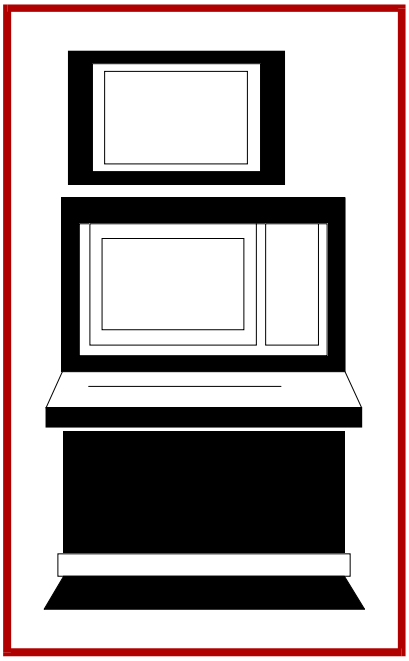
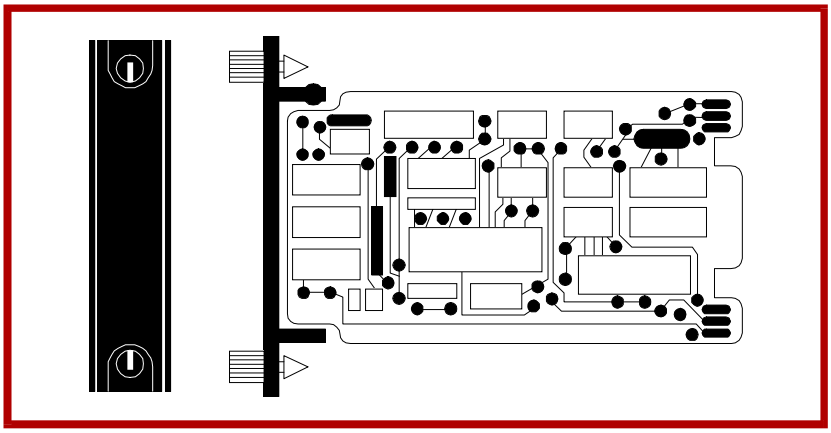
Bailey infi 90

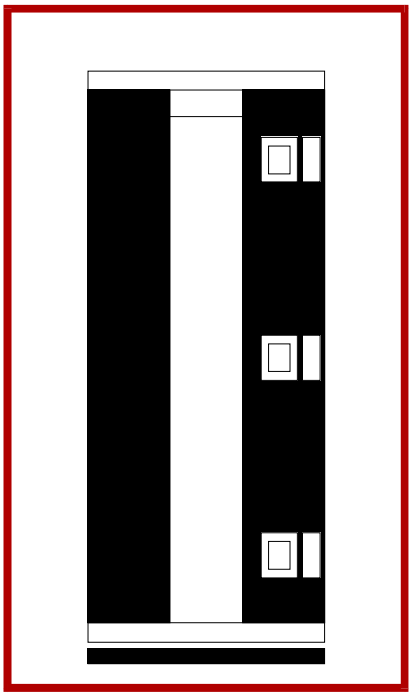
E96-401

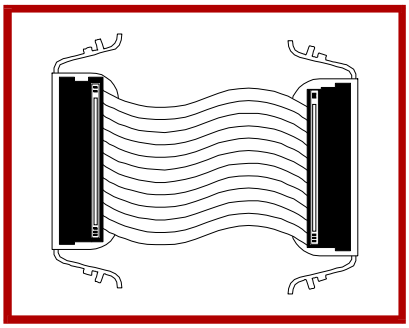
Instruction

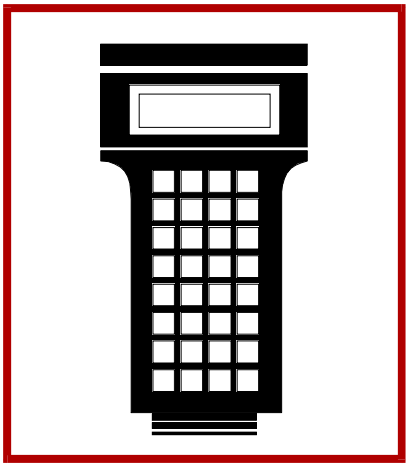
Multi-Function Processor Termination Module
(NIMP01/02)

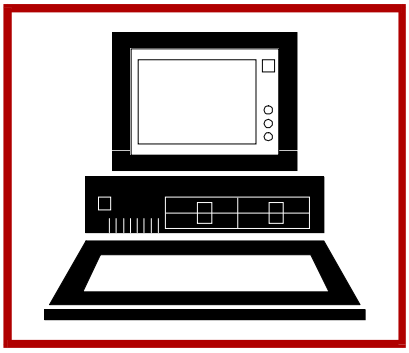












Bailey Process Control and Automation Solutions from Elsag Bailey Group

SECTION 1 - INTRODUCTION

OVERVIEW

There are two multi-function processor termination modules (IMP). The NIMP01 Multi-Function Processor Termination Module provides a connection to the serial interface for multi-function processors[1] (MFP). The NIMP01 termination module has two isolated RS-232-C ports. One port can be configured as a non-isolated RS-485 port. Multi-function processor modules use the ports to communicate with computers, printers and sequential events recorders. The NIMP01 termination module also provides the connection for a station serial communication link. This link allows the MFP module to communicate with an IISAC01 Analog Control Station or NDCS03 Digital Control Station. Figure 1-1 shows a typical IMP termination module application.

