computer power cord into the AC sockets in the rear of the power entry panel. ***DO NOT*** plug in the power supply yet.

IIOIS12 DC POWER TEST

1. Turn the power off to the IIOIS12.

2. Unplug DC power distribution cables from all peripheral devices (disk drives and keyboard interface module, if present). Disconnect the power cables at the distribution side of the cables.

> **NOTES:**
> 1. Do NOT disconnect the power wiring from the multibus card cage.
>
> 2. Turn power off before removing or inserting multibus modules.

3. Unplug all four modules from the multibus 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. Ensure that ALL power supply wiring is correct.

> **NOTE:** Check fuse in DC Power Supply.

6. Apply power to the IIOIS12.

7. Using a digital voltmeter, measure the DC voltages at the multibus card cage. Refer to Figure 6-1 for the location to measure the backplane voltages.

Table 6-2 lists the DC voltage levels at the multibus card cage backplane.

Table 6-2. IIOIS12 DC Voltages

Voltage	Colour	Connector Number	
		P1 Pin No	P2 Pin No.
-12 V ± 0.4 8V	Violet		3
+12 V ± 0.48 V	White/Violet	4	
Common	White/Green	1	6
+5 V ± 0.2 V	Brown	2	5

8. If necessary, adjust the DC voltages of the power supply (Figure 6-2).

> **NOTE:** DO NOT adjust the OL and OVP settings. These adjustments are factory set.

9. Turn off the power to the IIOIS12. Plug in all multibus modules.

10. Reconnect all DC power distribution cables.

11. Apply power to the IIOIS12 and check the DC voltage levels again. Adjust the power supply to obtain the voltages required.

Figure 6-2 shows the IIOIS12 Main Power Supply.
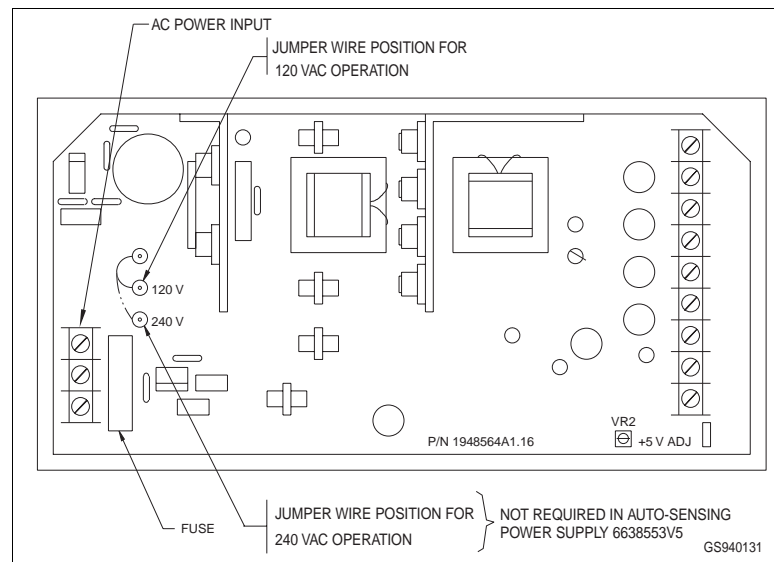
Figure 6-2. IIOIS12 Main Power Supply

IIOIC12 DC POWER TEST

1. Turn OFF the main power breaker on the IIOIC12.

2. Unplug the DC power cable from the MKM board.

> **NOTE:** Turn the power OFF before removing or inserting the DC power cable from the MKM board.

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

4. Ensure that all power supply wiring is correct.

   NOTE: Check fuse in DC Power Supply.

5. Apply power to the IIOIC12.

6. Using a digital multimeter, measure the DC voltage at the IIOIC12 DC distribution board connector TB1. (Refer to Figure 5-16).

7. Turn OFF the power to the OIC12. Plug the MKM DC power cable back into connector P16 on the MKM board.

Table 6-3. IIOIC12 DC Distribution Board Voltages

Voltage	Connector TB1 P1 Pin No.
+12 V $\pm$ 0.48 V	1
COM	2
-12 V $\pm$ 0.48 V	3
N/C	4
+5 V $\pm$ 0.2 V	5-6
COM	7-8

8. Reconnect all DC power distribution cables.

DIAGNOSTIC LEDS (IIOIS12 MASTER AND STAND-ALONE CONSOLES ONLY)

Table 6-4 lists the IIMCP01 failure LED codes. Table 6-5 lists the IIMLM01 failure LED codes.

Table 6-4. IMMCP01 Failure Codes

MCP Code	Top Bottom LED LED 87654321	Error Condition
12	0010010	MLM not responding to MCP commands.
13	0010011	ROM checksum error (socket U23 or U24).
14	0010100	Expander bus message failure.
15	00010101	Loop failure - check for break in circuit.
16	00010111	MLM loop-back test failure.
21	0010xxxx	Internal software error.
32	00110001	Memory or CPU failure.
32	00110010	Address or bus error.
33	00110011	Illegal instruction.
35	00110101	Spurious exception.
36	00110110	Divide by 0/check/format error.
38	00111000	MLM not configured for MCP operation. (MLM switch 2, pole 1 needs to be ON)

Table 6-4. IMMCP01 Failure Codes

MCP Code	Top LED Bottom LED 87654321	Error Condition
39	00111001	Duplicate node number on loop (MLM switch 4).
3E	00111110	MLM to MCP handshake failure.
3F	00111111	Stop pushbutton actuated.

Table 6-5. IIMLM01 Failure Codes

MCP Code	Top LED Bottom LED 87654321	Error Condition
13	00010011	ROM checksum error (socket U23 or U24).
31	00110001	Memory or CPU failure.
32	00110010	Address or bus error.
33	00110011	Illegal instruction.
34	00110100	Trace/privilege violation.
35	00110101	Spurious exception.
36	00110110	Divide by 0/check/format error.
37	00110111	Any trap instruction.
38	00111000	MLM not configured for MCP operation. (MLM switch 2, pole 1 needs to be ON)
3E	00111110	MLM to host handshake failure.

Restarting the OIS12's CIU

In order to restart the CIU (Refer to Figure 4-7) the procedure is:

- Press the STOP button.
- Press the RESET button.
- Press the RESET button again.

NIU (TALK 90) DIAGNOSTIC TEST (IIOIS12 CONSOLES ONLY)

If the network interface unit (NIU) fails to come on-line, the problem may be in the NIU or IIOIS12. The Talk 90 utility can isolate the problem. Check the labels on proms U23 and U24 on the IIMCP01 module. If the label is IIST01, the module connects to an INFI-NET communication loop. If the label is IIPST01, the module connects to a Plant Loop communication loop. Connect a nine pin to 25 pin D connector serial cable (NKMR02_10 or equivalent) between a dumb terminal and connector port B (bottom port) on the IIMCP01.

Set the terminal to: 9600 baud and eight data, one stop, zero start and no parity bits.

Follow these steps:

1. Press the right red button on the MCP (reset). The diagnostic menu will appear on the terminal.

2. Select Talk 90 by typing one and pressing <Return>.

3. Select 19 (CIU_RESTART) from the menu and press <Return>.

4. Answer the prompts:

    Key = **0** <Return>
    Watchdog = **0** <Return>
    Options = **10** (for Plant Loop) or **255** (for INFI-NET)
    <Return>
    Reply Delay = **0** <Return>
    Interrupts = **0** <Return>

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

6. On the terminal enter a one to return to Talk 90.

7. Check that the terminal displays a response of zero errors. The terminal will display the node address.

No errors indicates that the problem is in the IIOIS12 or in the cable between the IIOIS12 and the NIU.

Any indicated errors shows that the problem is in the NIU. 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 indicates a problem on the IIMLM01.
>
> 2. A message referring to the SSM indicates a problem on the IIMPCP01.

SECTION 7 - MAINTENANCE

INTRODUCTION

This section includes preventive maintenance. Refer to Section Section 3 through Section 5 to replace parts. Carefully review Section 4 for OIS12 and Section 5 for OIC12 for specific adjustments associated with replaceable parts.

Be sure to follow all warnings, cautions and notes. Put 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.

HARDWARE PREVENTIVE MAINTENANCE

Refer to Table 7-1 for suggested preventive maintenance procedures. Specific steps to do these procedures are found in the vendor information supplied with the unit.

Table 7-1. Preventive Maintenance

IIOIS12 Component	Frequency	
	Monthly	**Annually**
3.5-inches floppy disk drive	—	Clean, inspect and check alignment.
Printer	Inspect, clean and lubricate.	Adjust printer per manufacturer's specs.
Power supplies	—	Check voltages with specifications.
Computer check	Clean input grills, fans/filters.	Check computer battery voltage.
Cooling fans	Check air flow, clean filters.	Replace if faulty

SOFTWARE PREVENTIVE MAINTENANCE

The most important preventive maintenance item with regard to the OIS12 console software is to back up the OIS12 configuration files to floppy disk on a regular basis.

Refer to Section 7 of the **OIS12 Configuration** manual for the procedure to back up the OIS12 configuration.

The types of files included in the OIS12 configuration are tag database, trend database, log definitions and modules, graphic displays and symbols, console node options, user identification, and permit groups.

During the commissioning phase, it is recommended that backups be done no less than once a week, more frequently if a significant number of changes are made.

During normal operation, a backup should be done monthly, or if a significant number of changes are made. The backup disks should be clearly labeled with the date and OIS12 serial number in case you have several OIS12 consoles with unique configurations.

You should also maintain backups of the OIS12 configuration in another location as well as on site.

SECTION 8 - REPAIR/REPLACEMENT PROCEDURES

INTRODUCTION

Replace IIOIS12/IIOIC12 components, if required, by following the step-by-step procedures in this section. Refer to information in Section 3 and Section 4 when replacing parts. Review the *INSTALLATION* section carefully before returning the system to normal operation.

Be sure to follow all warnings, cautions and notes. Put 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.

CAUTION	Disconnect the system from electrical supply before attempting repair or replacement.

PART REPLACEMENT PROCEDURES

Colour Monitor

- Elsag Bailey Part Number - 1948623A6/A9.
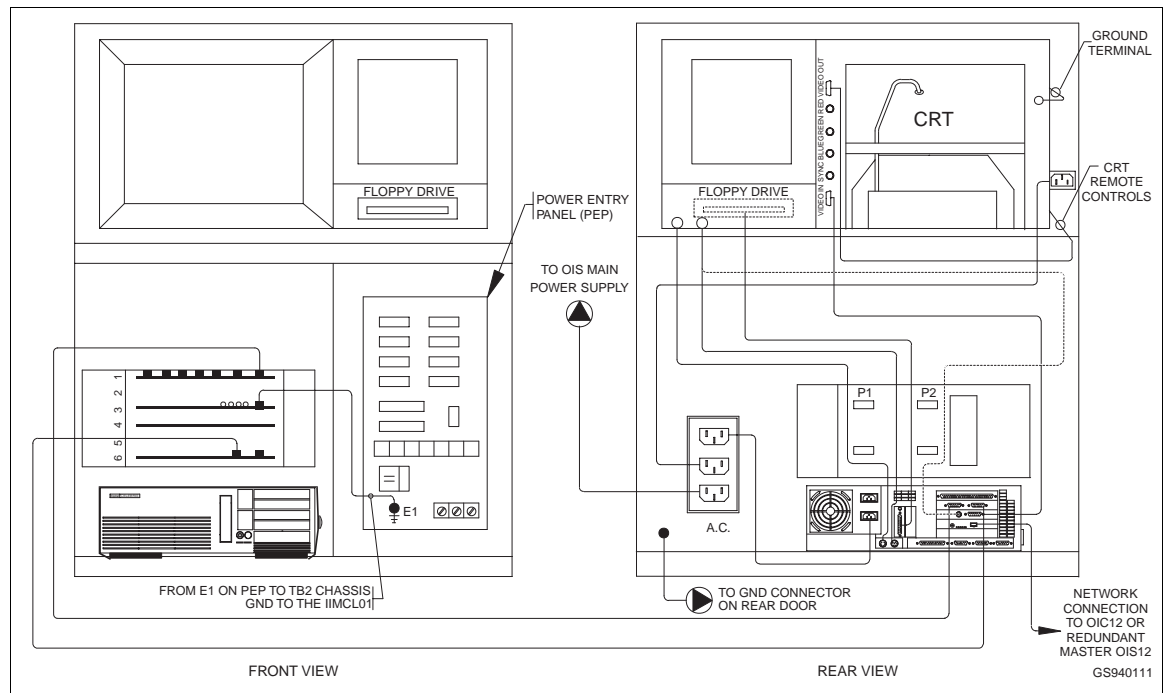
Figure 8-1. Colour Monitor Removal

1. In the front of the cabinet, turn off the main circuit breaker on the power entry panel to shut off power to the IIOIS12/IIOIC12. Check the power indicator to see if power is removed from the system. See Figure 8-1 when using this procedure.

2. In the front of the cabinet, remove the two $\frac{7}{16}$-inches bolts under the CRT shelf that hold the front of the CRT mounting tray to the cabinet.

3. In the back of the cabinet, remove the power cord, nine-pin external control cable, ground wire and VGA cable from the back of the monitor. Secure them out of the way.

WARNING	**The CRT will slide out the rear of the cabinet by itself when the mounting bolts are removed. Support the CRT before removing the rear two bolts.**

4. Remove the bolt on each side of the CRT mounting tray at the rear of the CRT. These bolts attach the tray to the cabinet shelf. After removal, place the CRT and tray onto a solid, flat surface.

5. Protect the screen of the CRT and set the CRT screen down on the protected surface.

6. Remove the CRT from the mounting tray by removing the four screws under the tray.

3.5-Inches Floppy Disk Drive (IIOIS12 Consoles Only)

See Figure 8-2 when using this procedure.

1. In the front of the cabinet, turn off the main circuit breaker on the Power Entry Panel (PEP) to shut off power to the IIOIS12. Check the power indicator to see if power is removed from the system.

2. Unplug the operator keyboard and units connected to the front of the operator keyboard interface panel.

3. Remove the ribbon cable to the 3.5-inches disk drive connector and circuit board.

4. Remove all of the cables from the rear of the operator keyboard interface panel and 3.5-inches drive unit and circuit board.

5. Remove the two screws holding the 3.5-inches drive tail brace to the left wall of the cabinet.

6. Remove the two screws holding the bottom of the operator keyboard interface panel to the back side of the CRT bezel. There are no screws on top or on the sides of the panel.

GS9402 2
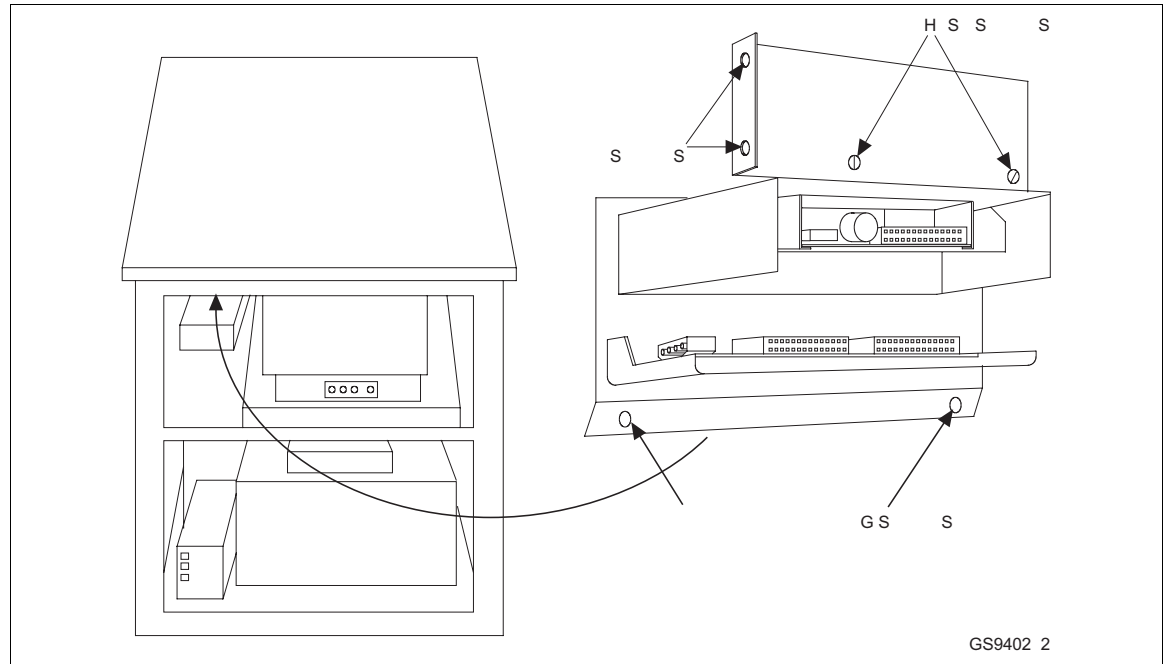
Figure 8-2. Floppy Disk Removal

7. Carefully remove the operator keyboard interface panel, containing the 3.5-inches drive, out the rear of the cabinet.

8. Remove four screws on the sides of the 3.5-inches drive and separate the bracket from the 3.5-inches drive. The drive will slide out through the front of the keyboard interface panel.

