Meridian 1

Meridian Integrated RAN

Description, installation, and operation

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About this document

This document provides information about the implementation of the Meridian Integrated RAN (MIRAN) in the Meridian 1 system. It describes the MIRAN operation, installation, configuration, administration, applications, and maintenance.

It focuses on the application and administration of the MIRAN for Recorded Announcement (RAN) and music-on-hold (MOH).

The purpose of this document is to instruct the user how to install, configure, operate, and maintain the Meridian Integrated RAN (MIRAN) as a part of the overall Meridian 1 system.

The following describes what you will find in this document:

Product description describes the MIRAN functional and physical characteristics.

Installation and administration Installation describes how to prepare the Meridian 1 equipment, how to install the MIRAN into the Intelligent Peripheral Equipment (IPE) module or shelf, and how to connect it to the external voice sources and voice delivery devices.

Administration describes the MIRAN configuration, RAN implementation, MIRAN expansion, channel assignment administration, and access security administration.

Telephone set-based OA&M application describes different RAN applications based on use of the telephone OA&M access to record new announcements or to place existing announcement in or out of service.

Terminal-based OA&M application describes different RAN applications based on use of the terminal OA&M access using menus and commands.

Maintenance describes how to perform maintenance functions and how to troubleshoot the MIRAN and the associated equipment.

Appendix A lists the MIRAN display hexadecimal codes and also pin assignment and connector types for external connections to the MIRAN. It also contains an example of how to configure the system for telephone set-based OA&M access.

Appendix B describes reliability, environmental specifications, product integrity, and regulatory standards for the MIRAN.

Description

This chapter describes the NTAG36 Meridian Integrated RAN (MIRAN), both at a system level and at a card level. It describes functions, specifications, applications, engineering guidelines, and operation of the MIRAN.

System overview

The MIRAN is an Intelligent Peripheral Equipment (IPE) card compatible with Meridian 1 options 21E, 51, 51C, 61, 61C, 71, 81, and 81C. It is also compatible with Options 11E and 11C system and SL-1 systems NT and XT upgraded to support IPE cards.

The system software required to support the MIRAN operation must be X11 release 20 or later.

The MIRAN application software is shipped preinstalled in MIRAN.

The MIRAN provides multi-tasking voice processing applications such as recorded announcement (RAN) and music-on-hold (MOH).

The MIRAN communicates with X11 system software using trunk signaling messages over the DS-30X link and emulates the Enhanced Universal Trunk card. The overlays used to configure the Enhanced Universal Trunk card, trunk routes, and trunk functions are used to configure the MIRAN routes.

It provides up to eight internal one-to-one trunk emulation ports/channels and one or two external multi cross-connect channels to support RAN and MOH applications. Each multi cross-connect channel may connect to up to 16 external trunk ports at the MDF.

The largest single MIRAN card provides 8 trunk emulation ports/channels and 2 multi cross-connect channels, for a total of 10 RAN/MOH channels.

PCMCIA Flash memory cards are used to expand the MIRAN message storage memory, to install new RAN and MOH applications, and to backup messages from the MIRAN to the PCMCIA card. If only 4 minutes of message storage capacity is required, it is provided internally in the MIRAN and a Flash memory card would not be necessary for this purpose.

A maximum of 16 MIRAN cards can be linked in a LAN configuration to expand the RAN capacity beyond that provided by a single MIRAN card. This LAN configuration allows one terminal to access any MIRAN in the chain for the purpose of maintaining and configuring individual MIRAN cards and their RAN and MOH applications.

The MIRAN connects to a maintenance terminal over an RS-232 port and to an external music source over an analog I/O port. This port can also be used to input music or voice to a tape recorder. An additional analog port is available on the backplane. A telephone set can also be used to configure the MIRAN, to record new announcements, and to swap existing announcements in and out of service. To use a telephone set, one port out of eight one-to-one ports/channels must be configured as a DID port dedicated to the telephone set.

Figure 1 illustrates the communication bus structure between the MIRAN and the Meridian 1 CPU as well as the Peripheral Controller in the IPE module.

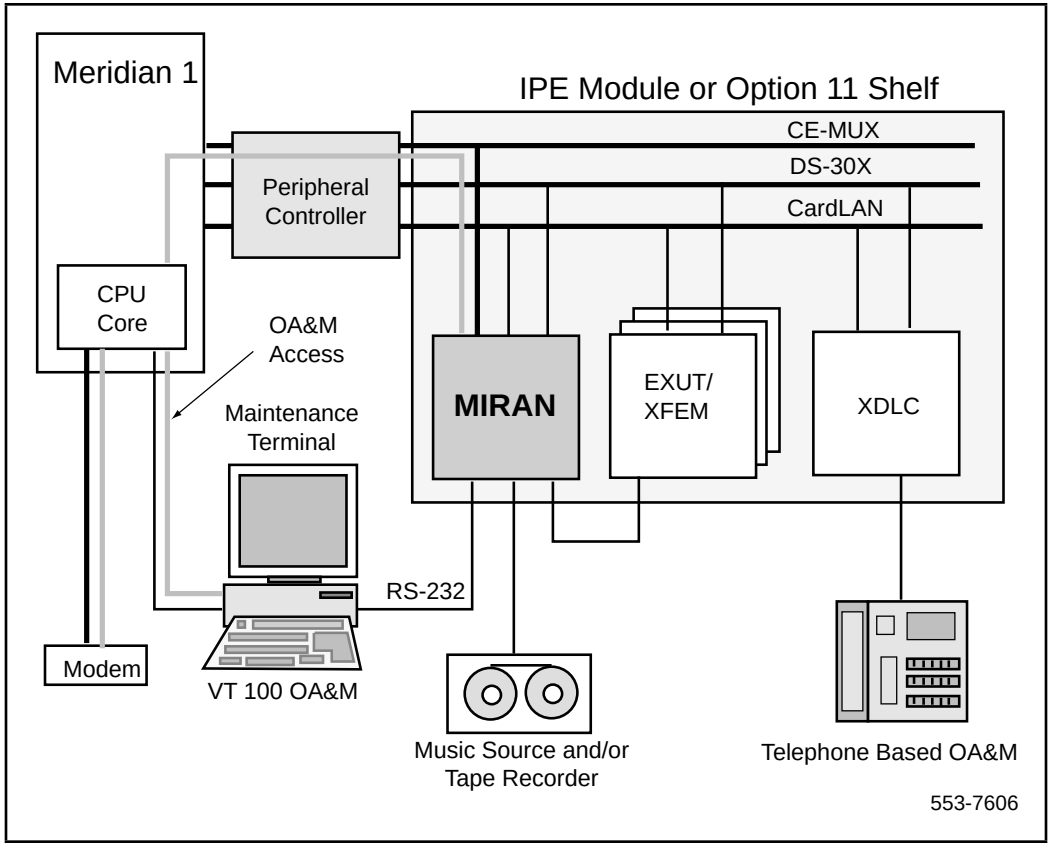
The terminal-based OA&M access is provided by the RS-232 maintenance port on Meridian 1 or Option 11E/11C systems, or, alternatively, over the CE-MUX using the pass-through feature on Options 11E and 11C. The MIRAN can also support Play, Delete, Record, and Assign functions for simple messages using a telephone set-based OA&M.

MIRAN description

The MIRAN emulates the NT8D14BA vintage or greater Enhanced Universal Trunk card. The trunk card software that supports the MIRAN was first introduced in X11 release 20. Software releases prior to X11 release 20 are not capable of supporting the MIRAN.

The MIRAN emulates any DS-30X signaling protocol, including TCM signaling, to be compatible with existing and future terminals and consoles. In addition, MIRAN provides unrestricted access to any one of the 32 voice channels on a DS-30X loop for both voice and data applications.

Figure 1
MIRAN interface structure in the Meridian 1 system



The enhanced flexibility of the MIRAN card provides:

— easily expandable, industry-standard architecture (small, medium, and large configuration controlled by keycode)

— a set of both standard and proprietary interfaces

— compatible with all systems that support IPE cards

— embedded real time operating system

— support for CE-MUX and Card-LAN

— provides simplicity of the basic system (no external devices or cables)

— versatile storage capacity features provide for:

- A minimum of 4 minutes of recording storage on the base MIRAN
- Up to 16 different messages per channel per day switchable on a time-of-day basis
- In-system upgradeable MIRAN with plug-in PCMCIA ATA Flash cards to more than five hours of storage
- Up to eight internal one-to-one RAN or MOH port/channels, which support continuous and start/stop RAN mode (seven, if one is used for telephone set-based OA&M access)
- Two cross-connect channels, which are cross-connected to a maximum of 16 trunk ports each, to provide a total of 32 RAN or MOH channels, which support only continuous RAN mode
- Music and voice storage to the limits of the available Flash memory
- Connection of up to two external analog (music) sources for recording and playing

— a versatile set of recording features that include the following:

- Different messages programmed to play at different times of day
- Batch files, which allow rapid reconfiguration in case of emergency
- Swapping of “in-service” and “in-reserve” messages using a set
- Message backup and restore capability
- Existing announcements can be transferred to the MIRAN
- New messages recorded over a telephone or from common plug-in audio equipment (e.g., CD players, cassette players, etc.)
- Password-protected RAN recording from any DTMF telephone set using a simple voice menu interface
- Professional recordings supplied to the customer on PCMCIA Flash cards for RAN and MOH
- Music storage up to the limit of available Flash memory
- Music recording provided on two external analog ports

MIRAN design characteristics

The MIRAN card supports voice processing by providing connectivity to the Meridian 1 system, voice storage capacity, and access to an OA&M facility.

The MIRAN:

— is based on an industry standard 486 processor core

— uses standard interface buses (PCI, ISA, and PCMCIA)

— uses proprietary Nortel DSP cards to access advanced DSP functions

— accesses all 32 DS-30X voice/signaling timeslots

— supports CE-MUX and Card-LAN interfaces

— provides two RS-232 serial ports for maintenance access (through the faceplate Mini-DIN connector and through the backplane connector or MDF). Port B connects to the terminal and port A is used together with port B for daisy-chaining multiple MIRAN cards into a LAN for a single terminal access

— supplies two audio channels for analog access (both input and output)

— provides up to two multi cross-connect outputs for connecting to trunk channels

Table 1 lists specific MIRAN hardware components designed to support RAN and MOH applications in the Meridian 1 and SL-1 systems.

External equipment such as terminals, telephone sets, recorders, and PCMCIA cards are not listed because they are a third party generic products.

Table 1 describes hardware components provided for MIRAN application.

Table 1
MIRAN hardware list

Component	Description
NTAG36 Meridian Integrated RAN (MIRAN)	An IPE card that provides RAN and MOH applications over the Meridian 1 system. (NTAG36 plus security device= NTAG88)
NTAG81AA Audio Cable	Connects external analog music source or a recording device to the 3.5 mm Audio Jack on the MIRAN faceplate. This is a splitter cable that provides the audio input signal on one connector and the audio output signal on the other connector.
NTAG81BA Maintenance Extender Cable	A 5-meter (16.4 feet) cable extends the NTAG81CA or the NTAG81DA Maintenance Cables when connecting a terminal to the MIRAN.Has one 9-pin D-Sub male and one 9-pin D-Sub female connectors.
NTAG81CA Maintenance Cable	A 3-meter (9.8 feet) cable that connects the terminal to the MIRAN Mini-DIN maintenance port on the faceplate. It is terminated with a 8-pin Mini-DIN male connector and a 9-pin D-Sub female connector.
NTAG81DA Maintenance Splitter Cable	A 3-meter (9.8 feet) cable connects the Mini-DIN connector on the MIRAN faceplate to a terminal or to an adjacent MIRAN to form a LAN daisy-chain. It has an 8-pin Mini-DIN connector on the common side and two 9-pin D-Sub connectors, one male and one female, on the split side.
NTBK48AA Terminal Cable	Connects Option 11E/11C SDI port to the terminal.
3MB PCMCIA Card	Used for software upgrade and storage.
40MB PCMCIA Card	Used for backup, upgrade, and storage.

MIRAN capacity expansion

If more capacity is required than eight one-to-one trunk emulation ports/channels a single MIRAN can provide, multiple MIRAN cards can be installed. However, if a telephone set is used to record the announcement into the MIRAN, one of eight one-to-one trunk emulation ports/channels must be configured as a DID port to connect the maintenance telephone set to the MIRAN, allowing only seven one-to-one trunk emulation ports/channels for recording announcements. If multiple MIRAN cards are used, you must configure port 7 for each MIRAN card as a DID trunk for telephone set-based OA&M access even though only one telephone set is used.

Up to sixteen MIRAN cards connected in a daisy-chain can be controlled from a single terminal. A low-speed connection between multiple MIRAN cards is possible to allow OA&M facilities on multiple cards to be accessed from a single terminal.

Port/channel expansion

One-to-one recording ports/channels on the basic RAN application emulate the Enhanced Universal Trunk card. Thus, current software can support a voice or music recording capacity of up to eight ports per MIRAN card.

In addition to the eight one-on-one trunk emulation ports/channels, up to two multi cross-connect channels are also provided, ten total ports/channels are available in the largest of the three MIRAN capacity options, as shown in Table 2.

Table 2
MIRAN capacity options

MIRAN capacity option	No. of Multi cross-connect channels	No. of one- to-one ports/channels
Small	1	4
Medium	2	4
Large	2	8

Note: Each MIRAN capacity option consists of the NTAG36 MIRAN card, NTAG37 Software Load (pre-loaded on the card), NTDK57 Security Device, and a Keycode.

Each of the two cross-connect channels can be cross-connected with 16 (600 Ohm) trunks or 16 (900 Ohm) trunks to provide a total of up to 32 trunks.

For each capacity option in Table 2, a MIRAN one-to-one port can be configured for telephone set-based OA&M. Also, note that only one-to-one ports/channels have Enhanced Universal Trunk card emulation; the two multi cross-connect channels do not.

Functional description

The NTAG36 MIRAN software and hardware architecture is an effective implementation of RAN and MOH applications for Meridian 1 and systems supporting IPE cards.

The MIRAN provides faceplate and backplane interfaces, which are used to connect external RAN and music sources and maintenance terminals to the MIRAN. The hardware description provides information on the faceplate connectors and indicators as well as the backplane connections to the MDF.

Software architecture

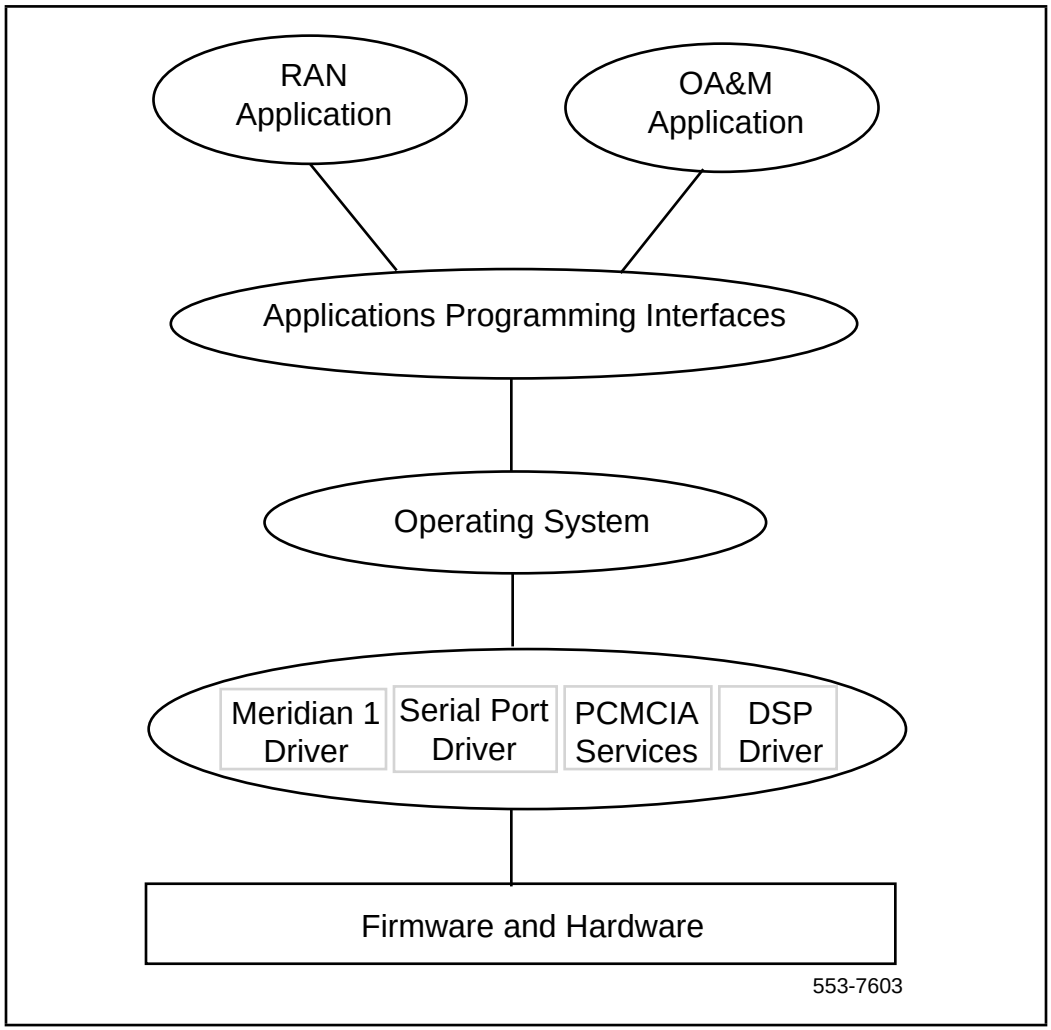
The MIRAN software architecture incorporates the VxWorks real time operating system that allows easy future expansion of features and services.

The MIRAN kernel is an off-the-shelf real-time operating system that supports real-time applications. It supports message queues, pipes, semaphores, asynchronous signals and intertask communication.

The operating system code must be loaded from internal Flash into DRAM unless the MIRAN has a bootable Flash memory card containing the OS code.

Figure 2 illustrates the basic MIRAN software architecture with RAN and OA&M applications, the operating system, and the MIRAN drivers.

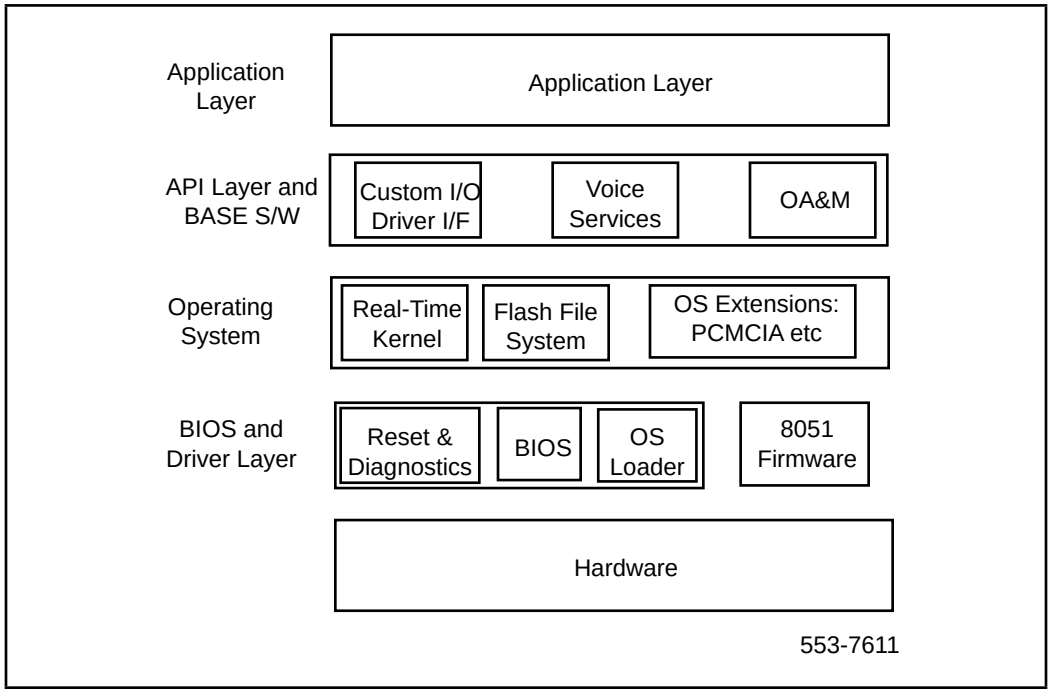
Figure 2
MIRAN software architecture



These procedures initialize the hardware and boot the operating system, using the low level reset, self-test, and BIOS initialization.

Figure 3 illustrates the MIRAN software communication layers.

Figure 3
MIRAN software layers



Hardware architecture

The MIRAN is designed with the 486 microprocessor as its core. The microprocessor interfaces directly to the DRAM array and cache memory and to the rest of the system over PCI and SAI buses. Peripheral interfaces such as RS-232 maintenance interface and PCMCIA interface, connect to one or the other of these buses.

Meridian 1 interfaces such as Card-LAN, DS-30X, and CE-MUX connect to a dedicated microcontroller. This microcontroller communicates with the core microprocessor over the dual-ported RAM.

The RAM within MIRAN is divided into program, data, and buffer areas to satisfy the operating system and application code requirements. It can also provide temporary storage.

To optimize the installation of the MIRAN and the external connections to the MIRAN, it provides faceplate connections for occasional use of the external devices and the backplane or MDF connections for permanent connection of these external devices.

Figure 4 shows the hardware that the MIRAN is replacing and Figure 5 illustrates the basic MIRAN functional blocks. The functions of these blocks are discussed in this chapter following the figure.

Mechanical characteristics

The MIRAN resides in a IPE module card slot of a Meridian 1 system. It can be installed into any IPE card slot in the IPE module or into an SL-1 shelf that supports IPE cards.

Figure 4 shows the MIRAN card to the right of the arrow and the hardware it replaces, to the left of the arrow.

Figure 4
MIRAN and the equipment it replaces

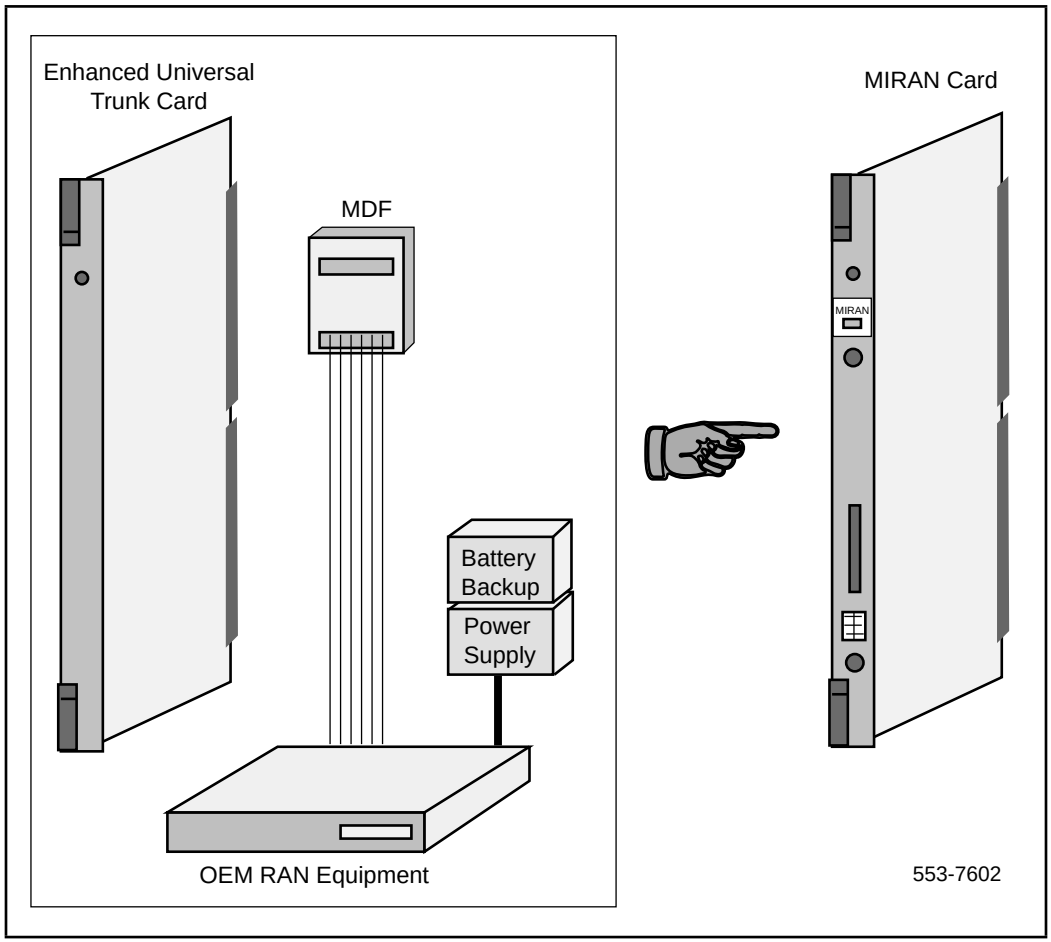
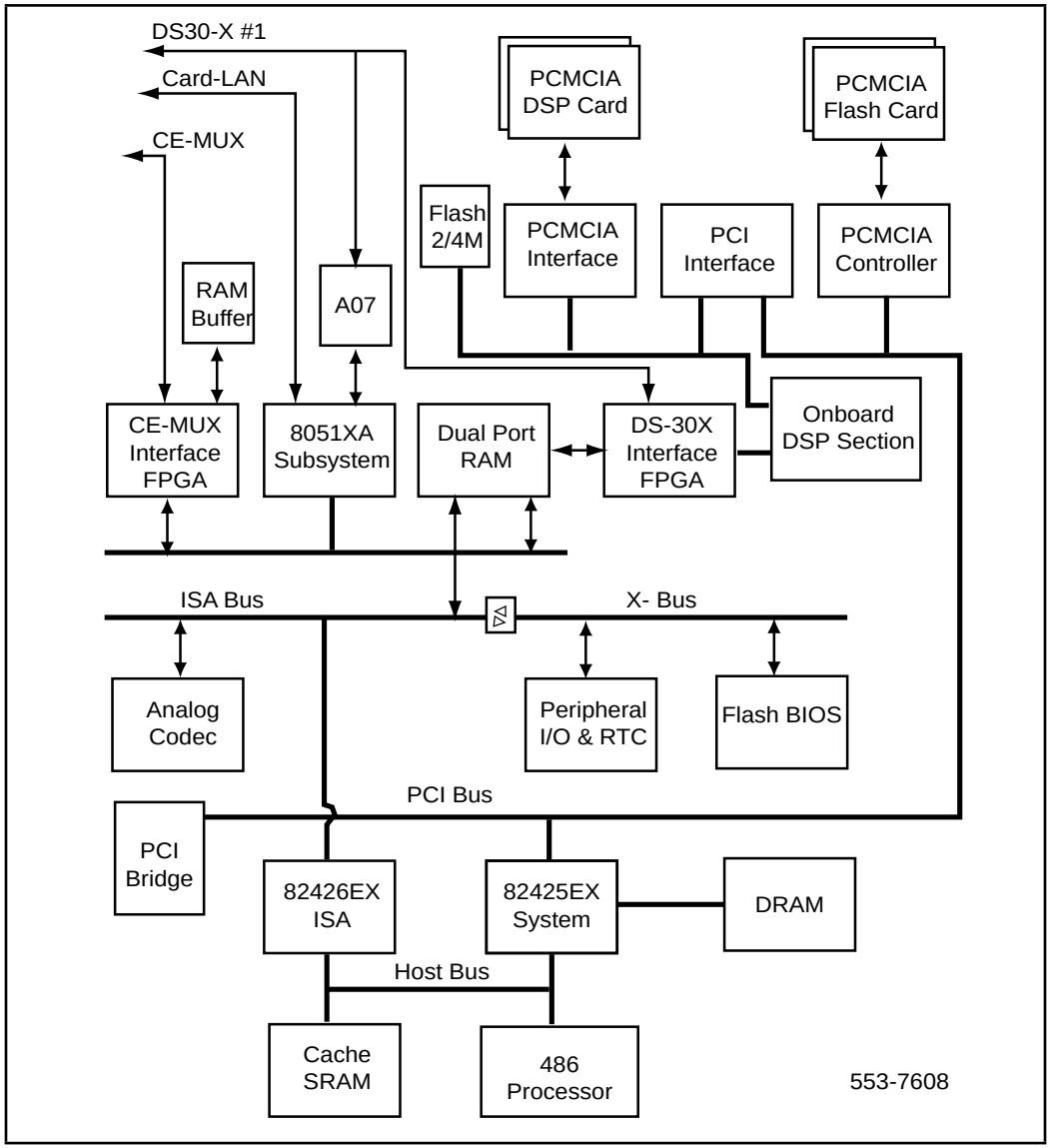


Figure 5 shows a high level block diagram of the MIRAN card components.

Figure 5
MIRAN block diagram



Faceplate connectors and indicators

The MIRAN faceplate provides the following interface connections:

Audio jack

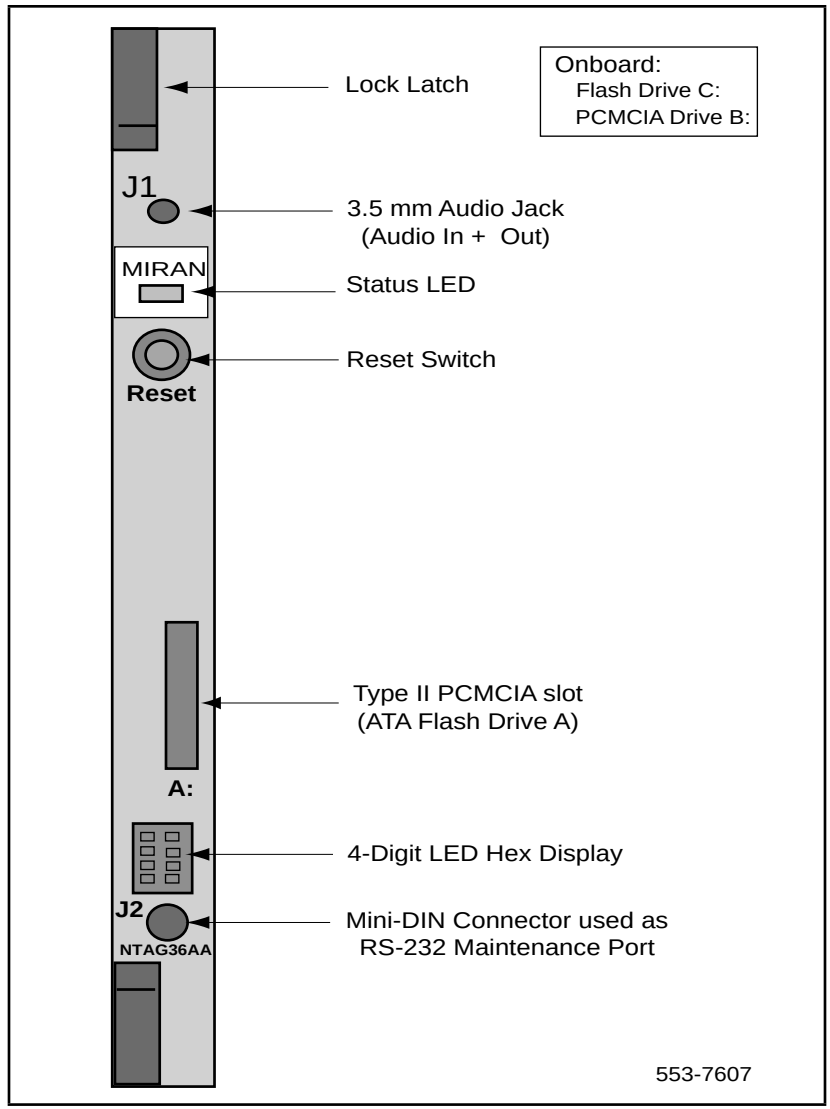
This 3.5 mm audio jack provides access to a single analog input and a single analog output. In addition, it is used to facilitate connection of external analog sources such as a tape recorder or CD player in order to record into MIRAN Flash memory or route it directly through a trunk emulation port into Meridian 1 for MOH. Alternatively, it can be used to back up messages from the MIRAN or to transfer them onto another MIRAN card.

The audio jack provides an external connection to Port 0 for a short term connection of an external analog source.

Where a permanent connection to an external music source is required, the external connection should be made at the backplane or the MDF not at the audio jack. At the backplane or the MDF, the port signals are duplicated and an additional audio input and output is provided.

Figure 6 shows the NTAG36 MIRAN card faceplate. It shows the connectors, a hex display, a status LED, a reset button, and PCMCIA card slots.

Figure 6
The NTAG36 MIRAN faceplate



Status LED

The MIRAN faceplate provides a single red LED to indicate the enabled/disabled status of the card and to indicate the self-testing result during power up or card insertion into an operational system.

Reset switch

The reset switch on the faceplate allows you to manually reset the MIRAN card. Normally, this switch is used to initiate a backup/restore or software upgrade from a PCMCIA-based Flash card or to clear a fault condition.

Dual Type II PCMCIA slot

This slot accepts standard PCMCIA cards including ATA Flash and Hard Disks that are Type II ATA compatible, as well as other peripheral cards as long as their respective drivers are available. This slot is used for MIRAN software upgrade, backing up messages, and storage.

Maintenance hex display

This is a four-digit LED-based hexadecimal display that provides the status of the MIRAN at all times. In addition, it provides an indication of fault conditions and the progress of PCMCIA-based software upgrades or backups.

It also indicates the progress of the internal self-test in the form of T:xx (refer to *Appendix A, MIRAN hexadecimal codes*). Upon successful completion of the test and the start-up of the RAN application, it will display the code "Rann", where **nn** is the LAN card number. If cards are not connected in a LAN configuration the display will show Ra00.

RS-232 Asynchronous Maintenance Port

A mini-DIN socket on the MIRAN faceplate provides access to both RS-232 ports. This faceplate port will provide access to the MIRAN for both OA&M and debugging purposes, although it is only intended for occasional usage. This connector is duplicated on backplane or MDF tip and ring pairs where a permanent terminal connection should be made.

MIRAN backplane connections

In addition to the faceplate connections, the MIRAN provides an on board PCMCIA slot, two external cross-connect channels, audio ports, and RS-232 ports A and B at the backplane. Refer to Figure 16 "Multiple MIRAN card

connections over the RS-232 port at the MDF" on page 59. Port B connects to the terminal and port A is used together with port B for daisy-chaining multiple MIRAN cards (up to 16 cards) into a maintenance LAN.

On-board connector for PCMCIA

The MIRAN circuit board has a slot that accepts Type I, Type II, and Type III standard PCMCIA Flash cards. This connector is located on the MIRAN printed circuit board, not on the faceplate. This PCMCIA slot is used for expanding voice and music memory storage.

Multi cross-connect channel connection

Multi cross-connect channels are accessible at the backplane or at the MDF. These two external cross-connect channels can be cross-connected with 16 (600 Ohm) trunks or 16 (900 Ohm) trunks each to provide a total of up to 32 trunks cross-connections. (These channels do not emulate a trunk).

RS-232 port

A serial port is provided on the MIRAN card for maintenance functions. Access to this port is over tip/ring pairs on the backplane or at the MDF where a permanently connected terminal should be connected. This port is also accessible through the MIRAN faceplate mini-DIN connector for an occasional OA&M session and debugging purpose.

Analog ports

The MIRAN supports two analog input ports in order to connect external sources for recording messages and/or music, or, alternatively, to provide two analog channels that can be mapped into up to eight logical RAN units.

The audio jack on the MIRAN faceplate provides access to a single analog input and a single analog output. On the backplane or MDF, however, two analog inputs and two analog outputs are available for backing up stored messages onto audio cassette tape or, alternatively, for connecting to an external paging amplifier.

The left and right channels are independent of each other in order to provide two analog ports for recording and playback. Tip and Ring pairs at the MDF provide the ability to permanently connect the external analog sources to both Port 0 and Port 1.

DS-30X

This interface allows both signaling and timeslot access over standard IPE card.

IPE analog line and trunk cards convert the incoming analog voice and signaling information to digital form and route it to the Meridian 1 CPU over DS-30X network loops. Conversely, digital voice and signaling information from the CPU is sent over DS-30X network loops to the analog line and trunk cards where it is converted to analog form and applied to the line or trunk facility.

A DS-30X network loop is composed of two synchronous serial data buses that transport data:

— One bus transmits data toward the line facility (Tx)

— The other bus receives data toward the Meridian 1 CPU (Rx)

DS-30Y network loops extend between controller cards and superloop network cards, and function similarly to DS-30X loops. Essentially, a DS-30Y loop carries the PCM timeslot traffic of a DS-30X loop, but up to four DS-30Y loops form a *superloop* with a capacity of 128 channels (120 usable timeslots). See the NTP *Meridian 1 system engineering* (553-3001-151).

