Foreword

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Advanced Messaging Group
Multimedia Publications Department
5401 North Beach St., MS E230-A
Fort Worth, TX 76137-2794

or telephone: **(817) 245-2823**

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Motorola, through its Advanced Messaging Technical Training Group in Fort Worth, Texas, offers courses on communicators, messaging switches, transmitters, and receivers. These courses are taught on the site or at a customer's location.

Students learn to install, configure, and maintain Motorola messaging systems. The classrooms at Motorola are equipped to ensure hands-on experience in practical lab exercises.

Training courses range from a basic introduction to communicators and messaging systems to customized classes on specific systems and large system applications.

To obtain a course catalog or scheduling information, please call (817) 245-2184 or (800) 724-3588 and ask for the training coordinator.

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The installation, maintenance, and / or operation of this equipment may present potentially unsafe conditions, including, but not limited to, electrical shock, improper voltage to components, and improper operation that can cause personal injury, death or damage to property.

Read Instructions: Read all the safety instructions before operating the equipment. Retain these safety instructions for future reference. Specialized procedures and instructions are required and must be followed. Also, all applicable safety procedures, such as Occupational, Safety, and Health Administration (OSHA) requirements, National Electric Code Requirements, local code requirements, safe working practices, and good judgement must be used by personnel.

Heed Admonitions: Adhere to all warnings on the equipment and in the operating instructions. Follow all operating and use instructions. Two safety admonitions are used in this instruction manual to indicate:

- Personal injury or equipment damage.

This safety admonition applies to an operating or maintenance procedure, practice or condition which, if not strictly observed, could result in personal injury or damage to the equipment or database.

- Harmful injury that may result in death.

This safety admonition applies to an operating or maintenance procedure, practice or condition which, if not strictly observed, could result in serious personal injury or death.

Mounting: Mount the equipment only as recommended by the manufacturer. Situate the equipment away from heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produces heat.

Power Sources and Grounding: Connect the equipment to the type of power source described in the installation instructions or as marked on the equipment. Take precautions to avoid defeating the grounding or polarization provisions of the equipment. Disconnect the power to the equipment by a circuit breaker when left unused for long periods of time.

Cleaning: Clean the outside of the equipment by using only a damp cloth. Do not immerse the equipment in any type of liquid, including water. Do not use liquid cleaners or aerosol cleaners. Dirt or other foreign matter should not be allowed to accumulate in the interior of the enclosure.

Damage Requiring Service: Do not attempt to perform service functions that are not described in the operating instructions. All other servicing should be referred to qualified service personnel.

Telephone Line Installation: All telephone line connections to the equipment should be accomplished with the telephone lines disconnected from the network interface.

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FCC Compliance Statement: ***This product generates, uses, and can radiate radio frequency energy and, if not installed in accordance with the instruction manual, can cause interference to radio communications. Operation of the equipment in a residential area is likely to cause interference, in which case the user is required, at his own expense, to correct the interference.***

Contents

Figures

Tables

Introduction

This chapter introduces the installation and operation manual for the Internal NIU Transmitter Controller with the WMS Data 1.0 software. This chapter includes information on the following topics:

About This Manual

This manual describes how to install and operate the Network Interface Unit (NIU) with the WMS Data 1.0 software. This manual includes the following chapters and appendixes:

- Chapter one: Introduction—This chapter provides a brief description of this manual, a list of the sections and their functions, a description of the intended audience, a list related publications, and a description of the conventions used in this manual.
- Chapter two: Quick Start—This chapter provides quick start procedures for starting basic operation of the NIU.
- Chapter three: System Description—This chapter provides a brief overview of the NIU, including a discussion of the controls, indicators, connectors, and modules. This chapter also provides detailed mechanical, electrical, and environmental specifications as related to the NIU.
- Chapter four: Installation—This chapter provides instructions for installing the NIU.
- Chapter five: Configuration—This chapter provides instructions on how to configure the NIU hardware and operation, including information on how to select the proper parameters for your specific needs.
- Chapter six: Operation—This chapter provides important features of the NIU useful during normal operation, such as status information, alarms, using the event log, and a discussion of N+1 redundant operation.
- Chapter seven: Maintenance—This chapter provide information on maintaining the NIU including reference oscillator alignment procedures, built-in test information, and troubleshooting information.
- Appendix A: Abbreviations and Acronyms—This appendix provides definitions of the abbreviations and acronyms used in the manual.
- Appendix B: NIU Commands—This appendix provides descriptions of the NIU software commands
- Appendix C: NIU Alarms and Events—This appendix provides definitions of the NIU alarms and events.
- Appendix D: NIU Traces—This appendix provides information on the NIU Traces.
- Appendix E: Nonvolatile Parameter Default—This appendix provides information on nonvolatile parameter defaults.
- Appendix F: RS-485 SuperStream Input—This appendix provides a description of SuperStream software configuration.

- Appendix G: C-NET to SuperStream Upgrade/Regression—This appendix provides information on upgrading from C-NET to SuperStream and reverting back to C-NET from SuperStream.
- Appendix H: Configuration and Installation Record—This appendix provides the Configuration and Installation Record Table which is used during installation to record the configuration of the NIU DIP switches.

Audience

This manual is intended for system technicians and Engineers responsible for installing, operating, and maintaining the Nucleus NIU Transmitter. A strong knowledge of messaging systems and telecommunications is recommended for personnel performing the tasks contained in this manual.

Related Publications

The following are related publications:

- *Wireless Messaging System Planner*, part number 6880491G50
- *Choreographer! Software Interface Installation and Operation*, part number 6880492G07
- *Choreographer! Software Interface Concepts Description*, part number 6880492G08
- *RF-C! Controller SilverSword SSCB FRU*, part number 6880493G88
- *RF-C! Controller SilverSword IOTB FRU*, part number 6880493G89
- *RF-C! Controller SilverSword I/O Cable Kit FRU*, part number 6880493G91
- *RF-C! Controller Hardware Installation*, part number 6880494G53
- *RF-C! Controller Software Installation and Operation*, part number 6880494G54
- *Internal NIU Transmitter Controller Installation and Operation*, part number 6880497G15
- *NUCLEUS Paging Station Transmitter Installation and Operation*, part number 6881002F05

Conventions

This section provides a description of conventions, command syntax, and admonitions used in this manual (see Table 1-1):

Table 1-1: Conventions and Command Syntax

Example	Convention/Syntax	Description
Type: **yes** <**Return**> <**Control+O**>	Helvetica bold Dual angle brackets (< >) Dual angle brackets and plus sign (+)	Indicates input by the user from the keyboard in the form of text, key commands, or both; for key commands, the plus sign indicates to hold down the first key and press the second key.
Ok button **File** pull-down menu **File>New**	Palatino bold Palatino bold plus single bracket (>)	Indicates GUI pull-down or menu pop-up commands performed by the user

Quick Start

This chapter provides quick start procedures for starting basic operation of the NIU. This chapter includes information on the following topics:

To be supplied.

System Description

This chapter provides a brief overview of the NIU, including a discussion of the controls, indicators, connectors, and modules. This chapter also provides detailed mechanical, electrical, and environmental specifications as related to the NIU. This chapter includes information on the following topics:

Overview

The NIU interfaces a paging system controller with a paging transmitter through a SuperStream data distribution link (see Figure 3-1).

Figure 3-1: Internal NIU Board

The NIU accepts SuperStream data from the controller across a distribution link, decodes the received information, and extracts the paging data, key commands, and control information for the paging transmitter.

The NIU can receive SuperStream data from an audio wireline, a satellite downlink (analog or digital), or from receiver audio (see Figure 3-2). A link modem (QAM) is required for wireline, analog satellite, or link receiver input. A dial modem is required for Public Switched Telephone Network (PSTN) diagnostics. After processing, the NIU sends the data in Synchronous Local Control (SYLC) to the Station Control Board (SCB).

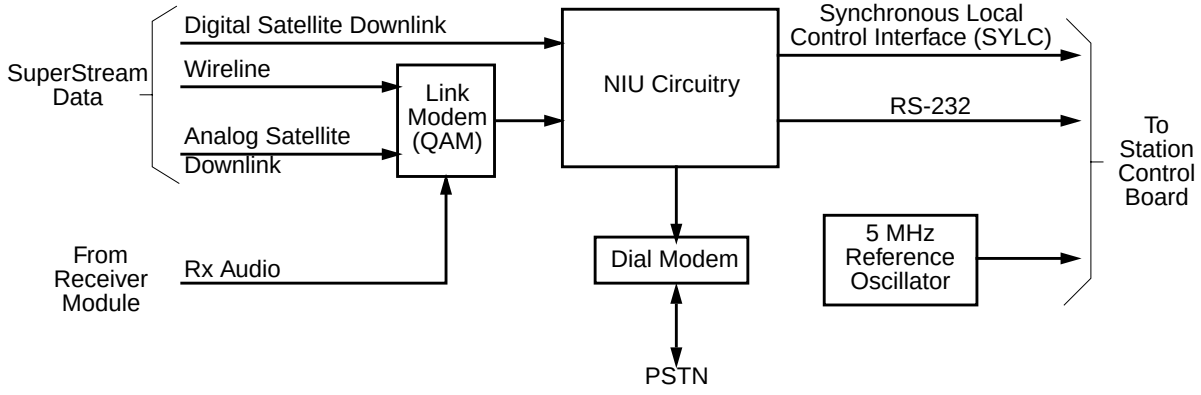

Figure 3-2: NIU Link Distribution System

The NIU is also responsible for maintaining transmitter synchronization through the use of Global Positioning System (GPS) receivers, allowing transmitters to function correctly within a simulcast system.

An NIU can be configured to operate as a:

- Transmitter NIU
- Monitor NIU

Transmitter NIUs

Transmitter NIUs decode the system, device, and stream IDs from the incoming data and perform forward-error correction on the data. Also, the paging data and the page-launch time (the transmission of the page) is extracted from the SuperStream data stream.

Transmitter NIUs also:

- Schedule paging data for delivery to a transmitter at the appropriate time to ensure proper simulcast operation
- Monitor transmitter alarm lines

Monitor NIUs

The Monitor NIUs provide simulcast verification and control the Monitor Receiver's channel selection. Synchronization data is captured from the Monitor Receiver by the Monitor NIUs, where synchronization is verified using the GPS as a time reference.

NIU and the Paging System

The NIU is just one of the elements that make up a Motorola paging system. Additional elements include the following:

- **Terminal**

  The terminal accepts paging requests through either a direct dial-up phone interface or data entry equipment. Terminals generally connect to a controller, which handles key requests, communication handshaking, and passes on pager addresses and information for transmission. Terminals maintain subscriber data, and can provide paging data and billing information.

- **Control Point**

  The control point for the paging system is the RF-Controller! (RF-C!). The RF-C! is responsible for:

  – controlling and routing messaging traffic.

  – batching and scheduling ReFLEX™, InFLEXion™, FLEX™, and POCSAG™ messaging protocol.

  – performing one- and two-way functions, such as subscriber location, message entry, acknowledgements, and unit registration.

- **Communication Path**

  The SuperStream data path from the control point to the paging station may be an Radio Frequency (RF) link, a wireline link, or a satellite link. An RF link requires a link receiver, while a satellite link requires a satellite downlink at the paging station.

- **Paging Station**

  The Nucleus II Paging Station typically includes a Network Interface Unit (NIU), which decodes the SuperStream data sent from the control point. The NIU converts the paging data into SYLC format and sends the data to the Station Control Module (SCM) for processing. The data is than converted into modulated RF energy for transmission to the pager.

- **Monitor Receiver**

  The use of a monitor receiver depends on the type of system synchronization used:

  – *Monitor Receiver Synchronization* – The monitor receiver monitors the paging station transmissions for modulation characteristics. When misaligned modulation is detected, the problem is reported back to the control point by dial-up phone line for corrective action.

  – *Direct Synchronization with Digital Satellite Link* – The monitor receiver is used for setup and diagnostics but not for synchronization.

  – *GPS Synchronization (Self-Synchronization)* – the monitor receiver is used for setup and diagnostics but not for synchronization.

- **Pager**

  The pager is a miniature radio receiver carried by the user for retrieval of information from the paging terminal. Pagers can provide the user with an alert, a voice transmission, a numeric display, or an alphanumeric display.

A typical system configuration is shown in the figure that follows (see Figure 3-3).

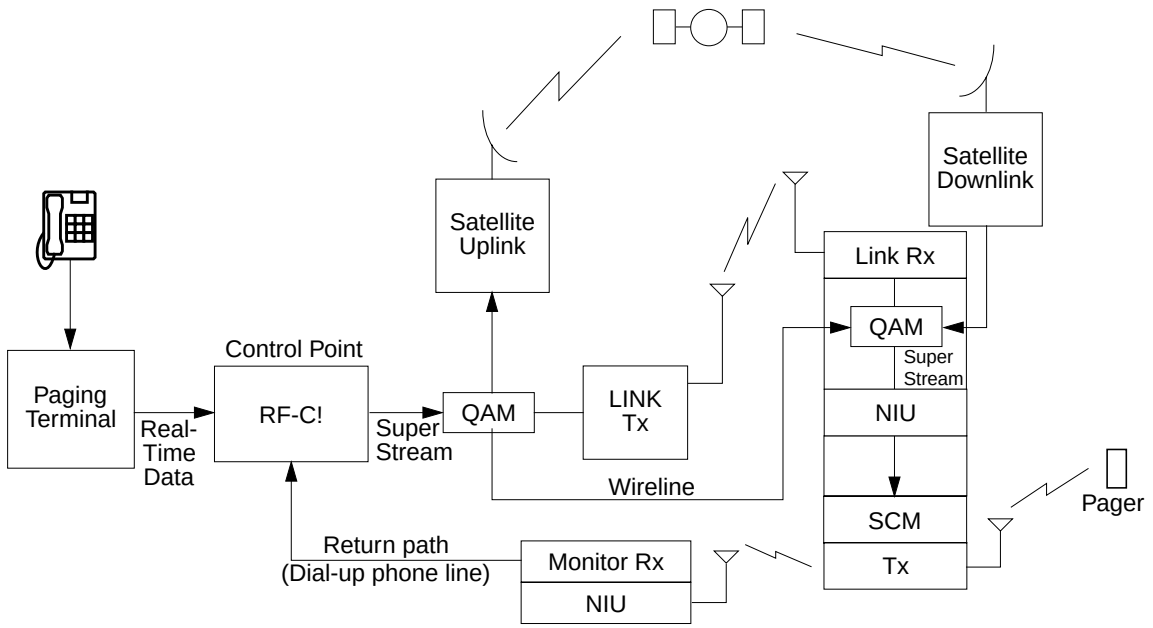

Figure 3-3: Typical Paging System with Monitor Receiver Synchronization

Controls and Indicators

The NIU contains LED indicators which provide information on the state of the NIU. The unit also contain switches for switching functional states.

LEDs

There are four indicating LEDs located on the front edge of the NIU board (see Figure 3-1).

- STATUS—Unit alarm status
- LINK—SuperStream data stream
- KEY (located behind the front panel)—Unit key status
- C-LAN (located behind the front panel)—C-LAN data status

A description of each state of the STATUS LED is provided in Table 3-1.

Table 3-1: STATUS LED States

Indication	Description
Slow flashing green	Normal operation, no alarm conditions
Fast flashing green	Dial modem has DCD connected
Slow flashing orange	Alarm exists or has occurred
Fast flashing orange	Alarm exists or has occurred, and a dial modem is connected
Steady red	Unit hung up

A description of each state of the LINK LED is provided in Table 3-2.

Table 3-2: LINK LED States (Sheet 1 of 2)

Indication	Description
Slow flashing green	SuperStream has sync
Fast flashing green	SuperStream has sync and running from ROM
Steady orange	Lost SuperStream sync for less than 30 seconds
Slow flashing orange	Running from ROM and lost SuperStream data for less than 30 seconds

Table 3-2: LINK LED States (Sheet 2 of 2)

Indication	Description
Steady red	SuperStream lost sync for more than 30 seconds
Flashing red	SuperStream lost sync for more than 30 seconds and running from ROM

A description of each state of the KEY LED is provided in Table 3-3.

Table 3-3: KEY LED States

Indication	Description
Off	Output inactive
Steady green	Key output active
Steady orange	Unit cannot key until sync adjust occurs
Steady red	Key output disabled

A description of each state of the C-LAN LED is provided in Table 3-4.

Table 3-4: C-LAN LED States

Indication	Description
Flashing green	Sending C-LAN data
Flashing orange	Receiving C-LAN data
Flashing red	C-LAN receive data error occurred

Switches

There are three switches located behind the Console connector , P1 on the NIU board (see Figure 3-1).

- ALARM—Unit alarm reset toggle switch (clears all latched noncurrent alarms)
- DISABLE—Unit enable / disable / maintenance disable toggle switch
- RESET—Unit master reset toggle switch (resets the hardware)

Connections

The NIU has connections for the following interfaces (see Figure 3-4):

- front panel connections (see paragraph, "Front Panel Connection")
- SuperStream analog link interface
- SuperStream digital link interface
- transmitter interface
- alarm interface (two user-programmable inputs)
- monitor receiver interface
- auxiliary relay interface
- C-LAN interface
- option port RS-232 interface
- dial-up modem interface
- external reference sources
- primary power and battery backup connection

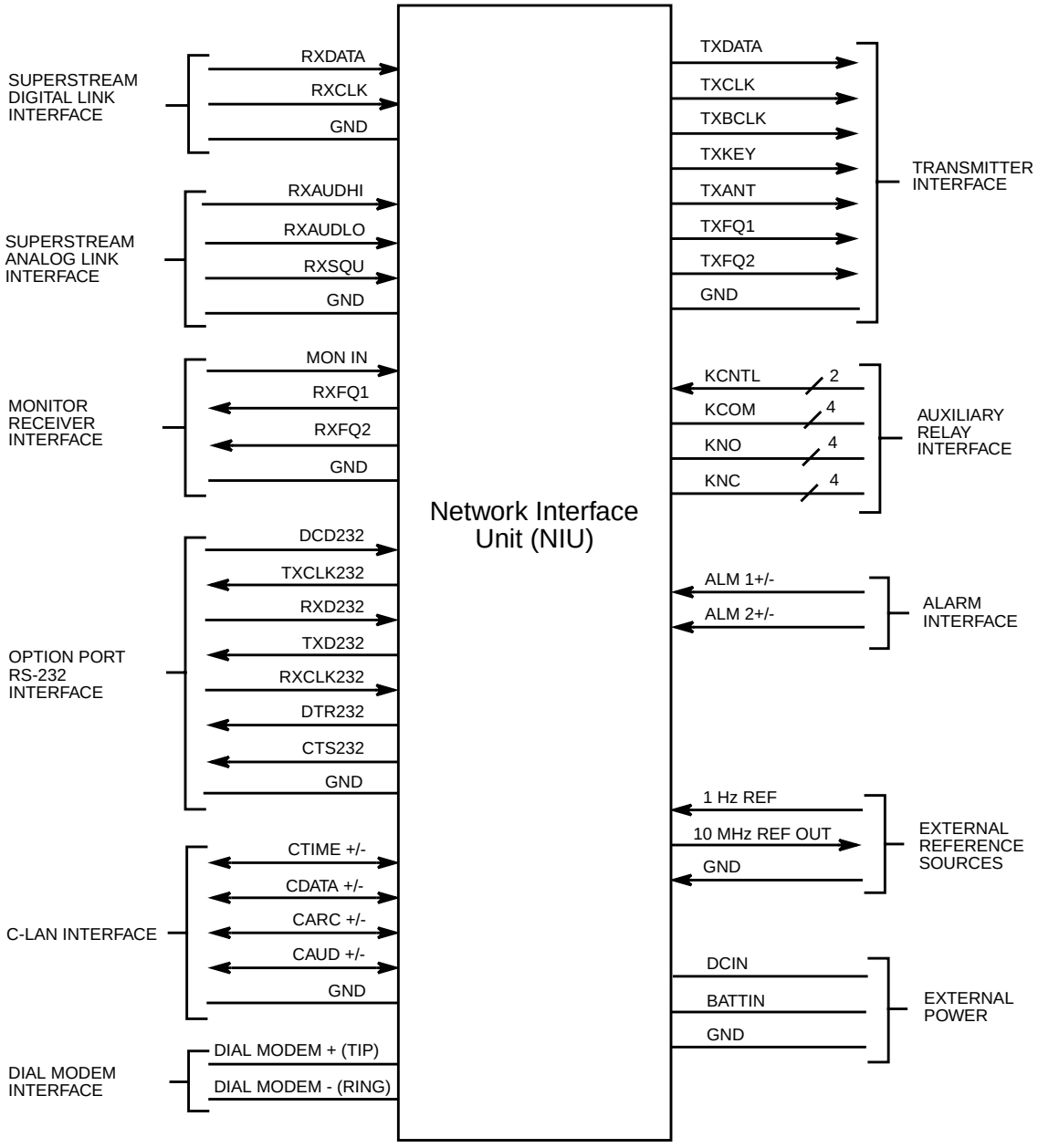

Figure 3-4: NIU Interfaces

Front Panel Connection

There is a Console DB9 communications port (provides terminal interface) located on the front of the NIU (see Figure 3-1).

A list of the front panel Console connector pin assignments is provided in Table 3-5.

Table 3-5: Pin Assignments for Console DB9 Connector

Number	Signal Name	Description
1	DCD	Data carrier detect input
2	RXD	Receive data input
3	TXD	Transmit data input
4	DTR	Data terminal ready output
5	GND	Signal ground
6	NU	Not used
7	NU	Not used
8	NU	Not used
9	NU	Not used

Rear Panel Connections

To be supplied.

Modules

There are locations on the NIU board for three module:

- dual flash (preinstalled on the board)
- dial modem (optional)
- link modem (optional)

Dual Flash

The NIU is delivered with the Dual Flash installed. The two flash chips allow the system user to continue paging while performing a linkload as a background task.

The **flash A** or **flash B** command allows the user to select which flash bank the NIU is running. The user can select a flash bank based on the version of software loaded into each flash memory bank. A user may also accomplish a forced bank select, bringing the off-line side on line. Paging is interrupted when a bank select is accomplished.

The dual flash configuration allows the user to linkload updated software to the off-line flash bank. This allows the user to continue paging while the linkload is in progress. Paging is given priority during the dualflash linkload process. If a large volume of paging traffic begins during the dual flash load process, the linkload will be blocked. Therefore, the dualflash link load should NOT be started during peak traffic periods.

Dual Flash controls and indicators

The dual flash contains no physical controls or indicators.

Dual Flash configuration

The dual flash contains no jumpers or other settings.

Dial Modem

The optional Dial Modem is a dual-card set consisting of a Modem Board and a Dial Access Arrangement (DAA) board. The board set provides communication to and from phone equipment over dial-up circuits. The dial modem is required equipment in CIUs and monitoring NIUs. In monitoring NIUs, the dial modem is used to send call-in alarm, status,

and timing information to the CIUs. When placed in NIUs the dial modem can provide remote interrogation of a paging site, and can be used to provide wireline alarm reporting. The dial modem is optional for paging NIUs.

The modem board provides the conversion of the digital communications data to an analog form that is suitable for transmission over a dial-up phone line. The output of the modem is interfaced to the DAA.

The DAA is an FCC part 68 approved interface to a dial-up phone circuit. The DAA provides ring detection, 2 to 4 wire conversion, and hook switch control.

The modem and DAA combined together form a Bell 212A 300/1200/2400 style modem.

Dial Modem controls and indicators

The dial modem contains no physical controls or indicators.

Dial Modem configuration

The dial modem contains no jumpers or other settings.

Dial Modem installation

The modem card plugs into the XA3 slot in the NIU, and the DAA plugs into the XA4 slot in the NIU.

Link Modem

The optional Link Modem is a synchronous serial 9600 bps, V.29, modem card used to convert the 9600 bps SuperStream data stream into a voice-bandwidth signal. The link modem allows for point to multipoint operation over dedicated phone circuits, radio links (both standard and narrow band), and analog satellite circuits. The link modem is required in NCUs and NIUs in any SuperStream system using an analog link distribution network. SuperStream systems using analog link distribution networks are required to have a minimum 23 dB signal-to-noise ratio. The link modem provides equalization functions that improve performance when operating over low quality voice circuits.

Link Modem controls and indicators

The link modem contains no physical controls or indictors.

Link Modem configuration

The link modem contains no jumpers or other settings.

Link Modem installation

The link modem is installed in the NIU. The link modem is physically placed inside these units and mounted in a “piggyback” fashion on four 5/8-inch PCB posts. The electrical connection to the NIU is made to the link modem 60-pin male connector which is attached to the NIU 64-pin female connector.