Multibus Chassis *(IIOIS12 Consoles Only)*

• Elsag Bailey Part Number L700806-1.

1. In the front of the cabinet, turn off the main circuit breaker on the power entry panel to shut off power to the IIOIS12. Check the power indicator to see if power is removed from the system. See Figure 8-3 when using this procedure.

2. Remove the modules from the multibus chassis.

3. In the back of the cabinet, disconnect all cables and wiring from the back of the multibus chassis. Label the connections if needed.

4. Remove the four screws at the front of the multibus chassis (two on each side).

5. Slide the multibus chassis out of the front of the cabinet.
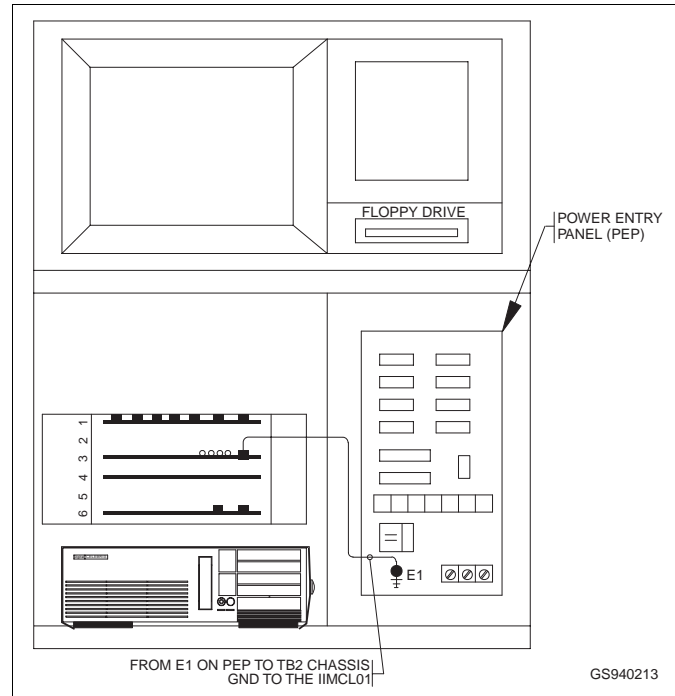
Figure 8-3. Multibus Chassis Removal

Power Entry Panel

- Elsag Bailey Part Number - 6638353A_.

1. In the front of the cabinet, turn off the main circuit breaker on the Power Entry Panel (PEP) to shut off power to the IIOIS12/IIOIC12. Check the power indicator to see if power is removed from the system. See Figure 8-4 when using this procedure.

2. Shut down AC line power to the IIOIS12/IIOIC12 (plant breaker) so that the AC line may be disconnected safely.

3. In the front of the cabinet, remove all cables from the front of the power entry panel (alarm contact wires and AC input).

4. In the back of the cabinet, remove AC cables from the outlets on the back of the PEP.

5. Remove all signal cables from the multibus modules that go to the back of the PEP. Leave the cables on the PEP. The new PEP comes with cables.

6. In the front of the cabinet, remove the five screws from around the edges of the PEP. Slide the PEP out the front of the cabinet.
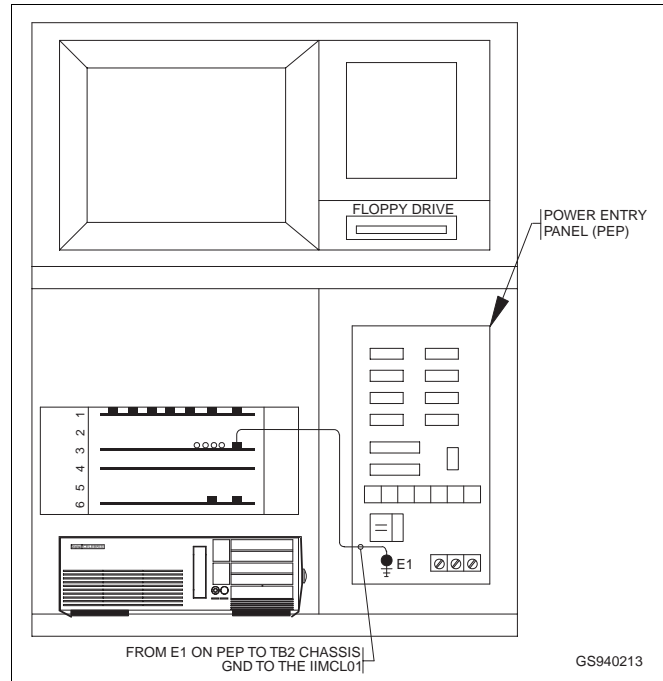
Figure 8-4. Power Entry Panel (PEP) Removal

Computer

- Elsag Bailey Part Number - L700796D13 for OIS12, L700796D16 for OIC12 (see also Appendix B).

1. At the front of the cabinet, remove the cabinet door and turn off the main circuit breaker on the power entry panel (PEP) to shut off power in the IIOIS12/IIOIC12. Check the power indicator to see if power is removed from the system. See Figure 8-5 when using this procedure.

2. At the front of the cabinet, remove the IIOIS12/IIOIC12 work surface by turning the red, locking lever underneath. Now slide the work surface forward.
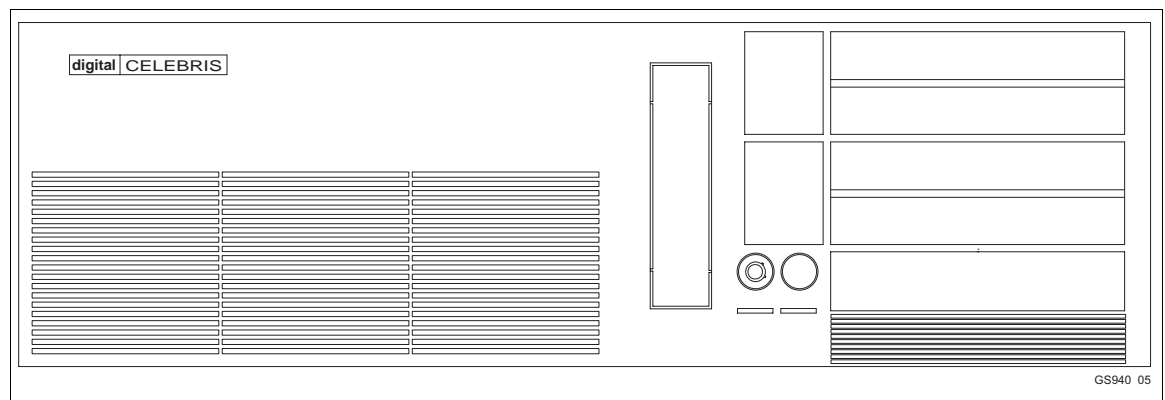
Figure 8-5. Computer Removal

3. At the rear of the cabinet, remove the door and remove all cables from the back of the computer. See Figure 8-6, for OIS12; see Figure 5-14 for OIC12.

• RS-232-C cables from serial interface card connectors (IIOIS only) or COM1 serial port (OIC12 only) (P/N L7500579V19-04).

• CRT cable from graphics card connector.

• External floppy disk ribbon cable (IIOIS12 only).

• Mouse cable from graphics card connector, P/N L700912A2 and L750053A1 (Release 5.0 used L700884A2).

• QWERTY keyboard extension cable (P/N L700804A1).

• AC cable from AC connector.

• Parallel printer cable, if installed.

• Ethernet cable, if applicable.

4. At the rear of the cabinet, unlatch the computer restraining belt. Slide the computer out through the rear of the cabinet.
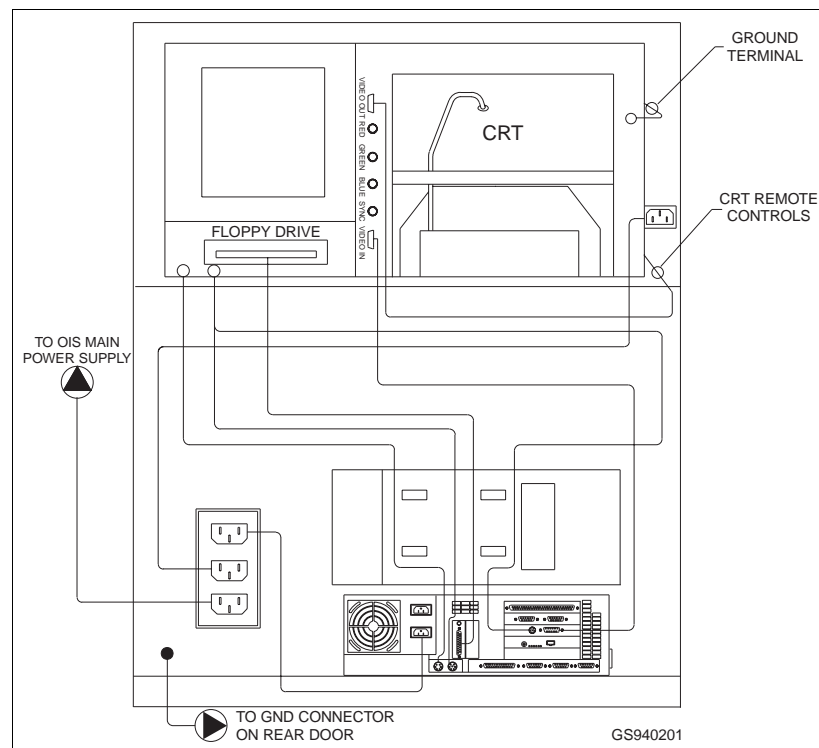
Figure 8-6. Computer Cable Connections

Computer Cards

NOTE: See also Appendix B.

- Disk Drive Controller Card, Elsag Bailey Part Number-L700797-1 (IIOIS12 Units Only).

- Graphics Card, Elsag Bailey Part Number - 1948938A83.

- Serial Interface Card, Elsag Bailey Part Number-L750021-3 (IIOIS12 Units Only).

- Network Card Elsag Bailey Part Number - L750067B2.

If computer cards are to be removed, see Figure 8-7 when using this procedure for OIS12; see Figure 5-5 for OIC12.
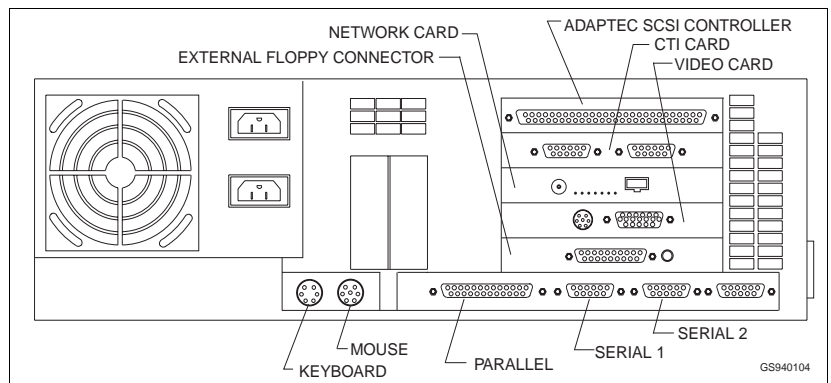
Figure 8-7. Computer Card Removal

Personnel working with or handling printed circuit boards and MOS devices need to be grounded by wearing conductive wrist ground straps. Refer to Section 3 for ESD information.

NOTE: Always use the Elsag Bailey Field Static Kit (P/N 1948385A2 consisting of a wrist strap, ground cord assembly and alligator clip) when working with the OIS/OIC. The kit is designed to connect the technician and the static dissipating work surface to the same ground point to prevent damage to the modules by electrostatic discharge.

1. Open the rear door to the cabinet and remove the computer from the console described in this section under the heading ***Computer***.

2. Remove the screws on the back of the computer.

3. Connect the ESD strap to the PEP and place it around your wrist.

4. Remove the cover and disconnect any power and ribbon cables to the card. Label the connections if needed.

5. Carefully lift the card out of the computer.

6. For replacing computer cards in the OIS12 computer, refer to Section 4, IIOIS12 Hardware for the necessary jumper/switch settings required for each of the cards.

For replacing computer cards in the OIC12 computer, refer to Section 5, IIOIC12 Hardware for the necessary jumper/switch settings required for each of the cards.

> **NOTE:** Although both the OIS12 and OIC12 use some of the same cards, the jumper/switch settings may not be the same for both.

7. If the Graphics card is replaced, the Bus Mouse must be enabled. Refer to the section *DOS UTILITIES - EXAMPLES* in Appendix A for details.

Hard Disk Drive

Personnel working with or handling printed circuit boards and MOS devices need to be grounded by wearing conductive wrist ground straps. Refer to Section 3 for ESD information.

> **NOTE:** Always use the Elsag Bailey Field Static Kit (P/N 1948385A2 consisting of a wrist strap, ground cord assembly and alligator clip) when working with the OIS. The kit is designed to connect the technician and the static dissipating work surface to the same ground point to prevent damage to the modules by electrostatic discharge.

1. Loosen the computer strap holding down the computer. Remove the cables from the rear. Now remove the computer, as described in this section under the heading *Computer*, and place it on an antistatic work surface.

2. Remove the three screws from the rear of the computer. Remove the screw on the center of the front and back edge of the cover.

3. Lift the cover and disconnect all power and ribbon cables to the hard disk drive. Label the connections if needed.

4. Remove the screws securing the hard disk drive to the system unit. Lift the drive out of the computer.

SECTION 9 - SUPPORT SERVICES

INTRODUCTION

Elsag Bailey is always ready to assist in the operation and repair of its products. Send requests for sales and/or application services along with installation, repair, overhaul and/or maintenance contract services to your nearest Elsag Bailey sales/service office.

REPLACEMENT PARTS AND ORDERING INSTRUCTIONS

Order replacement parts through an Elsag Bailey sales/service office. We request that the following information be provided when ordering parts:

1. Part description, part number and quantity.

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

3. Elsag Bailey publication number and reference used in identifying the part.

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

TRAINING

Elsag Bailey has a modern training center, equipped to provide service and repair instruction, which is available for in-plant training of customer personnel. Order specific information regarding course content and scheduling from your nearest Elsag Bailey sales/service representative.

TECHNICAL DOCUMENTATION

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

REPLACEMENT PARTS

Table 9-1 and 9-2 lists the recommended spare parts for the IIOIS12. Elsag Bailey suggests a stock supply of one item each to minimize the duration and cost of down-time in case of component failure.

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Table 9-1. Recommended Spare Parts List

Part Number	Part Description
1948623A6/A9	Colour monitor.
6638514A_	Mylar keyboard assembly (Elsag Bailey).
6638553A6/V5	Power supply.
IIADP02	Annunciator display panel.
IIMCL01 (OIS12)	Communication loop termination module.
IIMCP01 (OIS12)	Multibus communication module.
IIMKM01	Keyboard interface module.
IIMLM01 (OIS12)	Multibus loop module.
L700794_1 (IIDOP06)	Optical disk drive (option).
L700945A1 (IIATB06)	Trackball (option).
L700796_11 (OIS12) L700796_13 (OIC12)	Computer with an Intel 32-bit processor.

NOTE: See also Appendix B for computer subcomponents.

Table 9-2. Recommended Spare Parts List for Computer Subcomponents

OIS12	OIC12	Part Number	Part Description
x	x	1948938A83/A84, L750058_1	Graphics card.
x	x	L700797A1/A2 (ISA), L700796A3 (PCI)	SCSI disk controller (if supplied).
x		L750021A3	2-port serial card (if supplied).
x	x	L750067B2	Network card.
x	x	See Note	340 MB SCSI hard disk (min.).
x	x	L700884A1 (Release 5.0)	Mouse.
x	x	L700912-, (Release 5.1) (-A1 for Digital Equipment) (-A3 for Hewlett-Packard)	Mouse.

NOTE: See also Appendix B for computer subcomponents.

APPENDIX A - INSTALLING SOFTWARE

This section describes how to install the OIS12/OIC12 system software onto the OIS12/OIC12 console's computer.

The OIS12 system software must be loaded onto all OIS12's and OIC12's that have a hard disk drive.

