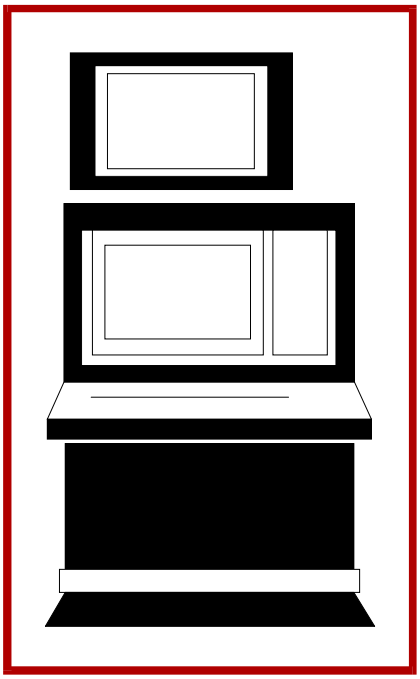
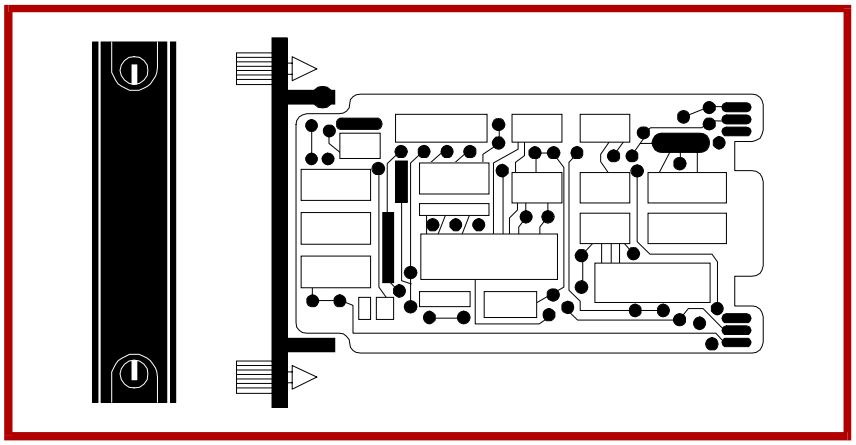
Bailey® infi 90®

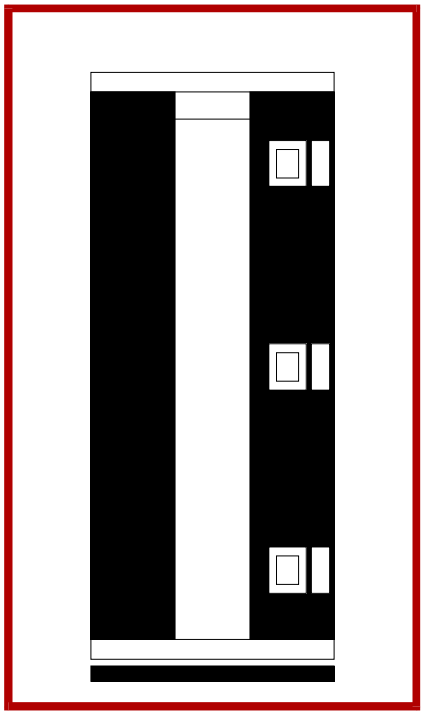
INOSM01

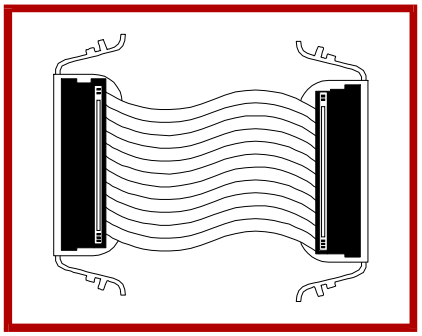
Instruction

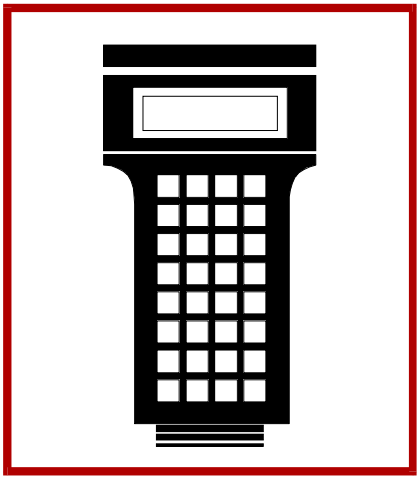
Open Systems Manager

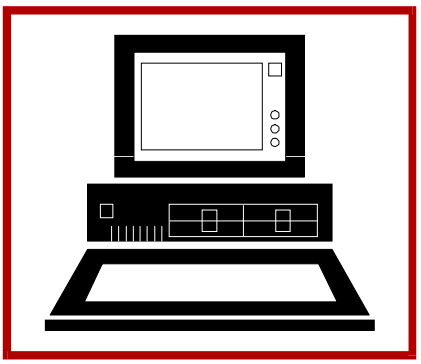












Bailey® Process Control and Automation Solutions from Elsag Bailey Group

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

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

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

WARNING

INSTRUCTION MANUALS

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

RADIO FREQUENCY INTERFERENCE

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

POSSIBLE PROCESS UPSETS

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

NOTICE

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Preface

The INOSM01 Open Systems Manager provides bidirectional access to the INFI 90® OPEN system process data from computer software applications. The application programming interface (semAPI) software provides the interface to the open systems manager. The open systems manager supports the TCP/IP communication protocol (optional DECnet™ is also supported for clients on the VAX /VMS™, VAX/Open VMS™, and Alpha AXP/Open VMS™ platforms). The semAPI software runs on a variety of platforms including VAX/VMS, VAX/Open VMS, Alpha AXP/Open VMS, and Windows NT/95™.

This instruction explains the features, specifications and operation of the INOSM01 Open Systems Manager. It includes installation procedures and explains how to maintain, troubleshoot and repair the system.

The system engineer or technician using the INOSM01 Open Systems Manager should read and understand this instruction before installing and operating the system. In addition, a complete understanding of the INFI-NET® communication system is beneficial.

List of Effective Pages

Total number of pages in this instruction is 78, consisting of the following:

Page No.	Change Date
Preface	Original
List of Effective Pages	Original
iii through ix	Original
1-2 through 1-9	Original
2-1 through 2-7	Original
3-1 through 3-19	Original
4-1 through 4-3	Original
5-1 through 5-4	Original
6-1 through 6-4	Original
7-1 through 7-8	Original
8-1	Original
A-1 through A-4	Original
Index-1 through Index-2	Original

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

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

Table of Contents

Table of Contents (continued)

List of Figures

List of Tables

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. **Special Handling** This module uses electrostatic sensitive devices.
SPECIFIC WARNINGS	There are exposed electrical connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death. (p. 6-2, 7-6) Never clean electrical parts or components with live power present. Doing so exposes you to an electrical shock hazard. (p. 6-3) Wear eye protection whenever working with cleaning solvents. When removing solvents from printed circuit boards using compressed air, injury to the eyes could result from splashing solvent as it is removed from the printed circuit board. (p. 6-3)
SPECIFIC CAUTIONS	Remove a module from its assigned slot before installing or removing a cable assigned to that slot. Failure to do so could result in damage to the module. (p. 3-4, 7-8) It is strongly recommended that all power (cabinet, I/O, etc.) be turned off before doing any wiring. Verify all connections before applying power. Failure to observe these precautions could result in equipment damage. (p. 3-10)

SECTION 1 - INTRODUCTION

OVERVIEW

The INOSM01 Open Systems Manager provides bidirectional access to Bailey INFI 90 OPEN system process data from computer software applications. The application programming interface software provides the interface to the open systems manager (Fig. 1-1). Within the semAPI software, calls are integrated with computer software applications and communication is established on the Ethernet network. The open systems manager supports the TCP/IP communication protocol (optional DECnet is also supported for clients on the VAX/VMS, VAX/Open VMS, and Alpha AXP/Open VMS platforms). The semAPI software runs on a variety of platforms including VAX/VMS, VAX/Open VMS, Alpha AXP/Open VMS, and Windows NT/95.

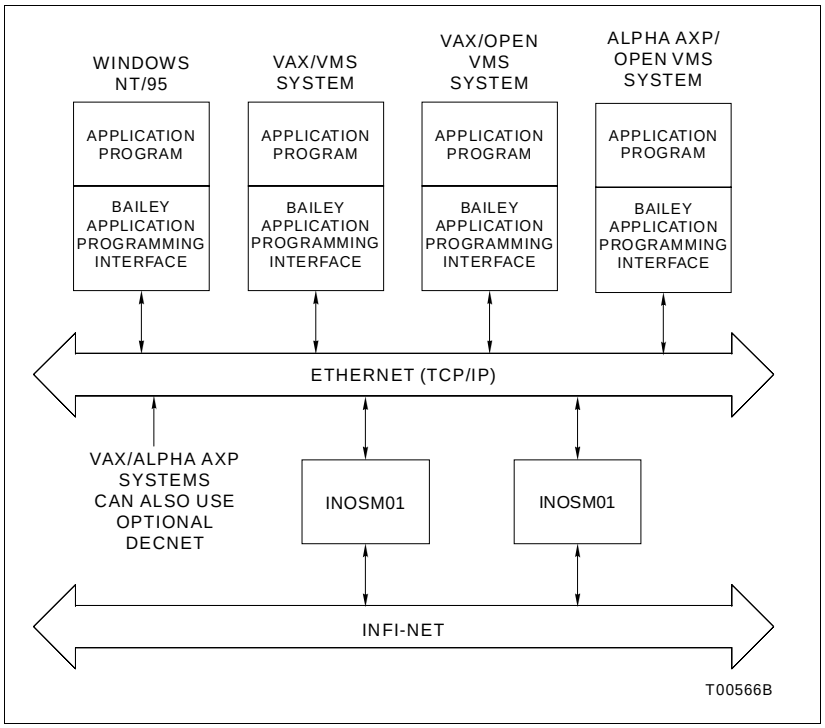

Figure 1-1. Open Systems Manager System Structure

INTENDED USER

System engineers and technicians installing, troubleshooting or repairing the INOSM01 Open Systems Manager should read this instruction. These individuals should have experience working with and know the precautions to take when handling electronic circuitry susceptible to electrostatic discharge. Personnel installing the system should also have an understanding of the Ethernet communication system hardware

configuration. Knowledge of INFI-NET communication system is helpful.

OPEN SYSTEMS MANAGER DESCRIPTION

The INOSM01 Open Systems Manager is made up of INFI 90 OPEN modules and termination units that mount in a standard INFI 90 OPEN module mounting unit and field termination panel. The INFI 90 OPEN components that make up the open systems manager are:

- INESM01 Ethernet Server Module.
- NTSM01 Server Module Termination Unit.
- INSCS01 SCSI Connector Module.
- INDDM01 Disk Drive Module.
- IMMPI01 Multi-Function Processor Interface Module.
- INICT03 INFI-NET to Computer Transfer Module.
- INNIS01 Network Interface Module.
- NTCL01 Communication Termination Unit.
- NTMP01 Multi-Function Processor Termination Unit.
- All required software, including Ethernet server software, SC0 Unix operating system, and SCO TCP/IP. SCO DECnet software is optional.

For a description of the IMMPI01, INICT03 and INNIS01 modules, refer to the ***INFI-NET to Computer Interface (INICI01/03)*** instruction. Refer to the ***Communication Termination Unit (NTCL01)*** instruction for a description of the NTCL01 termination unit. Refer to the ***Multi-Function Processor Termination Unit (NTMP01)*** instruction for a description of the NTMP01 termination unit.

NOTE: An NICL01 termination module can be used in place of an NTCL01 termination unit.

Ethernet Server Module

The INESM01 Ethernet Server Module (ESM) is a new communications module that interfaces to the Ethernet system via a termination unit. The Ethernet server module has three adapter boards that mount to it, providing a video port, an Ethernet interface and a SCSI interface.

The ESM module and adapter boards occupy one slot in an INFI 90 OPEN module mounting unit. Two captive latches on the front-mounted faceplate secure the module in the mounting unit. There are four LEDs on the faceplate that indicate normal operation, hard disk drive activity, Ethernet transmission activity, and the status of the Ethernet link (when using Type 10BaseT network cable). The faceplate also provides access to one DB-9 connector (for a serial communication port that is reserved for future use), one DB-15 connector (for a monitor), and one six-pin mini DIN connector for the keyboard. Controls on the faceplate include one stop pushbutton and one reset pushbutton.

The server module uses two of the three card edge connectors (P1 and P3) at the module mounting unit backplane. P1 connects the module to cabinet power and common. Communication to nodes on the Ethernet network is through the P3 connector via a cable connection to the NTSM01 Server Module Termination Unit.

Server Module Termination Unit

The NTSM01 Server Module Termination Unit is a seven by seven inch square printed circuit board. It mounts on the NFTP01 Field Termination Panel inside an INFI 90 OPEN cabinet. The board contains the necessary connectors and circuitry to terminate the Ethernet cabling and pass system communication to and from the INFI-NET to Ethernet server module. Two quick-connect connectors on the termination unit are for connecting 24 VDC and common. There is a three-amp fuse on the NTSM01 termination unit to protect the circuitry. Jumpers select options and communication signals for the various connectors on the termination unit.

The NTSM01 termination unit can handle connections for Type 10BaseT (twisted pairs), Type 10Base2 (thin Ethernet), and Type 10Base5 (thick Ethernet) network cabling. Type 10BaseT cable connects to the termination unit via an RJ-45 connector. Type 10Base2 cable connection to the termination unit is via a BNC connector. Type 10Base5 cable connects to the termination unit through an attachment unit interface (AUI) drop cable and medium attachment unit (MAU) transceiver. The termination unit connects to the INESM01 module via a cable connection (NKSM01 termination unit cable).

SCSI Connector Module

The INSCS01 SCSI Connector Module is a paddle board that connects the SCSI adapter board on the Ethernet server module to the IMMPI01 Multi-Function Processor Interface Module. This board converts the high density 50-pin connector on the SCSI adapter board to a standard 50-pin SCSI connector on the faceplate of the SCSI connector module for cable connection to the IMMPI01 module. This module occupies one slot in an INFI 90 OPEN module mounting unit.

Disk Drive Module

The INDDM01 Disk Drive Module contains a 3.5-inch floppy disk drive and a 120-megabyte hard disk drive. There are various connectors on the circuit board for ribbon cable connections to the INESM01 module. The floppy disk drive is accessible via the module faceplate. This module occupies one slot in an INFI 90 OPEN module mounting unit.