Card-LAN

This serial communications link is composed of two 19,200 baud asynchronous serial buses, both used by the Meridian 1 Peripheral Controller:

— The output bus, for sending control data to the MIRAN card

— The input bus, to receive the MIRAN card status data

In normal operation, the controller card continually scans (polls) all IPE cards connected to the Card-LAN to monitor their presence and operational status.

The Card-LAN link is used for communicating the basic card maintenance data and reading or programming the Card ID in the memory.

When an IPE line or trunk card is first plugged into the backplane, the system issues XMI002 message to indicate that it detected the card. The self-test is initiated. When the self-test is completed, a properly functioning card

responds to the next controller card poll with the self-test status. The controller then queries for card identification and other status information. The controller then downloads all applicable configuration data to the line/trunk card, initializes it, and puts it into an operational mode.

CE-MUX

The CE-MUX interface provides a standard multiplexed CPU bus to allow the MIRAN to emulate standard equipment circuit cards in order to provide Option 11E and 11C maintenance access.

MIRAN reset and self-test functions

Reset is executed immediately following a power-on or system-level reset, this procedure initializes the processor before proceeding with the power-on self-test. The MIRAN attempts to log the source of each reset condition. This information can later be displayed on the maintenance terminal to find the cause of the problem and time and date when it occurred.

Hard reset

A hard reset is equivalent to a card insertion or loss of power. It results in a total reset of all hardware elements and a full hardware and software initialization. A hard reset is always followed by a power-up sequence. This process may last up to 2 minutes.

A hard reset can be initiated by any of the following activities:

— card-level maintenance over the RS-232 port

— Meridian 1 maintenance

— MIRAN sanity reset

— excessive soft resets in a given time period

— by the administrator after upgrading MIRAN software

The excessive soft reset, refers to an attempt at software-level recovery that repeatedly fails. The only other option in that case is to reset the hardware and reload the operating system.

Soft reset

The soft reset re-initializes software elements on the card and corresponds to a reboot of the card. The system checks for the presence of an alternative boot source (e.g., a newly inserted PCMCIA Flash card) during soft resets. This process may last approximately 1 minute. During power up procedure, the system checks first drive A: then drive B: and finally drive C: for configuration information.

A soft reset can be initiated by any of the following:

- card-level maintenance
- Meridian 1 maintenance
- excessive sanity non-maskable interrupts in a given time period

The last situation would arise if a number of unsuccessful attempts were made to recover from a software (or hardware) error condition before exceeding a pre-defined threshold.

Executed immediately after a power-on or reset, this procedure:

— performs a minimum-level of hardware testing

— performs a full diagnostic check

— opens a communication path to an external maintenance terminal so that the MIRAN diagnostic status can be displayed during self test

Diagnostic self-test

This tests the installed hardware:

— determines the integrity of the hardware

— establishes MIRAN configuration in terms of its processor, RAM capacity, and Flash memory.

The MIRAN displays any unexpected results on the maintenance port and updates the Flash configuration. It may also indicate self-test results on the MIRAN faceplate hex display.

BIOS initialization

This process initializes the base hardware, using configuration information stored in Flash.The BIOS layer provides initialization and device drivers.

The BIOS layer initializes the hardware and boots the operating system, using the low level reset, self-test, and BIOS initialization.

Built-in monitoring functions

The operating system provides some form of low level access over a maintenance port for debugging purposes.

Sanity monitoring

This background task checks the sanity of the system, particularly in relation to other tasks that may be tying up CPU or memory resources. It attempts to restore normal MIRAN operation in cases where the performance has degraded to an unacceptable level. If all else fails, this task restarts the MIRAN in order to return to a functional state.

Responsibility for monitoring the MIRAN sanity is shared between the 486 and the 8051XA processors. The latter monitors the 486 by sending periodic diagnostic polling messages to which a response is expected within a given time period. Failure of the 486 to respond initiates a recovery procedure, which repeats the message at least two more times, followed by generating a soft reset to the 486, and eventually a full board-level reset. Failure to recover at that point results in a permanent error code on the hex display.

Error and alarm monitoring

You can access this facility from the OA&M module in order to monitor DS-30X and CE-MUX based messaging both to and from the Meridian 1. This resource can be particularly useful for debugging problems and for verifying functionality.

MIRAN expansion and upgrade

Software may be delivered by PCMCIA Flash card, and software upgrades using Flash PCMCIA. A PCMCIA Flash card without a configuration file is considered voice storage upgrade.

To install software upgrade or expand the port/channel capacity, you must install a new keycode.

Increasing voice storage

You can increase voice storage capacity to the maximum amount available on commercially available PCMCIA memory cards (by more than 5 hours, where each 1 Mbyte of memory provides 2 minutes of recording). Voice storage of up to 4 minutes is available on the basic MIRAN card. The PCMCIA card must be equipped with the ATA driver and an ATA compatible interface.

To expand the voice storage, insert a blank PCMCIA Flash card into faceplate drive A: or internal drive B: (drive C: is used for keycode storage). The MIRAN software checks the Flash card for formatting information. If none exists, the MIRAN will proceed to format the Flash card in DOS format. When formatting is completed, the full capacity of the Flash card will be available for storage. Use the on-board PCMCIA slot for voice memory expansion.

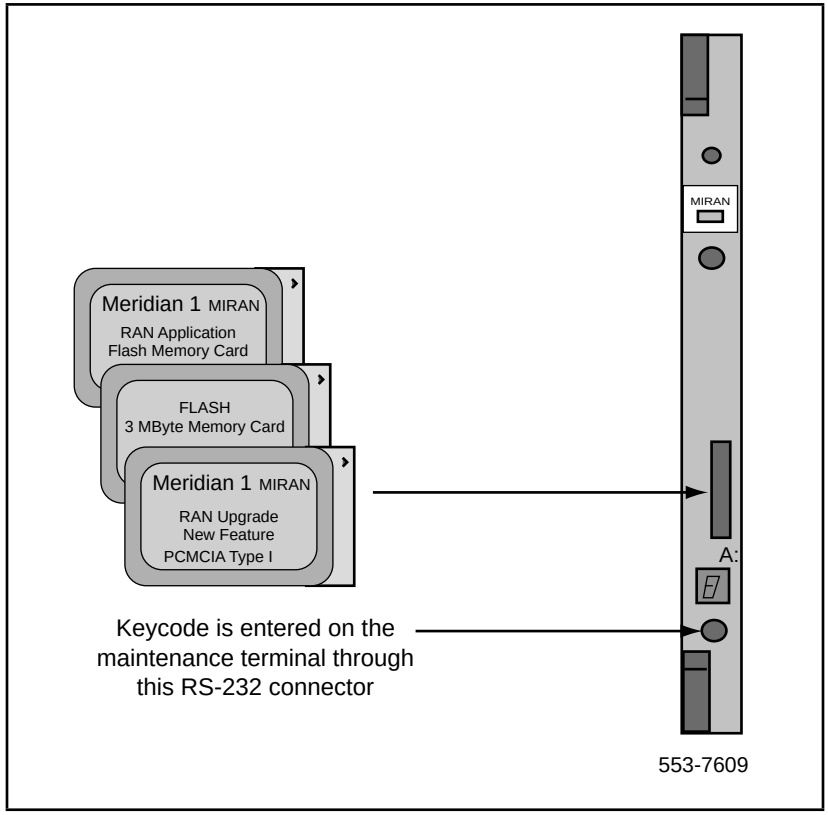
Upgrade using the PCMCIA cards

The faceplate PCMCIA slot (drive A:) is used for MIRAN feature upgrade or bug fixes. To upgrade MIRAN features, you must enter a new keycode. For bug fixes, you don’t need a new keycode. MIRAN is compatible with any PCMCIA Flash card supporting the industry standard ATA interface.

When an upgrade PCMCIA card is inserted into the faceplate, the base code recognizes its presence but does nothing until an OA&M administration session takes place. This session instructs the base code how to use the new files and whether any spare Flash memory on the card can be used by a MIRAN application.

Figure 7 illustrates how PCMCIA cards are loaded into the MIRAN faceplate slots to upgrade the MIRAN capacity.

Figure 7
Installing a PCMCIA card into the MIRAN faceplate slot

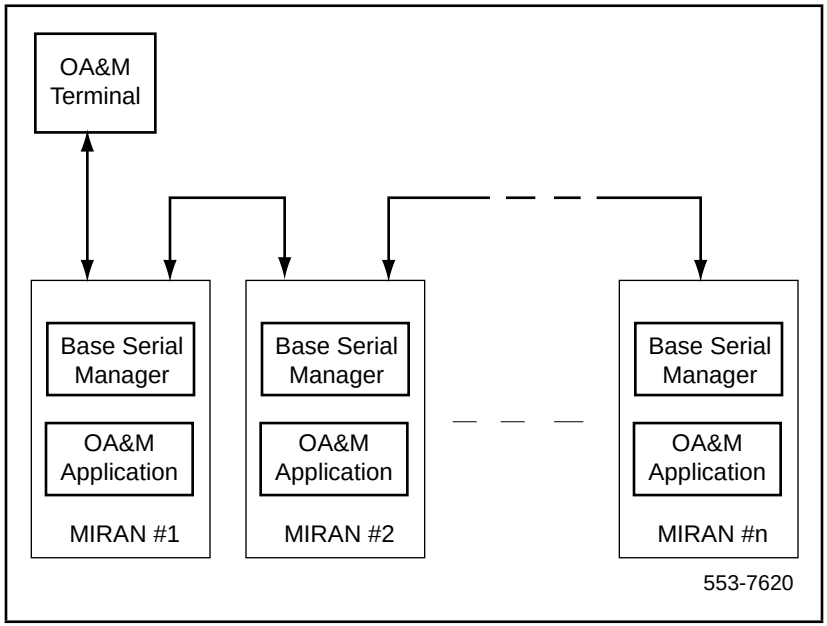


Expansion using multiple MIRAN cards in a LAN

If more MIRAN ports/channels are required than a MIRAN card can provide, up to 16 MIRAN cards may be linked together with maintenance cables to form a MIRAN LAN. For maintenance purposes they are joined together so that only one MIRAN needs to be connected to the maintenance terminal for the terminal to be able to access all MIRAN cards in the chain (in the LAN).

Figure 8 shows the daisy-chain connection of multiple MIRAN card in a LAN, where the OA&M terminal connected to one MIRAN can access any MIRAN in the chain.

Figure 8
Administration of multiple MIRAN card using terminal-based OA&M access



LAN messaging

LAN supports only two types of message, *configuration* and *data*, the latter of which uses the card address to specify the destination of the message. As a card receives a message header, it checks its validity and accumulates and processes the message if the address matches. Otherwise it passes it on to the next card in the chain.

All messages contain a checksum byte to detect errors. Part of the header also contains the number of bytes in the current message from 1 to 8 (excluding bytes in the header and checksum).

While the message for a card down the chain are passed on as they are received, they also accumulate at each node to allow retransmission of the entire message should a checksum failure occur. This reduces the delay in having to retransmit a corrupted message.

Multiple MIRAN message exchange

Because the first card in the chain transmits a LAN configuration message every five seconds, all of the other cards in the chain receive this message every five seconds also. Each card in turn that receives the message has a card ID number one greater than the ID number on the message received by the previous card as the message propagates down the line. If a new card is added at the start of the chain it starts initiating LAN configuration messages that causes all subsequent MIRAN cards to increment their card ID numbers by 1.

First card in chain.

If, after power-up, a MIRAN card fails to receive a valid LAN configuration message on Port A (the case for a card connected to a terminal or modem), it assumes that it is the first card in a chain and transmits a LAN configuration message on Port B with a card number of 1. It modifies its faceplate display to show the digit ‘0’. The card continues to transmit the LAN configuration message at 5-second intervals.

Subsequent cards in the daisy-chain.

If after power-up, a MIRAN card receives a LAN configuration message on Port A, it sets its card number to that contained in the message and retransmit the LAN configuration message on Port B with the card number incremented by 1. In this way, card numbers are propagated down the chain. As each MIRAN card receives a new LAN configuration message it updates the maintenance hexadecimal display with the number of the card currently receiving the message. Refer to Appendix A for a list of hexadecimal error codes.

LAN transit delays

At a rate of 9600 baud, each byte takes just over 1ms to transmit. Assuming for a maximum transmission and processing delay of 2ms at each node and allowing for a worst case of 16 cards, the delay to receive a message (assuming no retransmissions) would be:

2ms x 15 = 30ms (or 60ms for round trip)

Because this delay usually results from data typed at a keyboard, it should not be significant.

Software security

To provide security for the RAN and music applications as well as to prevent unlawful product usage, the MIRAN uses a security device and keycode security approach.

Security overview

A security device and keycode mechanisms are needed to protect against unlawful MIRAN feature usage, because industry-standard PCMCIA cards are used as the software medium on the MIRAN. All upgrades of either channel capacity or application software are restricted to a given MIRAN card and are accurately tracked to allow for satisfactory handling of field repairs and incremental upgrades.

Security is required for the following upgrades:

— port/channel capacity upgrades; two are possible:

  • from one multi cross-connect channel to two

  • from four one-to-one ports/channels to eight

— feature enhancements

— new applications

Security is not required for the following upgrades:

— Flash memory capacity expansion

— customer recorded prompts

— backup and restore operations

— application patching/bug fix

Security device

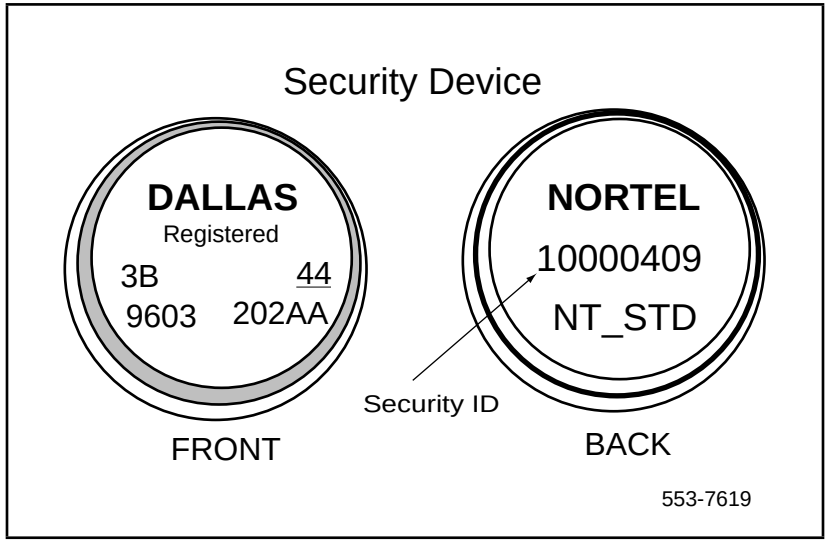
This button-sized device has a unique 12-digit laser-etched code that cannot be overwritten. In addition, it contains 1kbit of PROM to:

— identify the button as part of a Nortel product

— provide an 8-digit security ID

Figure 9 illustrates an example of a security device that contains a unique 12-digit laser etched code and 1kbit of PROM preprogrammed with Nortel specific information. The back of the security device shows the 8-digit security ID.

Figure 9
Example of a security device



Security ID

The security ID is the number that the customer must query from the MIRAN maintenance port prior to ordering an upgrade. It is read from the security device and it is unique for each MIRAN card.

The security ID can be found:

- at the top left-hand corner of the terminal-based OA&M menu or screen
- by using a command on the telephone set-based OA&M access
- on the shipping paperwork or box
- a sticker label on the card

Keycode

Nortel provides the customer with a keycode to enable them to install any desired upgrade. The keycode is entered over a terminal using the local maintenance port on the MIRAN card. The code consists of three sets of eight digits and must matches the Security ID on the MIRAN card.

Keycodes can enable additional functionality within an existing application (adding ports, features, etc.) or can be used with a PCMCIA Flash card to provide new software features. The MIRAN comes from the factory equipped with a keycode, however, spare and repaired MIRAN cards are not equipped with a keycode nor with the security device. For the MIRAN to operate correctly, the keycode must be installed.

Engineering guidelines

Meridian 1 general system engineering guidelines are described in *Meridian 1 system engineering* (553-3001-151). The following information deals specifically with engineering guidelines for the MIRAN planning and implementation. For the MIRAN technical characteristics, refer to *Appendix B: Product integrity*.

System compatibility

The MIRAN is emulating the Enhanced Universal Trunk card RAN and MOH functions and uses the existing Trunk Administration LD 14 and Trunk Route Administration LD 16 programs to configure the MIRAN trunk parameters and MIRAN trunk routs.

To support the MIRAN functions, the Meridian 1 system must be running on X11 release 20 if multi-channel RAN mode is not required.

For multi-channel RAN mode support, X11 release 21.41 or later, or X11 release 22.16 or later software, is required.

> ***Note:*** The multi-channel start/stop control RAN mode allows playing of the same recording independently on multiple channels over the same RAN route.

The MIRAN is supported by:

— Meridian 1 options 21E, 51, 51C, 61, 61C, 71, 81, and 81C (installed in any IPE card slot)

— SL-1 systems NT and XT upgraded to support IPE cards (installed in any IPE slot)

— Option 11E, and 11C (installed in all IPE slots, however, never install the MIRAN into card slot 10, it may get damaged)

MIRAN equipment

The MIRAN equipment can be tailored to meet a specific site and application requirements. You can select the number of ports/channels and the size of the memory required to support current and future requirements. The MIRAN is available in a basic form that provides limited number of ports/channels and minimum memory size. However, the basic MIRAN can be easily upgraded by building on the existing basic platform to expand the number of ports/channels and the memory size.

MIRAN channel capacity options

The MIRAN comes in three port/channel capacity options. These options are listed in Table 3.

Table 3
MIRAN channel capacity options

MIRAN option	Internal One-to-one ports/channels	Multi cross-connect channels	Telephone set based OA&M DID port
Small	4	1	7
Medium	4	2	7
Large	8	2	7 Note

Note: Port/channel number 7 is used as a DID port to connect the telephone set for recording purpose, therefore the large MIRAN option has only seven one-to-one channels available for RAN or MOH.

For each option configured for a telephone set OA&M, port 7 must be configured as a DID port to connect to the telephone set. In this case, port 7 of the large MIRAN option with eight one-to-one internal ports/channels is used to connect to the telephone set for recording purpose and cannot be used for RAN or MOH application. Port/channel 7 may be reconfigured for RAN and MOH when not used for telephone set-based OA&M access.

The small and medium MIRAN options continue to have all four one-to-one ports/channels available for RAN and MOH because port/channel 7, which is used for telephone set- based OA&M connection, is not active for RAN and MOH in those two options.

Supported RAN modes

The MIRAN card supports the following RAN modes for the internal and the external channels:

— Internal one-to-one ports/channels support continuous and start/stop RAN and MOH modes.

— Internal one-to-one ports/channels support start/stop multi-channel RAN and MOH modes.

— External cross-connect channels support delay dial and immediate, continuous RAN and MOH modes.

Note: MIRAN supports Auto-Wake-Up.To configure this feature on MIRAN, refer to Automatic Wake Up in *X11 features and services* (553-3001-305)

Voice storage capacity

The MIRAN storage capacity can be expanded by installing PCMCIA ATA Flash cards into either the faceplate A: slot or the internal B: slot. However, Nortel recommends that the internal slot B: be used for voice storage and the faceplate drive A: be used for software upgrades.

Table 4 lists the memory size and the corresponding message recording time.

Table 4
MIRAN voice storage capacity expansion

Memory allocation	Recording time
Base MIRAN card memory	4 minutes
Base plus 40 MB Flash memory	84 minutes
A PCMCIA card 170 MB	340 minutes
Each additional 1 MB of Flash memory	2 minutes

Feature enhancement

The customer would be provided with a pre-programmed PCMCIA Flash card, which contains either feature enhancements or completely new applications. The keycode is required for this upgrade and can be entered on the TTY or terminal, or by using a keycode file on the PCMCIA Flash card.

Multi cross-connect channel characteristics

Table 5 displays electrical specifications for the MIRAN RAN cross-connect interface.

Table 5
Characteristics of the multi cross-connect channel

Characteristic	Specification
Terminal impedance	*600/900 ohms
Supervision type	Continuous, level, or pulse
DC signaling maximum loop length	600/900-ohm loop
Ground potential difference	±1 V
* Up to 16 trunks with 600 Ohm and 16 trunks with 900 Ohm can be cross-connected.	

Power and ground requirements

Power to the MIRAN is provided by the IPE module power supply (AC or DC).

> ***Note:*** Power supplied at the IPE module backplane at each card slot exceeds the power requirement for each MIRAN card. Therefore, there is no restriction on the number of MIRAN cards in the IPE module. If you are using hard drives that are powered by the IPE module, make sure that the total power requirements does not exceed power available for that card slot.

Table 6 displays the MIRAN power requirements. All values assume the use of a 3.3V processor.

Table 6
MIRAN power requirements

Configuration	+/-15V	5V	Total Power
Basic 8-port/channel	7.0 W	8.0 W	15 W
8-port/channel ± 4MB Flash	7.0 W	8.3 W	15.3 W

The maximum IPE module per slot power budget is 30 Watts, with an effective limitation of 20 Watts for thermal compensation. A DC/DC converter is used to provide the 3.3 volts required by the 486 processor and the PCMCIA interfaces.

> ***Note:*** Power supplied at the IPE module backplane at each card slot exceeds the power requirement for each MIRAN card. Therefore, there is no restriction on the number of MIRAN cards in the IPE module.

Table 7 shows the maximum current required from each power supply rail.

Table 7
Backplane power available (per card slot)

Supply Rail	Available on backplane	With DC-DC converter	MIRAN
3.3 V	—	2400 mA	8 W
5 V	2000 mA	2000 mA	10 W
+/- 15 V	800 mA	366 mA	10 W

The processor contains three separate grounds: logic, analog, and frame. Logic ground is connected to the processor ground. The codec has its own separate analog ground that connects to the logic ground at a single point.

No connection between logic ground and frame ground is provided on either the processor or the expansion board. Instead, these two grounds are connected at the shelf where the MIRAN card is installed.

Each MIRAN I/O port routed to the backplane has its own ground to simplify connections.

External equipment

The MIRAN can perform RAN applications without any external connections. However, to perform OA&M sessions, connect external music sources to the MIRAN, to record RAN messages or music, you must connect the external devices to the MIRAN faceplate connectors, or to the backplane or MDF tip/ring pairs.

VT100 type terminal

A VT100 terminal or a personal computer emulating a terminal is used to perform RAN and MIRAN administration, access and configuration of any MIRAN in a LAN configuration of up to 16 MIRAN cards in a daisy-chain, and maintenance and diagnostics of each MIRAN.

A maximum of 16 MIRAN cards can be daisy-chained into a LAN connection to provide access to each MIRAN card from a single terminal.

A terminal can use:

— a menu system to perform administrative and maintenance functions, or

— commands that are entered on the command line

The terminal must be connected to the MIRAN RS-232 interface. The connection can be made:

— at the mini-DIN connector on the MIRAN faceplate using the NTAG81CA or NTAG81DA Maintenance Cable for occasional use, or

— at the MDF tip/ring pairs using a terminal cable that must be less than 50 feet long (cable not supplied)

For a Single Terminal Access (STA), MIRAN can be connected to an MSDL port operating in the STA mode. This way, MIRAN and other application cards installed in the system can be accessed from a single terminal.

Terminal interface must be set at 9600 baud, 8 data bits, 1 stop bit, and no parity. The flow control is not supported.

Table 8 lists the terminal-based OA&M access method for different system options over the SDI or MSDL ports.

Table 8
Terminal-based OA&M access for different system options

System option	Access description
Option 11 - remote	Connect system SDI port with a PCMCIA modem on the MIRAN or over the MIRAN RS-232 port. MIRAN looks for “VPS<cr> after login.
Option 11 - local	Connect system SDI port over the MIRAN RS-232 port. MIRAN looks for “VPS<cr> after login.
Meridian 1 Options 21-81C	Use STA feature on the MSDL card where MIRAN is an STA monitored system.
Option 11C	Use passthru feature of Option 11C for terminal emulation on System Management Products (SMP).
Option 11E	Access over CE-MUX.

Telephone set for OA&M access

No external connections are required as long as you use an existing telephone in the system.

To perform a telephone set-based OA&M access, you have to set one of the internal one-to-one MIRAN ports/channels (port 7) to be a DID trunk in the Meridian 1 system. The DID trunk route makes the MIRAN port 7 accessible by using a route access code from any telephone in the system. To access a MIRAN a valid password must be entered. Small and medium size MIRAN options also use port 7 for telephone set OA&M access.

External analog sources

The external analog sources provide a facility to connect tape recorders, CD players for recording onto the Flash memory on the MIRAN, or to record messages from the MIRAN onto a tape for backup, or to record these backed

up messages to an other MIRAN card. Refer to Figure 14 “Analog device connection at the MDF” on page 55 in the *Installation and administration* section.

You can connect these external analog sources to the:

— 3.5 mm Audio Jack on the MIRAN faceplate (one input and one output) by using the NTAG81AA Audio Cable

— at the backplane or the MDF tip/ring pairs (cable not supplied)

Engineering a MIRAN RAN and music application

Based on the options of the MIRAN equipment, external equipment, and your RAN and MOH requirements, you can engineer a MIRAN system to meet your system requirements.

The following five examples illustrate what equipment is required for a specific site (application) requirements. It also discusses the alternatives available for interconnection of multiple MIRANs and connection of external devices to the MIRAN.

Example 1:

Application requirements:

— Provide three internal RAN channels and one external cross-connect channel to cross-connect 10 trunk ports.

— Provide 1 hour of recording space on the MIRAN card.

— Provide telephone set-based OA&M access.

Equipment requirements:

— one medium MIRAN

— one 40 MB PCMCIA ATA Flash card

— two Enhanced Universal Trunk cards

Example 2:

Application requirements:

— Provide multi-channel level start/stop control RAN mode for four internal RAN channels and two external cross-connect channels to cross-connect 30 trunk ports.

— Provide 4 minutes of recording space on the MIRAN.

— Provide terminal-based OA&M access.

Equipment requirements:

— one medium MIRAN

— four Enhanced Universal Trunk cards

— one NTAG81CA Maintenance Cable (to connect the terminal to the mini-DIN connector on the MIRAN faceplate), or alternately

— a terminal-to-MDF cable where total distance from the MIRAN through the MDF to the terminal is less than 50 feet

Note: In this mode, all four ports/channels are playing the same announcement independently over the same RAN route.

Example 3:

Application requirements:

— Provide seven internal RAN channels and two external cross-connect channels to cross-connect 30 trunk ports.

— Provide 2 hour of recording space on the MIRAN.

— Provide terminal-based OA&M access.

Equipment requirements:

— one large MIRAN

— one 60 MB PCMCIA ATA Flash card

— four Enhanced Universal Trunk cards

— one NTAG81CA Maintenance Cable (to connect the terminal to the mini-DIN connector on the MIRAN faceplate), or alternately

— a terminal-to-MDF cable where total distance from the MIRAN through the MDF to the terminal is less than 50 feet

Example 4:

Application requirements:

— Provide 11 internal RAN channels and 3 external cross-connect channels to cross-connect 40 trunk ports.

— Provide 5 hour of recording space on the MIRAN.

— Provide telephone set-based OA&M access, and

— Provide terminal-based OA&M access.

Equipment requirements:

— one large MIRAN with 170 MB PCMCIA ATA Flash memory, and

— one basic small MIRAN

— five Enhanced Universal Trunk cards

— two NTAG81DA Maintenance Splitter Cable (to inter-connect the two MIRAN cards to their respective mini-DIN connectors on the MIRAN faceplate and to connect the terminal), or alternately

— cross-connect the RS-232 ports of the two MIRAN at the MDF and use a terminal-to-MDF cable to connect the terminal to one MIRAN if the distance between the MIRAN and the terminal through the MDF is less than 50 feet

Note: The total number of internal one-to-one ports/channels are 12. Even though we have a telephone set-based OA&M, if we use port 7 of the small MIRAN card we do not loose an active channel and have all 12 channels available for RAN or MOH applications.

Example 5:

Application requirements:

— Provide 14 internal RAN channels and 4 external cross-connect channels to cross-connect 60 trunk ports.

— Provide 5 hour of recording space.

— Provide two external analog (music) sources

— Provide telephone set-based OA&M access, and

— Provide terminal-based OA&M access.

Equipment requirements:

— two large MIRAN with 170 MB PCMCIA ATA Flash memory

— eight Enhanced Universal Trunk cards

— two NTAG81AA Audio Cables to connect external analog sources, or instead of using the NTAG81AA cables, you can connect the external analog sources at the MDF

— two NTAG81DA Maintenance Splitter Cable (to inter-connect the two MIRAN cards to their respective mini-DIN connectors on the MIRAN faceplate and to connect the terminal), or alternately

— cross-connect the RS-232 ports of the two MIRAN at the MDF and use a terminal-to-MDF cable to connect the terminal to one MIRAN if the distance between the MIRAN and the terminal through the MDF is less than 50 feet

Note: The total number of internal one-to-one ports/channels are 16. However, we have to use port 7 of one of the MIRAN as a DID port to connect a telephone set-based OA&M, therefore only 15 channels are available for RAN or MOH applications.

Installation and administration

This chapter describes the installation of the NTAG36 Meridian Integrated RAN (MIRAN). It describes how to install the MIRAN, how to connect it to a terminal for a terminal-based OA&M access, and how to connect the external analog sources for recorded announcement (RAN) and music-on-hold (MOH) to the MIRAN. It also describes the basic administration procedures used to maintain, modify, and expand the MIRAN functions.

Installation overview

The RAN service can be added to existing Meridian 1 system options 21E, 51, 51C, 61, 61C, 71, 81, and 81C as well as Options 11E, 11C and SL-1 systems that supports IPE and Enhanced Universal Trunk cards, originally installed and operating without MIRAN, or it can be an integral part of a newly installed Meridian 1 system.

The installation of the MIRAN into the Meridian 1 should begin after:

— A previously installed Meridian 1 system is upgraded to run on generic software X11 release 20 or higher, if multi-channel RAN control mode is not required. If multi-channel RAN control mode is required, the system must be running on generic software X11 release 21.41 or higher, or X11 release 22.16 or higher. For more information, refer to “Multi-channel level start/stop control RAN” on page 65.

— A newly installed system using the latest generic software X11 release 22.16 or higher.

To install a new Meridian 1 system or expand an existing one, refer to *Meridian 1 system installation procedures* (553-3001-210). It provides the information on how to install, verify, and maintain the Meridian 1 system.

To complete the installation of a MIRAN, you should follow the general procedures listed below.

These procedures include:

— Preparing the site

— Unpacking, inspecting, and taking inventory of the equipment

— Installing the MIRAN card in the selected IPE card slot, if not already installed

— Installing the cables between the MIRAN faceplate connectors and external devices, if required

— Installing the cables between the backplane connectors on the IPE module and the I/O panel connectors at the rear of the module, if required

— alternately installing the cables at the MDF to connect external devices to the MIRAN

— Connecting multiple MIRAN cards in a daisy-chain, if required

Installation preparation

The preparation consists of unpacking and inspecting components, taking inventory, and locating the IPE card slots where the MIRAN will be installed.

Unpacking and inspection

Unpack and inspect the equipment for damage. When unpacking, follow general precautions recommended by computer and telephone equipment manufacturers:

— Remove items that generate static charge from the installation site.

— Use antistatic spray if the site is carpeted.

— Ground yourself before handling any equipment.

— Remove equipment carefully from its packaging.

— Visually inspect the equipment for obvious faults or damage. Any damaged component must be reported to your sales representative and the carrier who delivered the equipment.

Taking inventory

After the equipment has been unpacked and visually inspected, verify that all the equipment is at the site before the installation begins. Equipment received must be checked against the shipping documents. Any shortages must be noted and reported to your sales representative.

Locating the card slot

A MIRAN card can be installed in any IPE card slot in an IPE module or shelf that has a 25-pair tip/ring cable connected between the backplane and the I/O panel. The only card slot that cannot be used is the Peripheral Controller card slot labeled *Cont.*

In Options 11E and 11C cabinet, the MIRAN card can be installed in any IPE card slot from 1 to 9 (card slot 10 is not used for MIRAN installation).

> ***Note:*** If the backplane RS-232 connections are used, the MIRAN card cannot be installed in IPE card slots 3, 7, 11, or 15, since the required tip/ring pairs in these slots are not available at the MDF.

Verifying MDF wiring

The MIRAN interfaces appear on the IPE module's backplane. The backplane is cabled to the input/output (I/O) panel at the rear of the IPE module, which is then connected to the Main Distribution Frame (MDF) by the 25-pair cable.

Trunks connect to the two MIRAN multi cross-connect channels at the MDF, as shown in Table 9. The two MIRAN multi cross-connect channels wiring is shown in Figure 10.

CAUTION

Do not install a MIRAN card into IPE card slots that are wired for line cards. Line cards are configured with ringing voltage, which, when applied to MIRAN, may damage the card.

Table 9 lists the 25 tip/ring pairs for the MIRAN card installed in the IPE module. It shows the wire color code at the MDF to facilitate cross-connect to the external terminal equipment or trunk tip/ring pairs.

Table 9
NT8D37 IPE Module MIRAN pair termination (I/O panel to MDF cable)

Pair	Pin No	Pair color	MIRAN Assignment
1T/1R	26/1	W-BL/BL-W	RANAT0/RANAR0
2T/2R	27/2	W-O/O-W	CNTRPLS0/GRD
3T/3R	28/3	W-G/G-W	RANAT1/RANAR1
4T/4R	29/4	W-BR/BR-W	CNTRPLS1/GRD
5T/5R	30/5	W-S/S-W	AGRD/AGRD
6T/6R	31/6	R-BL/BL-R	No connection
7T/7R	32/7	R-O/O-R	AIN1/AIN0
8T/8R	33/8	R-G/G-R	AIN3/AIN2
9T/9R	34/9	R-BR/BR-R	No connection
10T/10R	35/10	R-S/S-R	Reserved
11T/11R	36/11	BK-BL/BL-BK	Reserved
12T/12R	37/12	BK-O/O-BK	Reserved
13T/13R	38/13	BK-G/G-BK	Reserved
14T/14R	39/14	BK-BR/BR-BK	Reserved
15T/15R	40/15	BK-S/S-BK	Reserved
16T/16R	41/16	Y-BL/BL-Y	BDCDA-/Reserved
17T/17R	42/17	Y-O/O-Y	BSOUTA-/BSINA-
18T/18R	43/18	Y-G/G-Y	SGRD/BDTRA-
19T/19R	44/19	Y-BR/BR-Y	BRTSA-/BDSRA-
20T/20R	45/20	Y-S/S-Y	BSINB-/BCTSA-
21T/21R	46/21	V-BL/BL-V	BDCDB-/BSOUTB-
22T/22R	47/22	V-O/O-V	BDSRB-/BDTRB-
23T/23R	48/23	V-G/G-V	Reserved
24T/24R	49/24	V-BR/BR-V	Reserved
25T/25R	50/25	V-S/S-V	spare

Note: Each of the following I/O panel connectors is cabled as shown above: connectors A, B, C, D, E, F, G, K, L, M, N, R, S, T, and U. These connectors are associated with card slots 0 through 15 in the IPE module.

Identifying multi cross-connect channels at the MDF

The MIRAN external multi cross-connect channels are routed from the IPE module backplane to the MDF over the 25-pair tip/ring cable. These two cross-connect channels can be connected up to a maximum of 32 trunks (or to 16 each) at the MDF providing 32 RAN and MOH application channels.

Table 10 lists the NTAG36 MIRAN card pair termination for the two external cross-connect channels that connect to multiple trunks. It lists the pinout and the cable wire color code for the two MIRAN external channels. Each of these two external MIRAN channels can cross-connect to up to 16 trunks for a total of 32 RAN channels.

Table 10
NT8D37 IPE Module: NTAG36 MIRAN external cross-connect channels

MIRAN Pair	25-pair cable Pin No	Pair color code	MIRAN Port
1T/1R CP/MB	26/1 27/2	W-BL/BL-W W-O/O-W	A0
3T/3R CP/MB	28/3 29/4	W-G/G-W W-BR/BR-W	A1

Note: The MIRAN has 8 internal one-to-one ports/channels (0-7) and two external multi cross-connect channels (A0 and A1).

Figure 10 illustrates connection of the two MIRAN external multi cross-connect channels from the IPE module I/O panel to the MDF cross-connect terminals and from the MDF to the multiple trunks for Enhanced Universal Trunk wiring.