> **NOTES:**
> 1. The term OIS12 shall refer to both the OIS12's and OIC12's unless explicitly stated otherwise.
>
> 2. All consoles should be using the same release version of LAN-90 PCV software i.e. 5.1A or 5.2. Failure to do so will result in consoles not being able to communicate with each other via Ethernet.

STEPS IN THE INSTALLATION PROCESS

To install OIS12 system software on a new computer:

1. Start the computer up in DOS, back up to floppy disk all software which was preloaded. Delete all partitions.

2. Create a primary DOS partition and load the DOS operating system onto it.

3. Load the QNX operating system onto a QNX hard disk partition using the QNX installation program.

4. Load the OIS12 system software onto the QNX partition via the OIS12 system software installation program.

5. If you are using an optical disk drive, you have to configure the system software (via the Configuration Options menu) to recognize it.

CAUTION	**Before installing *any* software, verify that the revision level of the software on the disks matches the revision level stated in the section describing the installation of the software.**

To re-install OIS12 system software on an OIS12 console, the same procedure for installing OIS12 software on a new computer can be followed. However, certain steps can be ignored such as installing the DOS partition and loading DOS-based software. It is recommended that you reload QNX, QNX

INTRODUCTION

Windows and the OIS12 software to ensure no corrupted files remain on the hard disk.

> **NOTE:** The size of the hard disk shown in the figures is for example purposes only, the actual size will vary.

INSTALLING DOS

The details of creating the DOS® partition depend on the version of DOS you are installing. The examples that follow refer to the MS-DOS 6.0 FDISK program. The DOS partition is set up using the FDISK program, which is run either as part of a DOS installation program or from the DOS prompt.

To prepare the OIS12 for DOS, you must create a primary DOS partition. This is done by using the menu driven utility called "fdisk". For example purposes, the primary DOS partition will be set to 20 MB.

How to Start the MS-DOS FDISK Program

The "fdisk" utility is easy to use because it uses menus to lead you through each procedure. To start "fdisk", follow these steps:

1. Place the DOS boot floppy in the floppy drive.

2. Turn on the OIS12 and allow it to boot.

3. At the DOS prompt type:

    fdisk <Enter>

4. The "fdisk" program's Main menu will appear (Figure A-1).

```
                    MS-DOS Version 6.00
                  Fixed Disk Setup Program
            (C)Copyright Microsoft Corp. 1983 - 1994


                        FDISK Options


Current fixed disk drive:1

Choose one of the following:
1. Create DOS partition or Logical DOS Drive
2. Set active partition
3. Delete partition or Logical DOS Drive
4. Display partition information.


Enter choice:[1]


Press Esc to exit FDISK.F0 Return to Previous Menu
```

Figure A-1. Fdisk Disk Options Menu

Remove Current Partition

Select *Delete partition or Logical DOS Drive* and delete the primary DOS partition. This partition should be the total size of the hard disk.

You are now ready to create a new primary DOS partition.

Create a Primary DOS Partition

After selecting *Create DOS partition* option from Figure A-1, the menu shown in Figure A-2 will appear.

```
                Create DOS Partition or Logical DOS Drive

Current fixed disk drive: 1
Choose one of the following:
1. Create Primary DOS Partition
2. Create Extended DOS Partition
3. Create Logical DOS Drive(s) in the
   Extended DOS Partition.




Enter choice: [1]



Press Esc to return to FDISK Options.
```

*Figure A-2. Fdisks Create DOS Partition
or Logical DOS Drive Menu*

From this menu choose *Create Primary DOS Partition* option, the menu shown in Figure A-3 will appear.

```
                    Create Primary DOS Partition

Current fixed disk drive: 1




Do you wish to use the maximum available size for a Primary DOS Par-
tition and make the partition active (Y/N).......?[N]



Press Esc to return to FDISK Options.
```

Figure A-3. Fdisks Create Primary DOS Partition Menu

This menu will ask the question:

Do you wish to use the maximum size for a DOS partition and make the DOS partition active (Y/N).....?

Select **N** for NO (Figure A-3). The menu shown in Figure A-4 will appear and here you must enter **20** to create a 20 mega-bytes primary DOS partition (Figure A-4).

```
                    Create Primary DOS Partition


 Current fixed disk drive:1
 Total disk space is 340 Mbytes (1 Mbyte 1048576 bytes)
 Maximum space available for partition is 340 Mbytes (100%)




 Enter partition size in Mbytes or percent of disk space (%) to
 create a Primary DOS Partition.......[20].




 Press Esc to return to FDISK options.
```
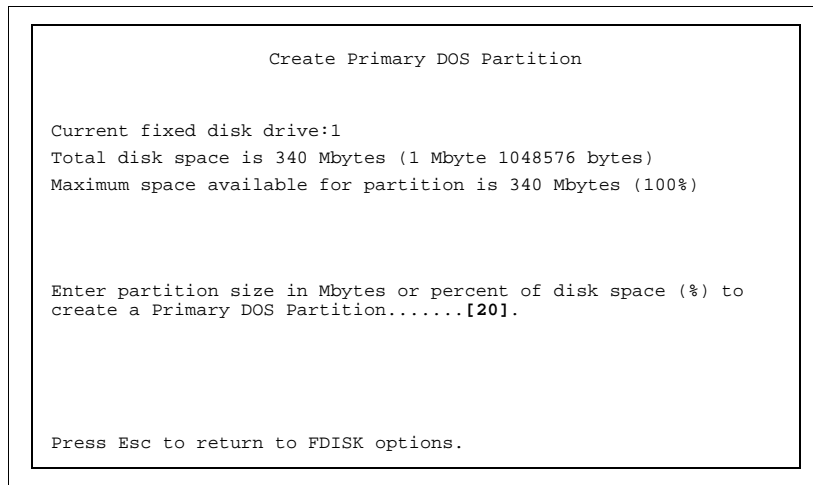
Figure A-4. Fdisks Create Primary DOS Partition Menu

The primary DOS partition is now created but NOT set active. To set the primary DOS partition active, go back to the main FDISK options screen and select option **2 (Change Active Partition).**

Enter the number **1** to make the first partition active as shown in Figure A-5.

```
                     Set Active Partition

 Current fixed disk drive: 1

 Partition Status Type Volume Label   Mbytes  System   Usage
 C: 1             PRI DOS              20      Unknown   2%




 Total disk space is 340 Mbytes (1 Mbyte = 1048576 bytes)
 Enter the number of the partition you want to make active.....[1].

 Press Esc to continue.
```
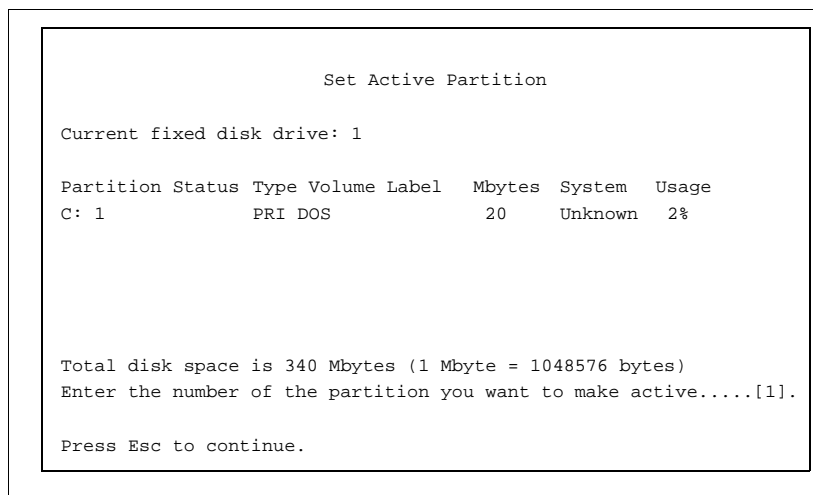
Figure A-5. Fdisks Set Active Partition Menu

An *A* in the status field shows that this partition is now active.

The following message will appear after the partition is set active and you escape from the fdisk program:

System will now restart

Insert DOS diskette in drive A:
Press any key when ready...

Put the DOS setup disk in the floppy drive and press any key to restart DOS.

The 20 megabyte primary DOS partition has now been created and set active. This partition must now be formatted and made bootable.

The MS-DOS 6.0 setup program will now run, it will copy all the DOS files into the c:\DOS directory, created by the program. When asked if you want the setup program to continue press <Enter> to continue and accept all the defaults. The program will give you a choice to format the new partition. Select **Format Partition** and press <Enter>. The setup program will create an "autoexec.bat" and a "config.sys" file.

Create DOS Bootable Disk

Place a blank disk in the OIS12 console drive "A". Enter the following command:

format A: /S

This will create a bootable DOS disk. Label it as such and store with the OIS12 disks included with the OIS12 console.

DOS UTILITIES - EXAMPLES

Adapter Card Utilities

Some of the adapter cards installed in the OIS12 console (e.g., graphic cards, network cards) have provided a utility or configuration disk and user's guide. These utilities should be installed in the DOS partition of the hard disk, using the instructions provided in the adapter card's user's guide.

Create the following directories on the "C" drive, using the name shown in square brackets by typing:

md (dirname) <Enter>

(ALTA)   Install the Alta Diagnostic disk in the floppy drive and at the DOS prompt, enter the commands:

> **xcopy a:*.* c:\alta /s**

Upon completion, switch to drive "C" and enter the commands:

> **cd \alt**
> **alta**

Follow the menus displayed on the screen.

Record the unit's Ethernet address in the Network Planning Form (Appendix C), as it will be required for configuring the network later on in the OIS12 software installation process.

The Ethernet address is twelve digits long, it consists of four sets of three hexadecimal numbers. Hexadecimal numbers also use the letters A-F as well as digits 0-9. An example is 00C 093 00D B4F

[ATI]   Insert the ATI GRAPHICS ULTRA+, or Ultra Pro disk 1 of 3 into the floppy drive. At the DOS prompt, enter the command:

> **a:install**

Select *Install Video Adapter Utilities* and accept the default directory. Follow the instructions displayed on the screen.

When the Main Selection menu re-appears, select the *Set Power-Up Configuration.*

On the Set Power-Up Configuration menu, select the following:

- **Monitor Type:** on the pop-up menu select **Custom, 1024x768, 72Hz non-interlaced** if the computer is a DEC. Press <Esc> to return to the Set Power-Up Configuration menu. If the computer is an HP, select **Custom, 1024x768, 72 Hz non-interlaced.**

- **VGA ROM Configuration**: on the pop-up menu select **16 bits.** Press <Esc> to return to the Set Power-Up Configuration menu.

- **Mouse Configuration:** if you have a three-button ATI Bus Mouse then on the pop-up menu select **Primary Address (23 Ch) and IRQ2**. Press <Esc> to return to the Set Power-Up Configuration menu. If you have a two-button DEC Bus Mouse, leave Mouse disabled.

- **VGA Bus I/O:** on the pop-up menu select **16 bits.** Press <Esc> to return to the Set Power-Up Configuration menu.

- **VGA Memory Size**: on the pop-up menu select **Shared**. Press <Esc> to return to the Set Power-Up Configuration menu.

The remainder of the options should stay at their default selections as listed below.

Power-Up Video Mode : **VGA (CV80)**
Coprocessor Bus I/O : **Auto-Select**
VGA Zero Wait State RAM : **Disabled**

When all selections have been made, press <Esc>. A pop-up window will appear, asking to save the power-up configuration.

Press **Y** and the screen will flicker while the new options are written to the video ROM. The computer will then reboot itself.

Adaptec 2940AU Installation and Configuration

Select a spare PCI card slot position for installation of the Adaptec SCSI controller (refer to Appendix B). Install the card and fasten it securely with the supplied screw. Connect the external SONY optical disk, insert an optical cartridge into the drive and apply power to the unit.

Apply power to the computer. At the *press <Ctrl><A> for SCSI Select utility*, press <Ctrl><A>. Select **Configure/View host adapter settings**. There are slight differences in the 2940U controller BIOS settings. The settings for the 2940AU controller should be as follows.

SCSI Bus Interface Definitions

Table A-1. Menu Options

Options	Settings
Host adapter SCSI ID	7
SCSI parity checking	Enabled
Host adapter SCSI termination	Automatic

Additional Options

Table A-2. Boot Device Configuration

Options	Settings
Boot SCSI ID	0
Boot LUN number	0

Table A-3. SCSI Device Configuration

Options	Settings					
	0	**1**	**2**	**...**	**6**	**7**
Initiate Sync Negotiation	no	yes	yes	...	yes	no
Enable Ultra SCSI Speed	no			...		no
Maximun Sync Transfer Rate	5.0	10.0	10.0	...	10.0	5.0
Enable Disconnection	yes			...		yes
Send Start Unit Command	yes	no		...	no	yes
BIOS Multiple LUN Support	no			...		no
Include In BIOS Scan	yes			...		yes

Table A-4. Advanced Configuration Options

Options	Settings
Plug And Play SCAM Support	Disabled
Reset SCSI Bus at IC Initialization	Enabled
Host Adapter BIOS	Enabled
Support Removable Disks	Disabled
Extended BIOS Translation	Enabled
Display <Ctrl><A>	Enabled
BIOS Support For Bootable CD-Rom	Disabled
BIOS Support For Int13 Extensions	Disabled

NOTE: The IRQ and the I/O Port Address is not selectable.

Network Controllers

HP On-Board Ethernet

The HP XU and XM series of computers have a built-in Ethernet adapter. This adapter is supported for use in the OIS12 system. This adapter is NOT supported for use with a diskless OIC12.

To configure the adapter, you must use the ROM BIOS setup provided by HP. On boot-up, the System Hardware Test screen will show the progress of the BIOS as it checks the computer's hardware.

- Press <F2> on this screen to enter the setup screen.

- Locate the entry for the PCI Integrated Ethernet Interface, refer to the computer's User''s Guide.

- Enable the PCI Integrated Ethernet Interface.

- Press <F3> to save the change, exit the setup program and reboot the computer.

- When the computer reboots, the unique PCI Integrated Ethernet Interface address will be enabled and displayed. For the XU series you must return to the page in the setup menu where you enabled the interface. For the XM series, it is displayed on the summary of the computer's hardware. Record this address in the *NETWORK PLANNING FORM* in Appendix C.

When you install both the QNX Operating System and the OIS12 software, select the NE2100 Ethernet driver. Using the NE2100 Ethernet driver will not require an entry for the IRQ or I/O address.

WinStar-16

The WinStar-16 is an ISA bus, NE1000/NE2000 compatible Ethernet card. All configuration settings are done using a DOS-based setup program supplied with the card. Refer to the *WinStar-16* manual for details on the settings. Use the following procedure to start the DOS-based setup program and to configure the WinStar 16 Ethernet card as shown in Table A-5.

- Boot the PC into DOS.

- Place the WinStar-16 Utility disk in the floppy drive.

- Enter the command: **a:\WSPNP.**

- Select the menu item **View Current Configuration** from the Main menu.

- Record the Ethernet address in Appendix C for this node.

- Verify the Ethernet's card settings as listed in Table A-5. If they do not match, return to the Main menu, select the menu item **Setup WINSTAR-16** and modify the configuration accordingly.

Table A-5. WinStar-16 Configuration

Option	Recommended Settings: OIS12 Server
Operating Mode	Jumperless
Ethernet Address[1]	***************
Medium Type[2]	Auto Detect
Full-duplex	Disabled
I/O Base[3]	340h
Interrupt[4]	10
Boot ROM	No Boot ROM

NOTES:

1. The 12-digit Ethernet address is unique per card.

2. The card's firmware will automatically detect the type of cable connected to the card. You can also specifically select either 10BaseT or 10Base2.

3. Alternative I/O Base addresses available are 320 and 360. Before using address 360, check that the parallel port is not assigned to address 378.

4. Alternative Interrupt is 5.

DOS UTILITIES - EXAMPLES

ALTA EtherCombo-16 T/C

The ALTA is an ISA bus, NE1000/NE2000 compatible Ethernet card. All configuration settings can be done using either the provided DOS-based utility program or jumpers, it is recommended that the jumpers be used to configure the card. The recommended jumper settings are listed in Table A-6. The DOS-based utility program supplied with the card also provides a number of diagnostics. Refer to the **ALTA Ether-Combo-16+ T/C** manual for details on the various jumper settings and diagnostics.

Use the following procedure to start the DOS-based setup program to configure the ALTA EtherCombo-16 T/C Ethernet card as shown in Table A-6 and Table A-7 for OIC12.

- Boot the PC into DOS.

- Place the ALTA EtherCombo-16+ T/C Utility disk in the floppy drive.

- Enter the command: **a:\ALTA**.

- When the Software Configuration menu is displayed, press <Enter>.

- Record the Ethernet address in Appendix C for this node.

- Verify the Ethernet's card settings as listed in Table 4-3. If they do not match, exit the program, power down the PC and check the jumpers.