Specifications

Specifications for the internal NIU are provided in Table 3-6.

Table 3-6: NIU Specifications (Sheet 1 of 2)

General	
Configuration Settings	Configuration settings are stored in battery backed up RAM. The battery voltage is monitored and a low battery condition produces an alarm.
Event log	All equipment includes an event log which records the last 128 significant events in battery backed up RAM. Significant events include maintenance activities, user setup data, and all alarms.
Alarm inputs	Internal NIUs have two programmable alarms. Each allows for a programmable name, mode (analog, digital, or power), high and low alarm limits, input debounce, key qualification, inhibit if other alarms already exist. A directional coupler is required to monitor forward and reflected power levels.
Alarm reporting	The NIU maintains a record of the last 128 significant events in battery backed-up RAM. Each alarm can be programmed to initiate a call-in to a console. Each call-in to a console. Each call-in will transfer all alarm information since the last call-in and, if programmed, all alarms listed within the log will be transferred.
Primary power	+10 to +30 Vdc
Environmental	Temperature: -30 to +60 celsius Humidity: 10% to 90% non-condensing
Power consumption	1.0 Amp @ +24 Vdc, or 2.0 Amps @ +12 Vdc, automatic selection
Link system interface:	
RXAUD	Balanced, 600- to- 20K-ohm selectable, adjustable -35 to 0 dBm. Recommended minimum signal-to-noise ratio: 25dB at 9600 bps link speed, or 18 dB at 4800 bps link speed (as measured by NIU).
RXSQU	Adjustable threshold +1 to +10 volts, 500 millivolts hysteresis
RXDATA	Digital link receiver data input, RS-232
RXCLK	Digital link receiver data clock input, RS-232
Transmitter interface	
TXDATA	TX data output, programmable polarity

Table 3-6: NIU Specifications (Sheet 2 of 2)

TFREQ1	LSB frequency control output, programmable polarity
TFREQ2	MSB frequency control output, programmable polarity
TXKEY	Key line output, programmable polarity
TXCLK	TX data clock output
TXBCLK	TX baud clock output
TXANT	TX/RX antenna output control
Outputs	All digital outputs are TTL, open-drain with 4.7K pull-up resistors; 16 milliampere current sink capability
Relay interface:	
Two form “C” relays	Normally Open (NO), Normally Closed (NC), Common (COM), and Control

Installation

This chapter provides instructions for installing the NIU. This chapter includes information on the following topics:

Equipment Installation

To be suplied.

DIP Switch Settings

DIP switches are used to set up the default NIU configuration. Before proceeding with the NIU installation, verify that the DIP switches on the NIU board are set properly for your particular application. Figure 4-1 shows the location of the DIP switches on the NIU circuit board.

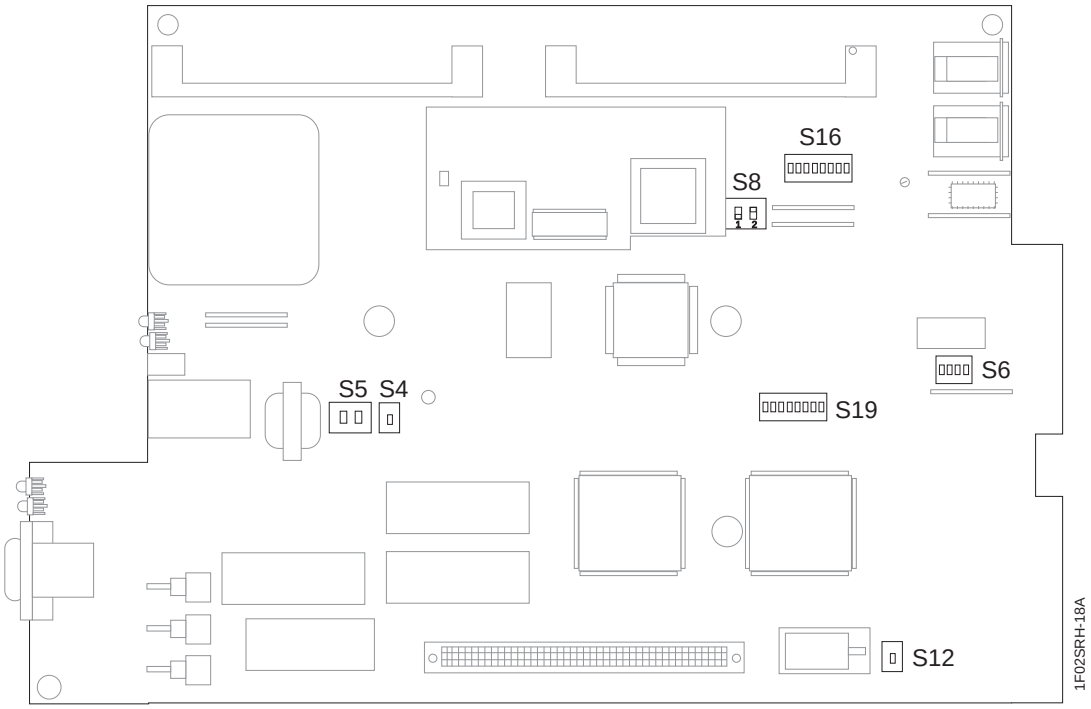

Figure 4-1: NIU DIP Switch Locations

NIU DIP switch information is provided in Table 4-1. This table list of all of the DIP switches and the configurable NIU function that can be set by each switch.

Table 4-1: NIU DIP Switch Settings (Sheet 1 of 2)

DIP Switch	NIU Function
S4	**Analog Link Input Impedance Selection (Affects Impedance only when S5 is on)** On = 600 Ohm Impedance Off = High Impedance
S5	**Analog Link Input Audio Transformer In/Out** In = Transformer In-line Out = Transformer Out
S6	**Alarms 1 and 2, and 4 Pull-up Select** *Note: The 10 k pull-up resistors being applied with the following switch poles are for use with open collector input* Pole 1 On = 10 K pull-up resistor applied to alarm 1 input Off = 10 K pull-up resistor not applied to alarm 1input Pole 2 On = 10 K pull-up resistor applied to alarm 2 input Off = 10 K pull-up resistor not applied to alarm 2 input Pole 3 Reserved Pole 4 On = 10 K pull-up resistor applied to AUX4 Off = 10 K pull-up resistor not applied to AUX4
S8	**Frequency Reference Select** Pole 1 On = Nucleus Ref Mod Provides 5 MHx to Station Off = NIU Provides 5 MHz to Station (A Nucleus Ref Mod must not be installed to use this option) *Note: The following switch pole must always be set On.* Pole 2 On = 1 Hz In Off = Reserved
S12	**Non-Volatile RAM Battery Enable** *Note: If this switch is set off, the configuration will be lost when power is removed from the NIU.* On = Battery Enabled Off = Battery Disabled

Table 4-1: NIU DIP Switch Settings (Sheet 2 of 2)

DIP Switch	NIU Function
S16	**Receiver, AUX1, AUX2, and AUX3 Pull-up Select**
Pole 1	Reserved
	Note: On the following switch pole settings, 1 = On and 0 = Off
Poles 2, 3, and 4	100 = To use an Internal Nucleus Link receiver 011 = To use an External Link receiver
	Note: If both an Internal Nucleus Link receiver and an External Link receiver are not connected at the same time, then poles 2, 3, and 4 can be set to on for either Link receiver type
Pole 5	On = 10K pull-up resistor applied to AUX3 Off = 10K pull-up resistor not applied to AUX3
Pole 6	On = 10K pull-up resistor applied to AUX1 Off = 10K pull-up resistor not applied to AUX1
Pole 7	On = 10K pull-up resistor applied to AUX2 Off = 10K pull-up resistor not applied to AUX2
Pole 8	On = Rx1 grounded (for single ended Link receiver input) Off = Rx1 not grounded (for balanced Link receiver input)
S19	**Link Type and Hardware Configuration Select**
Link Type	
Pole 1	On = Digital Link SuperStream Off = Analog Link SuperStream
Pole 2	Reserved
Pole 3	Reserved
Pole 4	On = FM3 Off = FM2
Poles 5 thru 8	Reserved

Transmitter Connections

The interface between the NIU and the paging transmitter consists of the following signals:

- transmitter data output (TXDATA)
- transmitter clock output (TXCLK, TXBCLK)
- transmitter key (TXKEY)
- transmitter antenna (TXANT)
- two transmitter frequency controls (TXFREQ1, TXFREQ2)
- ground (GND)

SuperStream Connections

SuperStream link system operation may use either analog or digital stream signal inputs. Information on connecting these inputs are provided in the following paragraphs.

If the same SuperStream stream is to be shared with other NIUs, the C-LAN must be connected and operational. For C-LAN connection information, see paragraph, "C-LAN Connections".

Analog SuperStream Link System

The interface between the NIU and an analog SuperStream link system consists of the following signals:

- receiver audio high (RXAUDHI)
- receiver audio low (RXAUDLO)
- receiver squelch (SQU)
- ground (GND)

Digital SuperStream Link System

The interface between the NIU and a digital SuperStream link system consists of the following signals:

- receiver data (RXDATA)
- receiver clock (RXCLK)
- ground (GND)

Console Port Connections

The console port interface requires a method of control over the hardware and software. The interface requires an RS-232 cable and a dumb terminal or terminal emulator program running on a computer.

An RS-232 cable is required to connect the interface from the Console DB9 connector on the NIU front panel device to the terminal or computer. For convenience, the cable should be approximately 10 feet long. There are five connections required for the interface: TXD in (pin 3), RXD out (pin 2), DTR (pin 4), DCD (pin 1), and ground (pin 5). These connections should be connected to their corresponding connections on the terminal or computer RS-232 serial COM port. Figure 4-2 shows a schematic diagram of the connections.

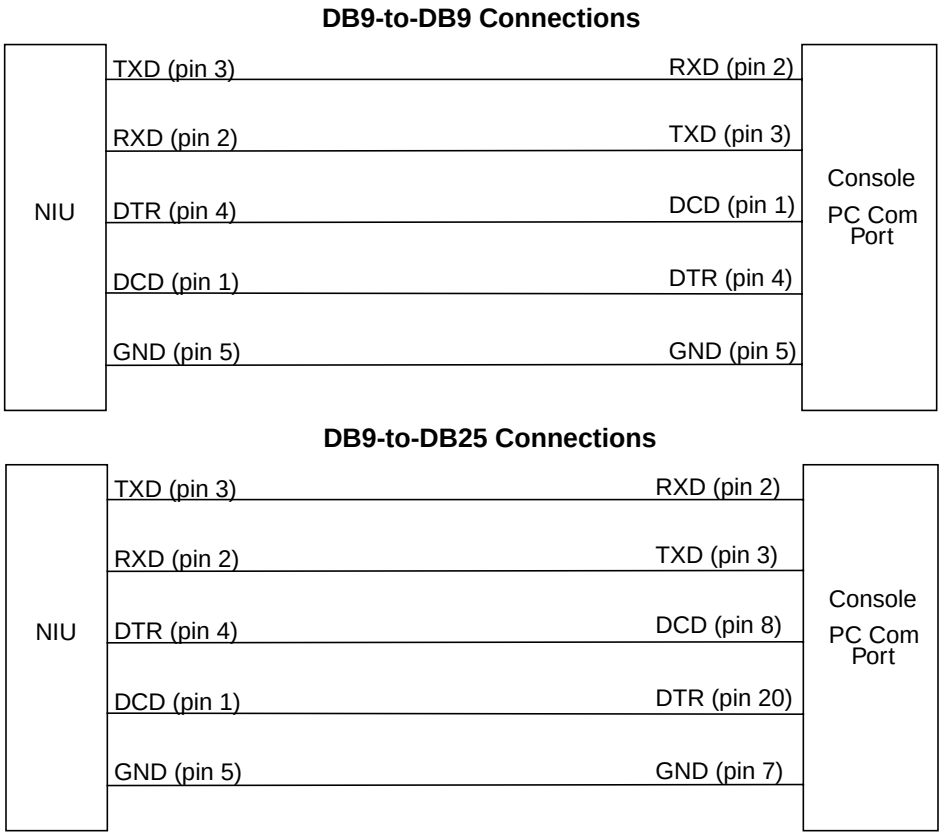

Figure 4-2: CONSOLE Port RS-232 Cable Connections

Monitor Receiver Interface

The minimum paging monitor receiver interface contains the following signals:

- the monitor receiver input (MONIN)
- two receiver frequency controls (RXFREQ1, RXFREQ2)

RL-900 Receiver Interface

The RL-900 receiver interface converts the Glenayre / Quintron RL900 link receiver demodulated analog signal to a digital signal (RS232 Levels) suitable for processing by a monitor NIU.

Motorola Receiver Interface

The receiver interface converts the Motorola Spectra-TAC receiver demodulated analog signal to a digital signal (RS232 Levels) suitable for processing by a monitor NIU.

GPS Installation

To be supplied.

C-LAN Connections

A typical C-LAN connection of three External NIUs is shown in Figure 4-3.

Figure 4-3: C-LAN Connections

In the C-LAN connections diagram, note the following:

- A C-LAN Termination Board must be connected at one end of the network.
- A Passive DIP must be installed at the other end of the network.
- Power (10 to 30 Vdc) must be connected to the C-LAN Terrmination Board.
- All connections other than power are RJ-45 cables.

If an Internal NIU to an External NIU C-LAN connection is required, the pinout of the RG-45 cable connectors must be reversed between the two connectors.

N+1 Connections

To be supplied.

External Dial Modem Connections

To be supplied.

Configuration

This chapter provides instructions on how to configure the NIU hardware and operation, including information on how to select the proper parameters for your specific needs. This chapter includes information on the following topics:

ProComm Plus Setup

Loading software requires a PC with Procomm Plus terminal emulator software, version 2.0 or greater installed and the PC connected to the NIU CONSOLE port.

To use the PC with Procomm Plus terminal emulator, set the protocol parameters as follows:

1. From the Procomm Plus Ready! prompt, press **<Alt>S** to enter the Procomm Plus Setup Utility.

2. Cursor down to the PROTOCOL OPTIONS entry and press **<ENTER>** to access the PROTOCOL OPTIONS menu.

3. With the cursor on GENERAL OPTIONS, press **<ENTER>** to access the GENERAL PROTOCOL OPTIONS menu.

4. Select menu item **C - "Abort xfer if CD lost"** and change the field to **NO**. Press **<ENTER>**, then **<ESC>** to return to the PROTOCOL OPTIONS menu.

5. Cursor down to the ASCII PROTOCOL OPTIONS entry and press **<ENTER>** to access the ASCII TRANSFER OPTIONS menu.

6. Set the screen parameters as follows:

   A—Echo locally ..... NO

   B—Expand blank lines ..... NO

   C—Expand tabs ..... NO

   D—Character pacing (millisec) 0

   E—Line pacing (1/10 sec) 0

   F—Pace character 10

   G—Strip 8th bit ..... NO

   H—Ascii download timeout ..... 0 seconds

   I—CR translation (upload) ..... NONE

   J—LF translation (upload) ..... STRIP

   K—CR translation (download) .... NONE

L—LF translation (download) ..... NONE

7. Press the **<ESC>** key three times to return to the Procomm Plus Ready! prompt.

Loading Software

There are two ways of loading software into the NIU from the console port:

- Load using ROM
- Load using the active flash

Loading while executing from ROM is the fastest method (requires about 12 minutes). However, using the ROM takes the NIU off-line. Loading from flash allows the NIU to continue operating on-line, but takes about twice as long to complete.

Loading software requires a PC with Procomm Plus terminal emulator software, version 2.0 or greater and the flash software file from Motorola.

Loading Software Using ROM

Note: This procedure loads the software into the flash memory bank that was inactive before switching to ROM.

Execute the **rom** command to switch from the flash memory to ROM memory.

1. To begin the load process, connect to the NIU console port using Procomm Plus, and type:

   load <Return>

   The unit responds:

   ```
   Flash A Ver (<current version>) will be erased!
   are you sure!!! y(es), if so.
   ```

2. Type **y** to continue or **<Return>** to abort the process.

   After typing **y**, the unit starts flashing all four front panel LEDs in amber and responds:

   ```
   Erasing FLASH A...
   ```

3. When the flash memory is erased, the unit prompts the user to start downloading the new software and starts printing periods (.):

   ```
   Ready for Download
   .
   .
   .
   ```

The unit is ready to receive the download file.

4. Type in **Procomm Plus**.

   Procomm Plus prompts with a menu selection for the protocol type.

5. Select **ASCII protocol**.

   Procomm Plus then prompts for the file name.

6. Type the download file path and file name and press <**Return**>.

   Procomm Plus starts the file transfer and continues until the file is transferred. During the transfer all four front panel LEDs continue flashing amber until the file load is complete.

   After the file is transferred, the unit performs the following actions (see Figure 5-1):

   – Performs a checksum of the flash just loaded
   – Starts operating in the flash just loaded
   – Reports any exceptions since the last reset
   – Displays the start-up banner

```
Flash Checksum OK.
Starting FLASH

No exception since last reset.

Checking for Communication with SCM......

                        M o t o r o l a   N I U
                      Copyright (c) 1997 Motorola
                         All rights reserved

NVRAM:    APR 28, 1997 7:39 PM
FLASH A: AUG 14, 1997 9:07 AM (HNU1_10)
FLASH B: AUG 01, 1997 4:44 PM (HNU1_09)
ROM:      APR 16, 1996 8:31 AM (NUC4_19)
**FLASH A Active.**
NIU:      NUCLEUS

[   1] MNUCNIU! >

[   1] MNUCNIU! > Enter Password:
```

Figure 5-1: Loading Using ROM Display

Loading Software Using the Active Flash

Note: This procedure loads the software into the off-line flash memory.

1. To begin the load process from the flash that is active, type:

   load <Return>

   If the console speed is more than 9600 bps, the unit responds:

   ```
   Console load must be 9600 bps or less, use set bps command!
   ```

2. Using the **set bps** command, set rate to **9600 bps**.

3. Re-establish communication with Procomm Plus by setting it to communicate at 9600 bps.

4. At the NIU prompt, type:

   load <Return>

   The unit responds:

   ```
   On line Flash A Ver(<current version>)
   Off line Flash B Ver(current version>) will be erased!
   are you sure!!! y(es), if so.
   ```

   Type **y** to continue or **n** to abort the process. After typing **y**, the unit responds:

   ```
   Erasing FLASH A...
   ```

   When the flash memory is erased, the unit prompts the user to start the downloading the new software and starts printing periods (.):

   ```
   Ready for Download
   .
   .
   .
   ```

   The unit is ready to receive the download file.

5. Type in **Procomm Plus**.

   Procomm Plus prompts with a menu selection for the protocol type.

6. Select **ASCII protocol**.

   Procomm Plus then prompts for the file name.

7. Type the download file path and file name and press <**Return**>.

   Procomm Plus starts the file transfer and continues until the file is transferred. After the file is transferred, the unit checks the checksum of the flash just loaded and continues operating in the active flash. The unit responds:

```
Flash checksum OK.
[   1] MNUCNIU! >

[   1] MNUCNIU! > Enter Password
```

Setting Up the System

Before configuring an NIU, the user must determine the following:

- What is the name of the site where this unit is located?
- What system number should be used?
- What device number should be used?
- What frequency / channels should this NIU key on?
- What transmitter maintenance group number should this NIU belong to?
- Does the transmit data need to be inverted?
- Does the maintenance data need to be inverted?

Responses to these questions are used to set up the NIU configuration using various **config** commands.

The **show config** command is used to display the current NIU configuration.

Configuring Name

The first config parameter that should be set is the name. The name is usually the name of the site where the base station is located. Using the **config name** command, enter the name (maximum of 20 characters).

Configuring System ID

Using the **config sysid** command, enter the system ID number (range of 1 to 255).

Configuring Device ID

Using the **config devid** command, enter the device ID number (range of 1 to 8191).

Configuring Valid Channels

Using the **config valid_chan** command, enter the numbers (1 to 8) of the channels that the NIU should key on

Configuring Transmitter Maintenance Group

The transmitter maintenance group to which this unit belongs must be set. Using the **config tx_maint** command, enter the number of the transmitter maintenance group (0 to 63).

Configuring Transmit Data Inversion

The polarity of the POCSAG and FLEX/ReFLEX transmit data output to the base station may be inverted, if necessary.Using the **config tx_polarity** command, set the POCSAG polarity to either normal (norm) or inverted (inv) and the FLEX/ReFLEX polarity to either normal (norm) or inverted (inv).

Configuring Maintenance Data Inversion

The polarity of the maintenance data output to the base station may be inverted, if necessary.Using the **config maint_polarity** command, set the maintenance polarity to either normal (norm) or inverted (inv).

SuperStream Link Source

Note: Analog inputs are currently not supported.

The NIU can receive the SuperStream link input in several different ways for maximum flexibility. Both digital and analog inputs are supported. A digital link can be received through either RS-232 or RS-485 inputs. Using an optional link modem, an analog input can be received from a voice bandwidth analog link such as a leased line.

The NIU can also be configured to route the SuperStream link input to other NIUs at the same site via the C-LAN network. This simplifies cabling and allows sharing of resources.

Configuring the SuperStream Input Link

The **set link** command configures the SuperStream input link. The link type, link speed, and link input source must be specified.

Note: Prior to starting the SuperStream input software configuration, verify that the hardware is properly configured for the desired link configuration.

The link type can be **analog, fm2**, or **fm3**.

- For SuperStream data received through the optional link modem, select the **analog** option.
- For SuperStream data received from a Skydata FM^3 or HyperCubed satellite link, select the **fm3** option.
- For all other digital input links (FM^2, VSAT, SCPC, etc.), select the **fm2** option.

The link speed parameter must be set to match the nominal bit rate of the SuperStream input link. Table 5-1 shows the supported link speeds for each link type. Note that the nominal bit rate without the FM^3 overspeed factor is used when specifying FM^3 link speeds.

Table 5-1: Link Speeds

Link Type	Bits Per Second
fm2	4800, 9600, 19200, 38400, 56000, 57600, 64000, 76800
fm3	9600, 19200, 38400, 57600, 64000, 76800
analog	4800, 9600

Note: RS-485 is recommended for digital link rates above 19200 bps.

The link input source depends on the link type. Table 5-2 shows the available options.

Table 5-2: Link Input Sources

Link Type	Input Source
fm2	clan or digital_in
fm3	clan or digital_in
analog	ext_rx, clan, loopback (for test purposes only), or phone (not recommended)

For digital links (link type **fm2** or **fm3**), the SuperStream link source can be either **clan** or **digital_in**. The **clan** option selects the RS-485 digital clock and data inputs from the C-LAN connector. Use this option when the NIU is receiving RS-485 SuperStream directly from a satellite receiver or digital SuperStream is routed from another NIU via the C-LAN. Use the **digital_in** option when the NIU is receiving digital SuperStream via the NIU's RS-232 digital clock and data link inputs.

For analog links (link type **analog**), the SuperStream link source can be either **ext_rx, clan, loopbk**, or **phone**. Only the first two options should be used. The **loopbk** option is for test purposes only, and the **phone** option is not recommended for customer use. The **ext_rx** option selects the analog audio input, and should be used when the analog input is directly connected to the NIU. The **clan** option selects the analog C-LAN input, and should be used when receiving analog input via the C-LAN connection.

Note: An NIU must have the optional link modem installed to accept an analog SuperStream input.

After configuring an analog link, the analog input level must be checked. This requires either a 1000 Hz tone or an analog SuperStream signal on the NIU's analog input. Check the input level using the **test level** or **show status** commands. If the analog input level is not -10 dBm (+/-1 dBm), use the **set level** command to adjust the level. If the target level is not reached within several attempts, check the analog input configuration and analog input.

The signal-to-noise ratio can also be checked using the **test level** command, but an analog SuperStream input must be present on the analog input. The minimum operational signal-to-noise ratio is 23 dB, however, this does not allow any margin. It is recommended that a minimum signal-to-noise ratio of 25 dB be achieved.

When the SuperStream input is properly configured and a SuperStream signal is being received, the LINK LED on the NIU front panel is green and the SYNC field displayed by the **show status** command shows **yes**. If these indicators are not correct, check your SuperStream hardware and software configuration.

Routing SuperStream to Other NIUs

An NIU which is receiving SuperStream through its digital or analog input can supply the same SuperStream to other NIUs at the site connected to the C-LAN.

A SuperStream input received through the RS-232 or RS-485 input can be routed out to the C-LAN to the RS-485 input of other NIUs at the site. An analog SuperStream input can be routed to the other NIUs as either analog data or RS-485 digital clock and data through the C-LAN. The latter allows use of a single link modem for multiple NIUs at a site.