FEATURES

- Provides Ethernet network to INFI-NET communication system connectivity using new INFI 90 OPEN communication modules.
- INFI 90 OPEN system embedded Ethernet server provides highly integrated networking solutions. Application programming development is independent of the type interface to the INFI 90 OPEN system.
- Compatible connections for Type 10Base5, Type 10Base2, or Type 10BaseT Ethernet system cables.
- Video and keyboard ports for loading software and using diagnostic utilities.
- Nonvolatile memory on a card mounted 120-megabyte hard disk drive.
- Mounts in a standard INFI 90 OPEN cabinet.
- System software options allow the open systems manager to interface software applications on VAX/VMS, VAX/Open VMS, Alpha AXP/Open VMS, and Windows NT/95 operating systems, and provides for two levels of system data access: data acquisition or supervisory control.

INSTRUCTION CONTENT

This instruction is divided into eight sections. Read this document before installing or operating the open systems manager. A summary of section content follows:

Introduction Contains general information such as an overview of the product, description, glossary of terms, nomenclatures and technical specifications.

Description and Operation Uses block diagrams, schematics and text to explain module operation.

Installation Covers the preliminary steps to prepare the interface modules for operation. It covers mounting requirements, termination

unit jumper settings and mounting, cable installation, module jumper settings and mounting, and interconnections.

Operating Procedures — Provides information on daily use, start-up procedures and normal operation.

Troubleshooting — Explains what to do if the system does not start up.

Maintenance — Contains scheduled maintenance tasks and procedures.

Repair and Replacement Procedures — Explains how to replace fuses and open systems manager components.

Support Services — Explains the services and training that Bailey Controls Company makes available to their customers.

Appendix — Provides a quick reference of INESM01 jumper settings and LED states, adapter board jumper settings, NTSM01 jumper settings and INICT03 dipswitch and jumper settings.

HOW TO USE THIS INSTRUCTION

Read this instruction before handling the INOSM01 Open Systems Manager modules. Refer to a specific section for information as needed.

1. Do the installation steps in Section 3.

2. Refer to Section 4 for start-up and daily operating procedures.

3. Refer to Section 5 to resolve problems if they occur.

4. Refer to Section 6 for scheduled maintenance requirements.

5. Refer to Section 7 to replace system components and for a list of replacement part numbers.

6. Use Section 8 for ordering replacement parts, information on training and ordering technical documentation.

7. Refer to Appendix A for a quick reference of module and termination unit jumper settings.

GLOSSARY OF TERMS AND ABBREVIATIONS

Table 1-1 contains a glossary of terms and abbreviations used in this instruction that are unique to Elsag Bailey systems.

Table 1-1. Glossary of Terms and Abbreviations

Term	Definition
Configuration	The act of setting up equipment to accomplish specific functions or a list of parameters associated with such a setup.
Exception report	Information update generated when the status or value of a point changes by more than a specified significant amount; abbreviated as XR.
Function code	An algorithm which manipulates specific functions. These functions are linked together to form the control strategy.
INFI-NET	Advanced data communication highway.
MMU	Module mounting unit. A card cage that provides electrical and communication support for INFI 90 OPEN/Network 90® modules.
Node	A point of interconnection to a network.
Termination unit	Provides input/output connection between plant equipment and the INFI 90 OPEN/Network 90 modules.

REFERENCE DOCUMENTS

Refer to Table 1-2 for a list of documents related to the open systems manager.

Table 1-2. Reference Documents

Number	Title
I-E96-422	Communication Termination Unit (NTCL01)
I-E96-428	Multi-Function Processor Termination Unit (NTMP01)
I-E97-521	INFI-NET Ethernet Server Installation and Configuration
WBPEEUI250010A0	INFI-NET to Computer Interface (INICI01/03)
WBPEEUI350251A0	Application Programming Interface (semAPI) VAX/VMS User Manual
WBPEEUI350254A0	Application Programming Interface (semAPI) Windows NT/95 User Manual

NOMENCLATURE

Table 1-3 lists INOSM01 Open Systems Manager and related equipment nomenclatures.

Table 1-3. Nomenclature

Nomenclature	Description
IEMMU01 IEMMU02	Module mounting unit (front mount) Module mounting unit (rear mount)
IMMPI01	Multi-function processor interface module
INDDM01	Disk drive module
INESM01	Ethernet server module
INICT03	INFI-NET to computer transfer module

Table 1-3. Nomenclature (continued)

Nomenclature	Description
INNIS01	Network interface module
INSCS01	SCSI connector module
NFTP01	Field termination panel (2 required)
NKCL01 NKCL11	Thin Ethernet cable (PVC) Thin Ethernet cable (non-PVC)
NKLS01 NKLS11	NTCL01 termination unit cable (PVC) NTCL01 termination unit cable (non-PVC)
NKSM01 NKSM11	NTSM01 termination unit cable (PVC) NTSM01 termination unit cable (non-PVC)
NKTU01 NKTU11	NTMP01 termination unit cable (PVC) NTMP01 termination unit cable (non-PVC)
NTCL01	Communication termination unit
NTMP01	Multi-function processor termination unit
NTSM01	Server module termination unit

SPECIFICATIONS

Table 1-4 lists specifications for the INESM01 and INDDM01 modules, and the NTSM01 termination unit. For INICT03, INNIS01 and IMMPI01 modules, refer to the INICI03 interface instruction. Refer to the NTCL01 and NTMP01 termination unit instructions for specifications on those devices. Tables 1-5 through 1-7 list Ethernet cable specifications based on ANSI/IEEE 802.3 specifications.

Table 1-4. Specifications

Property	Characteristic/Value
INESM01 module and adapter boards:	
Power requirements	4 A maximum at 5 VDC
Memory	8 Mbyte RAM
Operating frequency	100 MHz
Communication rate	10 Mbaud (Ethernet adapter board)
Input/output	Ethernet port Keyboard port Header for floppy disk drive and IDE hard disk drive SCSI port Serial communication port VGA video port (video adapter board)
System capability	Up to 30,000 database points typical
Mounting	Module and adapter boards occupy 1 standard INFI 90 OPEN module mounting unit slot

Table 1-4. Specifications (continued)

Property	Characteristic/Value
INDDM01 module:	
Power requirements	1.7 A maximum for 4 secs at power up 1.0 A maximum operating 0.8 A nominal operating
Disk drive capacity	One 120-Mbyte hard disk drive One 3.5-in., 1.44-Mbyte floppy disk drive
NTSM01 termination unit:	
Power requirements	1 A maximum at 24 VDC, 48 W maximum
Common mode voltage, all inputs	30 Vrms, Installation category III
Fuse	3 A, 125 V
Mounting	Screw mounts to an NFTP01 Field Termination Panel
INOSM01 environmental:	
Electromagnetic/radio frequency interference	Meets IEC 801-3, level 3, 10 V/m Keep cabinet doors closed. Do not use communication equipment any closer than 2 m (6.6 ft) from the cabinet.
Operating temperature	0° to 55°C (32° to 131°F)
Relative humidity	10% to 90% relative humidity up to 55°C (131°F) noncondensing (storage and transportation) 20% to 80% relative humidity up to 55°C (131°F) noncondensing (26°C (79°F) wet bulb, operating)
Atmospheric pressure	-305 to 3,050 m (-1,000 to 10,000 ft) operating -305 to 12,192 m (-1,000 to 40,000 ft) not operating
Air quality	Noncorrosive
INOSM01 certification	CSA certification for use as process control equipment in an ordinary (nonhazardous) environment.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Table 1-5. Type 10Base5 Specifications

Property	Characteristic/Value
Data transmission rate	10 Mbaud maximum
Cable segment length	500 m (1,640 ft) maximum
Total segment resistance	5 Ω
Cable length between MAU transceivers	2,500 m (8,200 ft) maximum (using repeaters)
MAU transceiver placement	50 m (165 ft) maximum distance from NTSM01 termination unit and transceiver 2.5 m (8.2 ft) minimum spacing between transceivers (at the annular markings on the coaxial cable)
Number of MAU transceivers per segment	100 per cable segment
Breakdown voltage, MAU transceiver function	250 VAC rms

Table 1-5. Type 10Base5 Specifications (continued)

Property	Characteristic/Value
Repeaters between stations	2 maximum (Ethernet V1.0 or V2.0 standard), 4 maximum (IEEE 802.3 standard). Repeaters apply towards the maximum number of MAU transceivers on a coax segment.
Stations on a network	1,024 maximum
Average characteristic cable impedance	50 ±2 Ω
Attenuation	Not to exceed 8.5 dB per 500 m (1,640 ft) segment at 10 Mbaud
AUI functionality	DI+, DI-, DO+, DO-, CI+, CI-
Coaxial tap connector characteristics:	
Capacitance	2 pF nominal connector loading at 10 Mbaud
Contact resistance (shield and center conductor)	50 mΩ
Probe current	0.1 A per contact (probe and shield)
Shield current	1 A surge for 1 sec

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Table 1-6. Type 10Base2 Specifications

Property	Characteristic/Value
Data transmission rate	10 Mbaud maximum
Cable segment length	185 m (610 ft) maximum per segment, 0.5 m (1.5 ft) minimum per segment between transceivers
Cable segments per network	5 maximum using 185 m (610 ft) cable segments
Transceivers per cable segment	30 maximum per 185 m (610 ft) cable segment
Breakdown voltage, MAU function	250 VAC rms
Distance between stations	925 m (3,052 ft) maximum
Repeaters between stations	2 maximum (thin Ethernet standard), 4 maximum (IEEE 802.3 standard)
Stations per network	150 maximum
Average characteristic cable impedance	50, ±2 Ω
Attenuation	Not to exceed 8.5 dB per 185 m (600 ft) segment at 10 Mbaud

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

Table 1-7. Type 10BaseT Specifications

Property	Characteristic/Value
Data transmission rate	10 Mbaud
Cable length between a station and concentrator	150 m (495 ft) maximum
Stations per network	1,024 maximum

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

SECTION 2 - DESCRIPTION AND OPERATION

INTRODUCTION

The INOSM01 Open Systems Manager physically connects and interfaces an INFI-NET communication system to an Ethernet network. There are six modules that make up the INOSM01 Open Systems Manager:

- INESM01 Ethernet Server Module.
- INSCS01 SCSI Connector Module.
- INDDM01 Disk Drive Module.
- IMMPI01 Multi-Function Processor Interface Module.
- INICT03 INFI-NET to Computer Transfer Module.
- INNIS01 Network Interface Module.

SYSTEM OPERATION

The INOSM01 Open Systems Manager provides bidirectional access to INFI 90 OPEN system process data from computer software applications. The application programming interface (semAPI) software provides the interface to the open systems manager. See Figure 2-1 for a block diagram of the open systems manager. Within the semAPI software, calls are integrated with computer software applications and communication is established on the Ethernet network. The open systems manager supports the TCP/IP communication protocol (optional DECnet is also supported for clients on the VAX/VMS, VAX/Open VMS, and Alpha AXP/Open VMS platforms). The semAPI software runs on a variety of platforms including VAX/VMS, VAX/Open VMS, Alpha AXP/Open VMS, and Windows NT/95.

The computers (depending on the semAPI software option loaded) can operate at one of two system data access levels: data acquisition or supervisory control. A data acquisition interface can only read data and exception reports from the system. Supervisory control interfaces can send data, tune blocks, and issue control commands to the system, in addition to reading data. Refer to the appropriate application programming interface (semAPI) user manual for information on semAPI interface software operation.

The computers on the Ethernet network operate independently of each other and can access the INOSM01 manager simultaneously. Therefore, multiple computer applications can communicate with the INOSM01 manager and multiple INOSM01 managers can communicate with one computer application. Ethernet V1.0, V2.0 and IEEE 802.3 standards allow 1,024 computers on an Ethernet network using Type 10Base5 and Type 10BaseT cable. Networks using Type 10Base2 cable can

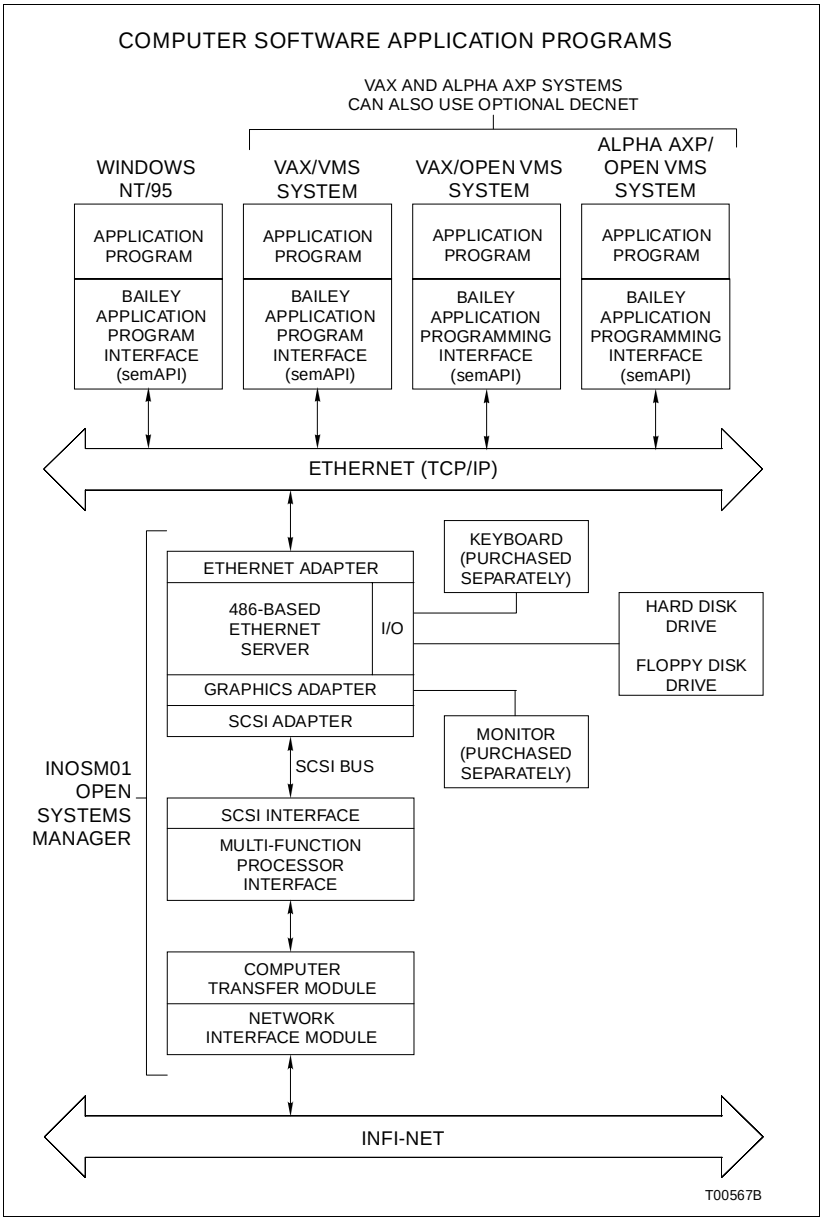

Figure 2-1. Open Systems Manager Block Diagram

support 150 computers. The open systems manager supports an INFI 90 database capable of containing a standard mix of 30,000 points at one time. Open systems manager installation options can limit the number of simultaneous users, the types of subroutines honored or the number of points supported.