Table A-6. ALTA EtherCombo-16 T/C Configuration

Option	Recommended Settings: OIS12 Server	
	Value	**Jumpers**
Configuration Mode	Hardware	J1 = OFF
Cabling Type[1]	BNC	J2 + J3 = ON + OFF
ROM Address[2]	C800h	J5 + J6 = OFF + OFF
ROM State	Disabled	J7 = OFF
Access Mode	I/O Port	J8 = OFF
I/O Base Address[3]	340h	J9 + J10 + J11 = OFF + ON + ON
RQ Settings[4]	10	J12 + J13 + J14 = OFF + OFF + ON
8/16 Bit Mode	16 Bit	J15 = ON
Bus Timing	CHRDY	J16 = OFF

NOTES:

1. You must specifically select either UTP (10BaseT, using RJ-45 connectors) or BNC (10Base2).

2. Although the Boot ROM is disabled, do not use address D000h. We have found the Boot ROM if installed on the cards will sometimes interfere with the CTI card even though the Boot ROM is disabled. Alternative ROM addresses available are C800h or D400h.

3. Alternative I/O Base addresses available are 320 and 360. Before using address 360, check that the parallel port is not assigned to address 378.

4. Alternative Interrupt is 5.

Table A-7. ALTA EtherCombo-16 T/C Configuration

| Option | Recommended Settings: OIC12 | | | |
| | Server Or Client-with-Disk Node | | Diskless Node | |
	Value	Jumpers	Value	Jumpers
Configuration Mode	Hardware	J1 = OFF	Hardware	J1 = OFF
Cabling Type[1]	BNC	J2 + J3 =ON + OFF	BNC	J2 + J3 =ON + OFF
ROM Address[2]	C800h	J5 + J6 =OFF + OFF	C800h	J5 + J6 =OFF + OFF
ROM State	Disabled	J7 = OFF	Enabled	J7 = ON
Access Mode	I/O Port	J8 = OFF	I/O Port	J8 = OFF
I/O Base Address[3]	340h	J9 + J10 + J11 = OFF + ON + ON	320h	J9 + J10 + J11= ON + OFF + ON
IRQ Settings[4]	10	J12 + J13 + J14 = OFF + OFF + ON	10	J12 + J13 + J14 = OFF+ OFF + ON
8/16 Bit Mode	16 Bit	J15 = ON	16 Bit	J15 = ON
Bus Timing	CHRDY	J16 = OFF	CHRDY	J16 = OFF

NOTES:

1. You must specifically select either UTP (10BaseT, using RJ-45 connectors) or BNC (10Base2).

2. Although the Boot ROM is disabled, do not use address D000h. We have found the Boot ROM if installed on the cards will sometimes interfere with the CTI card even though the Boot ROM is disabled. Alternative ROM addresses available are C800h or D400h.

3. Alternative I/O Base addresses available are 320 and 360. Before using address 360, check that the parallel port is not assigned to address 378.

4. Alternative Interrupt is 5.

INSTALLING QNX

The OIS12 requires a real-time operating system so that more than one task can be performed at the same time. This sub-section covers installation of QNX, the operating system used. A specific version of QNX is supplied with your program disks. If you are currently running an older version, you will need to back up your configuration. The QNX install program initializes the section of your hard drive used by the QNX operating system. Unless you change the partition sizes, any DOS partition will remain untouched.

You can upgrade your OIS12 system one computer at a time. The entire system does not need to be shut down in order to upgrade. However, each computer being upgraded will need to be shut down just before it is installed. See *Upgrading* in the *INSTALLING OIS12 SOFTWARE (SOFTWARE RELEASE 5.1A or 5.2)* subsection.

INSTALLING QNX FOR OIS12 (SOFTWARE RELEASE 5.1A or 5.2)

This Section describes the installation of the QNX Operating System, version 4.22 or later. Before proceeding with the installation, check that the version number on your set of QNX disks is 4.22 or later.

<table>
<tr>
<td align="center">CAUTION</td>
<td>If you are upgrading an OIS12 system, you must back up your configuration and data before you begin. If you have stored any other files, you should also back them up. The OIS12 will only back up its own files.

QNX must be installed on each computer on the network that has its own hard disk.</td>
</tr>
</table>

> **NOTE:** Diskless OIC12's can be configured on any of the other operator stations and do not need any installation. Refer to the ***Configuration Manual*** after installing the servers and clients-with-disk.

Assumptions

1. If upgrading you must have backed up your configuration and data.

2. You have the following disks:

BOOT disk	1 disk
INSTALL disks	3 disks
NETWORK EXPANSION	0 or more disks
QNX WINDOWS	2 disks

3. You have a Node number plan stating what node number to use for each computer and its Ethernet address. Refer to the subsection ***LICENSING*** in Appendix D for details on defining node numbers. A sample Network Planning Form is provided in Appendix A.

Installation

An automated install program is used to install QNX onto the hard disk.

STEP A   ***Booting from the Floppy Boot Disk***

Insert the Boot disk into the first drive (/fd/0) (A:)

If you are upgrading, exit OIS12.

Boot from the computer. Press <Ctrl Alt Shift Del>.

As QNX is loading you will see a spinning arrow.

Booting from the floppy is slow.

> **NOTE:** The following step numbers follow the pattern used by the automatic QNX installation program.

STEP 1   *Creating a QNX Hard Disk Partition*

At the # prompt type:

   install

QNX's hard disk installation screen is displayed.

This screen displays the QNX Technical support phone number and other miscellaneous warnings. If you require support, call your nearest Elsag Bailey representative.

Follow the prompts which are shown below.

   U.S. Keyboard:

Answer **Y** (U.S. keyboard is the default)

Step 1 screen is displayed

   Creating a QNX Hard Disk Partition.
   Value point machine:

Answer **N** (No is the default)

Verify hard disk type (IDE or SCSI)

   1a Verify drive size (Accept defaults)

The installation program will then run either "fsys.ide" or "fsys.scsi" device driver.

   1b Query free
   1c Query QNX
   1d Fdisk

The fdisk hard drive partition table screen is then displayed.

If no changes are needed to the partition table press **Q** to quit, otherwise, refer to the QNX documentation for a full description of the Fdisk Utility.

STEP 2   *Initializing the QNX file structure*

   2a mount -p /dev/hd0

   Warning QNX partition found (if reinstalling QNX only)

   2b dinit -hq /dev/hd0t77
   2c mount hd0t77 /hd

   Which test do you want?

Answer **V**.

INSTALLING QNX FOR OIS12 (SOFTWARE RELEASE 5.1A or 5.2)

STEP 3   *Copying files from floppy to Hard Drive*

When the Step 3 title box is displayed you will need to wait for the disk access to complete. When the disk light goes out, insert disk 1 and press <Enter>. Insert any additional disks when prompted.

STEP 4   *Making QNX boot from the Hard Drive*

Do you wish to install 32 bit kernel?

Answer **Y**

Enter logical Node #

This is the logical node number you have assigned to your computer. Enter the node number as per your Network Planning Form in Appendix C.

rundos

Answer **N**

Press <Enter> when prompted.

4b   Install setup
/etc/make_links
4b1   tic /usr/lib/....
4c   make ....
4d   Scp -t ......
4e   fdisk ...
4f   fdisk ...

STEP 5   *Create a system initialization file*

Select your time zone.

Select the time zone representing your local time zone from the list displayed.

Example: **U** for Cleveland, Ohio which is in the Eastern Time Zone.

CAUTION	Ensure that the same time zone is used on all computers.

Select time use

This specifies the time to which the battery charged hardware clock is set. This is the clock that keeps time while the computer is turned off. Standard dedicated OIS12 consoles computer should use Global time. Global time is also called Greenwich Mean Time or Universal Coordinated Time (UTC).

Answer **G** - global

INSTALLING QNX FOR OIS12 (SOFTWARE RELEASE 5.1A or 5.2)

How many consoles would you like mounted?

Answer **6**

Will you be using a mouse with this machine?

Answer **Y**

STEP 6   **Configure a network boot server**

Do you wish to configure this machine for use on the QNX network?

Answer **Y**

CAUTION	**You MUST choose to make every node a "Network Boot Server" in order for the installation program to properly configure the network.**

Prior versions of the OIS12 console used dedicated boot servers. The approach used by this version is discussed in *Upgrading* in the next section.

Do you have any network expansion diskettes?

Answer **Y** if you have any QNX Network Expansion disks or if you are networking more than one OIS12 console together, otherwise, answer **N**.

> **NOTE:** If this is not a stand alone machine, there will be one or more network expansion disks.

Insert network expansion licenses

Depending on your OIS12 system configuration, you may have more than one OIS12 and/or OIC12 nodes. For each OIS12 node, a complete set of QNX O/S disks has been provided. For each OIC12 node, a QNX Network Expansion disk has been provided. To increase the network size, all the INSTALL 1 disks and QNX Network Expansion disks must be inserted into the computer, one at a time, at this point of the installation procedure. After inserting each disk, press the <Enter> key.

Answer **No** when finished.

Driver selection

For NE1000 or NE2000 compatible Ethernet cards, choose **b** - ne1000

For NE2100 compatible Ethernet cards, and QNX (version 4.22) choose **c** - ne2100

INSTALLING QNX FOR OIS12 (SOFTWARE RELEASE 5.1A or 5.2)

For NE2100 compatible Ethernet cards, and QNX (version 4.22A.1) choose **d** - ne2100

> **NOTE:** One or two NE2000 error messages will be displayed at the top of the screen. Please ignore them.

Standard arcnet choose   **a** - arcnet

> *Physical to logical mapping*

For Ethernet, enter the 12 digit Physical Node Number. Refer to the ***NETWORK PLANNING FORM*** in Appendix C.

For Arcnet, answer **Y** - use the physical node as the logical node#.

> *Do you wish to configure this machine as a boot server for other machines?*

Answer **Y**

When instructed, remove disk from floppy drive, and reboot - <Ctrl Alt Shift Del>.

Login as **root**

STEP 7   ***Install QNX windows disks***

At the command line prompt #, type

> **install**

Insert window disk 1.

Press <Enter> when prompted.

> *restoring archive*

Press <Enter> when prompted.

Insert disk 2 and press <Enter> when prompted.

Remove any floppies from the drives.

This completes the QNX and QNX windows installation.

Reboot the computer.

INSTALLING OIS12 SOFTWARE (SOFTWARE RELEASE 5.1A or 5.2)

This section describes the installation of the OIS12 Console Software Release 5.1A or 5.2. Before proceeding with the installation, check that the Software Release number on your set of OIS12 disks is 5.1A or 5.2.

This installation guide is written for a first time installation of OIS12 console software. If this is an upgrade, be sure to review the section **_Upgrading_** before installing the software.

> **NOTE:** Before starting the installation of the OIS12 software, if you are using ATI mouse, it must already enabled in DOS before proceeding. Refer to the **_DOS UTILITIES - EXAMPLES_** section of this Appendix for details.

Overview

The consoles are networked to share information between each other. Each computer keeps a list of all other computers in the network. As new computers are added, they are added to these lists. When operator consoles are started, they check with other consoles to see if they missed any additions while they were turned off. When installing the network for the first time, each new additional computer must be able to communicate with a running console in order to obtain a list of other consoles it should communicate with. The first console installed must be fully installed and running before the second or any other console is installed. Once the first and second consoles have been installed, either one of them can be turned off while other consoles are installed. Any installed console can serve to add new computers to the network.

Client vs. Server

- Server consoles are connected to the INFI-NET loop through a CIU. Servers run additional software to support this connection. They also maintain a tag database, updating tags with values received from the loop and transmitting operator actions to the loop. The OIS12 is a Server console.

- Client consoles provide operator interfaces. They communicate with all or selected Servers to obtain tag values. The OIC12 is a client console.

- Server/Client consoles run both Server and Client software. The client software can attach to any Server on the network.

Upgrading

Saving Historical Data Files

Before upgrading your current system, you may have to back up any historical data which has been collected by the Enhanced Data Collection System (EDCS).

INSTALLING OIS12 SOFTWARE (SOFTWARE RELEASE 5.1A or 5.2)

If you are running the version 5.2 of the OIS12 console software, refer to the subsection *Back Up/Restore EDCS Data* located in Section 7 of the Configuration manual.

If you are running version 5.1A of the OIS12 console software and have been using the Enhanced Data Collection system, historical information will be stored on the hard disk and will span the times selected for retention in each of the historical classes.

Perform the following steps to backup your historical data files:

* Shut down the OIS12 console software.

* Exit the QNX Windows by right-clicking on the desktop and selecting **Exit** and **Exit QNX Windows**.

* Press <Enter> to get a login prompt.

* Login as **root** (the default password is **root** if you have not changed it).

Type the following commands:

> **cd /usr/lib/bailey/server/pcv/data/hist**
> **wc -c *.***

The **wc** command will check through all your EDCS data files and return the total amount of disk space used by these files. You can use this number to determine how many diskettes you will need to back up this data. Type the following command to determine how many diskettes you will need:

> **expr** *total from wc* **/ 2500000**
> (e.g., **expr 7649384 / 2500000)**

The result returned will be the number of diskettes you will require.

To back up the EDCS data files, type the following command:

> **pax -wv *.* | freeze | vol -w /dev/fd0**

You will the be prompted to insert your first diskette to begin the backup. The diskettes do not have to be already formatted for QNX4.

After you have completed the installation of the OIS12 software, you will be able to back up or restore historical information using the Backup/Restore EDCS Data function located in the Utilities menu.

Saving Configuration and Data Files

Back up your configuration, and data using the **File Backup Utilities** provided. Also back up any other non-OIS12 files that you might have created. Be sure to back up the configuration on EACH console.

You can upgrade your system one machine at a time. The entire system does not need to be shut down in order to upgrade. However, each console being upgraded will need to be shut down and will remain shut down while it is being reloaded. As consoles are brought up, they communicate only with other consoles of the same release version of software.

You will need to plan the change-over with regards to:

• The order of consoles to upgrade.
• The order the configurations will be reloaded.
• Missing tags which are located only on old release servers.
• Moving cables, if necessary.

The OIS12 console generally provides the operator interface, while automatic process control occurs in the Process Control Units. However, if you are using Logging to export values to tags in the database, you may have a control scheme in the OIS12 console, which you will need to account for during the upgrade.

After you upgrade a console, install the configuration using the **File Restore Utilities**, then shut down and reboot. This configuration is read during system start-up.

With prior versions of OIS12 servers, only boot servers booted from their own hard drives. With the current version all except diskless consoles will boot from their own hard drives. Although there is no need for specifically identified boot servers, each console must be configured as a boot server. This allows any of the Server-Clients or Clients-With-Disk to service boot requests from Diskless-Clients. With Ethernet, the Boot Server is transparently selected. For Ethernet cards you will need to modify the card's configuration as described in *NETWORK CONTROLLER CARD* in Section 4 and *Network Controller Card* in Section 5.

Assumptions

1. You have installed the QNX operating system as described in earlier subsection *INSTALLING QNX* of this Appendix.

2. You have the following volumes as listed in Table A-2 to install the base OIS12 software.

INSTALLING OIS12 SOFTWARE (SOFTWARE RELEASE 5.1A or 5.2)

CAUTION	**Do not press <Esc> unless you want to abort the installation. After aborting, you will need to re-install QNX and OIS12 software so that the software is correctly installed.**

Installation of Security Key

Included with your OIS12 software is a SentinalC-plus Security Key attached to the parallel port of the console. This device is used to identify registered copies of OIS12. Without the key, a pop-up window will appear once every five minutes declaring the software to be unregistered.

CAUTION	**Before installing or removing the security key, the computer *MUST* be turned off and proper anti-static safety precautions must be followed.** **Before connecting or disconnecting a printer to the security key, the printer *MUST* be turned off.**

To install the security key, simply attach the key to the parallel port 25 pin DIN connector at the rear of the computer. The port selected must be configured as LPT1. Tighten the thumb-screws to secure the key and connect the printer to the key. The SentinelC-plus security key is a passive device which allows the parallel port to function normally.

Installation

STEP 1 **Booting from Disk**

Reboot using the following steps:

Remove any floppy disks from the drives.

Press <Ctrl Alt Shift Del>

Login: **root**

STEP 2 **Setting Configuration Options**

Insert the pcvInstall disk in the first floppy drive.

Type: **install**

You now will see the Introduction screen (Figure A-6).

Answer **No** ONLY if this is the only computer running OIS12 software or you will not be networking these computers (Figures A-7 and A-8).