Note: Only one NIU should be configured to output the SuperStream signal to the C-LAN. All other NIUs on the C-LAN must be configured to use the C-LAN SuperStream signal as an input.

Routing Digital SuperStream through the C-LAN

SuperStream received through the RS-485 input is automatically routed to all other NIUs on the C-LAN if the digital clock and data lines on the C-LAN on the NIUs are connected. Each of the NIUs should be configured to accept the C-LAN digital clock and data as inputs. Use the **set link** command on each NIU to select clan as the link source. This automatically configures the C-LAN digital SuperStream signals as inputs.

SuperStream received through the RS-232 input of an NIU can also be routed to other NIUs on the C-LAN as RS-485 signals. The NIU receiving the RS-232 input must be configured to use the RS-232 inputs and route them to the C-LAN. To configure the NIUs, perform the following steps.

1. On the NIU with the C-LAN digital SuperStream signal, using the **set link** command, select **digital_in** as the link source.

2. Using the **set cdig_ou**t command, select the **digin** option (routes the RS-232 clock and data inputs to the C-LAN RS-485 signals).

3. Using the **set cdig_dir** command, select the **output** option (enables the output of the signals to C-LAN).

4. On each of the other NIUs which is to receive the C-LAN digital SuperStream signal, using the **set link** command, select **clan** as the link source.

Routing Analog SuperStream through the C-LAN

SuperStream received from an NIU's analog audio input can be routed to other NIUs via the C-LAN as either an analog or digital signal. Choosing the analog option routes the analog audio input directly to the C-LAN analog line. Choosing the digital option routes the digital outputs of the NIU's link modem to the C-LAN.

To route the analog audio input of an NIU to the C-LAN as an analog signal, perform the following steps.

1. On the NIU with the analog audio signal, using the **set link** command, select the **analog** link type and **ext_rx** link source options.

2. Using the **set caud_out** command, select the **rx** option (routes the analog input to the C-LAN).

3. Using the **set caud_dir** command, select the **output** option (configures the C-LAN analog line as an output).

4. On each of the other NIUs which is to receive the C-LAN SuperStream signal, using the **set link** command, select the **analog** link type and **clan** link source options.

To route the analog audio input of an NIU to the C-LAN as a digital signal, perform the following steps.

1. On the NIU with the analog audio signal, using the **set link** command, select the **analog** link type and **ext_rx** link source options.

2. Using the **set cdig_out** command, select the **r96** option (routes the digital output of the R96 link modem to the C-LAN).

3. Using the **set cdig_dir** command, select the **output** option (configures the C-LAN digital lines as an outputs).

4. On each of the other NIUs which is to receive the C-LAN SuperStream signal, using the **set link** command, select the **digital** link type and **clan** link source options.

SuperStream Parameters

The RF-C! can send paging data to multiple NIUs over multiple SuperStreams. It uses two identifiers, the system ID and stream ID to indicate which NIUs should receive and transmit the paging data. The system ID and stream ID configured in the NIU must match the SuperStream identifiers used by the RF-C!.

Configuring the Stream ID

The stream ID identifies the SuperStream link between the RF-C! and NIU. All NIUs sharing a physical SuperStream link via C-LAN will share the same stream ID. The stream ID configured in the NIU must match the stream ID configured for the link at the RF-C!.

If the NIU is receiving SuperStream, indicated by the green LINK LED on the front panel, the stream ID received from the RF-C! can be determined using the **show status** command.

Note: For a description of the show status screen, see Appendix B.

The stream ID is configured using the **config streamid** command.

The stream ID currently configured for the NIU can be determined using the **show config** command.

Configuring the System ID

The RF-C! allows for the configuration of multiple zones within a system. Each zone has a unique zone ID. A zone ID in the RF-C! is equivalent to a system ID in the NIU. Since a single NIU can be an element of multiple zones, the **config sysid** command allows for the configuration of both a primary and alternate system IDs.

The primary system ID is required. It should correspond to the primary zone for the NIU.

The alternate system IDs are optional. They identify up to eight other zones of which the NIU is an element. The NIU does not allow a system ID to be configured as both a primary and alternate system ID.

The system IDs are configured using the **config sysid** command.

The primary and alternate system IDs currently configured for the NIU can be determined using the **show config** command.

Synchronization

All NIUs in a paging system must be precisely synchronized to coordinate simulcast transmission by all paging transmitters. The NIU supports two synchronization methods:

- GPS Synchronization
- Direct Synchronization

GPS Synchronization uses GPS equipment at each paging transmitter site to provide an accurate, system-wide synchronization source. Direct Synchronization uses timing information from the SuperStream link as its synchronization source. Direct Synchronization eliminates the need for GPS receivers at the transmitter sites, but requires a stable input link signal with a constant link delay. All NIUs within a paging system must use the same synchronization method.

The NIU uses a high-stability voltage-controlled crystal oscillator (VCO) to generate a local reference clock. A digital phase-locked loop (PLL) locks the local reference clock with the synchronization source using a digital-to-analog converter (DAC) which provides a control voltage to adjust the VCO frequency. The NIU uses the local reference clock to transmit paging data precisely at the scheduled launch time. The local reference clock can be adjusted to compensate for differences between NIUs caused by factors such as link delays and transmitter delays.

When using GPS Synchronization the NIU receives a 1-pulse-per-second signal and GPS time-of-day data from a GPS receiver. This provides an accurate time source that is common to all NIUs in the paging system. By locking its local reference clock to the GPS time source, the NIU can precisely launch paging data in synchronization with other NIUs in the system.

In Direct Synchronization mode, the NIU extracts timing information directly from the SuperStream link. This timing information is common to all NIUs in the system except for the offset caused by transport delays in the distribution links. By locking its local reference clock to the SuperStream link and compensating for the link delay, the NIU can precisely launch paging data in synchronization with other NIUs in the system.

Configuring Synchronization Type

The **set align_type** command selects the alignment type. Either GPS synchronization (**gps**) or Direct Synchronization (**dir_sync**) may be selected. If GPS synchronization is selected, the NIU will ask if fallback should be enabled. If fallback is disabled, the NIU will stop transmitting paging data whenever GPS tracking is lost. Enabling fallback allows the NIU to continue transmitting even if GPS tracking is lost for up to a configured time period.

Configuring GPS Synchronization

The **set fallback_timer** command specifies the amount of time that GPS can be lost without disabling transmission. The fallback time can be set to 1 to 65535 minutes, or it can be set to 0, which makes the time unlimited.

Note: Carefully consider the fallback time value you choose. Since a synchronization timing source is not available while GPS is lost, the local reference clock phase and frequency will drift over time. This can cause simulcast and transmitter frequency problems if the fallback time is too large.

For GPS Synchronization, the **set gps_delay** command must be used on each NIU during initial system configuration to coordinate simulcast transmission by all paging transmitters in the system. The delay parameter compensates for variations in delays through the GPS equipment and paging transmitter. The parameter specifies the amount of time by which the NIU must adjust the scheduled page launch time to insure that the paging data leaves the transmitter antenna at the scheduled time.

Note: See chapter 6 paragraph "Simulcast Alignment" for a description of the procedure used to determine the correct GPS delay value to use.

Configuring Direct Synchronization

For Direct Synchronization, the **set link_delay** command must be used on each NIU during initial system configuration to coordinate simulcast transmission by all paging transmitters in the system. The delay parameter compensates for variations in delays through the input link and paging transmitter. The parameter specifies the amount of time by which the NIU must adjust the scheduled page launch time to insure that the paging data leaves the transmitter antenna at the scheduled time.

Note: See chapter 6 paragraph "Simulcast Alignment" for a description of the procedure used to determine the correct link delay value to use.

Other Adjustments

The **set da** command can be used for test purposes to manually change the DAC value used to control the VCO frequency. This command writes the new value to the DAC and restarts the PLL.

The **set pll** command enables or disables the PLL. If the PLL is disabled, normal paging transmission will be inhibited. If the PLL is enabled, the PLL will be restarted.

The **set maxwait** command can be used to adjust the maximum wait time between DAC adjustments. As the PLL stabilizes, it increases the time between adjustments (wait time) until it reaches the maximum wait time value. If a large DAC adjustment is needed, the NIU decreases the wait time to make the PLL more responsive. A high wait time is desirable because it allows the PLL to remain stable in spite of momentary instabilities in the synchronization source. The WT field in the **show status** command displays the current wait time value. The maximum wait time parameter is unique to each link type. Only the value for the current link type can be adjusted.

The **set osc** command is used to calibrate the VCO.

Configuring the Transmitter Interface

To be supplied.

Configuring the Station ID

Morse code station IDs are configured using the **config statid** command. Station IDs can be configured for each of the eight channels supported by the NIU. A single station ID can consist of up to 12 alphanumeric characters.

The NIU supports two station ID modes:

- substitute
- automatic

In substitute mode, the NIU will only transmit station IDs when scheduled by the RF-C!. The RF-C! should be configured to schedule station ID transmissions to meet the appropriate regulatory requirements. The NIU transmits the station ID on the channel requested by the RF-C!, provided the channel is configured as a valid channel in the NIU. Valid channels are configured using the **config valid_chan** command.

In automatic mode, the NIU will automatically transmit station IDs at a user-defined interval. This mode can be used to keep a frequency channel occupied if the NIU will not be transmitting paging data for an extended period of time. The NIU transmits the configured station ID on each valid channel. Valid channels are configured using the **config valid_chan** command.

For automatic mode, an interval can be configured to specify the amount of dead-air time between station ID bursts. The NIU transmits the station ID configured on each valid channels, waits for the specified interval, and repeat the transmission. This cycle continues until the station ID mode is changed to substitute mode.

Note: Automatic mode does not disable paging while transmitting station IDs. It should not be used while an NIU is transmitting paging data as it could result in lost pages. It should also not be used in a simulcast area because the station IDs are not scheduled by the RF-C! so they could disrupt paging.

Configuring C-LAN

C-LAN is configured using two commands.

- config arcnetid
- config clan_netid

The **config arcnetid** command allows for the high order address to be defined. There are 255 arcnetid addresses available. The arcnet ID is typically set to the same number as the device ID. For information on using the **config arcnetid** command, see Appendix B.

The **config clan_netid** command allows for the C-LAN communications ID to be defined. Those devices communicating on the same LAN configuration should have the same C-LAN ID. For information on using the **config clan_netid** command, see Appendix B.

Configuring Alarms

To be supplied.

Operation

This chapter provides important features of the NIU useful during normal operation, such as status information, alarms, using the event log, and a discussion of N+1 redundant operation. This chapter includes information on the following topics:

Maintenance Tool

The Maintenance Tool provides a user interface to the NIUs for performing on-site or dial-up maintenance and installation. This is supported through an ASCII terminal (e.g., a PC running a serial communication program) connected to the NIU Console port or connected through the dial modem. Remote access to other NIUs on the network is also supported through the C-LAN. Through this tool, a user can set up and display NIU parameters, monitor alarms and status, download new software, and perform other maintenance functions.

The user can execute the software located in one of the following memory areas:

- Flash (normal operation)—Flash A or Flash B
- ROM

Software Commands in Flash

During normal operation when the user is executing the software programmed in a flash memory bank, the software commands listed in Table 6-1 are available. For a complete description of each command, refer to Appendix B.

Table 6-1: Software Commands in Flash (Sheet 1 of 6)

Command	Description
ack_page	Acknowledge page alert
alarms	Set up alarms
clear_np1	Clear N+1 redundancy fault and switch the master back to standby
config arcnetid	Set Arcnet ID number
config clan_netid	Set clan_netid number
config color_code	Set ReFLEX color_code index
config devid	Set NIU device identification (ID) number
config maint_polarity	Configure OTA maintenance transmit polarity
config name	Set device name
config ota_maint	Configure NIU to monitor ota maintenance cycles
config ota_threshold	Set delay adjustment threshold for OTA maintenance cycles

Table 6-1: Software Commands in Flash (Sheet 2 of 6)

Command	Description
config password	Change NIU password
config redundancy	Configure N+1 Master NIU
config statid	Configure station ID parameters
config streamid	Set link stream ID
config sysid	Set system ID
config tx_maint	Configure NIU maintenance group
config tx_polarity	Configure POCSAG and FLEX/ReFLEX data polarity
config valid_chan	Configure valid transmission channels
date	Program the time and date
flasha	Start executing software programmed in flash memory bank A
flashb	Start executing software programmed in flash memory bank B
gps	Display and change GPS parameters
help	Display help information on each NIU command
level	Adjust analog link audio input level
load	Download software into the NIU
logout	Exit user interface
modem	Switch console port to modem operation
page	Enable sending of page alert pages
report	Set up OTA alarm and system maintenance reporting functions
reset alarm	Reset all latched noncurrent alarms
reset all	Reset alarms, log, and statistics
reset call_atmpts	Reset report call attempt counter
reset iobd	Reset I/O board parameters
reset key	Reset key time statistics
reset log	Clear event log

Table 6-1: Software Commands in Flash (Sheet 3 of 6)

Command	Description
reset measure	Clear OTA measurement data in a monitor NIU
reset modem	Reset dial modem
reset nvram	Reset configuration parameters to default values and states
reset ph_stats	Reset report calling statistics
reset stats	Reset statistics
reset unit	Reset unit
rlog	Remote login to another NIU through C-LAN
rom	Start executing software programmed in ROM
rtab	Display CLAN routing table and Arcnet address table information
scm alarms	Display current and latched SCM alarms
scm clr_alarms	Clear SCM alarms
scm load	Load SCM software
scm rst_alarms	Reset SCM alarms
scm switch	Switch SCM banks
scm version	Display software version of SCM banks
set align_type	Configure NIU for synchronization method used by paging system
set ant	Set antenna relay to either receive (Rx) or transmit (Tx)
set auxports	Set auxports to either inactive or active
set bps	Set console port baud rate
set caud_dir	Set C-LAN audio line direction
set caud_out	Set C-LAN audio line source
set cdig_dir	Set C-LAN digital link signal direction
set cdig_out	Set the C-LAN digital link signal source
set con	Set dial modem parameters
set cpuok	Set status of cpuok parameter

Table 6-1: Software Commands in Flash (Sheet 4 of 6)

Command	Description
set da	Set value of D/A converter controlling the 10 MHz oscillator
set daa	Control DAA board in dial modem
set dis	Control disabling of transmitter
set failsafe_timeout	Set SuperStream link failsafe time out
set fallback_timer	Set GPS fallback time
set gps_delay	Set GPS delay
set hi_ber	Set upper bit error rate threshold
set key	Manually key the transmitter
set level	Adjust analog link stream audio level
set link	Configure link type, speed, and source
set link_delay	Set link delay offset
set lo_ber	Set lower bit error rate threshold
set maxwait	Set maximum wait time between PLL adjustment
set osc	Align 10 MHz reference oscillator
set pll	Enable or disable PLL
set redundancy	Enable or disable N+1 redundancy
set resync	Force NIU to resynchronize to link data stream
set rx_delay	Set monitor receiver delay for OTA
set txfreq	Select one of eight available transmit channels
set txtype	Identify the transmitter type used with the NIU
show alarms	Display current and latched NIU alarms
show analog	Display state of analog inputs
show clan	Display C-LAN Arcnet statistics
show config	Display configuration parameters
show dipsw	Display DIP switch S15 settings

Table 6-1: Software Commands in Flash (Sheet 5 of 6)

Command	Description
show except	For debugging purposes only
show gps	Display global positioning system data and information
show key	Display key time statistics
show log	Display logged alarms and events
show measure	Display OTA maintenance measurement data
show mem	Display NIU memory usage and task information
show ota	Display OTA information from a reporting NIU
show phone	Allow access to alarm status from a reporting NIU
show report	Display options for the alarm reporting function
show rom_sum	Display ROM memory checksum
show statid	Display station ID information
show stats	Display NIU statistics report
show status	Displays setup and parameter values
show sum_a	Display flash memory bank A checksum
show sum_b	Display flash memory bank B checksum
show ver	Display software version of NVRAM, flash banks, and ROM
test all	For factory testing only
test ber	Test the bit error rate in the link data stream
test clan	Test C-LAN
test da	Test reference oscillator digital to analog converter
test end	End a test that is currently running
test forever	Extend length of any currently active test
testi io	Test NIU input/output lines
test launch	Test launch time
test led	Test front-panel LEDs

Table 6-1: Software Commands in Flash (Sheet 6 of 6)

Command	Description
test level	Test analog link signal level
test ota	Test OTA maintenance operation
test page	Test paging operations
test phase	Test PLL phase measurement circuit
test statid	Test transmission of station IDs
test switch_panel	Test transmitter
test txd	Test transmitter
time	Display NIU run-time since power-up or the last reset
trace	Enable display of debug information

Software Commands in ROM

When the user is executing the software programmed in ROM, the software commands listed in Table 6-1 are available. For a complete description of each command, refer to Appendix B.

Table 6-2: Software Commands in ROM (Sheet 1 of 2)

Command	Description
config arcnetid	Set Arcnet ID number
config clan_netid	Set clan_netid number
config devid	Set NIU device identification (ID) number
config sysid	Set system ID
flasha	Start executing software programmed in flash memory bank A
flashb	Start executing software programmed in flash memory bank B
help	Display help information on each NIU command
load	Download software into the NIU

Table 6-2: Software Commands in ROM (Sheet 2 of 2)

Command	Description
logout	Exit user interface
reset nvram	Reset configuration parameters to default values and states
reset unit	Reset unit
set bps	Set console port baud rate
set dis	Control disabling of transmitter
set key	Manually key the transmitter
set level	Adjust analog link stream audio level
set link	Configure link type, speed, and source
show alarms	Display current and latched NIU alarms
show dipsw	Display DIP switch S15 settings
show log	Display logged alarms and events
show sum_a	Display flash memory bank A checksum
show sum_b	Display flash memory bank B checksum
show ver	Display software version of NVRAM, flash banks, and ROM
trace	Enable display of debug information

Status

The current NIU status can be determined by using the following commands:

- show status—displays current NIU status
- show key—displays current NIU transmitter keying statistics
- show stats—displays current NIU link statistics

Using Show Status

The **show status** command displays the current status of the SuperStream link, PLL alignment, I/O signals, transmitter, and redundancy (see Figure 6-1).

```
DEVICE 2    : 20 char string          TIME/DATE  10:16:28  09-09-1997
TIME TO FAIL-SAFE TIMEOUT:   23:56:32
-------------------------------    Link     -------------------------------
TYPE:      fm2       SOURCE:    clan      R96-SRC:  ext_rx   SPEED:    76800
STREAM:    -1        SYNC:      no        BER:      0 E-06
CDIG-OUT: r96        CDIG-DIR: input     CAUD-OUT: rx        CAUD-DIR: input
ANA-S/N:  14  dB     ANA-LVL:  -14 dB
-------------------------------  Alignment  -------------------------------
PLL:       lock      D/A:       8675      WT:       25000    OSC_TYPE: uhso
ALIGN:     gps w/fb  DELAY:     0
FALLBACK FREERUN TIME:         00:00:06 REMAINING FREERUN TIME:      forever
------------------------------- I/O Signals -------------------------------
KEY:       no        TXFREQ:    1         ANT:      rx
AUX1:      active    AUX2:      inactive
DIPSW:     0xfe      CPUOK:     yes       LINKOK:   no
------------------------------- Transmitter -------------------------------
DISABLED: yes        IO-BD:     generic   TYPE:     unknown
------------------------------- Redundancy  -------------------------------
ACT LNK:  b_side     MODE:      auto
N+1: master, standby
```

Figure 6-1: Show Status Display

For definitions of the show status display fields, refer to **show status** command in Appendix B.

Using Show Key

The **show key** command displays the current transmitter keying statistics (see Figure 6-2).

```
Key stats accum time     : 1 days & 19:03:15
TX KEY state             : KEYED
Current key time         : 0 days & 20:00:45
Last key time            : 0 days & 00:01:04
Total key time           : 1 days & 07:44:25
Time since last key      : 0 days & 00:00:00
Last key stats reset     : 11:08:04  09-09-1997

Reset the key time stats? (y/n):
```

Figure 6-2: Show Key Display

For definitions of the show key display fields, refer to **show key** command in Appendix B.

The key statistics can be reset by selecting **y** at the **Reset the key time stats?** prompt or by using the **reset key** command.

Using Show Stats

The **show stats** command displays the SuperStream link statistics. The information that is most useful in detecting and resolving SuperStream link problems is displayed on the first screen (see Figure 6-3).

.

```
Stats accum time  : 1 days & 19:13:29
Link drop outs    : 3
Link lost time    : 0 days & 00:01:44
Peak BER          : 0 E-06    00:00:00  01-01-1988
Worst S/N         : 36 dB     21:19:25  09-09-1997
Last maint cycle  : 00:00:00  01-01-1988

      0 frames received                  0 with invalid sync,
      0 frames parsed,                   0 with ver/stream mismatch,
      0 with parsing error(s)            0 with valid header info,
      0 with invalid hdr checksum        0 with invalid hdr FEC
      0 with invalid sync hdr,           0 with sync hdr unacquired
```

Figure 6-3: Show Stats Display, Screen One

The fields of screen one of the show stats display are defined in Table 6-3.

Table 6-3: Show Stats Display Screen One Field Definitions

Field	Definition
Stats accum time	Elapsed time since the statistics were reset.
Link drop outs	Number of times the NIU has detected a loss of the SuperStream link signal.
Link lost time	Total amount of time the NIU has detected a loss of the SuperStream link signal.
Peak BER	Highest bit error rate detected by the NIU since the statistics were reset. The time stamp of the last peak BER is also displayed.
Worst S/N	Lowest measured signal to noise ratio and the time it was measured. The higher the signal to noise ratio, the clearer the signal.
Last maint cycle	Time at which the NIU last transmitted a maintenance burst.

The second screen displayed by the **show stats** command provides detailed SuperStream statistics. This information is used to monitor for errors in the SuperStream link (see Figure 6-4).

```
0 fragments parsed,                0 with accepted ids
0 frags for reassembler,           0 with reassembler abort
0 frags completed PDM,             0 frags completed ICM
0 frags incomplete msg,            0 frags failed assembly
0 frags had bad CRC,               0 frags bad sys/szm id
0 frags had bad msg FEC            0 frags had bad hdr FEC
0 frags had parse error            0 frags in idle frames
0 blocks deinterleaved,            0 codewords CRC checked
0 codewords FEC decoded,           0 cdwrds had 0 bit errors
0 cdwrds had 1 bit error           0 cdwrds had 2 bit errors
0 cdwrds had 3 bit errors          0 cdwrds had 4 bit errors
0 current BER,                     0 cdwrds in current BER
0 peak BER,                        0 cdwrds in peak BER
0 resyncs req by decoder           0 peak consecutive errors
```

Figure 6-4: Show Stats Display, Screen Two

The third screen displayed by the **show stats** command provides statistics about the paging data being processed by the NIU. The RF-C! bundles paging data into paging data messages (PDMs) and sends them to the NIU. This screen groups the PDMs by protocol, baud rate, and modulation level (see Figure 6-5).

.

```
562 PDMs for site encoding          562 PDMs are valid
  0 PDMs are invalid                  0 PDMs are special data
  0 PDMs are FLEX 1600 FM 2           0 PDMs are FLEX 3200 FM 2
  0 PDMs are FLEX 3200 FM 4         562 PDMs are FLEX 6400 FM 4
  0 PDMs are ReFLEX 1600 FM 2         0 PDMs are ReFLEX 3200 FM 2
  0 PDMs are ReFLEX 3200 FM 4         0 PDMs are ReFLEX 6400 FM 4
  0 PDMs are POCSAG 512               0 PDMs are POCSAG 1200
  0 PDMs are POCSAG 2400              0 total POCSAG cap codes
```

Figure 6-5: Show Stats Display, Screen Three

The number of PDMs that are invalid should be zero. If this statistic is non-zero, it could indicate a link problem such as a high bit error rate.

Special data PDMs include all non-paging data such as maintenance cycles and morse code station IDs.

To reset the statistics, use the **reset stats** command or respond **y** to the **Reset the stats?** prompt at the end of the display.

Alarms/Events

To be supplied.

Page Alert

The Page Alert feature provides the paging system with the capability to initiate a page to alert a system manager or other appropriate personnel when a problem occurs. This feature is enhances the mobility and rapid response ability of service personnel.

The NIU generates a Page Alert whenever a predefined alarm condition occurs. The NIU dials out using a modem to a designated paging terminal using Telocator Alphanumeric Protocol (TAP). With a Pager Identification Number (PIN) number defined in the protocol sent, the paging terminal accepts the page, processes the page, and the system manager or service technician is alerted as to an alarm condition.

The Acknowledge Page, or ack page, feature allows for the page to be sent at a predefined interval until the alarm condition is acknowledged. The acknowledgment is done via dial-up or direct connection with the alarming device.