The open systems manager is driven by the INFI-NET Ethernet server software package (in conjunction with the semAPI software). The Ethernet server software package is factory installed on the open systems manager hard disk drive and starts up automatically when the manager is installed and powered up.

The Ethernet server database requires configuration to define tag names that supervisory computers will access for reading and writing values, and receiving exception reports. The configuration defines a correspondence of INFI 90 OPEN addresses, indexes and tag names to the tag names in the Ethernet server database. Thus, the Ethernet server database configuration (in conjunction with the semAPI interface) allows application programming development to be independent of the interface to the INFI 90 OPEN control system. Ethernet server database configuration is done via one of the supervisory computers (on-line configuration only) or from a keyboard and monitor attached to the Ethernet server module (off-line configuration).

System operation on the INFI-NET side of the Ethernet server is typical of INFI-NET communication interface operation. Refer to the ***INFI-NET to Computer Interface (INICI01/03)*** instruction for a description of operation for this portion of the open systems manager.

SYSTEM DESCRIPTION

The Ethernet server module is a communication module that is designed to operate as a dedicated Ethernet server. The server module has two expansion slots for mounting adapter boards that handle various I/O responsibilities. An Ethernet adapter board occupies one slot and provides the interface to the Ethernet network via a termination unit. The server module termination unit provides connections for Type 10BaseT (twisted pairs), Type 10Base2 (thin Ethernet), and Type 10Base5 (thick Ethernet) cable.

A video adapter occupies the other expansion slot and provides the I/O circuitry and connector for a VGA monitor. Although a monitor is not required to boot the Ethernet server module, one is required to use server software utilities such as the Ethernet server diagnostic utilities, and for doing off-line configuration.

The server module disk drive controller circuitry connects via a ribbon cable to the disk drive module. The hard disk drive and floppy disk drive are mounted on the disk drive module. The Ethernet server database resides on the hard disk drive. The floppy disk drive is used to load the server software and for configuration in off-line mode.

The Ethernet server module communicates with the INFI-NET interface modules by way of a small computer system interface (SCSI). A SCSI adapter mounts on top of the video adapter and connects to a SCSI connector module. The SCSI connector module is a paddle board that physically connects to the SCSI interface on the IMMPI01 Multi-Function Processor Interface Module via a ribbon cable.

The IMMPI01 module provides the SCSI interface for the INICT03 INFI-NET to Computer Transfer Module and handles communication between the INICT03 and INESM01 modules. The INICT03 module interfaces to the INFI-NET communication system via the INNIS01 Network Interface Module and NTCL01 Communication Termination Unit.

HARDWARE DESCRIPTION

The INOSM01 Open Systems Manager hardware is made up of six INFI 90 OPEN modules, three termination units and required cables.

INESM01 Module

This module is a microprocessor-based circuit board with integrated Controlway and I/O expander bus circuits. The circuit board contains eight megabytes of dynamic random access memory. There is also a 256-kilobyte external write through cache.

All computer functions are implemented through the use of high density integrated circuits (IC). High density integrated circuits provide two serial ports, one parallel port, a keyboard port, floppy disk controller, hard disk controller, memory controller, DMA controller, IRQ controller, etc. The serial and parallel ports are reserved for future use.

One serial port (reserved for future use) and the keyboard port are accessible from the module faceplate via a six-pin mini DIN connector (keyboard port) and DB-9 connector (COM1 port). The other serial port and the parallel port are fed to the P3 edge connector on the module. Headers on the circuit board provide for ribbon cable connections to the floppy disk drive and hard disk drive (mounted on the disk drive module). The floppy controller is a fully compatible NEC µPD72065B controller with on chip data separator. The hard disk drive controller is fully IDE compatible. Power to the server module is provided via the P1 edge connector. The video adapter board provides a DB-15 connector at the module faceplate for a VGA monitor.

There are two ISA bus expansion slots for adapter boards (add-on boards). The adapter boards mount parallel to the module circuit board; therefore, adapter boards can be stacked on the server module which occupies one module mounting unit slot. There are three adapter boards mounted on the INESM01 module: Ethernet, video and SCSI adapter boards.

The circuit board has battery back up of real time clock functions. A charging circuit keeps the battery fully charged while the board is powered. If Vcc drops below 4.5 VDC, battery

power switches on. A fully charged battery will retain CMOS for one year. The battery requires at least eight hours of power to become fully charged (if completely discharged when power is first applied).

Controls on the module faceplate include four LEDs that indicate module operation, hard disk drive activity, Ethernet transmission activity, and Ethernet link status. There are two pushbuttons, one to stop and one to reset the module.

Adapter Boards

There are three adapter boards that mount on the INESM01 module: Ethernet, video and SCSI adapters.

ETHERNET ADAPTER BOARD

The Ethernet adapter board mounts at the rear of the server module because its input and output are to the Ethernet network via a cable connection to the NTSM01 termination unit. Ethernet connections are at the NTSM01 termination unit. The Ethernet controller integrated circuit integrates the ISA bus interface, Type 10BaseT interface, and attachment unit interface (AUI).

For Type 10BaseT cable, direct connection is possible because the termination unit cable and Type 10BaseT cable have the same characteristic impedance. There is also an isolation transformer/filter on the path of the transmit and receive data routes on the adapter board. Additionally, the receive path on the adapter board has characteristic impedance matching circuits.

The AUI interface on the adapter board requires isolation and active circuitry on the termination unit in addition to termination circuits at the end of the termination cable. The termination unit separates the AUI interface into a Type 10Base5 interface (thick Ethernet) and a Type 10Base2 interface (thin Ethernet). The receive path on the adapter board for the AUI interface also has characteristic impedance matching circuits.

VIDEO ADAPTER

The video adapter board mounts at the front of the module so that the video connector is accessible at the module faceplate. The board contains one megabyte of video dynamic random access memory. All timing signals are generated internally to the video controller; therefore, only a reference frequency is required. The video controller uses peripheral input/output (PIO) transfers and requires no interrupts or direct memory access (DMA) activity. The board is fully SVGA compatible.

SCSI ADAPTER

The SCSI adapter board mounts at the front of the module. Connectors on both sides of the adapter boards permit the SCSI adapter to be mounted on top of the video adapter board, thus sharing the same ISA expansion slot.

The SCSI controller integrated circuit integrates all SCSI interface and ISA interface functions so that no external logic is required. The controller only requires a reference frequency. The Ethernet server module makes data transfers to the SCSI adapter using 16-bit PIO transfers. The adapter board contains all the required termination circuitry for a SCSI interface. Termination is selected via onboard jumpers. A high density 50-pin connector connects the adapter board to the INSCS01 SCSI Connector Module.

INSCS01 Module

The INSCS01 SCSI Connector Module is a paddle board that converts the high density 50-pin connector on the SCSI adapter board to a standard 50-pin SCSI connector. The standard SCSI connector is on the faceplate of the INSCS01 module and provides a place to make a cable connection to the SCSI connector on the IMMPI01 module faceplate. Mounting requires one slot in a standard INFI 90 OPEN module mounting unit.

INDDM01 Module

The INDDM01 Disk Drive Module contains a card mounted 120-megabyte hard disk drive and 1.44-megabyte floppy disk drive. The floppy disk drive is accessible at the module faceplate. Two ribbon cables connect the drives to the disk drive controller on the Ethernet server module. Power is brought to the disk drives via the P1 edge connector at the module mounting unit backplane. The module occupies one slot in a standard INFI 90 OPEN module mounting unit.

NTSM01 Termination Unit

The NTSM01 Server Module Termination Unit contains the necessary connectors and circuitry to terminate the Ethernet cabling and pass system communication to and from the INFI-NET to Ethernet server module. The NTSM01 termination unit requires 24 VDC power for active circuitry that handles connections for Type 10BaseT (twisted pairs), Type 10Base2 (thin Ethernet), and Type 10Base5 (thick Ethernet) network cabling. Type 10BaseT cable connects to the termination unit via an RJ-45 connector. Type 10Base2 cable connection to the termination unit is via a BNC connector. Type 10Base5 cable connects to the termination unit through an attachment unit

interface (AUI) drop cable and medium attachment unit (MAU) transceiver. The termination unit connects to the INESM01 module via a cable connection. All active Ethernet circuitry is isolated from I/O power and INESM01 circuits.

SECTION 3 - INSTALLATION

INTRODUCTION

This section explains how to install the INOSM01 Open Systems Manager. It covers the handling of electrostatic sensitive devices, jumper settings on the INESM01 Ethernet Server Module, termination unit installation, mounting the interface circuit boards, and cable connections.

> **NOTE:** A keyboard and monitor are required to configure the open systems manager.

SPECIAL HANDLING

The open systems manager circuit boards contain devices susceptible to electrostatic discharge. Follow these handling procedures:

> **NOTE:** Always use field static kit (part number 1948385_1 - consisting of two wrist straps, ground cord assembly, alligator clip and static dissipative work surface) when working with the modules. The kit grounds a technician and the static dissipative work surface to the same ground point to prevent damage to the modules by electrostatic discharge.

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

2. ***Ground Bag Before Opening.*** Before opening a bag containing an assembly with semiconductors, touch it to the equipment housing or a ground to equalize charges.

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

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

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

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

7. ***Use a Grounded Wrist Strap.*** Connect the wrist strap to the appropriate grounding plug on the power entry panel. The grounding plug on the power entry panel must be effectively connected to the earth grounding electrode system through the AC safety ground.

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

UNPACKING AND INSPECTION

1. Examine the hardware immediately to verify that it has not been damaged in transit.

2. Notify the nearest sales office of any such damage.

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

4. Use the original packing material and container to store the hardware.

5. Store the hardware in an environment of good air quality, free from temperature and moisture extremes.

OPEN SYSTEMS MANAGER INSTALLATION

Install the modules, termination units and cables that make up the open systems manager.

Mounting Requirements

The INOSM01 manager requires six adjacent module mounting unit (MMU) slots for mounting. Figure 3-1 shows the order in which the interface modules mount in the module mounting unit. Three of the mounting spaces on the two field termination panels are required for mounting termination units.

Server Module Termination Unit Installation

One of three sets of jumpers on the server module termination unit require setting before installation. These jumpers (J1, J2 and J8) set up operation for the type of cable being used on the Ethernet network. All other jumpers are reserved for future use and should be open. Set the NTSM01 jumper blocks required for the cable type that is being used. Table 3-1 lists NTSM01 jumper settings and connector pinouts. Short a jumper to select an option. Figure 3-2 shows the server module termination unit circuit board layout.

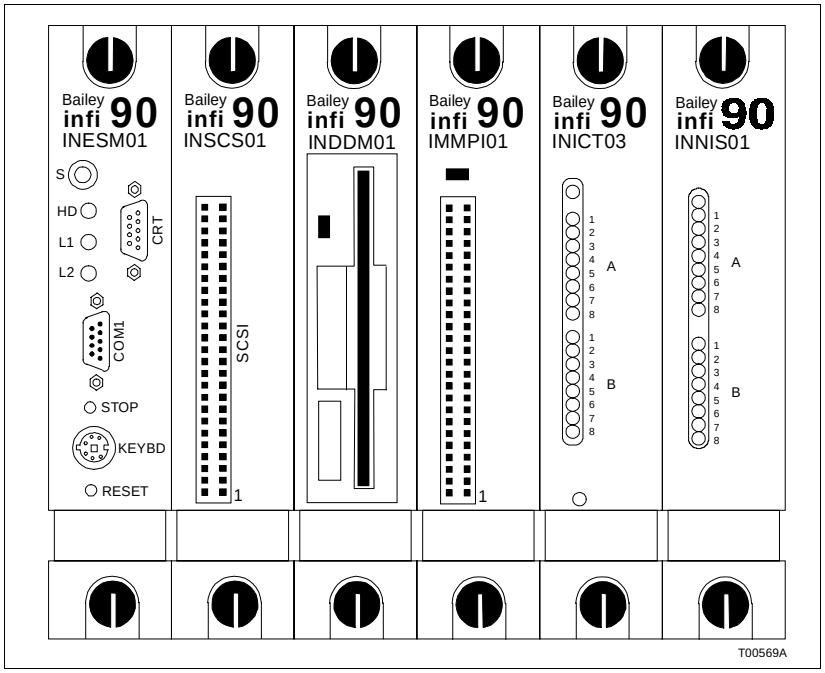

Figure 3-1. INOSM01 Module Mounting Sequence

Table 3-1. NTSM01 Jumper Settings and Connector Pinouts

Jumper	Cable Option	Signal	Jumper Setting	Connector Pinouts[1]
J1[2]	Type 10Base2 (thin Ethernet)	CI+	1-2	NA
		CI-	3-4	
		DI+	5-6	
		DI-	7-8	
		DO+	9-10	
		DO-	11-12	
J2[2]	Type 10Base5 (thick Ethernet)	CI+	1-2	P2 - 2
		CI-	3-4	P2 - 9
		DI+	5-6	P2 - 5
		DI-	7-8	P2 - 12
		DO+	9-10	P2 - 3
		DO-	11-12	P2 - 10
		12 VDC	NA	P2 - 13
		Common	NA	P2 - 4, 6, 8, 11, 14
J8	Type 10BaseT (twisted pairs)	TD+	1-2	P3 - 1
		TD-	3-4	P3 - 2
		RD+	5-6	P3 - 3
		RD-	7-8	P3 - 6

NOTES:

1. P2 and P3 connector pinouts not listed are no connection.
2. Jumpers J1 and J2 are mutually exclusive; only use one set or the other at a time.