Only answer **Yes** on one machine. See *Overview* above.

```
        ------    Introduction    ------
    This program will guide you through the installation proce-
    dure. Before continuing, check the Installation Manual to
    make sure you If you are upgrading from an older version of
    software, you must have a recent backup of your configura-
    tion. Each computer has its own configuration so you should
    have a backup for each computer on your network.

    If you DO NOT have the existing configuration for this com-
    puter backed up, you are NOT ready to continue with the
    installation.

    You can quit the installation program at any prompt by press-
    ing <Esc>.

    This procedure will: - Build operating system files. - Add
    the node to the network, if this is a networked installation.
    - Copy the diskettes to the hard disk and start the LAN-90
    PCV software.

Press <Enter> to continue, <Esc> to exit Install
```

Figure A-6. OIS12 Introduction Screen

```
        Do this computer contain network card?

                    Yes      No
```
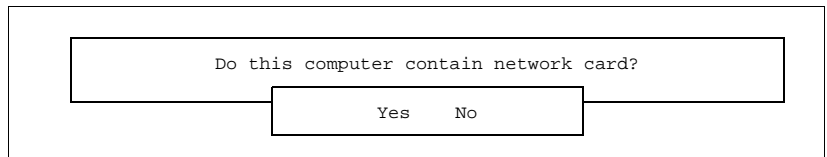
Figure A-7. Network Card Query

```
        Is this the first OIS12 node to be
            installed on the network?

                    Yes      No
```
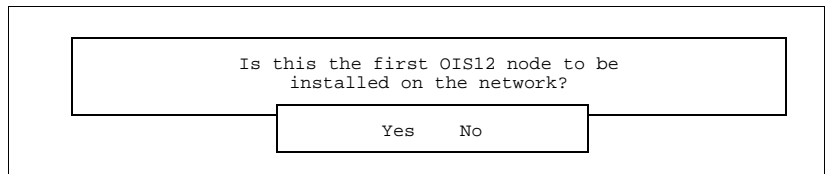
Figure A-8. First Node Query

The hardware configuration screen (Figure A-9) presents a list of hardware related selections. Verify each in the list and make any necessary changes. The fields CONSOLE TYPE and NETWORK TYPE will not appear if the console is stand-alone.

CLOCK [UTC, local]:

This specifies how the battery charged hardware clock is set. This is the clock that keeps time while the computer is turned off. Standard dedicated consoles should use UTC (Universal Coordinated Time) formerly known as Greenwich Mean Time. However if this computer is only occasionally used for LAN-90 PCV and is mostly used for DOS applications then the clock would probably be used with local time.

Answer: **UTC**

INSTALLING OIS12 SOFTWARE (SOFTWARE RELEASE 5.1A or 5.2)

```
┌────────────────────< Hardware Configuration >────────────────────┐
│                                                                   │
│  CLOCK:                      UTC Local                            │
│  TIME ZONE:                  Eastern                              │
│  KEYBOARD:                   USA                                  │
│  HARD DISK DRIVER:           Fsys.ide                            │
│  CONSOLE TYPE:               SERVER CLIENT                        │
│  NETWORK TYPE:               Ethernet Arcnet                      │
│  Driver :                    NE-2000 NE-2100 WD-8003              │
│  IRQ :                       10 11 12 15 2 3 4 5                  │
│  I/O Port :                  340 320 360 300                      │
│  Physical Address :          00C09300DB48                         │
│                                                                   │
│  ───────────────────────────────────────────────────────────     │
│                                                                   │
│  F1 Make System Files                                             │
│  F9 Help                                    F0 Next Screen        │
│                                                                   │
└───────────────────────────────────────────────────────────────────┘
```
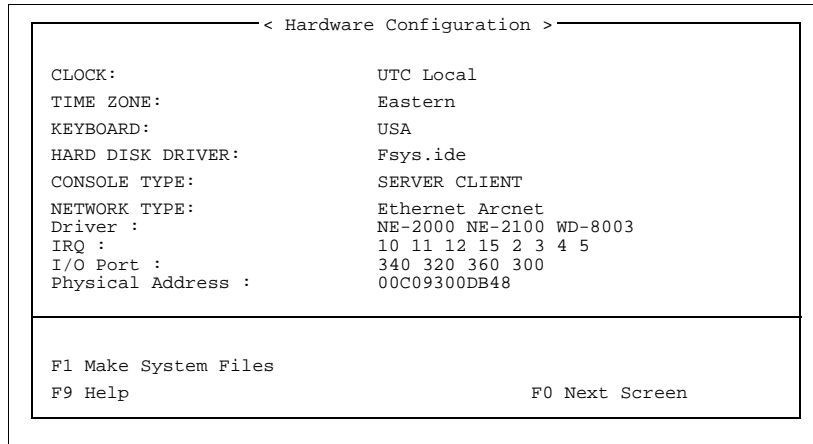
Figure A-9.   Hardware Configuration

TIME ZONE:

A pop-up window is displayed. Choose the local time zone
in which this computer is located, by using the <Ctrl> and
<Up> and <Down> arrow keys. Standard time and day-
light-savings time are automatically handled by the operat-
ing system.

KEYBOARD:

A pop-up window is displayed. Choose the language style
of the keyboard, by using the <Ctrl> and <Up> and <Down>
arrow keys.

Answer: **USA**

HARD DISK DRIVER:

Displays the name of the driver that LAN-90 PCV has
detected. The two standards are IDE or SCSI.

CONSOLE TYPE: [Server, Client]

Servers always have a connection to a CIU. Clients never
do.

NOTE: You will need to re-install starting with the QNX Operating
System to change the computer from client to server or back.

NETWORK:

Set the following entries to match the network card's con-
figuration. Enter the 12 digit Ethernet address for the
physical address.

Type [Ethernet, Arcnet].
Driver.

IRQ.
I/O Port.
Physical Address.

Confirm fields and write system files. Press <F1>

Exit configuration screen. Press <F10>

STEP 2A   ***Adding Nodes Network***

The following menu will appear only for networked OIS/OIC12's. Other node's Node Number and Ethernet address.

```
┌──────────────── < Add Node to Network > ─────────────────┐
│                                                          │
│  Information about one OTHER LAN-90 PCV 5.1 node is needed in order │
│  to add this computer to the network.                    │
│  Please ensure the OTHER computer is running LAN-90 PCV 5.1 and is  │
│  physically connected to the network.                    │
│  Enter the OTHER node's logical node number      : 1     │
│  Enter the OTHER node's physical network address : 00C093012DF2 │
│                                                          │
│                                                          │
│                                                          │
├──────────────────────────────────────────────────────────┤
│                                                          │
│  F1 Accept                                               │
│                                                          │
└──────────────────────────────────────────────────────────┘
```
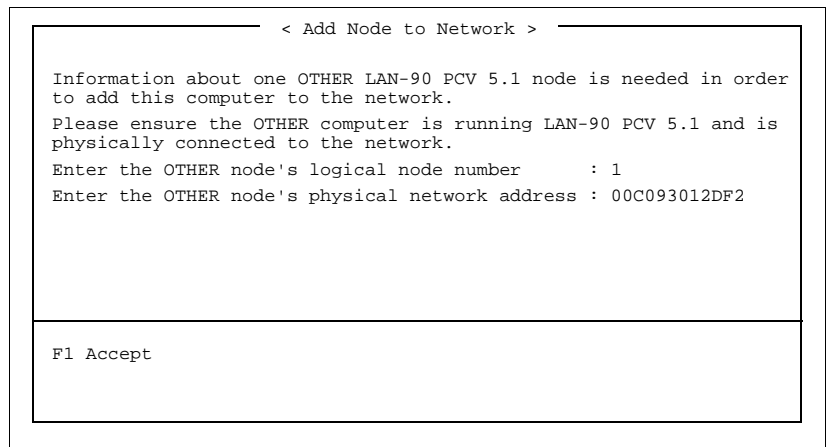
Figure A-10. Adding a Node to the Network

For computers with Ethernet cards, the installation progam will request the logical node number and Ethernet address of another computer on the network. If the logical node number or Ethernet address is incorrect or this computer is currently turned off you will receive an error message. Correct the address or enter the address of another computer that is running. When communication across the network is established, this computer will be added into the list of computers on this network, and system files will be created and copied.

STEP 3   ***Copying Volumes***

You will now see the Copy Software screen (Figure A-11).

This screen prompts you to insert the OIS12 volumes based on the type of node this computer is, refer to Table A-8. Each volume may include one or more actual disks.

As the first disk of each volume is inserted, pressing <Enter> will display an *accessing archive* message and the name of the volume set. Press <Enter> again to install this volume.

INSTALLING OIS12 SOFTWARE (SOFTWARE RELEASE 5.1A or 5.2)

```
         ---- Copy the software to the hard disk ----
   This step will copy the floppy disks to the hard disk.

   The floppies to be copied and the order to copy them depend on
   your configuration.See your manual for a list of the disks to
   copy for your configuration.

   This software is shipped as a set of volumes. Each volume
   consists of a set of floppy disks. When asked to insert the
   first disk of a volume, please insert the disk labeled "Disk 1
   of X" into the floppy disk drive.

   NOTE:  when asked to insert a new disk you must wait for the
          disk drive light to go out before removing the floppy
          disk.

Press <Enter> to continue, to exit Install
```

Figure A-11. Copying Volumes

Table A-8. Standard OIS12 Volumes

Volume Name	OIS12	OIC12 (with hard disk)
Installation	Yes	Yes
Programs	Yes	Yes
Server	Yes	No
Client	No	Yes
5000 tag database	Yes	No
Logging Application	Yes	Yes
Ripcam	Yes	Yes
OIS12	Yes	Yes

STEP 4   *Copying Optional Volumes*

Other optional packages (Table A-9), such as redundancy can be installed now as well. You may also install optional packages from inside the OIS12 console. Use the **Main Menu, Configuration, Setup, Install Options** selections.

STEP 5   *Install Completed*

When all volumes are installed, remove the disks and press <F10>. The program will adjust system files.

When the finished screen is displayed, press <Enter> to reboot and start the OIS12 software.

Table A-9. Optional OIS12 Volumes

Volume Name	OIS12	OIC12 (with hard disk)
Redundancy[1]	YES	YES
Quality Analysis & Control	YES	YES
classConnect/DDE Package[2]	***************	***************
1 Node TCP-Link or 4 Node TCP-Link 4[3]	YES[4]	YES[4]
Harmony	***************	***************
Protocol Specific Driver[5]	YES	NO

NOTES:

1. Installing the Redundancy Volume on all nodes, allows every node to have access to the Redundancy functions.

2. Refer to the Section 2 — ***Installation of the classConnect/DDE*** manual for details in loading the QNX TCP/IP disk onto the OIS12 node and the set of classConnect/DDE disks to be loaded into the DOS computers.

3. Either a 1-Node or a 4-Node TCP-Link Volume is supplied with the classConnect package and is dependant on the number of DOS computers (1 or 4) allowed to communicate with the OIS12 system.

4. The node selected to be the bridge between the OIS12 network and the DOS network can be either an OIS12 or OIC12 node.

5. The actual Protocol Specific Driver (PSD) provided will depend on the type of PLC with which you wish to communicate.

ADDING A NEW CONSOLE

STEP 1   *Updating current consoles*

Each console on the network requires a copy of every license issued. Any console lacking enough licenses will not be able to communicate with the network. Thus the first step to installing a new console is to add the new license to every console on the network.

Method 1 - Console by console

On each console, menu <right> click on the grey background, select **Programs** from the Workspace menu presented. Choose **Shell** from the Programs menu. You will be presented with a new window and the QNX prompt. Insert the new license expansion disk in the floppy drive.

Enter **login root** (you will need the password).

Enter **license**

Enter **license -r**

On the last console,
Enter **slay -fsSIGUSR1 bciNet.dbase**

Enter **exit** (to cancel root privileges and close the window).

The window will close. Go to the next console and repeat on every console.

Method 2 - Over the network

On the node 1 (//1) console, menu <right> click on the grey background, select **Programs** from the Workspace menu presented. Choose **Shell** from the Programs menu. You will be presented with a new window and the QNX prompt.

Insert the new license expansion disk in the floppy drive.

Enter **login root** (you will need the password).

Enter **license**

Enter **license -r**

Enter **license //1/etc/licenses //2/etc/licenses**

Enter **license //1/etc/licenses //3/etc/licenses**

    … etc., for all nodes

Enter **slay -fsSIGUSR1 bciNet.dbase** to have the network database recognize the new network size.

Enter **netmap** to see the list of running nodes. Nodes that are off, will show as Tx failures. On the nodes that are down, you will need to use method one in order to allow them to connect to the network.

Enter **exit** (to cancel root privileges and close the window)

STEP 2   *Update the network plan*

Add the new console's information to the **NETWORK PLANNING FORM** in Appendix C.

STEP 3   *Install QNX*

Follow the instructions in the subsection **INSTALLING QNX**. Be sure to install license expansion disks for every node on the network, not just the new console. If you are adding a fifth console to a network of four consoles, you will need to insert five license expansion disks into the new console.

STEP 4   *Install OIS12 console software*

Follow the instruction in the appropriate subsection **INSTALLING OIS12 SOFTWARE (SOFTWARE RELEASE 5.1A or 5.2)** of this Appendix.

STEP 5   *Include the new OIS12*

If the new console is an OIS12, all other nodes in the OIS12 network must be shut down and rebooted, so that the Network Status menu will include the new OIS12.

Changing a Stand-Alone Console to a Networked Console

STEP 1   *Install and configuring the network card*

Refer to the subsection ***NETWORK CONTROLLER CARD*** in Section 4 of this manual for installing the Ethernet card.

STEP 2   *Adding licenses to standalone console*

With the console running, follow Method 1 of Step 1 in the ***ADDING A NEW CONSOLE*** section to install additional licenses on the standalone console.

STEP 3   *Changing to a Networked Console*

Next, you must rebuild your system files to change the standalone console to a networked console. Press/click **D Configuration** from the Main menu to display the Configuration menu. Press/click **J Setup** to display the Setup menu. Press/click **A Network Setup** to display the Network Setup menu. Press/click **B Rebuild System Files** to display the Hardware Configuration screen.

You will notice that you are now asked whether the console is still standalone. Answer the default of **No**.

Since the computer now has a network card, a new section for network settings appears in the Hardware Configuration screen. Confirm the settings and enter your 12 digit Ethernet address. Press <F1> to rebuild the system files with your current settings.

Shut down your standalone console and reboot. Once restarted, your console is ready to recognize other consoles as they are added to the network.

Changing the Ethernet Card in Your Console

If you change the Ethernet card you are using in your console, you must let the OIS12 software know about this change. Follow these steps to identify and use the settings on your new Ethernet card.

STEP 1   *Install and configuring the Network Card*

Refer to ***NETWORK CONTROLLER CARD*** in Section 4 for installing the Ethernet card.

STEP 2   ***Recognizing the Console on the Network***

On one of the consoles on the network follow these steps:

Menu <right> click on the grey background, select **Programs** from the Workspace menu presented. Choose **Shell** from the Programs menu. You will be presented with a new window and the QNX prompt.

Enter **login root** (you will need the password)

Enter **netmap -m"**<node><space>**1**<space> <Ethernet address>**"-n** <other node>

Where:

<node>   Is the node number of the console in which you changed the Ethernet card.

<space>   At least one space must be left between each entry.

<Ethernet address> Is the 12 digit Ethernet address of the new network card you installed in the console.

<other node>   Is the node number of each of the other nodes on the network.

For example: **netmap -m"3 1 00c09300efdf" -n1**
              netmap -m"3 1 00c09300efdf" -n2

This identifies a new Ethernet card on the network for nodes 1 and 2.

Enter **netmap node 3's**

This displays the current network mapping used by this node.

Enter **exit** or press <Ctrl D>

This cancels root privileges and closes the window.

The network is now up to date. You do not have to reboot any of the consoles.

STEP 3   ***Configuring your Network Card settings with the Software***

You must rebuild your system files to use the new physical Ethernet address and keep the console recognized on the network. Press/click **D Configuration** from the Main menu to display the Configuration menu. Press/click **J Setup** to display the Setup menu. Press/click **A Network Setup** to display the

Network Setup menu. Press/click **B Rebuild System Files** to display the Hardware Configuration screen.

Confirm your I/O port address and interrupt. Enter the 12 digit physical Ethernet address of your new network card. Press <F1> to rebuild the system files with your current settings.

Connecting Two OIS12 Networks Together

Connecting two OIS12 networks together involves many detailed steps as listed below. A primary problem lies in the fact that the two network definitions may be using the same internal identifiers for different Servers and nodes. If you simply connected the two networks together, the network databases would exchange definitions resulting in mismatched and/or duplicate entries in the network database, the result being erratic behaviour and *ghost* servers. Before beginning the procedure listed below, you *must* be familiar with the QNX operating system and OIS12.