Figure 10
MIRAN multi cross-connect channels relative to the EXUT wiring

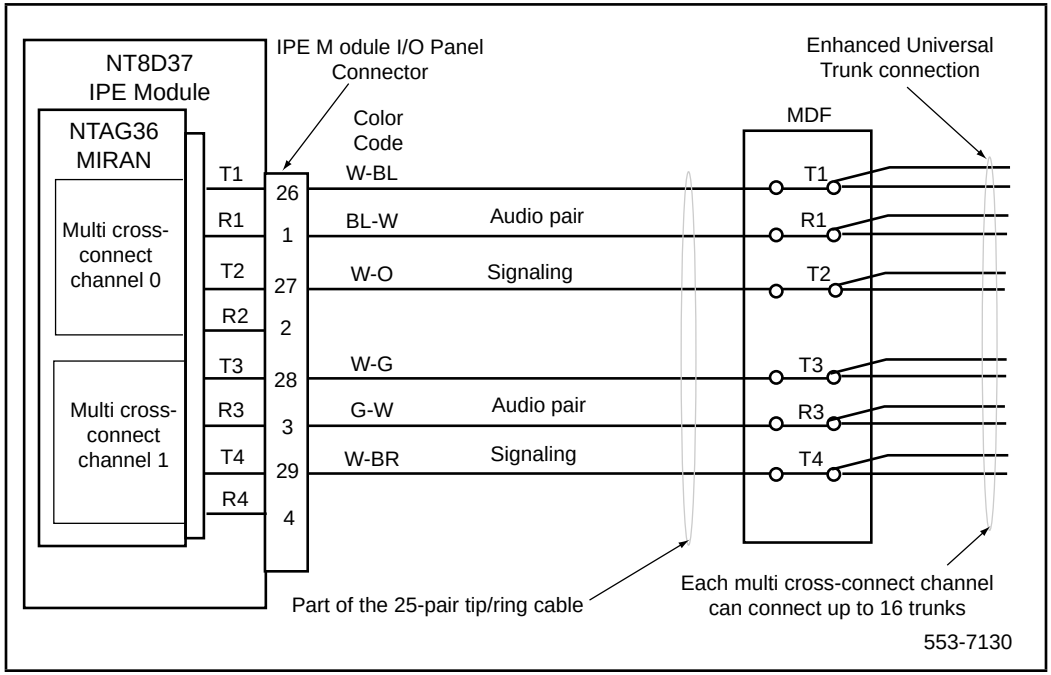
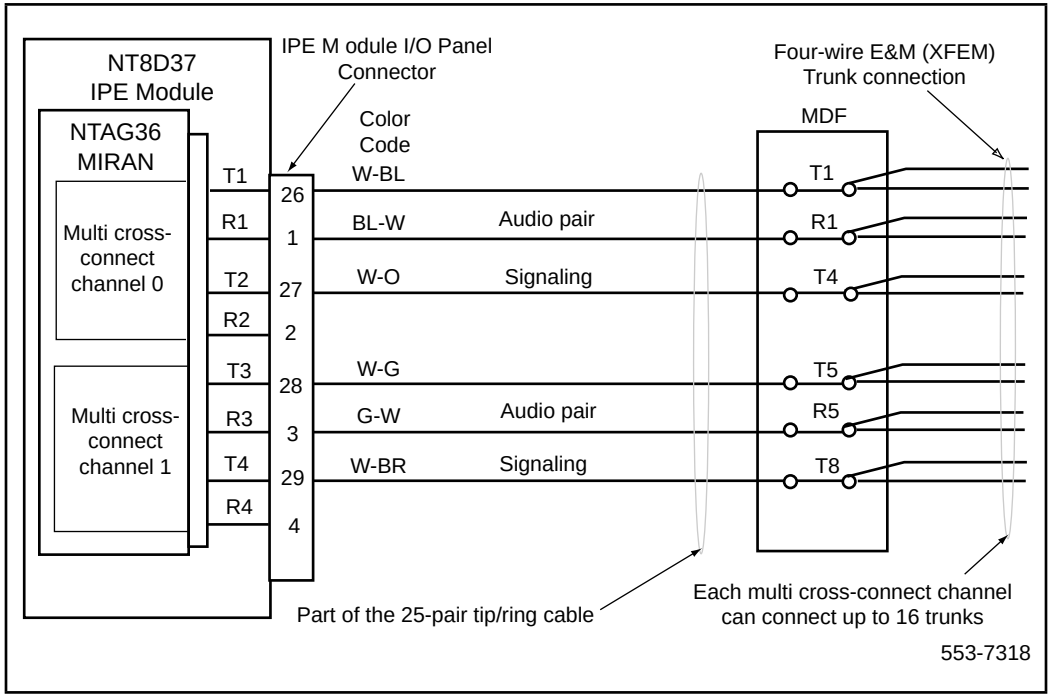


Figure 11 illustrates a connection of the two MIRAN external multi cross-connect channels from the IPE module I/O panel to the MDF cross-connect terminals and from the MDF to the multiple trunks for 4-Wire E&M trunk wiring.

Figure 11
MIRAN cross-connect channels relative to the XFEM wiring



MIRAN equipment installation

The installation of the MIRAN and the external equipment connections associated with the MIRAN should start after:

— verifying that the preinstallation preparation has been completed (this includes verifying that all the equipment has been received undamaged, that the IPE module has 25-pair cables connected from the backplane to the I/O panel and from there to the MDF

— planning you MIRAN equipment, port and memory capacity, and external equipment connection configuration using *Engineering guidelines* in the *Description* section of this document

— procure external connection cables not provided with Nortel equipment, if required (these are cables that connect the terminal and external analog sources to the MDF cross-connect instead of the MIRAN faceplate)

These three items provide the foundation for a efficient and accurate installation of the MIRAN hardware.

Installing MIRAN cards into the IPE module

Before you install the card inspect the IPE module or cabinet I/O panel or backplane cabling.

CAUTION

Do not install a MIRAN card into an IPE card slot if that card slot has been configured for a line card. Before you insert the card into the card slot, disconnect the cable connecting this card slot to the MDF. Line cards are configured with ringing voltage, which, when applied to MIRAN, may damage the card.

When installing MIRAN cards, follow the steps bellow:

1 Identify the IPE card slots selected for MIRAN card(s)

2 Pull the top and bottom extractors away from the MIRAN faceplate.

3 Insert the MIRAN card into the card guides and gently push it until it makes contact with the backplane connector.

4 Push the top and the bottom extractors firmly towards the faceplate to insert the MIRAN card into the faceplate connector and to lock it firmly in place.

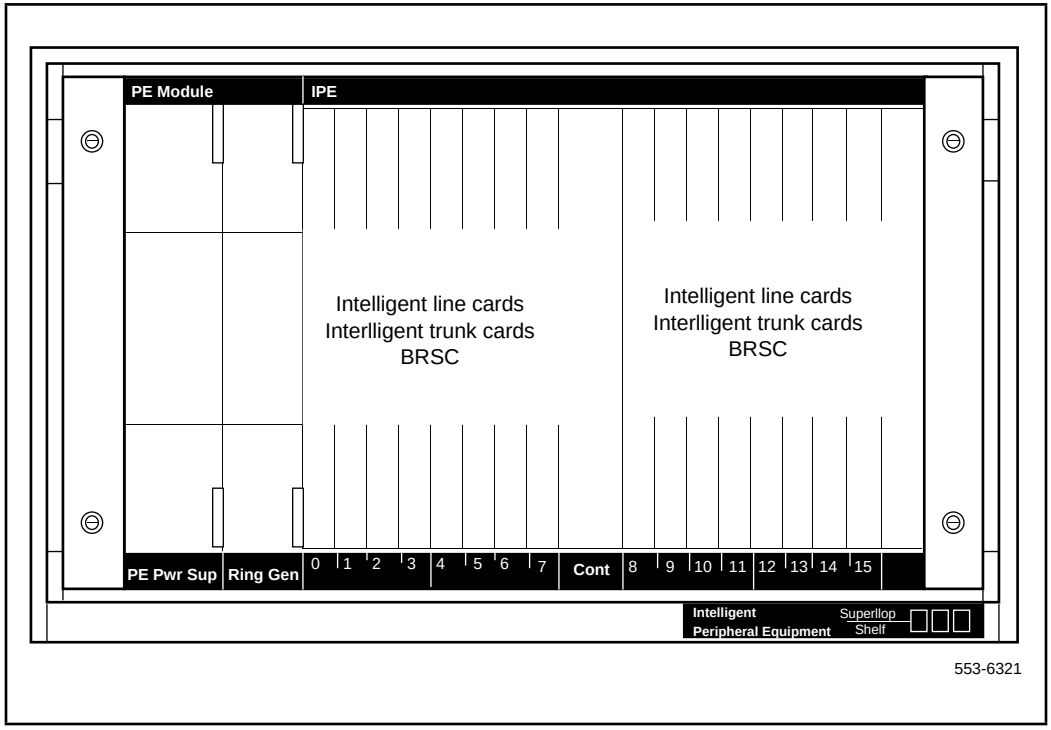
5 Observe the faceplate hexadecimal display. It should indicate the progress of the internal self-test in the form of **T:xx** (refer to *Appendix A, MIRAN hexadecimal codes*). Upon successful completion of the test and the start-up of the RAN application, it will display the code "**Rann**", where **nn** is the LAN card number. If cards are not connected in a LAN configuration the display will show Ra00.

6 To enable the MIRAN, load the Network and PE Diagnostic program LD 32 into the system memory using the system TTY to execute the **ENLC l s c** command, where **l** is the loop, **s** is the module or shelf, and **c** is the card to be enabled.

7 Repeat steps 1 through 6 for each additional MIRAN.

Figure 12 shows the IPE module and the card slots used by the IPE cards. A MIRAN card can be installed into any IPE card slot except the Peripheral Controller cad slot *Cont*.

Figure 12
MIRAN installed in an NT8D37 IPE module



Connecting a terminal to the MIRAN in the IPE module

A terminal connected to the MIRAN is used for terminal-based OA&M access. It can be connected:

— to the RS-232 mini-DIN connector on the MIRAN faceplate, or

— at the MDF

Connecting the terminal to the faceplate connector

The MIRAN has an 8-pin mini-DIN connector at the bottom of the faceplate. This connector provides two RS-232 ports. These two ports are used to connect a terminal and to interconnect multiple MIRAN cards into a daisy-chain where one terminal can service all the MIRAN cards in the chain. This connection is simple and is preferred for occasional use of the terminal. For a permanent connection, use the MDF to connect the terminal to the MIRAN, as described in the next procedure (Connecting the terminal to the MDF):

To connect the terminal or a personal computer emulating a terminal to the 8-pin mini-DIN connector on the MIRAN faceplate:

1 Place the terminal in the desired location. If the distance to the MIRAN is less than 10 feet, you will not need an extension cable.

2 Select the NTAG81CA Maintenance cable and plug its 8-pin mini-DIN male connector into the MIRAN 8-pin mini-DIN female connector located at the bottom of the faceplate.

3 Plug the NTAG81CA cable 9-pin D-Subminiature female connector into the terminal. If the terminal requires a different connector, procure an adapter cable or a compact adapter and install it between the terminal and the NTAG81CA cable.

4 If the terminal is more than 10 feet away from the MIRAN, use the 16-foot NTAG81BA Maintenance Extender Cable, or use and adapter cable of the appropriate length, if the terminal requires a different connector.

Connecting the modem to the faceplate connector

To connect a modem to the 8-pin mini-DIN connector on the MIRAN faceplate:

1 Place the modem in the desired location.

2 Select the NTAG81CA Maintenance cable and plug its 8-pin mini-DIN male connector into the MIRAN 8-pin mini-DIN female connector located at the bottom of the faceplate.

3 Plug the NTAG81CA cable 9-pin D-subminiature female connector into the 9-pin D-subminiature male connector of the Modem cable NTAG81DA cable.

4 Plug the NTAG81DA cable DB-25 male connector into the DB-25 female connector on the modem.

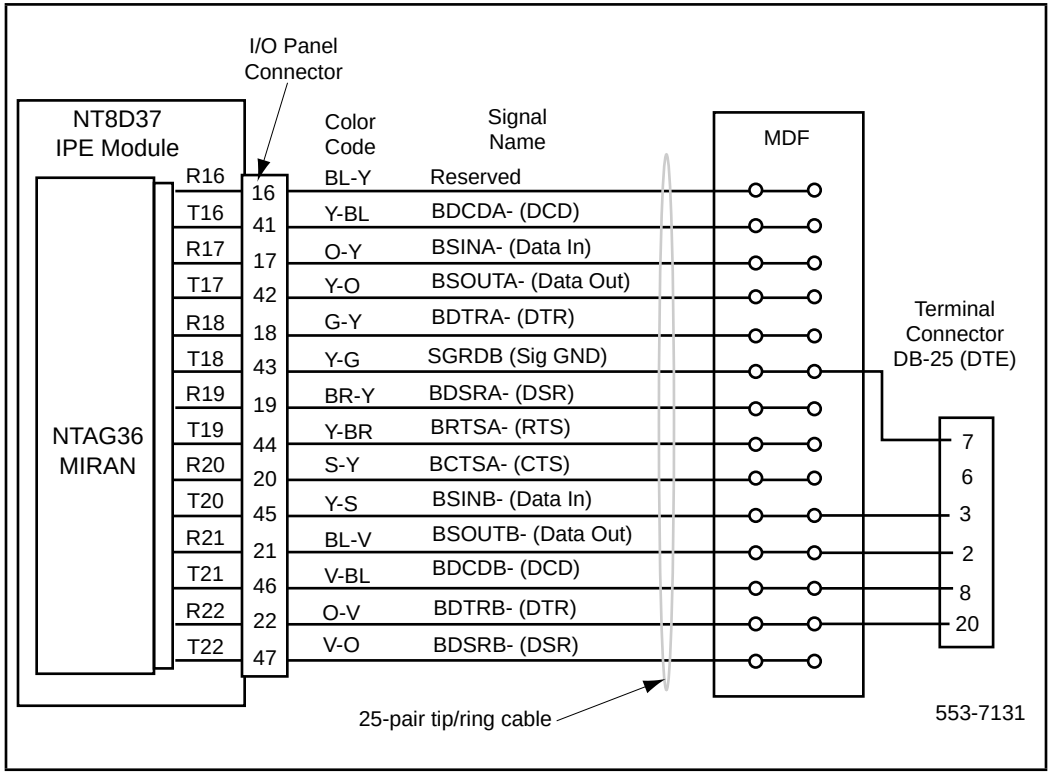
For additional information on how to setup the modem, refer to *Appendix A: Modem setup*.

Connecting the terminal to the MDF

For a permanent connection of a terminal to the MIRAN, connect the terminal to the MDF tip/ring pairs that provide the two RS-232 ports. The total distance from the MIRAN to the MDF and from the MDF to the terminal should not exceed 50 feet.

Figure 13 illustrates the terminal wiring, which starts from the IPE module backplane through the MDF to the terminal. It shows the I/O panel pinout, the 25-pair tip/ring wire color code, the signal description, the terminal cable, and DB-25 terminal connector.

Figure 13
Terminal connection to the MIRAN at the MDF



To connect the terminal or a personal computer emulating a terminal to the RS-232 ports at the MDF, refer to Figure 13 and follow the steps bellow:

1 Place the terminal in the desired location. Place it close to the MDF to minimize the total distance between the MIRAN and the terminal through the MDF. The total distance should not exceed 50 feet.

2 Cross-connect the terminal cable at the MDF as shown in Figure 13. Observe the cable connector pinout and the cable wire color code. Terminal cable is not supplied with the MIRAN equipment.

3 Punch the wires of the terminal cable open end into the MDF punch block according to the Figure 13 wiring diagram.

4 Plug the connector at the other end of the terminal cable into the terminal RS-232 connector.

Connecting the modem to the I/O panel connector

To connect a modem to the RS-232 port on the I/O panel connector that corresponds to the MIRAN card slot:

1 Place the modem in the desired location.

2 Plug the tip/ring 50-pin cable connector into the 50-pin I/O panel connector.

3 Plug the DB-25 male connector of the tip/ring cable into the modem DB-25 female connector.

For additional information on how to setup the modem, refer to *Appendix A: Modem setup*.

Connecting an external audio device

An analog audio source and receiver can be connected to the MIRAN for recording of music or messages to the Flash memory on the MIRAN and to backup messages from the MIRAN to a tape or to an other MIRAN card. It can also be used to connect an external music source (CD player or musac) directly through a trunk emulation port/channel, into Meridian 1 for MOH.

The analog sources can be connected:

— to the 3.5 mm Audio Jack on the MIRAN faceplate, or

— at the MDF

Analog to internal pass-through switchover

For Music-on-Hold, both analog channels can be used at the same time, each assigned to different internal channels.

To allow switching from an analog source to an internal channel, the configuration of each channel is polled every 30 seconds to check for an assignment switchover. If the assignment is for a voice file, the playthrough will be stopped and the voice file started immediately, and vice versa. This switchover always occur at the end of the file to avoid hearing truncated messages.

Connecting audio devices to the MIRAN faceplate

The MIRAN has a 3.5 mm Audio Jack at the top part of the faceplate. This jack provides one audio input and one audio output.

To connect the external audio source to the MIRAN faceplate audio jack:

1 Plug the 3.5 mm jack on the common side of the NTAG81AA Audio Cable into the 3.5 mm Audio Jack on the MIRAN backplane.

2 Plug the audio input end of the NTAG81AA cable connector into the audio source device. If the source is at a distance from the MIRAN, you may have to use an extension (not supplied).

3 Plug the audio output end of the NTAG81AA cable connector into the audio receiver device (for message backup). If the source is at a distance from the MIRAN, you may have to use an extension (not supplied).

Connecting audio devices at the MDF

The MIRAN provides two audio inputs and two audio outputs at the MDF.

To connect the external audio devices at the MDF, refer to Figure 14 and follow the steps bellow:

1 Position the audio devices in a convenient location.

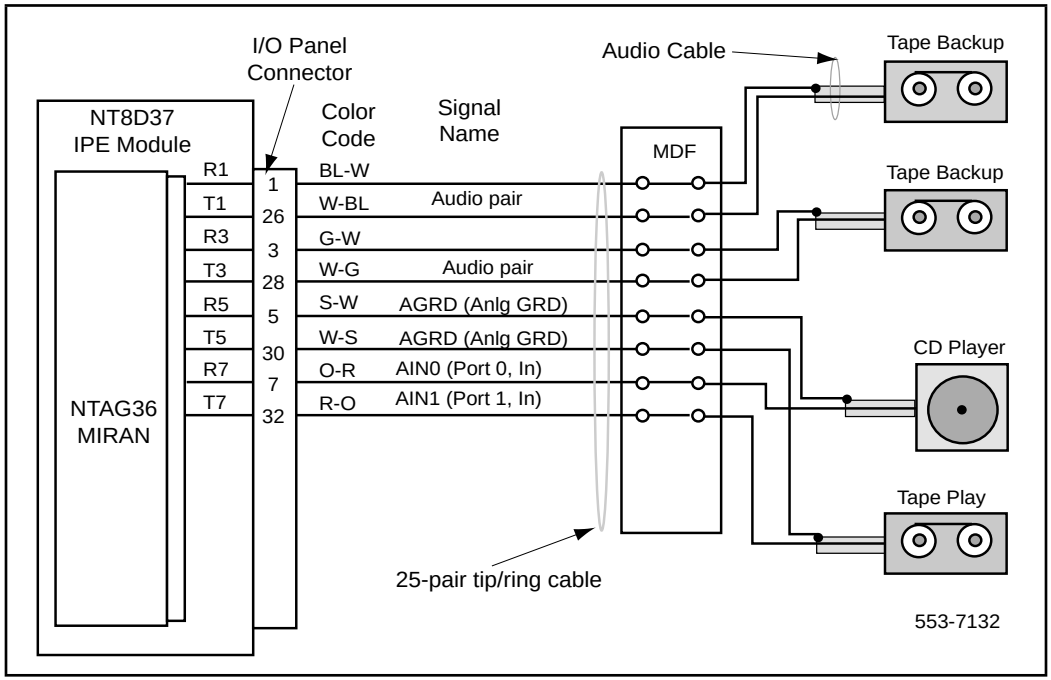
2 Obtain the required audio cables of the appropriate length. The cable should have open wires at one end to connect to the MDF punch block.

3 Connect each audio cable to the appropriate Analog GND and Port terminal on the MDF. Refer to Figure 14 for signal name and color code of the 25-pair tip/ring cable wires.

4 Plug the other end of each audio cable into the appropriate audio device, as shown in the figure.

Figure 14 illustrates the external audio source and backup device connections at the MDF. It shows two audio inputs that provide external music or messages to the MIRAN and two audio recorders that provide backup of messages located in the MIRAN. Analog audio sources have a separate analog ground (AGND) and analog audio backup devices have their own separate (AGND). An audio cable extends from the MDF to the audio device.

Figure 14
Analog device connection at the MDF



Connecting multiple MIRAN card

A maximum of 16 MIRAN cards can be connected in a daisy-chain to form a MIRAN Local Area Network for administration and maintenance purposes.

These MIRAN card can be inter-connected:

— at the mini-DIN connector on the MIRAN faceplate, or

— at the MDF

Connecting multiple MIRAN cards at the faceplate

All of the MIRAN cards in the system are connected in a daisy-chain using the NTAG81DA Maintenance Cable Splitter cable with a mini-DIN connector on the common end and two 9-pin D-Sub connectors on the other ends.

To install the MIRAN cards and connect them in a daisy-chain:

1 Install all the MIRAN cards into their card slots in the IPE module or shelf, if not already installed.

2 Plug the NTAG81DA cable mini-DIN connector into the mini-DIN connector on the MIRAN faceplate. Do this for every MIRAN installed.

3 Plug the NTAG81DA cable Port B 9-pin sub-min D-type male connector of the first MIRAN into the terminal, terminal emulating PC, or a modem. Use the appropriate adapter cable, if required.

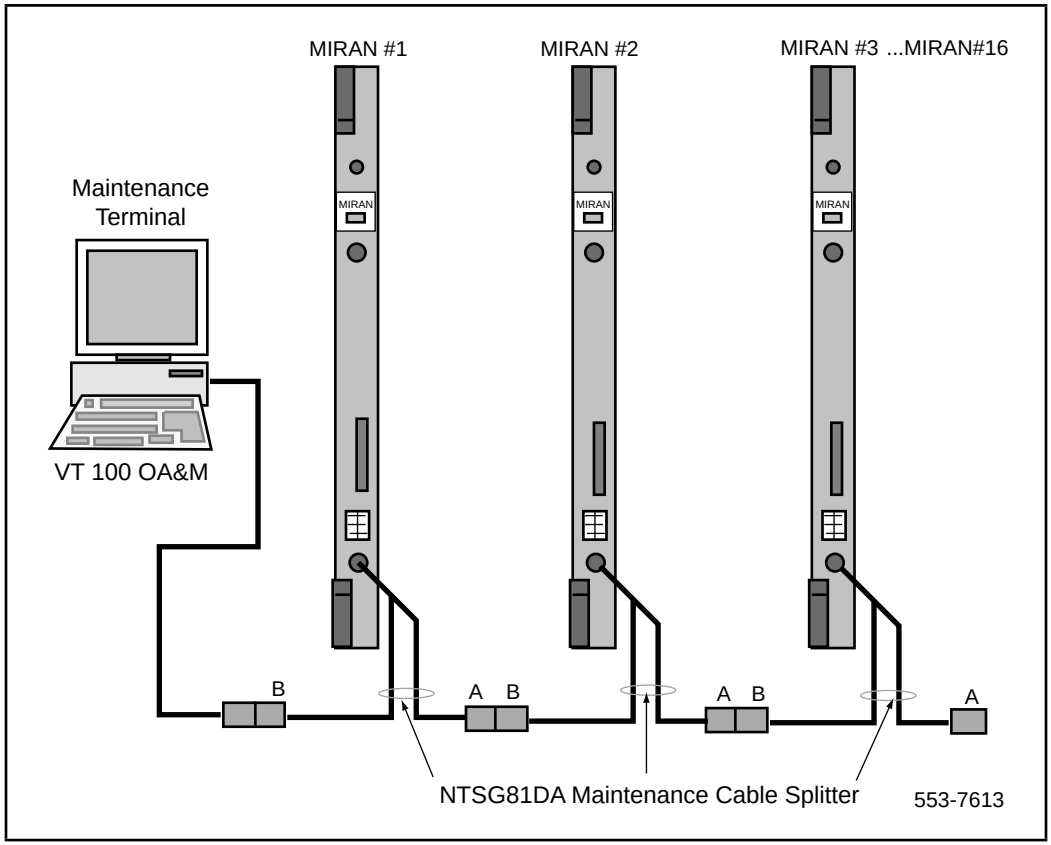
4 Plug the NTAG81DA cable Port A 9-pin sub-min D-type female connector of the first MIRAN into the NTAG81DA cable Port B 9-pin sub-min D-type male connector of the second MIRAN. Refer to Figure 15.

5 Repeat steps 3 and 4 for the rest of the MIRAN cards in the daisy-chain.

6 If MIRAN cards occupy the same module or shelf, the faceplate cables can be connected directly to each other as shown in Figure 15. For longer runs, the NTAG81BA Maintenance Extender cable may be required to span the distance.

Figure 15 illustrates the multiple MIRAN connections in a daisy-chain to enable one terminal to access each MIRAN in the chain. A maximum of 16 MIRAN cards can be daisy-chained into a LAN.

Figure 15
Terminal-based OA&M connection for multiple MIRAN cards



Connecting multiple MIRAN cards at the MDF

A maximum of 16 MIRAN cards can be connected in a daisy-chain at the MDF. This is a more convenient approach than the connection at the MIRAN faceplate because it allows MIRAN cards to be removed without disconnecting any cables.

> ***Note:*** If you remove a MIRAN card from the daisy-chain, all the remaining cards down-steam from the removed card, cannot be accessed by the administration and maintenance terminal. All the cards that are up-stream, towards the terminal, will continue to be accessed by the terminal. Once the card is re-installed, all cards can be accessed.

To connect MIRAN cards in a daisy-chain at the MDF:

1 Install all the MIRAN cards into their card slots in the IPE module or shelf, if not already installed.

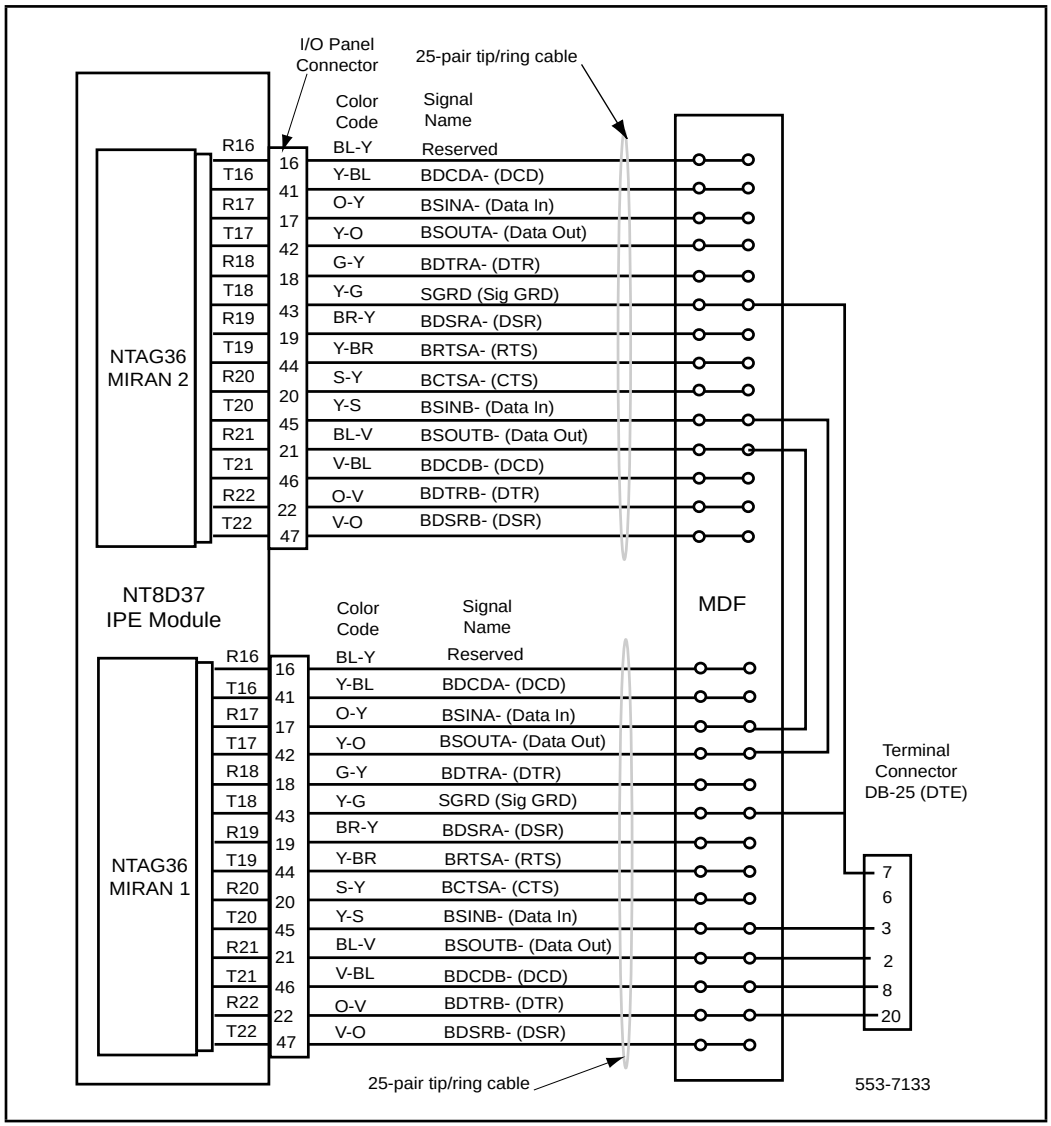
2 Identify each 25-pair tip/ring cable at the MDF that is associated with each MIRAN card. These cables have been installed during system installation or in the pre-installation preparation phase.

3 Cross-connect the wires at the MDF punch block that represent the RS-232 maintenance Port A and Port B as shown in Figure 16:

- Connect the terminal to the first MIRAN in the daisy-chain as shown in Figure 13 “Terminal connection to the MIRAN at the MDF” on page 52 by plugging the Port B 9-pin sub-min D-type male connector of the first MIRAN to the terminal cable.
- Cross-connect Port A 9-pin sub-min D-type female connector of the first MIRAN to Port B 9-pin sub-min D-type male connector of the second MIRAN in the chain, as shown in Figure 16.
- Continue cross-connecting Port A to Port B until the last MIRAN in the daisy-chain.
- Port A on the last MIRAN is not connected.

Figure 16 illustrates the connection of multiple MIRAN cards over RS-232 interfaces at the MDF by cross-connecting Port A to Port B of MIRAN cards.

Figure 16
Multiple MIRAN card connections over the RS-232 port at the MDF



Option 11E/11C MIRAN installation and terminal connection

Options 11E and 11C system uses a pass-through approach to connect the TTY and the terminal used for OA&M access.

CAUTION

Do not install a MIRAN card into an IPE card slot if that card slot has been configured for a line card. Before you insert the card into the card slot, disconnect the cable connecting this card slot to the MDF. Line cards are configured with ringing voltage, which, when applied to MIRAN, may damage the card. **Never** install the MIRAN into slot 10.

MIRAN card installation

To install one or more MIRAN cards into an Option 11E or 11C system:

1 Identify the IPE card slots selected for MIRAN card(s). Slot 10 should never be used to install the MIRAN card. If you are planning to use CE-MUX interface connection for Option 11E, install the MIRAN in a slot form 3 to 9 in the main cabinet.

2 Pull the top and bottom extractors away from the MIRAN faceplate.

3 Insert the MIRAN card into the card guides and gently push it until it makes contact with the backplane connector.

4 Push the top and the bottom extractors firmly towards the faceplate to insert the MIRAN card into the faceplate connector and to lock it firmly in place.

5 Observe the faceplate hexadecimal display. It should indicate the progress of the internal self-test in the form of T:xx (refer to *Appendix A, MIRAN hexadecimal codes*). Upon successful completion of the test and the start-up of the RAN application, it will display the code "**Rann**", where **nn** is the LAN card number. If cards are not connected in a LAN configuration the display will show Ra00.

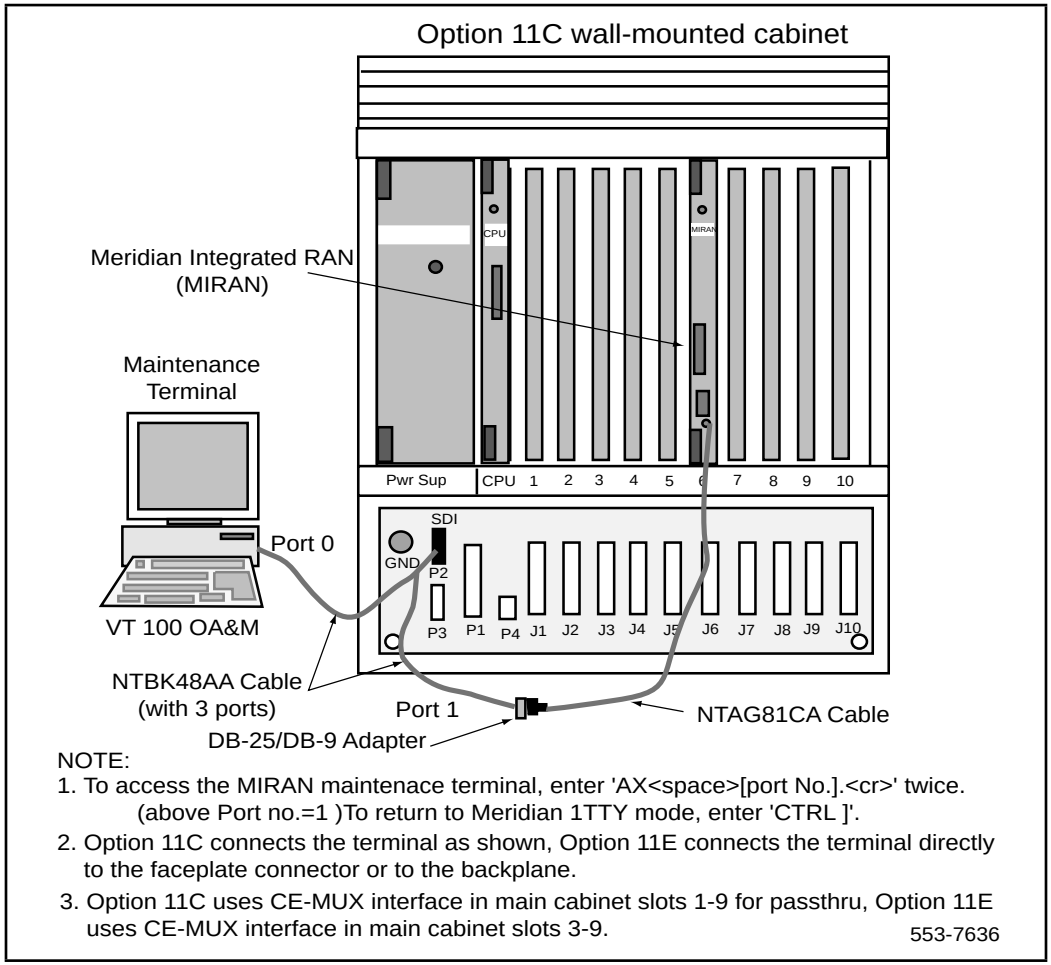
6 To enable the MIRAN, load the Network and PE Diagnostic program LD 32 into the system memory using the system TTY to execute the **ENLC l s c** command, where **l** is the loop, **s** is the module or shelf, and **c** is the card to be enabled.

7 Repeat steps 1 through 6 for each additional MIRAN.

Note: During the MIRAN bootup sequence you will see either an error message or an "ok" on the hex display. To interpret an error message, refer to the hex display error codes listed in the Appendix A.

Figure 17 shows the terminal connection to the SDI port on the cabinet backplane and to the Mini-DIN RS-232 connector on the MIRAN faceplate. This allows you to use the terminal as a TTY and as a terminal-based OA&M.

Figure 17
Option 11E or 11C terminal connection



Terminal connection

A terminal connected to the Option 11E or 11C system can be used as a system TTY and the terminal-based OA&M access to the MIRAN card.

To connect the terminal:

1. Position the terminal on a desk near the system.
2. Plug the NTBK48AA cable DB-9 male connector into the SDI connector on the Option 11E or 11C backplane, refer to Figure 17 for detail connection illustration.

   Note: To connect the MSDL SDI port on the Option 11E or 11C to the SDI connector, refer to the *Installation* chapter of the *Multi-purpose Serial Data Link description* (553-3001-195).

3. Connect the NTBK48AA Port 0 to the terminal RS-232 port.
4. Connect the NTBK48AA cable Port 1 DB-25 connector to the DB-25/DB-9 adapter.
5. Plug the NTAG81CA Mini-DIN connector into the MIRAN faceplate Mini-DIN RS-232 connector.
6. Plug the NTAG81CA cable DB-9 connector into the DB-9 connector on the DB-25/DB-9 adapter.

MIRAN configuration

Now that you installed the hardware, connected the terminal, connected the multi cross-connect channels to the trunk ports at the MDF, and connected the external audio devices to the MIRAN, you can proceed with the MIRAN configuration.