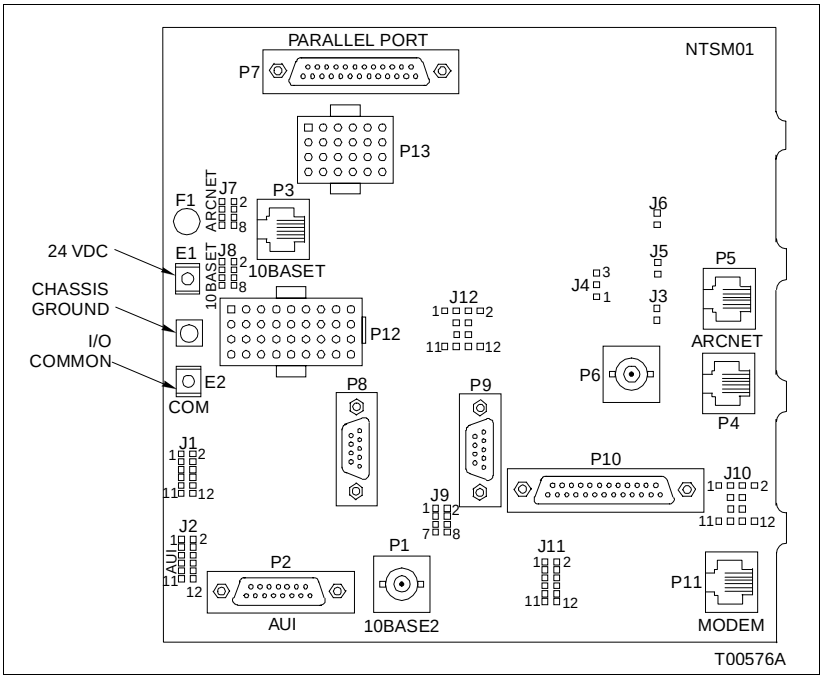

Figure 3-2. NTSM01 Circuit Board Layout

MOUNTING THE NTSM01 TERMINATION UNIT

1. Before mounting the NTSM01 termination unit, verify that the termination unit jumpers are set for the cable type being used.

2. Insert the tabs of the termination unit circuit board into the proper slots of the termination panel standoff and slide it into place (Figure 3-3).

3. Secure the termination circuit board to the field termination panel with two number 10 self-tapping screws.

TERMINATION CABLE INSTALLATION

CAUTION	**Remove a module from its assigned slot before installing or removing a cable assigned to that slot. Failure to do so could result in damage to the module.**

1. Connect the J3 connector of the NKSM01 cable to P13 on the NTSM01 termination unit. Figure 3-4 shows a diagram of cable connections.

2. Connect the J2 connector of the NKSM01 cable to P12 on the NTSM01 termination unit.

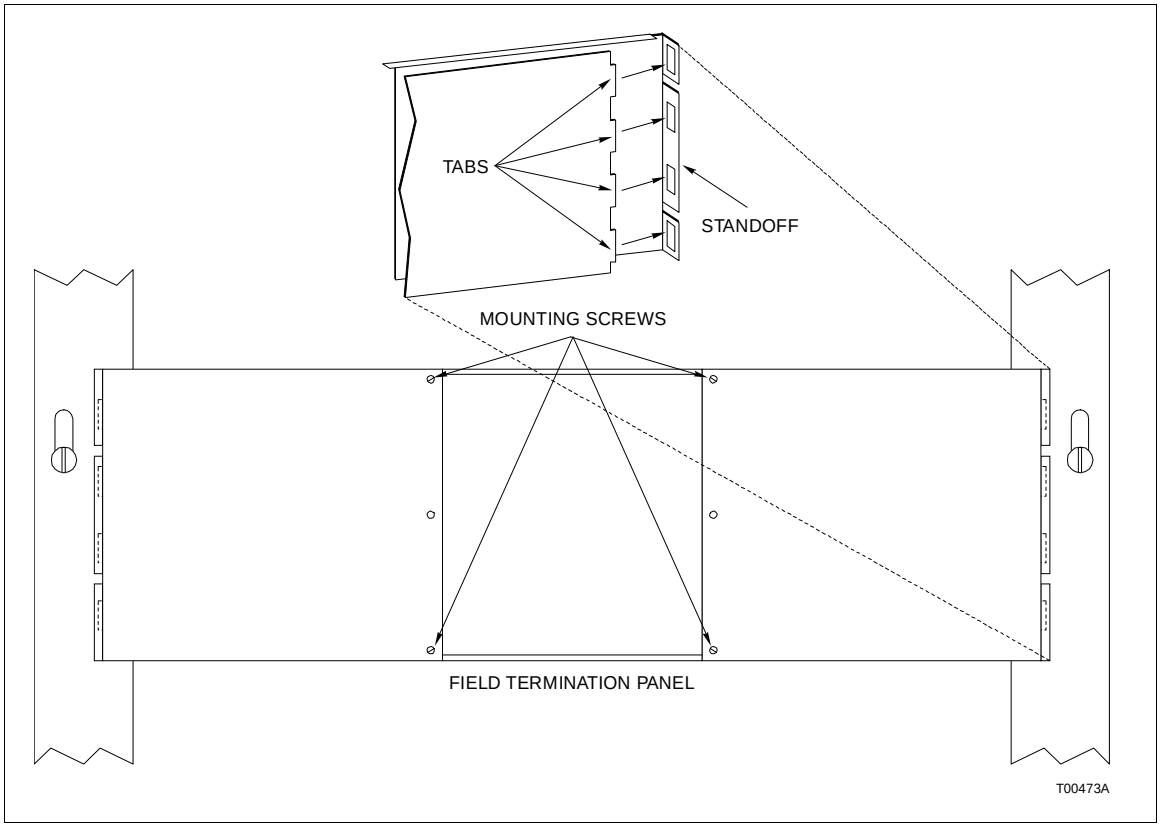

Figure 3-3. Mounting the Termination Unit

3. Connect the J1 connector of the NKSM01 cable to the backplane of the module mounting unit slot assigned to the INESM01 module.

ETHERNET CABLE INSTALLATION

The TSM termination unit provides Ethernet connections for Type 10BaseT, Type 10Base2 and Type 10Base5 cables. Refer to Tables 1-5 through 1-7 for Ethernet cable specifications (ANSI/IEEE 802.3 specifications). To connect the Ethernet cable to the TSM termination unit, follow the appropriate Ethernet cable installation instructions. Refer to Table 3-1 for termination connector pinouts if needed.

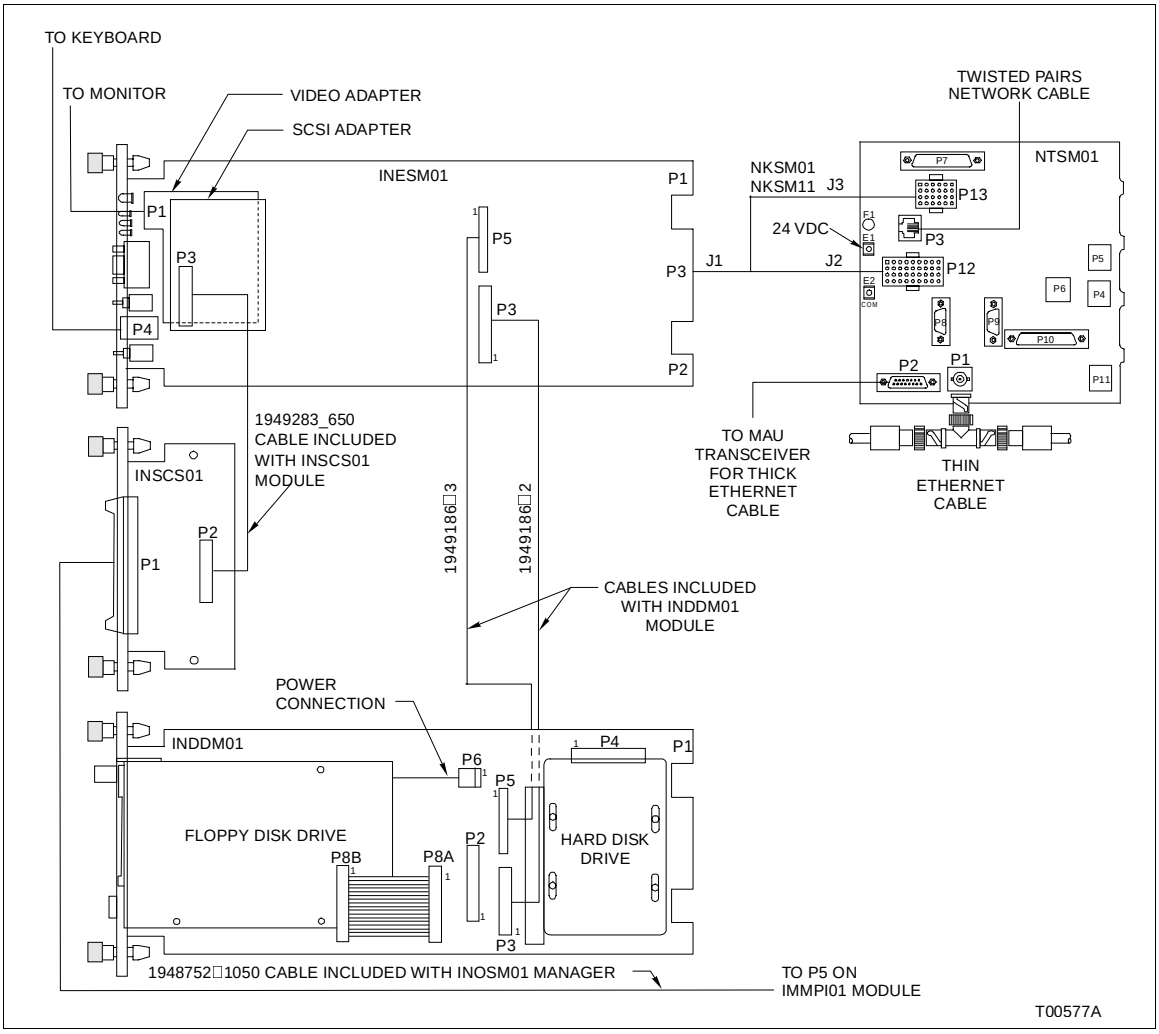

Figure 3-4. INOSM01 Cable Diagram (Page 1 of 2)

Type 10BaseT Installation (Twisted Pairs)

The TSM termination unit has an RJ-45 eight-pin socket for Type 10BaseT cable. The cable has a mating RJ-45 type eight-pin modular plug. To install:

1. Insert the modular plug at one end of the interface cable into the RJ-45 connector (P5) on the TSM termination unit.

2. Attach the other end of the cable to an input port of a 10BaseT concentrator.

Type 10Base2 Installation (Thin Ethernet)

The TSM termination unit has a BNC connector for Type 10Base2 cable. This connection requires a T-connector.

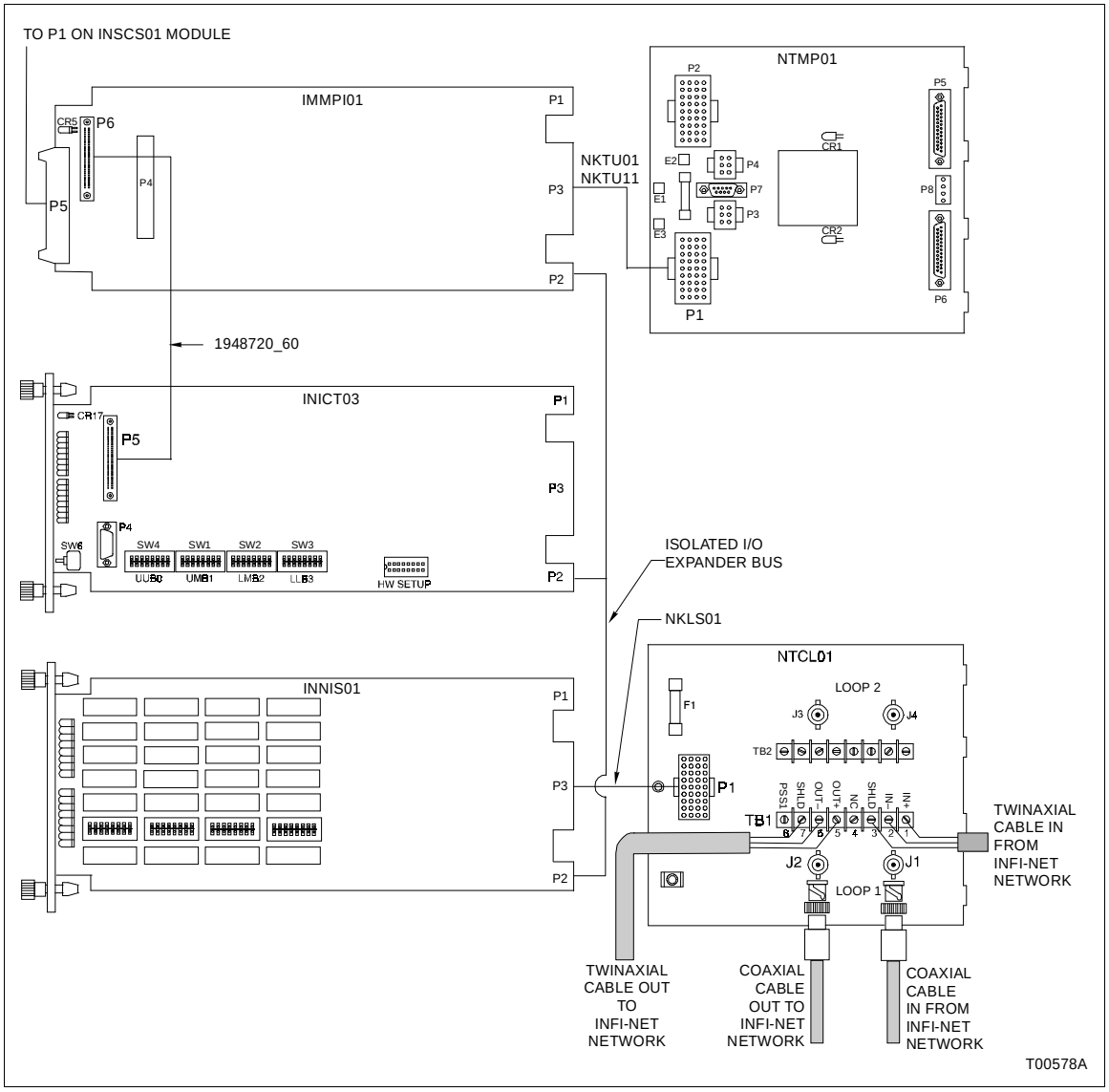

Figure 3-5. INOSM01 Cable Diagram (Page 2 of 2)

A 50-ohm terminator is also required if the server is the first or last server on the network. The T-connector shell (which connects to the cable shield) and any connectors attaching segments of cable should be insulated by means of a sleeve or boot so that the connector shell does not contact any structural metal at ground potential or other unintended conductor (Figure 3-6). Figure 3-7 shows how to install Type 10Base2 cable to the TSM termination unit. To install:

1. Connect the center barrel of the T-connector to the BNC connector (P1) on the TSM termination unit. Push the T-connector in and turn it clockwise until it locks in place.