To join two networks together the following procedure should be used:

1. Ensure that ALL nodes in the combined network have unique node numbers. For any nodes that have duplicate node numbers, one node must be reloaded starting with QNX and must be given a unique node number. This change to the node should be done before performing the remainder of this procedure and can be connected to the master network (see Step 3).

2. Ensure that ALL nodes have enough QNX licenses to support the total number of nodes in the combined network.

3. Choose one network to be the master network. The other network will be called the source network. You will be transferring nodes from the source network to the master network one at a time.

4. On one of the nodes on the source network, log into OIS12 as SYSOP.

5. Format a QNX floppy using the **Utilities-> Miscellaneous Disk Utilities-> Format Media** from the OIS12 Main menu.

6. Open a shell. (<Right> click the mouse on the desktop (grey background) and select **Programs-> Shell** from the Workspace menu).

7. Change to the root user by typing **su** <Enter>, followed by the root password (default is **root**).

8. Create a copy of the source system's netmap file on the floppy disk by typing the command: **netmap > /fd/0/netmap1.**

9. Take the floppy disk over to a node on the master network.

10. Login as SYSOP, open a shell (as described in Step 6), and switch to the root user (as described in Step 7).

11. Create a copy of the master system's netmap file on the floppy disk by typing the command: **netmap > /fd/0/netmap2.**

12. Merge and sort the two netmap files by typing the command: **sort -u /fd/0/netmap1 /fd/0/netmap2 > /fd/0/netmap**

13. Copy the combined netmap file to the network by typing the command: **cp /fd/0/netmap /etc/config**

> **NOTE:** If the OIS12 software is not running on the network when you copy the file, you will have to copy the file to every node on the network.

14. Get a list of all the nodes on the network by typing the command: **sin net**

15. Update the netmap on each listed node by typing the command: **netmap -f -n** *node* where *node* is the node number.

16. Take the floppy over to the source network and repeat steps 13, 14, and 15. Both the master and source network should have the same netmap file.

17. Go to the node on the master network (that was used previously), insert the floppy disk and copy the master network file onto the floppy by typing the command:
cp /usr/lib/bailey/system/config/net_dbase/network /fd/0

18. Return to the source network and copy the network file to each node on the source network by typing the command:
p /fd/0/network //*node***/usr/lib/bailey/system/config/net_dbase**
where *node* is the node number.

At this point, all the nodes on the two networks should contain the combined netmap and master's network files. The next steps will merge the two networks together in a safe manner. At this point you have three options depending on the physical layout of your network. The easiest method is to simply power down all the nodes on the source network. If you have no operational problem in doing this, then follow the steps under ***Power Down Option***. If you cannot power down the entire source network but you can physically switch the nodes between the source and master network, then follow the steps under ***Physically Switch Networks Option***.

If neither of these options is practical, you will have to follow the steps under *Operational Option*.

Power Down Option

1. Power down every node on the source network.

WARNING	**If you forget to power down even one node you will experience problems.**

2. Join the two network segments together.

3. Power up each node, one at a time. You should wait for the node to enter graphics mode before powering up the next node. If the node is a Server node, it will boot up as a Client node. Use **Configuration-> System Options-> Console Options** from the OIS12 Main menu (for that particular node) and redefine it as a Server node again (including creating a redundant group, if necessary), then shut down and reboot the node to enable the Server software.

Physically Switch Networks Option

1. Power down a node on the source network.

2. Disconnect the node from the source network and reconnect it to the master network.

3. Power up the node. If the node was a Server node, it will boot up as a Client node. Use **Configuration-> System Options-> Console Options** from the OIS12 Main menu (for that particular node) and redefine it as a Server node again (including creating a redundant group if necessary), then shut down and reboot the node to enable the Server software.

4. Repeat steps 1 to 3 for each node on the source network.

Operational Option

1. Disconnect as many server nodes from the source network as you need to maintain operational status. Until they are reconnected to the master network, they will act as stand-alone machines. (Redundant server pairs will become independent stand-alone servers.)

2. Power down all other nodes on the source network.

3. Join the two network segments together.

4. Power up each node, one at a time. You should wait for the node to enter graphics mode before powering up the next node.

If the node is a Server node, it will boot up as a Client node. Use **Configuration-> System Options-> Console Options** from the OIS12 Main menu (for that particular node) and redefine it as a Server node again (including creating a redundant group if necessary), then shutdown and reboot the node to enable the Server software.

5. Power down one of the stand-alone server nodes.

6. Connect it to the master network.

7. Power up the node. It will boot up as a Client node. Use the menus **Configuration-> System Options-> Console Options** from the OIS12 Main menu (for that particular node) so you will have to go into System Options and redefine it as a Server node again (including creating/assigning a redundant group if necessary) then shutdown and reboot the node to enable the server software. At this point, any attached client nodes will regain access to the server node.

8. Repeat steps 5 to 7 for each remaining stand-alone Server node.

After rebooting all the nodes from the source network, you will notice that the list of Servers on the Network Status menu is incomplete (usually on the nodes on the original master network). To make this list complete, each node on the master network must be shut down and rebooted. This does not have to be done all at once, the restarting of each node can take place whenever it is most convenient to you.

Error Recovery

If you are experiencing problems after connecting two networks together, there are two important places to look.

If the node cannot be seen by any other node, check the **/etc/config/netmap** files. The most likely cause is an incorrect Ethernet address or multiple addresses for the same node. Use the "qed" editor to correct these files.

If ghost server names appear, or clients cannot locate servers on the network, check the **/usr/lib/bailey/system/config/net_dbase/network** file. Choose one node and open the network file using the "qed" editor. Look for duplicate server entries for the same node:

> **PCV -N 1 -I 9 -F PCV.1 -B //1/usr/lib/bailey/pcv/rel5.2 -W…**

> **PCV -N 2 -I 10 -F PCV.2 -B //2/usr/lib/bailey/pcv/rel5.2 -W…****

> **PCV -N 2 -I 11 -F BOILER2 -B //2/usr/lib/bailey/pcv/rel5.2 -W…****
> ** Duplicate entry

In the above example; there are two OIS12 server entries (-F) for node 2 (-N 2). In this case, simply delete the entry that should not be there (most likely the "PCV.2" entry). Once you have corrected the error, save the file and the run the following command:

slay -sSIGUSR1 -f bciNet.dbase

This will cause the network database to reread the network file.

Initial Configuration

Once each computer has booted and you have logged in, not all your hardware is ready to work. There are some further tasks to complete the installation.

These tasks include, configuring as appropriate:

> CIU communication.
> Intellicon serial card.
> Optical disk.
> Diagnostic output.
> Mylar keyboard.
> Alarm terminal.
> Keyboard switching.
> Printer configuration.
> Server software options.
> Enhanced data collection system.
> Archiving.
> Redundancy.

Computers can be configured across the network. You do not need to be seated at that screen in order to change the configuration.

All these tasks (except Printer Configuration) are performed through the **Main Menu, Configuration, System Options, Console Configuration** menu path. These items are described in Section 2 of the Configuration Manual.

The Printer Configuration is performed through the **Main Menu, Configuration, Configure Printer Spoolers** menu path. This is described in Section 8 of the ***Configuration Manual***.

APPENDIX B - HARDWARE VARIATIONS

Over a period of time, the type of computer supplied in the OIS12 console and OIC12 console may vary. These computers are functionally equivalent, differing slightly in appearance. The following details indicate the exact configuration of the computers. Note the slot positions of the internal cards.

DIGITAL EQUIPMENT, CELEBRIS GL 6200 DESKTOP

- Elsag Bailey P/N L700796AA11 for IIOIS12.

C/W   200 MHz Pentium Pro CPU.

32 Mb RAM.

256 kb cache.

1 PCI, 1 PCI/ISA, 1 ISA slot.

130-W power supply.

Custom floppy drive connector and cable.

545-Mb (min.) EIDE disk drive.

DOS diskettes and manuals.

Keyboard (5-pin DIN), mouse[1].

Keyboard adapter (PS/2 to 5-DIN).

Shrouded male AC cord.

S3 Trio 64 video card (PCI) L750058B1/C1.

Ethernet card (ISA) L750067B2.

External floppy drive connectors mounted on rear knock-out openings.

[1]Mouse assembly Elsag Bailey P/N L700912A1.

CARD SLOT POSITIONS
(Slot 1 at bottom)

1   S3 Trio 64 video card (PCI) L750058B1/C1.

2   Spare (ISA/PCI).

3   Ethernet card (ISA) L750067B2.

DOS installed on 20-Mb partition.

DIGITAL EQUIPMENT, CELEBRIS GL 6200 DESKTOP

- Elsag Bailey P/N L700796AA11 for IIOIC12.

C/W 200 MHz Pentium Pro CPU.

32 Mb RAM.

1 PCI, 1 PCI/ISA, 1 ISA slot.

545-Mb (Min.) EIDE disk drive.

Qwerty keyboard, mouse[1].

S3 Trio 64 video card (PCI)) L750058B1/C1.

Ethernet card (ISA) L750067B2.

[1]Mouse assembly Elsag Bailey P/N L700912A1.

CARD SLOT POSITIONS

Same as IIOIS12.

HEWLETT-PACKARD, VECTRA VA 6200

- Elsag Bailey P/N L700986P4 for IIOIS12.

C/W 200 MHz Pentium Pro CPU.

32 Mb RAM.

256 kb cache.

2 serial, 1 parallel port.

2 PCI, 1 PCI/ISA, 1 ISA slot.

Ethernet card (ISA) L750067B2.

S3 video card (PCI) L750058B1/C1.

3.5-in. floppy drive (remote).

Custom floppy drive connector and cable.

545-Mb (Min.) EIDE disk drive.

DOS diskettes and manuals.

Qwerty keyboard (5-pin DIN), mouse[1].

Keyboard adapter (PS/2 to 5-DIN).

Shrouded male AC cord.

CTI Intellicon-2 serial card.

Floppy drive slot cover plate.

[1]Mouse assembly Elsag Bailey P/N L700912A3.

CARD SLOT POSITIONS (Slot 1 at bottom)

1 External floppy drive connector.

2 (ISA/PCI) Ethernet card L750067B2.

3 (PCI) S3 video card L750058B1/C1.

4 (PCI) spare.

DOS installed on 20-Mb partition.

HEWLETT-PACKARD, VECTRA VA 6200

- Elsag Bailey P/N L700986P5 for IIOIC12.

C/W 200 MHz Pentium Pro CPU.

3.5-in. floppy drive.

2 serial, 1 parallel port.

2 PCI, 1 PCI/ISA, 1 ISA slot.

256 kb cache.

32 Mb RAM.

545-Mb (Min.) EIDE disk drive.

Qwerty keyboard (5-pin DIN), mouse[1].

[1]Mouse assembly Elsag Bailey P/N L700912A3.

CARD SLOT POSITIONS

Same as IIOIS12

HEWLETT-PACKARD, VECTRA VL5 5133, 5166

- Elsag Bailey P/N L700986n4 for IIOIS12.

C/W 133 OR 166 MHz Pentium CPU.

Built-in S3 video with 2 Mb DRAM.

256 kb cache.

2 serial, 1 parallel port.

1 PCI, 1 PCI/ISA, 2 ISA slots.

Built-in Ethernet, add coax port (D3979A).

32 Mb RAM.

3.5-in. floppy drive (remote).

Custom floppy drive connector and cable.

545-Mb (min.) EIDE disk drive.

DOS diskettes and manuals.

Qwerty keyboard (5-pin DIN), mouse[1].

Keyboard adapter (PS/2 to 5-DIN).

Shrouded male AC cord.

CTI Intellicon-2 serial card.

Floppy drive slot cover plate.

[1]Mouse assembly Elsag Bailey P/N L700912A3.

CARD SLOT POSITIONS (Slot 1 at bottom)

1 External floppy drive connector.

2 CTI card (L750021A3).

3 Blank.

4 Blank.

DOS installed on 20-Mb partition.

HEWLETT-PACKARD, VECTRA VL5 5133, 5166

- Elsag Bailey P/N L700986N4 for IIOIS12.

C/W   133 OR 166 MHz Pentium CPU.

32 Mb RAM.

256 kb cache.

2 serial, 1 parallel port.

1 PCI, 1 PCI/ISA, 2 ISA slots.

3.5-in. floppy drive.

Built-in S3 video with 2 Mb DRAM.

Built-in Ethernet, add coax port (D3979A).

Qwerty keyboard (5-pin DIN), mouse[1].

545-Mb (min.) EIDE disk drive.

[1]Mouse assembly Elsag Bailey P/N L700912A3.

DIGITAL EQUIPMENT, VENTURIS FX 5133, 5166 Low Profile

- Elsag Bailey P/N L700796W11 for IIOIS12.

C/W   133 or 166 MHz Pentium CPU (min.)

256 kb cache.

2 serial, 1 parallel port.

1 PCI, 1 PCI/ISA, 1 ISA slot.

100-W power supply.

32 Mb RAM (min.).

1.44-Mb floppy drive (remote).

Custom floppy drive connector and cable.

535-Mb (min.) EIDE disk drive (L750115A1).

DOS diskettes and mouse[1].

Keyboard (5-pin DIN).

Keyboard adapter (PS/2 to 5-DIN).

Shrouded male AC cord.

CTI Intellicon-2 serial card.

Alta Ethernet card.

On-board Trio 64 (2 Mb DRAM) video.

External floppy drive connectors mounted on rear knock-out openings.

[1]Mouse assembly Elsag Bailey P/N L700912A1.

CARD SLOT POSITIONS
(Slot 1 at bottom)

1   Spare (PCI).
2   Spare (ISA/PCI).
3   Alta card (L750067B2).

DOS installed on 20-Mb partition.

DIGITAL EQUIPMENT, VENTURIS FX 5133, 5166

- Elsag Bailey P/N L700796W13 for IIOIC12.

C/W   133 or 166-MHz Pentium CPU (min.).

                     24 Mb RAM (min.).

                     On-board Trio 64 (2 Mb DRAM) video.

                     3.5-in. floppy disk drive.

                     MS Windows/DOS diskettes.

                     545-Mb (min.) EIDE hard drive.

                     Keyboard, mouse[1].

                     1 ISA slot, 1 PCI, 1 PCI/ISA.

1. Mouse assembly Elsag Bailey P/N L700912A1.

Ethernet card (P/N L750067B2) installed in slot 3 (top).

DIGITAL EQUIPMENT CORPORATION, VENTURIS FP 590, 5120

- Elsag Bailey P/N L700796N11 for IIOIS12.

C/W   90 or 120 MHz Pentium CPU (min.).

                     256 kb cache.

                     2 serial, 1 parallel port.

                     1 PCI, 1 PCI/ISA, 3 ISA slots.

                     200-W power supply.

                     32 Mb RAM (min.).

                     1.44-Mb floppy drive (remote).

                     Custom floppy drive connector and cable.

                     535-Mb (min.) SCSI disk drive (L750115A1).

                     Adaptec 1540CF or 1542 CF SCSI controller.

                     DOS 6.22 (or later) diskettes and mouse[1].

                     Keyboard (5-pin DIN).

                     Keyboard adapter (PS/2 to 5-DIN).

                     Shrouded male AC cord.

                     SCSI terminator, external.

                     CTI Intellicon-2 serial card.

                     Alta Ethercombo 16+T/C Ethernet card.

                     On-board S3 Trio 64 (2 Mb) video.

[1]Mouse assembly Elsag Bailey P/N L700912A1.

CARD SLOT POSITIONS (Slot 1 at bottom)
1	External floppy drive Connection.
2	
3	Alta card (L750067B2).
4	CTI card (L750021A3).
5	Adaptec card (L700797A1/A2).

DOS installed on 20-Mb partition.

DIGITAL EQUIPMENT CORPORATION, VENTURIS FP 590, 5120

- Elsag Bailey P/N L700796P13 for IIOIC12.

C/W   90 or 120 MHz Pentium CPU (min.).

On-board Trio 64 (2 Mb DRAM) video.

256 kb cache.

3 ISA slots, 1 PCI, 1 PCI/ISA.

16 Mb RAM (min.).

3.5-in. floppy drive.

Adaptec SCSI controller.

545-Mb (min.) SCSI hard disk drive.

Keyboard, mouse[1].

[1]Mouse assembly Elsag Bailey P/N L700912A1.

CARD SLOT POSITIONS (Slot 1 at bottom)
1
2
3   Alta card (L750067B2).
4
5   Adaptec card (L700797A1/A2).

HEWLETT-PACKARD, VECTRA XM4 5133, 5166

- Elsag Bailey P/N L700986H4/K42 for IIOIS12.

C/W   120 or 133 MHz Pentium CPU (min.).

Built-in S3 video with 2 Mb DRAM.

