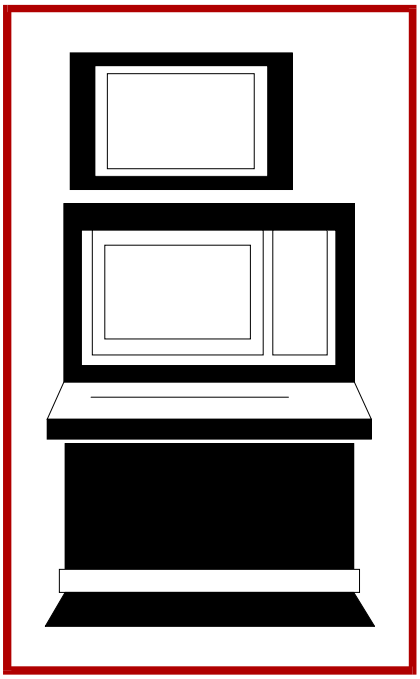
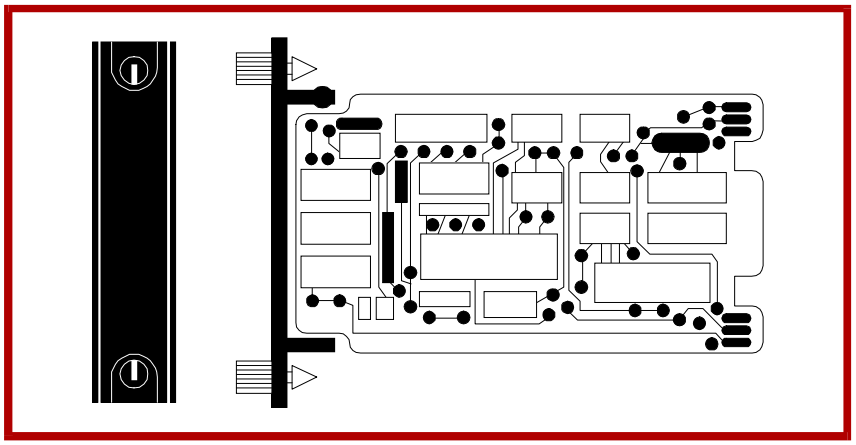
Bailey® infi 90®

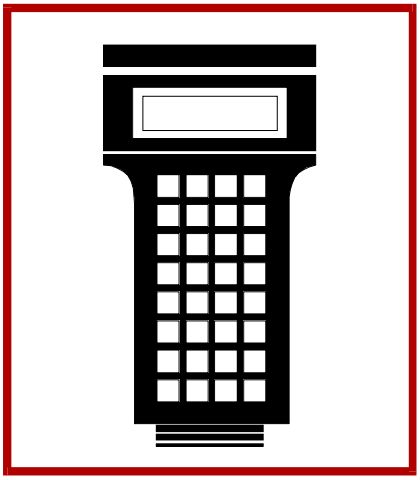
E96-607

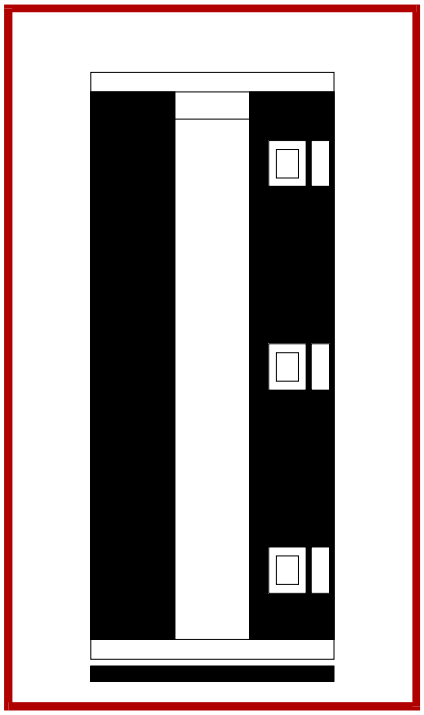
Instruction

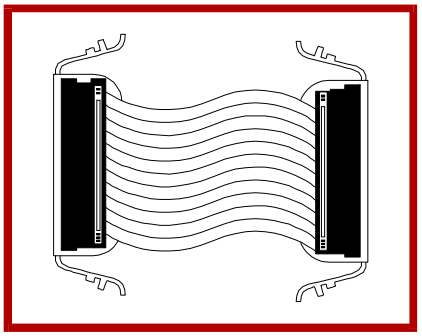
INFI-NET to INFI-NET Interface Modules

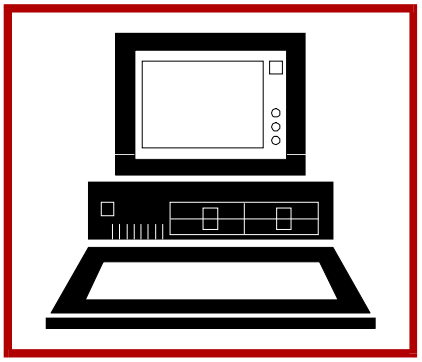












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WARNING notices as used in this instruction apply to hazards or unsafe practices that could result in personal injury or death.

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

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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.

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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.

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PERTURBATIONS DU PROCÉDÉ

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

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Preface

The INFI-NET® to INFI-NET interface modules provide communication links between two local or two remote INFI-NET communication loops. All INFI-NET to INFI-NET interface modules are directly upward compatible to existing Superloop interfaces.

The INNIS01 Network Interface Slave (NIS) is the front end of every INFI-NET interface. It provides the intelligent link between a node and an INFI-NET loop. An INFI-NET to INFI-NET transfer module and one or more NIS modules make up a specific node of an INFI-NET to INFI-NET interface. Each loop of the communication system (central and satellite loop) requires an INIIR01 INFI-NET to INFI-NET Remote Interface consisting of one NIS module and one INIIT02 INFI-NET to INFI-NET Transfer Module. Two NIS modules and one INIIT03 INFI-NET to INFI-NET Transfer Module make up an INIIL02 INFI-NET to INFI-NET Local Interface. The INIIL02 local interface supersedes and replaces the INIIL01 local interface. Termination devices and cables are required for both interfaces.