2. If this connection is the first or the last server connection on the network, attach a 50-ohm terminator (0.5-watt or

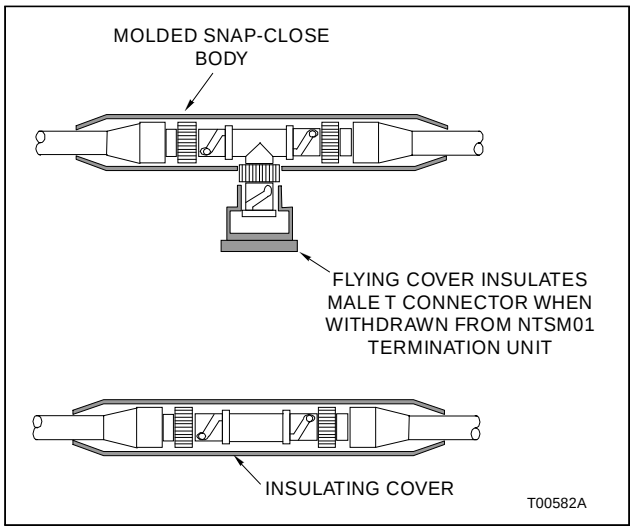

Figure 3-6. Connector Shell Insulation

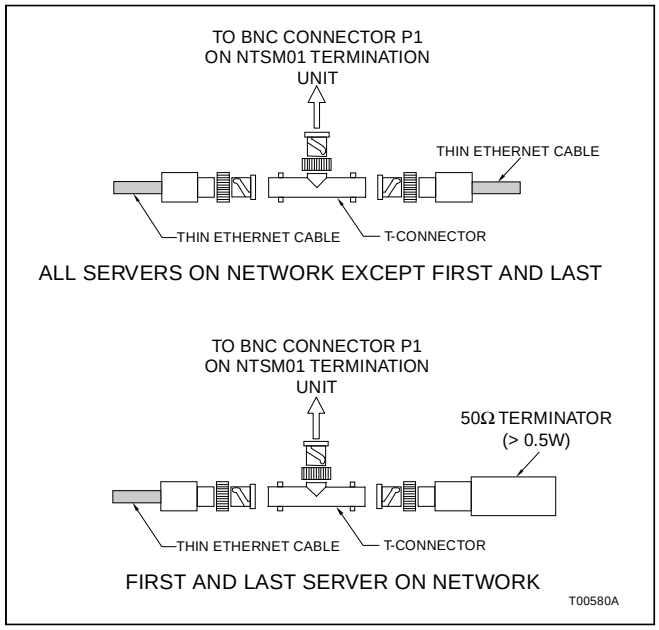

Figure 3-7. Type 10Base2 Cable Installation

greater) to one arm of the T-connector. Push the terminator on the T-connector arm and turn clockwise to lock in place.

3. Push the connector attached to the thin Ethernet cable onto the other arm of the T-connector. Turn clockwise to lock it in place.

4. If the connection is not the first or the last server connection on the network, attach the ends of the cables from two Ethernet nodes. Attach one cable to each side of the T-connector.

5. Install an insulating cover over the T-connector.

Type 10Base5 Installation (Thick Ethernet)

The NTSM01 termination unit has an attachment unit interface (AUI) connection for Type 10Base5 cable. This connection requires a medium attachment unit (MAU) transceiver to attach a trunk coaxial cable to an AUI drop cable. The MAU transceiver can have a coaxial tap connection or a BNC connector, provided the constant impedance of the BNC connector on the MAU transceiver is 50 ohms. The MAU transceiver to coaxial cable connection should be as short as possible (less than 30 millimeters (1.2 inches)) so that the connection does not significantly disturb transmission line characteristics. One-watt coaxial cable terminators with the characteristic impedance of the coaxial cable (50 ohms) should be installed to minimize reflections from the ends of cables.

The trunk coaxial cable shielding should be effectively grounded to earth ground. Effectively grounded means that the earth ground connection has a sufficiently low impedance and sufficient ampacity to prevent the buildup of hazardous voltages. Make a permanent connection to earth ground via the ground lug on one of the terminators at one end of the cable. A single ground return lug on a segment connector located in the center of the cable transmission system may be used to satisfy this requirement. To install:

1. Attach one end of a drop cable to the AUI connector (P2) on the TSM termination unit (Figure 3-8). Tighten the screws on the AUI connector to secure it to the termination unit.

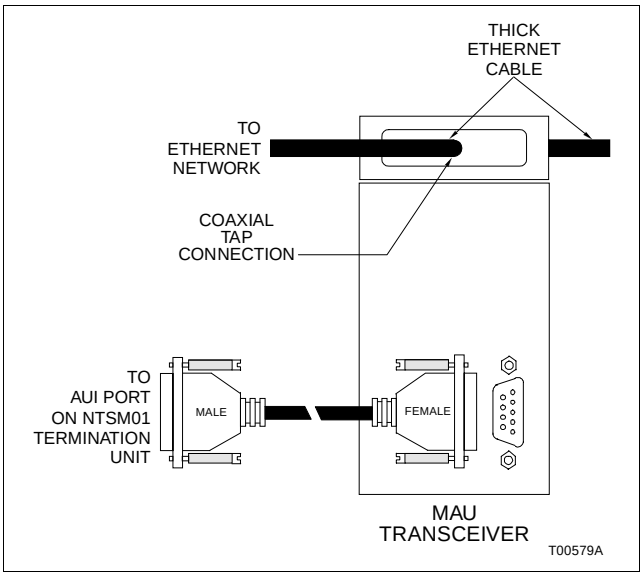

Figure 3-8. Attaching Trunk Coaxial Cable to MAU Transceiver

2. Attach the MAU transceiver at a marked location on the thick Ethernet cable (cable is marked every 2.5 meters) if using a coaxial tap connection. Several types of cable tap kits are available. Follow the instructions provided with the kit being used. For MAU transceivers with BNC connectors, terminate the coaxial cable with a BNC connector at the desired cable marking and connect it to the MAU transceiver. Attach the other end of the AUI drop cable to the MAU transceiver (Figure 3-8).

3. Effectively ground the trunk coaxial cable shielding by permanently connecting it to earth ground at one end of the cable or at one point along the cable.

POWER WIRING

CAUTION	**It is strongly recommended that all power (cabinet, I/O, etc.) be turned off before doing any wiring. Verify all connections before applying power. Failure to observe these precautions could result in equipment damage.**

There are two terminals (E1 and E2) on the NTSM01 termination unit for connecting 24 VDC power and I/O common. To install 24 VDC power wiring:

1. Crimp quick-connect connectors to both ends of two 14 AWG insulated wires.

2. Attach one wire to a 24 VDC quick-connect tab on the system power bus bar. Attach the other end of the wire to the E1 quick-connect tab on the termination unit.

3. Attach the other wire to an I/O common quick-connect tab on the system power bus bar. Attach the other end of the wire to the E2 quick-connect tab on the termination unit.

Ethernet Server Module Installation

The INESM01 Ethernet Server Module is shipped with the module jumpers correctly installed. Verify that jumper J14 is properly installed before installing the module. Jumper J14 opens the path from -30 VDC in older Network 90 system module mounting units. Jumper J14 must be set as shown in Table 3-2. See Figure 3-9 for the INESM01 circuit board layout. Dipswitch SW2 should be set with all poles open (off).

Table 3-2. INESM01 Jumper Settings

Jumper	Jumper Setting	Required Setting
J1	1-2	open
	2-3	short
J2	1-2	short
	2-3	open
J3	1-2	short
J4	1-2	open
J5	1-2	open
	3-4	
	5-6	
	7-8	
J6	1-2	open
	3-4	
	5-6	
	7-8	
J7	1-2	open
	2-3	short
J8	1-2	open
	2-3	short
J9	1-2	open
J10	1-2	short
J11	1-2	open
J12	1-2	open
J13	1-2	open
	2-3	short
J14	1-2	open
	2-3	short
J15	1-2	open
	2-3	short
J16	1-2	open
J17	1-2	open
J18	1-2	short

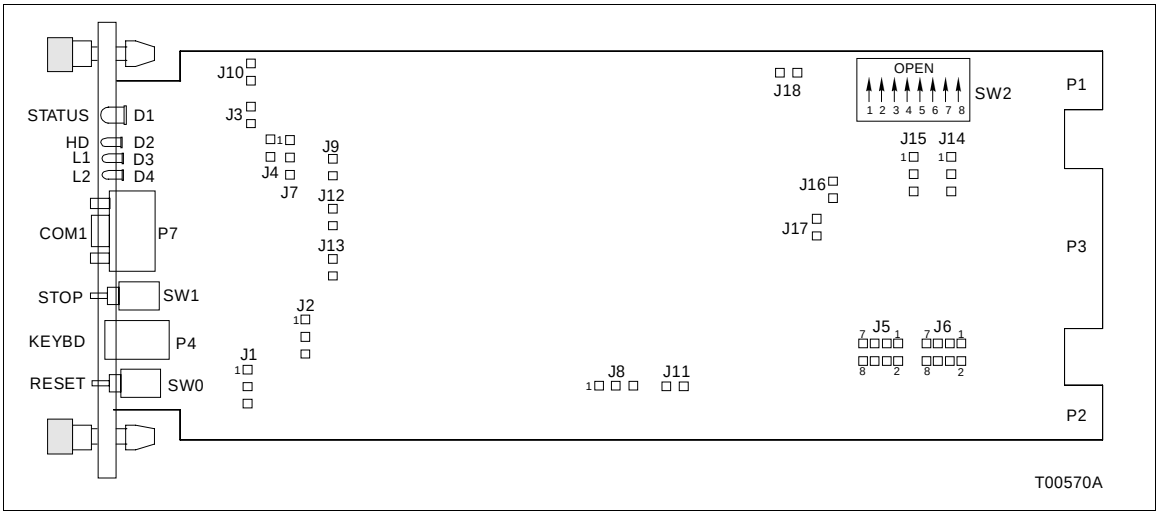

Figure 3-9. INESM01 Circuit Board Layout

INESM01 ADAPTER BOARDS

There are three adapter boards attached to the ESM module: video, Ethernet and SCSI adapters. The jumpers are set on these boards when they are installed on the ESM module in the factory. Table 3-3 lists the required adapter board jumper settings. Figures 3-10 through 3-12 show the layouts of the adapter boards. Figure 3-13 shows how the adapter boards mount on the ESM module. Verify that the adapter boards are in place before installing the ESM module.

Table 3-3. Adapter Board Jumper Settings

Adapter Board	Jumper	Jumper Setting	Required Setting
Ethernet	J1	1-2	short
		3-4	open
		5-6	open
	J2	1-2	short
		3-4	open
		5-6	open
	J3	1-2	short
		3-4	open
		5-6	open
		7-8	open
SCSI	J1	1-2	open
		3-4	
		5-6	
	J2	1-2	open
		3-4	
		5-6	

Table 3-3. Adapter Board Jumper Settings (continued)

Adapter Board	Jumper	Jumper Setting	Required Setting
SCSI *(continued)*	J3	1-2	open
		3-4	open
		5-6	short
		7-8	open
	J4	1-2	short
	J5	1-2	open
		2-3	
Video	J1	1-2	open
		2-3	

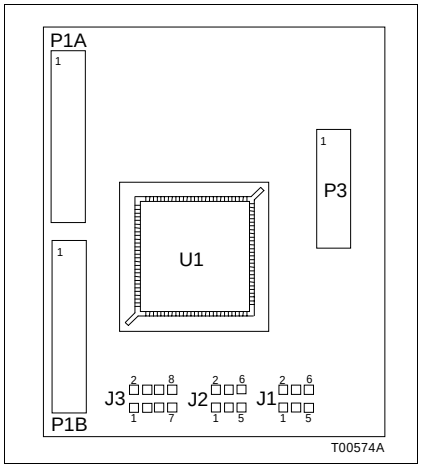

Figure 3-10. Ethernet Adapter Circuit Board Layout

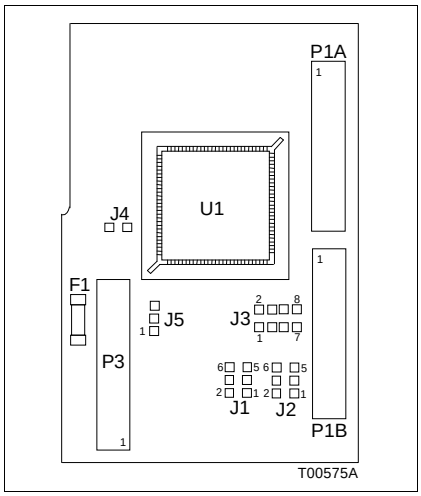

Figure 3-11. SCSI Adapter Circuit Board Layout

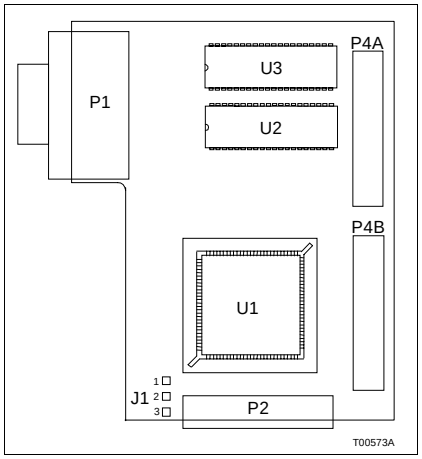

Figure 3-12. Video Adapter Circuit Board Layout

MODULE INSTALLATION

To install the INESM01 module:

1. Verify that jumper J14 has been properly installed.

2. Verify that the adapter boards are in place.

3. Guide the top and bottom edges of the circuit board along the top and bottom rails of its assigned MMU slot (Figure 3-1).

4. Slide the module part way into the MMU slot. Cable connections from the disk drive module and SCSI connector module are required before securing the module in the MMU unit.

5. Proceed to ***Disk Drive Module Installation*** to connect cables from the disk drive module to the ESM module.

Disk Drive Module Installation

The disk drive module (DDM) is shipped with the required cables and is ready to install. Before installing the module, verify that the cable connections are secure. Figure 3-13 shows the disk drive module circuit board layout.

To install the disk drive module:

1. Guide the top and bottom edges of the circuit board along the top and bottom rails of its assigned MMU slot (Figure 3-1).