The NIMP01 termination module also interfaces with the INIIT02 INFI-NET to INFI-NET Transfer Module. The INFI-NET to INFI-NET transfer module (IIT) supports bidirectional communication through two RS-232-C ports. Port one passes system data only. Port two passes system data or can be used as a diagnostic port. The central IIT module can use a variety of means to link to the satellite IIT module such as modems, microwave and transceivers. This module communicates directly with a network interface I/O module on the local INFI-NET ring through the I/O expander bus.

The INFI-NET to computer transfer module[2] (ICT) provides the electronics needed to direct the operation of the INFI-NET to computer interface. It handles all communication with the host computer through the multi-function processor interface (MPI) or RS-232-C serial port. The MPI interface can act as DCE or DTE equipment.

The NIMP02 termination module is used in addition to the NIMP01 termination module when terminating redundant modules.

INTENDED USER

Anyone who installs, uses and maintains the NIMP01 and NIMP02 Multi-Function Processor Termination Modules should read and understand this manual before placing the termination module into service. Installation and troubleshooting require a technician or engineer with electrical experience and a working knowledge of the RS-232-C and RS-485 standards.

1. When using an IMMFP03 Multi-Function Processor Module, the IMP termination module interfaces with the auxiliary I/O card (IMMPI01 or IMMPI02 Multi-Function Processor Interface).
2.When using an INICT03 INFI-NET to Computer Transfer Module, the IMP termination module interfaces with the auxiliary I/O card (IMMPI01 or IMMPI02 Multi-Function Processor Interface).

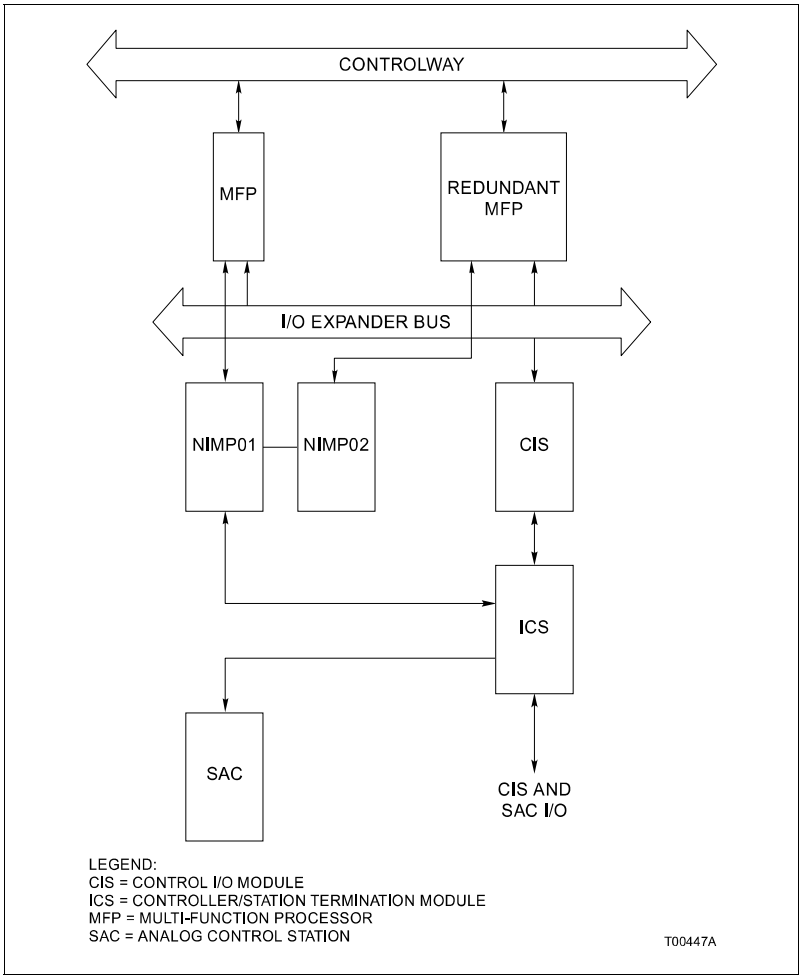


Figure 1-1. Example Redundant IMP Termination Module Application

MODULE DESCRIPTION

The NIMP01 termination module is a single printed circuit board that uses one slot in an NTMU01 or NTMU02 Termination Mounting Unit. The board contains:

- RS-232-C and RS-485 line drivers and receivers.
- Optical isolators.
- Connector sockets.
- DB-9 connectors.
- Light emitting diode (LED).
- Terminal blocks.
- Jumpers.
- Fuse.

The NIMP02 also occupies one slot in the TMU unit. It consists of:

- Two 16-pin connector sockets.
- One DB-9 connector for RS-485 link.
- Light emitting diode (LED).
- Terminal blocks.