This instruction explains INFI-NET to INFI-NET interface module features, specifications and operation. It includes installation, troubleshooting, maintenance and replacement procedures for each module.

® INFI-NET is a registered trademark of Elsag Bailey Process Automation.

INFI-NET to INFI-NET Local Interface

The INIIL02 INFI-NET to INFI-NET Local Interface is made up of two NIS modules and the INIIT03 INFI-NET to INFI-NET Transfer Module.

This interface provides a communication path between a central INFI-NET loop and a local satellite INFI-NET loop (Figure 1-2). The maximum distance between termination units

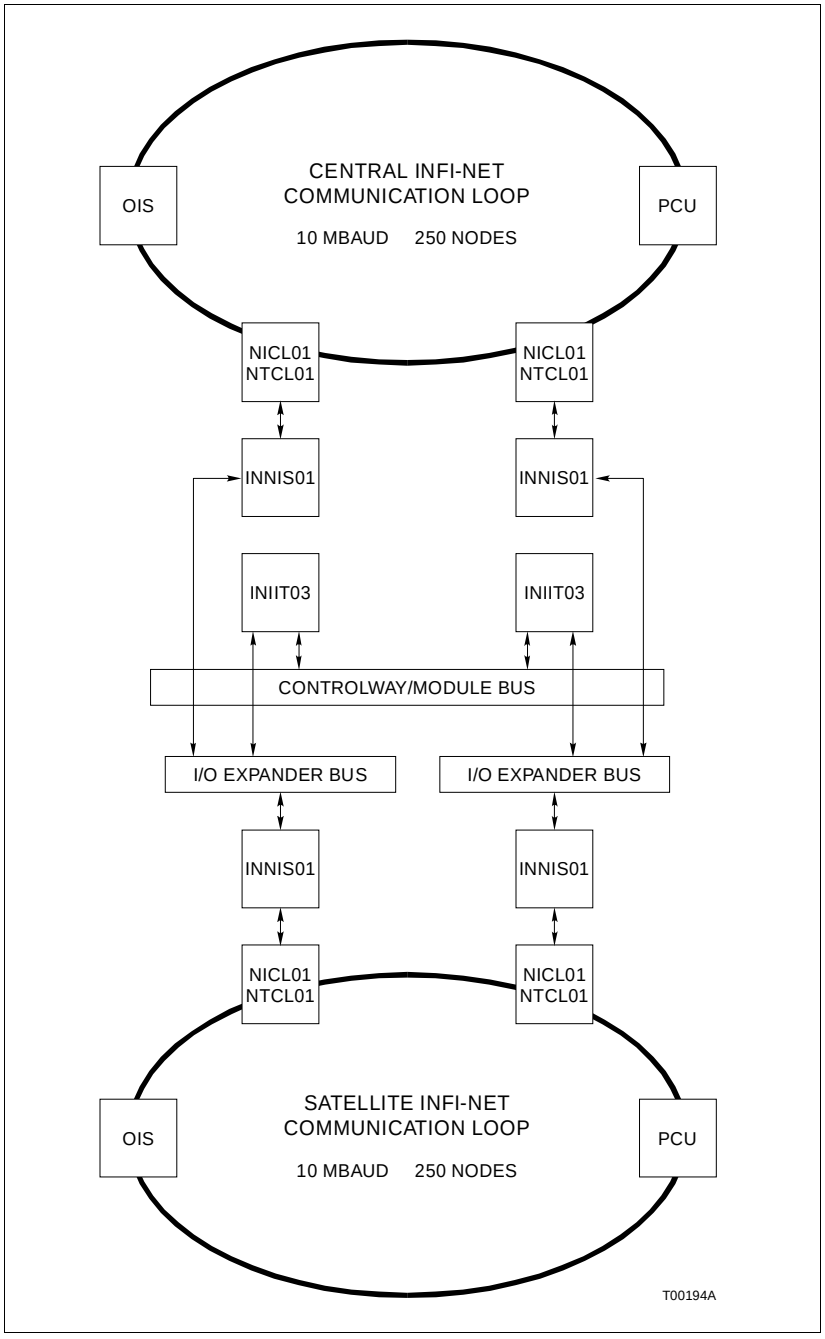

Figure 1-2. INFI-NET to INFI-NET Local Interface

module. The circuit board contains the serial communication circuitry necessary for it to communicate with another INIIT02 module.

Two captive latches on the INIIT02 faceplate secure the module in the MMU card cage. The faceplate contains eight CPU LEDs, a red/green status LED, and a stop/reset switch.

Interface termination is through a cable connection between P3 of the INIIT02 module and an NTMP01 Multi-Function Processor Termination Unit or NIMP01 Multi-Function Processor Termination Module. INIIT02 module power and I/O expander bus connections follow the same connector assignments common to most INFI 90 modules (P1 for power, P2 for I/O expander bus).

INIIT03 INFI-NET to INFI-NET Transfer Module

The INIIT03 INFI-NET to INFI-NET Transfer Module serves as the link between two local INFI-NET communication loops. It holds the node database and is responsible for transferring all messages between loops. Messages include exception reports, configuration data, control data and system status. This module communicates directly with the NIS module on each loop of the interface.

The INIIT03 module consists of one printed circuit board that occupies one slot in the module mounting unit. The circuit board contains the circuitry necessary for it to pass communication from the central communication loop to the satellite communication loop.

Two captive latches on the INIIT03 module faceplate secure the module in the module mounting unit. The faceplate contains 16 CPU LEDs, a red/green status LED, and a stop/reset switch.