Remote Dial-In

To be supplied.

GPS Operation

To be supplied.

N+1 Operation

The N+1 Redundancy feature provides the system user with backup capability with a minimum equipment costs. One “Master” NIU is configured to accept a maximum of four “Slave” NlUs. In the event of “Slave” NlU failure or predefined alarm situation the “Master” will assume the “Slaves” identity.

In each network configuration of NlUs, one NIU is defined as the “Master”. It monitors the operation of the “Slave” devices by polling the units. The Master monitors the SuperStream data stream, but processes no paging. The “Master” is the dedicated standby unit. All communications from the “Master” to the “Slave” devices is accomplished over C-LAN.

C-LAN communications are comprised of the following:

- CLOCK—Communicates the system timing functions
- AUDIO—Communicates analog signals
- C-LAN—Communicates analog signals
- ARCNET—Communicates high speed data

The “Master” is the only device capable of generating a LAN request. It polls the “Slave” devices in LAN id order looking for a “change” in their operational state. The C-LAN connections between devices are made by using the appropriate wiring configuration and terminations for your respective system. The “Master” is a dedicated standby unit continually monitoring the SuperStream data stream and polling over C-LAN to determine the status of all slave NlUs on the LAN. When a failure or alarm occurs that requires a switchover, the “Master” disables the “Slave” (select line), and assumes the “failed Slaves” identity.

Each “Slave” device functions in a similar manner to a non-N+1 Redundancy unit as it decodes the network data stream received from the link system, looking for data addressed to its associated transmitters. When relevant paging data is found, the associated transmitter broadcasts the data. The “Slave” device continues to function in this manner until an alarm condition requiring a switchover occurs.

If more than one “Slave” fails, the “Master” will assume the identity of the “Slave” with the highest priority. The other “Slave” will be left “off-the-air”. Priorities are configured in the Master Unit when configuring it for redundancy.

Dual Flash

To be supplied.

Modem Sharing

Modem Sharing allows NIUs in the same network to share the modem contained in one NIU for reporting alarm and event information, initiating maintenance cycles, and performing Page Alert dial-outs. This feature reduces the expense of obtaining dial modems and phone lines for all devices. One phone line may be connected to the modem in the primary NIU, and all other NIUs may share the modem.

When powering up, the master modem checks for the presence of dial tone. If dial tone is found, the NIU writes to memory that a modem is present. If no dial tone is found, the NIU writes to memory that no modem is present.

A modem that is physically present but with no connection to the Public Switched Telephone Network (PSTN) causes a no modem message to be written to memory. If a PSTN connection is made after power is applied to the NIU, then the NIU must be reset to remove the no modem indication stored in memory.

Modem sharing requires the use of the C-LAN to communicate between NIUs, as well as the use of several software commands.

In the event that the modem is not available when a device attempts to report, or dial out, the NIU will either attempt to resend the information, or a message will appear on the console indicating that the modem is already in use, depending on the NIU function and the parameters defined by the system user.

Shortly after power-up, all devices within the Modem Sharing configuration broadcast a request over C-LAN for the modem status of all other units in the configuration.

Over-The Air Maintenance

The paging system uses maintenance cycles to monitor transmitter site alarms and to maintain system timing synchronization to assure continued proper simulcast operation. Maintenance cycles are initiated by the RF-C during system idle times. A complete cycle consists of two successive iterations through up to 64 maintenance cycle time slots (maintenance groups). Paging data can be interspersed between successive maintenance cycle time slots. During each maintenance time slot, the control point requests a group of NIUs to send a maintenance data burst.

A maintenance cycle always consists of two iterations through the maintenance groups. It must always begin with the lowest maintenance group number in the system, followed by the remaining group numbers in increasing order until maintenance for all groups has been requested. This process is then repeated.

When a maintenance request is received, each NIU in the maintenance group keys and sends a maintenance data burst over the air containing current alarm, identification, and timing information. This information is received by monitor NIUs via their monitor receivers.

Each monitor NIU verifies the validity of the over-the-air (OTA) maintenance bursts and checks the modulation alignment of the associated transmitter. The monitor NIU verifies alignment by analyzing timing information from the data burst and comparing it with its internal database of propagation delay times.

If two successive timing measurements exceed the programmed limits, the monitor NIU sets an alarm. The monitor NIU also checks the OTA alarm data and determines whether a change in the alarm status has occurred. If modulation misalignment is detected or the OTA alarm status has changed, and the monitor NIU is configured to report this information, the monitor NIU issues a report to a logging site and / or issues a page alert via a phone line.

The monitor NIU also saves the timing information and other data from the maintenance burst for later examination by the user.

OTA Operation

When a monitor NIU receives a maintenance burst, it extracts timing information from the burst to determine when the transmitting NIU sent the burst. It compares this transmission time with the time it received the burst to determine the propagation delay between the transmitting site and the monitor NIU site. By subtracting the programmed propagation delay from the measured propagation delay and compensating for the delay through the monitor receiver, the monitor NIU determines how closely synchronized the transmitting NIU is to the

correct time (the monitor NIU uses its internal time as the reference). The difference between the programmed delay and the measured delay is the simulcast misalignment of the transmitting NIU. The transmitting NIU should then be adjusted to eliminate the simulcast error.

Every transmitter in the system which is to be monitored must be assigned to a maintenance group in accordance with the following rules:

- Every transmitter to be monitored by a common monitor NIU must be in a unique maintenance group.
- Transmitters within the same maintenance group must not be able to destructively interfere with each other at any assigned monitor NIU site.
- If a transmitting NIU is also a monitor NIU, it must be in the lowest numbered maintenance group monitored by that monitor NIU so that it is the first NIU to transmit a maintenance burst.
- If there are multiple monitor NIUs with overlapping simulcast areas, every monitor NIU must have at least one transmitting NIU in common with another monitor NIU in the area.

Figure 6-6 shows an example of a system configured for over-the-air maintenance. In this example, there are three monitor NIUs, each monitoring multiple transmitting NIUs. Each monitor NIU has at least one transmitting NIU in common with another monitor NIU. All transmitting NIUs heard by a common monitor NIU are in unique maintenance groups. Each monitor NIU would be configured to listen to the maintenance cycle transmissions from its transmitters. For example, monitor B would be configured to listen to groups 0, 2, 3, 8, 9, 10 and 11. All monitor NIUs are assumed to be co-located with a paging transmitter and are assigned to the lowest group number, group 0.

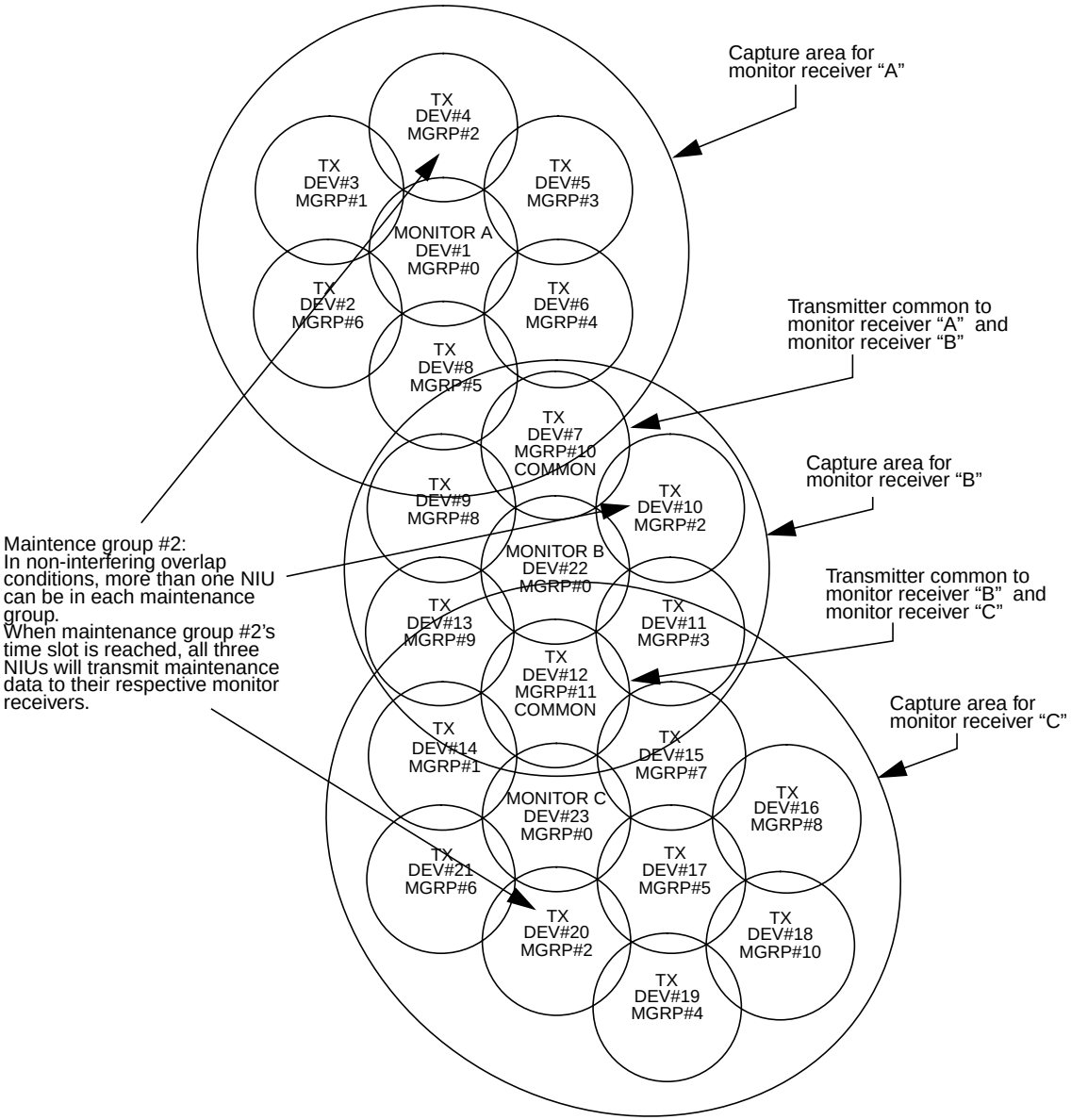

Figure 6-6: Sample OTA Maintenance System

When a maintenance request for a maintenance group is sent, all transmitting NIUs assigned to that maintenance group transmit a maintenance data burst. All other transmitting NIUs which receive the maintenance request dekey to prevent interference. In order to avoid destructive interference between NIUs sending a maintenance burst, only one transmitter in a maintenance group should be heard by any monitor NIU assigned to monitor that maintenance group.

A monitor NIU may also be used as a transmitter NIU by using a transmit/receive coax relay to switch between the paging transmitter and the monitor receiver. This switching is performed automatically by the NIU.

A monitor NIU which is also a transmitting NIU can take self-measurements, that is, it can receive its own maintenance bursts. For systems using GPS Synchronization, the monitor NIU treats these self-measurements as if they were for an external transmitting NIU and calculates the appropriate GPS delay adjustment to align its transmitter output with GPS time. For systems using Direct Synchronization, the monitor NIU uses its self-measurements internally to align measurements of other monitored NIUs with its own transmitter output. For such systems, a valid self-measurement is required before any other measurements can be used.

If a system has multiple monitor NIUs, simulcast performance throughout the system can only be monitored correctly if all of the monitor NIUs are aligned with each other. This requires that each monitor NIU have a transmitting NIU in common with at least one other monitor NIU. One monitor NIU in the system should be selected as the master. The remaining monitor NIUs become slaves.

The slaves must then be aligned with the master monitor NIU during initial system set-up using the following procedure.

1. Execute a maintenance cycle which includes the maintenance group assigned to a transmitting NIU which is common to both the master monitor NIU and the slave monitor NIU being aligned.

2. Compute the difference between the "required adjust" value shown by the **show measure** command on the master and slave monitor NIU for the common transmitter. Add this value to the slave monitor NIU's link delay (use the **set link_delay** command) for Direct Synchronization systems or receiver delay (use the **set rx_delay** command) for GPS Synchronization systems. For example, if the required adjust value is 33 µs on the master monitor NIU and 30 µs on the slave monitor NIU and the NIUs are configured for Direct Synchronization, subtract the difference (33 - 30, or 3) from the current link delay on the slave monitor NIU.

Note: Do not use a measured maintenance adjustment value unless the value has no associated errors.

3. Repeat the maintenance cycle and the adjustment process until the difference between the "required adjust" value on the master and slave monitor NIUs for the common transmitter is 0 (+/-2 µs).

4. Repeat the above three steps for each slave monitor NIU which has a common transmitter with the master monitor NIU.

5. If there are any slave monitor NIUs which do not have a common transmitter with the master monitor NIU, repeat the first three steps above for each of these slave monitor NIUs. In place of the master monitor NIU, use a slave with a common transmitter that has already been aligned to the master monitor NIU. Work outwards from the master monitor NIU until all monitor NIUs have been aligned.

Transmitting NIU Configuration

Each NIU must be assigned to a maintenance group. When the NIU receives a maintenance request for its maintenance group it will transmit a maintenance data burst. The **config tx_maint** command is used to assign the NIU's maintenance group.

Note: If a transmitting NIU is also a monitor NIU it should be assigned to the lowest numbered maintenance group which it is configured to monitor, normally group 0.

The data polarity for maintenance data bursts may need to be configured for transmitting NIUs due to differences in transmitters. This is done using the **config maint_polarity** command.

Monitor NIU Configuration

Each monitor NIU must be configured to define the maintenance groups and transmitting NIUs it should monitor. The monitor NIU only processes a maintenance data burst if the burst matches a maintenance group and NIU device ID it is configured to monitor. The **config ota_maint** command defines the list of maintenance groups and NIUs to be monitored. It also specifies the propagation delay from each configured transmitter site to the monitor site, and defines whether alarm changes from the OTA maintenance data should be logged.

Note: If a monitor NIU is also a transmitting NIU it should be configured to monitor itself, and its own maintenance group should be the lowest numbered maintenance group which it is configured to monitor.

The **config ota_threshold** command sets the threshold for checking modulation alignment in received maintenance data bursts. If both timing measurements for a transmitting NIU in a maintenance cycle exceed the threshold, the OTA maintenance error alarm is set on the monitor NIU.

The delay through monitor receivers may vary between different receivers. The monitor NIU can compensate for these variations by subtracting a programmed receiver delay from the OTA timing measurements. The **config rx_delay** command sets the receiver delay parameter.

Note: The receiver delay value must be accurate to align non-Nucleus transmitters to absolute GPS time.

OTA System Monitoring

Maintenance cycles can also be used to check the status of transmitting sites. The monitor NIUs collect status and version information from maintenance data bursts. This information can be examined by dialing in to the monitor NIUs via phone line. Some information can also be automatically reported via phone line to a logging device.

The **show ota** command displays logged alarm changes, alarm state, or version information from received maintenance bursts. If logging was requested when a monitored maintenance group was configured with the **config ota_maint** command, the monitor NIU saves any changes in alarms reported in maintenance bursts from that maintenance group. The **log** option in the **show ota** command displays these saved events. The **alarms** option displays the alarm information reported in the last maintenance burst from a monitored transmitting NIU. The **versions** option displays the version information last reported for all monitored transmitting NIUs.

A monitor NIU can be configured to automatically report received OTA alarm information via a phone line if specified alarms are set in a received OTA maintenance burst. This is done using the **report** command by enabling the **ota_rpt** option and specifying which alarms should cause a report using the **alarm#'s** option.

The **page** command can also be used to request that a page be sent via phone line whenever an alarm (such as an OTA maintenance error alarm) occurs.

Simulcast Alignment

Simulcast alignment is required during initial system configuration, and should be verified periodically using maintenance cycles. After a maintenance cycle, the monitor NIUs should be checked to verify that all monitored transmitting sites are correctly simulcasting.

The **show measure** command displays the results of OTA timing measurements. The last four OTA timing measurements for any monitored transmitter can be displayed.

Use the **show measure** command on the monitor NIU after a maintenance cycle to determine what adjustments are required on the transmitting NIUs. The "REQUIRED ADJUST" column shows the adjustment required on each monitored transmitting NIU to achieve proper simulcast operation. If the adjustment value has a tilde (~) next to it, the measurement had errors and the adjustment value ***should not*** be used. If no errors are indicated and the "MEASURE TIME & DATE" indicates that the measurement was taken in the last maintenance cycle, the required adjust value can be used. On the corresponding transmitting NIU, add the required adjust value to the link delay (using the **set link_delay** command) for Direct Synchronization systems or GPS delay (using the **set gps_delay** command) for GPS Synchronization systems.

Note: Do not use a required adjust value unless the value has no associated errors.

Note: The required adjust value is an offset relative to the current delay setting, not an absolute delay value. It should be added to the current delay on the NIU being adjusted.

Remote Dial-In

To be supplied.

Maintenance

This chapter provide information on maintaining the NIU. This chapter includes the following:

- Reference oscillator alignment procedure
- Built-in tests information
- Troubleshooting information

This chapter contains the following sections:

5 MHz Reference Oscillator Alignment Procedure

To be supplied.

Built-in Tests

To be supplied.

Troubleshooting Chart

To be supplied.

Abbreviations and Acronyms

Table A-1 provides definitions for the abbreviations and acronyms used in this manual.

Table A-1: Abbreviations and Acronyms List (Sheet 1 of 16)

Abbreviation/Acronym	Definition
A	ampere(s)
A/D	analog-to-digital
ACB	advanced control board
ACK	acknowledgment
ADPCM	adaptive differential pulse code modulation
ALT	accelerated life testing
AC	alternating current (when used alone)
ac	alternating current (when used with a value)
AC-DC	alternating current and direct current
AC to DC	alternating current to direct current
AF	audio frequency
AFC	automatic frequency control
AGC	automatic gain control
Ah	ampere-hours
ALC	automatic level control
AM	amplitude modulation
a.m.	time designation before noon
AMMR	Advanced Messaging Manual Revision
APM	augmented phase modulation
ASC	advanced simulcast controller

Table A-1: Abbreviations and Acronyms List (Sheet 2 of 16)

Abbreviation/Acronym	Definition
ASCII	American Standard Code for Information Interchange
ASIC	application specific integrated circuit
ATC	advanced transmitter controller
AVC	automatic volume control
AWG	American Wire Gauge
BCD	binary-coded decimal
Bell 103	modem line specification 300 bps
Bell 202	modem line specification 1200 bps
BER	bit error rate
BHCR	busy hour call rate
BIOS	basic input/output system
BIW	bit information word
BMS	Billing Management System
bps	bits per second
Btu	British thermal unit
˚C	Celcius
Capcode	personal message unit radio signaling address
C-LAN	ARCNET local area network
CCIR	Consultative Committee on International Radio
CCITT	Comite Consultatif Internationale de Telegraphique et Telephonique
CCS7	Common Channel Signaling System 7
CCW	counterclockwise
CD-ROM	Compact disk read-only memory
CDR	call detail recording
CEPT	Conference des administrations Europeen des Postes et Telecommuniucations (European conference of postal and telecommunications administrations)

Table A-1: Abbreviations and Acronyms List (Sheet 3 of 16)

Abbreviation/Acronym	Definition
CIB	computer interface board
CIU	channel interface unit
CLI	calling line identifier
cm	centimeter(s)
CMOS	complementary metal-oxide semiconductor
CO	central office (telephone)
CODEC	coder/decoder
COS	class of service
CP	central processor
CP/IOP	central processor/input output processor
CPU	central processing unit
CRC	cyclic redundancy check
CRT	cathode ray tube
CSU	channel service unit
CTC	computer-to-computer
CW	continuous wave or clockwise
D/A	digital-to-analog
DAA	data access arrangement
DAC	digital-to-analog converter
DACS	digital access and cross-connect system
DAT	digital audio tape
DATD	digital audio tape drive
dB	decibel(s)
DC	direct current (when used alone)
dc	direct current (when used with a value)

Table A-1: Abbreviations and Acronyms List (Sheet 4 of 16)

Abbreviation/Acronym	Definition
DCD	data carrier detect
DCE	data communications equipment
DCI	digital channel interface
DCS	digital cross-connect system
DDC	digital diagnostics controller
DDD	direct distance dialing
DDM	dual device module
DEMUX	demultiplexer
DID	direct inward dialing
DIOP	digital input/output processor
DIP	dual in-line package
DMA	direct memory access
DMI	dual multifunction input
DMS	direct message storage
DOS	Disk Operating System
DPL	digital private line
DPSK	differential phase-shift keying
DPU	defects per unit
DRAM	dynamic random access memory
DRC	digital remote control
DRC I	digital remote control [used with PURC, PURC 5000, PURC 5000 with Advanced Control and Nucleus with Advanced Control (NAC)]
DRC II	digital remote control [used with PURC 5000 with Advanced Control and Nucleus with Advanced Control (NAC)]
DSP	digital signal processor
DS1	digital signal 1 (T1 physical)

Table A-1: Abbreviations and Acronyms List (Sheet 5 of 16)

Abbreviation/Acronym	Definition
DSU	data service unit
DTE	data terminal equipment
DTI	dual telephone input
DTMF	dual-tone multifrequency
DTO	dual transmitter output
DTR	data terminal ready
DVP	digital voice protection
E & M	Ear and Mouth Wires (a type of signaling system)
E1	standard for digital transmission in Europe
ECL	emitter-coupled logic
ECN	engineering change notice
EEPOT	electrically erasable potentiometer
EEPROM	electronically erasable programmable read-only memory
EIA	Electronics Industries Association
EMF	electromotive force
EMBARC	electronic mail broadcast to a roaming computer
EMI	electromagnetic interference
EMOS	High-density, N-channel metal-oxide semiconductor
ENET-CNT	Ethernet Control LAN
ENET-VD	Ethernet Voice and Data LAN
EPIC	Enhanced Pendulum Integrated Circuit
EPROM	erasable programmable read-only memory (typically programmed electronically by ultraviolet light)
ERMES	European Radio Message System
ERP	effective radiated power
ESSC	enhanced site status controller

Table A-1: Abbreviations and Acronyms List (Sheet 6 of 16)

Abbreviation/Acronym	Definition
˚F	Fahrenheit
FAX	facsimile transmission
FCC	Federal Communications Commission
FDD	floppy disk drive
FDDI	fiber distributed data interface
FDM	frequency division multiplex
FET	field effect transistor
FIFO	first in-first out
FIPS	Federal Information Processing Standards
FM	frequency modulation
FMECA	failure mode effects and criticality analysis
FRAD	frame relay assembler/disassembler
FRU	field replaceable unit
FS	file server
FSK	frequency shift keying
ft-lb	foot-pound(s)
FTP	File Transfer Protocol
GPS	Global Positioning System
GSC	Golay Sequential Code
GUI	graphical user interface
HDR	high data rate
hex	hexidecimal
HF	high frequency
HIX	home index
HLGT	high-level guard tone

Table A-1: Abbreviations and Acronyms List (Sheet 7 of 16)

Abbreviation/Acronym	Definition
HPF	high-pass filter
HSO	high-stability oscillator
HSP	high-speed paging
Hz	Hertz
I/O	input/output
ICC	intelligent communications controller
ICD	interface control document
ID	identification (or identity)
IDE	integrated disk electronics
IF	intermediate frequency
ILR	internal link receiver
IMACS	integrated multiple access communication server
in. lb	inch-pound(s)
INR	intrinsic noise ratio
IOP	input/output processor
IOS	input/output selector
IPA	intermediate power amplifier
IPS	integrated paging system
IQ	intelligent query
IRQ	interrupt request
ISA	Industry Standard Architecture (for PCs)
ISBT	independent-sideband transmission
ISDN	integrated services digital network
ISU	Integrated Service Unit
K	kelvin

Table A-1: Abbreviations and Acronyms List (Sheet 8 of 16)

Abbreviation/Acronym	Definition
kB	kilobyte
kbps	thousand bits per second
kg	kilogram(s)
kHz	kilohertz
kilobit	kb
KSR	keyboard send/receive
kV	kilovolt(s)
kVA	kilovolt-ampere(s**)**
kW	kilowatt(s)
kWh	kilowatt-hour(s)
LAN	local area network
LASER or laser	light amplification through stimulated emission of radiation
LCD	liquid crystal display
LCM	local control station control module
LED	light-emitting diode
LF	low frequency
LLGT	low-level guard tone
LNA	low-noise amplifier
LO	local oscillator
LPF	low-pass filter
LSB	least significant bit
LSI	large scale integration
LSP	low-speed paging
m	meter(s)
mA	milliampere(s)

Table A-1: Abbreviations and Acronyms List (Sheet 9 of 16)