FEATURES

The NIMP01 termination module has two jumper configurable RS-232-C ports for DCE or DTE operation, one of which can be configured as an RS-485 port. The ports allow the MFP module to talk to a variety of computers and communication equipment. An on-board LED lights when the MFP module connected to the IMP module is the primary module and is on-line. The termination module also provides two serial communication links for control stations through the NICS01 and NIDS01 termination modules. These links allow the MFP module to talk to analog and digital control stations. The NIMP02 module features a single LED that illuminates when the redundant MFP module is active.

INSTRUCTION CONTENT

This manual consists of five sections and five appendices.

Introduction — Contains an overview of the features, specifications and a description of the IMP termination module.

Installation — Describes precautions to observe when handling modules and setup procedures required before module operation. This section discusses dipswitch settings and installation procedures.

Maintenance — Provides a maintenance schedule.

Repair/Replacement Procedures — Details how to replace an IMP termination module.

Support Services — Describes the support services (spare parts, training, documentation, etc.) available from Bailey Controls Company.

Appendices — Briefly discuss the modules that use the IMP termination module and provide a cross reference of dipswitch and jumper settings for those modules.

HOW TO USE THIS MANUAL

Read this manual through in sequence. Read Section 2 thoroughly. Do the steps in order. Complete all steps in the section before using the IMP termination module. Refer to the Table of

Contents or Index to find specific information after the module is operating.

GLOSSARY OF TERMS AND ABBREVIATIONS

Table 1-1 lists definitions of the terms and abbreviations used in this instruction.

Table 1-1. Glossary of Terms and Abbreviations

Term	Definition
DCE	Data communication equipment or data circuit-terminating equipment. Equipment that establishes and terminates a communication link between two devices. In RS-232-C communication systems, the DCE nomenclature indicates the signals that appear at specified cable connection contacts. A modem is an example of this type of device.
Dipshunt	Dual in-line package with shorting straps.
DTE	Data terminal equipment. Equipment comprising the data source, data sink or both that provides the communication control function. In RS-232-C communication systems, the DTE nomenclature indicates the signals that appear at specified cable connection contacts. Terminals and printers are examples of this type of device.
ESD	Electrostatic sensitive devices. Electronic components subject to damage or failure when exposed to an electrostatic charge; require special handling.
Handshaking	Procedures and protocol used by two devices to establish and maintain communication.
MFT	Machine fault timer. Reset by the processor during normal operation. If not reset regularly, the MFT times out and the module stops.
MMU	Module mounting unit. A card cage that provides electrical and communication support for INFI 90/Network 90® modules.
RS-232-C and RS-485	Two serial communication interface standards developed by the Electronics Industry Association (EIA) specifying what signals and voltages will be used to transmit data from a computer (DTE) to a modem (DCE).
SCSI	Small computer system interface. An I/O bus standard by the American National Standard Institute (ANSI) that defines the protocol and peripheral interconnection formats of a high speed parallel bus for use throughout the computer industry.
SRAM	Static random access memory. Contents are lost when power is removed.
TM	Termination module. Provides input/output connection between plant equipment and the INFI 90/Network 90 modules.
TMU	Termination mounting unit. A card cage that provides housing for INFI 90/Network 90 termination modules.

® Network 90 is a registered trademark of Elsag Bailey Process Automation.

REFERENCE DOCUMENTS

Table 1-2 lists the documents referenced in this instruction.

Table 1-2. Reference Documents

Document No.	Title
I-E93-902	Digital Control Station (NDCS03)
I-E96-117	Analog Control Station (IISAC01)
I-E96-201	Multi-Function Processor Module (IMMFP01)
I-E96-202	Multi-Function Processor Module (IMMFP02)
I-E96-203	Multi-Function Processor Module (IMMFP03)
I-E96-409	Controller/Station Termination Module (NICS01)
I-E96-500	Site Planning and Preparation
I-E96-601	INFI-NET Communications Modules

NOMENCLATURE

Table 1-3 is a list of related hardware.

Table 1-3. Nomenclature

Nomenclature	Description
IISAC01	Analog control station
IMMFP01/02/03	Multi-function processor module
IMMPC01	Multi-processing controller module
IMMPI01/02	Multi-function processor interface
INICT03	INFI-NET to computer transfer module
INIIT02	INFI-NET to INFI-NET transfer module
NDCS03	Digital control station
NICS01	Control/station termination module
NIDS01	Digital station termination module
NKSE01	Station serial extension cable (PVC)
NKSE11	Station serial extension cable (non-PVC)
NKTM01	Termination module cable
NKTU02	Termination module cable (PVC)
NKTU12	Termination module cable (non-PVC)
NTMU01	Termination mounting unit (rear mount)
NTMU02	Termination mounting unit (front mount)

SPECIFICATIONS

Refer to Table 1-4 for the specifications of the NIMP01 and NIMP02 termination modules.