FEATURES

- INFI-NET provides a plantwide communication network. INFI-NET time synchronizes the control process plantwide.
- Each node can operate independently of other INFI-NET nodes. INFI-NET communication modules provide localized start-up/shutdown on power failure without operator intervention.
- Response time is fast. The ten-megabaud loop communication rate gives timely information exchange.
- The INFI-NET interface modules handle four message types: Broadcast, time synchronization, multicast and NIS poll. All messages contain cyclic redundancy check codes (CRC) and checksums to insure data integrity.

5. Read Section 7 if system repair or replacement is needed.

6. Refer to Section 8 for ordering information, training and documentation.

REFERENCE DOCUMENTS

Table 1-1 lists documents with additional information that is related to the INFI-NET to INFI-NET interfaces.

Table 1-1. Reference Documents

Document Number	Title
I-E96-200	Function Code Application Manual
I-E96-309	Digital Slave I/O Module (IMDSM05)
I-E96-310	Digital Slave Output Module (IMDSO01/02/03)
I-E96-313	Digital Slave Output Module (IMDSO04)
I-E96-401	Multi-Function Processor Termination Module (NIMP01/02)
I-E96-408	Communication Termination Module (NICL01)
I-E96-422	Communication Termination Unit (NTCL01)
I-E96-428	Multi-Function Processor Termination Unit (NTMP01)

NOMENCLATURE

Table 1-2 lists nomenclatures associated with the INFI-NET to INFI-NET interfaces.

Table 1-2. Nomenclature

Nomenclature	Description
IEMMU01	Module mounting unit, rear mount
IEMMU02	Module mounting unit, front mount
IMDSM05	Digital slave I/O module
IMDSO01	Digital slave output module
IMDSO02	Digital slave output module
IMDSO03	Digital slave output module
IMDSO04	Digital slave output module
INIIL02	INFI-NET to INFI-NET local interface
INIIR01	INFI-NET to INFI-NET remote interface
INIIT02	INFI-NET to INFI-NET transfer module (remote)
INIIT03	INFI-NET to INFI-NET transfer module (local)
INNIS01	Network interface slave module
NFTP01	Field termination panel
NICL01	Communication termination module

SPECIFICATIONS

Table 1-4 contains INFI-NET to INFI-NET interface module specifications.

Table 1-4. Specifications

<table>
<tr><th>Property</th><th>Characteristic/Value</th></tr>
<tr><td>INNIS01 module</td><td></td></tr>
<tr><td>Power requirements</td><td><table><tr><th>Voltage (VDC)</th><th>Current (mA)</th><th>Power (W)</th></tr><tr><td>5</td><td>900</td><td>4.5</td></tr><tr><td>+ 15</td><td>5</td><td>0.075</td></tr><tr><td>– 15</td><td>200</td><td>3.0</td></tr></table></td></tr>
<tr><td>Memory</td><td>128 kbytes processor RAM
80 kbytes other RAM
64 kbytes processor ROM</td></tr>
<tr><td>Communication rates</td><td>2 Mbaud or 10 Mbaud</td></tr>
<tr><td>System capability</td><td>62,500 system nodes, 250 nodes per loop</td></tr>
<tr><td>Mounting</td><td>Occupies one slot in a standard INFI 90 module mounting unit</td></tr>
<tr><td>INIIT02 module</td><td></td></tr>
<tr><td>Power requirements</td><td><table><tr><th>Voltage (VDC)</th><th>Current (mA)</th><th>Power (W)</th></tr><tr><td>5</td><td>2</td><td>10</td></tr></table></td></tr>
<tr><td>Memory</td><td>256 kbytes ROM
512 kbytes RAM
256 kbytes NVRAM</td></tr>
<tr><td>Ports</td><td>2 full duplex serial EIA standard RS-232-C</td></tr>
<tr><td>Communication rates</td><td>75 to 19,200 baud (user-selectable)</td></tr>
<tr><td>Mounting</td><td>Occupies one slot in a standard INFI 90 module mounting unit</td></tr>
<tr><td>INIIT03 module</td><td></td></tr>
<tr><td>Power requirements</td><td><table><tr><th>Voltage (VDC)</th><th>Current (mA)</th><th>Power (W)</th></tr><tr><td>5</td><td>2</td><td>10</td></tr></table></td></tr>
<tr><td>Memory</td><td>2 Mbytes RAM
512 kbytes ROM</td></tr>
<tr><td>Mounting</td><td>Occupies one slot in a standard INFI 90 module mounting unit</td></tr>
<tr><td>All INFI-NET interface modules</td><td></td></tr>
<tr><td>Electromagnetic/radio frequency interference</td><td>Values are not available at this time. Keep cabinet doors closed. Do not use communication equipment any closer than 2 meters from the cabinet.</td></tr>
<tr><td>Ambient temperature</td><td>0° to 70°C (32° to 158°F)</td></tr>
<tr><td>Relative humidity</td><td>0% to 95% up to 55°C (131°F) noncondensing
0% to 45% above 55°C (131°F) noncondensing</td></tr>
<tr><td>Atmospheric pressure</td><td>Sea level to 3 km (1.86 mi)</td></tr>
<tr><td>Air quality</td><td>Noncorrosive</td></tr>
<tr><td>Certification</td><td>All INFI-NET interface modules are CSA certified for use as process control equipment in an ordinary (nonhazardous) environment.</td></tr>
</table>

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

SECTION 2 - DESCRIPTION AND OPERATION

INTRODUCTION

INFI-NET is a unidirectional, high-speed serial data highway that all INFI 90 nodes share. The INNIS01 Network Interface Slave Module and the INIIT02 INFI-NET to INFI-NET Transfer Module make up an INIIR01 INFI-NET to INFI-NET Remote Interface. Two network interface slave (NIS) modules and the INIIT03 INFI-NET to INFI-NET Transfer Module make up an INIIL02 INFI-NET to INFI-NET Local Interface. This section of the product instruction provides an overview of INFI-NET interface module operating theory.