Abbreviation/Acronym	Definition
MB	megabyte
MCW	modulated continuous wave
MDA	modulation domain analyzer
MDF	main distribution frame
MDS	multifunction dual synthesizer
MF/R1	multifrequency/Region 1
MFC/R2	multifrequency compelled/Region 2
mg	milligram(s)
mH	millihenry(s)
MHz	megahertz
µA	microampere(s)
µF	microfarad(s)
µH	microhenry(s)
µs	microsecond(s)
µV	microvolt(s)
µW	microwatt(s)
MIPS	millions of instructions per second
MISO	master in/slave out (used to indicate data flow to master on SPI)
ml	milliliter(s)
mm	millimeter(s)
MODEM or modem	modulator/demodulator
MOS	metal-oxide semiconductor
MOSI	master out/slave in (used to indicate data flow from master on SPl)
MPL	multiple private line
MPU	microprocessor unit

Table A-1: Abbreviations and Acronyms List (Sheet 10 of 16)

Abbreviation/Acronym	Definition
ms	millisecond(s)
MS	messaging switch
MSB	most significant bit
MS-H	home messaging switch
MS-I	input messaging switch
MS-O	output messaging switch
MSO	medium stability oscillator
MSK	minimum shift keying or minimum phase shift keying
MTBF	mean time between failures
MTTR	mean time to repair
MUX	multiplexer
mV	millivolt(s)
N1	Nippon trunk level 1
NAK	negative acknowledgment
NCU	Nucleus™ control unit
NIC	network Interface controller
NIU	network interface unit
NMI	nonmaskable interrupt
NMS	network management system
NTT	Nippon Telephone and Telegraph
NVRAM	nonvolatile RAM
OCU	office channel unit
Ω	ohm
OMC	Operations and Maintenance Center
OPS	operational system

Table A-1: Abbreviations and Acronyms List (Sheet 11 of 16)

Abbreviation/Acronym	Definition
OS	operating system
OSI	Open Systems Interconnect
OTA	Over-the-Air
P-LAN	PURC local area network
PA	power amplifier
PABX	private automatic branch exchange
PAD	packet assembler/disassembler
PC	printed circuit or personal computer
PCD	personal communications device or communicator
PCI	personal computer interface
PCID	Personal Communications Industry Association
PCS	personal communications services
PCT	paging communications terminal
PET	page entry terminal
pf	power factor
PGA	programmable gate array
PIN	personal identification number
PL	private line
PLL	private leased line or phase-locked loop
p.m.	time designation after noon
PMOS	positive metal-oxide semiconductor
PMU	personal message unit
POCSAG	Post Office Code Standardization Advisory Group
POTS	plain old telephone service
ppb	parts per billion

Table A-1: Abbreviations and Acronyms List (Sheet 12 of 16)

Abbreviation/Acronym	Definition
ppm	parts per million
PPM	pulse-position modulation
pps	pulses per second
PRF	pulse repetition frequency
PRI	primary rate interface
PRM	paging reference module
PROM	programmable read-only memory
PSDN	packet switched data network
PSK	phase-shift keying
PSTN	public switched telephone network
PTT	push-to-talk
QAM	quadrature amplitude modulation
R/W	read/write
RF	radio frequency
RAID	redundant array of independent disk/redundant array of inexpensive disk (drives)
RAM	random-access memory
REN	ringer equivalence number
RF	radio frequency
RG	ring generator
RIC	radio identity code
RISC	reduced instruction set computer
RMP	radio metering panel
ROM	read-only memory
RMS	root-mean-square
rpm	revolutions per minute

Table A-1: Abbreviations and Acronyms List (Sheet 13 of 16)

Abbreviation/Acronym	Definition
rps	revolutions per second
RS-232	serial interface specification
RTC	real-time clock
RTS	ready to send
RU	rack unit
Rx	receiver
s	second
SAC	splitter amplifier control
SAM	status annunciator module
SAT	system availability tool
SCI	serial communications interface
SCM	station control module
SCSI	small computer system interface
SDD	software design document
SDLC	synchronous data link control
SIMMS	single in-line memory modules
single-pole, double-throw	SPDT
single-pole single-throw	SPST
SLIP	Serial Line Internet Protocol or Synchronous Line Interface
SMDR	station message detail recording
SNMP	Simple Network Management Protocol
SOP	standard operating procedure
SPC	serial-to-parallel converter
SPI	serial/parallel interface OR serial peripheral interface
SRAM	static random access memory

Table A-1: Abbreviations and Acronyms List (Sheet 14 of 16)

Abbreviation/Acronym	Definition
SRS	software requirements document
SS7	Signaling System 7
SSC	site status controller
SSCB	synchronous serial communication board
SSDA	synchronous serial data adapter
STDINT	standard interface
STI	serial timer interface
SHF	super-high frequency
SVC	supervisor/controller
SYNCC	synchronization control
T1	standard for digital transmission in the US, Canada, Hong Kong, and Japan
TAM	two-way asymmetric
TAP	Telocator Alphanumeric Protocol
TBD	to be determined
TCP/IP	Transmission Control Protocol/Internet Protocol
TCU	transmitter control unit
TDM	time division multiplexer
TDP	Telocator Data Protocol
TDSS	triple drive support subsystem
TDU	total defects per unit
TELCO	telephone company
TIPP	Telocator Internetworking Paging Protocol
TIS	Telocator Inter-Switch paging application protocol
TME	telocator message entry
TNPP	Telocator Networking Paging Protocol

Table A-1: Abbreviations and Acronyms List (Sheet 15 of 16)

Abbreviation/Acronym	Definition
TRC	tone remote control
TSI	time slot interchange or interchanger
TTL	transistor-transistor logic
Tx	transmitter
UAP	universal applications processor
UCC	universal communications controller
UDS	universal data system
UHSO	ultra-high stability oscillator
UPS	uninterruptible power supply
UTC	universal time control
V.21	modem line specification 300 bps
V.22	modem line specification 2400 bps
V.27	facsimile line specification 4800 bps
V.29	facsimile line specification 9600 bps
V.32	modem line specification 9600 bps
V.42	modem line specification 19, 200 bps
Vac	volts AC
VCB	voice controller board
VCO	voltage-controlled oscillator
Vdc	volts DC
VDT	video display terminal
VME bus	Versa Module Europa bus
VOR	voice-operated receiver
VOX	voice-operated transmitter
VSWR	voltage standing wave ratio

Table A-1: Abbreviations and Acronyms List (Sheet 16 of 16)

Abbreviation/Acronym	Definition
WAN	wide area network
WASP	Wide Area Signaling Protocol
W	watt
X.25	packet switching standard (CCITT)
X.400	message handling system standard

NIU Software Commands

This appendix provides a description of the NIU software commands. It includes the following commands which are described at the page location listed after each command.

Ack_page Command

Command

ack_page—acknowledges page alert acknowledgment (ACK) pages that require an acknowledgment

Command Use

ack_page <Return>

Description

After typing the command, if the NIU currently has a page that requires acknowledgment, the unit responds:

```
            <name of page alert page>

Acknowledge all pages (y/n):
```

After typing **yes**, all pending page alert pages that require acknowledgment are acknowledged (acknowledge repeat function cleared). If the NIU currently does not have a page that requires acknowledgment, the unit responds:

```
There are currently no pages to acknowledge.
```

Related Commands

page—enables the sending of page alerts when a selected alarm occurs

page alert general—performs the general setup for page alert operation

page alert general ack_enable—selects alarms that require acknowledgment

Alarms Command

Command

alarms—used to setup alarms 1, 2, 6, and 7 in the NIU.

Command Use

alarms <Return>

Description

After typing the command, the unit enters the alarm setup mode and the Current Alarm Settings screen is displayed (see example in Figure B-1).

```
            20 char string  CURRENT ALARM SETTINGS
                                        L-LIMITS-H  DEBOUNCE OFFSET KEY INHIBIT
## ALARM NAME           MODE    RANGE (V,W,C) (V,W,C)  (sec)  (mV)  REQ IF TRUE
-------------------------------------------------------------------------- 1 2
01 20 char string       diglo      5V  0.800   2.000    2.00    90   .  . .
02 20 char string       diglo      5V  0.800   2.000    2.00    90   .  . .
06 rx squelch           dighi     25V  1.000   7.000    0.20    90
07 ram battery          a-in       5V  0.000   2.900    2.00    90
enter alarm #(1,2,6 or 7) to edit:
```

Figure B-1: Current Alarm Settings Display

The first column in the Current Alarm Settings display (labeled ##) is the alarm number. This number is fixed. Alarm numbers 1 and 2 are user programmable external alarms from the NIU's alarm interface inputs and alarm numbers 6 and 7 are configurable internal alarms.

The last line of the Current Alarm Settings display prompts for the alarm number. Type an alarm number in the range of 1, 2, 6, or 7. After typing an alarm number, the unit responds:

```
edit what (name|mode|range|low-limit|hi-limit|debounce|offset|key|inhibitors)
[1]enter:
```

The edit display lists the nine available alarm edit commands. The number in the brackets is the alarm number currently being edited.

All of the alarm edit commands may be used for alarms 1 and 2, while only the following edit commands are allowed for alarms 6 and 7:

- **low-limit**

- **hi-limit**
- **debounce**
- **offset**

The unit is ready for input of the alarm edit commands (see Table B-1). Each of these commands may be entered from the alarm setup prompt.

Table B-1: Alarm Edit Commands

Commands	Description	State/Range
name	Used to enter a name; used for display and reporting	20 character maximum
mode	Used to enter the state which causes an alarm to occur	diglo digital low
		dighi digital high
		a-in analog in
		a-out analog out
		p-in power in
		p-out power out
range	Sets the voltage input range for each alarm input	(5 V or 25 V)
low-limit	Sets the low limit for each alarm input	In digital or analog modes: 0–5000 mV
		In power modes: 0–500 W
hi-limit	Sets the high limit for each alarm input	In digital or analog modes: 0–5000 mV
		In power modes: 0–500W
debounce	Sets the amount of time required for an alarm state to become valid (filters out momentary glitches)	0–327675 ms
offset	Sets voltage that is removed from the input measurement	0–65535 mV
key	Indicates that the transmitter must be keyed for the alarm to be set or cleared	
inhibitors	Modifies the set of alarms that inhibit this alarm	1 or 2

Clear_np1 Command

Command

clear_np1—clears an N+1 redundancy fault and switches the master back to standby

Command Use

clear_np1 <Return>

Description

This command is used on N+1 master to clear N+1 faults and force the master back to standby mode (allowing the N+1 slave to go back online).

After typing the command on the N+1 master, the unit responds:

```
are you sure!!! y(es), if so.
```

The user types **yes** to continue or **<Return>** to abort the process. After typing **yes**, the unit clears the N+1 redundancy fault and returns to the standby mode.

Config Arcnetid Command

Command

config arcnetid—sets the Arcnet ID number

Command Use

config arcnetid <Return>

Description

The Arcnet ID range is from 1 to 255 and assigns the Arcnet hardware address to the NIU (Arcnet is the data communication part of C-LAN)

Each NIU connected to a common C-LAN must have unique Arcnet ID.

After typing the command, the unit responds:

```
arcnetid = <current arcnetid number>
Enter new arcnetid (1-255):
```

After typing the new arcnetid number, the unit responds::

```
arcnetid = <new arcnetid number>
```

Related Command

show config—displays all configuration parameters

Config Clan_netid Command

Command

config clan_netid—sets the clan_netid number

Command Use

config clan_netid <Return>

Description

The Clan net ID range is from 1 to 255.

After typing the command, the unit responds:

```
clan_netid = <current clan_netid number>
Enter new clan_netid (1-255):
```

After typing the new clan_netid number, the unit responds:

```
clan_netid = <new clan_netid number>
```

Related Command

show config—displays all configuration parameters

Config Color_code Command

Command

config color_code—used to set the ReFLEX color_code index

Command Use

config color_code <Return>

Description

The ReFLEX color code index range is 0 to 127 and maps to actual ReFLEX color codes as shown in Table B-2.

Table B-2: ReFLEX Color Codes (Sheet 1 of 2)

Color Code Index	ReFLEX Color Code	Color Code Index	ReFLEX Color Code	Color Code Index	ReFLEX Color Code	Color Code Index	ReFLEX Color Code	Color Code Index	ReFLEX Color Code
0	0x5555	**1**	0xfb40	**2**	0xeec0	**3**	0x21c0	**4**	0x93c0
5	0x46e0	**6**	0xc210	**7**	0xe910	**8**	0x0d10	**9**	0x8b50
10	0x51d0	**11**	0x07d0	**12**	0x9bb0	**13**	0x2370	**14**	0xc770
15	0xf9f0	**16**	0x1df0	**17**	0x6318	**18**	0x5d98	**19**	0x16c4
20	0x6bc4	**21**	0xaf5c	**22**	0xbadc	**23**	0x23dc	**24**	0x57a2
25	0x8e66	**26**	0x4e41	**27**	0xd741	**28**	0xc2c1	**29**	0x26c1
30	0x0dc1	**31**	0x8421	**32**	0xd221	**33**	0xf921	**34**	0xaf21
35	0x5ea1	**36**	0x23a1	**37**	0xe661	**38**	0x3ce1	**39**	0xf3e1
40	0x5c11	**41**	0xfb91	**42**	0xa751	**43**	0xa231	**44**	0x8931
45	0x9cb1	**46**	0x53b1	**47**	0xeb71	**48**	0x4209	**49**	0xa609
50	0xacc9	**51**	0x9de9	**52**	0x2839	**53**	0x5539	**54**	0xe739
55	0x6179	**56**	0x1b05	**57**	0x0e85	**58**	0x0445	**59**	0x5245
60	0xb645	**61**	0x47c5	**62**	0x42a5	**63**	0x1e65	**64**	0x92e5
65	0x0be5	**66**	0x1615	**67**	0xd915	**68**	0x2255	**69**	0x0955
70	0xbb55	**71**	0x1cd5	**72**	0x4ad5	**73**	0xd3d5	**74**	0x32b5

Table B-2: ReFLEX Color Codes (Sheet 2 of 2)

Color Code Index	ReFLEX Color Code	Color Code Index	ReFLEX Color Code	Color Code Index	ReFLEX Color Code	Color Code Index	ReFLEX Color Code	Color Code Index	ReFLEX Color Code
75	0xdc75	**76**	0x8a75	**77**	0x50f5	**78**	0xc9f5	**79**	0x2df5
80	0x051d	**81**	0xb71d	**82**	0x469d	**83**	0xcf7d	**84**	0xdc23
85	0xf723	**86**	0x06a3	**87**	0x32e3	**88**	0xd6e3	**89**	0x598b
90	0xeb8b	**91**	0xe14b	**92**	0x992b	**93**	0x3eab	**94**	0x0d3b
95	0x5b3b	**96**	0x0a47	**97**	0xee47	**98**	0x9347	**99**	0x49c7
100	0xadc7	**101**	0xjbc7	**102**	0x9627	**103**	0x4ca7	**104**	0xa267
105	0x4667	**106**	0xdf67	**107**	0x2ee7	**108**	0xf977	**109**	0xaf77
110	0xecf7	**111**	0xbaf7	**112**	0x5ef7	**113**	0xdc8f	**114**	0x6e8f
115	0x138f	**116**	0x0ccf	**117**	0xe76f	**118**	0xef1f	**119**	0x425f
120	0x8d5f	**121**	0xdb5f	**122**	0xde3f	**123**	0xa33f	**124**	0x473f
125	0x04bf	**126**	0x9dbf	**127**	0x2fbf				

After typing the command, the unit responds:

```
color_code index = <current color_code index number>
Enter new color_code index (0-127):
```

After typing the new color_code index number, the unit responds:

```
color_code index = <new color_code index number>
```

Related Command

show config—displays all configuration parameters

Config Devid Command

Command

config devid—used to set the NIU device identification (ID) number

Command Use

config devid <Return>

Description

The device ID allows the user to give each unit a unique identification number. The device number allows the RF-C! controller to issue commands that pertain only to a unique unit. There are 8191 device IDs available in a range of 1 to 8191. All NIUs on the same SuperStream link must have a unique device number.

After typing the command, the unit responds:

```
devid = <current device ID number>
Enter new device (1-8191):
```

After typing the new device ID number, the unit responds:

```
devid = <new device ID number>
```

Related Command

show config—displays all configuration parameters

Config Maint_polarity Command

Command

config maint_polarity—used to configure the OTA maintenance transmit polarity

Command Use

config maint_polarity <Return>

Description

This command is used to configure the OTA maintenance transmit polarity in the NIU for inverted (inv) or noninverted (norm).

After typing the command, the unit responds:

```
maint_polarity = <current polarity>
Enter new maint polarity (norm, inv):
```

After typing **norm** or **inv**, the unit responds:

```
maint_polarity = <new polarity>
```

Related Command

show config—displays all configuration parameters

Config Name Command

Command

config name—used to set the device name

Command Use

config name <Return>

Description

The device name is a 20-character string used for display and reporting.

After typing the command, the unit responds:

```
name = <current device name>
Enter new name:
```

After typing the new name (up to 20 characters), the NIU responds:

```
name = <new device name>
```

Related Command

show config—displays all configuration parameters

Config Ota_maint Command

Command

config ota_maint—used to configure the NIU to monitor over-the-air maintenance cycles

Command Use

config ota_maint <Return>

Description

This command configures the NIU to monitor over-the -air maintenance cycles from a list of transmitting NIUs.

After typing the command, the unit responds:

```
ota_maint what (add|delete|list)
```

If **add** is selected, the unit prompts for the maintenance group to be monitored:

```
group to add (0-63):
```

After typing the maintenance group number, the unit requests the device ID of the NIU to be monitored:

```
NIU device (1-8191):
```

After typing the NIU device ID, the unit prompts for the air delay time (the radio propagation delay from the reporting NIU to the monitoring NIU):

```
Air delay in uS (0-50000):
```

After typing the air delay, the unit responds:

```
Log OTA items (y/n):
```

Type **y** if logging of alarm changes from the OTA maintenance cycles is desired. Type **n** to disable OTA logging.

If **delete** is selected, the unit prompts:

```
group to delete (0-63):
```

Type the maintenance group number which is to be deleted.

If **list** is selected, the unit displays the current OTA maintenance configuration.

Type **<Return>** at the **ota_maint (add/delete/list)** prompt to exit the command.

Related Command

show config—displays all configuration parameters.

Config Ota_threshold Command

Command

config ota_threshold—used to set the delay adjustment threshold for OTA maintenance cycles

Command Use

config ota_threshold <Return>

Description

This command sets the threshold for determining if an ATO maintenance delay adjustment measurement is out of tolerance.

After typing the command, the unit prompts for a threshold value:

```
ota_threshold = <current value> usecs
Enter new ota_threshold in usecs (0-10000):
```

After typing the new threshold value, the unit responds:

```
ota_threshold = <new value> usecs
```

If the required delay adjustment measured by two successive OTA maintenance cycles exceeds the programmed threshold, the “ota maint error” alarm will be set.

Related Command

show config—displays all configuration parameters.

show measure—displays OTA maintenance measurement data

Config Password Command

Command

config password—used to change the NIU password

Command Use

config password <Return>

Description

This command changes the password used to logon to an NIU.

The entered password may contain up to 20 characters.

After typing the command, the unit prompts for the current password:

```
Enter old password:
```

After typing the old password, the unit prompts for the new password:

```
Enter new password:
```

After typing the new password, the unit prompts for the confirmation of the new password:

```
Enter new password again:
```

After the new password is typed correctly the second time, the unit responds:

```
password accepted
```

If the new password is typed incorrectly the second time, the unit responds:

```
password not accepted
```

Config Redundancy Command

Note: This command should only be used on an NIU which will be an N+1 Master.

Command

config redundancy—used to configure an N+1 Master NIU

Command Use

config redundancy <Return>

Description

This command should be performed after the slave is configured using the **set redundancy** command.

In the following steps, type <**Return**> to skip entry for that option and continue to the next entry step.

After typing the command, the unit displays the current N+1 slave configuration (see Figure B-2).

```
                N+1 Slave table

Slave #  Device Id
1        <current assigned device Id>
2        <current assigned device Id>
3        <current assigned device Id>
4        <current assigned device Id>

        Enter slave # to change:
```

Figure B-2: N+1 Slave Table Display

After typing the slave number to change, the unit prompts for the slave device ID number

```
Enter new slave device id [disable, 1-8191]:
```

Note: If **disable** *is entered, the slave number is disabled and "none" is displayed for the device ID.*

After typing either **disable** or the new slave device ID number, the unit responds with the N+1 Slave table display again so that a new device ID number may be assigned to another slave number. After all of the desired changes are made to the N+1 Slave table, the NIU Internal Alarms table is displayed (see Figure B-3).

```
                NIU internal Alarms

#  Description         switch   #  Description         switch
00 powerfail/restart       no   16 link modem fail         no
01 20 char string          no   17 timing fail             no
02 20 char string          no   18 dial modem fail         no
03 SCM alarms              no   19 lost link clock         no
04 N+1 fault               no   20 bad stream id           no
05 Multi slave fail        no   21 synthszr out of lock    no
06 rx squelch              no   22 low forward power       no
07 ram battery             no   23 GPS fail                no
08 not used in nucleus     no   24 flash cksum err         no
09 lost stream sync        no   25 nv ram error            no
10 tx disable              no   26 high reflected power    no
11 high BER                no   27 tx fault               no
12 ota maint error         no   28 frm overrun             no
13 paging disabled         no   29 not used in nucleus     no
14 DAC hi/low limit        no   30 DIP switches            no
15 page scheduling err     no   31 daily call-in           no

        Enter item # to toggle:
```

Figure B-3: NIU Internal Alarms Display

Type the item number of an alarm to toggle the switch state for the alarm.

If the switch state for an alarm is **yes**, the N+1 Master NIU will attempt to switch in for any slave NIU on which that alarm is currently active. Setting the switch state to **no** disables switch in for that alarm.

If the NIU is not configured as an N+1 Master, the set redundancy command must be used to enable N+1 redundancy and configure the NIU as a Master.

After all of the desired changes are made to the NIU Internal Alarms table, the SCM Alarms table is displayed (see Figure B-4).

```
                        SCM  Alarms

#  Description                      switch
00 HIGH REFLECTED POWER             no
01 LOW FORWARD POWER                no
02 EXT HIGH REFLECTED POWER         no
03 EXT LOW FORWARD POWER            no
04 BATTERY REVERT                   no
05 SYNTH OUT OF LOCK                no
06 PA FAN                           no
07 SYS TIMER EXPIRED                no
08 HIGH STABILITY REF FAIL          no
09 PA FAIL                          no
10 EXCITER STARUP FAILURE           no
11 STATION RESET                    no
12 ALIGNMENT ID MISMATCHED          no
13 PA NOT ALIGNED                   no
14 HIGH FORWARD POWER               no

       Enter item # to toggle:
```

Figure B-4: SCM Alarms Display

Type the item number of an alarm to toggle the switch state for the alarm.

If the switch state for an alarm is **yes**, the N+1 Master NIU will attempt to switch in for any slave NIU on which that alarm is currently active. Setting the switch state to **no** disables switch in for that alarm.

After all of the desired changes are made to the SCM Alarms table, press <**Return**> to exit the command.

Related Commands

set redundancy—used to enable or disable N+1 redundancy.

show status—displays setup and parameter values for the NIU.

Config Statid Command

Command

config statid—used to configure station ID parameters

Command Use

config statid <Return>

Description

This command configures the NIU for sending station Morse code IDs.

Note: Station IDs are sent out for valid channels only.

After typing the command, the unit displays the current station ID configuration (see Figure B-5).

```
station id mode = <current mode>
CHAN   ID
 1     []
 2     []
 3     []
 4     []
 5     []
 6     []
 7     []
 8     []
statid what (statid|mode|auto_int|list)
```

Figure B-5: Configure Station ID Information Display

The display lists all of the possible statid subcommands.

The following is a list of statid subcommands with a description of each:

statid—used to enter or change the station ID for one of the eight channels station IDs.

After typing the **statid** subcommand, the unit prompts for the channel to change:

```
station id to change (1-8):
```

After typing the channel number, the unit responds:

```
station id = []
Enter new station id (max 12 chars) or none:
```

Type the new station ID (12 alphanumeric character maximum), or none to delete the current station ID.

mode—used to select either automatic or substitute station ID mode.

After typing the mode subcommand, the unit prompts for the new mode:

```
mode = <current mode>
Enter new mode (auto,sub):
```

If automatic mode is selected, the NIU will automatically send all programmed station IDs at the selected auto interval. If substitute mode is selected, the NIU will substitute the programmed station IDs when commanded to send station ID.

auto_int—used to set auto interval when in the auto mode. The auto interval has a range of 1 to 1,000 minutes.