RAN activation and route selection

In the Meridian 1 system, the MIRAN units are configured exactly the same as the Enhanced Universal Trunk card units are configured for RAN. For detail information of overlays Trunk Route Administration (LD 16) and Trunk Administration (LD 14), refer to *X11 input/output guide* (553-3001-400).

To configure the RAN propagation route and the mode of activating the recorded announcement, you must define its parameters using Trunk Route Administration program LD 16. The MIRAN emulates the Enhanced Universal Trunk characteristics and does not require modification of LD 16 to configure the MIRAN functions.

Specifically, the MIRAN and the Enhanced Universal Trunk card, support the following modes of operation:

— Delay Dial Continuous RAN

— Immediate Start Continuous RAN

— Level Controlled Stop/start RAN

The MIRAN supports all of the above on four or eight totally independent ports/channels. Thus, different parts/channels of the same RAN message can be played to different callers at the same time.

Continuous RAN

Continuous (immediate or delay) RAN plays a message constantly over and over again. Callers “barge in” on a playing message if the immediate start is selected or are provided with a ringback tone until the message begins its next playing, if delay dial is selected in LD 16. At the end of each message, a pulse is issued on the control pulse line that is used by the trunk unit to cut through to the waiting call. External channels barge in at any time during the message, internal ports/channels wait until the message starts to be connected to a RAN message.

Cross-connect channels support only delay dial and immediate continuous RAN mode.

To configure the continuous mode of the RAN activation, load Route Data Block program LD 16 using the system TTY and enter the appropriate responses to the prompts as listed in Table 11.

Table 11
Defines a continuous RAN route

Prompt	Response	Description
REQ	NEW/CHG	Define new or change existing configuration
TYPE	RDB	Route data block
CUST	0-99	Customer number
ROUT	0-511	Route number
TKTP	RAN	Trunk type recorded announcement (RAN)
RTYP	CON DID	Continuous. DID is selected for telephone-based OA&M access over MIRAN port 7.
REP	1-15	Number of repetitions of RAN
POST	ATT DIS	Route to attendant after maximum repetitions Disconnect after maximum repetitions
STRT	IMM DDL	Immediately connect call to recorded announcement Delay call connection until start of announcement
ASUP	(NO) YES CO	Do not return answer supervision Return answer supervision Return answer supervision if originator is a CO trunk
ACOD	xxx...x	Trunk route access code

Multi-channel level start/stop control RAN

In the multi-channel level start/stop control RAN, the leading edge of the start signal initiates message playback that continues until either the trailing edge of the start signal occurs or the end of the message is reached. A message that is terminated by the trailing edge of a level start signal is immediately reset and again made available for playback. The multi-channel level start/stop control RAN mode allows you to play the same announcement over multiple RAN channels completely independently using the same RAN route. For an example, refer to "Example 2:" on page 38.

To configure the RAN route, load LD 16 using the system TTY and respond to the prompts as shown if Table 12 with the appropriate parameter selection for your application.

Table 12
Defines a multi-channel start/stop RAN route

Prompt	Response	Description
REQ	NEW/CHG	Define new or change existing configuration
TYPE	RDB	Route data block
CUST	0-99	Customer number
ROUT	0-511	Route number
TKTP	RAN	Trunk type recorded announcement (RAN)
RTYP	MLSS	Multi-channel start/stop RAN (for X11 release 21.41 and higher and 22.16 or higher)
REP	1-15	Number of repetitions of RAN
POST	ATT DIS	Route to attendant after maximum repetitions Disconnect after maximum repetitions
STRT	IMM	Immediately connect call to recorded announcement
ASUP	NO YES CO	Do not return answer supervision Return answer supervision Return answer supervision for a CO trunk
ACOD	xxx...x	Trunk route access code

Multi-channel Start/Stop RAN (MLSS) allows you to support multiple start/stop RAN channels within the same RAN route and the individual RAN channel to each trunk route number.

Start/stop immediate RAN

In the immediate ("level") start RAN, the leading edge of the start signal initiates message playback that continues until either the trailing edge of the start signal occurs or the end of the message is reached. A message that is terminated by the trailing edge of a level start signal is immediately reset and again made available for playback. To configure the RAN route, load LD 16 using the system TTY and respond to the prompts as shown if Table 13 with the appropriate parameter selection for your application.

Table 13
Defines an immediate start or start/stop RAN route

Prompt	Response	Description
REQ	NEW/CHG	Define new or change existing configuration
TYPE	RDB	Route data block
CUST	0-99	Customer number
ROUT	0-511	Route number
TKTP	RAN	Trunk type recorded announcement (RAN)
RTYP	LVL	Level start/stop mode.
REP	1-15	Number of repetitions of RAN
POST	ATT DIS	Route to attendant after maximum repetitions Disconnect after maximum repetitions
STRT	IMM	Immediately connect call to recorded announcement
ASUP	NO YES CO	Do not return answer supervision Return answer supervision Return answer supervision if originator is a CO trunk
ACOD	xxx...x	Trunk route access code

Music-on-hold activation and route selection

Music-on-hold (MOH) operates in a continuous mode with an immediate connection of the music source, which plays constantly. Callers “barge in” on playing music.

To specify the conference loop for the MOH, you have to access the Configuration Record program LD 17, as shown in Table 14.

Table 14
Add or change conference loop for MOH

Prompt	Response	Description
REQ	CHG	Define change existing configuration
TYPE	CFN	Configuration record
CEQU	Yes (No)	Change common equipment parameters
XCT	0-158	Loop number for NT8D17 Conference/TDS card.
CONF	0-158	Conference loop should be an even number.

To configure the RAN route, load Route Data Block program LD 16 using the system TTY and respond to the prompts as shown if Table 15 with the appropriate parameter selection for your application.

Table 15
Defines music-on-hold route

Prompt	Response	Description
REQ	NEW/CHG	Define new or change existing configuration
TYPE	RDB	Route data block
CUST	0-99	Customer number
ROUT	0-511	Route number
TKTP	COT, MUS	Trunk type ‘for RAN
MUS	Yes (No)	Music-on-hold
_MRT	0-511	Music route number
STRT	IMM	Immediately connect call to music-on-hold
ICOG	OGT	For music-on-hold select outgoing trunk only
ASUP	NO YES CO	Do not return answer supervision Return answer supervision Return answer supervision if originator is a CO trunk
ACOD	xxx...x	Trunk route access code

Configuring telephone set-based OA&M access

To configure MIRAN for telephone set-based OA&M access using internal one-to-one port/channel 7, you have to configure the appropriate route and trunk data blocks.Table 16 lists Route Data Block program LD 16 commands to define the route data block for the port/channel 7 used for telephone set -based OA&M access. For a configuration example, refer to Appendix A, “DID configuration for telephone set-based OA&M access” on page 181.

Table 16
Configuring telephone set-based OA&M access route

Prompt	Response	Description
REQ	NEW/CHG	Define new or change existing configuration
TYPE	RDB	Route data block
CUST	0-99	Customer number
ROUT	0-511	Route number
TKTP	DID	Trunk type for telephone set-based OA&M access
ICOG	IAO	Incoming and outgoing trunk
NEDC	ETH	Near end. Both ends have disconnect control
FEDC	ETH	Far end. Both ends have disconnect control
ASUP	NO YES CO	Do not return answer supervision Return answer supervision Return answer supervision if originator is a CO trunk
ACOD	xxx...x	Trunk route access code

Table 17 lists Trunk Data Block program LD 14 commands that allow you to configure the trunk data block for the telephone set-based OA&M access. For a configuration example, refer to Appendix A, "DID configuration for telephone set-based OA&M access" on page 181.

Table 17
Configuring the telephone set-based OA&M trunk data block

Prompt	Response	Description
REQ	NEW	New MIRAN trunk data block
TYPE	DID	Type of trunk. Set MIRAN port 7 to DID for telephone set-based OA&M access
TN	l s c u	MIRAN loop, shelf, card slot and port. For telephone-based OA&M select MIRAN port 7
CDEN	8D	Card density of 8 ports
XTRK	EXUT	Extended trunk type for telephone set-based OA&M access
TRK	ANLG	Analog trunk
SIGL	LDR	Signaling. Loop dial repeating
CUST	0-99	Customer number defined in LD 15 and prompted when REQ= NEW
RTMB	0-127	Route number
BIMP	600, 900	Balanced trunk impedance for MIRAN
STRI	DDL, IMM	Incoming trunk starting arrangement

Configuring the MIRAN trunk characteristics

After you have configured the route, you can now configure the trunk characteristics. A trunk data block specifies the parameters for a particular trunk. Since the MIRAN is emulating the Enhanced Universal Trunk card, you can define the MIRAN parameters using the Trunk Administration program LD 14 on the system TTY and respond to the prompts as shown in Table 18 to configure the MIRAN data block.

Table 18
Configuring the MIRAN trunk data block for RAN and MOH

Prompt	Response	Description
REQ	NEW	New MIRAN trunk data block
TYPE	MUS, RAN, DID	Type of trunk; music or RAN Set MIRAN port 7 to DID for telephone OA&M
TN	l s c u	MIRAN loop, shelf, card slot and port. For telephone-based OA&M select MIRAN port 7
CDEN	8D	Card density of 8 ports
XTRK	EXUT	Type of trunk Enhanced Universal or E&M
SIGL	LDR	Signaling for battery or loop outpulsing for telephone-based OA&M over MIRAN port 7
CUST	0-99	Customer number defined in LD 15 and prompted when REQ= NEW
RTMB	0-127	Route number
BIMP	600, 900	Balanced trunk impedance for MIRAN
STRI	DDL, IMM	Incoming trunk starting arrangement
CFLP	0-159	Music conference loop

Configuring Option 11C pass-through mode

To be able to use the MIRAN maintenance terminal as a system TTY in Options 11C, you must configure the terminal parameters using the Configuration Record program LD 17 as shown in Table 19:

Table 19
Option 11C pass-through configuration

Prompt	Response	Description
ADAN	NEW TTY 1	Add system terminal TTY 1
TTY_TYPE	LSL	Terminal type
CAB	0	Cabinet number
CARD	0	SDI card position (Note)
PORT	1 (or 2)	SDI port selected (Note)
DES	MIRAN	Card name (Meridian Integrated RAN)
FLOWTYPE	NONE	Interface flow control
BPS	9600	Interface transmission speed
BITL	8	Word length - 8 bits
STOP	1	Stop bit
PARY	NONE	Parity

Note: To connect an MSDL SDI port to the Option 11E/11C SDI connector, refer to the *Installation* chapter of the *Multi-purpose Serial Data Link description* (553-3001-195)

To access the MIRAN, type the prompt ‘AX<space>[port number]. Press Enter twice to display the MIRAN OA&M screen on the maintenance terminal.

To return to the system TTY mode, type <CTRL>] and the control will be passed back to the Meridian 1 system.

Configuring Option 11C for CEMUX access

To be able to use the MIRAN maintenance terminal as a system TTY in Options 11C over the CEMUX, you must configure the terminal parameters using the Configuration Record program LD 17 as shown in Table 20.

Table 20
Option 11C CEMUX access configuration

Prompt	Response	Description
REQ	CHA	Change data
TYPE	CFN	Configuration record
ADAN	NEW TTY 3	Add new TTY
TTY_TYPE	LSL	Low speed AUX link
CAB	0	Main cabinet
CNDO	03	Card slot
PORT	0	MIRAN port
DES	MIRAN	Port or link designation
FLOWTYPE	NONE	Flow control
BPS	9600	TTY speed
BITL	8	Number of bits
STOP	1	Stop bit
PARITY	NONE	Parity bit
ENL		Enable MIRAN
To access MIRAN, at the prompt type; **>ax y**, where **y** is the TTY number. Example, **>ax 3**. To exit MIRAN, press the **Ctrl** + **]**.		

Configuring the terminal for terminal-based OA&M access

For a terminal-based OA&M access, you have to specify the VT-100 type terminal interface characteristics to ensure compatibility with the MIRAN RS-232 interface.

Set the interface parameters as follows:

— Transmission speed; 9600 bps

— Data bits: 8

— Stop bit: 1

— Parity: No

— Flow control: none

To administer RAN applications using the terminal, go to “RAN Application: Terminal-based OA&M” chapter in this manual.

If using a Window™ based terminal emulator, you should disable the CTRL and the arrow keys by Windows™ because these keys are used by the OA&M for traversing the menus.

MIRAN administration

As part of the administration tasks, you may have to upgrade RAN applications and perform backups. The upgrades can be:

— storage capacity expansion

— channel capacity expansion

RAN application security

There are several levels of access to the MIRAN card for the RAN application. This is to ensure the security of all announcements recorded.

The password protection for telephone set-based OA&M will be transparent to the system in which the MIRAN card is installed. In order to provide security, two levels of passwords are used. The distributor and the user levels.

The distributor level password can be alphanumeric of up to 16 characters long. The user password must be only numeric and up to 16 digits long.

Distributor level password

The distributor default password is "**4321**" . The distributor is able to access the base code self-test and diagnostic procedures. Also, this password level provides message monitoring for Card-LAN, DS-30X, and CE-MUX, 8051 signals.

User password

The user default password is "**4321**". The general OA&M password allows a user to login to the MIRAN administration menu, check the status of the card and display the recorded announcements in service and in reserve. The first level of access will in addition allow the user to swap announcements in and out of service. The second level of access will in addition again allow the user to record and configure recorded announcements.

Software security

To provide security for the RAN and music applications as well as to prevent unlawful product usage, the MIRAN uses the security device and keycode security approach.

Security overview

A security device and keycode mechanisms are needed to protect against unlawful MIRAN feature usage. All upgrades of either port capacity or application software are restricted to a given MIRAN card and are accurately tracked to allow for satisfactory handling of field repairs and incremental upgrades.

A new keycode is required for the following upgrades:

— port capacity upgrades; two are possible:

  - from one multi-cross connect channel to two
  - from four one-to-one ports/channels to eight

— feature enhancements

— new applications

Security is not required for the following upgrades:

— Voice and music storage capacity expansion

— customer recorded announcements

— backup and restore operations

— application patching/bug fix

Security device

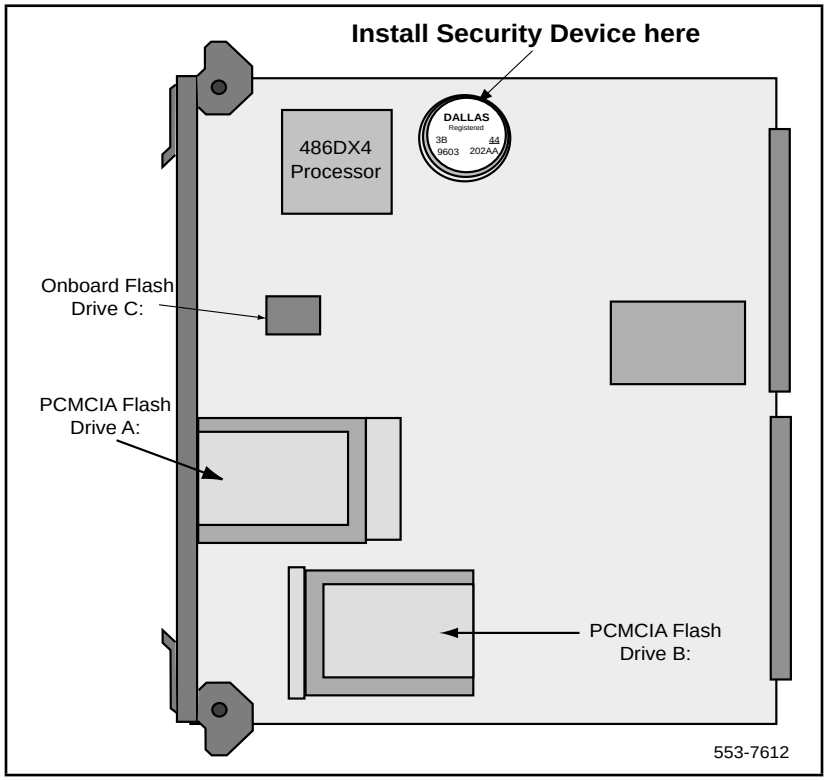
This button-sized device has a unique 8-digit security ID that cannot be overwritten. In addition, it contains 1kbit of PROM to:

— identify the button as part of a Nortel product

— act as a store for any upgrades previously performed on the MIRAN card

Figure 18 shows the position of the security device and the on-board PCMCIA Flash card.

Figure 18
Security device installation location



Security ID

The security ID is an 8-digit number used to uniquely identify the MIRAN card. It is stored on the PROM on the card.

The security ID can be found:

- at the top left-hand corner of the terminal-based OA&M menu or screen
- by using a command on the telephone set-based OA&M access
- on the shipping paperwork or box
- a sticker label on the card

To upgrade a MIRAN, the customer provides Nortel with the security ID of the original card and Nortel provides the customer with a matching keycode.

Keycode

Nortel provides the customer with a keycode to enable them to install any purchased upgrades. The keycode is entered over the local maintenance port on the MIRAN card. The code consists of a stream of 24 digits that matches the Security ID of the MIRAN being upgraded.

When the MIRAN is ordered with a new Meridian 1 (Options 51C through 81C), the keycode is pre-loaded by the factory into the MIRAN. Option 11E or 11C and stand-alone orders of the MIRAN, require that you enter the keycode using a VT100 type terminal.

Keycodes can enable additional functionality within an existing application (adding ports, features, etc.) or can be used with a PCMCIA Flash card to provide new software or pre-recorded announcements.

The keycode must contain the security device information to be compatible with the specific MIRAN to enable the upgrade. If there is a mismatch, the upgrade cannot be activated.

RAN installation

Various recorded announcements are recorded and assigned to the required RAN one-to-one ports/channels over the RAN OA&M application. One announcement may be assigned to several ports to let the MIRAN card know which announcement is to be played when a particular MIRAN port is seized. To play the same announcement over several trunks on the same route, you must use multi-channel level start/stop control RAN mode.

The different ports/channels on the card are configured as either immediate start or delay start to allow the MIRAN card to match system configuration options to each trunk port. Finally, corresponding routes and Enhanced Universal Trunk cards are defined on a system level. Refer to "MIRAN configuration" on page 62 in this chapter.

If the same recorded announcement is required on more than one MIRAN card, then it must be installed separately on each card by backing up to PCMCIA Flash on one card and restoring on the remaining cards.

Real time clock setup

The MIRAN real time clock is set up using the MIRAN administration menu (refer to "RAN Application: Terminal-based OA&M" on page 107). The craft person should set the clock to match the system clock. This should be done before starting RAN configuration.

The MIRAN clock has battery backup in case of power reset. In addition, the clock is used to timestamp entries in various log files on the card, and to switch between "day-time" and "night-time" announcements.

Telephone set-based OA&M

If the telephone set-based administration is needed, then you must configure the MIRAN port/channel 7 for this purpose. Because the telephone set-based OA&M port/channel 7 is originally available for general RAN functions, you must define it as a DID trunk port. A all numeric password is required to use the telephone set-based OA&M access. Port/channel 7 is also available for telephone set-based OA&M access in small and medium size MIRAN cards.

> ***Note:*** Make sure that the keycode has been loaded into the MIRAN using a VT100 type terminal (if not already loaded in the factory), before you attempt to use telephone set-based OA&M access.

First define the port on the card as a DID trunk, then define the corresponding route and the access code at the system level. This port is then restricted to telephone set-based OA&M and cannot be used to play recorded announcements or music. For configuration details, refer to “Configuring telephone set-based OA&M access” on page 69 and configuration example in Appendix A, “DID configuration for telephone set-based OA&M access” on page 181.

Access the OA&M application by dialing the DID trunk access code and entering the password. After the password is entered, the voice menu becomes available. Refer to Table 16 for LD 16 prompts and Table 17 for LD 14 prompts.

Terminal-based OA&M

The MIRAN terminal-based or text-based interface is provided for the RAN OA&M over the direct connection to a terminal or PC. It is also available indirectly, using the STA (Single Terminal Access) feature on the Multi-purpose Serial Data Link (MSDL) card. Refer to “RAN Application: Terminal-based OA&M” on page 107.

MIRAN card administration

The following tasks may be performed by the RAN application, using the RAN administration menu on the MIRAN card using terminal-based OA&M access:

— Recording announcements.

— Changing recorded announcements between different MIRAN ports/channels.

— Swapping recorded announcements between “in service” and “in reserve”.

— Adding additional memory resources.

— Upgrading MIRAN applications using PCMCIA card.

The following MIRAN tasks are **not** available over the telephone set-based OA&M; due to their complexity; they are **only** available over a terminal-based OA&M:

— Uploading recorded announcements/music over the analog port on the MIRAN card faceplate.

— Uploading recorded announcements/music using a PCMCIA card.

— Connecting an analog source (e.g. CD player for music-on-hold) through the analog port on the faceplate.

— Cannot enter a keycode.

— Checking usage of the memory resource.

— Backing up MIRAN applications and/or announcements.

— Restoring MIRAN applications and/or announcements.

— Accessing various information files (e.g., security file, operational measurements file, etc.)

— Setting the MIRAN card clock.

MIRAN administration using a terminal

Use a VT-100 type terminal or a PC terminal emulator program under Windows to perform an OA&M session.

If multiple MIRAN cards are used in a single system, an OA&M terminal attached to one card can gain pass-through access to any other MIRAN card that is daisy-chained to the first (refer to Figure 15). Access a MIRAN card connected to the VLAN from the maintenance terminal.

For using the terminal-based OA&M access, refer to “RAN Application: Terminal-based OA&M” on page 107.

Telephone set-based MMI

After port/channel 7 on the MIRAN card is configured for the telephone set-based maintenance and the keycode has been loaded, then it is possible for the customer to access this channel from any telephone set and record any announcements required. This is done in the same manner as recording a personal greeting for Meridian Mail, for example.

To use a telephone set-based OA&M access, the following steps are required:

1 Assign channel 7 for telephone set-based OA&M access, refer to "OA&M Access Configuration" on page 142.

2 Record announcements using the telephone set, refer to "Telephone set-based OA&M flowcharts" on page 99.

3 Assigning recorded announcements to specific channels, time-of-day, and day-of-the-week; refer to "Assign Message" on page 118.

Note: If you assign a channel using the telephone set, all previous recording configurations for that channel are overwritten and replaced by the recording assigned through the telephone set.

For using the telephone set, refer to the section titled "RAN Application: Telephone set-based OA&M" on page 91.

Recording announcements and music

There are three different voice recording methods available to MIRAN customers:

— Access port/channel 7 (the maintenance port) over a DTMF telephone, and use the voice menu provided to record announcements that you speak into the telephone

— Use a PC with terminal emulation program and record to the PC over an RS-232 port

— Cable your portable tape or CD player directly into an audio port on the faceplate or MDF to record directly into the MIRAN.

Music can be recorded in the same manner as actual announcements. The MIRAN can hold several minutes of music in Flash EPROM for use by features such as music-on-hold. Generally the music is downloaded to the MIRAN from an external analog source such as a tape recorder or a CD player. The music source is connected to the analog port of the MIRAN card. Connections are available on both the faceplate and the MDF.

PC-based recording

This is professional recording that can be provided to the user. An example of the system requirements to perform the recording and editing are:

— Windows™ environment

— Creative Labs AWE 32 Plug and Play audio card ModelCT3601, or equivalent

— PCMCIA Drive: DATABOOK ThinCard Drive Model TMB-240, or equivalent

— Software: GOLDWAVE sound editor, or equivalent

To perform the pc-based recording use one of the following methods:

— Use ".WAV" output of PC sound editor such as SoundBlaster™ or equivalent

— Convert from .WAV to raw A-law or U-law PCM (.ALW or .ULW file extensions should be used) using the sound editor

— Download to the MIRAN using PCMCIA

— Use the MIRAN utility to convert from .WAV to raw A-law or U-law PCM where the sound editor does not support this conversion feature

Note: When recording announcements, use the following recommendations. To remove sharp transitions at the boudaries of an announcement, add fade-in (from 0) at the start of the message and fade-out (to 0) at the end of message. Also, one second of silence must be added to the beginning and to the end of each message or clicking noise can be heard by the user.

The MIRAN professional recordings are first made on a third party PC sound editor that produces.WAV files (.WAV is the Windows™ sound file standard). The best known of these editors is SoundBlaster™ Stereo Pro (16 bit sampling), comes with professional studio software for the manipulation of sound files subsequent to recording.

A specific sound editor is not recommended or supported by Northern Telecom. However, the format of the output file should be .WAV. Thus the choice of recording product will be at the discretion of the local distributor or end user.

After the files are edited in the PC, they can be downloaded to a PCMCIA card on the MIRAN in .WAV format. The PCMCIA card can then be inserted into the MIRAN.

You can use the Convert Message Files menu to convert the .WAV files into the .ALW or .ULW raw PCM files or vice versa, where .ALW corresponds to A-law and .ULW to U-law format. You can also convert .WAV files into the .SDN files and vice versa using the Convert Message Files menu in the terminal-based OA&M access mode.

Tape recorder and CD player recording

The .ALW or .ULW files are generated over the cross-connect channels using a recorder or a CD player. The recording supported is 8-bit PCM A-law or Mu-law mono sound.

Telephone set-based recording

The files are generated over the telephone set-based OA&M access are saved in .ALW or . ULW format based on the current system's coding/decoding law.

If you record a new message, it will be stored on the first available disk starting with B:, then A:, and finally C:.

If the message is stored on drive A: or B:, the message will be deleted unless you save it. If the message is stored on drive C: it is placed in RAM. If you save the message, the message is recorded in Flash on drive C:. Message saving is a slow process (takes about as long as it takes to record it).

CAUTION

When writing to the drive C:, MIRAN ports/channels should be idle except for channel 7, which is used for telephone set-based OA&M access. If message playing is allowed at this time, the messages playback quality may be poor, or the MIRAN card may re-boot.

Music sources

Music can be accessed by two methods, both externally and internally. Both of these methods may be used at the same time.

External music

In the case of external music, there is a permanent connection between an external music source (e.g. CD player, tape recorder etc.) and the MIRAN over the analog input port. This port is available both at the MDF and also on the MIRAN faceplate. External music is the most suitable implementation in cases where there is a requirement to frequently change the music.

The analog input is obviously not confined to music and can be used in many applications e.g. a “talking timetable”, or perhaps advertisements, which are changed on a regular basis. This type of implementation would generally be found on the larger system options where it is acceptable to have a dedicated piece of audio equipment for this purpose.

Internal music

Internal music is normally used in situations where it is not possible or desirable to have a music source permanently connected to the MIRAN. In this situation, a craftsperson uses an external music source to record the music onto the MIRAN, where it is stored digitally in Flash memory.

If more than 4 minutes of storage is required, a PCMCIA card is required.

Card-level administration

The card-level administration is used to re-record or re-assign messages to channels based on traffic statistics. Refer to “RAN Application: Terminal-based OA&M” on page 107.

Altering an assigned message: option 1

Disable any units to which the message is assigned, unassign the message, delete the message, and record a new message that can be re-assigned.

Replace and old message: option 2

Record and swap a new message between active calls to avoid disturbing service; then, delete the old message. This method assumes sufficient free storage to allow recording the new message without deleting the old one.

Command files

The MIRAN can accept downloaded command files that are similar to DOS batch files. Command files are used to store configuration information during backup and restore operations. The PCMCIA Flash card stores command files along with voice files. Entered on the terminal or downloaded, backup information can be edited on a PC capable of reading ATA-compatible PCMCIA cards. Refer to *Command summary* menu in “RAN Application: Terminal-based OA&M” on page 107.

Utilities that can edit messages are simple text files, such as DOS EDIT or Windows Notepad, can also edit command files. It is not necessary to type configurations individually into each MIRAN, because customer configurations can be generated on a PC and copied to multiple MIRAN cards on the same RAN route.

RAN upgrades

Several types of RAN application upgrades are available on the MIRAN card. These are:

— a software upgrade for bug fix and/or addition of new features

— a memory upgrade to increase the voice storage capacity

— a memory upgrade to add new pre-recorded announcements / music

— a mixture of the above

To perform and RAN upgrade:

1 Insert a PCMCIA card into the A: slot on the MIRAN faceplate.

- If the new PCMCIA card contains a configuration file, the MIRAN executes this file to perform the upgrade automatically. This configuration file can be prepared in the distributor's office for each MIRAN customer and then placed on the PCMCIA card along with the application and/or recorded announcements to be upgraded. Then, the PCMCIA card is sent to the customer, who only has to insert the PCMCIA card in the MIRAN card to perform the upgrade.
- If the new PCMCIA card contains a feature upgrade but no configuration file, the MIRAN card can perform the upgrade without any intervention by the craftsperson.
- After the feature upgrade configuration is completed, enter the new keycode on the MIRAN terminal to activate new features you just installed.
- For the new feature to become active, you must perform a hard reset.

2 If the PCMCIA card contains .WAV sound files but no configuration file, you have to establish a administration session, as described in this step, in order to perform the upgrade and configuration of file assignments.

To replace old announcement files with new files on the PCMCIA:

- Display existing (old) files using the List Files menu "List Files" on page 133.
- Delete the files you wish to replace with new files on the PCMCIA card, by using the "Delete File" on page 136.
- Copy new files from PCMCIA card into the drive where your other announcement files are located, by using the "Copy File" on page 135.
- Convert files from .WAV to . ULW or .ALW or vice versa, if required, by using the "Convert Message File" on page 124.
- Professionally recorded prompts must be in .WAV, .ALW, or .ULW format. For recording announcement files, refer to *Appendix A, Sound recording configuration.*

3 To configure the announcement file assignment, you have to assign the day/time and channel when and where this file will be played. To do this, use the “Assign Message” on page 118.

4 If a PCMCIA card contains both a feature and recorded announcement upgrade but has no configuration file, the MIRAN circuit card performs the feature upgrade automatically.

- Perform the recorded announcement upgrade as in step 3 of this procedure.
- After the configuration is completed, enter the new keycode on the MIRAN terminal to activate new features you just installed.
- For the new feature to become active, you must perform a hard reset.

Software upgrade

Perform a software upgrade:

1 Insert the new feature PCMCIA card into the drive A: slot on MIRAN, as shown in Figure 19.

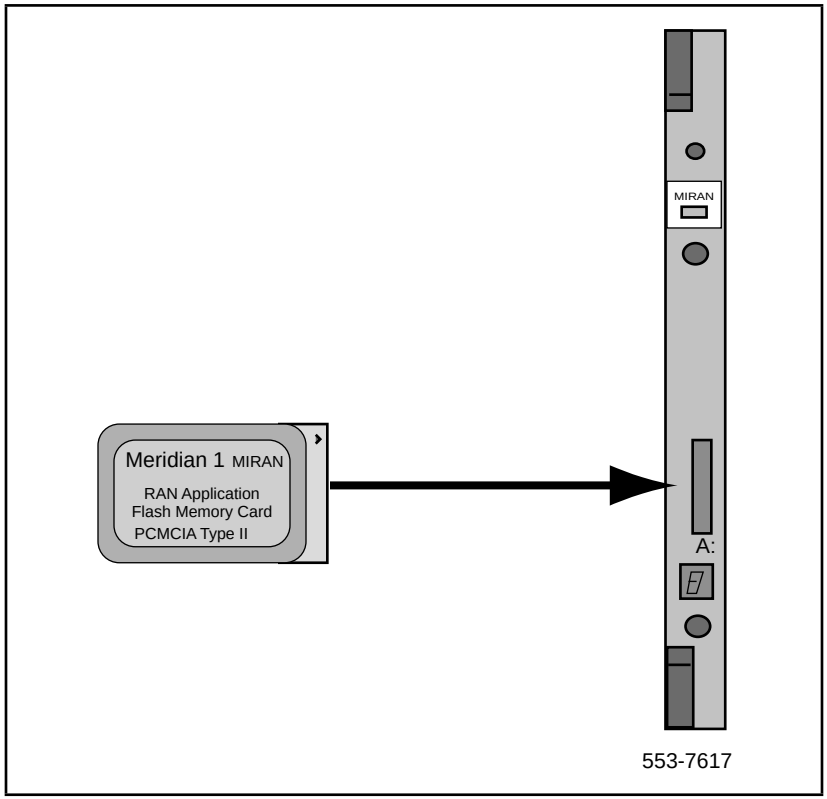
2 Initiate the upgrade by using the “Software Upgrade” on page 140. The MIRAN copies across the new application while maintaining all files from the existing ATA Flash memory that are still needed (i.e. existing recorded announcements and configuration). Once the upgrade is complete, remove the old Flash card, unless it is needed to provide additional storage capacity.

3 Keycode requirement:

- If the software upgrade is a maintenance type (bug fix etc.), new keycode is not needed.
- If the upgrade consists of a new application or enhancement, the administrator must enter a new keycode on the maintenance terminal to enable the upgrade.
- For the new feature to become active, you must perform a hard reset.

Figure 19 shows the MIRAN faceplate and the PCIMCIA card slot.

Figure 19
MIRAN software upgrade



Increasing voice storage

You can increase voice storage capacity to the maximum amount available on commercially available PCMCIA memory cards (up to 5 hours).

To expand the message storage capacity, insert a blank PCMCIA Flash card into the A: slot on the faceplate. The MIRAN software checks the Flash card for formatting information. If none exists, the MIRAN will proceed to format the card in DOS format. When completed, the full capacity of the card will be available for storage. To expand voice storage, use the on-board slot B:

Backups

Backup of recordings is not necessary because the Flash technology used on the MIRAN is very reliable. However, backup is available to a PCMCIA memory card, if needed.

The configuration must be backed up. To backup the configuration, refer to “Backup Configuration” on page 127.

PCMCIA backup

Insert a blank PCMCIA card into drive A: just as if you were increasing the voice storage capacity. Before beginning to record any additional messages to this Flash, initiate an OA&M session and select the backup to PCMCIA option or use the **BACKUP** command.

The drive A: is checked for the BACKUP.DAT file before checking drive C:. If the file exists on the PCMCIA card in drive A:, the system will retrieve the configuration from this drive rather then the BACKUP.DAT file in drive C:. For details, refer to the *RAN Application: Terminal based OA&M* and *Telephone set-based OA&M* chapters in this document. The new card is now available as a backup medium rather than as a storage medium.

If you attempt to backup to a non-blank card, the existing files will be overwritten.

> ***Note:*** When backing up recordings and configuration, you must define the drive you wish to use for backup.

A backup includes both recorded announcements and configuration. The configuration contains information relating to the RAN/music PCM data stored in Flash that includes:

— voice files

— announcement-to-channel allocation

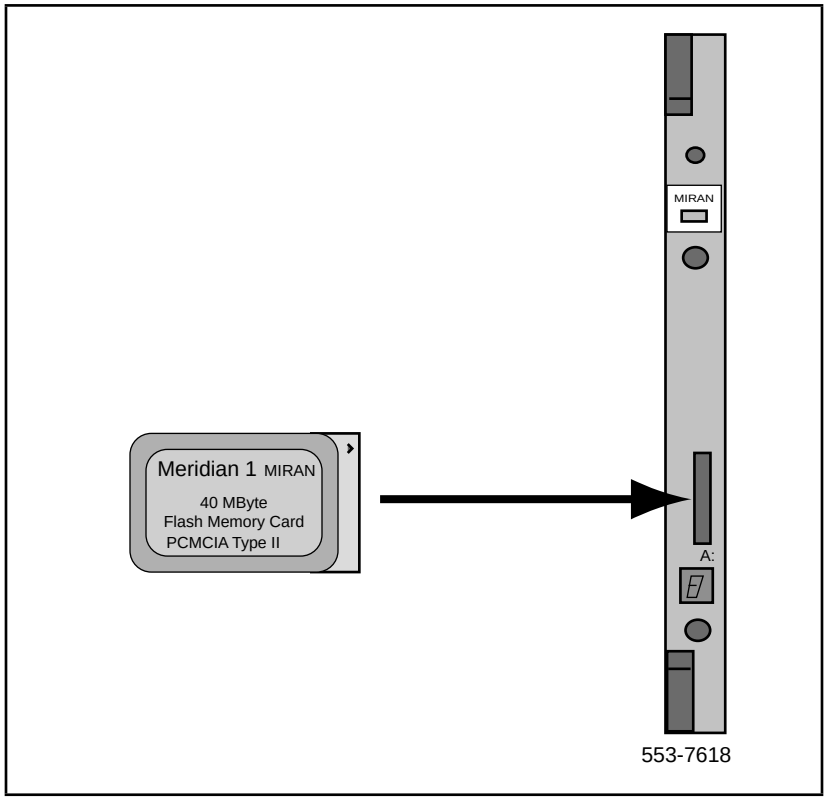
— external/internal music selection

— passwords

— RS-232 port settings

Figure 20 illustrates backing up recordings by using a Flash Memory card.

Figure 20
Backup of MIRAN configuration/recordings



Restoring configuration

When you re-boot MIRAN, the MIRAN configuration is restored from the disk using the following sequence; first drive A: then drive B: and finally drive C:. This allows a previously stored configuration to be over-written by installing an ATA card in drive A:, which contains a new BACKUP.DAT file that has been saved on a different MIRAN card.