MODULE INTEGRITY

All INFI-NET communication modules have normal INFI 90 security functions that insure module integrity. Module hardware checks for illegal addresses, and monitors the machine fault timer and the I/O expander bus clock. If a module detects an illegal address, it generates a bus error and displays an error code on the faceplate LEDs. If the processor fails to reset the machine fault timer, it expires. When the machine fault timer expires, the communication module stops and the status LED turns red. Module hardware also monitors the I/O expander bus clock. If there is no clock signal, the module hardware generates an interrupt causing the module to stop.

NIS MODULE

The NIS module interfaces both the INIIT02 and INIIT03 transfer modules to an INFI-NET loop. The NIS module operates with each type of transfer module in the same manner.

Messages

The NIS module processes four different message types: Broadcast, time synchronization, multicast and NIS poll.

BROADCAST

A node generates a broadcast message when sending information to all system nodes. Typically, these messages announce changes in node status. Broadcast messages include *NODE ONLINE*, *NODE OFFLINE*, *NODE RESTART* and *NODE BUSY*.

Start-Up Control

If either INIIT02 module is restarted, it sends a message to the other INIIT02 module so that it can take the steps needed to synchronize itself with the restarted transfer module.

Redundancy

Redundancy requires a full set of duplicate modules (two INNIS01 modules and two INIIT02 modules on each loop). The secondary transfer module continuously monitors the primary. A failover occurs when the secondary IIT module detects a primary module failure on Controlway. When this happens, the secondary interface takes over and the primary interface is taken off-line.

INIIT03 INFI-NET TO INFI-NET TRANSFER MODULE

The INIIT03 module passes exception reports, and control and configuration data between a central INFI-NET loop and a satellite INFI-NET loop that have termination points within 150 feet of each other. Operation of the interface is transparent to the user.

Blown Fuse Detection

The INIIT03 module can detect a blown fuse on the loop termination unit or module. If the loop termination unit or module blows a fuse, or power is removed from the loop termination unit or module, the INIIT03 module status LED turns red and CPU LEDs three through six turn on. This feature requires an NIS module with firmware revision E.1 or later.

Data Flow

When an NIS module receives a message, it determines the destination of the message (in or out of its loop). If the message has a destination on the other side of the INIIL02 interface or the interface node itself is a destination, then the NIS module acknowledges the message and notifies the INIIT03 module (through the I/O expander bus) that there is an incoming message. The INIIT03 module transfers the message from the NIS module. If the received message contains exception reports, these are stored in its exception report database. The interface packages exceptions to a common destination for transmission, thus minimizing traffic through the interface.

When the local interface transmits a message it waits for acknowledgment from the destination node. If it does not receive an acknowledge (ACK) or busy negative acknowledge (NAK), the NIS module initiates retries. The NIS module attempts up to 11 retries before it marks a node that does not

respond as node off-line (NOL). Some messages, such as control and configuration messages, pass through the INIIT03 module unchanged and the original source of the message is responsible for retrying them.

The local interface notifies the message source node when there is a destination node off-line. It is then the responsibility of the message source to refrain from sending messages to off-line nodes.

Redundancy

Redundancy requires a full set of duplicate modules (four INNIS01 modules and two INIIT03 modules). The secondary transfer module continuously monitors the primary. A failover occurs when the secondary IIT detects a primary module failure on Controlway. When this happens, the secondary assumes responsibility and the primary is taken off-line. The new primary INIIT03 module brings its NIS modules on-line.

Table 3-8. Optional Digital I/O Modules

Nomenclature	Output	Document No.
IMDSM05	24 VDC	I-E96-309
IMDSO01	24 to 240 VAC	I-E96-310
IMDSO02	4 to 50 VDC	
IMDSO03	5 to 160 VDC	
IMDSO04	24 VDC	I-E96-313

INIIL02 INFI-NET TO INFI-NET LOCAL INTERFACE INSTALLATION

Install the modules and termination devices and cables that make up an INIIL02 INFI-NET to INFI-NET Local Interface. The required modules are:

- One INIIT03 INFI-NET to INFI-NET Transfer Module.
- Two INNIS01 modules, one for each loop.
- Two NTCL01 Communication Termination Units or two NICL01 Communication Termination Modules, one for each INNIS01 module.
- One termination unit cable or one termination module cable for each NTCL01 or NICL01 termination device. The NTCL01 termination unit uses NKLS01 or NKLS11 termination cables. The NICL01 termination module uses NKLS02 or NKLS12 termination cables.

For redundant INFI-NET to INFI-NET local interfaces, double the required modules and termination units or modules and cables. To install an INFI-NET to INFI-NET local interface:

1. Set the jumpers on all termination units or modules.

2. Install all the termination units or modules and their cables.

3. Set the dipswitches and jumpers on the INNIS01 modules and INIIT03 module.

4. Check the module mounting unit for -30 VDC and modify if necessary.

5. Prepare an isolated module mounting unit for the INIIL02 interface.

6. Install the INNIS01 modules and INIIT03 module.

NTCL01 or NICL01 Installation

Configure and install the required termination units or modules and their cables before installing any of the interface modules.

The INNIS01 module terminates through an NTCL01 Communication Termination Unit or an NICL01 Communication Termination Module. These devices terminate the INFI-NET communication loop through either twinax or coax terminals.

Appendices A and B contain a quick reference of termination unit or module jumper settings, board layout and cable connections. Refer to the ***Communication Termination Unit (NTCL01)*** instruction or the Communication Termination Module (NICL01) instruction for specific directions on configuring jumpers, mounting, termination cable installation, and twinax/coax cable lengths.

INNIS01 Dipswitches and Jumpers

Configure the dipswitches and jumpers on the INNIS01 module. Refer to ***INNIS01 Dipswitches and Jumpers*** for information on these dipswitches and jumpers.