Table 1-4. IMP Termination Module Specifications

Property	Characteristic/Value
Power Requirements	+24 VDC, 210 mA maximum current consumption
Communication	Two RS-232-C serial ports, or one RS-232-C port and one RS-485 port.
	1 control station serial link
Cable Insulation Specifications:	
PVC (UL Rating CL2)	80°C (176°F) at 300 V
Non-PVC (UL Rating PLTC)	90°C (194°F) at 300 V
Mounting	Screw mounts on the field termination panel.
Environmental:	
Electromagnetic/Radio Frequency Interference	Values are not available at this time. Keep cabinet doors closed. Do not use communication equipment any closer than 2 meters from the cabinet.
Operating Temperature	0° - 70°C (32° - 158°F)
Relative Humidity	5% - 90% (±5%) up to 70°C (158°F) (noncondensing)
Altitude	Sea level to 3 km (1.86 mi)
Air Quality	Bailey equipment should be operated and stored in a noncorrosive environment.
Cooling Requirements	No cooling necessary when used in Bailey cabinets and operated within environmental limits.
Certification	All termination units are CSA certified as process control equipment for use in an ordinary (nonhazardous) location.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

SECTION 2 - INSTALLATION

INTRODUCTION

This section lists the steps to properly install the NIMP01 and NIMP02 Multi-Function Processor Termination Modules (IMP). The installation procedure includes physical installation, dip-shunt configuration, cable connection, power wiring and handling. To properly install the IMP termination modules, do the steps in this section in the order they appear.

SPECIAL HANDLING

Observe these steps when handling electronic circuitry:

> **NOTE:** Always use Bailey's field static kit (part number 1948385A1 - 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 is 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 for shipping damage.

2. Notify the nearest Bailey Controls Company 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.

SETUP/PHYSICAL INSTALLATION

This section explains how to configure and install the termination modules. You must set the jumpers before installing the termination modules. The pin jumpers on the NIMP01 termination module determine the operation of the RS-232-C ports. Each port can be configured as a DTE, DCE, nonhandshake or loopback device. Only port one can terminate to a diagnostic terminal. The termination module can interface with:

- Devices:
  Printer.
  Sequence of events recorder.
  IBM® PC.
  COMPAQ® and compatible computers.

- Terminals:
  VT1XX.
  ADM3.
  VISUAL 50.
  WYSE (WY50).
  TELEVIDEO.
  FALCO.

- VAXstation™.

Fuse Installation

Fuse F1, a 1.0 amp/250 volt fuse (Bailey part number 194776A11001) is installed in each IMP termination module. Figure 2-1 shows the termination module layout. Verify that the fuse is installed in fuse holder F1.

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® COMPAQ is a registered trademark of COMPAQ Corporation.
™ VAXstation is a trademark of Digital Equipment Corporation.

Jumper Configuration

Figure 2-1 shows the jumper locations. There are 18 configurable jumpers.

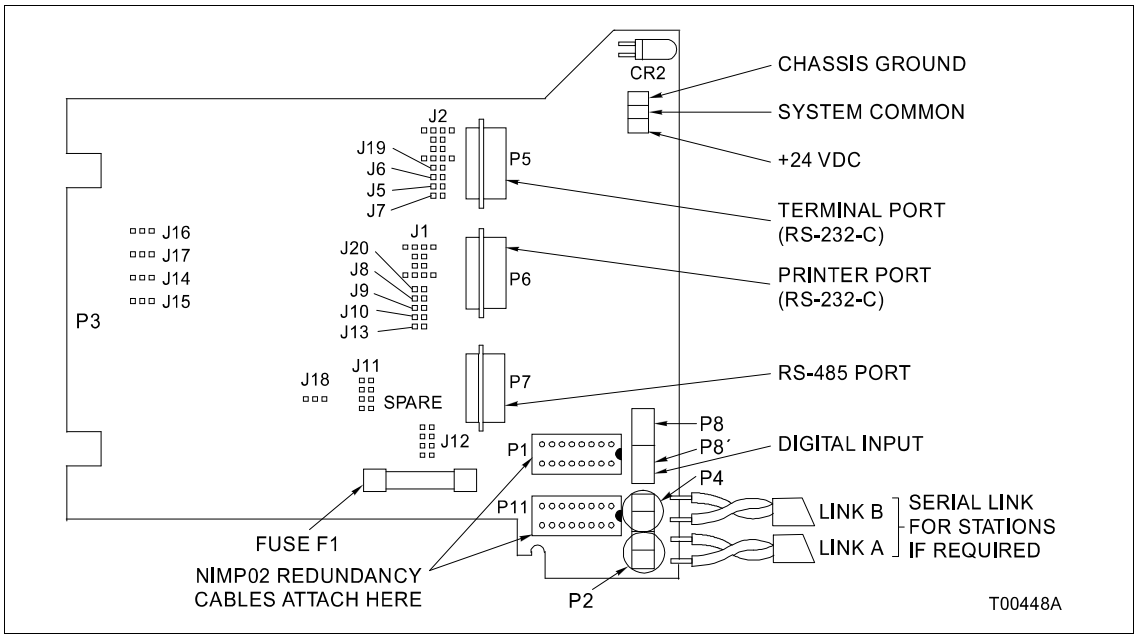

Figure 2-1. IMP Termination Module Layout

JUMPERS J1 AND J2

Figures 2-2, 2-3, 2-4, and 2-5 show the internal circuitry of jumpers J1 and J2. These jumpers must be set to match the equipment communicating with the primary module. Jumper J2 controls the P5 connector, J1 the P6 connector. Connectors P5 and P6 represent the DB-9 connectors.