RAN Application: Telephone set-based OA&M

This chapter describes the telephone set-based OA&M access to the RAN applications.

General steps in configuring and using the telephone set

To use a telephone set-based OA&M access, the following steps are required:

1 Configure port/channel 7 as the DID trunk for the telephone set-based OA&M access. Refer to “Configuring telephone set-based OA&M access” on page 69.

2 Assign channel 7 for telephone set-based OA&M access, if not already assigned, refer to “OA&M Access Configuration” on page 142.

3 Go off-hook and dial the access code.

4 Enter the password (must be all numeric). Go to Password Entry flowchart in “Password Entry” on page 100. The Main Menu becomes accessible to the user.

5 From the Main Menu, dial the appropriate command to execute a specific function. Refer to“Main Menu” on page 101.

From the Main Menu you can activate the following functions:

- Dial **1** to setup messages. Refer to “Setup Menu” on page 105.
- Dial **2** to play the current message.
- Dial **4** to move to the previous menu.

- Dial **5** to record a message. Refer to “Record Menu - part 1” on page 102.
- Dial **6** to move to the next message.
- Dial **8** to query the MIRAN security ID.
- Dial **76** to delete a message. Refer to “Delete Menu” on page 104.

6 Assign announcements (recorded using the telephone set) to specific channels, time-of-day, and day-of-the-week using the terminal, refer to “Assign Message” on page 118.

Note: To assign a message using the telephone set-based OA&M access command, you remove all previous assignments for the channel selected, which may not be what you want. By using the terminal-based OA&M access menu “Assign Message” on page 118, you can assign specific messages to specific channels without deleting all previous assignments for that channel.

Telephone set-based interface

Note: Before you can login and access the MIRAN, you must **be sure that the keycode has been loaded into the MIRAN**. Otherwise, you will not be able to access the MIRAN. The keycode is installed into fthe MIRAN at the factory when ordered with a new Meridian 1 (Options 51C through 81C). For Option 11 and merchandize orders of the MIRAN, the keycode is not loaded and must be entered using a VT100 type terminal.

A telephone set-based interface within the RAN application allows you to access the application from any telephone set, either internally or externally, to record new announcements or to swap existing announcements in and out of service. It is intended for use in small system configurations where the MIRAN card is used for basic RAN applications. The telephone set-based OA&M is useful for quick modification of announcements but not suitable for extensive or complex modifications; extensive changes are better handled by the terminal-based OA&M interface.

The operations performed in this mode are limited to:

— record new messages or announcements

— play messages

— assign messages to one-to-one internal ports and two cross-connect ports

— access the card's security ID

It is not possible to access the telephone set-based OA&M while the terminal-based OA&M is logged in.

One of the eight one-to-one ports (port 7) on the MIRAN card must be dedicated to support the telephone set-based OA&M access. The reserved port is configured as a DID trunk on the Meridian 1 system to make it accessible over its route access code. The telephone set-based OA&M reduces the number of MIRAN ports available for RAN or music from eight to seven. Because there is no messaging between MIRAN cards, one port must be reserved for the telephone set-based OA&M on each MIRAN card that requires this interface. If the telephone set-based OA&M is not required, then all eight ports on the MIRAN card are available for RAN or music.

The telephone set-based OA&M access may be invoked locally on the system or remotely external to the system. Security for telephone set-based OA&M is ensured via a MIRAN-provided password. The MIRAN card will not identify itself until a valid password has been entered. Overwriting/deleting files, accessing system configuration functions, and changing passwords are not possible in the telephone set-based mode.

The user interface for the telephone set-based OA&M access uses a series of simple voice menus and prompts to guide the user through the configuration process. All prompts are in N.A. English and are part of the existing Meridian Mail prompt pool.

The tone interface for the telephone set-based OA&M access is based on that for Meridian Mail, for example, press "76" to delete an announcement. All feedback to the user is also by using tones, e.g. overflow tone for error conditions. A lookup card for the telephone set-based OA&M is provided to the craftsperson, similar to the one provided for users of Meridian Mail.

Restrictions on telephone set-based OA&M access

Toll calls to the telephone set-based OA&M channel can be disconnected if the NATL prompt in LD 16 is set to YES. Dialing a 0 or a 1 as the first digit is not allowed and the call is released if you specify NATL= YES. The same thing happens when the NFCR prompt is set to YES in LD 15. Both prompts should be set to NO to avoid this problem.

When you dial the password, after the password press the number sign twice (##) to make sure the system recognizes the end of the password.

Using the telephone set

To perform application tasks over the telephone set, you have to use the telephone dialpad. By pressing specific digits on the dialpad, you will be able to login and issue specific commands as described below.

Login

To login, you must dial the access code of the DID trunk configured on channel 7 of the MIRAN card. Channel 7 must be enabled using the *Access Configuration* menu in the *RAN Application: Terminal-based OA&M* chapter in this document.

The default password is "**4321**". Enter the password with **all numeric characters** followed by two number signs (##). If after three attempts you do not enter a correct password, the system will lock you out.

Menu operation

Menu selection is made by pressing a digit on the telephone dialpad. To terminate an entry execution and to request content specific help messages:

— **Terminate an Entry** - enter **#** (this number sign is used to exit the menu)

— **Request for Help** - enter ***** (this star sign provides a help message)

Assigning a message

To assign a message file to a port so that any call routed to that specific port will hear the assigned message.

Table 21 shows internal and cross-connects MIRAN ports/channels.

Table 21
Port/channel number assignments for telephone set-based OA&M

Channel Number	Description
0	Internal one-to-one port/channel
1	Internal one-to-one port/channel
2	Internal one-to-one port/channel
3	Internal one-to-one port/channel
4	Internal one-to-one port/channel
5	Internal one-to-one port/channel
6	Internal one-to-one port/channel
7	Internal one-to-one port/channel (used for telephone set-based OA&M access, if required).
8	Cross-connect channel (also **A0** for terminal-based OA&M access configuration)
9	Cross-connect channel (also **A1** for terminal-based OA&M access configuration)

*Port/channel 7 is configured for the terminal-based OA&M access.

— **Setup** - enter **1** (it activates the assign command)

— **Enter port number** - enter the port number from the table above

Message selection

When you login, the first message within the available disk volumes is automatically selected. This message can be assigned, played, or deleted. To select a message:

— **Next Message** - enter **6** (to go to the next message in the sequence)

— **Previous Message** - enter **4** (to return to the previous message)

When you go back to the start of the message list, the announcement will be “Message one”.

Playing a message

To play the currently selected message file use the following command sequence:

— **Play Message** - enter **2** (plays the current message from the main menu)

— **Stop Playing** - enter **#** (to stop playing the current message)

Recording a message

To record a message use the following command sequence. When saved, recorded messages are assigned a filename of the form MSGnnnn.ALW or MSGnnnn.ULW depending on the system companding law:

— **Record Message** - enter **5** (to record a new message)

— **Stop Recording** - enter #

— **Save Message** - enter **1**

The message can be added to the first disk volume with available space of at least 64 kbytes or 8 seconds of recording.

If the available space is exceeded while recording, a BEEP is given along with the “Recording stopped” announcement.

Deleting a message

The current message will be unassigned and deleted.

— **Delete a Message** - enter **76** (unassigns and deletes the current message)

Playing the 8-digit security device ID

To hear the MIRAN security device ID number:

— **Security device ID -** enter **8** (will hear the eight digits that identify the security device)

Example of a message recording over an analog port

Table 22 lists the steps required to use the telephone set to activate, update, or delete messages on the MIRAN.

Table 22
A telephone set-based MMI example

Step	User action	MIRAN response	Comments
1	Go off-hook	N/a	N/a
2	Enter access code for channel 7	Voice prompts for Login; password	Dial the MIRAN admin DN (access code).
3	Enter password and then ## (all numeric)	Voice menu of options available	You may receive a “Login incorrect” message if the password is in error.
4	Press 5 to start recording	Voice menu of options available	Records one or more messages into temporary files.
5	Enter “#” to stop recording	STOP_TONE	Recording stops.
6	Enter “1” to save the message	“Message saved”	The message is saved to disk and becomes the currently selected message.
7	Place the receiver on-hook	N/a	N/a
8	Select Play Message menu using the terminal	Play messages form temporary files	If messages are acceptable, you can assign them to channels.
9	Select Assign Message menu using the terminal	Assign the message to the channel, time and day	This assigns each message recorded using telephone set-based OA&M access to the appropriate channel.

Voice prompts

Table 23 lists voice prompts file names, prompt detail, and its duration.

Table 23
OA&M voice segment files, their content, and duration (Part 1 of 2)

Filename	Prompt content	Duration
_seg0242.sbc	Sorry, that command cannot be used at this point.	2.72sec
_seg0247.sbc	There is nothing to play.	1.24sec
_seg0248.sbc	silence	0.44sec
_seg0262.sbc	Good-by	0.8sec
_seg0323.sbc	zero	0.83sec
_seg0324.sbc	one	0.76sec
_seg0325.sbc	two	0.67sec
_seg0326.sbc	three	0.8sec
_seg0327.sbc	four	0.8sec
_seg0328.sbc	five	0.92sec
_seg0329.sbc	six	0.89sec
_seg0330.sbc	seven	0.83sec
_seg0331.sbc	eight	0.67sec
_seg0332.sbc	nine	0.83sec
_seg0369.sbc	Please try again.	1.56sec
_seg0391.sbc	To exit, press number sign (#).	2.27sec
_seg0404.sbc	To begin recording, press 5. To end recording, press number sign (#).	4.57sec
_seg0410.sbc	For help, press star (*).	2.14sec
_seg0518.sbc	Please enter your password, followed by number sing (#).	2.72sec

Table 23
OA&M voice segment files, their content, and duration (Part 2 of 2)

Filename	Prompt content	Duration
_seg0523.sbc	Deleted.	0.6sec
_seg0562.sbc	End of list.	0.89sec
_seg0643.sbc	To go to the next message, press 6. To go to the previous message, press 4.	4.96sec
_seg1237.sbc	Message saved as message.	2.11sec
_seg2003.sbc	To re-record the prompt, press 5. to review it, press 2.	4.25sec
_seg2220.sbc	Assistance is not available.	1.6sec
_seg2291.sbc	Main menu.	0.92sec
_seg2342.sbc	Login incorrect.	1.53sec
_seg2451.sbc	To save the message as new, press one.	2.52sec
_seg2528.sbc	Enter a list of addresses followed by number sing (#). End the list by an additional number sign (##).	6.04sec

Telephone set-based OA&M flowcharts

Refer to the telephone set-based flowcharts on the pages indicated to view the following telephone set-based functions:

— Password Entry flowchart

— Main Menu flowchart

— Record menu flowchart

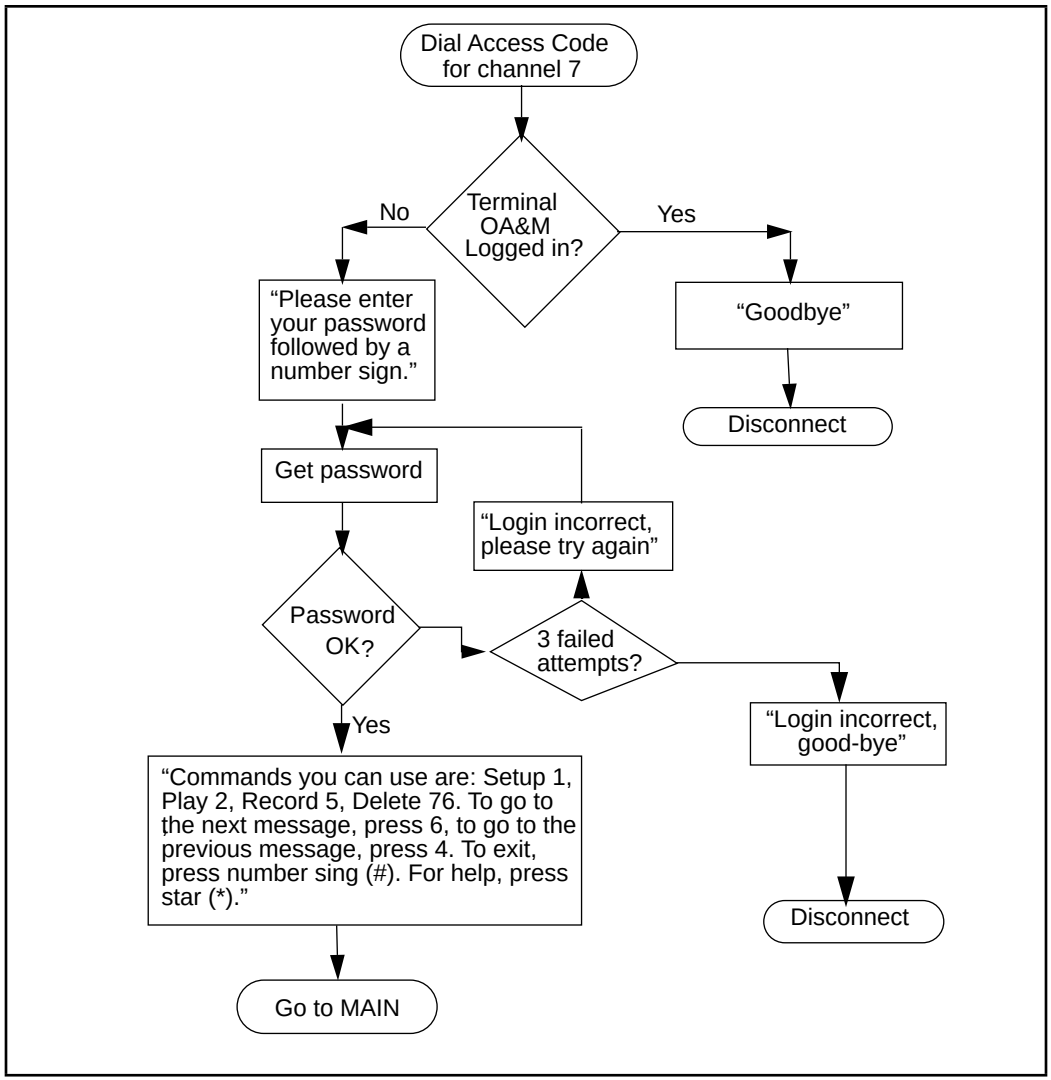
— Delete menu flowchart

— Setup menu flowchart

Password Entry

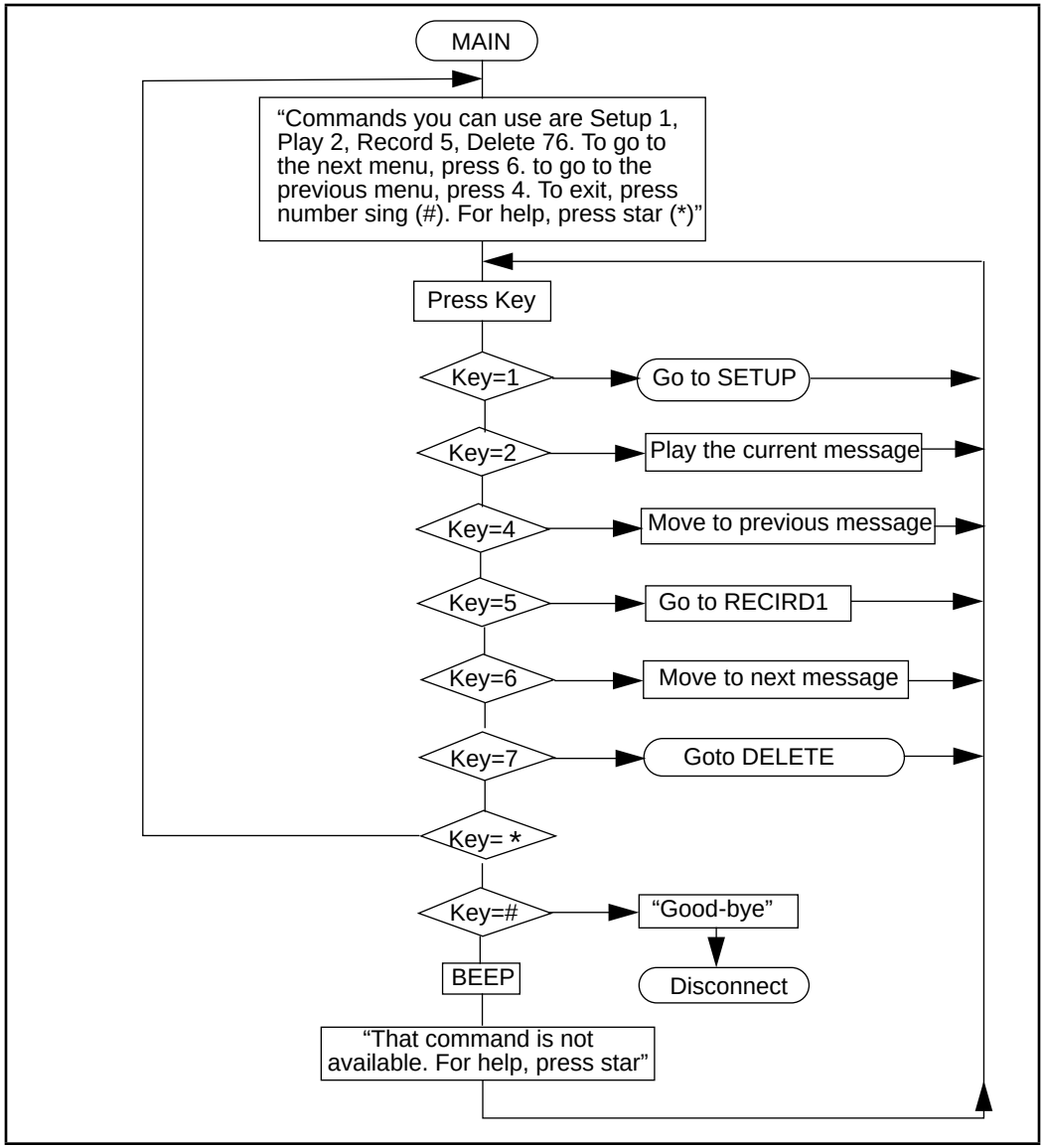
Dial in the access code to access MIRAN.

Figure 21
Password entry flowchart



Main Menu

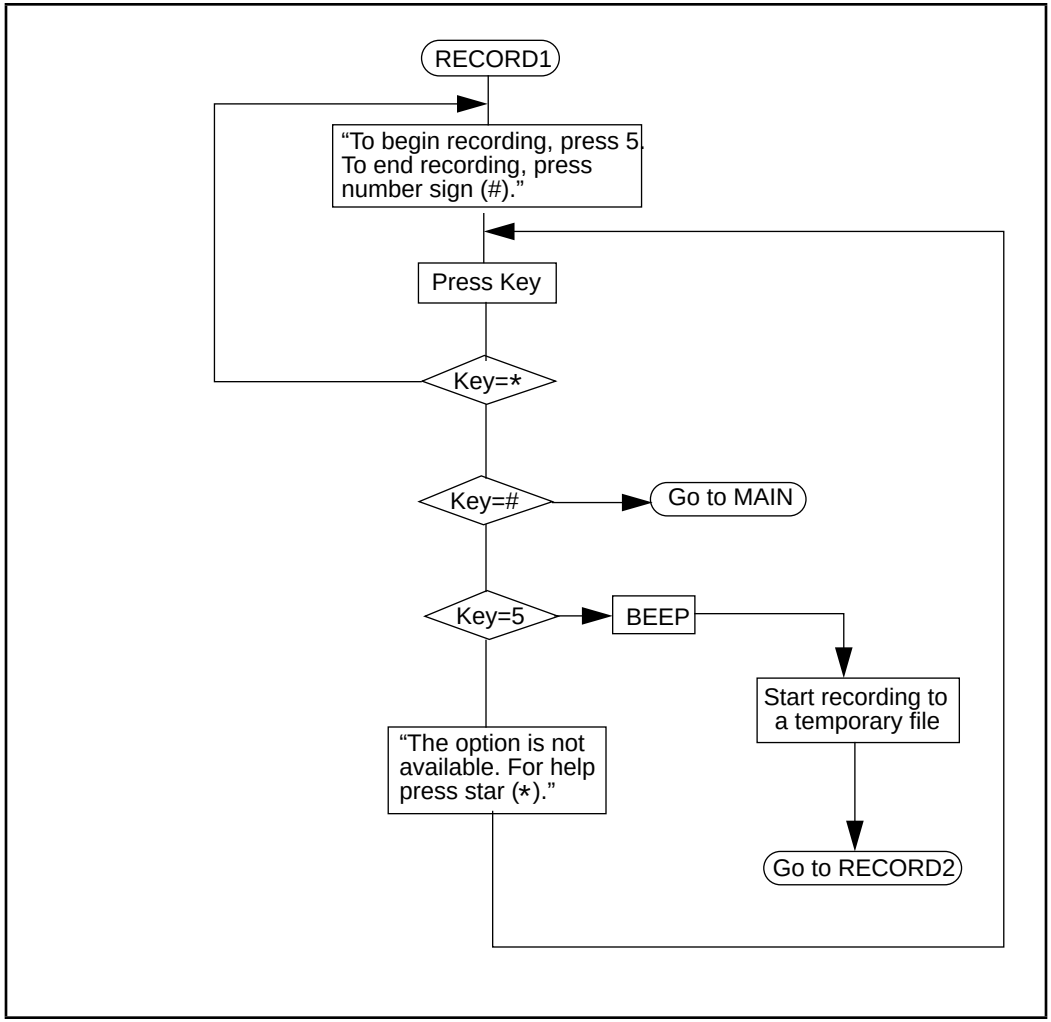
Figure 22
Main Menu flowchart



Record Menu - part 1

Dial 5 in the Main Menu to access the Recording Menu. This function allows you to make recordings, which are later assigned using the Setup menu. The Setup menu is accessed from the Main Menu by dialing 1.

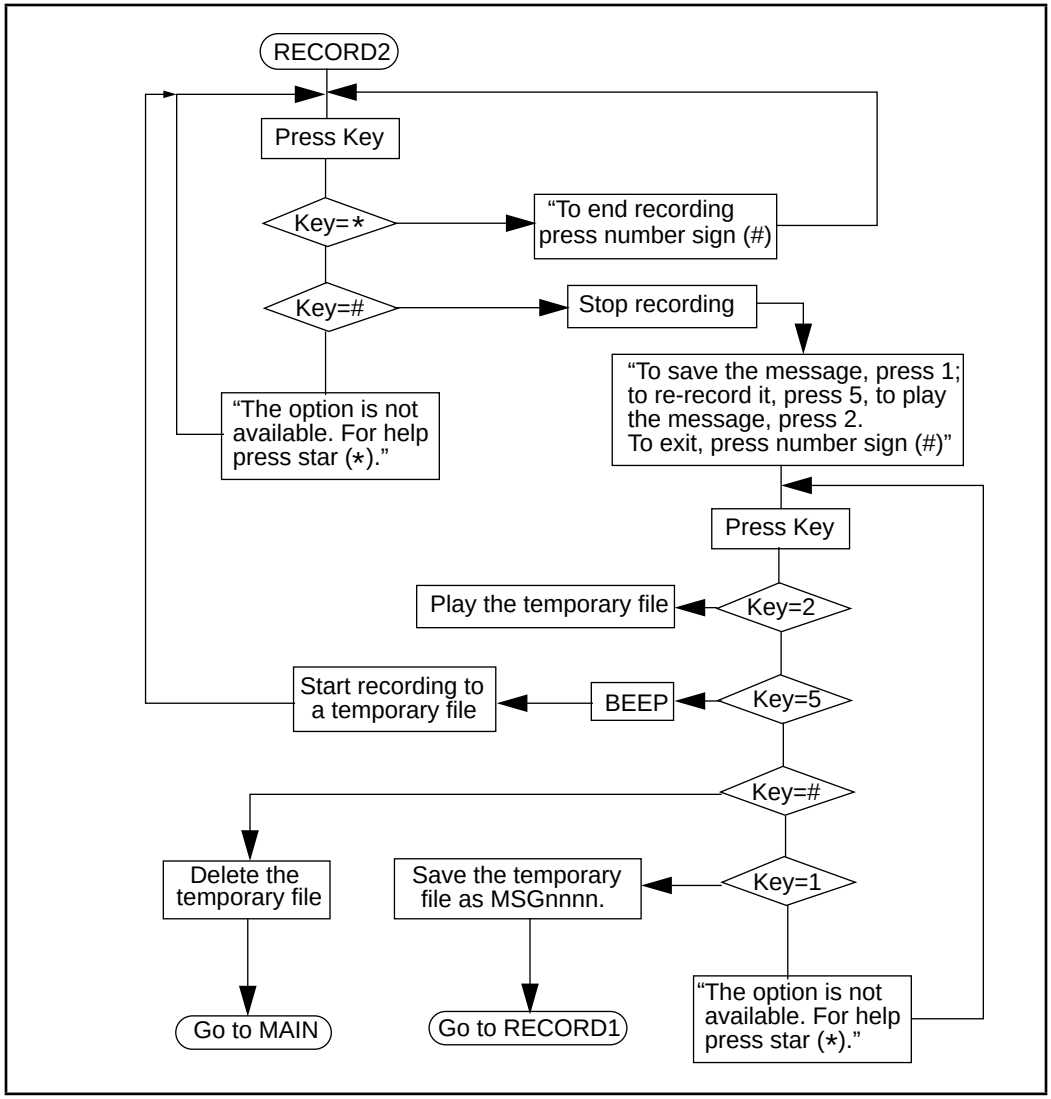
Figure 23
Record menu flowchart, part 1



Record Menu - part 2

This menu allows you to record and save the recorded message file.

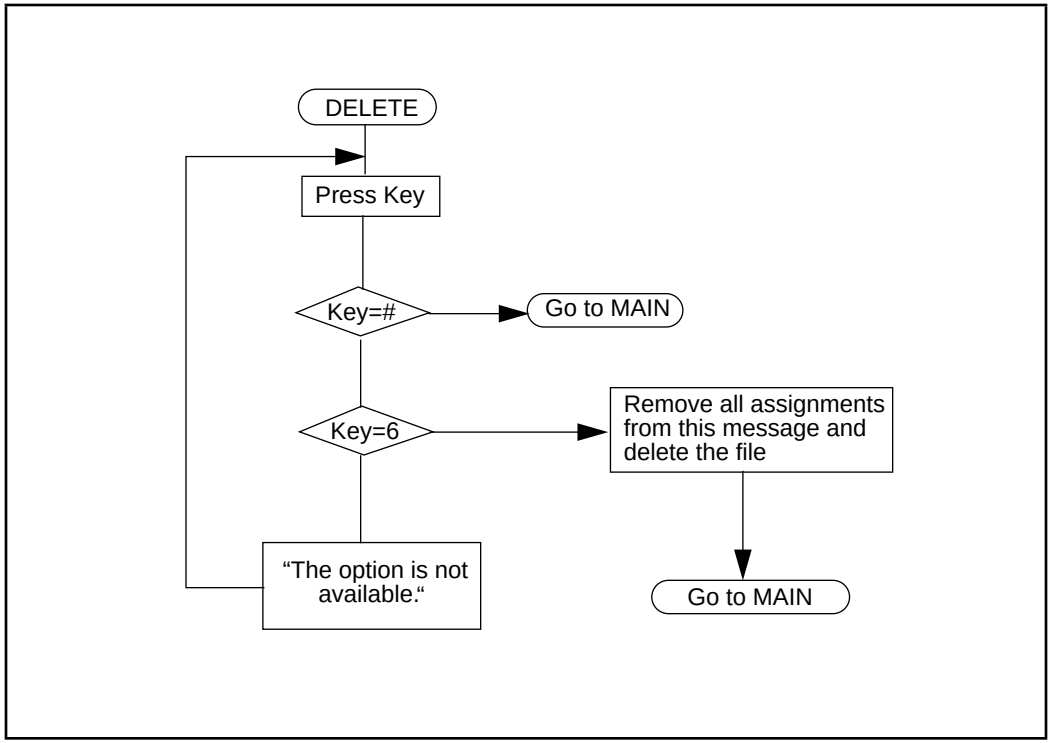
Figure 24
Record menu flowchart, part 2



Delete Menu

The Delete menu is accessed from the Main Menu by dialing 76. This function deletes the message from an assignment.

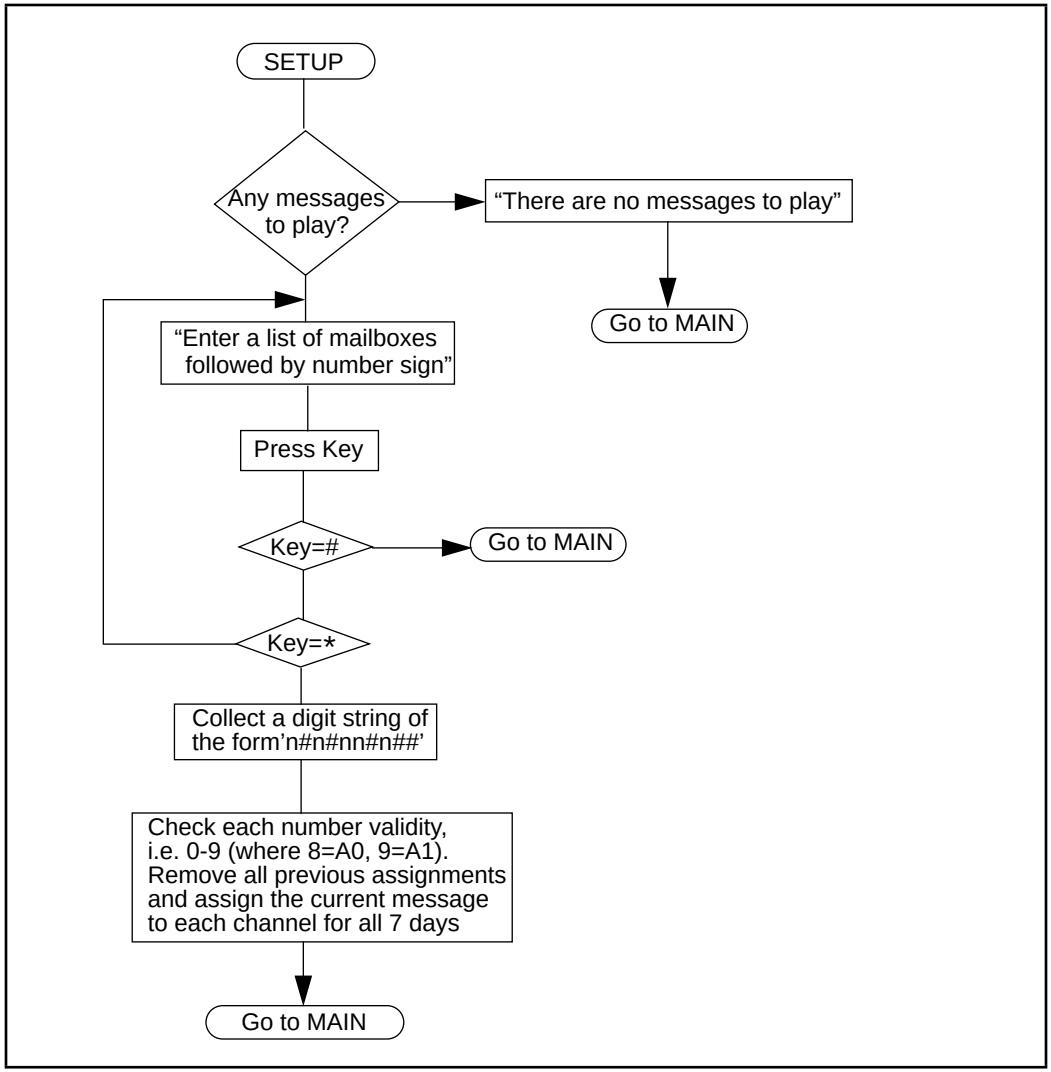
Figure 25
Delete menu flowchart



Setup Menu

This menu is accessed by dialing 1 in the Main Menu. It assigns messages to RAN channels.

Figure 26
Setup menu flowchart



RAN Application: Terminal-based OA&M

This chapter describes the terminal-based OA&M access using menus and commands:

— screens and commands supported by the terminal-based OA&M application

— special feature operation

The software described here is part of the MIRAN-specific OA&M tool running under VxWorks and is independent of Meridian 1 software.

General steps in configuring MIRAN

To give you a general sequence of steps in configuring MIRAN functions and then using the terminal-based OA&M access to configure system RAN and MOH applications, follow the steps below:

1 Configure the RAN and MOH trunk route and trunk data block, as described in "MIRAN configuration" on page 62, by using LD 16 and LD 14 programs. This step is completed during installation and configuration (as described in *Installation and configuration* chapter).

2 Configure DID trunk for the telephone set-based OA&M access, if required. For a configuration example, refer to "DID configuration for telephone set-based OA&M access" on page 181. This step is completed during installation and configuration (*Installation and configuration* chapter).

3 Setup the terminal for the terminal-based OA&M access. This step is completed during system installation and configuration and as described in "Configuring the terminal for terminal-based OA&M access" on page 74 the *Installation and configuration* chapter.

4 Enter your password. The default password for distributor and user access is "**4321**".

5 Enter the keycode, if not already entered. Refer to "Keycode Entry" on page 139.

Note: The keycode is entered using the terminal only when MIRAN is first installed into Option 11E/11C or if it is purchased as merchandize. A new keycode has to be entered after each software or channel capacity upgrade. However, the keycode is preloaded in the factory when MIRAN is ordered with a Meridian 1 system option and does not have to be entered on the terminal.

6 Record messages. From the Main Menu select RAN Administration menu and from this menu select Record Message screen. Refer to "Record Messages" on page 122. You can now record one or more messages you can then assign to different channels.

7 Assign a message. From the Message Commands menu, select Assign Message screen to assign a specific announcement file (you just recorded or you selected from the existing recording files) to a specific channel with a specific starting time. You can repeat this step for other files and channels. Refer to "Assign Message" on page 118.

8 Backup the original configuration onto the drive C:, or a PCMCIA card in drive A:, when equipped.

9 Copy new files (if first installing or upgrading software) from drive A: to drive C:. Remove the PCMCIA from drive A: and store in a safe place for future use or in case the MIRAN card fails. This would allow you to copy the configuration into the new MIRAN without having to re-configure the system and re-record messages.

Description of terminal-based OA&M

The terminal-based OA&M application is provided through the RS-232 maintenance port on a MIRAN card. The MIRAN is connected directly to a VT-100 terminal or to a PC running a terminal emulation program.

Up to 16 MIRAN cards can be interconnected using the RS-232 ports to create a simple LAN. This LAN daisy-chain connection allows maintenance of all MIRAN cards from a single terminal.

There are two ways to use a terminal-based OA&M user interface to access all commands and options:

— Use the menu system

— Enter commands on the command line

To run the terminal-based user interface, configure the VT-100 terminal emulation parameters as shown below in Table 24.

Table 24
Terminal configuration parameters

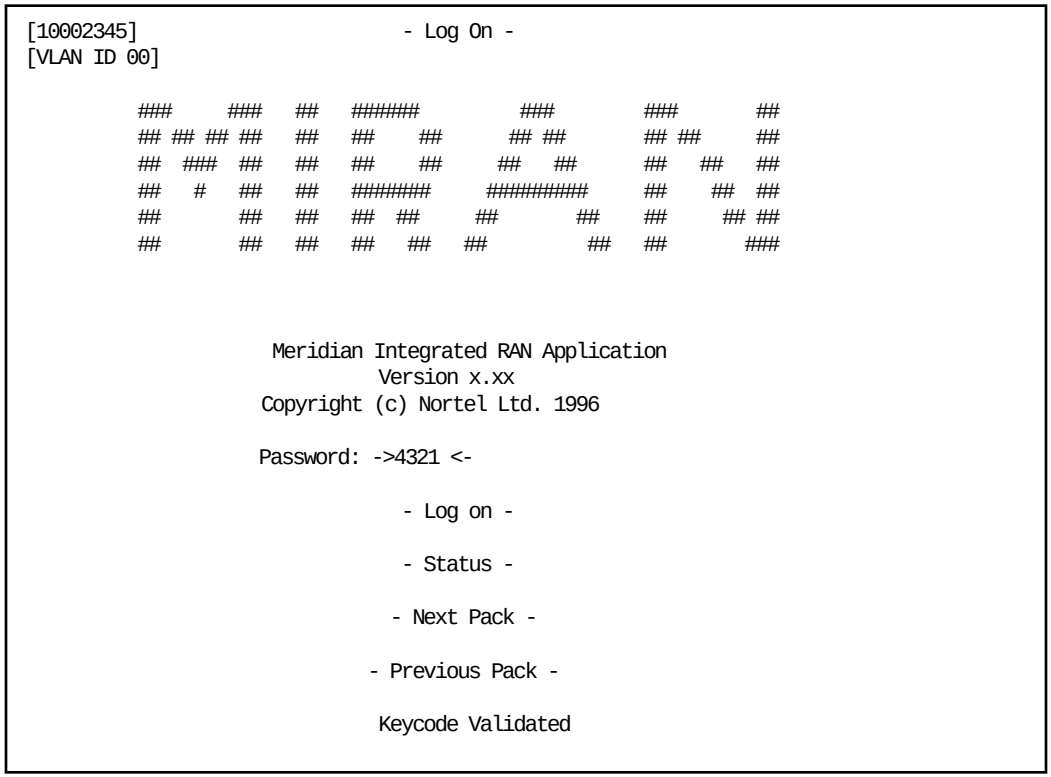
Parameter	Setting
Transmission rate	9600 baud
Data bits; stop bit	8
Stop bit	1
Parity	No
Flow control	None

Note: If you are using Windows™ based terminal emulation, you have to disable the CTRL and ARROWS keys by using Windows, because these keys are used by the OA&M access to traverse the menus.