> **NOTE:** The INIIL02 interface uses two INNIS01 modules. The two INNIS01 modules must have different I/O expander bus addresses (set by dipswitch SW4 on the NIS module).

INIIT03 Dipswitches and Jumpers

The INIIT03 module consists of one circuit board. The circuit board has four dipswitches, four jumpers and one dipshunt that set the module operating characteristics and options. Figure 3-6 shows the dipswitch and jumper locations on the INIIT03 circuit board.

> **NOTE:** Dipswitch positions marked not used or ***reserved*** must be set to the indicated position, otherwise the INIIT03 module will not operate properly. Since factory settings may not reflect the default settings, it is imperative to check all dipswitch and jumper settings before putting the module into operation.

INIIT03 DIPSWITCH UUB0, MODULE ADDRESS

Dipswitch UUBO sets the INIIT03 module Controlway or module bus address, enables module diagnostics and sets its communication rate for Controlway or module bus. Table 3-9 explains the function of dipswitch UUBO. Dipswitch poles one through three set normal operation and communication speed. Poles four through eight set the INIIT03 module address. The INIIT03 module must have an address of either zero or one.

> **NOTE:** The preferred setting for position three of dipswitch UUB0 is Controlway because of its high speed communication and redundancy. In redundant configurations, dipswitch UUB0 should be identical on the primary and secondary INIIT03 modules, except pole eight.

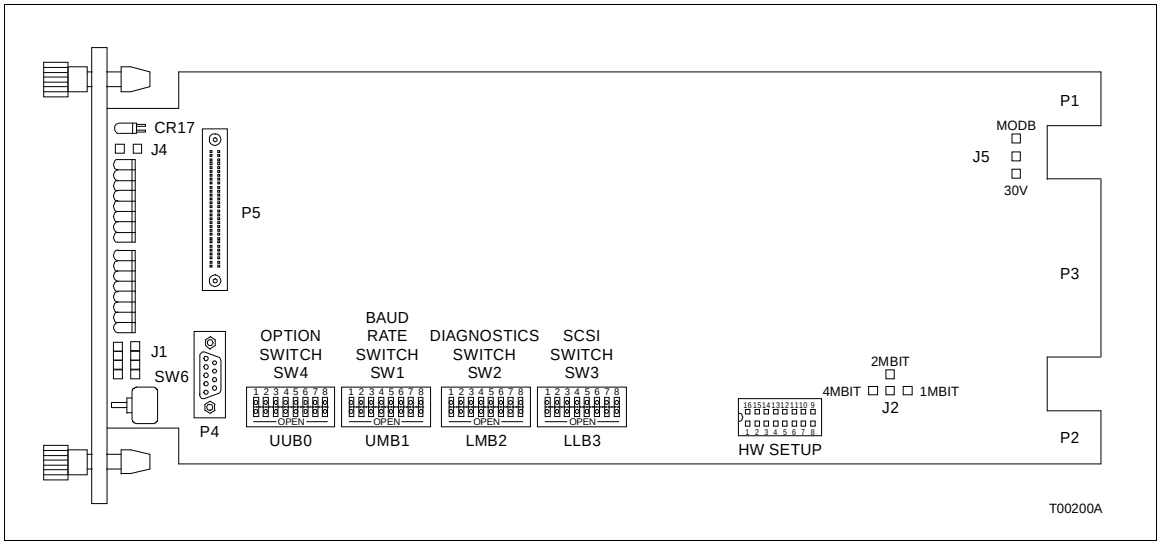

Figure 3-6. INIIT03 Module Circuit Board Layout

Table 3-9. INIIT03 Dipswitch UUBO, Operation/Module Address

Pole 1	2	3	4	5	6	7	8	Function	User Setting
0								Normal run.	0
1								Not used. Must be set as shown.	
	0							Not used. Must be set as shown.	0
	1							Not used.	
		0						Controlway (1 Mbaud).	
		1						Module bus (83.3 kbaud).	
			0	0	0	0	0	Module address = 0.	
			0	0	0	0	1	Module address = 1.	

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

INIIT03 DIPSWITCH UMB1, MODULE OPTIONS AND DIAGNOSTICS

Dipswitch UMB1 is not used by the INIIT03 module and is reserved for future use. All poles of dipswitch UMB1 must be set to zero or closed.

INIIT03 DIPSWITCH LMB2, MODULE OPTIONS

Dipswitch LMB2 is an eight-position dipswitch that determines additional operating options of the module. Table 3-10 lists the LMB2 option settings. Record the LMB2 dipswitch settings in the space provided. The normal setting for pole one of dipswitch LMB2 is zero.

Table 3-10. INIIT03 Dipswitch LMB2, Module Options

Pole 1	2	3	4	5	6	7	8	Function	User Setting
0								ROM checksumming enabled.	
1								ROM checksumming disabled.	
								Diagnostic port (P4) data characteristics:	
	0	0						8 data bits, 1 stop bit, no parity.	
	0	1						8 data bits, 1 stop bit, even parity.	
	1	0						8 data bits, 1 stop bit, odd parity.	
	1	1						8 data bits, 2 stop bits, no parity.	
			0	0				Exception reporting rate (time between scans):	
			0	1				2.0 seconds.	
			1	0				1.0 second.	
			1	1				0.5 second.	
								0.25 second.	
					0			No failover to secondary module on power system status alarm.	1
					1			Failover to secondary module on power system status alarm.	
						0		Not used. Must be set as shown.	0
						1		Not used.	
							0	No redundancy.	
							1	Redundancy configured.	

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

INIIT03 DIPSWITCH LLB3, DIAGNOSTICS

Dipswitch LLB3 selects certain operating options and enables diagnostics that are meaningful to qualified Bailey Controls Company service personnel.