Determine if the equipment requires a DCE, DTE, nonhandshake or loopback jumper setting configuration. Figures 2-2 through 2-5 show how to set jumpers J1 and J2 for the different configurations.

JUMPERS J5 THROUGH J10, J19 AND J20

Jumpers J5 through J10, J19 and J20 enable the handshake functions for the communication link and must be set to match the equipment being used. See Figure 2-6 for a schematic of the jumpers. Normally, these jumpers are installed to the +12 VDC supply corresponding to logic zero. Jumper posts labeled J11 and J12 are provided to store the jumpers when not used for J5 through J10, J19 and J20.

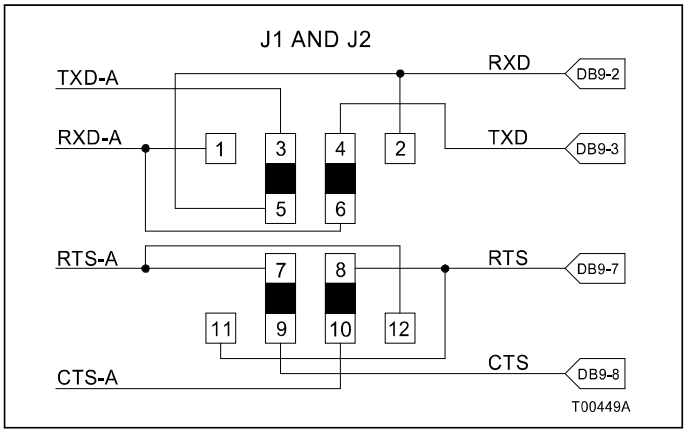

Figure 2-2. DCE Jumper Configuration

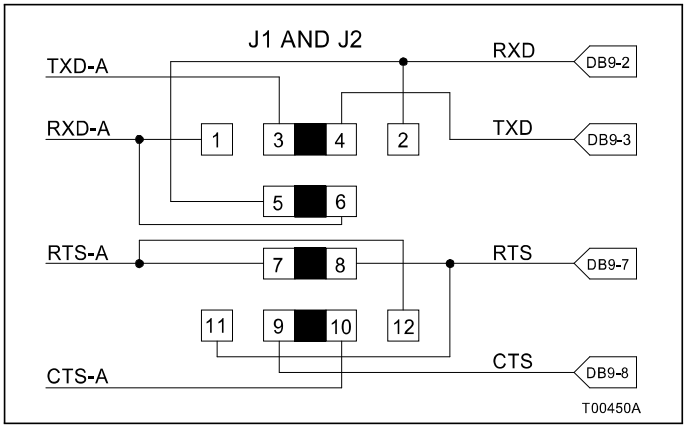

Figure 2-3. DTE Jumper Configuration

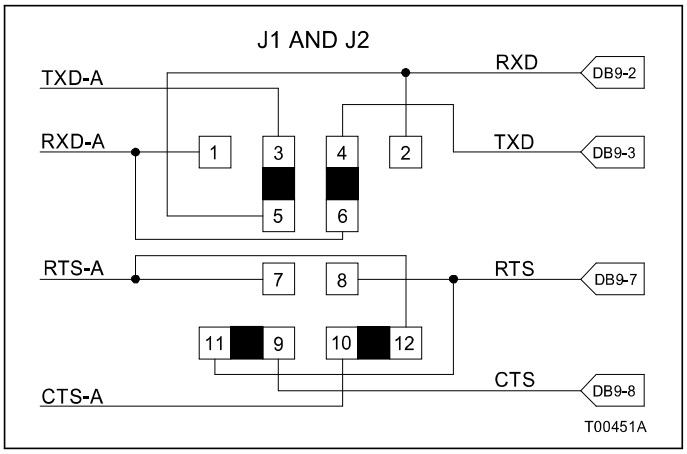

Figure 2-4. Nonhandshake Jumper Configuration

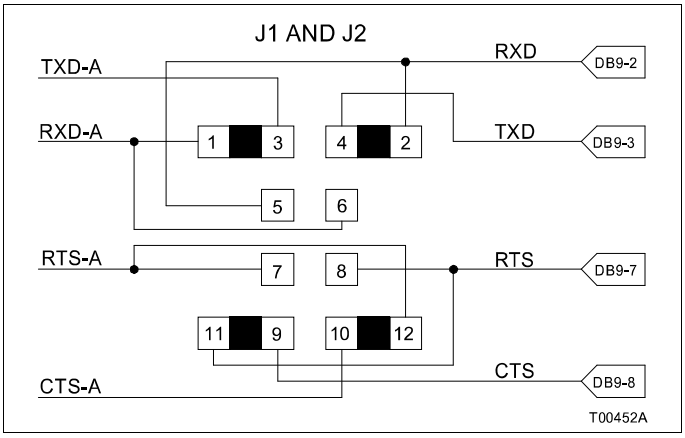

Figure 2-5. Loopback Jumper Configuration

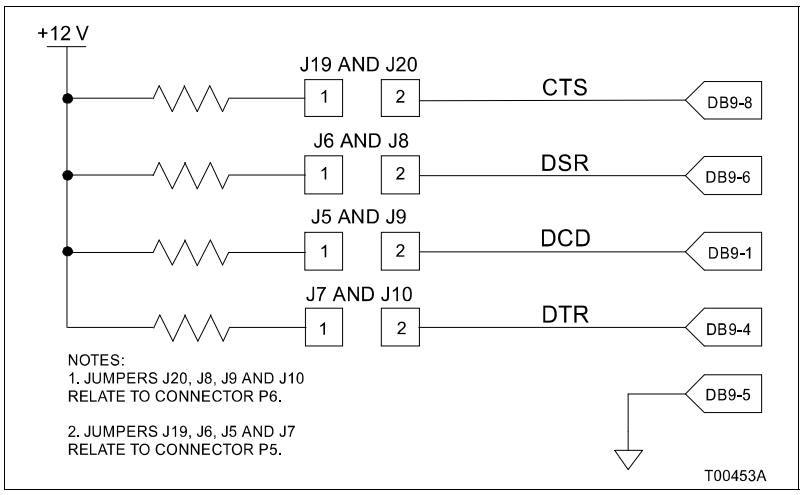

Figure 2-6. Handshake Signal Schematic

JUMPERS J11 AND J12

Jumpers J11 and J12 are storage posts for extra jumpers.

JUMPER J13

Jumper J13 with pins one and two jumpered connects RS-485 cable shielding (P7, pin one) to chassis ground.

JUMPERS J14 THROUGH J17