256 kb cache, 16 Mb RAM (2x8 Mb).

2 serial, 1 parallel port.

1 PCI, 1 PCI/ISA, 3 ISA slots.

Built-in Ethernet, coax port (D3979A).

D2691A (x2)   2x8 Mb RAM (L700891A1).

1.44-Mb floppy drive (remote).

Custom floppy drive connector and cable.

540-Mb (min.) SCSI disk drive (L750116A1)[2].

Adaptec 1540CF or 1542 CF SCSI[2] controller.

840-Mb (min.) EIDE disk drive[2].

DOS 6.22 (or later) diskettes and mouse[1].

Keyboard.

Keyboard adapter (PS/2 to 5-DIN).

Shrouded male AC cord.

SCSI terminator, external.

PCI video card L750058_1.

CTI Intellicon-2 serial card.

Floppy drive slot cover plate.

Total: 32 Mb RAM.

[1]Mouse assembly Elsag Bailey P/N L700912C3.
[2]EIDE hard drive supplied in K4 part; SCSI disk drive and controller in H4 part.

CARD SLOT POSITIONS
(Slot 1 at bottom)

1	External floppy drive connector
2	CTI card (L750021A3)
3	Adaptec card (L700797A1/A2)[2]
4	Blank

DOS installed on 20-Mb partition.

HEWLETT-PACKARD, VECTRA XM4 5133, 5166

• Elsag Bailey P/N L700986H5/K5 for IIOIC12.

C/W   120 or 133 MHz Pentium CPU (min.).

Built-in S3 video with 2 Mb DRAM.

Built-in Ethernet, coax port (D3979A).

16 Mb RAM (2x8 Mb).

3.5 in. FDD, mouse[1].

MS Windows, DOS and diskettes.

256 kb cache.

Qwerty keyboard.

Adaptec 1540CF or 1542CF SCSI controller[2].

545 (min.) SCSI hard drive[2].

840-Mb (min.) EIDE disk drive[2].

Total: 16 Mb RAM.

[1]Mouse assembly Elsag Bailey P/N L700912C3
[2]EIDE hard drive supplied in K5 part; SCSI disk drive and controller in H5 part.

CARD SLOT POSITIONS
(Slot 1 at bottom)

1	Blank.
2	Blank.
3	Adaptec card (L700797A1/A2)[2].
4	Blank.

HEWLETT-PACKARD, VECTRA XU/C 590, 5120

- Elsag Bailey P/N L700986G4 for IIOIS12.

C/W	90 or 120 MHz Pentium CPU.
	256 kb cache, 8 Mb RAM.
	1 serial, 1 parallel port.
	1 PCI, 1 PCI/ISA, 3 ISA slots.
	160-W power supply.
D2690A (x2)	2x4 Mb RAM.
D2691A (x2)	2x8 Mb RAM (L700891A1).
	1.44-Mb floppy drive (remote).
	Custom floppy drive connector and cable.
	540-Mb (min.) SCSI disk drive (L750116A1).
	Adaptec 1540CF or 1542 CF SCSI controller.
	DOS 6.22 (or later) diskettes and mouse [1].
	Keyboard.
	Keyboard adapter (PS/2 to 5-DIN).
	Shrouded male AC cord.
	SCSI terminator, external.
	ATI Ultra+ (2 Mb) or ATI Ultra Pro (2 Mb) video card (L750058_1).
	CTI Intellicon-2 serial card.
	Floppy drive slot cover plate.

[1]Mouse assembly Elsag Bailey P/N L700912C3.

CARD SLOT POSITIONS (Slot 1 rear view right-hand side)

1	Adaptec card (L700797A1/A2).
2	CTI card (L750021A3).
3	
4	Video card.
5	External floppy drive connector.

DOS installed on 20-Mb partition.

HEWLETT-PACKARD, VECTRA XU 590

- Elsag Bailey P/N L700986C4 for IIOIS12 H-P P/N D3087A.

C/W	90 MHz Pentium CPU.
	256 kb cache, 8 Mb RAM (2x4).
	1 serial, 1 parallel port.
	1 PCI, 1 PCI/ISA, 3 ISA slots.
	160-W power supply.
D2691A	16 Mb RAM (2x8) plus
D2690A	8 Mb RAM (2x4).
	Total 32 Mb.
	1.44-Mb floppy drive (remote).
	Custom floppy drive connector and cable[2].
	535-Mb (min.) SCSI disk drive.
	Adaptec 1540CF or 1542 CF SCSI controller.
	DOS 6.22 and mouse[1].
	Keyboard (5-pin DIN).
	Keyboard adapter (PS/2 to 5-DIN).
	Shrouded male AC cord.
	SCSI terminator, external.
	ATI Ultra+ (2 Mb) VGA card or ATI Ultra Pro (2 Mb) VGA card.
	CTI Intellicon-2 serial card.
	Alta Ethercombo 16+T/C Ethernet card[3].

[1]Mouse Assembly Elsag Bailey P/N L700912A3 for H-P.
[2]Custom floppy drive Cable is P/N BLY OIS-12 from Value Added Systems Inc.
[3]Ethernet card not used in later models.

CARD SLOT POSITIONS (Slot 1 at rear right-hand side)

5	Floppy connector.
4	Alta card (L750067B2).
3	ATI card (1948938A83/A84).
2	CTI card (L750021A3).
1	Adaptec card (L700797A1/A2).

SPECIFICATIONS

VECTRA SU	System dimensions (without keyboard)
	Width: 17.30 in. (44.0 cm)
	Depth: 16.5 in. (41.0 cm)
	Height: 6.6 in. (17.0 cm)
	Weight: 24.8 Lbs (11.3 kg)

Keyboard dimensions

Width: 18.30 in. (46.4 cm)

Depth: 7.0 in. (17.8 cm)

Height: 1.3 in. (3.3 cm) flat,
2.0 in. (5.1 cm) standing

ENVIRONMENT SPECIFICATION

Air temperature   Operating from 40° to 104°F (5°C to 40°C)[1].
Nonoperating from -40° to 158°F
(-40°C to 70°C).

Relative
Humidity   Operating from 15% to 80% R.H. [1]
(Noncondensing) at 104°F (40°C)

Altitude   Operating 10,000 ft (3,100 m).
Nonoperating 50,000 ft (15,250 m).

[1]Operating temperature and humidity range may vary with data storage device.

Input voltage   Auto ranging, worldwide power supply
100 V to 240 V over 47 Hz to 63 Hz.

Power
Consumption   40 W to 50 W (typical).
170 W (absolute maximum).
Low-power "sleep" mode.

HEWLETT-PACKARD, VECTRA VL3 Pentium

• Elsag Bailey P/N L700986E5 for IIOIC12
  H-P P/N D3393A 5/75 Model 1 or P/N D3396A 5/90 Model
  1or P/N D3393A.

D2691A   8 Mb RAM.
plus 8 Mb RAM (Elsag Bailey P/NL700891A1).

3.5-in. floppy disk drive.

DOS 6.22 and diskettes.

340-Mb (min.) IDE hard disk drive.

256 kb cache.

CARD SLOT POSITIONS (Slot 1 at bottom)

1   Blank.
2   Alta card (L750067B2).
3   ATI graphics card (1948938A83/A84).
4   Blank.

HEWLETT-PACKARD, VECTRA VL2 4/66

- Elsag Bailey P/N L700986C5 for IIOIC12 H-P P/N D3138A.

C/W	8 Mb RAM.
D2691A	plus 8 Mb RAM
	Elsag Bailey P/N L700891A1).
	3.5-in. floppy disk drive.
	DOS 6.22.
C3751A	Mouse[1].
D2890A	340-Mb (min.) hard disk drive.
D3168A	128k cache.

[1]Mouse Assembly Elsag Bailey P/N L700912C3 for H-P.

CARD SLOT POSITIONS (Slot 1 at bottom)

1	Blank.
2	Alta card (L750067B2).
3	ATI graphics card (1948938A83/A84).
4	Blank.

SPECIFICATIONS

VECTRA VL2	System dimensions (without keyboard).
	Width: 16.50 in. (42.0 cm).
	Depth: 15.3 in. (39.0 cm).
	Height: 4.9 in. (12.5.0 cm).
	Weight: 20.0 Lbs (9.0 kg).
	Keyboard dimensions.
	Width: 18.30 in. (46.4 cm).
	Depth: 7.0 in. (17.8 cm).
	Height: 1.3 in. (3.3 cm) flat, 2.0 in. (5.1 cm) standing.

ENVIRONMENT SPECIFICATION

Air temperature	Operating from 40° to 104°F (5° to 40°C). Nonoperating from -40° to 158°F (-40° to 70°C).
Relative humidity	Operating from 15% to 80% R.H. (Noncondensing).
Altitude	Operating 10,000 ft (3,100 m). Nonoperating 50,000 ft (15,250 m).

Note: Operating temperature and humidity range may vary with data storage device.

Input voltage	Wide range, input power supply 100 V to 240 V over 47 Hz to 63 Hz.

Power
consumption   Less than 30 W (typical),
                 130 W (absolute maximum).

DIGITAL EQUIPMENT CORPORATION, CELEBRIS 590FP DECpc

- Elsag Bailey P/N L700796G11 for IIOIS12 (DEC P/N 2C-95041-01).

C/W	90 MHz Pentium CPU.
	256 kb cache.
	2 serial, 1 parallel port.
	1 PCI, 1 PCI/ISA, 3 ISA slots.
	200-W power supply.
FR-PCVAM-AE(X2)	32 Mb RAM (2x16).
	1.44-Mb floppy drive (remote).
17-03842-01, -02	Custom floppy drive connector and cable.
PCXAR-AH	535-Mb (min.) SCSI disk drive.
FR-PCTAZ-AE	Adaptec 1540CF or 1542CF SCSI controller.
	DOS 6.22 and mouse[1].
	Keyboard (5-pin DIN).
	Keyboard adapter (PS/2 to 5-DIN).
	Shrouded male AC cord.
H8574-A	SCSI terminator, external.
DT-A0028-TV	ATI Ultra+ (2 Mb) VGA card.
DT-A0082-DI	CTI Intellicon-2 serial card.
DT-A0082-EY	Alta Ethercombo 16+T/C Ethernet card.

[1]Mouse Assembly Elsag Bailey P/N L700912A1 for Digital Equipment.

CARD SLOT POSITIONS (Slot 1 at bottom)

1	External floppy connection.
2	Alta card (L750067B2).
3	ATI card (1948938A83/A84).
4	CTI card (L750021A3).
5	Adaptec card (L700797A1).

Install 20-Mb DOS partition on hard drive.

SPECIFICATIONS

CELEBRIS	Width: 14.40 in.
	Height: 6.14 in.
	Depth: 16.34 in.
VENTURIS	Full Profile (FP).
	Width: 14.40 in.
	Height: 6.10 in.
	Depth: 16.30 in.

ENVIRONMENT SPECIFICATION

The product will comply with the following environment requirements:

Air temperature	Operating from 10° to 40°C. Storage from -20° to 65°C.
Relative humidity	Operating from 20% to 80% R.H. Storage from 10% to 90% R.H.
Shock Drop	Nonoperating with packaged container under 24 in. high.
Operating Drop	Operate within specification during the appropriate sine-vibration tests, 5 - 10 Hz in (DA), 10-500-10 Hz in 0.1 C (peak), 10 - 5 Hz in 0.02 in. (DA) sweep rate of one octave/min.
Random Vibration	Nonoperating with packaged container with excitation 1.03 GRMS overall from 5 to 200 Hz.
Power requirements	The power supply is capable of supplying a continuous 200 W of power, the power supply is switchable, not autosensing.

DIGITAL EQUIPMENT CORPORATION, CELEBRIS FP590

• Elsag Bailey P/N L700796N13 for IIOIC12.

C/W	24 Mb RAM.
	3.5-in. floppy disk drive.
	5 ISA slots.
	Keyboard, mouse[1].
	DOS and diskettes.
	Adaptec 1540CF or 1542CF SCSI controller.
	245 (min.) SCSI hard drive.

[1]Mouse assembly Elsag Bailey P/N L700912A1.

CARD SLOT POSITIONS (Slot 1 at bottom)

1	Spare.
2	Alta card (L750067B2).
3	ATI card (1948938A83/A84).
4	Spare.
5	Adaptec card (L700797A1/A2).

DIGITAL EQUIPMENT CORPORATION, VENTURIS 486 DX FP

- Elsag Bailey P/N L700796G13 for IIOIC12 (DEC P/N FR-862AA-AD).

C/W	16 Mb RAM.
	3.5-in. floppy disk.
	5 ISA slots.
	Keyboard, mouse[1].
QB-2R5AA-SA	DOS and Windows.
	340 Mb (Min.) SCSI hard disk.
FRPC75M-BB	128 cache.

[1]Mouse Assembly Elsag Bailey P/N L700912A1 for Digital Equipment.

CARD SLOT POSITIONS (Slot 1 at bottom)

1	Blank.
2	Alta card (L750067B2).
3	ATI graphics card (1948938A83).
4	Blank.
5	Adaptec.

DIGITAL EQUIPMENT CORPORATION, MODEL 560 LPX

- Elsag Bailey P/N L700796D13 for IIOIS12 (DEC P/N 2C-94095-03).

	DEC LPX 560.
	24 Mb RAM (PC77M-AA, 2x4 Mb, PC77M-AB, 16 Mb).
	256 kb cache.
	2 serial, 1 parallel port.
	1.44-Mb, 3.5-in. floppy drive (remote).
17-03842-01, -02	Custom floppy drive connector and cable.
PCXAR-AM	340-Mb SCSI hard drive.
	200-W power supply.
FR-PCTAZ-AE	ADAPTEC 1540CF SCSI controller (Elsag Bailey P/N L700797A1).
	DOS 6.2 (or later) in 20-Mb partition (C: 20 Mb, no D: drive).
	Qwerty keyboard c/w 5 pin DIN connector, mouse[1].
	Shrouded male AC power cord.
H8574-A	External SCSI terminator connector.
DT-A0028-TV	ATI Ultra + (2 Mb) VGA card (Elsag Bailey P/N 1948935A83).
DT-A0082-DI	CTI Intellicon 2 port serial card (Elsag Bailey P/N L750021A3).

DT-A0082-EY   ALTA Ethercombo - 16+ T/C Ethernet card (Elsag Bailey P/N L750067B2) Includes "T" connector).

[1]Mouse Assembly Elsag Bailey P/N L700912A1 for Digital Equipment.

PC CARD CONFIGURATION
(Slot numbers 1-6, left-to-right, rear view)

SLOT

1	External floppy drive Connector.
2	NONE.
3	ADAPTEC card (set up per Figure 4-11).
4	ALTA Ethernet card (set up per Figure 4-14).
5	ATI card (1948938A83).
6	CTI - 2 Port serial card (set up per Figure 4-13).

DIGITAL EQUIPMENT CORPORATION, MODEL 4100 LPV+

• Elsag Bailey P/N L700796D16 for IIOIC12 (DEC 4100 DX LPV+).

DEC P/N FR-748AA-WA includes:

PC74M-AB	16 Mb RAM, plus.
PC74M-AA	8 Mb RAM (2x4 Mb).
PCXAL-NA	Qwerty keyboard.
RX23L-AA	1.44-Mb, 3.5-in. floppy drive.

Note: Mouse Assembly Elsag Bailey P/N L700912A1 for Digital Equipment.

CARD SLOT POSITIONS
(Slot numbers 1-3, top to bottom, rear view)

1	Alta Ethernet card.
2	None.
3	ATI graphics card (1948938A83).

PHYSICAL DIMENSIONS

Width:	15.669 in. (398 mm).
Height:	3.622 in. (92 mm).
Length:	16.142 in. (410 mm).
Weight:	21.028 lbs (9.538 kg) not including added cards.

POWER SPECIFICATIONS

145 watts continuous, switch selectable between 115V and 220 V. Input AC voltage at 50 or 60 Hz.

APPENDIX C - NETWORK PLANNING FORM

NETWORK PLANNING FORM

It is recommended that a copy of the completed form be inserted in each console's OIS12 hardware manual, for future reference. This form should be revised and if necessary expanded any time there is a change to the network configuration.

Table C-1. Network Planning Form

Network Planning Form				
Logical Node #	Card ID	IRQ	I/O Addr.	Description
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Card ID
Enter the Ethernet address or the arcnet physical node number.

IRQ
Enter the IRQ used for the card in this console.

I/O Addr.
Enter the I/O address used for the card in this console.

Description
Describe the console by its location or other features so that you will know which console is being referred to.