2. Slide the module part way into the MMU slot.

3. Connect the ribbon cable from the P5 connector on the DDM module to the P5 connector on the ESM module.

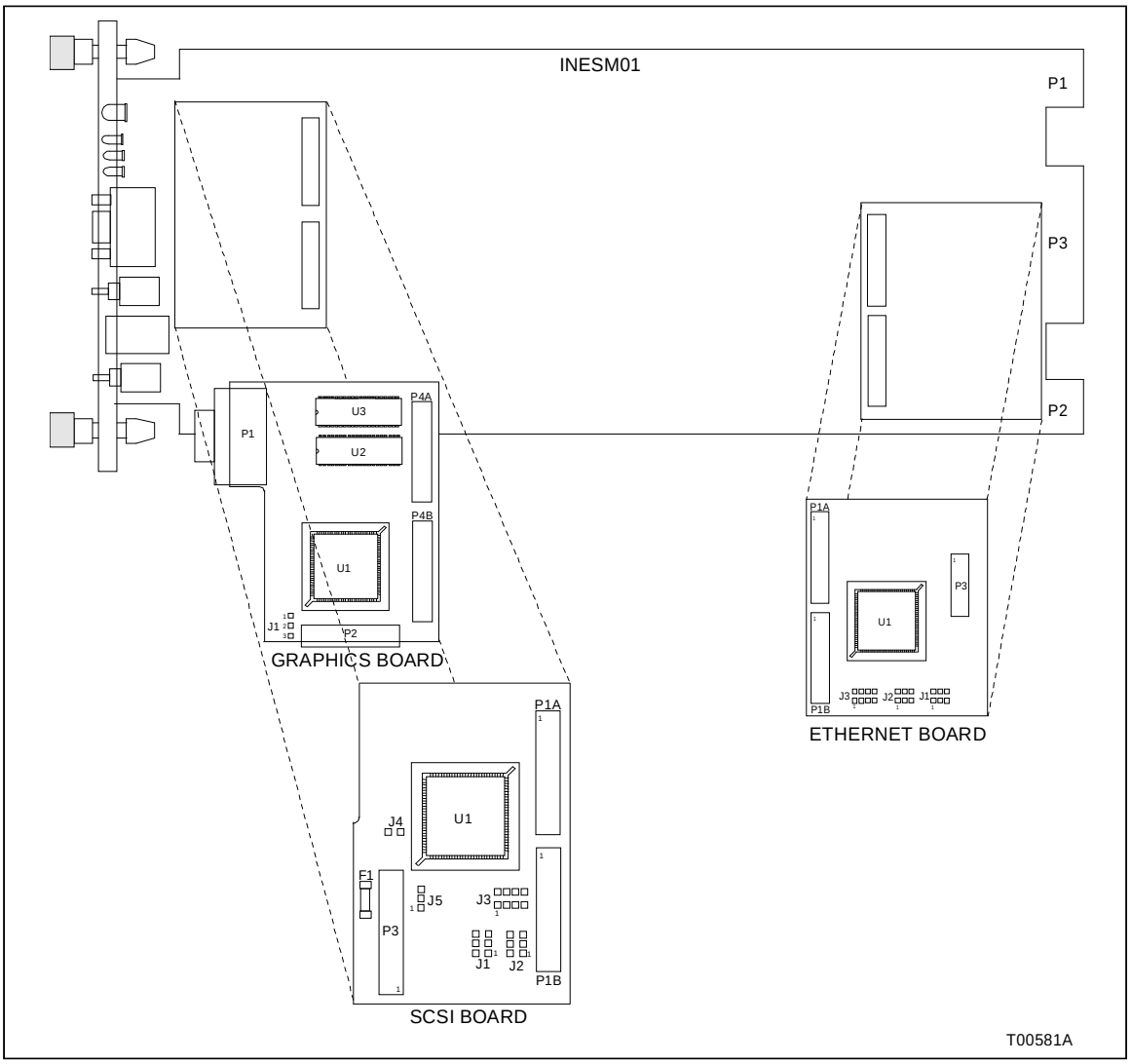

Figure 3-13. INESM01 Adapter Board Mounting

4. Connect the ribbon cable from the P3 connector on the DDM module to the P3 connector on the ESM module.

5. Slide the ESM and DDM modules into the mounting slots.

6. Proceed to ***SCSI Connector Module Installation***.

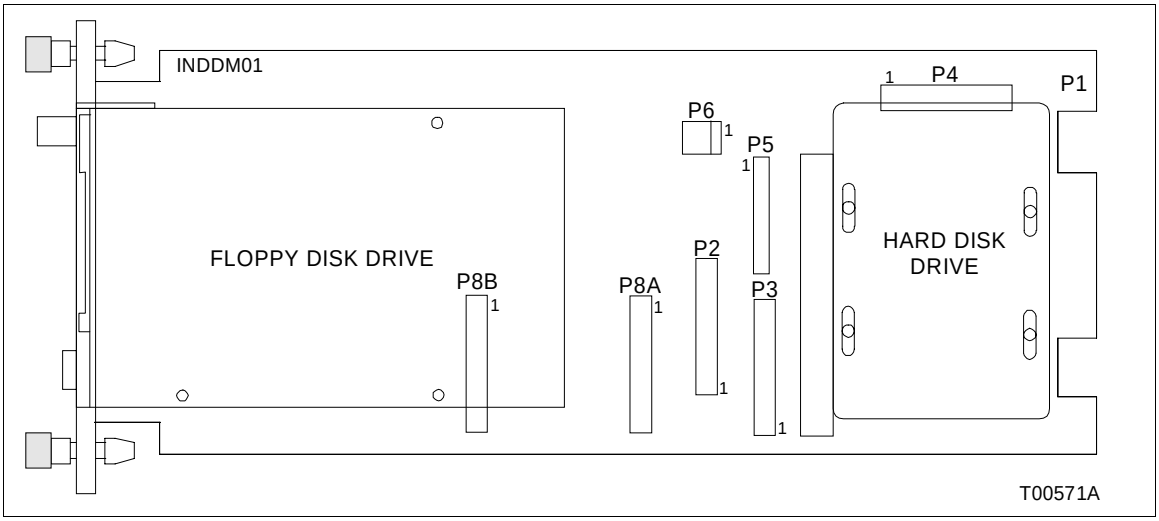

Figure 3-14. INDDM01 Circuit Board Layout

SCSI Connector Module Installation

The SCSI connector module is shipped with the required cable and is ready to install. Before installing the module, verify that the cable connection is secure. Figure 3-15 shows the INSCS01 circuit board layout.

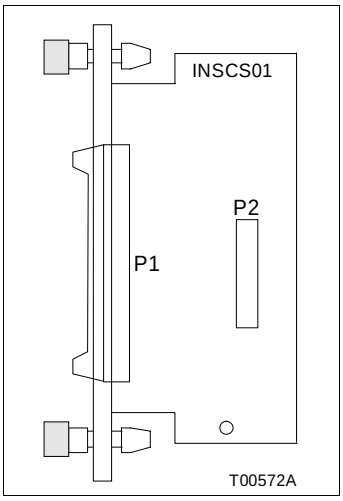

Figure 3-15. INSCS01 Circuit Board Layout

To install the SCSI connector module:

1. Connect the ribbon cable from the P2 connector on the SCSI connector module to the P3 connector on the SCSI adapter board (mounted to the ESM module).

2. Insert the SCSI connector module into its assigned MMU slot (Figure 3-1). Push the module into its MMU unit until the faceplate is flush with the top and bottom of the MMU frame.

3. Turn the two captive latches ½-turn to lock the module in place.

4. Push the ESM module into its mounting slot until the faceplate is flush with the top and bottom of the MMU frame and it is seated within the cable connector on the MMU backplane.

5. Turn the two captive latches ½-turn to lock the module in place.

6. Push the DDM module into its slot until the faceplate is flush with the top and bottom of the MMU frame.

7. Turn the two captive latches ½-turn to lock the module in place.

INICI03 Interface Installation

Complete dipswitch and jumper setting information can be found in the ***INFI-NET to Computer Interface (INICI01/03), Communication Termination Unit (NTCL01)*** and ***Multi-Function Processor Termination Unit (NTMP01)*** instructions. Table 1-2 lists the document numbers of these instructions. Refer to these instructions for information on preparing the module mounting unit, mounting the modules and cable connections. The information in this section outlines any specific dipswitch and jumper setting requirements for operation in the INOSM01 Open Systems Manager.

INICT03 MODULE

Table 3-4 lists the INICT03 dipswitch settings. Refer to Table 3-5 for jumper settings.

IMMPI01 MODULE

There are no jumper settings required on the IMMPI01 module for operation with the INOSM01 Open Systems Manager.

Table 3-4. INICT03 Dipswitch Settings

Dipswitch	Dipswitch Pole								Options Selected
	1	2	3	4	5	6	7	8	
UMB1	0	1	1	1	0	1	1	1	9600 baud rate, ports 1 and 2.
LMB2	0	0	0	0	0	0	0	0	Diagnostics disabled.
LLB3	1	0	1	1	1	1	1	1	SCSI port enabled, SCSI address = 3, SCSI parity checking enabled.
UUB0	0	0	0	1	0	0	0	0	ROM checksumming enabled, ports 0 and 1 data characteristics: 8 data bits, 1 stop bit, no parity, modem password disabled, port addressing mode disabled, checksumming option disabled.

NOTE: 0 = CLOSED or ON, 1 = OPEN or OFF.

Table 3-5. INICT03 Jumper Settings

Jumper	Setting	Options Selected
J1	open	RS-232-C diagnostic port options.
J2	4-3	1 Mbit SRAM device (128 x 8).
J4	open	Machine fault timer disabled. Must be open for normal operation.
J5	30V	Opens the path of -30 VDC in older Network 90 systems. Must be set as shown.

INNIS01 MODULE

Set the INNIS01 dipswitches for the requirements of the INFI-NET communication system it is servicing. Refer to the ***INFI-NET to Computer Interface (INICI01/03)*** instruction for tables listing the function of each dipswitch. Refer to Table 1-2 for the document number.

MODULE INSTALLATION

The product instruction explains how to prepare the module mounting unit for these modules and the cable connections between the modules. After preparing the module mounting unit:

1. Completely install the INICT03, INNIS01 and IMMPI01 modules, and the required termination units and cables.

2. Install the 50-pin ribbon cable from the connector on the SCSI module faceplate to the connector on the IMMPI01 faceplate (Figure 3-4).

SYSTEM START-UP

The INOSM01 Open Systems Manager is shipped with the server software installed. No keyboard or monitor is needed for the INESM01 server module to boot. The open systems manager will start up automatically upon power up. After the open systems manager boots, refer to the ***INFI-NET Ethernet***

Server Installation and Configuration instruction to configure the system.

Database configuration can be done on-line via one of the supervisory computers or off-line via a monitor and keyboard connected to the Ethernet server module (at the faceplate). Use a VGA monitor and a PC-AT compatible keyboard with a PS/2 type six-pin mini DIN adapter. Refer to Table 7-1 for part numbers of these items.

If the interface does not start up, refer to Section 5 for help. For information on INESM01 faceplate LEDs states during operation, refer to Section 4.

SECTION 4 - OPERATING PROCEDURES

INTRODUCTION

The INOSM01 Open Systems Manager is ready to place into operation if all the steps in Section 3 have been completed. The INFI-NET Ethernet server base system software package is factory installed; therefore, it will start up automatically when the open systems manager is powered on. Refer to the ***INFI-NET Ethernet Server Installation and Configuration*** instruction for other operating instructions such as logging on the system, assigning passwords and configuration. An Ethernet server module shutdown procedure is contained in this section.

INESM01 FACEPLATE

The INESM01 Ethernet Server Module faceplate contains various connectors, LEDs and pushbuttons (Figure 4-1). The ethernet server module operates without a monitor and keyboard. However, a monitor and keyboard are required to load software

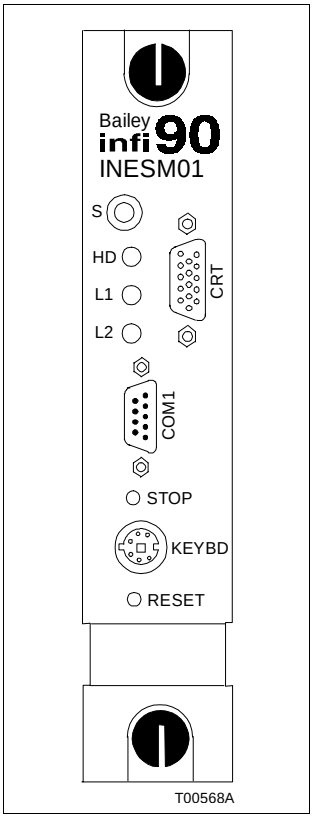

Figure 4-1. INESM01 Module Faceplate

and execute Ethernet diagnostic tools. The LEDs display normal operating status. Table 4-1 lists the normal operating LED states.

Table 4-1. INESM01 LED States

LED	State	Meaning
S	Green	Normal operation
	Red	Server module in reset (stopped)
HD	Yellow (flashing)	Hard disk drive activity[1]
L1	Green (flashing)	Ethernet transmission activity[1]
L2	Yellow	Ethernet link good[2]

NOTES:
1. No activity when the LED is off.
2. Only valid if 10BaseT cable is used; otherwise, this LED remains off.

STOP PUSHBUTTON

Do not use the stop pushbutton. It is reserved for future use.

RESET PUSHBUTTON

Do not use the reset button under normal operation. It is reserved for future use. Using the reset button to stop the Ethernet server can result in file corruption. Refer to ***SHUTDOWN PROCEDURE*** to shut down the Ethernet server.

SHUTDOWN PROCEDURE

Shutdown requires a compatible keyboard and VGA monitor. The keyboard must be PC-AT compatible with a P/S 2 type six-pin mini DIN connector. Refer to Table 4-1 for part numbers of a compatible keyboard and monitor. To shut down the INESM01 module:

1. Plug in the keyboard and monitor (if not already connected.

2. If the command prompt (#) is on the screen, go to Step 6. Otherwise, log in to the system.

3. Press Alt-F1 to receive the log in prompt.

4. At *Login:*, type:

   root Enter

5. Enter the password when the password prompt appears and press Enter.

6. The command prompt (#) should appear. Type:

   srvinfi.90 Enter

7. Select option *(2) Stop INFI-NET ETHERNET SERVER* and press **Enter**.

8. Select option *(3) Quit* and press **Enter**.

9. Execute shutdown by typing:

   Shutdown -y -g0 Enter

10. The module is shut down and ready for removal, reset or power down when this message is displayed on the screen:

*** Safe to Power Off ***
- or -
*** Press Any Key to Reboot ***

> **NOTE:** If pressing a key to reboot does not boot the system, use the reset pushbutton on the INESM01 module.

SECTION 5 - TROUBLESHOOTING

INTRODUCTION

This section contains troubleshooting guidelines for the INOSM01 Open Systems Manager. Use the troubleshooting guidelines in this section to find and correct problems if the open systems manager fails to start up after it is installed. If any circuit boards, cables or fuses need replacing, refer to ***Section 7*** for replacement instructions.

The Ethernet server software utilities have diagnostic utilities available. The Ethernet server diagnostic utilities provide a means of locating and correcting system problems. Refer to ***ETHERNET DIAGNOSTIC UTILITIES*** for details. Using the Ethernet diagnostic utilities and Ethernet server shutdown requires the Ethernet server module monitor and keyboard.