All switch positions on LLB3 should be set as shown for normal operation. Table 3-11 shows the dipswitch settings for LLB3. Verify that all dipswitch positions on LLB3 are set as marked in the user setting column.

Table 3-11. INIIT03 Dipswitch LLB3, Diagnostics

Pole 1	2	3	4	5	6	7	8	Function	User Setting
0								NIS handshake time-out enabled.	
1								NIS handshake time-out disabled.	
	0							Not used. Must be set as shown.	0
	1							Not used.	

Table 3-11. INIIT03 Dipswitch LLB3, Diagnostics (continued)

Pole 1	2	3	4	5	6	7	8	Function	User Setting
0								INFI-NET diagnostic utilities disabled.	
1								INFI-NET diagnostic utilities enabled.	
	0							Common time synchronization between loops.	
	1							Time synchronization isolation.	
		0						Not used. Must be set as shown.	0
		1						Not used.	
			0					Cache burst fill disabled.	0
			1					Cache burst fill enabled.	
				0				Data cache disabled.	
				1				Data cache enabled.	
					0			Instruction cache disabled.	
					1			Instruction cache enabled.	

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

JUMPERS J1, J2, J4, J5

CAUTION

Always operate the IIT module with the machine fault timer circuit enabled. Unpredictable module outputs may result if the machine fault timer circuit is disabled. These unpredictable module outputs may adversely affect the entire communication system.

ATTENTION

N'utilisez jamais un module IIT sans l'usage de sa minuterie de détection de défaillance (MFT). Sinon, les sorties du module pourraient prendre des valeurs ou des états imprévisibles. Le comportement imprévisible des sorties pourrait perturber la totalité du système de communication.

Jumpers J1, J4 and J5 define module functions and operation. Jumper J1 determines if the RS-232-C diagnostic port (P4) operates as data communication equipment (DCE) or data terminal equipment (DTE). Jumper J4 enables the machine fault timer (MFT). Jumper J5 disengages -30 VDC from the module when installing it in an MMU card cage that uses -30 VDC. Jumper J2 is set at the factory and should not be changed. Refer to Table 3-12 for those jumpers that have default settings.

HW SETUP DIPSHUNT

The HW SETUP dipshunt is factory installed. There should be a jumper installed in the second dipshunt position (i.e., pin two is shorted to pin 15). Verify that the jumper is installed in the correct position. The INIIT03 module will not operate properly if this dipshunt position is open. All other dipshunt positions should be open.

Table 3-12. INIIT03 Jumper Settings for J1, J2, J4 and J5

Jumper	Setting	Function	User Setting
J1[1]	Vertical	Sets the RS-232-C diagnostic port (P4) to operate as DCE.	
	Horizontal	Sets the RS-232-C diagnostic port (P4) to operate as DTE.	
J2	4-3	Factory setting.	Shorted
	4-2	Not used.	Open
	4-1	Not used.	Open
J4	Open	MFT disable jumper. This jumper must remain open for normal operation.	Open
J5[2]	30 V	Disconnects Controlway for operation in module mounting units that have -30 VDC (early Network 90).	
	MODB	Connects Controlway channel B for operation in module mounting units that have Controlway (INFI 90).	

NOTES:
1.This feature is used by Bailey service personnel. The J1 setting does not affect the module during normal operation.

2.Refer to ***INIIT03 INSTALLATION OPTIONS*** for an explanation of the installation options available when installing the INIIL02 interface in a system that uses -30 VDC.

INIIL02 Interface Module Mounting Unit Preparation

CAUTION

To avoid potential module damage, evaluate your system for compatibility prior to module installation. This module uses connections to the module mounting unit backplane that served other functions in early Network 90 systems.

ATTENTION

Pour éviter d'endommager des modules, évaluez la compatibilité de votre système avant de les y brancher. L'uage que fait ce module de certianes connexions au fond de panier du châssis de montage diffère de l'assignation prévue par le système Network 90 original.

The INIIL02 INFI-NET to INFI-NET Local Interface requires a dedicated module mounting unit. If the module mounting unit is part of an older system, it must be checked for -30 VDC. The next three subsections explain how to check the module mounting unit for -30 VDC, INIIT03 installation options available for systems that use -30 VDC, and how to isolate the MMU card cage for the INIIL02 interface. ***Do not*** attempt to install

the INIIL02 interface until all the steps in the next three subsections have been completed.

CHECKING THE MODULE MOUNTING UNIT FOR -30 VDC

1. Face the rear of the cabinet. Locate the -30 VDC faston. It is the second faston from the top on the back of the MMU backplane.

2. Check for -30 VDC with respect to system common at the -30 VDC faston.

> **NOTE:** If the module mounting unit does not use -30 VDC, the second faston from the top on the back of the MMU backplane supplies 5 VDC.

3. If there is -30 VDC present then either set INIIT03 jumper J5 to the 30 V position or disconnect -30 VDC from the module mounting unit (refer to ***INIIT03 INSTALLATION OPTIONS***). Remove -30 VDC from the module mounting unit by removing the supply wiring from the -30 VDC faston.

4. For additional information and/or assistance, contact Bailey Controls technical support.

INIIT03 INSTALLATION OPTIONS

There are two installation options available. The first option applies to systems that do not have -30 VDC power. The second option is for systems that have -30 VDC power.

1. Set J5 to MODB when installing the INIIT03 module in a module mounting unit that does not have -30 VDC on the module mounting unit. Position three of dipswitch UUB0 is set to zero for Controlway.

or

2. Set J5 to 30 V when installing the INIIT03 module in a module mounting unit that has -30 VDC on the module mounting unit. Pole three of dipswitch UUB0 is set to one for module bus.