Jumpers J14 through J17 allow proper routing of the signals on the termination module circuit board. These alternate signals are not related to data communications and are reserved for future use. For proper RS-232-C and RS-485 operation, these must be left in the pins one and two jumpered configuration.

JUMPER J18

To configure the terminal serial port for RS-485 operation, complete Steps 1 and 2.

1. Jumper pins 1 and 2 of J18.

2. Use P7 as the serial port instead of P5.

NOTE: Port P5 is inactive in this mode. Port P7 has a fixed pin arrangement and is not altered by any P5 jumpers. This communication link is not optically isolated. Port P6 remains an RS-232-C port.

Sequence of Event Recorders Jumper Settings

Figures 2-7, 2-8, and 2-9 shows jumpers J1, J2, J8, J9 and J10 configuration sequence of event recorders.

Cabling Connections

Figure 2-10 shows the cable connections from the IMP termination modules to the control modules. Table 2-1 lists the termination module cable applications.

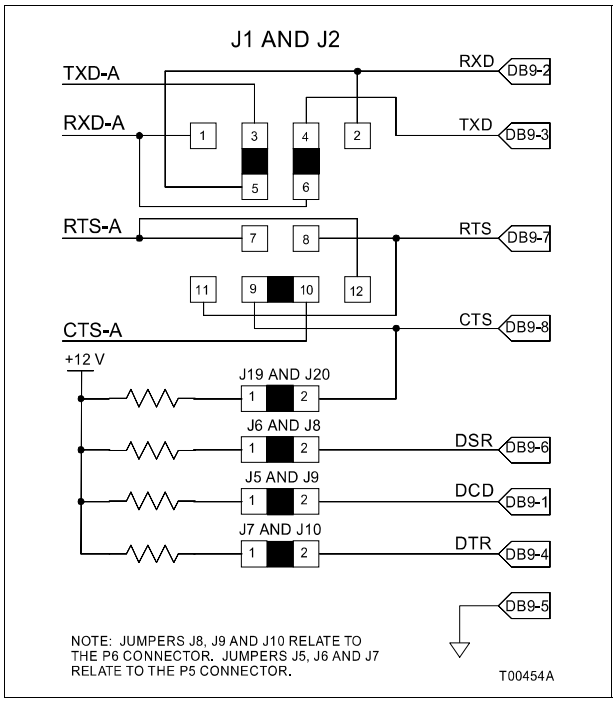

Figure 2-7. Jumper Settings for Rochester 3800

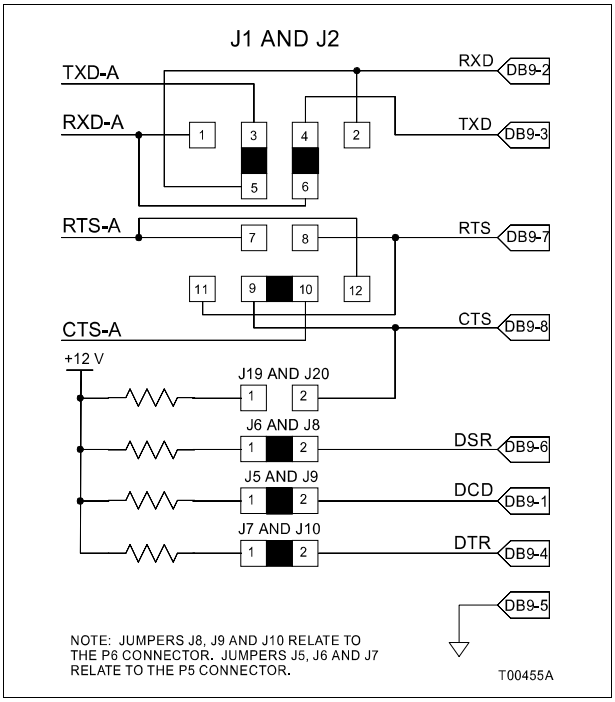

Figure 2-8. Jumper Settings for Rochester ISM

Cable Installation

Figure 2-10 shows the cable connections between the modules, termination modules and output devices. The cable from the IMP termination module to the control module can be either the KTU termination module cable (round cable) or the KTM termination module cable (ribbon cable).