Additional troubleshooting information can be found in the ***INFI-NET to Computer Interface (INICI01/03)*** instruction (refer to Table 1-2 for document numbers). The information in that instruction explains the meaning and corrective action for INNIS01 and INICT03 LED error codes.

Troubleshooting should be done by an experienced electronic technician or engineer who knows the precautions to take when handling devices sensitive to electrostatic discharge. The individual should also be familiar with the operation, shut-down and installation requirements of Ethernet network systems, and know how to use common electronic test equipment such as a digital multimeter.

> **NOTE:** The Ethernet server module must be properly shut down before it is removed from its module mounting unit slot or before turning off power to the cabinet. Failure to properly shut down the Ethernet server module could result in file corruption.

GENERAL TROUBLESHOOTING

Use the general troubleshooting guidelines in this section if the open systems manager fails to start up after installation. The steps presented are basic troubleshooting techniques with which an experienced electronic technician or engineer should be familiar.

> **NOTE:** Shut down the INESM01 Ethernet Server Module before turning off power to the cabinet to check cable connections. Do not make or undo any cable connections to a module or termination unit with the power on. INESM01 shutdown requires a keyboard and monitor; refer to Table 7-1 for part numbers and descriptions of a compatible keyboard and monitor.

If the INOSM01 Open Systems Manager will not start up:

1. Check cabinet power. Verify that power is available to the INOSM01 manager modules and termination units.

   a. Check the 24 VDC power and common connection to E1 and E2 on the NTSM01 termination unit.

   b. Verify that the NTSM01 fuse is good.

   c. Check the 24 VDC power and common connection to E1 and E2 on the NTCL01 termination unit.

   d. Verify that the NTCL01 fuse is good.

2. Check the NTSM01 termination unit installation.

   a. Check the jumper settings on the NTSM01 termination unit and verify that they are set correctly for the Ethernet cable being used. Refer to Table 3-1 for NTSM01 jumper settings.

   b. Check the Ethernet cable connection to the NTSM01 termination unit.

   c. Check the termination unit cable connection to the NTSM01 termination unit and to the module mounting unit backplane. Refer to Figure 3-4 for a diagram of all INOSM01 cable connections.

3. Check the NTCL01 termination unit installation.

   a. Check the jumper settings on the NTCL01 termination unit and verify that they are set correctly for the application. Refer to the ***Communication Termination Unit (NTCL01)*** instruction for jumper settings.

   b. Check the INFI-NET communication loop cable connection to the NTCL01 termination unit.

   c. Check the termination unit cable connection to the NTCL01 termination unit and to the module mounting unit backplane (Figure 3-4).

4. Check the INESM01 module installation.

   a. Verify that the SCSI, video and Ethernet adapter boards are installed and properly seated on the INESM01 module.

   b. Use an ohmmeter to verify that the SCSI adapter board fuse is good. If the fuse is open, call service to replace the fuse.

c. Verify that the adapter board jumpers are set correctly. Refer to Table 3-3 for adapter board jumper settings.

d. Verify that the INESM01 jumpers are set correctly. Refer to Table 3-2 for INESM01 jumper settings.

e. Check the ribbon cable connections from the INDDM01 module to the INESM01 module. There should be two cable connections from the INDDM01 module to the INESM01 module: one from the hard disk drive and one from the floppy disk drive (Figure 3-4).

f. Check the ribbon cable connection from the INSCS01 module to the SCSI adapter board on the INESM01 module.

g. Check the ribbon cable connection from the faceplate of the INSCS01 module to the faceplate of the IMMPI01 module.

5. Check the IMMPI01 and INICT03 modules installation.

a. Check the ribbon cable connection from the IMMPI01 module to the INICT03 module.

b. Check the NTMP01 termination unit installation and cable connection to the IMMPI01 module.

c. Verify that the security key on the NTMP01 termination unit is correctly installed. Refer to the appropriate application programming interface user manual for information on the security key.

d. Verify that the INICT03 dipswitches, jumpers and dipshunt are set correctly.

e. Check the module mounting unit setup of the I/O expander bus for the INICI03 interface (refer to the INICI03 instruction for information on isolating the I/O expander bus).

6. If the INOSM01 manager installation checks out, use the Ethernet diagnostic utilities to examine the Ethernet server database and status (refer to the ***INFI-NET Ethernet Server Installation and Configuration*** instruction for information on the Ethernet diagnostic utilities).

7. If the problem cannot be isolated and the INOSM01 manager continues to fail to start up, call service.

LOW BATTERY ON START-UP

If the INESM01 Ethernet Server Module battery has a low charge, it will not start up automatically on power up. To correct the problem:

1. Pull the INDDM01 module out of the module mounting unit so that it is disconnected from power.

2. Apply power to the INESM01 module for a minimum of 4 hours by inserting it into its module mounting unit slot.

3. After 4 hours, fully insert the INDDM01 module into the module mounting unit so that it is powered and push the reset pushbutton on the INESM01 module.

4. When prompted on the monitor, press Ctrl-Alt-S.

   NOTE: If the module continues to boot repeatedly instead of showing the correct prompt that there is a hardware failure, replace the INESM01 module.

5. In setup, change *Display Type* to the *EGA* or *VGA* option.

6. Press F10 to exit setup and boot the system.

7. If the system does not start up, there is a hardware failure. Replace the INESM01 module.

ETHERNET DIAGNOSTIC UTILITIES

The Ethernet server diagnostic utilities permit examination of the Ethernet server database, the Ethernet server status, Ethernet server configuration, and communication with supervisory computers. To use Ethernet diagnostic utilities, follow the instructions in the ***INFI-NET Ethernet Server Installation and Configuration*** document.

A VGA monitor and keyboard are required to use the Ethernet server diagnostic utilities. The computer keyboard requires a P/S 2 type six-pin mini DIN connector or a typical PC-AT keyboard with a PC-AT compatible to P/S type six-pin mini DIN adapter. Refer to Table 7-1 for part numbers of the monitor and keyboard.

SECTION 6 - MAINTENANCE

INTRODUCTION

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

This section presents procedures that can be performed on-site. These preventive maintenance procedures should be used as guidelines to assist in establishing good preventive maintenance practices. Select the minimum steps required to meet the needs of your system.

Personnel performing preventive maintenance should meet the following qualifications.

- Maintenance personnel should be qualified electrical technicians or engineers that know the proper use of test equipment and how to handle electronic circuitry.
- Maintenance personnel should understand Ethernet network operation and know network shutdown and start-up procedures.

PREVENTIVE MAINTENANCE SCHEDULE

Table 6-1 is the preventive maintenance schedule for the INOSM01 Open Systems Manager. The table lists the preventive maintenance tasks in groups according to their specified maintenance interval. Some tasks in Table 6-1 are self explanatory. Instructions for tasks that require further explanation are covered under ***PREVENTIVE MAINTENANCE PROCEDURES***.

NOTE: The preventive maintenance schedule is for general purposes only. Your application may require special attention.

Table 6-1. Preventive Maintenance Schedule

Task	Frequency
Check the INOSM01 interface modules and module mounting unit for dust. Clean as necessary using an antistatic vacuum.	3 months
Check all signal, power and ground connections associated with the INOSM01 interface modules and termination units. See procedure.	
Inspect the interface modules and termination units, giving particular attention to power supply contacts and edge connectors. Clean as necessary. See procedure.	12 months
Complete all tasks in this table.	Shutdown

EQUIPMENT REQUIRED

This is a list of tools and equipment required for the maintenance procedures.

- Antistatic vacuum.
- Four-inch bladed screwdriver (suitable for termination unit terminals).
- Isopropyl alcohol (99.5 percent electronic grade).
- Eberhard Faber (400A) pink pearl eraser.
- Fiberglass burnishing brush.
- Lint free cloths.
- Small needle nose pliers.

PREVENTIVE MAINTENANCE PROCEDURES

This section covers tasks from Table 6-1 that require specific instructions or further explanation:

- Checking signal, power and ground connections.
- Cleaning printed circuit boards and edge connectors.

Checking Connections

WARNING	**There are exposed electrical connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.**

Check all signal wiring, power and ground connections for the INOSM01 interface modules and termination units. When checking connections, always turn a screw, nut or other fastening device in the direction to tighten only. If the connection is loose, it will be tightened. If the connection is tight, the tightening action will verify that it is secure. There must not be any motion done to loosen the connection.

NOTE: This preventive maintenance task should be performed while power to the cabinet is off.

1. Check and verify module cable connections.

2. Verify that all connections between interface modules, power connections, network cable connections and computer cable connections are secure.

Printed Circuit Board Cleaning

WARNING	**Never clean electrical parts or components with live powder present. Doing so exposes you to an electrical shock hazard.** **Wear eye protection whenever working with cleaning solvents. When removing solvents from printed circuit boards using compressed air, injury to the eyes could result from splashing solvent as it is removed from the printed circuit board.**

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

Do all cleaning and handling of the printed circuit boards at static safe work stations. Always observe the steps under ***SPECIAL HANDLING*** in Section 3 when handling printed circuit boards.

GENERAL CLEANING AND WASHING

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

To wash the printed circuit board:

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

2. Remove excess solvent by using compressed air to blow it free of the circuit board.

EDGE CONNECTOR CLEANING

To clean edge connector contacts:

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

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

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

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

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

To clean tarnished or deeply stained edge connector contacts:

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

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

3. Do not use excessive force while burnishing. Use only enough force to shine the contact surface. Inspect the edge connector after cleaning to assure no loss of contact surface.

CLEANING FEMALE EDGE CONNECTORS

To clean the contacts on a female edge connector:

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

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

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

4. Remove excess alcohol and dry using compressed air.

SECTION 7 - REPAIR AND REPLACEMENT PROCEDURES

INTRODUCTION

This section covers INOSM01 Open Systems Manager module replacement procedures.

> **NOTE:** Always use the field static kit (part number 1948385_1) when working with any module. This kit connects the static dissipative work surface and technician to the same ground point.

EQUIPMENT REQUIRED

Termination unit replacement is the only procedure requiring tools. The tools required are:

- A screwdriver for termination unit mounting screws.
- A screwdriver for terminal block screws on the NTCL01 termination unit (if using twisted pairs cable).

The INESM01 Ethernet Server Module must be properly shut down before any component is removed from the system. Failure to shut down the Ethernet server module can result in file corruption. Equipment required for shutdown is:

- A VGA monitor.
- A keyboard with a PS/2 type six-pin mini DIN connector or an AT-PC compatible keyboard with adapter.

Table 7-1 lists part numbers for the monitor, keyboard and an AT-PC to PS/2 type six-pin mini DIN adapter.

MODULE REPLACEMENT

This section contains instructions for replacing the INESM01, INDDM01 and INSCS01 modules, and the NTSM01 termination unit. Refer to the ***INFI-NET to Computer Interface (INICI01/03)*** instruction to replace the INICT03, IMMPI01 and INNIS01 modules. Refer to the ***Communication Termination Unit (NTCL01)*** instruction to replace the NTCL01 termination unit. Refer to the ***Multi-Function Processor Termination Unit (NTMP01)*** instruction to replace the NTMP01 termination unit. Table 7-1 lists part numbers of replacement parts for the replacement procedures in this instruction. For nomenclatures, refer to Table 1-3.

Table 7-1. Replacement Parts

Part Number	Description
1945820_13001	3 A, 125 V fuse for NTSM01 termination unit
1948062_3	Ethernet server module keyboard
1948752_1050	SCSI cable, IMMPI01 Multi-Function Processor Interface Module
1949186_2 1949186_3	Disk drive module ribbon cables: Hard disk drive cable Floppy disk drive cable
1949282_5	PC-AT connector to PS/2 type 6-pin mini DIN connector adapter
1949283_650	SCSI connector module ribbon cable
1949358_1	Ethernet server module monitor
6640459_1	Ethernet adapter board
6640461_1	SCSI adapter board
6640933_1	Video adapter board

INESM01 Module Replacement

If it is determined that the INESM01 module is faulty, replace it with a new one. Do not try to repair the module; replacing components may affect module performance.

The INESM01 module can be pulled from its backplane connection with the power on. The system must be properly shut down before it is removed from the module mounting unit. Failure to properly shut down the module could result in file corruption. Make certain that the module is completely disconnected from the module mounting unit backplane before disconnecting any of the ribbon cables.

To replace the module:

1. Refer to ***SHUTDOWN PROCEDURE*** in Section 4 to shut down the INESM01 module.

2. Push and turn the two front panel captive retaining latches ½-turn to unlatch the module. It is unlatched when the slots on the latches are vertical and the open end of the slots faces away from the module.

3. Slide the module out of its module mounting unit backplane connector so that power is removed from the module.

4. The INSCS01 and INDDM01 modules may need to be partially pulled forward to ease removal of the INSCS01 module, hard disk drive, and floppy disk drive ribbon cables. If so, push and turn the two front panel captive retaining latches ½-turn to unlatch the modules and partially pull them forward as needed.

5. Remove the ribbon cable from the P3 connector on the SCSI adapter board (directly behind the module faceplate).

6. Remove the ribbon cables from the P5 and P3 connectors on the INESM01 module.

7. Slide the module out of the module mounting unit.

8. The Ethernet server module is shipped with jumpers installed. Jumper J14 needs to be checked before installing the module. A jumper should be installed over posts 2-3 of jumper J14.

9. Partially insert the replacement INESM01 module in its assigned slot.

10. Connect the ribbon cable from the P5 connector on the INDDM01 module to the P5 connector on the INESM01 module.

11. Connect the ribbon cable from the P3 connector on the INDDM01 module to the P3 connector on the INESM01 module.

12. Connect the ribbon cable from the P2 connector on the INSCS01 module to the P3 connector on the SCSI adapter board mounted on the INESM01 module.

13. Fully insert the INESM01 module into its module mounting unit and turn the captive latches ½-turn to lock the module in place.

14. If the INDDM01 and INSCS01 modules were partially removed to ease ribbon cable removal, fully insert those modules and turn the captive latches ½-turn to lock the modules in place.

15. Upon power up, the Ethernet server module should start up automatically.

> **NOTE:** Replacing an INESM01 module (complete with adapter boards) requires that the system be configured for the new hard address of the Ethernet adapter board.

INDDM01 Module Replacement

If the hard disk drive or floppy disk drive fail or are making disk errors, replace the INDDM01 module. Do not attempt to replace the faulty disk drive.

> **NOTE:** A replacement INDDM01 module is shipped without the factory installed software. Load the software by either using the floppy disks included with the software package or call service to load the software.