Logon screen

This screen appears when you press the Enter key after you connect the terminal to the MIRAN maintenance port. The prompt displays the **VLAN ID nn**, where **nn** is the MIRAN number in the daisy-chain for the card currently being accessed. The maintenance terminal is always connected to the first MIRAN in the LAN and is numbered 00 automatically.

This Logon screen allows you to log in by entering the password or to select *Status* to display the Status screen without entering the password.



Log on - can be selected only after you first enter the password.

Status - is used to display the Status screen without logging on.

Next/Previous Pack - selects one of the other MIRAN cards, if equipped.

Status screen

This screen is displayed on the terminal when you select *Status* in the Logon screen. It displays the current status of the RAN Application version and release, the board status, the current time, and the status of the 8 one-to-one channels and two cross-connect channels. To display up-to-date channels status, refreshed the screen by pressing the spacebar.

```
[10002345]                          -Pack Status-                    [NT_DISTRIB]


Board Enabled: No        Current Time: MON 12:25:09

Channel  Enable  Application  Playback Level  Message Source  Active
   0        Y    STOP/START RAN      13       A:MSG01.ULW       Y
   1        Y    STOP/START RAN      13       A:MSG02.ULW       Y
   2        Y    STOP/START RAN      13       A:MSG03.ULW       Y
   3        Y    STOP/START RAN      13       A:MSG04.ULW       Y
   4        N    Unequipped          13                         N
   5        N    Unequipped          13                         N
   6        N    Unequipped          13                         N
   7        N    Set Based                                      N

Cross Connect Ports

Port   Function  Application         Level     Message Source  Active
 A0      Output       Idle            13                        N
 A0      Input        Idle            13                        N
 A1      Output       Idle            13                        N
 A1      Input        Idle            13                        N

                          Press Enter to continue
```

To exit this screen, press the Enter key. The terminal will display the Logon screen. At the Logon screen you can enter the password to access the Main Menu screen.

Setting up telephone set-based OA&M access

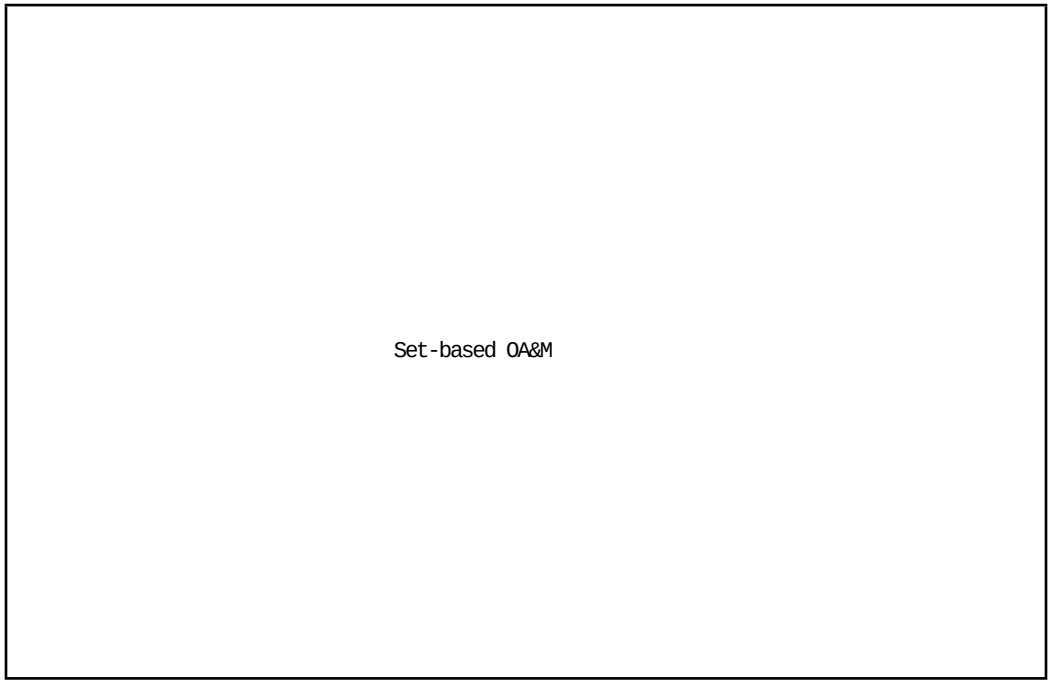
To configure the system for the telephone set-based OA&M access, you must:

1 Assign channel 7 for the telephone set-based OA&M access, if not already assigned, refer to “OA&M Access Configuration” on page 142.

2 Go off-hook and dial the access code.

3 MIRAN display shows RA-S indicating that the telephone set-based OA&M is now active and the terminal is locked out until the telephone set goes on-hook.

The following screen is displayed on the terminal as long as the telephone set-based OA&M access is active.



Main Menu

The Main Menu screen is displayed when you enter the password and select *Log on* in the Logon screen. Each option listed on the Main Menu leads to another task screen or submenu.

The Main Menu options are four top level submenus:

— **RAN Administration** - Includes all RAN-specific tasks and menus (e.g., message commends, operational statistics, backup and restore configuration, set playback levels, and run batch file).

— **MIRAN Administration** - accesses all MIRAN-specific tasks and menus (e.g. file commands, keycode entry, software upgrade, pack information, and OA&M access configuration).

— **Access to other MIRAN cards** - accesses any other MIRAN card in a multi-MIRAN installation where all MIRAN card are connected in a LAN configuration. When you select this option in the Main Menu, the control passes to the next MIRAN card in the chain.

— **Maintenance and Diagnostics** - provides access to system information, password change, command line access, warm reboot, and cold reboot. The distributor can access all functions, and user can access only system information and password change.

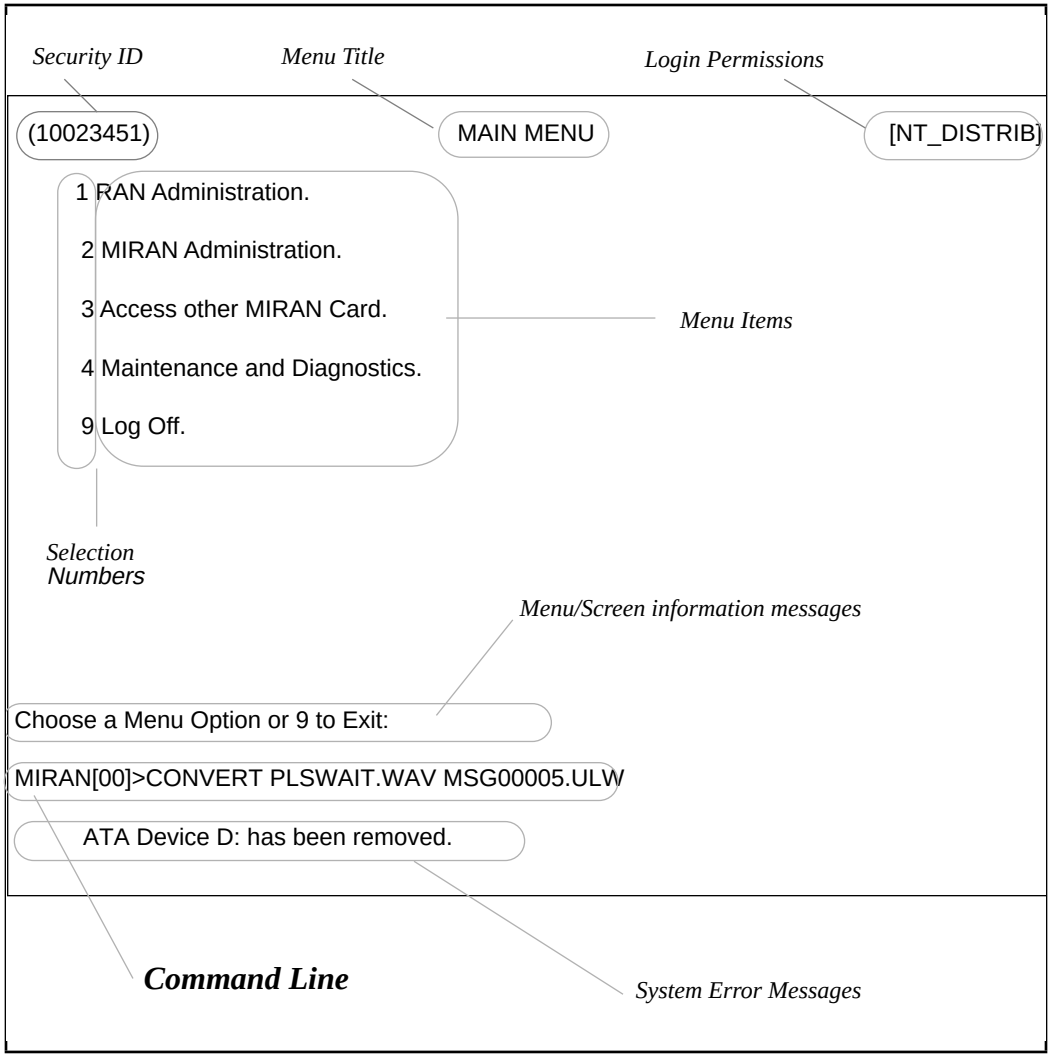
— **Logoff** - logs you out of the Main Menu and the terminal displays the Logon screen.

The example Main Menu below shows circles labeling the fields of features displayed on a typical screen.

The next figure shows the actual Main Menu as it appears on the screen.

The Main Menu also provides for a command line entry, where instead of selecting a menu on the screen, you can enter and execute a command. Refer to the example Main Menu below that shows the command line at the bottom of the screen.

Enter at the command line; **XCOPY A.*.SBC C:** to copy across all of the telephone set-based OA&M prompts.


Security ID
Menu Title
Login Permissions
(10023451)
MAIN MENU
[NT_DISTRIB]
1 RAN Administration.
2 MIRAN Administration.
3 Access other MIRAN Card.
4 Maintenance and Diagnostics.
9 Log Off.
Menu Items
Selection Numbers
Menu/Screen information messages
Choose a Menu Option or 9 to Exit:
MIRAN[00]>CONVERT PLSWAIT.WAV MSG00005.ULW
ATA Device D: has been removed.
Command Line
System Error Messages

```
[10002341]                          MAIN MENU                          [NT_DISTRIB]

                  1  RAN Administration

                  2  MIRAN Administration

                  3  Access other MIRAN Card

                  4  Maintenance and Diagnostics




                  9  Log Off



Choose a Menu Option or 9 to Exit:
MIRAN [00]>
```

RAN Administration

The RAN Administration provides a set of menus that control RAN configuration, display operational statistics, set playback level, and run batch files.

To access the RAN Administration menu, press ‘1” in the Main Menu.

```
[10002341]                    -RAN Administration-              [NT_DISTRIB]

                  1   Message Commands

                  2  Operational Statistics

                  3  Backup Configuration

                  4  Restore Configuration

                  5  Playback Level

                  6  Run Batch File


                  9  Back to Previous Menu...


Choose a Menu Option or 9 to Exit:
MIRAN[00]>
```

— **Message Commands** - displays the Message Commands menu that deals with RAN messages

— **Operational Statistics** - displays RAN channel usage statistics

— **Backup Configuration** - saves announcement messages to a disk

— **Restore Configuration** - restores the announcement messages from a disk to the MIRAN

— **Set Playback Level** - sets the sound volume (loudness) for each channel

— **Run Batch File** - executes a batch file containing OA&M commands. It allows multiple channel assignments to be performed with a single command used for switching RAN in and out of assignment for emergency or holidays time table and announcements types.

Message Commands

Press ‘1” on the RAN administration menu to access the Message Commands submenu.

```
[10002345]              -Message Commands-                  [NT_DISTRIB]

                1  Assign Message

                2  List Assignments

                3  Copy Assignments

                4  Clear Assignments

                5  Record Message

                6  Play Message

                7  Convert Message File


                9  Back to Previous Menu...


Choose a Menu Option or 9 to Exit:
MIRAN[00]>
```

The Message Commands entries are used to control message assignments and recording of new messages on the MIRAN. Each entry represents a menu that follows below.

Assign Message

Assign Message menu allows you to assign messages to specific channels and specify the time and day when the message will be active.

```
[10002345]              -Assign Message-                    [NT_DISTRIB]

             Day: -> Wed <-

          Channel: 2

         Filename: A:AARAN.ULW

                           - Browse -


             Time:00:00

         Abstract:

                           - Assign -

                            - Exit -
```

— **Day** - specifies the day of the week by entering the three letter abbreviation of the day (Mon, Tue, Wed, Thu, Fri, Sat, or Sun). If you enter "*", you assign the message to all days of the week.

— **Channel** - enter a channel number from 0 to 7 to specify an internal channel, or A0 or A1 to assign the message to an cross-connect channel. The star (*) can be used to assign the same message to all internal channels (0-7) at the same time. Channel 7 may not be used if telephone set-based OA&M access is also established.

— **Filename** - enter the filename of a voice message or use the Browse feature to browse through the available filenames and select one. A file name consists of 8 alphanumeric characters a dot and 3-character extension.

— **Browse** - is used to scan through the list of available messages.

— **Time** - enter time to start the message in the 24 hour clock form (HH:MM). The star (*) can be used to assign a message for an entire day. All previous assignments for that day and channel are deleted and replaced with an assignment starting at 00:00 time. If you specify 00:00, all assignments for 00:00 are changed and all other assignments stay the same.

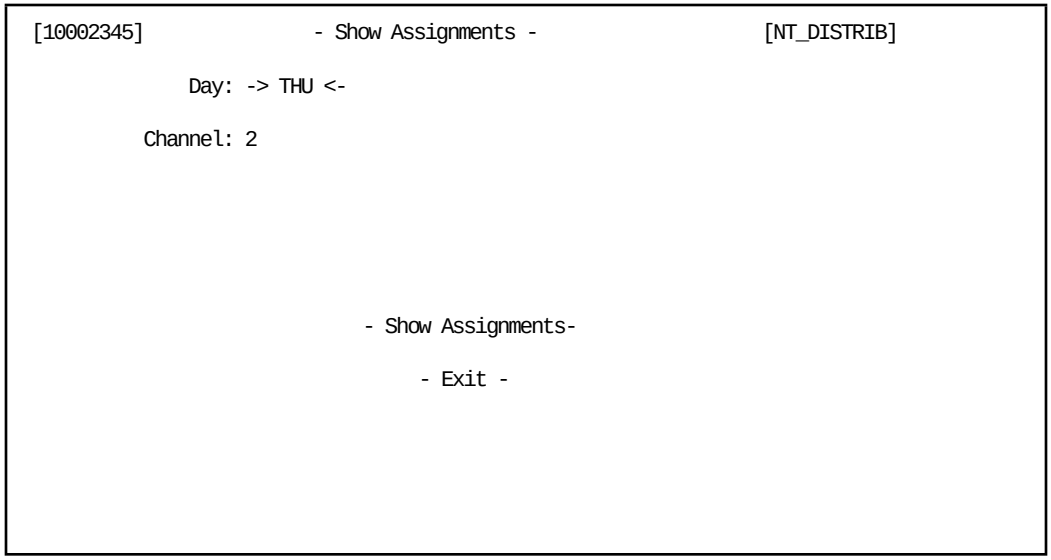
— **Abstract** - add informative text about the message assignment.

— **Assign** - assigns the selected message to the channel for the specified day and time.

— **Exit** - allows you to exit the Assign Message screen and return to the previous menu without assigning anything.

List Assignments

This screen allows you to display the message assignments for a given channel on a given day of the week.



— **Day** - specifies the day of the week that you wish to display the assignments, by entering the three letter abbreviation of the day (Mon, Tue, Wed, Thu, Fri, Sat, or Sun).

— **Channel** - enter a channel number from 0 to 7 to specify an internal channel, or A0 or A1 to specify a cross-connect channel you wish to display the assignments.

— **Show** - is selected to display the assignments.

— **Exit** - allows you to exit the List Assignments screen and return to the previous menu without displaying anything.

Copy Assignments

This screen is used to copy assignments from one channel for a given day into one or more channels for their given days. This way, a complex assignment for one day can be copied to one or more other days of the week.

```
[10002345]              - Copy Assignments -                    [NT_DISTRIB]

               Day: ->  Wed <-

           Channel: 0


    Destination Day: Thu

Destination Channel: 6




                           - Copy Assignments -

                                 - Exit -
```

— **Day** - specifies the day of the week that you wish to copy the assignments from. Enter the three letter abbreviation of the day (Mon, Tue, Wed, Thu, Fri, Sat, or Sun).

— **Channel** - enter a channel number from 0 to 7 to specify an internal channel, or A0 or A1 to specify a cross-connect channel you wish to copy the assignments from.

— **Destination Day** - specifies the day of the week that you wish to copy the assignments to.

— **Destination Channel** - enter a channel number from 0 to 7 to specify an internal channel, or A0 or A1 to specify a cross-connect channel you wish to copy the assignments to.

— **Copy Assignments** - select it to execute copying from the specified channel to the specified channel. If you enter Wed channel *, system will copy all assignments for Wednesday for that channel.

— **Exit** - allows you to exit the Copy Assignments screen and return to the previous menu without copying anything.

Clear Assignments

This screen allows you to clear individual or multiple message assignments for a given day of the week.

```
[10002345]              - Clear Assignments -                  [NT_DISTRIB]

              Day: -> Mon <-

          Channel: *

             Time: 00:00


                           - Unassign -

                             - Exit -
```

— **Day** - specifies the day of the week that you wish to clear the assignments. Enter the three letter abbreviation of the day (Mon, Tue, Wed, Thu, Fri, Sat, or Sun). By entering "*", you specify the entire week.

— **Channel** - enter a channel number from 0 to 7 to specify an internal channel, or A0 or A1 to specify a cross-connect channel you wish to clear the assignments. The star (*) can be used to clear all assignments for internal channels 0-7.

— **Time** - enter time of the message assignment you wish to clear. The time is specified in the 24 hour clock form (HH:MM). If you enter "*", all assignments for that channel for that day will be cleared.

— **Unassign** - clears the specified assignments.

— **Exit** - allows you to exit the Clear Assignments screen and return to the previous menu without clearing anything.

Record Messages

This screen controls the recording of messages on the MIRAN card.

```
[10002345]              - Record Message -                    [NT_DISTRIB]

          Audio Input: ->  A0 <-

             Filename:c:philip.ULW

                                - Browse -



             Duration: 20

                           - Start Recording -

                            - Stop Recording -

                                 - Exit -
```

— **Audio Input** - enter an internal recording channel A0 or A1. Only these two channels can be used for message recording.

— **Filename** - enter the filename of a voice message and use the Browse feature to browse through the existing filenames to make sure that the file you are about to record does not already exist. A file name consists of 8 alphanumeric characters a dot and 3-character extension.

— **Browse** - is used to scan through the list of available messages.

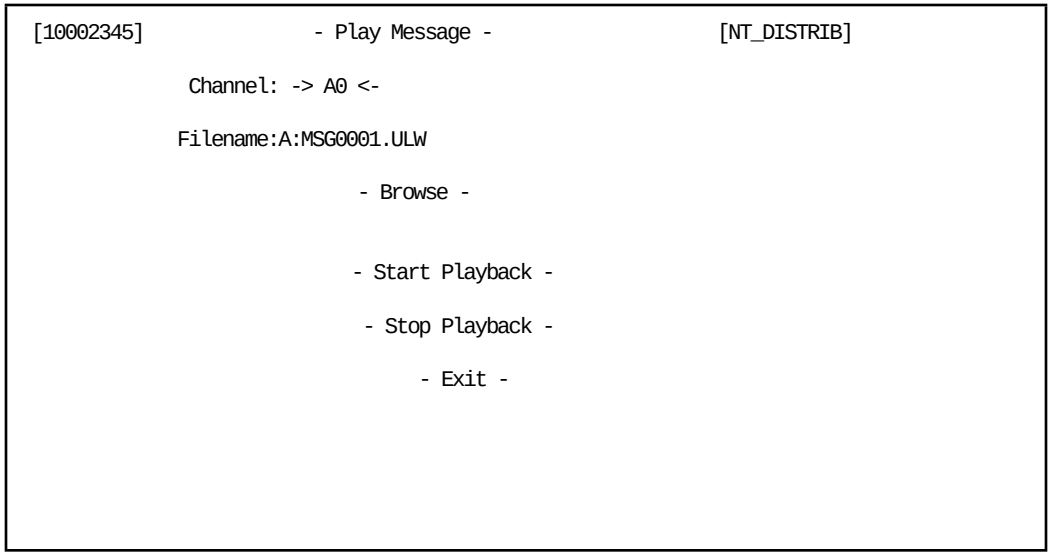
— **Duration** - specifies the duration of a recording or select Stop Recording. You must account for full duration of recording.

— **Start/Stop Recording** - starts and stops the recording process. Recording will stop either if duration time is reached, the file system is full, or the Stop Recording option is selected.

— **Exit** - allows you to exit the Record Message screen and return to the previous menu without recording anything.

Play Message

This screen allows you to check messages by playing them back. It does not allow you to change messages assignments.



To verify a message, setup a test route to play the message. After the message is accepted, you can assign it to a regular route.

— **Channel** - enter channel A0 or A1 to specify an internal recording channel you wish to use. Only these two channels can be used play message recording.

— **Filename** - enter the filename of a voice message you wish to play back or use the Browse feature to browse through the existing filenames to select the one you wish to play back. A file name consists of 8 alphanumeric characters a dot and 3-character extension.

— **Browse** - is used to scan through the list of available messages.

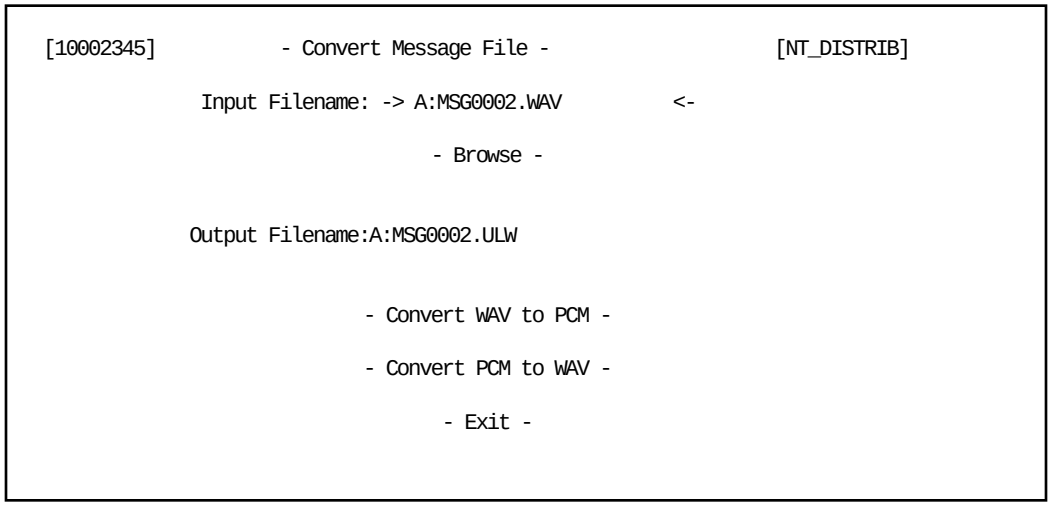
— **Start/Stop Playback** - starts and stops the playback process. Playback will stop either if duration time is reached, the end of file is reached, or the Stop Playback option is selected.

— **Exit** - allows you to exit the Play Message screen and return to the previous menu without recording anything.

Convert Message File

This screen controls the conversion of voice files from one form to another facilitate use of files created in a PC recording environment.

The conversion can be from .ULW format of 8kHz 8-bit PCM to the .WAV format of 8kHz 8-bit PCM with descriptive WAV header.



Note: The conversion process makes a duplicate copy of the input file, ensure sufficient disk space for the conversion operation and discard unwanted files.

— **Input Filename** - enter the filename of a voice message you wish to convert or use the Browse feature to browse through the existing filenames to select the one you wish to convert. The file must be in the 8.3 format (8 characters a dot and 3 extension characters).

— **Browse** - is used to scan through the list of available messages.

— **Output Filename** - enter the filename of a voice message you converted. If you don't enter the output filename, this filename will have the same name as the input file with the appropriate extension (.WAV, .ALW, or . ULW) based on the conversion used.

— **Convert** - select the appropriate conversion option to convert the input file format into the output file format.

— **Exit** - allows you to exit the Play Message screen and return to the previous menu without recording anything.

Operational Statistics

This screen is used to check the current traffic statistics for the internal channels. The cross-connect channels are not displayed since the MIRAN card has no control over the traffic related to these channels.

```
[10002345]              - Operational Statistics -                [NT_DISTRIB]

        Last Hour  Average  Last Day  Average  Last Week  Average
  ------------------------------------------------------------------------
   00      34         232      122      423       2344      3109
   01      34         232      122      423       2344      3109
   02      34         232      122      423       2344      3109
   03      34         232      122      423       2344      3109
   04      34         232      122      423       2344      3109
   05      34         232      122      423       2344      3109
   06      34         232      122      423       2344      3109
   07      34         232      122      423       2344      3109



                           - Clear Statistics -

                                - Exit -



Command: RESETSTAT
OK     : Statistics Reset
```

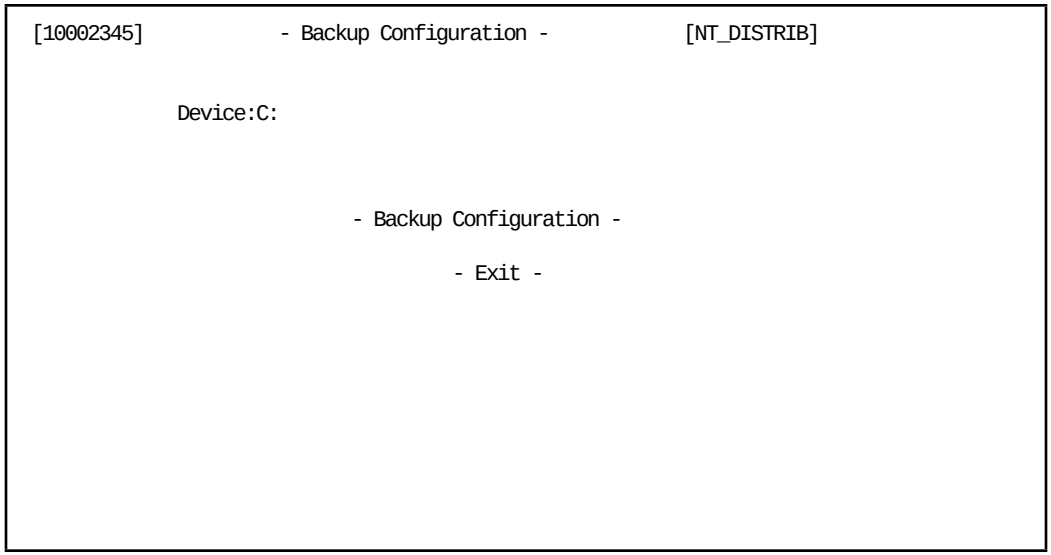
— **Clear Statistics** - select any one of the eight channels and select Clear Statistics to clear the channel statistics

— **Exit** - allows you to exit the Operational Statistics screen and return to the previous menu without affecting the count for each channel.

— **RESETSTAT** - command used to reset current statistics.

Backup Configuration

This screen allows you to backup the MIRAN configuration to a specified storage device.



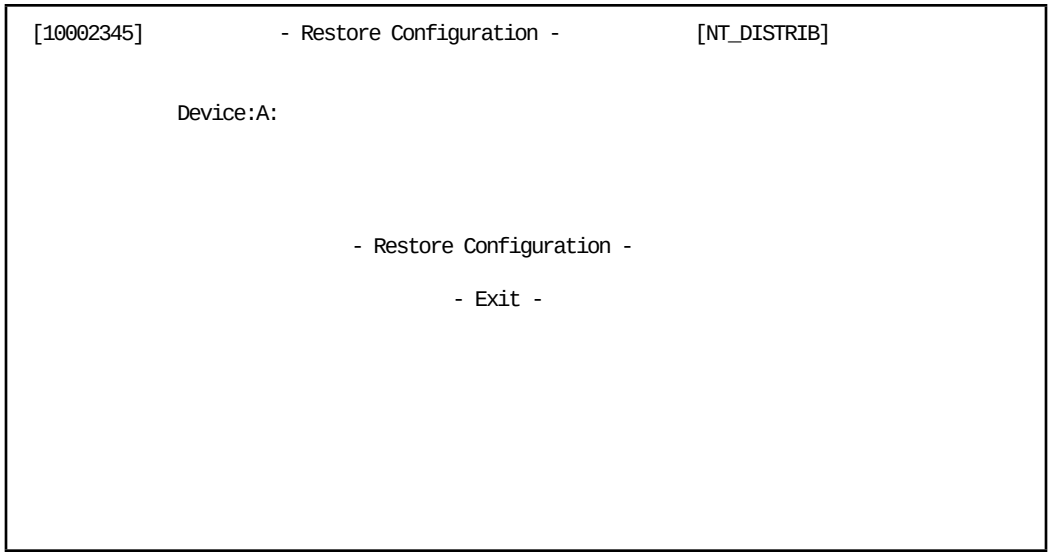
— **Device -** select the storage device where you wish to backup the configuration. This is usually a PCMCIA Flash card in the external drive A:.

— **Backup Configuration** - starts the backup process to the specified device.

— **Exit** - allows you to exit the Backup Configuration screen and return to the previous menu without performing backup or exiting the screen after completing the backup.

Restore Configuration

This screen allows you to restore the MIRAN configuration to the internal Flash memory from a backup device.



- **Device -** select the storage device where the backup configuration is stored. This is usually a PCMCIA Flash card in the external drive A:.
- **Restore Configuration -** starts the restoration process from the specified device.
- **Exit -** allows you to exit the Restore Configuration screen and return to the previous menu without performing configuration restoration or exiting the screen after completing the restoration.

Playback Levels

This screen allows you to set the playback level (loudness) to be set independently for each channel.

```
[10002345]              - Playback Levels -                 [NT_DISTRIB]

 Internal Channels
 Companding law: Mu-law

 0  13  1  13  2  13  3  13
 4  13  5  13  6  13  7  13

 External Channels
Companding law: Mu-law
 A0  13     A1  13


                           Channel: ->  A1  <-

                             Level: 13


                                - Set Level -

                             - Change Codec Law -

                                  - Exit -
```

— **Internal Channels -** displays internal channel options and their playback levels

— **External Channels -** displays external channel options and their playback levels

— **Channel** - enter a internal channel number from 0 to 7 to specify an internal channel, or A0 or A1 to specify an external cross-connect channel you wish to change the playback level.

— **Level** - enter a number from 0 to 15 to specify the level or loudness of the message playback. The lowest level is 0, 8 is nominal, and 15 is the highest level or the loudest.

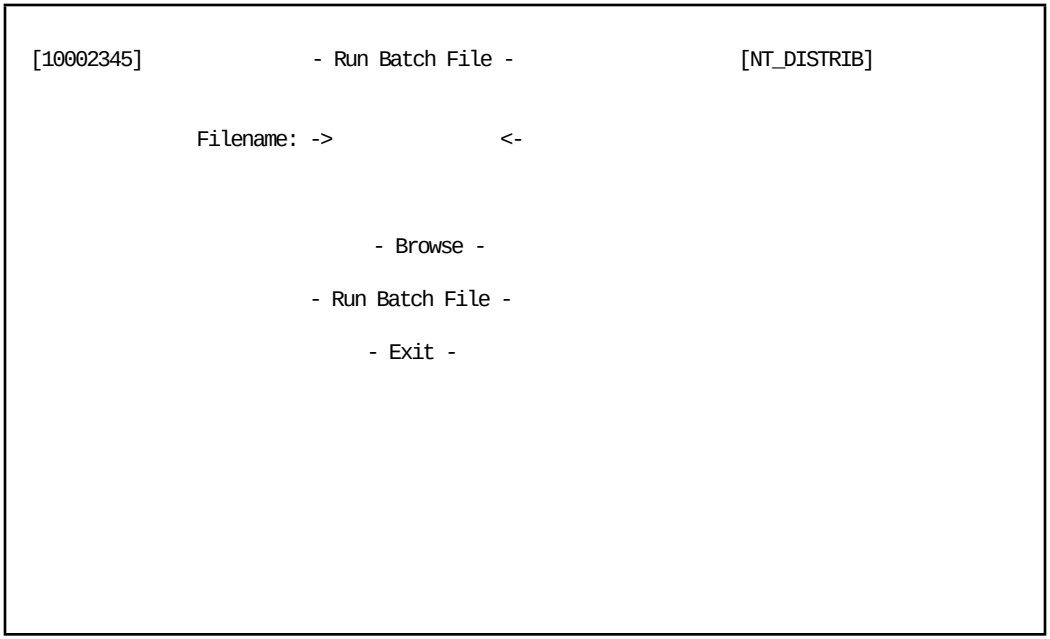
— **Set Level** - saves the audio level you made for the channel.

— **Change Codec Law** - saves the companding law change you made for the channel.

— **Exit** - allows you to exit the Set Playback Level screen and return to the previous menu without changing the level of a channel.

Run Batch Files

This menu allows you to select the file storage drive you wish to access and display the files contained on that logical drive. After you selected an option, a screen will appear displaying files. Refer to Choose a File screen that follows.



— **Filename** - enter the filename of the batch file you wish to run.

— **Browse** - is used to scan through the list of available batch files.

— **Run Batch File** - starts the execution (run) of the selected batch file.

— **Exit** - allows you to exit the Run Batch File screen and return to the previous menu without running the batch file.

MIRAN Administration

This screen lists a set of MIRAN administration menus that control the MIRAN configuration, file management, upgrades, and OA&M access.

```
[10002345]              - MIRAN Administration -                  [NT_DISTRIB]

                1  File Commands

                2  Keycode Entry

                3  Software Upgrade

                4  System Information

                5  OA&M Access Configuration



                9  Back to Previous Menu...




Choose a Menu Option or 9 to Exit:
MIRAN[00]>
```

- **File Commands** - displays a menu that performs file manipulations.
- **Keycode Entry** - controls the upgrade of the MIRAN port size from small to medium and large as well as software upgrades.
- **Software Upgrade** - allows software upgrade using the PCMCIA card. A keycode is required for software upgrade but it is not required for bug fixes.
- **System Information** - displays the MIRAN hardware platform configuration and software release information.
- **OA&M Access Configuration** - controls the telephone set based OA&M access to the MIRAN.
- **Back to Previous Menu** - returns you to the previous menu.

File Commands

This screen accesses all MIRAN file management commands.

```
[10002345]              - File Commands-                    [NT_DISTRIB]

                 1  List Files

                 2  Copy File

                 3  Delete File

                 4  Rename File

                 5  Move File


                 9  Back to Previous Menu...









Choose a Menu Option or 9 to Exit:
MIRAN[00]>
```

— **List Files** - allows you to browse through the directory file listings for the internal drive C: and any additional PCMCIA-based stored file lists.

— **Copy File** - allows you to a copy file to a different file on the same volume or to other volumes.

— **Delete File** - deletes a selected file.

— **Rename File** - allows you to rename any existing file.

— **Move File** - copies a file to the specified location and deletes the original source file.

— **Back to Previous Menu** - returns you to the previous menu.

List Files

This menu allows you to select the file storage drive you wish to access and display the files contained on that logical drive. After you selected an option, a screen will appear displaying files. Refer to File Display Screen on the next page.

```
[10002345]                - Choose Device -                [NT_DISTRIB]

          1  Internal Storage C:

          2  External ATA Card A:

          3  External ATA Card B:

          4  All Devices


          9  Exit


                        Choose a Device or 9 to Exit
```

— **Internal Storage C:** - is on board Flash drive. Select this option to display its files.

— **External ATA Card A:** - is the external PCMCIA ATA Flash card installed into the external slot A. Select this option to display its files.

— **External ATA Card B:** - is the PCMCIA ATA Flash card installed into the PCMCIA slot B located on the MIRAN pc board. Select this option to display its files.