After typing the **auto_int** command, the unit prompts for the new auto interval:

```
auto interval = 60 minutes
Enter new interval in minutes (1-1000):
```

list—displays the current station ID configuration for all channels.

Related Command

config valid_chan—used to configure the valid transmission channels.

show statid—displays station ID information.

test statid—used to test transmission of station IDs over the air

Config Streamid Command

Command

config streamid—used to set the link stream ID

Command Use

config streamid <Return>

Description

This command configures the stream ID for the SuperStream link. The NIU will only process paging data addressed to the programmed stream ID.

The NIU stream ID must match that of its controlling RF-C! controller. Use the **show status** command to display the stream ID currently being received from the RF-C! controller.

After typing the command, the unit prompts for the new stream ID:

```
streamid = <current stream ID number>
Enter new streamid (1-1023):
```

After typing the new stream ID, the unit responds:

```
streamid = <new stream ID number>
```

Related Command

show config—displays all configuration parameters

show status—displays setup and parameter values for the NIU

Config Sysid Command

Command

config sysid—used to set the system ID

Command Use

config sysid <Return>

Description

The system ID is used to uniquely identify the source and destination for all data coming from a single paging terminal output encoder. System numbers need to match for an entire simulcast system.

Primary system ID and alternate system IDs can be configured with this command.

All system IDs should be unique. If a primary system ID is entered that matches one of the alternate system IDs, the alternate system ID is removed.

After typing the command, the unit responds:

```
primary system id = <current primary ID number>
are you sure!!! y(es), if so.
```

After typing **yes**, the unit prompts for the new primary station ID:

```
Enter new primary system id (1-255):
```

After typing the primary system ID, the unit responds:

```
primary system id = <new primary ID number>
alternate system ids = <current list of alternate IDs>
Operation(add/delete)?
```

Up to eight alternate system IDs may now be entered or existing alternate IDs may be deleted.

Note: Alternate system IDs can not match primary system ID.

No two alternate system IDs can match.

Type **add** or **delete** and the unit responds:

```
Enter system ids to add (1-255):
```

or

```
Enter system ids to delete (1-255):
```

After typing the alternate ids that are to be added or deleted, the unit responds:

```
alternate system ids = <new alternate IDs>
```

Related Command

show config—displays all configuration parameters

Config Tx_maint Command

Command

config tx_maint—used to configure the maintenance group of the NIU

Command Use

config tx_maint <Return>

Description

Each NIU is assigned a maintenance group. This group is used when the RF-C! controller initiates a maintenance cycle. A maintenance cycle causes all NIUs programmed in a specific maintenance group to key and send maintenance data. The maintenance cycle starts with the lowest selected maintenance group number and ends with the highest maintenance group number. Multiple NIUs can be assigned the same maintenance group in a given system as long as no more than one of the NIUs can be heard by any monitoring NIU.

After typing the command, the unit prompts for the new maintenance group:

```
tx_maint group = <current maintenance group>
Enter new tx_maint group (0-63):
```

After typing the new maintenance group, the unit responds:

```
tx_maint group = <new maintenance group>
```

Related Command

show config—displays all configuration parameters

config ota_maint—used to configure the NIU to monitor over-the-air maintenance cycles

Config Tx_polarity Command

Command

config tx_polarity—used to configure POCSAG and FLEX/ReFLEX data polarity

Command Use

config tx_polarity <Return>

Description

This command is used to configure POCSAG and FLEX/ReFLEX data polarity to inverted (inv) or noninverted (norm).

After typing the command, the unit responds:

```
POCSAG polarity      = <current polarity of norm or inv>
FLEX/ReFLEX polarity = <current polarity of norm or inv>
Enter new POCSAG polarity (norm, inv):
```

After typing the new POCSAG polarity, the unit requests the FLEX/ReFLEX polarity:

```
Enter new FLEX/ReFLEX polarity (norm, inv):
```

After typing the new FLEX/ReFLEX polarity, the unit responds:

```
POCSAG polarity      = <new polarity of norm or inv>
FLEX/ReFLEX polarity = <new polarity of norm or inv>
```

Related Command

show config—displays all configuration parameters

Config Valid_chan Command

Command

config valid_chan—used to configure the valid transmission channels

Command Use

config valid_chan <Return>

Description

This command selects the channels on which the NIU will transmit.

After typing the command, the unit responds:

```
valid_chan what (add|delete|list)
```

If **add** is selected, the unit prompts for a channel to be added:

```
Channel to add (1-8):
```

If **delete** is selected, the unit prompts for a channel to be deleted:

```
Channel to delete (1-8):
```

Only one channel can be added or deleted at a time.

If **list** is selected, the unit displays the current list of valid channels:

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

Related Command

show config—displays all configuration parameters

Date Command

Command

date—used to program the time and date

Command Use

date <Return>

Description

This command allows the user to program the time and date used for logging events and displaying status. This command should be used when a unit is configured and placed in service. During operation the time and date are normally updated periodically over the link data stream by the RFC! controller.

After typing the command, the unit responds:

```
time: <current time>    date: <current date>
new time/date? enter: hh:mm  mm-dd-yy
```

Type in the new time and date in the following format:

hh:mm mm-dd-yy

For example, type:

12:59 07-15-97 <**Return**>

The unit responds by displaying the time and date that was set:

```
time: 12:59:00    date: 07-15-1997
```

Flasha Command

This command causes the unit to reset.

Command

flasha—used to start executing the software programmed in flash memory bank A

Command Use

flasha <Return>

Description

This command allows the user to start executing the software programmed in flash memory bank A.

After typing the command, the unit responds:

```
are you sure!!! y(es), if so,
```

Ensure that flash bank A is loaded with valid software.

The user may type **yes** to continue or **<Return>** to abort the command. After typing **yes**, the unit will reset and start executing the software loaded in flash bank A.

If flash bank A is not programed, the unit switches to ROM.

Related Commands

show ver—displays the software version of the NVRAM, flash banks, and ROM

flashb—used to start executing the software programmed in flash memory bank B

rom—used to start executing the software programmed in Read Only Memory (ROM)

Flashb Command

This command causes the unit to reset.

Command

flashb—used to start executing the software programmed in flash memory bank B

Command Use

flashb <Return>

Description

This command allows the user to start executing the software programmed in flash memory bank B.

After typing the command, the unit responds:

```
are you sure!!! y(es), if so,
```

Ensure that flash bank B is loaded with valid software.

The user may type **yes** to continue or **<Return>** to abort the command. After typing **yes**, the unit will reset and start executing the software loaded in flash bank B.

If flash bank B is not programed, the unit switches to ROM.

Related Commands

show ver—displays the software version of the NVRAM, flash banks, and ROM

flasha—used to start executing the software programmed in flash memory bank A

rom—used to start executing the software programmed in Read Only Memory (ROM)

GPS Command

Note: This command should only be used on an NIU which controls a GPS receiver.

Command

gps—used to display and change GPS parameters

Command Use

gps <Return>

Description

After typing the command, the unit responds (see Figure B-6).

```
GPS SETUP  : in GPS receiver : in NIU
-------------------------------------------
GMT time   : 22:37:47        : 22:37:47
GMT date   : 06-21-1997      : 06-21-1997
Latitude   : 32:50:33 N      : 32:50:33 N
Longitude  : 97:17:35 W      : 97:17:35 W
Height     : +220.72 Meters  : +220.72 Meters
Tracking   : 6               : n/a

Recalculate GPS position? (y/n):
```

Figure B-6: GPS Parameters Display

The user may type **y** to recalculate GPS position or **n** to abort the command. After typing **y**, the unit prompts for the current GMT time:

```
Enter new GMT time(hh:mm):
```

After typing the GMT time, the unit requests the current GMT date:

```
Enter new GMT date(mm-dd-yy):
```

After typing the GMT date, the unit requests the latitude:

```
Enter new latitude(deg(0-90) min(0-59) sec(0-59) N/S) :
```

After typing the latitude, the unit requests the longitude:

```
Enter new longitude(deg(0-180) min(0-59) sec(0-59) E/W) :
```

After typing the longitude, the unit requests the height:

```
Enter new height in meters (-1000.00 - 18000.00):
```

After typing the height, the unit redisplays the GPS parameters.

Related Command

show gps—displays the global positioning system (GPS) status, time / position, tracking data and information

Help Command

Command

help—displays help information on each NIU command

Command Use

help <Return>

help * <Return>

help <command> <Return>

Description

A complete list of all available commands can be displayed by typing the **help** command with no argument. Use the asterisk (*) argument to display help information for all commands. Help information for a particular command can be displayed by typing the command, **help**, followed by a space and the name of the command.

For example, to display a list of the NIU commands, type **help <Return>** (see Figure B-7).

```
CMDS ARE:
alarms    config    clear_np1 date      flasha    flashb
help      logout    load      level     report    modem
page      ack_page  rlog      rtab      reset     rom
scm       set       show      test      time      trace
gps
```

Figure B-7: Help Command Display

To access information on the **set** command, type **help set** <**Return**> (see Figure B-8).

```
COMMAND:  DESCRIPTION:          OPTIONS:
set     [set signal           ] {key|dis|ant|auxports|txfreq|bps|link|da|
                                  r96_src|pll|cpuok|hi_ber|lo_ber|cdig_out|
                                  cdig_dir|caud_out|caud_dir|daa|level|con|
                                  txtype|resync|maxwait|osc|align_type|
                                  link_delay|gps_delay|redundancy|
                                  fallback_timer|freq_accuracy|rx_delay|
                                  failsafe_timeout}
```

Figure B-8: Help Set Command Display

Level Command

Command

level—used to manually adjust the audio level of the analog link input

Command Use

level <Return>

Description

This command allows the user to manually adjust the audio level of the analog link stream.

After typing the command, the unit request an adjustment value:

```
Enter adjustment (+/- 1-255):
```

Positive values increase the audio gain. Negative values decrease the gain.

After typing the adjustment value, the unit responds:

```
Adjusted <up/down adjustment value> tick(s).
```

Related Commands

set level—used to adjust the audio level of the analog link stream

test level—used to test the level of the audio signal of the analog stream

Load Command

Command

load—used to download software into the NIU

Command Use

load <Return>

Description

This command allows the user to update software in the NIU from the DB9 console port. There are two ways of loading software into the NIU from the console port:

- Load using ROM
- Load using the active flash

Loading while executing from ROM is the fastest method (requires about 12 minutes). However, using the ROM takes the NIU off-line. Loading from flash allows the NIU to continue operating on-line, but takes about twice as long to complete.

This command requires a PC with Procomm Plus terminal emulator software, version 2.0 or greater and the flash software file from Motorola.

Loading Software Using ROM

Note: This procedure loads the software into the flash memory bank that was inactive before switching to ROM.

Execute the **rom** command to switch from the flash memory to ROM memory.

1. To begin the load process, connect to the NIU console port using Procomm Plus, and type:

   load <Return>

   The unit responds:

```
Flash A Ver (<current version>) will be erased!
are you sure!!! y(es), if so.
```

2. Type **y** to continue or **<Return>** to abort the process.

After typing **y**, the unit starts flashing all four front panel LEDs in amber and responds:

```
Erasing FLASH A...
```

3. When the flash memory is erased, the unit prompts the user to start downloading the new software and starts printing periods (.):

```
Ready for Download
.
.
.
```

The unit is ready to receive the download file.

4. Type in **Procomm Plus**.

Procomm Plus prompts with a menu selection for the protocol type.

5. Select **ASCII protocol**.

Procomm Plus then prompts for the file name.

6. Type the download file path and file name and press <**Return**>.

Procomm Plus starts the file transfer and continues until the file is transferred. During the transfer all four front panel LEDs continue flashing amber until the file load is complete.

After the file is transferred, the unit performs the following actions (see Figure B-9):

- Performs a checksum of the flash just loaded
- Starts operating in the flash just loaded
- Reports any exceptions since the last reset
- Displays the start-up banner

```
Flash Checksum OK.
Starting FLASH

No exception since last reset.

Checking for Communication with SCM......

                          M o t o r o l a   N I U
                        Copyright (c) 1997 Motorola
                            All rights reserved

NVRAM:   APR 28, 1997 7:39 PM
FLASH A: AUG 14, 1997 9:07 AM (HNU1_10)
FLASH B: AUG 01, 1997 4:44 PM (HNU1_09)
ROM:     APR 16, 1996 8:31 AM (NUC4_19)
**FLASH A Active.**
NIU:     NUCLEUS

[   1] MNUCNIU! >

[   1] MNUCNIU! > Enter Password:
```

Figure B-9: Loading Using ROM Display

Loading Software Using the Active Flash

Note: This procedure loads the software into the off-line flash memory.

1. To begin the load process from the flash that is active, type:

   load <Return>

   If the console speed is more than 9600 bps, the unit responds:

   ```
   Console load must be 9600 bps or less, use set bps command!
   ```

2. Using the **set bps** command, set rate to **9600 bps**.

3. Re-establish communication with Procomm Plus by setting it to communicate at 9600 bps.

4. At the NIU prompt, type:

   load <Return>

The unit responds:

```
On line Flash A Ver(<current version>)
Off line Flash B Ver(current version>) will be erased!
are you sure!!! y(es), if so.
```

Type **y** to continue or **n** to abort the process. After typing **y**, the unit responds:

```
Erasing FLASH A...
```

When the flash memory is erased, the unit prompts the user to start the downloading the new software and starts printing periods (.):

```
Ready for Download
.
.
.
```

The unit is ready to receive the download file.

5. Type in **Procomm Plus**.

   Procomm Plus prompts with a menu selection for the protocol type.

6. Select **ASCII protocol**.

   Procomm Plus then prompts for the file name.

7. Type the download file path and file name and press <**Return**>.

   Procomm Plus starts the file transfer and continues until the file is transferred. After the file is transferred, the unit checks the checksum of the flash just loaded and continues operating in the active flash. The unit responds:

```
Flash checksum OK.
[   1] MNUCNIU! >

[   1] MNUCNIU! > Enter Password
```

Logout Command

Command

logout—used to exit from the NIU user interface

Command Use

logout <Return>

Description

This command exits the current login session.

After typing the command, the unit responds:

```
[   1] NUCNIU! > Enter Password:
```

To enter any commands, the user must login by entering the correct password. The factory set default password is **complex**.

Modem Command

Command

modem—used to switch the console port to modem operation

Command Use

modem <Return>

Description

This command connects the console to the NIU dial modem.

1. Type <**Control D**> to exit this mode.

   After typing the command, the unit responds:

```
MODEM READY: <ctrl> d to exit

OK
```

The console is now connected for dial modem operation. Standard Hayes modem commands may be entered.

2. To exit modem operation, type:

   <control> d

The unit responds:

```
exiting
[   1] MNUCNIU! >
```

The unit is now switched back to console port operation.

Page Command

Command

page—used to enable the sending of page alert pages when a selected alarms occurs

Command Use

page <Return>

Description

This command allows the user to enable the sending of page alert pages when a selected alarms occurs.

After typing the command, the unit enters the page alert setup mode and the unit responds:

```
page alert (initial|general|main|backup|terminal|filter_status|
            page_phone_status|send_test|cancel_test)
        Enter choice:
```

The unit is ready for input of the page alert commands. The following paragraphs describe each of the page alert commands and parameters. Each of these commands must be entered from the page alert enter choice prompt.

Related Commands

The following page alert commands:

initial—used to perform the initial page alert setup

general—used to perform the general setup for page alert operation

main—used to setup the parameters for the main pager for page alert operation

backup—used to setup the parameters for a back pager for page alert operation

terminal—used to select terminal usage for page alert operation

filter_status—used to display the status of the alarm filter operation

page_phone_status—used to display the phone status report for page alert operation

send_test—used to send a test page to a pager

cancel_test—used to cancel a test page to a pager

Page Alert Initial Command

Command

initial—used to perform the initial page alert setup

Command Use

initial <Return>

Description

After typing the command, the user progresses through all three of the setup tables that are necessary for the user to set up the initial page alert operation:

- Page Alert General Setup (see paragraph, "Page Alert General Command")
- Main Pager Setup (see paragraph, "Page Alert Main Command")
- Backup Pager Setup (see paragraph, "Page Alert Backup Command")

Related Commands

page alert general—used to perform the general setup for page alert operation

page alert main—used to setup the parameters for the main pager for page alert operation

page alert backup—used to setup the parameters for a back pager for page alert operation

Page Alert General Command

Command

general—used to perform the general setup for page alert operation

Command Use

general <Return>

Description

After typing the command, the Page Alert General Setup display appears (see Figure B-10).

```
    Page Alert general setup:

Enable Page Alert                      = NO
Alarms causing a page when set         = NONE
Alarms causing a page when clear       = NONE
Filtered alarms that cause a page      = NONE
     -> Alarm filter time (minutes)    = 1
     -> Max alarms before alert        = 5

Alarms that require ack                = NONE
     -> Ack repeat interval            = 5

Max # of attempts before terminal switch = 3

Items to page                          = no

Page Alert general setup (enable|set_alarms|clr_alarms|filtered_alarms|
            time_filter|max_filter|ack_enable|repeat_ack|attempts_max)
       Enter choice:
```

Figure B-10: Page Alert General Setup Display

The Page Alert General Setup display lists the commands for all of the parameters that can be entered or changed.

The unit is ready for input of the parameter commands. Each of these commands must be entered from the enter choice prompt.

The following is a list of the parameter commands with a description of each (see Table B-3).

Table B-3: Page Alert General Setup Commands

Commands	Description	Range
enable	Used to enable or disable page alert.	yes or no
set_alarms	Used to select the alarms that will cause a page when set.	0–31
clr_alarms	Used to select the alarms that will cause a page when cleared.	0–31
filtered_alarms	Used to select the filtered alarms that will cause a page.	0–31
time_filter	Used to set the alarm filter time.	1–255 min
max_filter	Used to set the maximum number of filtered alarms required before page.	0– 255 (0 = disable)
ack_enable	Used to select the alarms that will require page acknowledgment.	0–31
repeat_ack	Used to set the time interval between acknowledgment pages.	4 –60 min
attempts_max	Used to set the maximum number of call attempts before terminal switch.	1–10 min

Page Alert Main Command

Command

main—used to setup the parameters for the main pager for page alert operation

Command Use

main <Return>

Description

After typing the command, Main Pager Setup display appears (see Figure B-11).

```
        Main Pager Setup:

    Phone number                          : NONE
    Password                              : NONE
    Pager id number                       : NONE
    Message length                        : 80
    Modem speed                           : auto
    Modem bit settings                    : 7 1 Even

  Main Pager Setup (phone#|password|pager_id|msg_length|speed|bit_settings)
            Enter choice:
```

Figure B-11: Main Pager Setup Display

The Main Pager Setup display lists the commands for all of the parameters that may be entered or changed.

The unit is ready for input of the parameter commands. Each of these commands must be entered from the enter choice prompt.

The following is a list of the parameter commands with a description of each (see Table B-4).

Table B-4: Page Alert Main Pager Setup Commands

Commands	Description	Range
phone#	Used to input up to a 37-character string that is used, in conjunction with the Hayes ATD command, to allow a modem to dial a designated paging switch using Telocator Alphanumeric Protocol (TAP). A sequence of Hayes command dial modifiers may also be placed in the phone number[1].	Up to a 37 character string. For an input of none, type: **erase**
password	Used to enter password.	Up to a 6 character string
pager_id	Used to enter up to a 20 character string password Pager Identification Number (PIN) number for the pager.	For an input of none, type: **erase**
msg_length	Used to set the page message length.	1 to 255 characters
speed	Used to set the internal or external modem speed.	Internal: Auto, 300,1200, and 2400 bps.
		External: Auto, 300, 1200, 2400, 4800, 9600, 19200, 38400, and 57600 bps.
bit_setting	Used to set the modem bit setting.	7, 1, even or 8, 1, none

1. Contact Motorola for information regarding the valid modifiers for the internal dial modem.

Page Alert Backup Command

Command

backup—used to setup the parameters for a back pager for page alert operation

Command Use

backup <Return>

Description

After typing the command, the unit responds (see Figure B-12).

```
    Backup Pager Setup:

  Phone number                          : NONE
  Password                              : NONE
  Pager id number                       : NONE
  Message length                        : 80
  Modem speed                           : auto
  Modem bit settings                    : 7 1 Even

Backup Pager Setup (phone#|password|pager_id|msg_length|speed|
            bit_settings)
        Enter choice:
```

Figure B-12: Backup Pager Setup Display

The Backup Pager Setup display lists the commands for all of the parameters that may be entered or changed.

The unit is ready for input of the parameter commands. Each of these commands must be entered from the enter choice prompt.

The following is a list of the parameter commands with a description of each (see Table B-5).

Table B-5: Page Alert Backup Pager Setup Commands

Commands	Description	Range
phone#	Used to input up to a 37-character string that is used, in conjunction with the Hayes ATD command, for a modem to dial a designated paging terminal using Telocator Alphanumeric Protocol (TAP). A sequence of Hayes command dial modifiers may also be placed in the phone number[1].	Up to a 37 character string. For an input of none, type: **erase**
password	Used to enter password.	Up to a 6 character string
pager_id	Used to enter up to a 20-character string password Pager Identification Number (PIN) number for the pager.	For an input of none, type: **erase**
msg_length	Used to set the page message length.	1 to 255 characters
speed	Used to set the modem speed.	Internal—Auto, 300,1200, and 2400 bps
		External—Auto, 300, 1200, 2400, 4800, 9600, 19200, 38400, and 57600 bps
bit_setting	Used to set the modem bit setting.	7, 1, even or 8, 1, none

1. Contact Motorola for information regarding the valid modifiers for the internal dial modem.

Page Alert Terminal Command

Command

terminal—used to select terminal usage for page alert operation

Command Use

terminal <Return>

Description

When main or backup terminal operation is selected, the unit sends page alerts from that terminal until the value, Max # of attempts before terminal switch, is reached. The unit switches terminals and sends page alerts from the new terminal. When both terminal operation is selected, the unit alternates the sending of page alerts between the main and backup terminal.

The value, Max # of attempts before terminal switch, displays in the Page Alert General Setup table (see paragraph, "Page Alert General Command").

After typing the command, the unit responds (see Figure B-13).

```
        Page Alert Terminal Selection:

    Terminal selection = MAIN

Page Alert Terminal Selection (main|backup|both)
          Enter choice:
```

Figure B-13: Page Alert Terminal Selection Display

The unit is ready for entry of the terminal selection.

Select either main, backup, or both at the enter choice prompt.

Related Command

general—used to perform the general setup for page alert operation

Page Alert Filter_status Command

Command

filter_status—used to display the status of the alarm filter operation

Command Use

filter_status <Return>

Description

Alarm filter operation is set up using the Page Alert General command (see paragraph, “Page Alert General Command”).

After typing the command, the unit responds (see Figure B-14).

```
Filtered Alarm Status
## _______name_________ filt time set  ## _______name_________ filt time set
00 powerfail/restart     no   --- ---  16 link modem fail       no   --- ---
01 20 char string        no   --- ---  17 timing fail           no   --- ---
02 20 char string        no   --- ---  18 dial modem fail       no   --- ---
03 SCM alarms            no   --- ---  19 lost link clock       no   --- ---
04 N+1 fault             no   --- ---  20 bad stream id         no   --- ---
05 Multi slave fail      no   --- ---  21 synthszr out of lock  no   --- ---
06 rx squelch            no   --- ---  22 low forward power     no   --- ---
07 ram battery           no   --- ---  23 GPS fail              no   --- ---
08 not used in nucleus   no   --- ---  24 flash cksum err       no   --- ---
09 lost stream sync      no   --- ---  25 nv ram error          no   --- ---
10 tx disable            no   --- ---  26 high reflected power  no   --- ---
11 high BER              no   --- ---  27 tx fault              no   --- ---
12 ota maint error       no   --- ---  28 frm overrun           no   --- ---
13 paging disabled       no   --- ---  29 not used in nucleus   no   --- ---
14 DAC hi/low limit      no   --- ---  30 DIP switches          no   --- ---
15 page scheduling err   no   --- ---  31 daily call-in         no   --- ---

Do you wish to reset the filters (y/n):
```

Figure B-14: Filtered Alarm Status Display

Type **y** to reset the alarm filters or **n** to not reset the filters.

Related Command

page alert general—used to perform the general setup for page alert operation

Page Alert Page_phone_status Command

Command

page_phone_status—used to display the phone status report for page alert operation

Command Use

page_phone_status <Return>

Description

The report provides status information for both the main pager and the backup pager.