ISOLATING CONTROLWAY AND I/O EXPANDER BUS

The INIIT03 INFI-NET to INFI-NET Transfer Module must have a Controlway or module bus that is dedicated to the INIIL02 interface. In redundant applications both the primary and secondary INIIT03 modules share this isolated Controlway or module bus. Additionally, each INIIT03 module in a redundant interface must have its own I/O expander bus. The INNIS01 modules communicate to their respective INIIT03 modules through these isolated I/O expander buses. Figure 1-2 shows

Table 4-4. Bytes Required for Block Type

Block Type	Bytes				
	Block	Status	Value	Specs	Total[1]
Digital	42	1	—	1	44
RCM	42	2	—	1	46
Module status	42	5	—	—	48
Extended module status	42	16	—	—	58
Analog real-3	42	1	3	13	60
RMSC real-3	42	1	3	13	60
Analog real-4	42	1	4	17	64
RMSC real-4	42	1	4	17	64
Station real-3	42	2	12	20	76
DAANG real-3	42	2	12	20	76
Station real-4	42	2	16	26	86
DAANG real-4	42	2	16	26	86

NOTE: 1.Total bytes must be an even number, therefore all odd totals are increased by one.

INIIT03 INFI-NET TO INFI-NET TRANSFER MODULE LEDs AND CONTROLS

The faceplate of the INIIT03 module has the following components (see Figure 4-3):

- Red/green status LED.
- 16 CPU LEDs divided into two banks.
- Stop/reset pushbutton.

Red/Green Status LED

The status LED is a red/green LED that displays the operating status of the INIIT03 module. It has three possible states. Table 4-5 lists the meaning of the status LED states. Refer to Section 5 for corrective action if the status LED indicates that an operating error exists.

Bank A CPU LEDs

These LEDs display the status of the module while it is in normal operation. Table 4-6 shows the Bank A CPU LED states during normal operation. Refer to Table 5-3 for a list of LED error codes and corrective action.

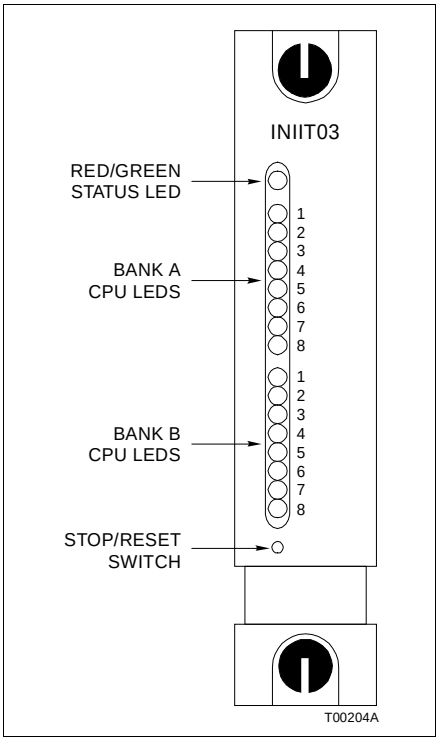

Figure 4-3. INIIT03 Faceplate

Table 4-5. INIIT03 Red/Green Status LED States

LED State	Meaning
Off	No power to the IIT module or the machine fault timer is disabled (jumper installed) and the module is running.
Solid green	The IIT module is in the execute mode.
Solid red	Hardware failure or configuration error, check Bank B CPU LEDs for an error code.

Table 4-6. Bank A CPU LED States

LED State								Meaning
8	7	6	5	4	3	2	1	
x	x	x	x	x	x	x	x	Module start-up, LEDs 1 through 8 sequence irregularly.
1	1	0	0	0	0	0	0	Primary transfer module, normal operation.
1	0	0	0	0	0	0	0	Backup transfer module, normal operation.

Stop/Reset Switch

Push the stop/reset switch once and wait for the status LED to turn red before removing the INIIT03 module from the module mounting unit.

After the module is stopped, pushing the stop/reset switch resets the INIIT03 module. This action:

1. Resets the module to power up values after a stop.

2. Recovers from an operator-initiated stop or module time-out.

INIIL02 MODE OF OPERATION

The INIIL02 INFI-NET to INFI-NET Local Interface has one mode of operation. The module should be in execute mode. If not, it has failed or there is some other problem with the module. In the execute mode, the INIIT03 module transfers data and status information from the central INFI-NET communication loop to the local satellite INFI-NET communication loop.

INTERFACE POINT CAPACITY

There are three factors that determine the maximum number of points in an INIIL02 interface configuration: Point type (exception report data type), the number of devices that receive each distinct (unique) exception report and the total memory available (1.66 megabytes). Table 4-7 lists the memory usage for routing records. Table 4-8 lists the memory usage per tag and point type.

Table 4-7. INIIT03 Module Memory Usage by Routing Record

Routing Record	Memory Bytes Required[1]	Comments
Bridge	18	A bridge is any local or remote INFI-NET to INFI-NET communication interface or INFI-NET to Plant Loop communication interface. One bridge record is created for each bridge other than the one under consideration.
Node	50	The INIIL02 interface allocates a node record for each node on the central loop and each node on the satellite loop.
Module	14	One module record is allocated for each remote module from which the INIIL02 interface imports or exports exception reports.
Block	(refer to Table 4-8)	One block record is required for each exception report being imported.
Remote route	12	A remote route record is required for each destination of an exception report. The maximum number of destinations can be approximated by summing the number of consoles and bridges on each communication loop connected to the INIIL02 interface.

NOTE: 1.The INIIT03 module has 1.66 megabytes of RAM available for use.

INIIT02 MODULE STATUS SUMMARY

INIIT02 INFI-NET to INFI-NET Transfer Module has a 16-byte module status record that provides summary flags for error conditions, module type and firmware revision level. Refer to ***APPENDIX G - MODULE STATUS*** in the ***Function Code Application Manual*** for a listing of the fields that make up the INIIT02 module status report and the definition of each field within the module status report. Refer to the applicable operator interface product instruction for an explanation of how to access the module status report.