The INDDM01 module can be pulled from its backplane connection with the power on. Make certain that the module is completely disconnected from the module mounting unit backplane before disconnecting any of the ribbon cables. Always shut down the INESM01 module before removing any system component. Failure to properly shut down the INESM01 module could result in file corruption.

To replace the module:

1. Refer to ***SHUTDOWN PROCEDURE*** in Section 4 to shut down the INESM01 module.

2. Push and turn the two front panel captive retaining latches ½-turn to unlatch the INDDM01 module. It is unlatched when the slots on the latches are vertical and the open end of the slots faces away from the module.

3. Slide the module out of its module mounting unit backplane connector so that power is removed from the module.

4. The INSCS01 and INESM01 modules may need to be partially pulled forward to ease removal of the hard disk drive and floppy disk drive ribbon cables. If so, push and turn the two front panel captive retaining latches ½-turn to unlatch the modules and partially pull them forward as needed.

5. Remove the ribbon cable from the P3 connector on the SCSI adapter board (directly behind the module faceplate).

6. Remove the ribbon cables from the P5 and P3 connectors on the INESM01 module.

7. Slide the disk drive module out of the module mounting unit.

8. The disk drive module is shipped with the required ribbon cables attached to the module. Partially insert the disk drive module into its module mounting unit slot.

9. Connect the ribbon cable from the P5 connector on the INDDM01 module to the P5 connector on the INESM01 module.

10. Connect the ribbon cable from the P3 connector on the INDDM01 module to the P3 connector on the INESM01 module.

11. Slide the INDDM01 and INESM01 modules into the mounting slots.

12. Replace the ribbon cable from the INSCS01 module to the P3 connector on the SCSI adapter board.

13. Push and turn the front panel captive latches ½-turn to lock the modules in place.

14. Refer to the ***INFI-NET Ethernet Server Installation and Configuration*** instruction to load the system software, and configure the hard disk drive and Ethernet server.

15. Upon power up (or reset), the Ethernet server module should start up automatically.

INSCS01 Module Replacement

There are no active components on the SCSI module to fail. Therefore, it is highly unlikely that this module is the cause of a failure. If the SCSI module is suspected of having a short or open in a trace or connection, use an ohmmeter to check the minifuse on the SCSI adapter board mounted on the INESM01 module. If the SCSI adapter board fuse is open, call service for fuse replacement. If the SCSI adapter board fuse is good, replace the INSCS01 module and ribbon cable.

The INSCS01 module bridges the INESM01 and IMMPI01 modules. The INESM01 module must be shut down before disconnecting the INSCS01 ribbon cables. Failure to properly shut down the INESM01 module could result in file corruption.

To replace the module:

1. Refer to ***SHUTDOWN PROCEDURE*** in Section 4 to shut down the INESM01 module.

2. Push and turn the two front panel captive retaining latches ½-turn to unlatch the INESM01 module. It is unlatched when the slots on the latches are vertical and the open end of the slots faces away from the module.

3. Slide the module out of its module mounting unit backplane connector so that power is removed from the module.

4. Push and turn the two front panel captive retaining latches ½-turn to unlatch the INSCS01 module.

5. Remove the ribbon cable from the P3 connector on the SCSI adapter board (directly behind the INESM01 faceplate).

6. Remove the 50-pin ribbon cable from the SCSI connector on the faceplate of the INSCS01 module.

7. Connect the 50-pin ribbon cable from the IMMPI01 module (removed in the previous step) to the SCSI connector on the replacement INSCS01 module.

8. Connect the ribbon cable from the INSCS01 module to the P3 connector on the SCSI adapter board.

9. Align the INSCS01 module with its mounting slot. Push and turn the front panel captive latches ½-turn to lock the module in place.

10. Slide the INESM01 module into its mounting slot. Push and turn the front panel captive latches ½-turn to lock the module in place.

11. Upon power up, the Ethernet server module should start up automatically.

NTSM01 TERMINATION UNIT

WARNING	**There are exposed electrical connections inside the cabinet. These exposed electrical connections present a shock hazard that can cause injury or death.**

If it is determined that the NTSM01 termination unit is faulty, first verify that the fuse is good. If the fuse is good, replace the termination unit with a new one. Do not attempt to replace components to repair the termination unit.

Fuse Replacement

If the NTSM01 termination unit fuse opens, replace it with a fuse having an equivalent rating (three amps, 125 VDC). Table 7-1 lists the fuse replacement part number.

To replace the fuse:

1. Refer to ***SHUTDOWN PROCEDURE*** in Section 4 in to shut down the INESM01 module.

2. Turn off power to the termination unit.

3. Remove the fuse from fuse holder F1.

4. Replace with an equivalent fuse.

5. Turn on power to the termination unit.

Termination Unit Replacement

The NTSM01 termination unit terminates the Ethernet network to the Ethernet server module. The INESM01 module must be shut down before disconnecting the NTSM01 termination unit or associated cables. Failure to properly shut down the INESM01 module could result in file corruption.

Power should be removed from the INOSM01 modules and termination units before disconnecting power wiring and cables

from the NTSM01 termination unit. Figure 3-2 shows the NTSM01 circuit board layout.

To replace the termination unit:

1. Refer to ***SHUTDOWN PROCEDURE*** in Section 4 to shut down the INESM01 module.

2. Turn off power to termination unit.

3. Disconnect the power wiring from E1 and E2.

4. Disconnect the Ethernet cable.

5. Disconnect the termination unit cable from the P12 and P13 connectors on the termination unit.

6. Remove the two mounting screws securing it and remove the termination unit from the field termination panel.

7. Verify that the fuse is installed on the replacement termination unit and set the jumpers for the type of Ethernet cable being used (refer to Table 3-1).

8. Secure the replacement termination unit circuit board to the field termination panel with the two mounting screws.

9. Attach the termination unit cable connector J2 to connector P12 on the termination unit. Attach termination unit cable connector J3 to connector P13 on the termination unit.

10. Attach the Ethernet cable to appropriate connector on the termination unit.

11. Connect the wire from system common on the system power bus bar to E2 on the termination unit.

12. Connect the wire from 24 VDC on the system power bus bar to E1 on the termination unit.

13. Turn on power to the termination unit.

14. The open systems manager should start up automatically upon power up.

NKSM01 Termination Unit Cable Replacement

CAUTION	**Remove a module from its assigned slot before installing or removing a cable assigned to that slot. Failure to do so could result in damage to the module.**

If it is determined that the NKSM01 Termination Unit Cable is faulty, replace it with a new one. Do not try to repair the cable.

The INESM01 module can be pulled from its backplane connection with the power on. The module must be properly shut down before it is removed from the module mounting unit. Failure to properly shut down the module could result in file corruption. Make certain that the module is completely disconnected from the module mounting unit backplane before disconnecting any cables. Do not force a cable connection; all cable connections are keyed and should easily snap into place when properly installed.

To replace the cable:

1. Refer to ***SHUTDOWN PROCEDURE*** in Section 4 to shut down the INESM01 module.

2. Push and turn the two front panel captive retaining latches ½-turn to unlatch the module. It is unlatched when the slots on the latches are vertical and the open end of the slots faces away from the module.

3. Slide the module out of its module mounting unit backplane connector so that power is removed from the module.

4. Remove the J1 connector of the NKSM01 or NKSM11 cable from the module mounting unit backplane.

5. Remove the J2 and J3 connectors of the NKSM01 or NKSM11 cable from the P12 and P13 connectors on the NTSM01 termination unit.

6. Connect the J2 connector of the NKSM01 or NKSM11 cable to the P12 connector on the NTSM01 termination unit.

7. Connect the J3 connector of the NKSM01 or NKSM11 cable to the P13 connector on the NTSM01 termination unit.

8. Connect the J1 connector of the NKSM01 or NKSM11 cable to the backplane of the module mounting unit assigned to the INESM01 module.

9. Fully insert the INESM01 module into its module mounting unit and turn the captive latches ½-turn to lock the module in place.

SECTION 8 - SUPPORT SERVICES

INTRODUCTION

Bailey Controls Co. is ready to help in the use and repair of its products. Contact the nearest sales office to make requests for sales, applications, installation, repair, overhaul and maintenance contract services.

REPLACEMENT PARTS AND ORDERING INFORMATION

When making repairs at your facility, order replacement parts from a Bailey Controls Co. sales office. Provide the following information:

1. Part description, part number and quantity.

2. Model and serial numbers (if applicable).

3. Bailey instruction number, page number and reference figure that identifies the part.

Order parts without commercial descriptions from the nearest sales office.

TRAINING

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

TECHNICAL DOCUMENTATION

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

APPENDIX A - QUICK REFERENCE GUIDE

INTRODUCTION

Use this appendix as a quick reference guide of jumper settings for the INESM01 Ethernet Server Module, NTSM01 Server Module Termination Unit, SCSI adapter board, Ethernet adapter board and video adapter board. The required dipswitch and jumper settings for the INICT03 module and the jumper settings for the IMMPI01 module are included. INNIS01 dipswitches depend upon the setup of a particular INFI-NET communication system. Refer to the ***INFI-NET to Computer Interface (INICI01/03)*** instruction for information on setting INNIS01 dipswitches and NTCL01 and NTMP01 jumpers.

INESM01 MODULE JUMPERS AND LEDS

The jumpers on the INESM01 module and adapter boards are factory set at the required setting. Refer to Table A-1 to verify the required INESM01 jumper settings. Jumper J14 opens the path from -30 VDC in older Network 90 system module mounting units. Jumper J14 must be set as shown in the table or damage to the module will result.

There are four LEDs on the INESM01 faceplate that are used during normal operation. Refer to Table A-2 for LED states.

Table A-1. INESM01 Jumper Settings

Jumper	Jumper Setting	Required Setting
J1	1-2	open
	2-3	short
J2	1-2	short
	2-3	open
J3	1-2	short
J4	1-2	open
J5	1-2	open
	3-4	
	5-6	
	7-8	
J6	1-2	open
	3-4	
	5-6	
	7-8	
J7	1-2	open
	2-3	short

Table A-1. INESM01 Jumper Settings (continued)

Jumper	Jumper Setting	Required Setting
J8	1-2	open
	2-3	short
J9	1-2	open
J10	1-2	short
J11	1-2	open
J12	1-2	open
J13	1-2	open
	2-3	short
J14	1-2	open
	2-3	short
J15	1-2	open
	2-3	short
J16	1-2	open
J17	1-2	open
J18	1-2	short

Table A-2. INESM01 LED States

LED	State	Meaning
S	Green	Normal operation
	Red	Server module in reset (stopped)
HD	Yellow (flashing)	Hard disk drive activity[1]
L1	Green (flashing)	Ethernet transmission activity[1]
L2	Yellow	Ethernet link good[2]

NOTES:

1. No activity when the LED is off.
2. Only valid if 10BaseT cable is used; otherwise, this LED remains off.

ADAPTER BOARD JUMPERS

Table A-3 lists the required jumpers settings for the Ethernet, SCSI and video adapter boards.

Table A-3. Adapter Board Jumper Settings

Adapter Board	Jumper	Jumper Setting	Required Setting
Ethernet	J1	1-2	short
		3-4	open
		5-6	open
	J2	1-2	short
		3-4	open
		5-6	open

Table A-3. Adapter Board Jumper Settings (continued)

Adapter Board	Jumper	Jumper Setting	Required Setting
Ethernet *(continued)*	J3	1-2	short
		3-4	open
		5-6	open
		7-8	open
SCSI	J1	1-2	open
		3-4	
		5-6	
	J2	1-2	open
		3-4	
		5-6	
	J3	1-2	open
		3-4	open
		5-6	short
		7-8	open
	J4	1-2	short
	J5	1-2	open
		2-3	
Video	J1	1-2	open
		2-3	

NTSM01 TERMINATION UNIT JUMPERS

Table A-4 lists jumper settings and the associated connector pinouts for the Ethernet connectors on the NTSM01 termination unit. Only the jumpers in Table A-4 are presently used; the other jumpers are reserved for future use and should not be installed.

Table A-4. NTSM01 Jumper Settings and Connector Pinouts

Jumper	Cable Option	Signal	Jumper Setting	Connector Pinouts[1]
J1[2]	Type 10Base2 (thin Ethernet)	CI+	1-2	NA
		CI-	3-4	
		DI+	5-6	
		DI-	7-8	
		DO+	9-10	
		DO-	11-12	
J2[2]	Type 10Base5 (thick Ethernet)	CI+	1-2	P2 - 2
		CI-	3-4	P2 - 9
		DI+	5-6	P2 - 5
		DI-	7-8	P2 - 12

Table A-4. NTSM01 Jumper Settings and Connector Pinouts (continued)

Jumper	Cable Option	Signal	Jumper Setting	Connector Pinouts[1]
J2 *(continued)*	Type 10Base5 (thick Ethernet)	DO+	9-10	P2 - 3
		DO-	11-12	P2 - 10
		12 VDC	NA	P2 - 13
		Common	NA	P2 - 4, 6, 8, 11, 14
J8	Type 10BaseT (twisted pairs)	TD+	1-2	P3 - 1
		TD-	3-4	P3 - 2
		RD+	5-6	P3 - 3
		RD-	7-8	P3 -6

NOTES:
1. P2 and P3 connector pinouts not listed are no connection.
2. Jumpers J1 and J2 are mutually exclusive; only use one set or the other at a time.

INICT03 MODULE DIPSWITCHES AND JUMPERS

Table A-5 lists the required jumper settings for the INICT03 module as part of the INOSM01 Open Systems Manager. Table A-6 lists the required jumper settings.

Table A-5. INICT03 Dipswitch Settings

Dipswitch	Dipswitch Pole 1	2	3	4	5	6	7	8	Options Selected
UMB1	0	1	1	1	0	1	1	1	9600 baud rate, ports 1 and 2.
LMB2	0	0	0	0	0	0	0	0	Diagnostics disabled.
LLB3	1	0	1	1	1	1	1	1	SCSI port enabled, SCSI address = 3, SCSI parity checking enabled.
UUB0	0	0	0	1	0	0	0	0	ROM checksumming enabled, ports 0 and 1 data characteristics: 8 data bits, 1 stop bit, no parity, modem password disabled, port addressing mode disabled, checksumming option disabled.

NOTE: 0 = CLOSED or ON, 1 = OPEN or OFF.

Table A-6. INICT03 Jumper Settings

Jumper	Setting	Options Selected
J1	open	RS-232-C diagnostic port options.
J2	4-3	1 Mbit SRAM device (128 x 8).
J4	open	Machine fault timer disabled. Must be open for normal operation.
J5	30V	Opens the path of -30 VDC in older Network 90 systems. Must be set as shown.

IMMPI01 MODULE JUMPERS

There are no jumper settings required on the IMMPI01 module for operation with the INOSM01 Open Systems Manager.

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