— **All Devices** - displays files located on all drives.

— **Exit** - returns you to the previous menu without choosing a device.

File Display

This screen displays files for the selected volume or drive from the previous menu.

```
[10002345]                - View Files -                    [NT_DISTRIB]

   Filename          Size      Time    Date         Description
 1 C:HOLIDAY.BAT     131072    10:15   20/10/96     .bat file.
 1 C:ENYA.SND        131072    12:10   22/10/96     .bat file.
 1 C:ALL_BUSY.SND    131072    09:25   10/11/96     .bat file.
 1 C:2ND_RAN.SND     131072    13:15   20/11/96     .bat file.




 9 Exit

 4 Files
 Page 1 of 1

                  Select a File or press Enter for more
```

— **Filename** - the name of the file on the selected drive. If more than 8 files exist, press the Enter key to display the rest of the files. The type of file is designated by the extension (.BAT, .SND).

— **Size** - shows the size of the file in bytes.

— **Time and Date** - is the time date the file was installed on the drive.

— **Description** - describes the type of file. In this example all the files are considered batch files (.bat).

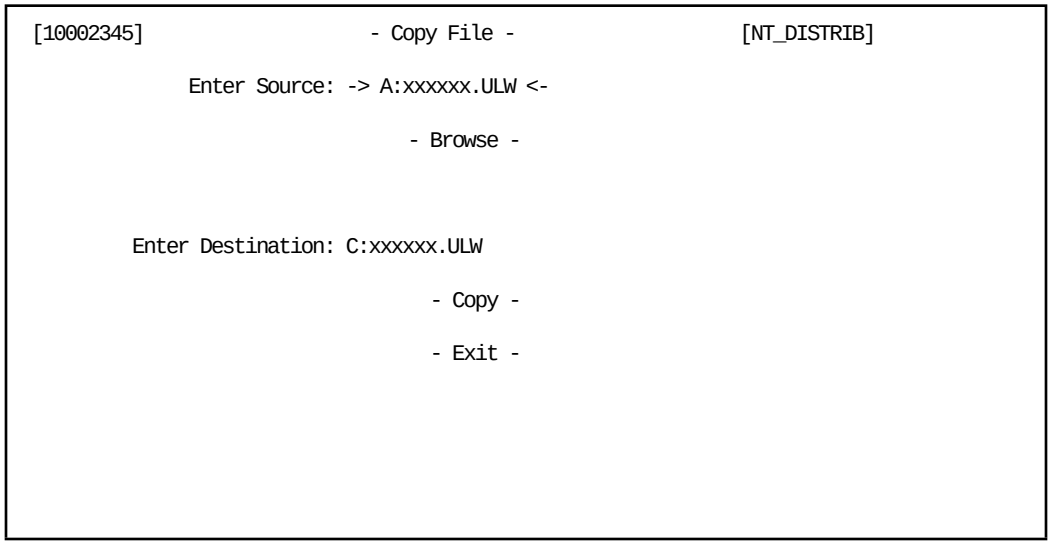
— **Exit** - to exit the screen.

The screen also indicates the number of files listed and the page where these files are displayed. If the first page is full and there are more files on the second page, you can press Enter to display the next page.

Copy File

This screen is used to copy a file within a volume or drive, from one drive to the other, or to backup files onto a disk.

CAUTION
File transfer between drives should be performed with the MIRAN card disabled.



— **Enter Source** - is the file you wish to copy.

— **Browse** - is used to scan through the list of available files to select the file you wish to copy instead of typing in the name of the file.

— **Enter Destination** - is the filename where the file should be copied.

— **Copy** - copies the file you selected (sources file) into the destination filename location. If there is a filename conflict or the source filename does not exist, and error will be displayed.

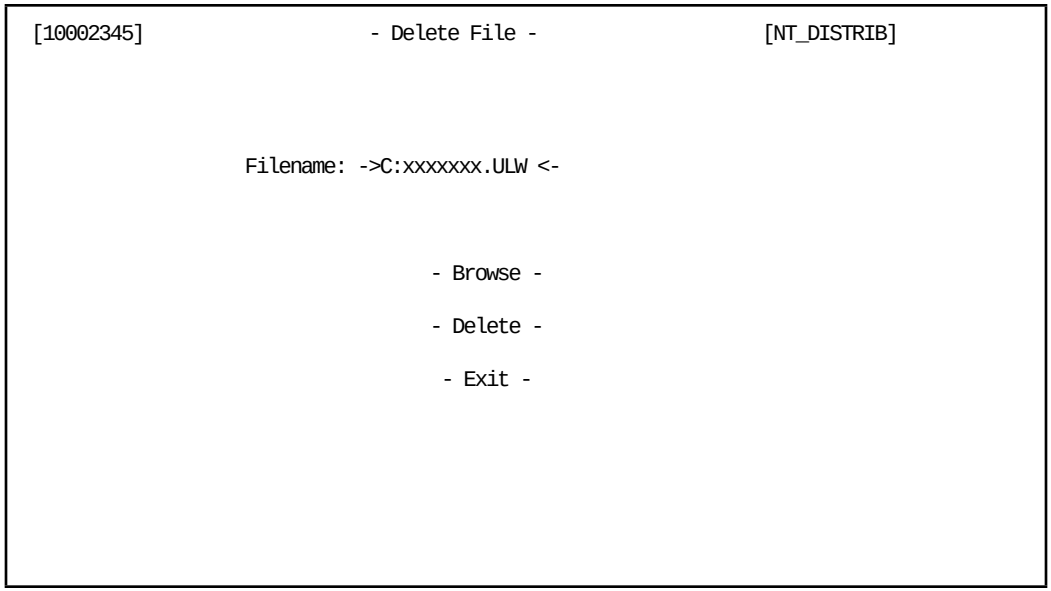
— **Exit** - allows you to exit the screen before copy is performed or after the copy command has been executed.

Delete File

CAUTION

Before you delete a file, make sure that the file is not active at that time.

This screen allows you to delete a file from any of the available drives.



— **Filename** - enter the name of the file you wish to delete.

— **Browse** - allows you to scan through files in any drive and select the file you wish to delete.

— **Delete** - deletes the specified file from the Flash memory.

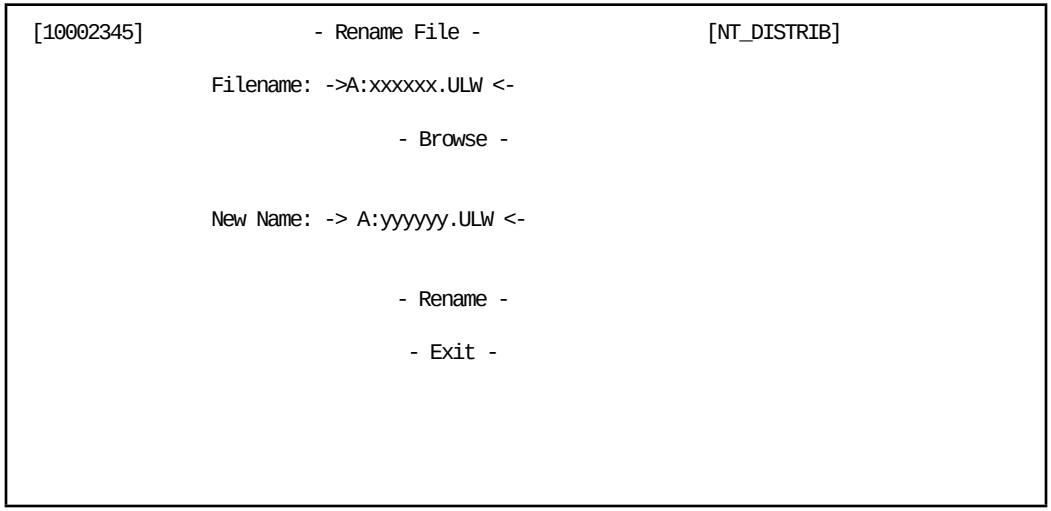
— **Exit** - allows you to exit the screen without deleting a file or to exit the screen after you deleted the file.

Rename File

This screen is used to rename a file. The file can be located on any available volume (drive).

CAUTION

Before you rename a file, make sure that the file is not active at that time.



— **Filename** - is the original file you wish to rename.

— **Browse** - allows you to scan through files in any drive and select the file you wish to rename.

— **New Name** - is the new name of the old file.

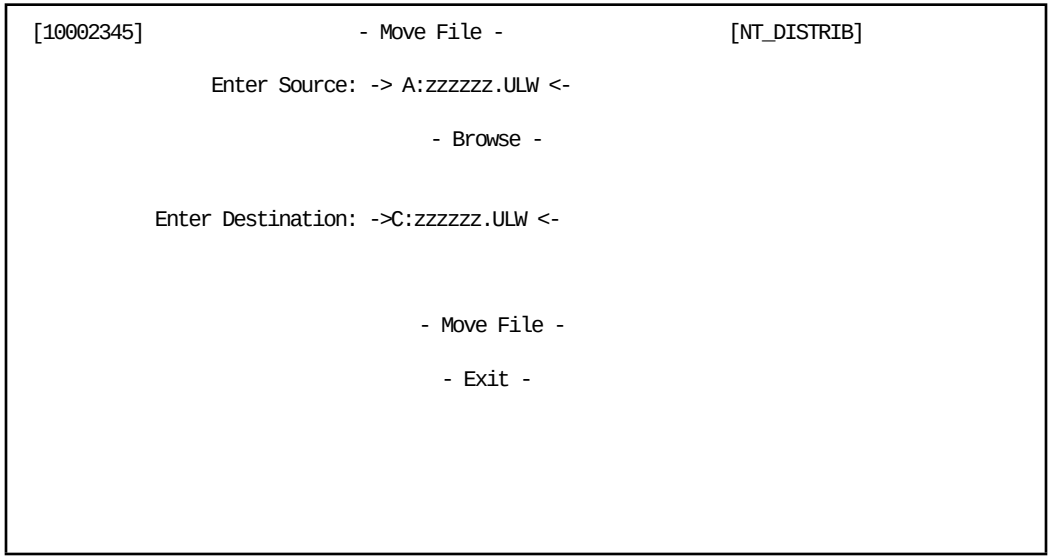
— **Rename** - renames the specified file.

— **Exit** - allows you to exit the screen without renaming a file or to exit the screen after you renamed the file.

Move File

This screen allows you to move files between any available disk volumes.

> **CAUTION**
> Before you move a file, make sure that the file is not active at that time.



- **Enter Source** - is the file you wish to move.
- **Browse** - is used to scan through the list of available files to select the file you wish to move instead of typing in the name of the file.
- **Enter Destination** - is the filename where the file should be moved.
- **Move File** - moves the file you selected (sources file) into the destination filename location. Following the successful copy of the source file into the destination location, the source filename is deleted.
- **Exit** - allows you to exit the screen before the move is performed or after the move command has been executed.

Keycode Entry

This screen is used to enter a new keycode after a hardware or software upgrade to enable the upgrade.

```
[10002345]              - Keycode Entry -                    [NT_DISTRIB]

                      Current Configuration
                       --------------------
                   Version: 1.30
                     PARMS:  INT= 8 EXT= 2
                  KEYCODE:  01476536 42542266 74412263



                           New Parameters
                           -----------------
              Internal Ports:
               External Ports:
                    Key Code:


                                - Execute -

                                 - Exit -
```

- **Current Configuration** - displays the currently installed configuration that includes the application name and version, hardware ports, and the current keycode.
- **New Parameters** - displays the MIRAN new port option and the new keycode.
- **Internal Ports** - displays the number of available internal one-to-one ports.
- **External Ports** - displays the number of available cross-connect channels.
- **Key Code** - enter a new 24-digit keycode as 3 groups of 8 digits separated by spaces. If incorrect keycode is entered, a message is displayed indicating keycode mismatch.

— **Execute** - executes the new keycode and enables the upgrade.

— **Exit** - you can exit the screen before or after you execute the upgrade.

Software Upgrade

If a software upgrade is performed, an new keycode will be required. For a bug fix, a new keycode is not required.

CAUTION

Do not reboot or power down the MIRAN card during software upgrade process. When the upgrade is complete, the system acknowledges with an OK. **After OK is displayed, you must COLD REBOOT the card to activate the software upgrade**.

This screen allows you to perform the software upgrade on the MIRAN.

```
[10002345]              - Software Upgrade -                  [NT_DISTRIB]


              Filename: ->A:205B1912.130 <-


                              - Browse -

                             - Upgrade -

                               - Exit -
```

— **Filename** - is the file you wish to download onto the MIRAN internal Flash memory to upgrade the current software.

— **Browse** - is used to scan through the list of available upgrade files to select the file you wish to download into the internal Flash memory. The selected file appears in the Filename space on the screen.

— **Upgrade** - places the selected file into the internal program Flash memory on the MIRAN card.

— **Exit** - allows you to exit the screen before the software upgrade is performed or after the Perform Upgrade command has been executed.

Note: Do not reboot or power down the MIRAN card during software upgrade process.

System Information

This screen displays the current hardware and software configuration of the MIRAN card. This information can be used when diagnosing hardware and software issues that may be related to the product release.

```
[10002345]                - System Info -                  [NT_DISTRIB]

                        Hardware Configuration
                          ---------------------

                            CPU: 486DX4-100
                Level 2 Cache: Not Installed
               System Memory: 4 Mbytes
     Disk A: (External ATA): Installed
     Disk B: (Internal ATA): Not Installed
     Disk C: (Internal PCI): 2 Mbytes


                        Software Configuration
                        ----------------------

                   Application: NTAG37AA Rls 1.30
                8051XA Firmware: NTAG45AA Rls


                     Press Enter to continue
```

— **Hardware Configuration** - displays the CPU, system memory, and the status of the drives.

— **Software Configuration** - displays the application, firmware, and software releases.

— **To continue** - press Enter to continue to the next system information page.

OA&M Access Configuration

> **CAUTION**
> Before you enable channel 7 for the telephone set-based OA&M access, make sure it is not configured for RAN or MOH. You can also use the command ENBLESET to enable channel 7 for the telephone set.

This screen enables or disables the telephone-based OA&M access to the MIRAN. The default is disabled.

```
[10002345]      - OA&M Access Configuration -                    [NT_DISTRIB]

                        Current Configuration
                         ---------------------

         Set Based Access (Channel 7): Enabled









                              - Enable Set Based Access -

                              - Disable Set Based Access -

                                        - Exit -

Command: ENBLESET
```

— **Set Based Access (Channel 7)** - indicates the current status of the telephone set based OA&M access.

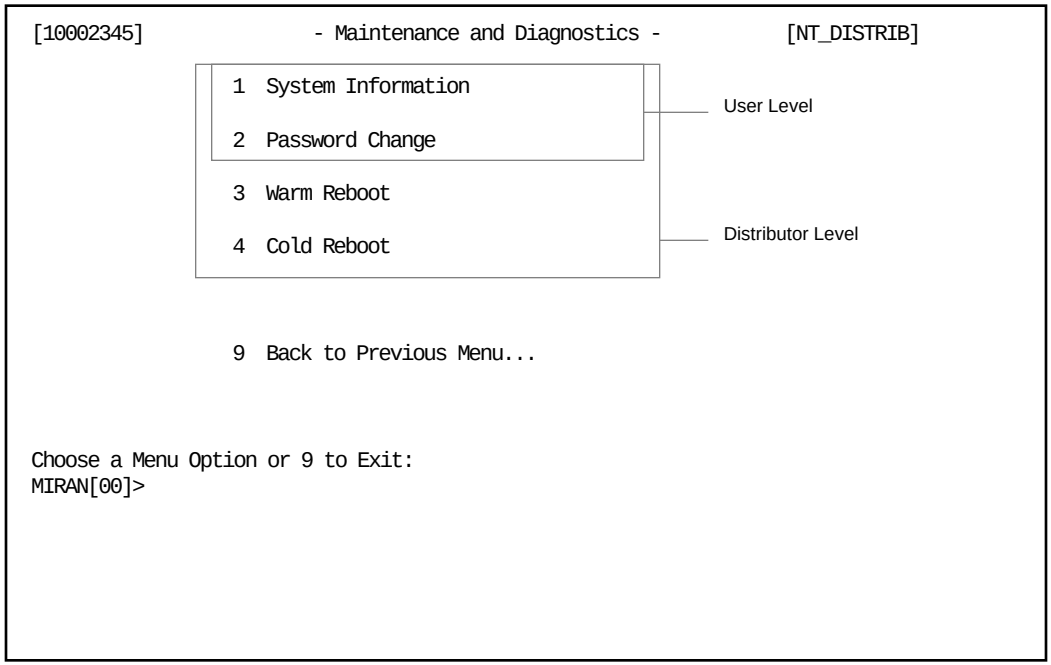
— **Enable Set Based Access** - enables the telephone set based OA&M access. It configures channel 7 for this purpose and therefore channel 7 cannot be used for RAN assignments.

— **Disable Set Based Access** - disables the telephone set based OA&M access and allows channel 7 to be used for RAN assignments.

— **Exit** - allows you to exit the screen before or after modifying the current status of channel 7

Maintenance and Diagnostics

This menu provides access to the MIRAN maintenance and diagnostics. It is divided into user and distributor accessible functions.



— **System Information** - displays hardware and software configuration.

— **Password Change** - allows the current password to be changed based on the level of access of the current user.

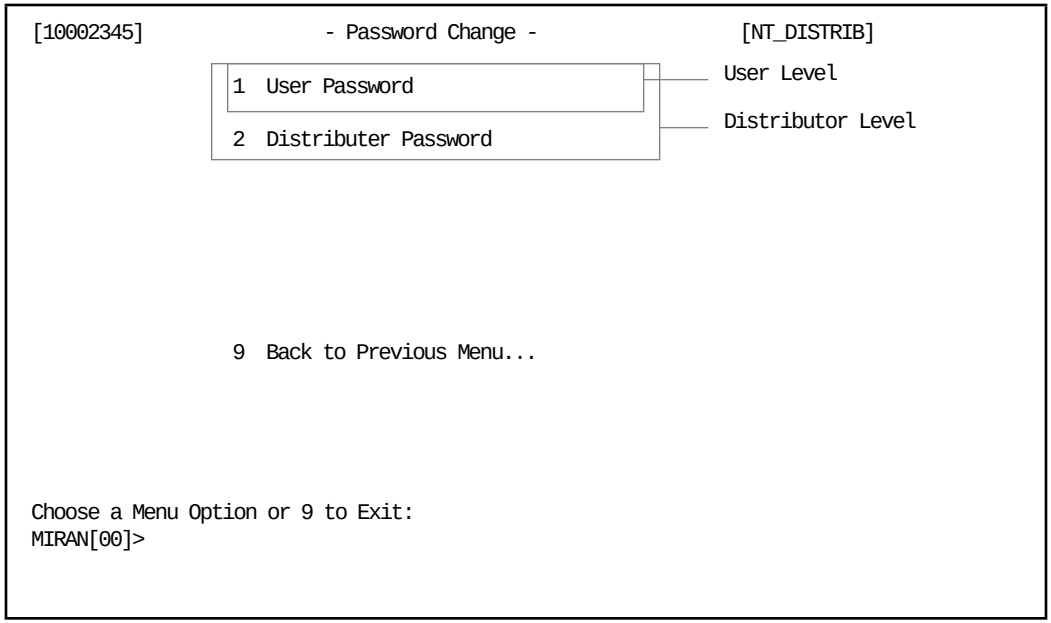
— **Warm Reboot** - the host is reset by the 8051XA. (Duration 1 minute).

— **Cold Reboot** - invokes full MIRAN reboot. (Duration 2 minutes).

— **Back to Previous Menu** - returns you to the previous menu.

Password Change

This menu is used to change the existing password used for OA&M access. Holder of a password can alter a password of the same level or lower. For example, a user can change only user password, a distributor can change user and distributor passwords.



— **User Password** - is able to access only user level functions.

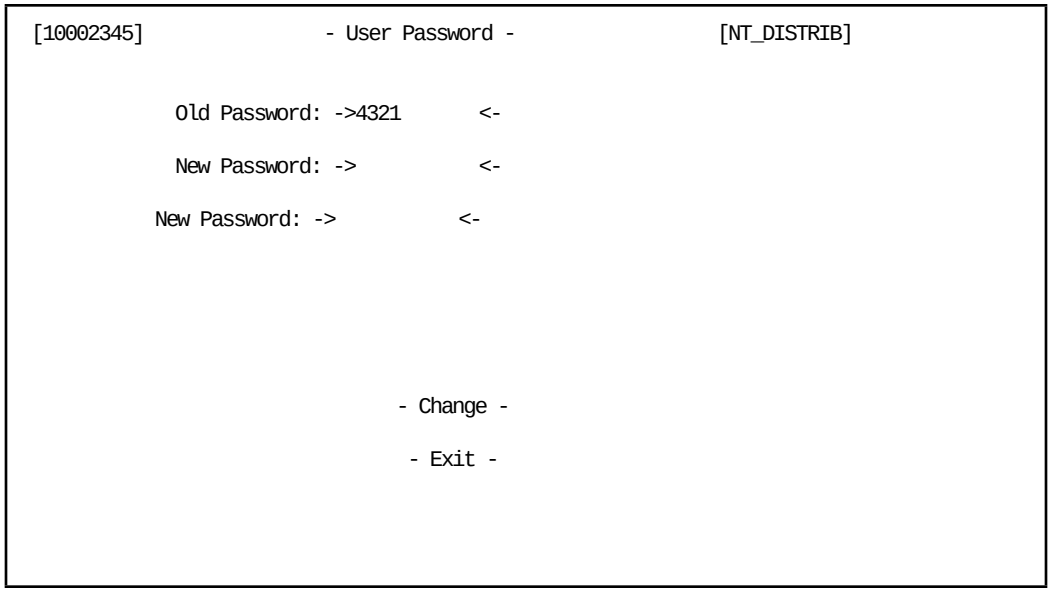
Note: The user level password must be all numeric.

— **Distributor Password** - is able to access distributor and user functions (distributor password can be alphanumeric).

— **Back to Previous Menu** - returns you to the previous menu.

Password Change - User Password

This screen is used to change the user password (the default password is **4321**). This password can be changed by the user and distributor. The password must be at least four characters long. If the telephone set-based OA&M access is used, the password must be numbers only (no alpha characters are allowed).



- **Old Password** - is the existing user password.
- **New Password** - replaces the existing password.
- **New Password** - new user password appears after the Change command has been executed.
- **Change** - causes the password to be changed and confirmed.
- **Exit** - exits the screen before changing the password or alternately, exits the screen after the change password was executed.

Password Change - Distributor Password

This screen is used to change the distributors password (the default password is **4321**). This password can be changed by the distributor. The password must be at least four characters long.

```
[10002345]              - Distributor Password -              [NT_DISTRIB]


            Old Password: ->4321       <-

            New Password: ->           <-

          New Password: ->           <-









                              - Change -

                               - Exit -
```

— **Old Password** - is the existing distributor password.

— **New Password** - replaces the existing distributor password.

— **New Password** - new distributor password appears after the Change command has been executed.

— **Change** - causes the password to be changed and confirmed.

— **Exit** - exits the screen before changing the password or alternately, exits the screen after the change password was executed.

MIRAN OA&M command set

Instead of using the menu structure described in the first half of this chapter, you can enter commands on the command line in the Main Menu. This is advantageous to an experienced user who knows what command to use therefore does not have to navigate through the OA&M menu structure.

Most of these commands can also be used in batch files to allow complex configurations to be executed in a single command.

Files are specified using DOS convention of an 8-character filename followed by a 3-character extension. The filename is normally preceded by a device descriptor as shown in Table 25.

Table 25
MIRAN disk drives

Drive name	Designation
External PCMCIA Drive	A:
Internal PCMCIA Drive	B:
Internal Flash Drive	C:

The MIRAN channels are named as shown in Table 26:

Table 26
Channel designations

Channels	Designation
Internal	0-7
External (cross-connect)	A0, A1
Analog Inputs	ANALOG0, ANALOG1

These designators are used on the command line when executing MIRAN commands.

OA&M Command summary

OA&M commands are used instead of using different menus to perform system applications configuration. You enter a command on the command line at the bottom of the Main Menu screen, refer to fields description in the screen of "Main Menu" on page 113. This screen also shows an example of a command entered on the command line.

Example: **MIRAN[00]>**CONVERT PLSWAIT.WAV MSG00005.ULW

Table 27 lists MIRAN OA&M commands along with their descriptions, parameters, and syntax definitions. It also lists terminal-based OA&M access commands that can be entered on the command line on the terminal screen.

Table 27
OA&M command summary (Part 1 of 4)

Command	Parameters	Function
ACCESS	[VLAN Number]	Passthru to another MIRAN card over VLAN.
ASSIGN	[Day] [Channel] [Device:File-name.PCM] [Time]	Assign a message to a channel on a given time and date. Wild cards are allowed.
ASSIGNCOPY	[Day] [Channel] [Day] [Channel]	Copy an assignment for a given day and channel to another day and channel.
BACKUP	[Device]	Backs-up the assignment information to the internal C: drive.
CONV_PCM_WAV	[Input Device:File-name.SND] [Output Device:File-name.WAV]	Convert a file from PCM to WAV
CONV_WAV_PCM	[Input Device:File-name.WAV] [Output Device:File-name.ULW]	Convert a file from WAV to PCM

Table 27
OA&M command summary (Part 2 of 4)

Command	Parameters	Function
COPY	[Source Device:File-name.Type] [Destination Device:File-name.Type]	Copy a disk file.
DELETE	[Device:File-name.Type]	Delete a disk file.
DISABLESET		Disable Set-Based Channel 7
DISTRIBPASS	[Old Password] [New Password1] [New Password1]	Change the distributor password.
ENABLESET		Enable Set-Based Channel 7.
KEYCODE	[Keycode]	Capacity upgrade by means of a keycode.
LIST	[Device:File-name.Type]	List files for a given volume.
LISTALL	[Filename.Type]	List files for all volumes.
LOGOFF		Log off and bring user back to the login screen.
MOVE	[Source Device:File-name.Type] [Destination Device:File-name.Type]	Move a disk file.
PLAY	[Channel] [Device:File-name.Type]	Play a voice file on a given channel.
PLAYLEV	[Channel] [Level]	Set the playback level for a particular channel.
PLAYSTOP	[Channel]	Stop playback of a file on a given channel.

Table 27
OA&M command summary (Part 3 of 4)

Command	Parameters	Function
RECORD	[Channel] [Device:File-name.Type] [Dura-tion]	Record from a given channel to a file for a given duration.
RECORDSTOP	[Channel]	Stop recording on a given channel.
RENAME	[Device:Old_File_Na me.Type] [New_File_Name.Ty pe]	Rename a disk file.
RESETSTAT		Reset channel statistics.
RESTORE	[Device]	Restore the backed-up configuration from the C: drive.
RUN	[Device:File-name.BAT]	Run a batch file.
SETDATE	[Day of Month/Month/Year]	Set the date.
SETDAY	[Day]	Set the day-of-week.
SETTIME	[Hour:Min]	Set the time-of-day.
SHOW	[Day] [Channel]	Lists the assignments for a given day and channel.
STATS		Show channel statistics screen.
STATUS		Show pack status screen.
SW_UPGRADE	[Device:File-name.Type]	Software upgrade from disk file.
SYSINFO		Bring user to the system information screen.

Table 27
OA&M command summary (Part 4 of 4)

Command	Parameters	Function
TIME		Show the current day, time, and date
UNASSIGN	[Day] [Channel] [Time]	Unassign a message from a given channel.
USERPASS	[Old Password] [New Password1] [New Password1]	Change the user password.

OA&M Command Syntax

The command syntax explains in detail each command and its parameters.

Operational Statistics

Displays a report of the RAN statistics.

Syntax **STATS**

System Information

Displays a report of the system hardware configuration.

Syntax **SYSINFO**

Change Password - User, Administrator

MIRAN supports two levels of password security.

Level 1	Distributor	Has restricted diagnostic and debug functions.
Level 2	User	Can change configurations, messages, upgrade software etc. but can not access diagnostics or debug functions.

These commands allow the system passwords to be updated. It will not be possible to change the password of a higher level user.

Syntax: USERPASS [old password] [new password1] [new password1]

DISTRIBPASS [old password] [new password1] [new password1]

Message Commands

The following commands deal with announcement messages.

Message Record

Records a message and stores it in a file. Recording starts immediately and terminates after the specified duration.

Syntax:	**RECORD** [source] [device:filename] [duration]
[source]	ANALOG1, ANALOG2, CHANNEL 7 (for set)
[device:filename]	Device indicates on which device the file resides. The file name is a maximum of 8 characters with a 3 character extension.
[duration]	Maximum play duration in seconds.

Stop Recording Message

Halts all message recording.

Syntax: **RECORDSTOP**

Play Message

Plays a message file via the specified port.

Syntax:	**PLAY**[destination] [device:filename] [duration]
[destination]	A0 or A1 (.ULW or .ALW files only) channel 7 (OA&M channel))
[device:filename]	Device indicates on which device the file resides. The file name is a maximum of 8 characters with a 3 character extension. If ANALOG0 or ANALOG1 is specified, the analog input ports are used as message source.
[duration]	Maximum play duration in seconds. If duration is omitted then all the message will be played.

Stop Playback Message

Stops playback of a message file via the specified port. This can be used to stop playback of a long message before making a new assignment.

Syntax	**PLAYSTOP** [channel]
[channel]	0-7, A0, A1

Set Playback Level Message

Sets the playback level for given channel.

Syntax:	**PLAYLEV** [channel] [level]
[channel]	0-7 for internal channels A0, A1for external channels.
[level]	Integer in range 0-15.

Convert Message File

Converts audio files from one format to another. Raw PCM (.ULW or .ALW) is the default format used by the MIRAN card. This utility allows conversion between any combination of the following formats:

Windows™ format audio file .WAV

Raw PCM .ULW, .ALW

Syntax and description of message files

Syntax:	**CONV_PCM_WAV** [src dev:filename.ULW] [dest dev:filename.WAV]
[src dev:filename.ext]	Device indicates on which device the file resides. Filename, max 8 characters.
[dest dev:filename.ext]	Device indicates on which device the converted file will be placed.Filename, max 8 characters.

Assign Message

MIRAN supports up to 16 different message assignments per day of the week, as shown below:

Event	File	Description	Time/Date
0	MSG00001.ULW	Please hold for operator.	08:30 Mon
1	MSG00002.ULW	Office is closed.	17:00 Mon
2	MSG00001.ULW	Please hold for operator.	08:30 Tue
3	MSG00002.ULW	Office is closed.	17:00 Tue
4	MSG00001.ULW	Please hold for operator.	08:30 Wed
5	MSG00002.ULW	Office is closed.	17:00 Wed
6	MSG00001.ULW	Please hold for operator.	08:30 Thu
7	MSG00002.ULW	Office is closed.	17:00 Thu
8	MSG00001.ULW	Please hold for operator.	08:30 Fri
9	MSG00002.ULW	Office is closed.	17:00 Fri

The list above will play the message “Please hold for operator” during office hours and the message “Office is closed” for all other times but only for the specified channel.

Syntax:	**ASSIGN** [day] [channel] [device:filename] [time]
[day]	Specifies the day of the week the assignment is for
[channel]	Specifies to which channel the sound file will be assigned
[dev:filename.ext]	Device indicates on which device the file resides. Filename, max 8 characters. If ANALOG0 or ANALOG1 are specified, the analog input ports will be used as the source of the message
[Time]	This is the time at which the announcement will be switched in. It is in the format HH:MM.

Assign Copy

Copy an assignment for a given day and to channel to another day and channel.

Syntax:	**ASSIGNCOPY** [sday] [schannel] [dday] [dchannel]
[sday]	Specifies the source day of the week.
[schannel]	Specifies the source channel.
[dday]	Specifies the destination day of the week.
[dchannel]	Specifies the destination channel.

Unassign Event

Unassigning an event will remove it from the event list for the specified channel and will clear the event time and day. The unassign command will be accepted only if the event is the last one on the list.

Syntax:	**UNASSIGN** [day] [channel] [time]
[day]	Specifies the day of the week the assignment is for.
[channel]	Specifies to which channel the event will be unassigned.
[time]	This is the time at which the announcement will be switched in. It is in the format HH:MM.

Show Assignments

This command displays the assignments for the specified channel for a given day.

Syntax:	**SHOW** [day] [channel]
[day]	Specifies the day of the week.
[channel]	Specifies to which channel the event will be unassigned.

File Commands

Control RAN and music files.

List Files

Lists all the files on the specified device or drive:.

Syntax:	**LIST** [device:] [filename] [.extension]
[device:]	Device indicates on which device the file resides.
[filename:]	Filename, max 8 characters or wildcard “*”. If a filename is omitted then all files on the specified device will be listed.
[.extension:]	The extension can be max 3 characters or wildcard “*”. If an extension is omitted then all files with a null extension on the specified device will be listed.

List All Files

The function of this command is the same as for the LIST command but is applied over all storage devices.

Syntax:	**LISTALL** [filename][.extension]
[filename:]	Filename, max 8 characters or wildcard “*”. If a filename is omitted then all files on the specified device will be listed.
[.extension:]	The extension can be max 3 characters or wildcard “*”. If an extension is omitted then all files with a null extension on the specified device will be listed.

Copy File

Allows you to copy files:

Syntax:	**COPY** [src device:filename.ext] [dest device:filename.ext]
[src dev:filename.ext]	Device indicates on which device the file resides. Filename, max 8 characters and.ext max 3 characters.
[dest dev:filename.ext]	Device indicates on which device the copied file will be placed.Filename, max 8 characters and.ext max 3 characters.

Move File

Allows you to move files from a source to a destination location:

Syntax:	**MOVE** [src device:filename.ext] [dest device:filename.ext].
[src dev:filename.ext]	Device indicates on which device the file resides. Filename, max 8 characters and.ext max 3 characters.
[dest dev:filename.ext]	Device indicates on which device the moved file will be placed.Filename, max 8 characters and .ext max 3 characters.

Delete file

Allows you to delete a file:

Syntax:	**DELETE** [dev:filename.ext]
[dev:filename.ext]	Device indicates on which device the file resides. Filename, max 8 characters and.ext max 3 characters.

Rename File

Allows you to rename a file:

Syntax:	RENAME [old dev:filename.ext] [new filename.ext]**.**
[old dev:filename.ext]	Device indicates on which device the original file resides. Filename, max 8 characters and.ext max 3 characters.
[new filename.ext]	New filename, max 8 characters and.ext max 3 characters

Backup

This command copies all active configuration message files to the specified destination.:

Syntax:	**BACKUP** [destination]
[destination]	This can be one of the following, device: - logical storage device A:, B: or C:. ANALOG0 - Analogue output port 0 ANALOG1 - Analogue output port 1

Restore

This command restores files that were backed up using the BACKUP command. Only files that were backed up to a logical device can be restored:

Syntax:	**RESTORE** [device:]
[device:]	Device indicates on which device the backed up file resides.

Upgrade

This command upgrades the MIRAN operating system and application software to the version stored on the specified device:

Syntax:	**SW_UPGRADE** [device:]
[device:]	Device indicates on which device the new software resides.

Run Batch File

Allows you to run batch files:

Syntax:	**RUN** [device:filename.BAT]
[device:filename]	Device indicates on which device the file resides. Filename, max 8 characters. The extension.BAT will be assumed.

Comment

This allows you to write comments:

Syntax:	**#**
	If the first character of a command string is “#” then the string is assumed to be a comment and is ignored.

Miscellaneous Commands

These commands configure and display time and date parameters.

Set Time of Day

This command sets the time of day.:

Syntax:	**SETTIME** [HH:MM]
[HH:MM]	Time of day in hours and minutes**.**

Set Day of Week

This command sets the day of the week.:

Syntax:	**SETDAY** [day]
[day]	Day of the week, i.e. (MON,TUE,WED,THU,FRI,SAT,SUN).

Set the date

This command sets the date for the internal calender.:

Syntax: **SETDATE** [day of month / month / year]

Display Day and Time

Shows the current day-of-week and time.

Syntax: **TIME**

Show Pack Status

Shows the pack status screen.

Syntax: **STATUS**

Show Statistics

Shows the current statistics for channel usage.

Syntax: **STATS**

Clear Statistics

Resets all of the statistics values back to zero.

Syntax: **RESETSTAT**

Enable Set Based OA&M

This command enables channel 7 to operate as the set based OA&M channel.

Syntax: **ENABLESET**

Disable Set Based OA&M

This command disables channel 7 to operate as the set based OA&M channel.

Syntax: **DISABLESET**

Logoff

This command logs you out of the terminal OA&M.

Syntax: **LOGOFF**

MIRAN Batch File Support

The MIRAN batch files are used to execute sequences of frequently used commands. The syntax of these commands is the same as for the command line. Comments are indicated by a "#" character in the leftmost column.

Restrictions

The maximum number of lines per batch file (including comments) is limited to 255.

Commands and comments can not be mixed on the same line.