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.**
ATTENTION	**Avant de retirer ou de brancher un câble, retirez le module logé dans la coulisse correspondante. Autrement, le module risque d'être endommagé.**

NKTM01 CABLE

This cable connects the NIMP01 termination module to the primary module and the NIMP02 termination module to the redundant module. The NKTM01 Termination Module Cable (KTM) is a flat ribbon cable (30 meters [100 feet] maximum).

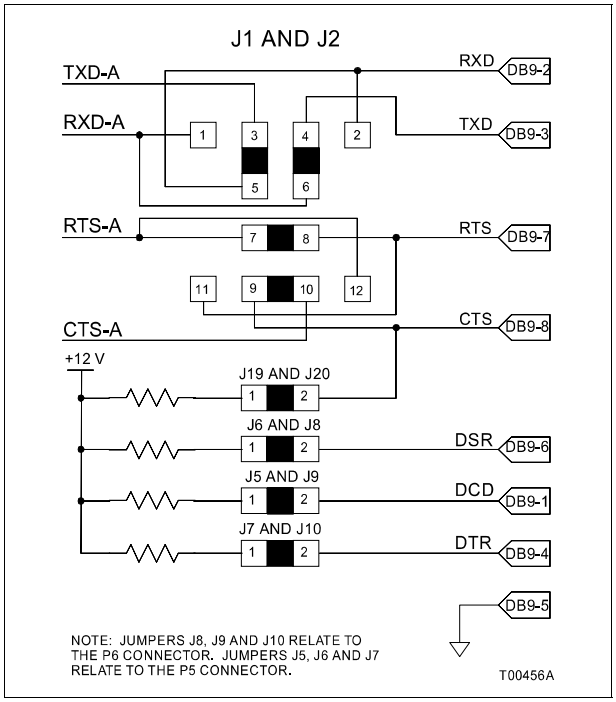

Figure 2-9. Jumper Settings for ESA Controls SER-740

Do not bundle the ribbon cable with other wiring. Bundling the cable can cause cross talk in the ribbon cable. To install the cable:

> **NOTE:** If the module is installed, pull it several inches from the backplane ***before*** installing the cable.

1. Insert one end of the cable into the module mounting unit backplane slot assigned to the module. The cable should latch securely in place. Card edge connector P3 of the module connects to this end of the cable.

2. Insert the other end of the cable into the termination mounting unit (TMU) backplane slot assigned to the IMP termination module. The cable should latch securely in place. Card edge connector P3 of the termination module connects to this end of the cable.

NKTU02 AND NKTU12 CABLES

The NKTU02 PVC Termination Cable (KTU) and the NKTU12 Non-PVC Termination Cable (KTU) connect the NIMP01 termination module to the primary module and the NIMP02 termination module to the redundant module. The KTU cable is a

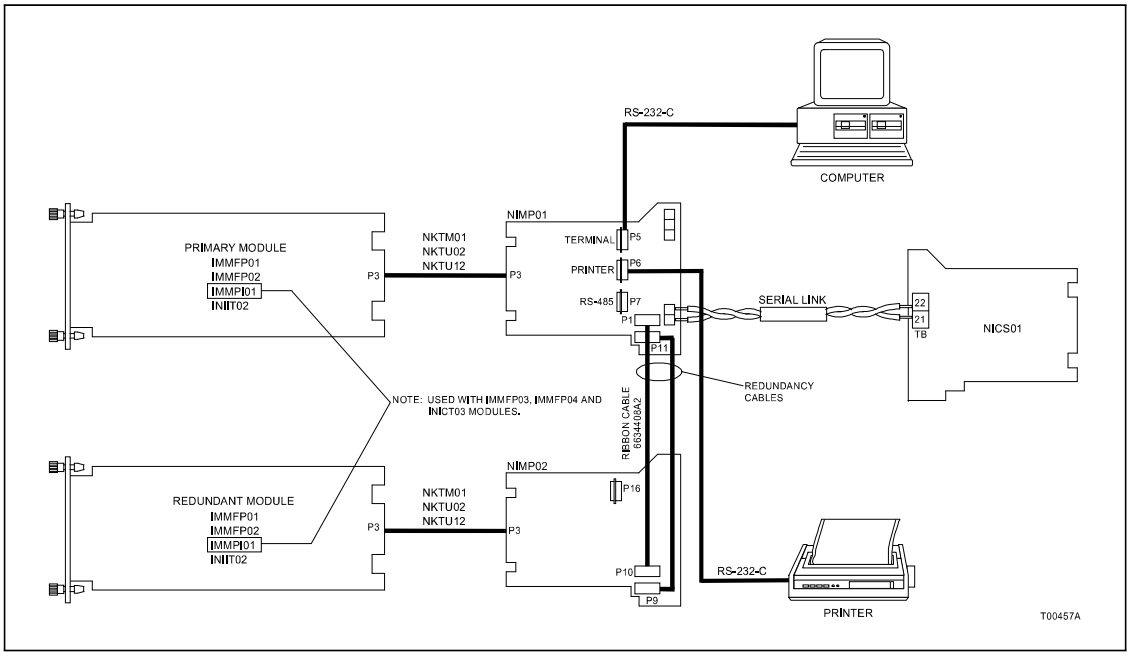

Figure 2-10. IMP Termination Module Cable Connections

round cable (61 meters [200 feet] maximum). The cable is shielded. To install the cable:

> **NOTE:** If the module is installed, pull it several inches from the backplane ***before*** installing the cable.

1. Insert one end of the cable into the module mounting unit backplane slot assigned to the module. The cable should latch securely in place. Card edge connector P3 of the module connects to this end of the cable.

2. Connect the shield wire to the shield bus bar.

3. Insert the other end of the cable into the termination mounting unit (TMU) backplane slot assigned to the IMP termination module. The cable should latch securely in place. Card edge connector P3 of the termination module connects to this end of the cable.

4. Install a cable retaining bracket to the rear of the TMU unit.

Table 2-1. IMP Cable Applications, Connections and Length Requirements

Cable	Connections				Maximum Length Meters (Feet)
	From		To		
	Device	Connector	Device	Connector	
HCBL01	DCE or DTE device	DB-25	NIMP01	P2 or P3	15 (50)[1]
NKTM01	NIMP01	P1	Primary module	P3	30 (100)
	NIMP02		Redundant module		
NKTU02 or NKTU12	NIMP01	P1	Primary module	P3	61 (200)
	NIMP02		Redundant module		
6634408A2	NIMP01	P1	NIMP02	P10	30 (100)
	NIMP01	P11	NIMP02	P9	

NOTE:
1.The specified maximum length only applies to the HCBL01 cable. The performance of INFI 90 modules does not place a restriction on the maximum length of the RS-232-C cable. Follow industry-wide accepted RS-232-C practices and rules when selecting a suitable RS-232-C cable for your system.

RS-232-C COMMUNICATION CABLE

The RS-232-C communication cable connects the IMP module to a computer, terminal, printer or modem (Figure 2-10). Table 2-1 lists the requirements of the RS-232-C cable, its application, connector assignments and length restrictions. To install the RS-232-C cable:

1. Turn off power to the host computer or terminal.

2. Install the RS-232-C cable to the DB-9 connector on the IMP module marked P5 for port 1. Connect the other end of the RS-232-C cable to the external device.

3. Install the RS-232-C cable to the DB-9 connector on the IMP module marked P6 for port 2. Connect the other end of the RS-232-C cable to the external device.

RIBBON CABLE 6634408A2

This cable connects the NIMP01 and NIMP02 termination modules for redundant module configuration. To install the cable:

1. Insert one end of the cable into the P1 connector of the NIMP01 termination module.

2. Insert the other end of the cable into the P10 connector of the NIMP02 termination module.

3. Insert one end of the cable into the P11 connector of the NIMP01 termination module.

4. Insert the other end of the cable into the P9 connector of the NIMP02 termination module.

Installing the Termination Module

The IMP termination module inserts into a standard INFI 90 termination mounting unit (TMU) and occupies one slot. To install:

1. Verify the slot assignment of the termination module.

2. Align the termination module with the guide rails in the termination mounting unit and partially insert the module.

3. Push down the plastic stop and insert the module until it is latched into the TMU unit.

4. Install the front cover.

Terminal Wiring

CAUTION	**It is strongly recommended that all power (cabinet, I/O, etc.) be turned off before doing any termination module wiring. Failure to do so could result in equipment damage. Do not apply power until all connections are verified.**
ATTENTION	**Il est fortement recommand, que toutes les alimentations (armoire, E/S, etc.) soient coupées avant d'effectuer quelque raccord que ce soit sur un carte de raccordement. Un manquement à ces instructions pourrait causer des dommage à l'équipement. Ne pas rebrancher les alimentations avant d'avoir vérifié tous les raccordements.**

Serial link and power wiring must be connected to the NIMP01 terminal strip. The NIMP02 module only has power wiring terminals. To connect serial link and power wiring:

NOTE: Proper polarity of all signals must be maintained.

1. Remove the front cover.

2. Insure the IMP termination module is pulled out far enough to gain access to the terminal strip.

3. Feed the serial link wiring into the terminal strip area and connect them to the appropriate terminals.

4. Connect an 18 AWG wire from the +24 VDC bus of the termination mounting unit to the +24 VDC terminal of the termination module.

5. Connect an 18 AWG wire from the common bus of the termination mounting unit to the common terminal of the termination module.

6. Connect an 18 AWG wire from the chassis ground terminal of the termination module to the cabinet chassis ground bolt.

7. Insert the module until it locks securely into place.

8. Replace (snap on) the front cover.

The termination module is ready for operation if:

1. The fuses are installed.

2. The cable is installed and verified.

3. All field wiring is complete.

4. Power is connected and applied to the termination module.