After typing the command, the unit responds (see Figure B-15).

```
Main Pager PHONE STATS -    (disabled)
              Running Total                Last valid
Total tries         0                          0
Successful          0                          n/a
No dialtone         0                          0
Busy                0                          0
No answer           0                          0
Bad connect         0                          0
Accum time       0 days & 06:27:29           0 days & 06:27:29
Last reset     00:16:16  01-01-1988        00:16:16  01-01-1988

Backup Pager PHONE STATS -    (disabled)
              Running Total                Last valid
Total tries         0                          0
Successful          0                          n/a
No dialtone         0                          0
Busy                0                          0
No answer           0                          0
Bad connect         0                          0
Accum time       0 days & 06:27:29           0 days & 06:27:29
Last reset     00:16:16  01-01-1988        00:16:16  01-01-1988

Do you wish to reset the stats (y/n):
```

Figure B-15: Pager Phone Statistics Display

Type **y** to reset the page alert phone statistics or **n** to not reset the statistics.

Page Alert Send_test Command

Command

send_test—used to send a test page to a pager

Command Use

send_test <Return>

Description

After typing the command, the unit responds:

```
**** Sending a Test Page. ****
```

If a previous test page exists that was not sent, the unit responds:

```
!!!! ALREADY SENDING A TEST PAGE !!!!
```

Related Command

page alert cancel_test—used to cancel a test page to a pager

Page Alert Cancel_test Command

Command

cancel_test—used to cancel a test page to a pager

Command Use

cancel_test <Return>

Description

After typing the command, the unit responds:

```
**** Cancelling Test Page ****
```

If a test page does not exist, the unit responds:

```
!!!! NO TEST PAGE ACTIVE !!!!
```

Related Command

page alert send_test—used to send a test page to a pager

Report Command

Command

report—used to set up the OTA alarm and system maintenance reporting functions from the NIU

Command Use

report <Return>

Description

After typing the command, the unit enters the reporting setup mode and responds (see Figure B-16).

```
DEVICE 1    : 20 char string          TIME/DATE  15:17:25  07-15-1997
rept_phone#                 : 20 char string
auto_rpt                    : no
alarm#'s                    : 31
events                      : no
ota_rpt                     : no
max_tries                   : 10
dial_type                   : tone
daily_call                  : none
ans_rings                   : 1
attempts used               : 0
items to rpt                : no

edit what (rept_phone#|auto_rpt|alarm#'s|events|ota_rpt|max_tries|dial_type|
             daily_call|ans_rings|list)
```

Figure B-16: Report Setup Display

The edit what display lists all of the possible report edit commands.

The unit is ready for input of the report edit commands. Each of these commands must be entered from the report setup prompt.

The following table is a list of the report edit commands with a description of each (see Table B-6).

Table B-6: Report Edit Commands

Commands	Description
rept_phone#	Used to input up to a 20-character string that is used, in conjunction with the Hayes ATD command, for a modem to dial the console for alarm reporting. This is the phone number that is used for alarm reporting. A sequence of Hayes command dial modifiers may also be placed in the phone number[1].
auto_rpt	Used to enable or disable the automatic alarm reporting function.
alarm#s	Used to provide a list of alarms that cause the unit to call-in and report immediately (rather than wait for the daily call-in time) when any one or more of them become valid by changing state.
events	Used to enable or disable sending of the event log during report call-ins.
ota_rpt	Used to enable or disable OTA alarms dial reporting.
max_tries	Used to set the attempts-per-hour (1 to 10) the unit makes when calling the console to report alarms. When the number of tries set in max_tries is reached, the unit stops dialing and sets alarm number 18 (dial modem fail). During the next hour the unit resets max_tries and starts over. The max_tries function limits the phone line usage if a wrong number is programmed or some other malfunction occurs.
dial_type	Used to select either pulse or tone dialing for the dial modem.
daily_call	Used to set the time when alarm number 31 (daily call-in) occurs.
ans_rings	Used to set the number of rings (1 to 9) the unit allows, when calling the console, before hanging up. Answer rings may also be turned off (0).
list	Provides a report setup screen with two additional parameters: attempts used—indicates the number of attempts that the unit made to call the console to perform the automatic alarm reporting function. items to rpt—indicates whether the unit has an item to report.

1. Contact Motorola for information regarding the valid modifiers for the internal dial modem.

The **attempts used** parameter on the report setup screen indicates the number of attempts that the unit has made to call the console to perform the automatic alarm reporting function.

The **items to rpt** parameter on the report setup screen indicates whether the unit has an item to report.

Related Command

show report—displays the options selected for the alarm reporting function

Reset Commands

Command

reset—used to reset parameters and devices

Command Use

<reset command> <Return>

Use one of the reset commands listed in the following paragraph.

Description

These commands allow the user to reset various parameters and devices (see Table B-7). The commands are entered one at a time.

Table B-7: Reset Commands

Command	Description
reset alarm	Resets (clears) all latched noncurrent alarms (same function as toggling the alarm reset switch)
reset all	Resets alarms, log, and statistics (same as executing the **reset alarm**, **reset log**, and **reset stats** commands)
reset call_atmpts	Resets report call attempt counter
reset iobd	Resets I/O board parameters
reset key	Resets key time statistics
reset log	Clears the event log
reset measure	Clears the OTA measurement data in a monitor NIU
reset modem	Resets the dial modem
reset nvram	Resets all configuration parameters to default values and states
reset ph_stats	Resets report calling statistics
reset stats	Resets statistics
reset unit	Resets the unit (same function as toggling the reset switch)

Rlog Command

Note: The C-LAN network must be connected and operating properly for this command operate.

Command

rlog—used to perform a remote login to another NIU through C-LAN

Command Use

rlog <Return>

Description

After typing the command, the unit displays a routing table showing the remote NIUs which have been previously accessed (see Figure B-17).

```
Routing Table for: c-lan net# 1, device# 1, arcnetid 1

Entry#  c-lan net#   device#
  a.      1           6
Pick from table or enter [net# device#]:
```

Figure B-17: Rlog Routing Table Display

Note: Attempting to remotely login to another NIU automatically disables any currently active traces.

Type the entry # of one of the selections available from the Routing Table display or type the C-LAN network ID and device ID of the NIU that you want to remotely access.

Note: When typing the C-LAN network ID and device ID of the NIU, a space is required between the two numbers.

The unit responds (see Figure B-18).

```
Rlogging to IP 80010006
<ctrl> z to exit
*

[   6] NUCNIU! > Enter Password:
```

Figure B-18: Rlogging into a Remote NIU Display

Log into the remote NIU by typing the password.

To exit from the remote NIU and return to the original NIU, type **<ctrl> z**.

Rom Command

CAUTION

This command causes the unit to restart.

Command

rom—used to start executing the software programmed in Read Only Memory (ROM)

Command Use

rom <Return>

Description

This command is used to switch to ROM when the unit is running in flash memory bank A or B. Under normal operating conditions, the unit is executing in one of the flash banks.

After typing the command, the unit responds:

```
are you sure!!! y(es), if so.
```

After typing **y**, the unit reboots and displays the start-up banner and the login prompt (see Figure B-19).

```
Checking for Communication with SCM......

C-NET Pt Advanced Paging Network
Copyright (c) 1992-1995 by Motorola, Inc.
Copyright (c) 1990 by Complex Systems, Inc.
Copyright (c) 1984-1988 by Cellular Technology, Inc.

NVRAM:   MAY 30, 1995 11:55 AM
FLASH A: AUG 14, 1997 9:07 AM (HNU1_10)
FLASH B: AUG 01, 1997 4:44 PM (HNU1_09)
ROM:     APR 16, 1996 8:31 AM (NUC4_19)
**ROM Active.**
NIU:     NUCLEUS - FLEX


[   1]  NUCNIU % Enter Password: *
```

Figure B-19: Executing Software Programmed in ROM

The **%** prompt indicates the unit is running from the ROM memory.

Related Commands

show ver—displays the software version of the NVRAM, flash banks, and ROM

flasha—used to start executing the software programmed in flash memory bank A

flashb—used to start executing the software programmed in flash memory bank B

Rtab Command

Command

rtab—used to display the CLAN routing table and the associated Arcnet address table information

Command Use

rtab <Return>

Description

After typing the command, the unit responds (see Figure B-20).

```
Routing Table for device 1, Arcnet ID 1
 Device  Interface
      1  internal
      6  Arcnet A

Arcnet Address Table
 Device  Interface  Arcnet ID  Timeout
      6  Arcnet A          6        2
```

Figure B-20: Rtab Routing Table and Arcnet Address Table Display

The Routing Table section shows the device ID of all NIUs which have been accessed and the interface used to access the NIU.

The Arcnet Address Table section shows the device ID of all NIUs which have been accessed through the CLAN and the Arcnet ID of those NIUs.

SCM Alarms Command

Command

scm alarms—displays the current and latched alarms for the SCM

Command Use

scm alarms <Return>

Description

After typing the command, the unit responds (see Figure B-21).

```
DEVICE 1    : 20 char string          TIME/DATE  13:50:51  06-26-1997

####  _____________________name_____________________ latch curr
f881 HIGH REFLECTED POWER                             clr  clr
f882 LOW FORWARD POWER                                clr  clr
f883 EXT HIGH REFLECTED POWER                         clr  clr
f884 EXT LOW FORWARD POWER                            clr  clr
f886 BATTERY REVERT                                   clr  clr
f889 SYNTH OUT OF LOCK                                clr  clr
f88b PA FAN                                           clr  clr
f89a SYS TIMER EXPIRED                                clr  clr
f89d HIGH STABILITY REF FAIL                          clr  clr
fa40 PA FAIL                                          clr  clr
fa73 EXCITER STARUP FAILURE                           clr  clr
fa80 STATION RESET                                    clr  clr
fa81 ALIGNMENT ID MISMATCHED                          clr  clr
fa82 PA NOT ALIGNED                                   clr  clr
fa83 HIGH FORWARD POWER                               clr  clr
```

Figure B-21: SCM Current and Latched Alarms Display

SCM Clr_alarms Command

Command

scm clr_alarms—used to clear the SCM alarms that are currently set

Command Use

scm clr_alarms <Return>

SCM Load Command

Command

scm load—used to load updated software into the SCM

Command Use

scm load <Return>

Description

After typing the command, the unit responds:

```
are you sure!!! y(es), if so.
```

The user types **yes** to continue or **<Return>** to abort the process. After typing **yes**, the unit responds:

```
Active bank version:    3.310H
Inactive bank version:  3.210
Download to inactive or active bank (inactive/active)?:
```

The user must type **inactive**. If active is selected, the unit switches to the inactive bank before continuing.

After typing **inactive**, the unit responds:

```
Beginning download to SCM inactive bank
Ready for download
.
.
```

When the periods begin after the message, Ready for download, type:

<Control> a <PgUp> A <filename> <Return>

The SCM software load begins.

Once the download is complete, the banks are not switched automatically. To switch banks use the scm switch command.

Related Command

scm switch—used to switch banks in the SCM

SCM Rst_alarms Command

Command

scm rst_alarms—used to reset the SCM alarms that are latched set

Command Use

scm rst_alarms <Return>

SCM Switch Command

Command

scm switch—used to switch banks in the SCM

Command Use

scm switch <Return>

Description

This command causes the active and inactive banks to swap states.

After typing the command, the unit responds:

```
Active bank version:    3.310H
Inactive bank version:  3.210
are you sure!!! y(es), if so.
```

Type **yes** to continue or **<Return>** to abort the process. After typing **yes**, the SCM switches to the other bank.

SCM Version Command

Command

scm version—used to display the software version of the active and inactive banks of the SCM

Command Use

scm version <Return>

Description

After typing the command, the unit responds:

```
Active bank version:    3.310H
Inactive bank version:  3.210
```

Set Align_type Command

Command

set align_type—used to configure the NIU for the synchronization method used by the paging system

Command Use

set align_type <Return>

Description

The alignment type is set to either GPS or direct synchronization.

After typing the command, the unit prompts for the synchronization type:

```
Alignment type is <current alignment type>
Enter alignment type (gps,dir_sync):
```

After typing the new alignment type, the unit responds:

```
Alignment type is <alignment type entered>
```

If **gps** alignment is entered, the unit asks if you want to enable or disable fallback. Enabling fallback allows the NIU to freerun if GPS tracking is lost and continue paging. Type **y** to enable fallback or **n** to disable fallback. If fallback is selected, refer to the **set fallback_timer** command to set the maximum fallback time.

Related Commands

set fallback_timer—used to set the GPS fallback time

show status—displays setup and parameter values for the NIU

Set Ant Command

Command

set ant—used to set the antenna relay to either receive (Rx) or transmit (Tx)

Command Use

set ant <Return>

Description

This command sets the state of the antenna relay.

After typing the command, the unit prompts for the new relay setting:

```
ant = <currently set rx or tx>
Enter new ant (rx,tx):
```

After typing the new relay setting, the unit responds:

```
ant = <new antenna selection rx or tx>
```

Related Command

show status—displays setup and parameter values for the NIU

Set Auxports Command

Command

set auxports—used to set the four auxports to either inactive or active

Command Use

set auxports <Return>

Description

After typing the command, the unit responds:

```
aux1 = <current state>
Enter new state (inactive/active):
```

In the following steps, press <**Return**> to skip entry for that option and continue to the next auxport state entry step.

After typing the state selected for auxport one, the unit prompts for the state of auxport two:

```
aux1 = <state entered>

aux2 = <current state>
Enter new state (inactive/active):
```

After typing the state selected for auxport two, the unit prompts for the state of auxport three:

```
aux2 = <state entered>

aux3 = <current state>
Enter new state (inactive/active):
```

After typing the state selected for auxport three, the unit prompts for the state of auxport four:

```
aux3 = <state entered>

aux4 = <curent state>
Enter new state (inactive/active):
```

After typing the state selected for auxport four, the unit responds:

```
aux4 = <state entered>
```

Related Command

show status—displays setup and parameter values for the NIU

Set Bps Command

Command

set bps—used to set the console port baud rate

Command Use

set bps <Return>

Description

This command sets the baud rate of the front panel console port.

After typing the command, the unit responds:

```
bps = <current bps>
Enter new bps (300,1200,2400,4800,9600,19200,38400,57600):
```

After typing the new baud rate from the displayed choices, the unit console port switches to the newly entered baud rate for communication.

After the baud rate is changed, the baud rate for the dumb terminal or terminal emulation software on the PC must be changed to match the console rate (with Procomm Plus terminal emulation software, use the **<Alt P>** command to change the baud rate).

Set Caud_dir Command

Command

set caud_dir—used to set the C-LAN audio line direction (see Appendix F)

Command Use

set caud_dir <Return>

Description

This command sets the direction of the C-LAN audio line. The audio line should be set as an input if the analog link input is to be received oven the C-LAN. It should be set as an output if the NIU is supplying the analog link signal to other NIUs across the C-LAN.

After typing the command, the unit responds:

```
caud_dir = <current source>
Enter new caud_dir (input,output):
```

After typing the audio line direction, the unit responds:

```
caud_dir = <source entered>
```

Note: No more than one NIU on the C-LAN should be configured with the C-LAN audio line as an output.

Related Commands

set link—used to setup the configuration of link stream type, speed, and source

show status—displays setup and parameter values for the NIU

Set Caud_out Command

set caud_out—used to set the C-LAN audio line source (see Appendix F)

Command Use

set caud_out <Return>

Description

This command selects the source for the C-LAN audio signal when it is configured as an output. The audio signal can be routed from the NIUs external analog input (**rx**) or from the dial modem (**phone**).

*Note: Use of the **phone** option is not recommended.*

After typing the command, the unit responds:

```
caud_out = <current source>
Enter new caud_out (rx,phone):
```

After typing the selection for the audio source, the unit responds:

```
caud_out = <source entered>
```

Related Commands

set link—used to setup the configuration of link stream type, speed, and source

show status—displays setup and parameter values for the NIU

Set Cdig_dir Command

Command

set cdig_dir—used to set the C-LAN digital link signal direction source (see Appendix F)

Command Use

set cdig_dir <Return>

Description

This command sets the direction of the C-LAN digital link signals (clock and data). The direction should be set to input if the digital link signals are to be received over the C-LAN. The direction should be set to output if the NIU is supplying the digital link signals to the other NIUs across the C-LAN.

After typing the command, the unit responds:

```
cdig_dir = <current source>
Enter new cdig_dir (input,output):
```

After typing the digital link signal direction, the unit responds:

```
cdig_dir = <source entered>
```

Note: No more than one NIU on the C-LAN should be configured with the C-LAN digital link as an output.

Related Commands

set link—used to setup the configuration of link stream type, speed, and source

show status—displays setup and parameter values for the NIU

Set Cdig_out Command

Command

set cdig_out—used to set the C-LAN digital link signal source (see Appendix F)

Command Use

set cdig_out <Return>

Description

This command selects the source of the source of the C-LAN digital link signals when they are configured as outputs. The source can be either the link modem (**r96**) or the external digital input (**digin**).

After typing the command, the unit responds:

```
cdig_out = <current source>
Enter new cdig_out (r96,digin):
```

After typing the selection for the digital source, the unit responds:

```
cdig_out = <source entered>
```

Related Commands

set link—used to setup the configuration of link stream type, speed, and source

show status—displays setup and parameter values for the NIU

Set Con Command

Command

set con—used to set dial modem parameters

Command Use

set con <Return>

Description

This command is used to set the dial modem parameters.

After typing the command, the unit shows the current settings and prompts for the new modem type (see Figure B-22).

```
modem type  = <current modem type>
auto baud   = <current auto baud state>
max rate    = <current max rate>
init string = <current init string>

Modem type (internal|external):
```

Figure B-22: Set Con Modem Parameters Display

In the following steps, type <**Return**> to skip entry for that option and continue to the next step.

After typing the new selected modem type, the unit prompts for whether autobauding should be enabled:

```
Auto baud (y/n):
```

After typing the new selected state of autobaud setting, the unit prompts for the maximum baud rate:

```
Enter new max rate (300,1200,2400):
```

After typing the new maximum baud rate, the unit prompts for the modem initialization string:

```
Enter new init string (40 char max):
```

After typing the new initialization string, the unit displays the new settings:

```
modem type  = <modem type entered>
auto baud   = <auto baud state entered>
max rate    = <max rate entered>
init string = <init string entered>
```

Set Cpuok Command

Command

set cpuok—used to set the status of the cpuok parameter to either yes or no

Command

set cpuok <Return>

Description

After typing the command, the unit responds:

```
cpuok = <current state>
Set cpuok (y/n):
```

After typing the selected cpuok state, the unit responds:

```
cpuok = <state entered>
```

Related Command

show status—displays setup and parameter values for the NIU

Set Da Command

Command

set da—used to set the value of the D / A converter controlling the 5 MHz reference oscillator

Command Use

set da <Return>

Description

The output frequency of the 5 MHz reference oscillator is controlled by a D / A converter. The PLL normally automatically adjusts the D / A to maintain the correct output frequency. This command allows the user to directly set the D / A value.

- A D / A value of 0 sets the oscillator to its minimum value
- A D / A value of 16383 sets the oscillator to its maximum value

After typing the command, the unit responds:

```
D/A = <current D/A value>
Enter new D/A value (0 - 16383):
```

After typing the new D / A converter value, the unit responds:

```
D/A = <D/A value entered>
```

The PLL will be restarted if the D / A value is changed.

Related Command

set osc—used to align the 5 MHz reference oscillator

show status—displays setup and parameter values for the NIU

Set Daa Command

Command

set daa—used to control the DAA board in the dial modem

Command Use

set daa <Return>

Description

This command sets the DAA board to the modem, off-hook, or on-hook state. In the modem state, the DAA is automatically controlled by software. This is the normal mode of operation. Selecting the off-hook or on-hook state allows the user to override software control and force the modem off-hook or on-hook respectively.

After typing the command, the unit responds:

```
daa = <current daa state>
Enter new daa (modem,offhk,onhk):
```

After typing the new DAA board state, the unit responds:

```
daa = <daa state entered>
```

Set Dis Command

Command

set dis—used to control disabling of the transmitter

Command Use

set dis <Return>

Description

This command controls the capability of the NIU to key the transmitter.

Three states are available:

- **No** state—clears disabling of the transmitter
- **Yes** state—disables the transmitter, preventing it from being keyed
- **Maintenance** state—disables keying of the transmitter for normal paging traffic, but allows keying for test data, OTA maintenance, and station ID

After typing the command, the unit responds:

```
dis = <current state>
Disable (no,yes,maint):
```

After typing the new disable state, the unit responds:

```
dis = <state entered>
```

The set dis command is not intended for controlling transmitter keying for servicing the transmitter and antenna. Always take appropriate precautions before performing service

Related Command

show status—displays setup and parameter values for the NIU

Set Failsafe_timeout Command

Command

set failsafe_timeout—used to set the SuperStream link failsafe time out

Command Use

set failsafe_timeout <Return>

Description

This command configures the SuperStream link failsafe time out. If the timeout is enabled, the NIU will automatically switch to the off-line flash software bank (if it contains C-NET software) if the SuperStream link is lost for more than the timeout value. This failsafe feature is intended for use when switching over a paging system from a C-NET link to a SuperStream link

After typing the command, the unit responds:

```
failsafe_timeout <is disabled or = current value>
Enter new failsafe_timeout (disable, 180-86400):
```

Enter the new timeout value in seconds, or **disable** to disable failsafe timeout operation.

After typing the new time-out value, the unit responds:

```
failsafe_timeout <is disabled or = entered value>
```

Note: The failsafe timeout should be disabled after the C-NET to SuperStream conversion is complete and reversion to C-NET is longer desired.

Related Command

show config—displays all configuration parameters

show status—displays setup and parameter values for the NIU

Set Fallback_timer Command

Command

set fallback_timer—used to set the GPS fallback time

Command Use

set fallback_timer <Return>

Description

This command set the amount of time that the NIU PLL is allowed to freerun if GPS is lost.

This timer is used only when GPS fallback is enabled in the set align_type command.

After typing the command, the unit responds:

```
GPS fallback time = <current fallback time>
Enter new time in minutes (max = 65535, forever = 0):
```

Enter the freerun time in minutes (1-65535), or 0 to allow freerunning forever.

After typing the new fallback time value, the unit responds:

```
GPS fallback time = <forever or entered value>
```

Note: Carefully consider the fallback time value you choose. Since a synchronization timing source is not available while GPS is lost, the local reference clock phase and frequency will drift over time. This can cause simulcast and transmitter frequency problems if the fallback time is too large.

Related Command

set align_type—used to configure the NIU to match the synchronization method used by its paging system

Set Gps_delay Command

Command

set gps_delay—used to set the GPS delay (for GPS synchronization only)

Command Use

set gps_delay <Return>

Description

This command sets the GPS delay offset. The GPS delay offset compensates for varying equipment delays through the GPS equipment and the transmitter. The delay must be set properly for each NIU to coordinate simulcast transmission by all paging transmitters in a system.

After typing the command, the unit responds:

```
GPS delay = <current delay> uS
Enter new GPS delay in uS (-450000 to +450000):
```

Enter the GPS delay value in microseconds.

After typing the new GPS delay, the unit responds:

```
GPS delay = <entered time> uS
```

Related Command

show status—displays setup and parameter values for the NIU

Set Hi_ber Command

Command

set hi_ber—used to set the upper bit error rate (BER) threshold

Command Use

set hi_ber <Return>

Description

This command sets the upper threshold for reporting a high BER alarm.

After typing the command, the unit responds:

```
hi_ber = <current high ber value> E-06
Enter new high ber (BER/E-06)[<current low ber value>-65535]:
```

Enter the new threshold in bit errors per million. The value must be greater than or equal to the current low BER threshold.

After typing the new high BER threshold value, the unit responds:

```
hi_ber = <entered high ber value> E-06
```

Related Command

set lo_ber—used to set the lower bit error rate (BER) threshold

Set Key Command

Command

set key—used to manually key the transmitter

Command Use

set key <Return>

Description

This command is used to control manual keying of the transmitter to active (**yes**) or inactive (**no**).

After typing the command, the unit responds:

```
key = <current state>
Key (y/n):
```

Enter **y** to key the transmitter, or **n** to dekey the transmitter.

Note: The effect of manual keying is temporary and will be overridden if the NIU is receiving paging data.

After typing the selected key state, the unit responds:

```
key = <state entered>
```

Related Command

show status—displays setup and parameter values for the NIU

Set Level Command

Command

set level—used to adjust the audio level of the analog link stream

Command Use

set level <Return>

Description

This command adjusts the audio level of the analog link stream to its optimal value of -10db (+/- 1db). If the NIU is able to achieve the target level, the NIU responds with the new signal-to-noise ratio and the new level as follows:

```
ANA-S/N:  <current level>  dB   ANA-LVL:  <current level>  dB
Adjusting level to -10db
ANA-S/N:  <current level>  dB   ANA-LVL:  10  dB
```

If the NIU can not adjust to the target level, the unit responds:

```
ANA-S/N:  <current level>  db   ANA-LVL:  <current level>  db
Adjusting level to -10db
Couldn't achieve desired level
ANA-S/N:  <current level>  db   ANA-LVL:  <current level>  db
```

Related Command

level—used to manually adjust the audio level of the analog link input

show status—displays setup and parameter values for the NIU

test level—used to test the level of the audio signal of the analog stream

Set Link Command

Command

set link—used to configure the link type, speed, and source (see Appendix F)

Command Use

set link <Return>

Description

This command configures the link input.