INIIT03 ERROR CODES

If module errors occur while the INIIT03 INFI-NET to INFI-NET Transfer Module is operating the module halts, the status LED turns red and the Bank B CPU LEDs display an error code. If a redundant module is installed, it takes over operation. Table 5-3 lists the INIIT03 error codes, their meaning and corrective action. Nonfatal module problems will appear in the module status report, through an operator interface such as the operator interface station.

Table 5-3. INIIT03 Module Error Codes

Bank B CPU LEDs 8	7	6	5	4	3	2	1	Code	Error Condition	Corrective Action
0	0	0	0	1	1	0	1	0D	Intermodule link error.	Check for I/O expander bus connection between primary and secondary INNIS01. Check cable to termination unit/module.
0	0	0	0	1	1	1	0	0E	Module addresses are the same on primary and redundant INIIT03.	Change dipswitch UUB0 pole 8 on one of the INIIT03 modules.
x	0	0	1	0	0	0	1	11	INNIS01 handshake failure.	Replace INIIT03 or INNIS01.[1]
x	0	0	1	0	0	1	0	12	INNIS01 not responding.	Check I/O expander bus address and INNIS01 seating.[1]
0	0	0	1	0	0	1	1	13	ROM checksum error.	Reset INIIT03; replace if error continues.
0	0	0	1	0	1	0	0	14	I/O expander bus message failure.	
x	0	0	1	0	1	0	1	15	Loop failure.	Replace INNIS01; check cabling and termination unit/module.[1]
x	0	0	1	0	1	1	0	16	Loopback test failure.	
x	0	1	0	1	0	1	1	2B	Attempt to de-allocate block not allocated.	Reset INIIT03. Review system configuration, particularly ASCII tags, incomplete console databases, or missing XR source nodes. If error continues contact Bailey technical support.
0	0	1	1	0	0	0	1	31	Memory or CPU fault.	Replace INIIT03.
0	0	1	1	0	0	1	0	32	Address or bus error.	Reset INIIT03; replace if error continues.

Table 5-3. INIIT03 Module Error Codes (continued)

Bank B CPU LEDs 8	7	6	5	4	3	2	1	Code	Error Condition	Corrective Action
0	0	1	1	0	0	1	1	33	Illegal instruction.	Reset INIIT03; replace if error continues.
0	0	1	1	0	1	0	0	34	Trace/privilege violation.	
0	0	1	1	0	1	0	1	35	Spurious/unassigned exception.	
0	0	1	1	0	1	1	0	36	Divide by 0/checksum/ format error.	
x	0	1	1	1	0	0	0	38	Option dipswitches do not match between primary and secondary modules.	Check for compatible dipswitch settings on INNIS01/INIIT03 pairs.[1]
x	0	1	1	1	0	0	1	39	Duplicate node number.	Select another node address on loop (dipswitch SW1 on INNIS01 module).[1]
x	0	1	1	1	1	0	0	3C	Loop termination unit/ module failure.	Check loop termination unit/module fuse. Check power to termination unit/ module. Replace if error persists.[1]
0	0	1	1	1	1	1	1	3F	INIIT03 was stopped with the stop/reset pushbutton.	Reset INIIT03.
1	1	1	1	1	1	1	1	FF	Power fail interrupt or I/O expander bus clock failure.	Check 5 VDC and ±15 VDC power. Check I/O expander bus dipshunts and MMU backplane. Replace module if error continues.

NOTE: 1. Bit 8 indicates which communication loop is in error. If bit 8 = 0, the error code applies to the central loop. If bit 8 = 1, the error code applies to the satellite loop.

INIIT03 MODULE STATUS SUMMARY

The INIIT03 INFI-NET to INFI-NET Transfer Module has a 16-byte module status record that provides summary flags for error conditions, module type, and firmware revision level. Refer to ***APPENDIX G - MODULE STATUS*** in the ***Function Code Application Manual*** for a listing of the fields that make up the INIIT03 module status report and the definition of each field within the module status report. Refer to the applicable operator interface product instruction for an explanation of how to access the module status report.

EDGE CONNECTOR PIN ASSIGNMENTS

Tables 5-4, 5-5, and 5-6 list INNIS01 edge connector pin assignments. Tables 5-7, 5-8, and 5-9 list INIIT02 edge connector assignments. Tables 5-10, 5-11, 5-12, and 5-13 list INIIT03 edge connector assignments.

Table 5-10. INIIT03 Edge Connector P1 Pin Assignments

Pin	Signal	Pin	Signal
1	+5 VDC	2	+5 VDC
3	No connection	4	Controlway B/NC
5	Common	6	Common
7	No connection	8	Not used
9	Power fail interrupt[1]	10	No connection
11	Controlway A / module bus	12	No connection

NOTE: 1.Active low.

Table 5-11. INIIT03 Edge Connector P2 Pin Assignments

Pin	Signal[1]	Pin	Signal[1]
1	Data bit D1	2	Data bit D0
3	Data bit D3	4	Data bit D2
5	Data bit D5	6	Data bit D4
7	Data bit D7	8	Data bit D6
9	Clock	10	Sync
11	Parity	12	Error

NOTE: All data bits are active low.

Table 5-12. INIIT03 Edge Connector P3 Link Pin Assignments

Pin	Signal	Pin	Signal
1	Red1 parity	16	GND
2	Red1 data 7	17	Red1 data 6
3	Red1 data 5	18	Red1 data 4
4	Red1 data 3	19	Red1 data 2
5	Red1 data 1	20	Red1 data 0
6	GND	21	GND
7	Red1 BLCK	22	Red2 BLCK
8	GND	23	GND
9	Red1 busy	24	Red2 busy
10	GND	25	GND
11	Red2 data 7	26	Red2 data 6
12	Red2 data 5	27	Red2 data 4
13	Red2 data 3	28	Red2 data 2
14	Red2 data 1	29	Red2 data 0
15	GND	30	Red2 parity