APPENDIX D - QNX BACKGROUND INFORMATION

It is a good idea to familiarize yourself with the basic philosophy and operation of QNX™ as described in ***QNX4 System Architecture*** and ***QNX4 User's Guide*** (Section 1). This appendix will provide a brief technical overview of QNX.

> **NOTE:** In a standard installation of OIS12 software, there will be no need to modify any of the files described in this section. This information is intended to provide technical background information only.

THE SYSTEM INITIALIZATION FILE

What Happens When You Boot

When you boot QNX, you are booting an image composed of several processes. The first process in the image is always the Process Manager (which contains the Microkernel). The Process Manager performs processor initialization, and then schedules each process included within the image for execution. The last process in the image is the "sinit" utility.

The "sinit" utility initiates the second phase of your system initialization by starting a shell that executes commands from a file. This file (the system initialization file) contains commands that set up services for the machine. It is a standard shell file that runs just like any other shell file except that breaks are disabled.

Being able to start system services after boot is one of the benefits of QNX's modular architecture. The image that is booted typically contains only those few essential services needed to start all other desired services.

When "sinit" runs, it first determines if the image it is part of was booted from disk or from over the network. If the image was booted from disk, "sinit" checks to see if a normal boot or an alternate boot occurred. (You can optionally select an alternate boot by pressing <Esc> when prompted by the boot loader during powerup). Based upon this information, "sinit" attempts to open one of two system initialization files:

a normal boot (from disk or network)	"/etc/config/sysinit.n" (where n=node #) If this fails, it tries: "/etc/config/sysinit"
an alternate boot (from disk only)	"/etc/config/altsysinit" If this fails, it tries: "/etc/config/sysinit"

The "sinit" utility will attempt to open "sysinit" only if it cannot open the first file. If it can open neither file, "sinit" terminates and no system initialization will be performed. If the open succeeds, "sinit" replaces itself with the Shell "/bin/sh" and passes it the name of the file that "sinit" opened.

Each of the system initialization files that may be executed by "sinit" serves a particular purpose:

- "sysinit.*node*".
- "sysinit".
- "altsysinit".

"sysinit.node"   This file contains the custom commands needed to set up the environment and services for your machine, allowing every node in the network to have its own setup. The node suffix, which is used by "sinit", is the logical node ID of your machine. This is a value between one and the number of nodes in your network.

A sysinit.1 file is always created by the install program. The file's initial contents reflect the installation parameters determined by installsys.

Nodes that boot over the network from a server (i.e., workstations) initially use the default "sysinit" file for booting. To customize a workstation's setup, you have to create a "sysinit.*node*" file on the boot server for that workstation. You can start with the "sysinit.*node*" file for another node with a similar configuration, or you can simply make a copy of the default "sysinit" file, which you may then modify:

([cp /etc/config/sysinit /etc/config/sysinit].node)

The "usrinit.*node*" file is executed just before *pcv tasks* are started. The "postinit.*node*" file is executed just after *pcv tasks* have been started.

Remember that the node suffix must be the logical node ID of the workstation you are customizing.

CAUTION	**Never use the "vedit" editor to modify system files. Use of this editor can result in system corruption. Instead use the "qed" editor.**

"sysinit"   This file is executed if a "sysinit.*node*" file is not present. It should contain services that will work on any machine. QNX ships a generic file that should be able to boot any machine. We recommend that you make few or no modifications to this file.

The sysinit file is automatically put on your system during the installation.

NOTE: If you change the logical node ID of a machine, the machine will now look for a different "sysinit.*node*" file.

"altsysinit"   This file serves as a safety net in case a modification to your "sysinit.*node*" file leaves the system in a state where you cannot log in. The "altsysinit" file is executed only if you specify an alternate boot when booting from local disk (i.e., you press <Esc> when the boot loader prompts you for an alternate boot).

The "altsysinit" file should always contain a backup of the last working copy of the "sysinit.*node*" file for a machine that boots from a local hard disk. So, before you make any changes to a working "sysinit.*node*" file that could prevent the machine from booting from hard disk, you should copy the "sysinit.*node*" file to "altsysinit":

cp /etc/config/sysinit.node /etc/config/altsysinit

We recommend that you update the "altsysinit" file after all successful changes to your "sysinit.*node*" file.

We recommend that you also copy the operating system image after successfully installing QNX:

cp /.boot /.altboot

USING THE SYSTEM INITIALIZATION FILE

Base-Level Services

The contents of each machine's system initialization file reflects the hardware on that machine and the services it is to provide. The following describes a base set of services that will be in most initialization files.

NOTE: If several machines will be using a common set of commands, you can place the commands in a separate shell file and have the file executed via the . (dot) shell built-in. For example, say you create a file called "techies" containing commands to be used by all the machines in your Technical Department. The file could be executed from within the "sysinit.*node*" file of each machine in that department with the following command:

./etc/config/techies

You would add node-specific commands after this "dot" line. For more information on the dot command, see "sh" in the ***Utilities Reference***.

Establishing the time zone   The following lines define the time zone (EST in this case) and get the time from the real-time clock. These two lines should be the first in the file for machines that boot from hard disk.

They are optional in a machine that boots over the network, since the machine inherits this information from the node it boots from.

> **export TZ=EST5DST4,M4.1.0/3,M10.5.0/3**
> **rtc hw**

For more information, see the following section on ***TIME ZONES AND THE REAL-TIME CLOCK***.

Starting device drivers

The following lines start the Device Manager and the console driver with eight virtual consoles, then instructs the Shell to reopen its standard I/O through the new console device.

> **Dev &**
> **Dev.con -n 8 &**
> **reopen //0/dev/con1**

The following lines start up any other device drivers you may need. They start both a serial driver, which will look for COM1 and COM2, and a parallel driver. These drivers will terminate if they cannot find the necessary hardware.

> **Dev.ser &**
> **Dev.par &**

If you started "Dev.ser" you might need to use the "stty" utility to change the default line configuration. For example, the following lines change the baud rate to 19200:

> **stty baud=19200 < /dev/ser1**
> **stty baud=19200 < /dev/ser2**
> etc …

Starting the floating-point emulator

If your programs use floating point and you do not have an 80x87 chip, you need to start the floating-point emulator:

> **emu87 &**

Loading node mapping

When booting a node on a network, you must run the "net-map" utility, which informs the Network Manager of node ID mapping. You should place the following "netmap" command in the "sysinit.*node*" file, even if the node is not currently running on a network (the command has no effect on a non-networked machine):

> **netmap -f**

Note that this command is included in the standard sysinit files shipped by QNX.

Starting a name Server

At least one machine in the network must run the global name server. You could start the name server on this machine if it is not rebooted frequently:

nameloc &

You may also run "nameloc" on other nodes (up to a total of ten) in order to provide redundancy in case one node running "nameloc" fails.

Starting a terminal daemon

The following line starts a login on the first console and arms all other consoles:

tinit -T /dev/con* -t /dev/con1 &

While it is not mandatory, almost all installations use the "tinit" utility. Hence system initialization files provided by QNX contain "tinit".

> **NOTE:** When it is included, "tinit" must be the last command executed in the system initialization file.

Optional Services

You can add many other services to your system initialization file. You should add these services just before the line containing the "tinit" command. The following examples show commonly used optional services. Note that these utilities typically support common-line options to modify their behavior-these options are explained in the documentation for each utility.

Defining environment variables

Define any environment variables you wish inherited by all processes started in the system initialization file:

export var=value

The EXPORT command is described under the "sh" command in the ***QNX4 Utilities Reference.***

Starting a floppy driver

Start a local floppy driver (if the QNX file system is running locally, do not include the first line):

Fsys &
Fsys.floppy &

If a floppy driver is running, you can use the "vol" and "pax" utilities to access the block special file (e.g., "/dev/fd0"). If you want to access it as a QNX file system, you must mount it as such (we recommend you use "pax" to transport files between QNX files ystem):

mount /dev/fd0 /fd0

Starting a DOS   Start a DOS file system to access DOS floppies and partitions. This requires that the QNX file system be running with a driver for the floppy and/or hard disk:

> **Dosfsys &**

Selecting a cron
server   If you think this machine will rarely be rebooted, you may also select a cron server:

> **cron &**

Starting a clock   Start a clock that will always display the time in the upper right corner of the screen:

> **clock -f green "+%X" &**

Supporting Non-USA Keyboards

By default, the QNX console driver assumes a 101-key USA keyboard layout. However, QNX provides a variety of configurations corresponding to the keyboards most commonly used throughout the world. If you need to select an alternate keyboard configuration, you use the "kbd" utility.

If you select a non-USA keyboard when installing QNX on a hard disk machine, the appropriate "kbd" command will be added to the machine's "sysinit.*node*" file. If you subsequently set up workstations, you will have to change their "sysinit.*node*" files to include this command.

Note that you can also generate custom keyboard layouts with the "kedit" utility.

TIME ZONES AND THE REAL-TIME CLOCK

It is important that the correct date, time, and time zone information be established early during initialization. This should be the first step in your system initialization file. The install program assumes your hardware clock has a valid date and time and asks you for the time zone information.

Internally, QNX uses Coordinated Universal Time (UTC), which is often referred to as Greenwich Mean Time. Applications and utilities convert a local time by using information about your time zone.

> **NOTE:** If the time zone is not set, QNX will assume that local time is the same as UTC time. This would present a problem only if you wish to transfer files to another system in a different time zone. In this case, the dates on the file will appear to be shifted by the difference between the two time zones. If you plan to use QNX's update system to download new software, the time zone should be set correctly.

Establishing the Time Zone

The time zone information should be established before the current date and time is set. If the real-time clock in your computer has been set to local time, QNX needs the time zone information in order to establish UTC.

In the following example, the time zone as well as the time change rules are set for Eastern Standard Time in North America:

export TZ=est5DST4,M4.1.0/3,M10.5.0/3

Where:

export	Shell command to set an environment variable.
TZ	Name of variable.
EST	Eastern Standard Time.
5	Five hours before Greenwich Mean Time.
DST	Daylight Savings Time.
4	Four hours before Greenwich Mean Time.
M4.1.0/3	First Sunday of April at 3 am.
M10.5.0/3	Last Sunday of October at 3 am.

Getting the Date and Time from the Real-Time Clock

If you are booting from disk, you should follow the first line in your system initialization file with the "rtc" utility to establish the current date and time from the real-time clock. The following two lines would accomplish this:

export TZ=EST5DST4,M4.1.0/3,M10.5.0/3
rtc hw

This will set the date and time on an IBM AT-compatible computer.

Note that there are two possible approaches to take when setting the real-time clock in your machine:

- Setting the real-time clock to UTC.
- Setting the real-time clock to local time.

We recommend that you set the time in the real-time clock to UTC. But if you are also running operating systems that assume the real-time clock is set to local time (e.g., DOS).

You will want to use the "rtc" utility with the -1 ("el") option:

rtc -l hw

This invocation of "rtc" assumes that the real-time clock was set to local time. Note that when you use local time in the real-time clock, you will have to manually change the value in the real-time clock when you switch to an from daylight savings time in locales where it is used.

> **NOTE:** If the time in your hardware clock is incorrect (perhaps the battery has been replaced), you should set the system time using the "date" utility, then set the real-time clock using the "rtc" utility with the **-s** option. For details, see the documentation for these utilities in the **QNX4 Utilities Reference.**

If you are booting the over the network
If you boot over the network, the booting machine will inherit UTC time and time zone environment variable from the node it boots from. Therefore, you do not need to put this information in your system initialization file.

LICENSING

Operating System Licensing

QNX must be licensed for each computer it runs on. This is true whether you are using 10 stand-alone machines or 10 networked machines.

In a network, each machine is referred to as a "node" and each node is assigned a "logical" node ID. Logical node IDs range from 1 to the number of nodes in the network. For example, a network licensed for three nodes would support logical node IDs one, two, and three. You set the size of the network by running the "license" utility (see the section ***Expanding Your License***).

To verify licensing, you can use the "ls" command. The following would indicate a single-node QNX license:

```
ls /etc/licenses
qnx000178n001
  |   |    |

  |   |      |Number of Nodes

  |      |Serial Number
  |

  |Product
```

If you have installed other QNX applications (e.g., Watcom C), their licenses will also be displayed.

Application Licensing

Per-node licensing

Most applications are licensed per node in a QNX network in the same way as the operating system. If you have an application licensed for, say, three nodes, then you would be restricted to running it on only three nodes of your network. (Your network license size may exceed the license size for an application).

You may run multiple invocations of the application on each licensed node. When you run an application licensed per node, the invoking node will consume one of the licenses. The license will remain with that node until it is rebooted.

By convention, serial numbers that end in "**n**ddd" are licensed per node.

Concurrent-use licensing

Applications may also be licensed for the number of copies in concurrent use. For example, if an application is licensed for three concurrent copies, then up to three copies may be run anywhere in the network at one time. Note that on a non-networked single node machine, you may still run only three concurrent invocations.

By convention, serial numbers that end in "**u**ddd" are licensed per use.

Expanding Your License

You expand your license size for the operating system or an application using the "license" utility. This utility installs license serial numbers from floppies to your hard disk. Each QNX boot diskette and application diskette contains a serial number license for one node (or for one use).

The following example transfers the license from floppy drive 0 ("drive A:" in DOS terminology) to your hard disk. Note that the floppy driver ("Fsys.floppy") must be running:

license

NOTE: After adding new serial numbers to your set of licenses, you must activate them. To do so, you can run "license -r", which reads licenses from "/etc/licenses" on the hard disk and places them in the machine's in-memory license database.

On a network, you can run "license -r" node to read up-to-date licenses from another node's current in-memory license database.

Any machines that boot over the network will inherit the serial numbers from the machine they boot from. If you wish to boot

network machines from their local hard disk, you must use the "license" utility to add serial numbers to each hard disks you wish to boot from. Once you have done this on a single hard disk, you can use "license" to copy the serial numbers across the network from one hard disk to another and thus avoid having to re-insert floppies. Note that license files cannot be copied by **cp**.

For more information on the "license" utility, see the ***Utilities Reference.***

> **NOTE:** For licensing to work across a network, the boot server (the machine with the licenses) must be running the "nameloc" utility. If a machine has a local hard disk (with licenses) and a network card, but is not on a network, a portable, for example, it must also run "nameloc" for licensing to work.

APPENDIX E - INTECOLOR SERVICE CENTERS

Service Centers are equipped to service Intecolor products in their geographical region.

Headquarters and Worldwide Support
including North and South America
Intecolor Corporation
2150 Boggs Road
Duluth GA 30l36 USA

TEL: 770 623-9145 x 4
FAX: 770 623-9163
Attn: Technical Support

Canada
Allan Crawford Associates
5835 Coopers Ave.
Mississauga, Ontario
L4Z 1V2

TEL: (905) 890-2008
TEL: (905) 890-2010
FAX: (905) 890-1959

GTS Computer Systems
Dixie Business Park
1535 Meyerside Drive, Unit #4
Mississauga, Ontario
Canada L5T 1M9

TEL: (905) 795-2760
FAX: (905) 795-2762

United Kingdom
Techex Limited
5B Roundways Elliott Road
West Howe Industrial Estate
Bournemouth Dorset BH11 8JJ UK

TEL: (44)1202571181
FAX: (44)1202 580452
Attn: Graham Broomfield

Europe, Africa, Middle East
Intecolor Europe BV
Amsterdamseweg 15
1422 AC Uithoorn
The Netherlands

TEL: (31) 29 753-1262
FAX: (31) 29 753-1424

Australia
Intelligent Systems
Unit 4, 20 Enterprise Ave.
Berwick, Victoria, 3806
Australia

TEL: (61) 3 796 2290
FAX: (61) 3 796 2286
Attn: Neville South

Southeast Asia
SKW Systems (Asia) Pte. Ltd.
32, Ang Mo Kio Industrial Park II
#01-12 Sing Industrial Complex
Singapore 569510

TEL: (65) 4841962/4841963
FAX: (65) 4841964
Attn: Mr. S.K. Wong

INTECOLOR AUTHORIZED SERVICE AGENTS

Service Agents are available for on-site diagnostic and certain repairs in a limited geographical area.

Paris, Lyon France
IP Systemes
Z.A. Courtaboef Parc Hightech
9, Ave du Canada
91966 Les Ulis, France

TEL: (33) 1 69 28 65 00
FAX: (33) 1 69 29 87 31
Attn: Phillipe Convenant

Canada
Tera Nova Technologies
221 Kingsbridge Garden Circle
Mississauga, Ontario
L5R 1L4

TEL: (905) 507-8572
FAX: (905) 507-8714
Attn: Davider Taank

Northern Italy
BF Elettrici
Via Argentina, 24/2
33100 Udine
Italy

TEL: (39) 0432-284491
FAX: (39) 0432-281893
Attn: Bruno Feruglio

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