In the following steps, type <**Return**> to skip entry for that option and continue to the next entry step.

After typing the command, the unit responds:

```
link = <current link type, link speed, and link source>
are you sure!!! y(es), if so.
```

After typing **yes**, the unit responds:

```
Enter new type (analog,fm2,fm3):
```

Enter the new link input type. Select one of the following:

- **analog**— for an analog link input
- **fm2**—for a standard digital input
- **fm3**— for a digital input with FM^3 overspeed

After typing the new link type, the unit responds:

```
Enter new speed (4800,9600,19200,38400,56000,57600,64000,76800):
```

Note: The list of available speeds will vary depending on the selected link type.

Enter the new link speed. For FM^3 type links, enter the nominal speed (without the overspeed factor).

After typing the new link speed, the unit responds if the link type is **fm2** or **fm3**:

```
CNET2 source (clan,digital_in):
```

Enter **clan** if the link input source is the CLAN digital lines. Enter **digital_in** if the source is the external digital input.

If the link type is analog, the unit responds:

```
Enter new source (ext_rx,clan,loopbk,phone):
```

Enter the analog link input source. Select one of the following:

- **ext_rx**— for external audio input
- **clan**—for the C-LAN analog input
- **loopbk** and **phone**— these options are intended for testing purposes only and should not be used.

After typing the new link source, the unit display the new settings:

```
link = <New link type, link speed, and link source>
```

Related Command

show status—displays setup and parameter values for the NIU

set caud_dir—used to set the C-LAN audio line direction

set caud_out—used to set the C-LAN audio line source

set cdig_dir—used to set the C-LAN digital link signal direction source

set cdig_out—used to set the C-LAN digital link signal source

Set Link_delay Command

Command

set link_delay—used to set the link delay offset (for direct synchronization only)

Command Use

set link_delay <Return>

Description

This command sets the link delay offset.

The link delay offset compensates the delay through the transmitter and for varying link propagation delays between the paging transmitter sites in the system and the paging controller. The delay must be set properly for each NIU to coordinate simulcast transmission by all paging transmitters in a system. OTA maintenance cycles can be used to determine the correct delay value for each transmitter.

The range of time is from –4000000 to +4000000 µs.

After typing the command, the unit responds:

```
link delay = <current delay> uS
Enter new link delay in uS (-4000000 to +4000000):
```

Enter the link delay value in microseconds.

After typing the new link delay offset, the unit responds:

```
link delay = <entered time> uS
```

Related Command

show status—displays setup and parameter values for the NIU

Set Lo_ber Command

Command

set lo_ber—used to set the lower bit error rate (BER) threshold

Command Use

set lo_ber <Return>

Description

This command sets the lower threshold for the high BER alarm. Once the high BER alarm is set, the BER must drop below the lower threshold before the alarm will be cleared.

After typing the command, the unit responds:

```
lo_ber = <current low ber value> E-06
Enter new low ber (BER/E-06)[0-<current high ber value>]:
```

Enter the new threshold in bit errors per million. The value must be less than or equal to the current high BER threshold.

After typing the new low BER threshold value, the unit responds:

```
lo_ber = <entered low ber value> E-06
```

Related Command

set hi_ber—used to set the upper bit error rate (BER) threshold

Set Maxwait Command

Command

set maxwait—used to set the maximum wait time allowed between PLL adjustments

Command Use

set maxwait <Return>

Description

This command is used to set the maximum wait time between PLL adjustments to the reference oscillator. Only the current link type is affected by the setting; each link type retains its own setting.

After typing the command, the unit responds:

```
Max <current link type> wait is 25000
Enter new maxwait, (500-25000):
```

Enter the new wait time in seconds.

After typing the new maximum wait time, the unit responds:

```
Max <current link type> wait is <entered time>
```

Set Osc Command

Command

set osc—used to align the 5 MHz reference oscillator

Command Use

set osc <Return>

Description

This command is used to align the 5 MHz reference oscillator. Before proceeding with the command, connect a frequency counter to the 5 MHz reference output BNC connector, J30 on the Nucleus Paging Station Backplane.

Note: NIU oscillator alignment should be performed only after the NIU has been powered up for at least one hour. A frequency counter of 0.6 ppb or greater accuracy is recommended to assure accurate alignment. The frequency counter should be allowed to warm up and should be calibrated per the manufacture's instructions.

After typing the command, the unit responds:

```
are you sure!!! y(es), if so.
```

The user types **yes** to continue with the alignment or **no** to abort the process.

After typing **yes**, the unit responds:

```
PLL is off, and D/A set to low end (D/A = 0)
Adjust osc to 4,999,997.0 Hz
<RET> to cont, <ESC><RET> to exit
```

Remove the oscillator tuning slug cover screw and adjust the oscillator tuning screw until the frequency matches the displayed value.

Type **<Return>** to proceed to the next step.

```
D/A is set to high end (D/A = 16383)
Adjust R29 to 5,000,003.0 Hz
<RET> to cont, <ESC><RET> to exit
```

Adjust potentiometer R29 until the frequency matches the displayed value.

Type **<Return>** to complete the alignment process:

```
D/A is set to mid-point (D/A = 8192)
```

The frequency counter should indicate 5,000,000.0 Hz with little or no error.

Set Pll Command

Command

set pll—used to enable or disable the PLL

Command Use

set pll [1 or 0] <Return>

Description

This command is used to enable or disable the PLL.

An optional parameter of 0 or 1 may be entered with the command. If this parameter is entered, the PLL is disabled (0) or enabled (1), and the new PLL status is displayed.

If only the command is entered, the unit responds:

```
PLL is <current state>
Enable PLL (y/n):
```

After typing **y** to enable the PLL or **n** to disable it, the unit responds:

```
PLL <state entered>
```

Related Command

show status—displays setup and parameter values for the NIU

Set Redundancy Command

Command

set redundancy—used to enable or disable N+1 redundancy

Command Use

set redundancy <Return>

Description

This command is used to enable or disable N+1 redundancy and configure the unit as a master or slave.

After typing the command, the unit responds:

```
redundancy = <current state>
Enable N+1 redundancy: (y/n):
```

To disable N+1 redundancy, type **n** and the unit responds:

```
redundancy = no
```

To enable N+1 redundancy, type **y** and the unit responds:

```
redundancy = yes
master = no
Set device as master: (y/n):
```

The device can be set to be a master by typing **y** or set to be a slave by typing **n**.

Related Commands

config redundancy—used to configure an N+1 Master NIU

show status—displays setup and parameter values for the NIU

Set Resync Command

Command

set resync—used to force the NIU to resynchronize to the link data stream

Command Use

set resync <Return>

Description

This command forces the NIU to resynchronize to the link data stream.

After typing the command, the unit responds:

```
BREAKS STREAM
are you sure!!! y(es), if so,
```

Type **yes** to force a resynchronization.

Set Rx_delay Command

Command

set rx_delay—used to set the monitor receiver delay for OTA

Command Use

set rx_delay <Return>

Description

The range of time is from –1000000 to +1000000 µs.

After typing the command, the unit responds:

```
rx_delay = <current delay> uS
are you sure!!! y(es), if so.
```

After typing **yes**, the unit responds:

```
Enter new rx_delay in uS (-1000000 to +1000000):
```

After typing the new receiver delay time, the unit responds:

```
rx_delay = <entered time> uS
```

Related Command

show config—displays all configuration parameters

Set Txfreq Command

Command

set txfreq—used to select one of eight available transmit channels (frequencies)

Command Use

set txfreq <Return>

Description

After typing the command, the unit responds:

```
txfreq = <current TX freq>
Enter TX freq - (1-8):
```

After typing the new transmit frequency channel, the unit responds:

```
txfreq = <TX freq entered>
```

Related Command

show status—displays setup and parameter values for the NIU

Set Txtype Command

Command

set txtype—used to identify the transmitter type used with the NIU

Command Use

set txtype <Return>

Description

This command sets the name of the transmitter type being controlled by the NIU.

Any name of up to eight characters may be entered. This command is for informational purposes only and does not affect NIU operation.

After typing the command, the unit responds:

```
txtype = <current txtyp>
Enter new txtype:
```

After typing the new txtype, the unit responds:

```
txtype = <txtype entered>
```

Related Command

show status—displays setup and parameter values for the NIU

Show Alarms Command

Command

show alarms—displays the current and latched NIU alarms

Command Use

show alarms <Return>

Description

This command displays the current and latched state of the NIU alarms.

Appendix C, Table C-1 contains a complete list of all NIU alarms and their definitions.

After typing the command, the unit displays the alarm state (see Figure B-23 and Table B-8).

```
DEVICE 1    : 20 char string          TIME/DATE  07:25:25  07-15-1997
##  ________name________ latch curr   ##  ________name________ latch curr
00 powerfail/restart     clr  clr     16 link modem fail       clr  clr
01 20 char string        SET  SET     17 timing fail           clr  clr
02 20 char string        SET  SET     18 dial modem fail       clr  clr
03 SCM alarms            clr  clr     19 lost link clock       SET  clr
04 N+1 fault             clr  clr     20 bad stream id         SET  clr
05 Multi slave fail      clr  clr     21 synthszr out of lock  clr  clr
06 rx squelch            clr  clr     22 low forward power     clr  clr
07 ram battery           clr  clr     23 GPS fail              clr  clr
08 not used in nucleus                24 flash cksum err       clr  clr
09 lost stream sync      SET  clr     25 nv ram error          clr  clr
10 tx disable            clr  clr     26 high reflected power  clr  clr
11 high BER              clr  clr     27 tx fault              clr  clr
12 ota maint error       clr  clr     28 frm overrun           clr  clr
13 paging disabled       clr  clr     29 not used in nucleus
14 DAC hi/low limit      clr  clr     30 DIP switches          clr  clr
15 page scheduling err   clr  clr     31 daily call-in         clr  clr
```

Figure B-23: Show Alarms Current and Latched NIU Alarms Display

Table B-8: Latched and Current Alarm States

Latched	Current	Definitions
Clr	**Clr**	Alarm has not occurred since last alarm reset.
Set	**Set**	Alarm has occurred since last alarm reset and is currently active.
Set	**Clr**	Alarm has occurred since last alarm reset and is not currently active.

Related Command

reset alarm—resets (clears) all latched noncurrent alarms (same function as toggling the alarm reset switch)

Show Analog Command

Command

show analog—displays the state of the analog inputs

Command Use

show analog <Return>

Description

This command displays the current state of the analog inputs.

After typing the command, the unit responds (see Figure B-24).

```
DEVICE 1    : 20 char string          TIME/DATE  13:06:11  07-16-1997
unkeyed
 1. 20 char string:          3.1 V      2. 20 char string:          3.1 V
 3. forward power:           0.0 W      4. reflected power:         0.0 W
                                        6. rx squelch:              4.0 V
 7. ram battery:             3.5 V      8. not used in nucleus:
29. not used in nucleus:
```

Figure B-24: Show Analog Alarm Name and Voltage Display

The display is periodically updated until **<Return>** is typed.

Related Command

alarms—used to setup alarms 1, 2, 6, and 7 in the NIU

Show Clan Command

Command

show clan—displays the C-LAN Arcnet statistics

Command Use

show clan <Return>

Description

This command displays a summary of C-LAN Arcnet event statistics.

After typing the command, the unit responds (see Figure B-25).

```
C-LAN statistics:
Tx interrupts:     14049
Rx interrupts:     0
ExcNak interrupts: 0
Recon interrupts:  1
My recons:         0
Tx errors:         1
Tx timeouts:       0
Rx fulls:          0
```

Figure B-25: Show C-LAN Statistics Display

The Tx interrupts and Rx interrupts statistics can be used as a measure of C-LAN Arcnet traffic. The remaining statistics should be very low if the C-LAN is operating properly.

Show Config Command

Command

show config—displays all configuration parameters

Command Use

show config <Return>

Description

This command displays a summary of the configured NIU parameters.

After typing the command, the unit responds (see Figure B-26).

```
DEVICE NAME:       20 char string
TIME & DATE:       07:33:53  07-15-1997
PRIMARY SYSTEM ID: 1
ALTERNATE SYS IDS: none
DEVICE ID:         1
C-LAN ID:          1
ARCNET ID:         1
STREAM ID:         1023
FAIL-SAFE TIMEOUT: disabled
TX MAINT GROUP:    0
VALID TX CHANNELS: 1
POCSAG POLARITY:   norm
FLEX/ReFLEX POL:   norm
MAINT POLARITY:    norm
COLOR CODE:        0 (0x5555)
RX DELAY:          0 uS
OTA THRESHOLD:     30 uS

<RET> to cont, <ESC><RET> to exit
```

Figure B-26: Show Configuration Parameters Display

The user may type <**Return**> to continue with the remainder of the display or <**Esc**> <**Return**> to exit this command. After typing <**Return**>, if you have configured maintenance groups, the unit responds:

```
  OTA MAINT GROUPS:
GROUP   DEVICE   AIR_DELAY   LOG OTA
  1        1        0 uS      yes
```

Related Commands

config arcnetid—used to set the arcnetid number

config clan_netid—used to set the clan_netid number

config color_code—used to set the color_code index

config devid—used to set the NIU device identification (ID) number

config maint_polarity—used to configure the OTA maintenance transmit polarity

config name—used to set the device name

config ota_maint—used to configure the NIU to monitor over-the-air maintenance cycles

config ota_threshold—used to set the ota_threshold value

config streamid—used to set the link stream ID

config sysid—used to set the system identification

config tx_maint—used to configure the maintenance group of the NIU

config tx_polarity—used to configure POCSAG and FLEX/ReFLEX data polarity

config valid_chan—used to configure the valid transmission channels

set failsafe_timeout—used to set the SuperStream link failsafe time out

set rx_delay—used to set the monitor receiver delay for OTA

Show Dipsw Command

Command

show dipsw—displays the settings of DIP switch S19

Command Use

show dipsw <Return>

Description

After typing the command, the unit responds (see Figure B-27 and Table B-9).

```
DIP switch S19:

  Off  On  Function     DIP setting  NV setting
  -------- --------     -----------  ----------
1 |    X | Link mode    digital      digital
2 | X    | Reserved
3 | X    | Reserved
4 | X    | Link type    fm2          fm2
5 | X    | Reserved
6 | X    | Reserved
7 |    X | Reserved
8 | X    | Reserved
  --------
```

Figure B-27: Show Dipswitch S19 Display

Table B-9: Description of the Dipswitch S19 Display

Column	Description
Off/On	Lists the current state of each switch pole of dipswitch S19
Function	Lists the function of each switch pole; poles 2, 3, and 5 through 8 are reserved (unused)
DIP setting	Lists the configuration defined by the DIP switch setting
NV setting	Lists the configuration defined by the NVRAM settings

Show Except Command

Command

show except—for debugging purposes only

Show Gps Command

Command

show gps—displays the global positioning system (GPS) status, time / position, tracking data and information

Command Use

show gps <Return>

Description

After typing the command, the unit responds (see Figure B-28).

```
DEVICE 1    : 20 char string          TIME/DATE  14:13:21  06-11-1997

------------------------ GPS STATUS >>>>>> GOOD <<<<<< ------------------------
GPS TOD status : good                 GPS 1PPS status: active
Update source  : local

------------------------------ GPS TIME/POSITION ------------------------------
GMT            : 19:13:05             Latitude       : 32:50:33 N
Date           : 06-11-1997           Longitude      : 97:17:35 W
                                      Height         : +220.72 meters

------------------------------ GPS TRACKING INFO ------------------------------
Visible sats   : 7                    SAT ID   SS  LOCK     SAT ID   SS  LOCK
Tracking sats  : 6                     1   5   55   yes      2  10   59   yes
DOP            : hold                  3   9   38   yes      4  30   37   yes
Fix type       : --                    5   7   31    NO      6  24   60   yes


--------------------------- LOCAL GPS RECEIVER INFO ---------------------------
Local receiver : Basic Oncore         Software ver   : 8
                                      Software rev   : 4
```

Figure B-28: Show GPS Information Display

Show Key Command

Command

show key—displays key time statistics

Command Use

show key<Return>

Description

This command displays the keying statistics since the last key time statistics reset.

After typing the command, the unit responds (see Figure B-29 and Table B-10).

```
DEVICE 1    : 20 char string          TIME/DATE  09:23:30  06-20-1997
Key stats accum time     : 2 days & 23:50:20
TX KEY state             : unkeyed
Current key time         : 0 days & 00:00:00
Last key time            : 0 days & 00:00:00
Total key time           : 0 days & 00:00:00
Time since last key      : 2 days & 23:50:20
Last key stats reset     : 09:33:10  06-17-1997

Reset the key time stats? (y/n):
```

Figure B-29: Show Key Time Statistics Display

The user may type **y** to reset the key time statistics and exit this command or **n** to exit this command without resetting the key time statistics.

Table B-10: Description of Key Time Statistics (Sheet 1 of 2)

Statistic Name	Description
Key stats accum time	total accumulated time since last key statistics reset
TX KEY state	current key state (either keyed or unkeyed)
Current key time	elapsed time of current key; if dekeyed this time is zero (0)
Last key time	elapsed key time of the last time the transmitter was keyed

Table B-10: Description of Key Time Statistics (Sheet 2 of 2)

Statistic Name	Description
Total key time	total accumulated time keyed since last key statistics reset
Time since last key	elapsed time since last key
Last key stats reset	time and date of the last key statistics reset

Show Log Command

Command

show log—displays a list of logged alarms and events (see Table C-1 and Table C-2)

Command Use

show log [<count> or **all] <Return>**

Description

This command displays the alarms and events logged by the NIU.

If no option is entered, all alarms and events which have occurred since the last **show log** command are displayed. If the option **count** is entered, the last count entries from the log are displayed. If the option **all** is entered, the entire log is displayed.

After typing the command, the unit responds (see Figure B-30).

```
DEVICE 1    : 20 char string          TIME/DATE  11:30:16  07-15-1997
NUM  DEV   ID   EVENT NAME            ###  TYPE TIME      DATE       STATUS
 66  NIU     1  bad stream id         20   A    08:23:17  07-15-1997  SET
 67  NIU     1  powerfail/restart      0   A    08:23:17  07-15-1997  SET
 68  NIU     1  20 char string         1   A    08:23:17  07-15-1997  SET
                val = 0
 69  NIU     1  20 char string         2   A    08:23:17  07-15-1997  SET
                val = 0
 70  NIU     1  DIP switches         30   A    08:23:17  07-15-1997  SET
 71  NIU     1  lost stream sync      9   A    08:23:49  07-15-1997  SET
 72  NIU     1  timing fail           17   A    08:24:12  07-15-1997  SET
 73  NIU     1  load flash            32   E    08:34:51  07-15-1997  n/a
 74  NIU     1  powerfail/restart      0   A    08:34:58  07-15-1997  SET
 75  NIU     1  lost link clock       19   A    08:34:59  07-15-1997  SET
 76  NIU     1  paging disabled       13   A    08:34:59  07-15-1997  SET
 77  NIU     1  DIP switches          30   A    08:34:59  07-15-1997  SET
 78  NIU     1  20 char string         1   A    08:35:01  07-15-1997  SET
                val = 0
 79  NIU     1  20 char string         2   A    08:35:01  07-15-1997  SET
                val = 0
10  more events in log:
<RET> to cont, <ESC><RET> to exit
```

Figure B-30: Show Log Display

The user may type <**Return**> to continue with the remainder of the log display or <**ESC**> <**Return**> to exit this command. Each time <**Return**> is pressed, the unit responds with the next portion of the log display.

Show Measure Command

Command

show measure—displays OTA maintenance measurement data

Command Use

show measure [<maint group> or **all] <Return>**

Description

This command displays data from received OTA maintenance bursts.

If no option is entered, the last measurement for each configured maintenance group is displayed. If the option **maint group** is entered, all of the recorded measurements for that maintenance group are displayed. If the option **all** is entered, all of the recorded measurements for all configured maintenance group are displayed.

After typing the command, the unit responds (see Figure B-31).

```
[ ] = Self measurement
< > = Master switched in for displayed device

DEVICE 1    : 20 char string          TIME/DATE  14:40:51  06-11-1997
DEVICE  MAINT    AIR                              REQUIRED       MEASURE
  ID    GROUP   DELAY    ERROR STATUS              ADJUST      TIME & DATE
    1     1       0 uS   End of bufrs, last=         +0 uS   00:00:00  01-01-88
```

Figure B-31: Show Maintenance Measurement Data Display

Show Mem Command

Command

show mem—displays NIU memory usage and task information

Command Use

show mem <Return>

Description

This command displays the current memory usage and information about all of the NIU tasks.

After typing the command, the unit responds (see Figure B-32).

```
Region 0:  89264 of  94916 bytes used
Region 1:  80384 of 131072 bytes used

Task       Stack                                Task       Stack
Name  Pri  Top        Size   Used    %   Name  Pri  Top        Size   Used    %
LED_  100  0001b3fc   1280    365   28   PORT  100  0001aefc   1280    535   41
POR1  100  0001a9fc   1280    542   42   NIUM  100  0001a4fc   1280    375   29
NSIG  102  00019ffc   2560   1414   55   NPLL  100  000195fc   1536    345   22
REPT  100  00018ffc   2048    953   46   TEST   99  000187fc   1536    297   19
NOTA  100  000181fc   1792    355   19   SALM  100  00017afc   1280    319   24
SHEL  100  000175fc   2304   1663   72   SHL1  100  00016cfc   2304    997   43
RSHE  100  000163fc   2304   1049   45   GPS_  101  00015afc   2048   1137   55
 SCM  100  000152fc   1280    605   47   SCMA  100  00014dfc   1536   1141   74
CCMD  101  000147fc   1536    357   23   ARCO  102  0000defc   1280    370   28
ARCA  102  0000d9fc   1280    367   28   ECHO  100  0000d4fc    768    355   46
IPTK  102  0000d1fc   1280    297   23   NP1_  101  0000ccfc   2048    965   47
```

Figure B-32: Show Memory Display

Show Ota Command

Command

show ota—displays OTA information from a reporting NIU

Command Use

show ota <Return>

Description

This command displays the log, alarms status, and versions information for NIUs reporting over the air to it.

After typing the command, the unit responds:

```
Display OTA log, alarms or versions?
```

Select and display the OTA log, alarms, or versions.

Show Phone Command

Command

show phone—allows access to the alarm status from a reporting NIU

Command Use

show phone <Return>

Description

This command displays the alarm status for NIUs reporting over the air to it.

After typing the command, the unit responds (see Figure B-33).

```
REPORTING PHONE STATS -  20 char string  (disabled)
              Running Total
Total tries         0
Successful          0
No dialtone         0
Busy                0
No answer           0
Bad connect         0
Accum time       0 days & 02:08:57
Last reset     08:34:58  07-15-1997

Reset the stats? (y/n):
```

Figure B-33: Show Reporting Phone Status Display

The user may reset the phone statistics. Type **y** to reset the statistics or **n** to not reset the statistics.

Show Report Command

Command

show report—displays the options for the alarm reporting function

Command Use

show report <Return>

Description

After typing the command, the unit responds (see Figure B-34).

```
DEVICE 1    : 20 char string          TIME/DATE  15:17:08  07-15-1997
rept_phone#                 : 20 char string
auto_rpt                    : no
alarm#'s                    : 31
events                      : no
ota_rpt                     : no
max_tries                   : 10
dial_type                   : tone
daily_call                  : none
ans_rings                   : 1
attempts used               : 0
items to rpt                : no
```

Figure B-34: Show Report Setup Display

Related Command

report—used to set up the OTA alarm and system maintenance reporting functions from the NIU

Show Rom_sum Command

Command

show rom_sum—displays checksum of ROM memory

Command Use

show rom_sum <Return>

Description

This command computes and displays the checksum of the ROM memory.

After typing the command, the unit responds:

```
EPROM cksum: <current checksum value>
```

Show Statid Command

Command

show statid—displays station ID information

Command Use

show statid <Return>

Description

After typing the command, the unit responds (see Figure B-35).

```
station id mode = sub
CHAN   ID
 1     [station_1]
 2     [test_station]
 3     []
 4     []
 5     []
 6     []
 7     []
 8     []          _
```

Figure B-35: Show Station ID Information Display