Batch file Example

Batch file INIT.BAT

Initial channel assignments

Copy speech file pls_hold from device A: to internal flash device C:

COPY A:PLS_HOLD.ULW C:

Assign "please hold" message to channel 0

ASSIGN MON 0 C:PLS_HOLD.ULW 00:00

Assign music connected to analogue port 0 to channel 1

ASSIGN MON 1 ANALOG0 00:00

Special Features

This section will give examples and setup information for two special RAN features supported by the MIRAN:

— Playing different messages at different times on a single channel

— Setting up emergency messages quickly

Playing different messages at different times

Setup instructions

It will be possible to configure up to 16 different message/times per RAN channel, each message will begin to played at the specified time until the next timed assignment, for example if the message assignment for RAN channel 0 is configured as shown below.

```
Message Assignment for channel 0:

CHANNEL........TIME........FILE .......ABSTRACT
..0........08:30.......MSG00001.ULW .office is open
..0........13:00.......MSG00002.ULW .closed for lunch
..0........14:00.......MSG00003.ULW .office is open
..0........15:00.......MSG00004.ULW .office is closed

----------press enter to continue----------

MIRAN[00]
```

The schedule of messages played to callers is:

— 15:00 - 08:29 MSG00003.ULW “Office is closed”

— 08:30 - 12:29 MSG00001.ULW “Office is open”

— 12:30 - 13:29 MSG00002.ULW “Closed for lunch”

— 13:30 - 14:59 MSG00001.ULW “Office is open”

Note that the last message at 15:00 will be played at the beginning of the following day.

These messages can be assigned using one of the following two methods:

1 1. Directly from the command line using the “ASSIGN [channel] [dev:filename.ULW] [hh:mm]” command

```
ASSIGN 0 MSG00004.ULW 08:00
```

2 The same message can be assigned using the menu system as follows.

a From the MAIN MENU enter 1 for RAN Administration.

b In the RAN Administration menu enter 1 for Message Commands.

c In the Message Commands menu enter 1 for Assign Message.

d Enter channel 0, a list of the message assignments for channel 0 is displayed until the Enter key is pressed.

e After the Enter key has been pressed the display lists all the available message files, the user selects the file MSG00004.ULW by entering the number listed beside the file name.

f The user is then prompted for the time which is entered as “08:00”.

g The user is then prompted to confirm the assignment.

After using any of the above methods, the new assignment appears as shown in the screen below.

```
Message Assignment for channel 0:

CHANNEL........TIME........FILE........ABSTRACT
..0........12:00.......MSG00001.ULW .Partial service is available
..0........13:00.......MSG00002.ULW .office is open
..0........14:00.......MSG00003.ULW .closed for lunch
..0........15:00.......MSG00004.ULW .office is open
..0........15:00.......MSG00004.ULW .office is closed


----------press enter to continue----------

MIRAN[00]
```

Setting up emergency messages quickly

You can use either of two approaches to rapidly reconfigure the MIRAN card for Emergency Messages:

Method 1: use the RESTORE command

The advantage of this method is that it is not dependent upon the current MIRAN card configuration.

1 Pre-configure a MIRAN card as it would operate in an emergency situation.

2 Backup the configuration to an external PCMCIA storage card using the BACKUP command.

3 During the emergency situation the MIRAN card can be completely re-configured (regardless of the current configuration) by typing the RESTORE command.

Method 2: use a batch file

Approach 2 allows more flexibility than Approach 1 and may not require an external PCMCIA storage card. However, it is more sensitive to the current MIRAN configuration.

1 Create a single batch file which will contain all the necessary commands to configure the system with the emergency messages (i.e. ASSIGN and UNASSIGN commands).

2 Whenever the emergency situation arises the MIRAN can be reconfigured by typing “RUN [batch file name]”.

Maintenance

This chapter describes Meridian Integrated RAN (MIRAN) maintenance tools and procedures to guide you in identifying the MIRAN faults, locating defective equipment, correcting problems by fixing or replacing defective equipment, and verifying the operation of the MIRAN after corrections or replacements have been made.

Maintenance overview

The problem identification should be approached systematically. A problem may have more than one cause. To isolate the cause, a knowledge of MIRAN operation is required. Once the cause is identified, the problem can be corrected by replacing the defective card, connecting accidentally disconnected cables, or correcting the software security problem.

The system and the MIRAN provide built-in self-diagnostic indicators and software and hardware tools. These diagnostic facilities simplify system troubleshooting and reduce mean-time-to-repair (MTTR).

This document focuses on the maintenance of the MIRAN equipment. It requires that system operates correctly before you start diagnosing the MIRAN problems.

The system installation and maintenance guide documents: *Meridian 1 general maintenance information* (553-3001-500), *Meridian 1 fault clearing* (553-3001-510), and *Meridian 1 hardware replacement* (553-3001-520) describe how to maintain the entire system. This chapter describes how to maintain the MIRAN as an integral part of the system.

Diagnostic tools

Diagnostic tools are used to troubleshoot problems in the system including problems with the MIRAN. When diagnosing MIRAN problems, you may have to use more than one of these tools.

System diagnostic tools consist of:

— LED indicators

— display codes

— card self-tests

— sanity monitoring

— overlay commands

— history files

LED indicators

System cards are equipped with red LED indicators and module power supplies are equipped with green LED indicators. These indicators show the status of each card or power supply.

MIRAN maintenance LED indicator. The MIRAN has a card LED indicator at the top of the faceplate. The card LED is a red LED that indicates the status of the card. If the LED is ON, the card may be faulty or disabled. When the card is powered up, it blinks 3 times during self-test and then is stays ON if functioning correctly, otherwise it turns ON without blinking and stays ON. The LED turns OFF when the card is software enabled.

Display codes

The MIRAN is equipped with a 4-digit alphanumeric hexadecimal display on the faceplate.

The hexadecimal display indicates the progress of the internal self-test in the form of T:xx (refer to *Appendix A, MIRAN hexadecimal codes*). Upon successful completion of the test and the start-up of the RAN application, it will display the code "**Rann**", where **nn** is the LAN card number. If cards are not connected in a LAN configuration the display will show Ra00.

The maintenance display on the MIRAN faceplate provides detailed maintenance information. The display includes the following types of information:

— self-test results on power-up

— maintenance routine results

— upgrade and backup information

— Reading and writing to and from Drives A:, B:, or C:

Self-test

A self-test is automatically performed by each MIRAN card when you insert it into an operating system module, when you enable the card, or when you power up or reset the system. You can also perform a self-test on a card using software commands or menus.

The self-test checks general MIRAN functions and determines if they are operating correctly. It is very useful when you first install the cards because, upon insertion, the card automatically starts the self-test and gives you an immediate indication of its operating status.

Self-test performs a detail test and analysis of the installed hardware both to determine the integrity of the hardware and to establish the configuration of MIRAN card (refer to Table 28). If the detected configuration is different from that stored in the Flash memory, the difference is logged on the maintenance terminal and the Flash configuration information is updated. Results of the self-test may also be displayed on the hex display on the MIRAN faceplate.

Table 28
MIRAN self-test sequence

Item tested	Description of action
Processor/Coprocessor	Read and store processor ID. Run processor self-test.
Onboard Flash memory	Check the amount of Flash installed. Perform checksum testing of diagnostics, application, configuration areas, BIOS, and OS.
DRAM	Check the amount of DRAM installed. Perform R/W test.
PCI Chipset	Perform R/W test on selected registers.
System I/O Controller	Perform R/W test on selected registers.
PCMCIA Controller	Perform R/W test on selected registers.
DS-30X Interface	Test shared memory and perform loopback test over SD-30 LCA.
CE-MUX Interface	Test shared memory and perform loopback test over CE-MUX LCA
PCMCIA DSP card(s)	Check the presence of DSP cards and initiate diagnostic tests on DSP cards, if present.
PCMCIA Flash card(s)	Check the presence of Flash memory and the MIRAN check configuration information.

Sanity monitoring

Sanity monitoring is a background routine that checks the operation of system resources such as CPU activity memory allocation etc. This background routine attempts to restore normal system operation if the system performance has degraded to an unacceptable level. If all else fails, this routine will restart the system to try to restore it to normal operation. If the soft reset is not effective, a full board level reset is initiated. If reset is not successful, the permanent error code is displayed on the MIRAN hex display.

Overlay commands

Diagnostics are performed for every card as part of the daily routines, or may be invoked from a maintenance TTY or the SMP (when equipped). See the NTP titled *Meridian 1 system maintenance* (553-3001-520).

The MIRAN card appears as an Enhanced Universal Trunk card to a system in which it is installed. All relevant system maintenance commands for a Enhanced Universal Trunk card can therefore be used with MIRAN. Enabling and disabling of RAN channels is done in Network and Peripheral Equipment Diagnostics program LD 32. To test the music and RAN device, use the Trunk Diagnostics program LD 36.

Table 29 lists some of the commands used to control the MIRAN status and functions.

Table 29
Commands to enable/disable and test MIRAN channels

Overlay	Command	Operation performed
LD 32	DISC / ENLC	Disable / Enable specified card
LD 32	DISU / ENLU	Disable / Enable specified channel
LD 36	MUS	Test music device for specified customer and route
LD 36	RAN	Test RAN device for specified customer and route
LD 32	STAT	Get status of specified card /channel

All the above commands are handled by the MIRAN card exactly as they are by the Enhanced Universal Trunk card, transparently to the system.

History file

Information on any fault conditions are stored on the MIRAN card to provide a history file for the craftsperson. The file is in the form of a cyclical buffer, which is overwritten from the top when it runs out of space. It is configured to use memory resources efficiently.

The following fault conditions are stored in the history file to provide information for MIRAN maintenance tasks:

— memory resource problems

— unexpected removal of PCMCIA card

— encountering incorrect format files during upgrade (e.g. trying to upgrade application with a voice file or vice versa)

— record of card reset/card enable/disable card, with date- and time-stamp

— receipt of invalid Card LAN, DS-30 or CE-MUX messages

MIRAN fault isolation and correction

Fault clearing procedures for the MIRAN are the same as for other IPE cards; refer to *Meridian 1 fault clearing* (553-3001-510) for more information.

Table 30 deals specifically with MIRAN service problems. To diagnose these problems, the table refers you to the test procedures in this manual that will most likely be able to resolve these problems based on the symptoms these problems are exhibiting.

Table 30
MIRAN equipment problems

Symptoms	Diagnosis	Solution
Red card LED on the MIRAN is permanently on.	Card is disabled or faulty.	Go to *Procedure 1,* in this chapter to check the card status and perform self-test.
Display on the MIRAN card shows fault codes.	Card faulty, failed self-test or problem communicating with peripheral equipment.	Go to *Procedures 1* and *2* to check self-test and self-test on reset. Also refer to *Hex codes in Appendix A* for a list of error codes. Based on the maintenance display codes description, take the appropriate action and resolve the problem.
Error messages printed on the terminal or the Meridian 1 TTY.	Hardware or software problems with the MIRAN.	Note various error messages. Refer to *X11 input/output guide* (553-3001-400) for a list of these messages and their description. Based on the code's description, take the appropriate action to resolve the problem.

If you cannot resolve the problem after exhausting all available diagnostic tools and test procedures, make a list of all the symptoms you observed and contact your field service representative. Refer to Appendix A "Codes and interfaces" on page 177 to identify the HEX codes that indicate possible problems with the MIRAN.

Procedure 1

MIRAN self-test steps

1 The card will self-test.

2 Card LAN will poll the card.

3 If self-test passed, the card will send back "powered-up occurred" message.

4 Card LAN will request configuration data.

5 The card will return configuration data (card type, A07 signaling type, and TN mapping type 2).

6 Card LAN will enable the DS-30X signaling channel.

7 The MIRAN card will wait until it receives configuration data (trunk type, signaling type, balance impedance, etc.)via the DX-30X, but it will then discard this data.

8 The card will go into its main program loop.

Procedure 2
Reset MIRAN card command

1 Software will send a reset message to the card if no channels are busy.

2 The card will set all appropriate resources to disabled state and turn on the faceplate LED.

3 The MIRAN card will reset and self-test. Self-test results will be stored in case a later query is performed by the Meridian 1. Refer to hex codes in Appendix A.

4 Card LAN will poll the card.

5 If self-test passes, the card will send back a message: “power-up occurred”.

6 Card LAN will request configuration data.

7 The card will return configuration data (card type, A07 signaling type, and TN mapping type 2) and enable DS-30X link.

8 Card LAN will enable the DS-30X signaling channel

9 The card will wait until it receives download configuration data (trunk type, signaling type, balance impedance, etc.)via the DS-30X, but it will then discard this data.

10 The card will go to its main program loop.

MIRAN fault isolation using the menu system

Refer to “RAN Application: Terminal-based OA&M access” chapter in this manual for details on using the menu system. You will see the Main Menu when you access the terminal-based OA&M. Each option listed on the Main Menu leads to another task screen or submenu.

Main menu

To access the Main Menu, press the Enter key on your terminal. This OA&M screen presents the highest level of end-user maintenance access and provides all functions needed to configure, maintain, and upgrade the MIRAN card.

```
[10002345]                    MAIN MENU                    [NT_DISTRIB]

                1  RAN Administration.

                2  MIRAN Administration.

                3  Access other MIRAN Card.

                4  Maintenance and Diagnostics.



                9  Logoff.









Choose a Menu Option or 9 to Exit:
MIRAN[00]>
```

To troubleshoot the MIRAN using the menu system, select 4 in the Main Menu and press the Enter key to display the Maintenance and Diagnostics sub-menu.

```
[10002345]            -Maintenance and Diagnostics -          [NT_DISTRIB]

            1  System Information

            2  Password Change

            3  Warm Reboot

            4  Cold Reboot



            9  Back to Previous Menu ...



Choose a Menu Option or 9 to Exit:
MIRAN[00]>
```

Card replacement

The MIRAN is based on Flash EPROM technology. This allows you to remove the MIRAN from the IPE shelf indefinitely without loosing the configuration data.

To replace the MIRAN card:

1. Disable the MIRAN card by loading the LD 32 overlay and executing the **DISC l s c** command, where **l**= loop, **s**= shelf or module, **c**= card in the module.
2. Remove the card from its card slot in the IPE module.

3 Remove all PCMCIA cards from the faulty MIRAN card (i. e. the internal PCMCIA card and the PCMCIA cards installed into the MIRAN faceplate slots.

4 Transfer the Security Device from the faulty MIRAN to the replacement.

5 Transfer all PCMCIA cards to the new MIRAN card.

Note: This procedure moves all software, configuration, and records to the replacement MIRAN card.

6 Install the new MIRAN card into the IPE module card slot.

7 Enter the same keycode to enable the new MIRAN card.

8 Enable the new card by executing the **ENLC l s c** command.

9 Configure the newly installed MIRAN card.

10 Package the faulty MIRAN card and ship it to the repair center.

Appendix A: Codes and interfaces

This appendix describes a typical sound recording configuration, lists the Meridian Integrated RAN (MIRAN) hexadecimal codes that are displayed on the four-digit display on the MIRAN faceplate, and describes the external connectors and their pin assignments. The hex codes provides the status of the card during power-up and on the operational status when in service.

Sound recording configuration

The following is an example of a PC-based digital sound recording. Alternate configurations can be used that produce the 8kHz A-law or U-law PCM format output files required by the MIRAN either in .ULW or .WAV format.

Minimum PC requirements:

— 100MHz Pentium processor

— 32Mbytes of RAM

— 1Gbyte hard drive

— x4 CD ROM

— Windows 95

— Speakers

Recommended sound card:

Creative Labs AWE 32 Plug and Play audio card Model CT3601 (comes with the microphone)

PCMCIA drive:

DATABOOK ThinCard Drive Model TMB-240

Software:

GOLDWAVE sound editor.

> ***Note:*** When recording announcements, use the following recommendations. To remove sharp transitions at the boudaries of an announcement, add fade-in (from 0) at the start of the message and fade-out (to 0) at the end of message. Also one second of silence must be added to the beginning and to the end of each message.

When the internal RAM test, ALU test, address mode test, boot ROM test, timer test, or external RAM test fails, the MIRAN will go into a maintenance loop and no further processing will be possible. A failure message is displayed to indicate which test failed. The message changes to **F:xx** Example; if the timer test fails, F:05 is displayed.

MIRAN hexadecimal codes

T:00	Initialization
T:01	Testing Internal RAM
T:02	Testing ALU
T:03	Testing address modes
T:04	Testing Boot ROM
T:05	Testing timers
T:06	Testing watchdog timer
T:07	Testing external RAM
T:08	Testing Host DPRAM
T:09	Testing DS30 DPRAM
T:10	Testing security device
T:11	Testing Flash memory
T:12	Programming PCIFPGA

T:13	Programming DS30 FPGA
T:14	Programming CEMUX FPGA
T:15	Programming DSP FPGA
T16	Testing CEMUX interface
T:17	Testing EEPROM
T:18	Booting 486, waiting for response with self-test information
T:19	Waiting for application start-up message from 486
T:20	CardLan enabled, waiting for Request Config. Message
T:21	CardLan operational, A07 enabled under host control
T:22-99	Reserved for future diagnostic tests
RAnn	RAN application active and enabled for terminal OA&M (nn- MIRAN LAN card number 00-15).
RA-S	RAN application active with Set Based OA&M running. (Terminal is locked out until this clears)
W A:	Writing to A: drive. (Do not power down MIRAN or remove the drive).
W B:	Writing to B: drive. (Do not power down MIRAN or remove the drive)
W C:	Writing to C: drive. (Do not power down the MIRAN)
R A:	Reading from A: drive
R B:	Reading from B: drive
R C:	Reading from C: drive
UP00	Upgrade to onboard Flash has started (0% completed)
UPnn	Upgrade to onboard Flash in progress (nn% complete)

UPOK	Upgrade to onboard Flash successfully completed
UPF	Upgrade to onboard Flash failed.

When any other test fails including the EEPROM test, a message will be displayed for three seconds after the T:17 message to indicate the problem. If more than one test fails, the message displayed indicates the first fault.

MIRAN interface connectors

The interface connectors connect the MIRAN to the external equipment at the faceplate and the backplane or MDF connectors.

RS-232 ports and pinouts

Two serial ports are provided on the MIRAN board for maintenance functions. Access to both ports is over tip/ring pairs on the backplane. A permanently connected terminal should be connected at the backplane. Both ports are also accessible through the MIRAN faceplate mini-DIN connector for occasional OA&M and debugging purpose. Port B connects the terminal and port A connects to port B in a daisy-chain MIRAN configuration.

Table A-1 displays pinouts for the MIRAN faceplate mini-DIN connector.

Table A-1
Faceplate mini-DIN connector signals

Pin No.	Signal	Description
1	BDTRB-	Port B Data Terminal Ready
2	BSOUTB-	Port B Serial Data Out
3	BSINA-	Port B Serial Data In
4	SGRD	Signal Ground
5	BSINA-	Port A Serial Data In
6	BCTSA-	Port A Clear To Send
7	BSOUTA-	Port A Serial Data Out
8	BDTRA-	Port A Data Terminal Ready

Table A-2 lists the RS-232 connections at the I/O panel 50-pin connector. It lists the pins signal assignments, wire color code, and the description of the signals. Total distance from the MIRAN to the MDF and from the MDF to the terminal should not exceed 50 feet.

Table A-2
RS232 port pinouts and wire color code on the 50-pin connector

I/0 Panel 50-pin connector pin assignment and wire color code	MIRAN signal name	MIRAN signal description
16 (BL-Y)	Reserved	Future use
41 (Y-BL)	BDCDA-	Port A Data Carrier Detect
17 (O-Y)	BSINA-	Port A Serial Data In
42 (Y-O)	BSOUTA-	Port A Serial Data Out
18 (G-Y)	BDTRA-	Port A Data Terminal Ready
43 (Y-G)	SGRD	Signal Ground
19 (BR-Y)	BDSRA-	Port A Data Set Ready
44 (Y-BR)	BRTSA-	Port A Request to Send
20 (s-y)	BCTSA-	Port A Clear to Send
45 (Y-S)	BSINB-	Port B Serial Data In
21 (BL-V)	BSOUTB-	Port B Serial Data Out
46 (V-BL)	BDCDB-	Port B Data Carrier Detect
22 (O-V)	BDTRB-	Port B Data Terminal Ready
47 (V-O)	BDSRB-	Port B Data Set Ready

DID configuration for telephone set-based OA&M access

To configure the system for the telephone set-based OA&M access, you must configure the DID route and trunk route data block using LD 16, LD 14, and to configure the telephone set using LD 11.

Table A-2 lists the commands to configre the DID route.

Table A-3
DID route configuration example using LD 16 (Part 1 of 2)

Prompt	Response	Prompt	Response
TYPE	RDB	TIMR	IFC 256
CUST	0		OGF 512
ROUT	89-100		EOD 13952
TYPE	RDB		LCT 256
CUST	00-0		DSI 34944
DMOD			NRD 10112
ROUT	89-100		DDL 70
DES	Set Based		ODT 4096
TKTP	DID-DID		RGV 640
M911_ANI	NO		FLH 510
NPID_TBL_NUM	0		GTO 896
SAT	NO		GTI 0
RCLS	EXT		SFB 3
DTRK	NO		IENB 5
ISDN	NO		TPD 0
PTYP	ACO		AAD 384
AUTO	NO		MAD 500
DNIS	NO		VSS 0
IANI			VGD 6
ICOG	IAO	SST	5 0
RANX	NO	DTD	NO
SRCH	LIN	SCDT	NO
TRMB	YES	2 DT	NO
STEP		NEDC	ETH
ACOD	89	FEDC	ETH
TARG	01	CPDC	NO
BILM	NO	DLTN	NO
OABS		HOLD	02 02 40
JDGT	4	SEIZ	02 02
INST		SVFL	02 02
IDC	NO	OPCB	NO
DCNO	0	DDO	NO
NDNO	0	DRNG	NO
DEXT	NO	BTUA	NO
MFC	NO	CDR	NO

Table A-3
DID route configuration example using LD 16 (Part 2 of 2)

Prompt	Response	Prompt	Response
CCD	NO	OHTD	NO
NATL	YES	PLEV	2
SSL		OPR	NO
CFWR	NO	PRDL	YES
IDOP	NO	EOS	NO
VRAT	NO	DNSZ	0
MUS	NO	RCAL	NO
MR	NO	MCTS	NO
PANS	YES	ALRM	NO
RUCS	0	BTT	30
EQAR	NO	ACKW	NO
FRL	0 0	ART	0
FRL	1 0	PECL	NO
FRL	2 0	DCTI	0
FRL	3 0	TIDY	89 89
FRL	4 0	SGRP	0
FRL	5 0	CCB	NO
FRL	6 0	CCBA	NO
FRL	7 0	CAC	3
OHQ	NO	ANDN	
OHQT	00	AACR	NO
TTEL	0		

Table A-4
DID configuration example

DID trunk configuration using LD 14		**Set configuration using LD 11**	
Prompt	**Response**	**Prompt**	**Response**
TYPE	DID	TYPE	2616
TN	3 7	TN	9 0
DATE		DATE	
DES		DES	VPS
TN	003 0 00 07	TN	009 0 00 00
TYPE	DID	TYPE	2616
CDEN	8D	CDRN	8D
CUST	0	CUST	0
XTRK	EXUT	AOM	0
FWTM	NO	FDN	
TRK	ANLG	TGAR	0
NCOS	0	LDN	NO
RTMB	89 1	NCOS	0
NITE		SGRP	0
SIGL	LDR	RNPG	0
STRI/STRO	IMM IMM	SCI	0
SUPN	NO	SSU	
CLS	UNR DTN ...	XLST	
TKID		SCPW	
DTCR	NO	SFLT	NO
DATE	27 Jan 97	CAC	3
		CLS	UNR ...
		CPND_LANG	ENG
		HUNT	
		PLEV	02
		AST	
		IAPG	0
		AACS	NO
		ITNA	NO
		DGRP	
		MLWU_LANG	0
		DNDR	0
		KEY 00 SCR	1700 0 MARP

Analog ports and pinouts

The MIRAN supports two analog input ports in order to connect external sources for recording messages and/or music, or, alternatively, to provide two analog channels that can be mapped into up to eight logical RAN units.

The 3.5 mm Audio jack provides access to a single analog input and a single analog output. On the backplane, however, two analog inputs and two analog outputs are available for backing up stored messages onto audio cassette tape or, alternatively, for connecting to an external paging amplifier.

Table A-5 lists the 50-pin I/O panel connector pins and their signal assignment for the analog ports.

Table A-5
Analog port backplane signals

I/0 Panel 50-pin connector pin assignment and wire color code	MIRAN signal name	MIRAN signal description
5 (S-W)	AGND	Analog Ground
30 (W-S)	AGND	Analog Ground
7 (O-R)	AIN0	Analog In, Port 0
32 (R-O)	AIN1	Analog In, Port 1
9 (BR-R)	AGND	Analog Ground
34 (R-BR)	AGND	Analog Ground

Note: Cross-connect audio pairs can be used to connect to external recording devices for the purpose of backing up announcements to a tape.

MIRAN cross-connect channels

The MIRAN supports two cross-connect channels to provide connection to callers on multiple incoming lines.

Table A-6 lists the 50-pin I/O panel connector pin assignments for the MIRAN cross-connect channels.

Table A-6
MIRAN cross-connect port MDF signals

25-pair pinout and color code	Signal	Description
1 (BL-W)	RANAR0	Port 0 Audio RING
26 (W-BL)	RANAT0	Port 0 Audio TIP
2 (O-W)	RANB0	Port 0 Signaling RING to Port 0 busy (GRD)
3 (G-W)	RANAR1	Port 1 Audio RING
28 (W-G)	RANAT1	Port 1 Audio TIP
4 (BR-W)	RANB1	Port 1 Signaling RING to Port 1 busy (GRD)

MIRAN faceplate to modem cabling

Table A-7
NTAG81CA/DA modem cable RS-232 pinouts

Signal name	9-pin male (MIRAN side) Pin No.	25-pin male (Modem side) Pin No.
TX	2	2
RX	3	3
DTR	4	20
GRN	5	7

I/O panel to modem cable

Table A-8
I/O panel connector to modem cable pinouts

Signal name	50-pin I/O panel parallel connector Pin No.	25-pin male (RS-232) (Modem side) Pin No.
TX	21	2
RX	45	3
DTR	22	20
GRN	43	7

Modem setup

To setup the modem, use a terminal connected to the modem. Set up the terminal for 9600 bps, 8 bits, 1 start, 1 stop, and no parity.

1 Setting the modem to auto answer

- Connect the terminal to the modem
- Type “AT” for a Hayes compatible modem. If the modem is connected properly, it will reply “OK”.
- Type “ATS0=1”
- Type “AT&W0” to save the settings.

2 Disable result codes.

- Type “AT” for a Hayes compatible modem. If the modem is connected properly, it will reply “OK”.
- Type “ATQ1”
- Type “AT&W0” to save the settings.

3 Connect the modem to MIRAN using one of the cable configuration tabulated above.

Appendix B: Product integrity

This chapter presents information about MIRAN reliability, environmental specifications, and electrical regulatory standards.

Reliability

Reliability is measured by the Failure Rate (in FITS), Mean Time Between Failures (MTBF), and the Return Rate.

— **Failure Rate (FITS) -** predicted failure rate per billion hours of operation is 1168.

— **Mean Time Between Failures (MTBF) -** expected mean hours of operation between failures is 98 years.

— **Return Rate (% per year)** - expected return rate per year for the first 2 years is 1% per year.

Environment specifications

This describes the operating and storage temperature ranges and humidity for MIRAN. The ideal operating temperature is obtained when the environmental temperature is regulated using air-conditioning, however MIRAN is design to operate in the standard telephony equipment accepted temperature and humidity ranges.

Table B-1 displays acceptable temperature and humidity ranges for the MIRAN card.

Table B-1
Temperature-related specifications

Specification	Minimum	Maximum
Normal Operation		
Recommended	15° C	30° C
Relative humidity	20%	30% (non-condensing)
Absolute	10 ° C	45° C
Relative humidity	20% to	80% (non-condensing)
Rate of change	Less than 1° C per 3 minutes	
Storage		
Long Term	–20° C	60° C
Relative Humidity	5%	95% (non-condensing
	-40° C to 70° C, non-condensing	
Short Term (less than 72 hr)	–40° C	70° C
Temperature Shock		
In 3 minutes	-40° C	25° C
In 3 minutes	70° C	25° C
	-40° to 70° C, non-condensing	

Electrical regulatory standards

The following three tables list the safety and electro-magnetic compatibility regulatory standards for the MIRAN, listed by geographic region. Specifications for the MIRAN meet or exceed the standards listed in these regulations.

Safety

Table B-2 provides a list of safety regulations met by the MIRAN, along with the type of regulation and the country/region covered by each regulation.

Table B-2
Safety regulations

Regulation Identifier	Regulatory Agency
UL 1459	Safety, United States, CALA
CSA 22.2 225	Safety, Canada
EN 41003	Safety, International Telecom
EN 70950/IEC 950	Safety, International
BAKOM SR 784.103.12/4.1/1	EMC/Safety (Switzerland)
AS3260, TS001 - TS004, TS006	Safety/Network (Australia)
JATE	Safety/Network (Japan)

Electro-magnetic compatibility (EMC)

Table B-3 lists electro-magnetic emissions regulations met by the MIRAN, along with the country's standard that lists each regulation.

Table B-3
Electro-Magnetic Emissions

Regulation Identifier	Regulatory Agency
FCC part 15 Class A	United States Radiated Emissions
CSA C108.8	Canada Radiated Emissions
EN50081-1	European Community Generic Emission Standard
EN55022/CISPR 22 CLASS B	Radiated Emissions (Basic Std.)
BAKOM SR 784.103.12/4.1/1	EMC/Safety (Switzerland)
SS-447-20-22	Sweden EMC standard
AS/NZS 3548	EMC (Australia/New Zealand)
NFC 98020	France EMC standard

Table B-4 lists electro-magnetic immunity regulations met by the MIRAN, along with the country's standard that lists each regulation.

Table B-4
Electro-Magnetic Immunity

Regulation Identifier	Regulatory Agency
CISPR 22 Sec. 20 Class B	I/O conducted noise
IEC 801-2 (level 4)	ESD (Basic Standard)
IEC 801-3 (level 2)	Radiated Immunity (Basic Standard)
IEC 801-4 (level 3)	Fast transient/Burst Immunity (Basic Standard)
IEC 801-5 (level 4, preliminary)	Surge Immunity (Basic Standard)
IEC 801-6 (preliminary)	Conducted Disturbances (Basic Standard)
BAKOM SR 784.103.12/4.1/1	EMC/Safety (Switzerland)
SS-447-20-22	Sweden EMC standard
AS/NZS 3548l	EMC (Australia/New Zealand)
NFC 98020	France EMC standard

List of Terms

ALU

Arithmetic Logic Unit.

API

Application Programming Interface. High level language software used as components in the development of an application. Also, graphics routines that perform basic graphics tasks or other functions when called by high-level application programs.

ASIC

Application-Specific Integrated Circuit. A microprocessor chip designed to do specific tasks; providing graphics capability is one such task.

ATA

AT Attachment interface. Normally used to refer to the PCMCIA version of the IDE disk drive interface found in a PC. For MIRAN, standard ATA based cards are required instead of the simpler memory based cards. The later are lower cost but require custom driver software both at the PC and MIRAN.

AUI

Autonomous/Attachment User Interface. Refers to the 15-pin, D-type connector and cables used to connect single- and multiple-channel equipment in an Ethernet transceiver.

BIOS

Basic Input/Output System. A set of permanently stored program outlines in buffers that allow software to interact with hardware components (e.g., keyboard) in a device-independent manner.

Boundary scan

Test methodology for integrated circuits that provides visibility and control of on-chip logic.

Card option

Low-end Meridian Mail platform that is packaged in the same cabinet with the Meridian 1/Option 11 switch.

CD-Rom

Compact Disk Read-Only Memory

CE-MUX

Common Equipment bus with MUltipleXed address and data.

CPE

Customer Premise Equipment. Equipment that resides on a customer's premises and is controlled by the customer as opposed to the Central Office

CPU

Central Processing Unit. A chip that performs logic, control, and arithmetic functions. The part of the switch that performs these functions and any others needed to carry out call processing.

DIN

A German manufacturer of electronic devices for interconnection and other purposes.

DS-30X

Parallel serial transmission from a superloop (XNET) card to a Controller Card in an IPE shelf.

DRAM

Dynamic Random Access Memory. A type of semi-conductor memory that is characterized by its high density (smaller packages for a given amount of memory). It typically has slower access time as compared with SRAM and requires external memory refresh circuitry.

DSP

Digital Signal Processing. A specialized computer chip that performs speedy and complex operations on digitized waveforms. Useful in processing sound and video.

DTMF

Dual Tone Multi-Frequency. A term describing push-button or touch-tone dialing.

EIDE

Enhanced IDE (see IDE below). This feature provides a significant improvement in performance over the standard IDE; it is comparable to standard SCSI in terms of throughput.

EMC

Electro-Magnetic Compatibility. Refers to equipment units that are collectively performing each of their functions without causing or suffering unacceptable degradation due to electromagnetic interference from other equipment/systems in the same environment.

EMI

(ElectroMagnetic Interference) - Unwanted electromagnetic coupling, such as a ham radio heard on an electric organ or church music heard in hearing aids. Also known as "static".

EPLD

Erasable Programmable Logic Device. An electronic device for performing logical operations that can easily be erased and reprogrammed.

ESS

Environmental Stress Screening

EST

Environmental Stress Testing.

EXUT

Enhanced Universal Trunk card. See *XUT*.

Field programmable

A program to which changes can be made while it is installed.

Firmware

Hardwired logic, software, data, and programming instructions such as that stored by threading wires through ferrite cores. May also refer to software programmed in the factory or burnt in the field, and is semipermanently stored within ROM.

Flash memory

Electrically erasable memory that is non-volatile (not affected by power disruptions).

FPGA

Field Programmable Gate Array.

Gate array

A circuit consisting of an array of logic gates (network nodes) aligned on a substrate (piece of silicon) in a regular pattern.

IDE

Integrated Drive Electronics. A low-cost hard disk drive interface.

IPE

Intelligent Peripheral Equipment - A range of cards that contain micro-processors that provide off-loading of the CPU function and the flexibility to make changes to the system's parameters without revising the hardware.

ISA

Industry Standard Architecture. A particular type of bus architecture on an IBM-DOS motherboard.

IVR

Interactive Voice Response. An application that allows telephone callers to interact with a host computer via pre-recorded messages and prompts.

Kernel

That part of a computer's operating system that performs basic functions like switching between tasks.

LCA

Logic Cell Array) - A Xilinx product that is a form of Field Programmable Gate Array. See *FPGA.*

Loader

A device that moves a program or data from a floppy or hard disk and stores it into a computer's RAM memory.

MAU

Media Access Unit. A device used to allow connection of the Ethernet AUI signals on MIRAN to an external LAN.

MDS

Modular Documentation System

MINT

Message INTerrupt. This occurs when a message being transmitted receives an interrupt signal from an outside device, which must process a task of its own. Then the transmission of the original message can resume, or be resent.

M1

Meridian 1 switch.

Mmail

Meridian Mail. Nortel’s proprietary voice processing platform.

MOH

Music On Hold. Refers to telephony equipment, supplied by a Nortel switch via one or more trunk cards, to provide recorded music or radio to each caller on hold until the called party becomes available.

MTBF

Mean Time Between Failure. A measure of reliability: the time that a user may reasonably expect a device or system to work before an incapacitating fault occurs. Also, the average number of hours between one random failure and the next under stated conditions.

MTTR

Mean Time To Repair. The average time required for corrective maintenance.

NTP

Northern Telecom Publications; customer documentation. Each NTP is identified by a unique ten-digit publication number.

OA&M

Operations, Administration, and Maintenance

OEM

Original Equipment Manufacturers

PAS

Product Administration System.

PBX

Private Branch eXchange. A telephony switch that is privately owned.

PCB

Printed Circuit Board.

PCI

Peripheral Component Interconnect. An Intel device that enables high performance in an interface between a CPU bus and a peripheral device. A high-speed PC local expansion bus, capable of interconnecting ICs and plug-in boards to the hose processor.

PCM

Pulse Code Modulation. A method for encoding an analog voice signal into a digital bit stream.

PCMCIA

Personal Computer Memory Card International Association. This organization has defined a credit card sized plug-in board for use in PCs. These cards are the only way to get to a laptop bus without using a docking station. In addition, application software can be stored on the card into system address space so that the software can run directly from the car, resulting in a faster start and less memory required from the host computer.

PRS

Problem Reporting System. A procedure followed by Nortel when customers (internal or external) find an error and file a Problem Report form with a committee that manages the PR System. The committee determines who should receive the report, and then this individual or team must "clear the PR" by describing or demonstrating how the problem was addressed.

RAN

Recorded ANnouncement trunks - A trunk that provides a link between the PBX and a recorded announcement device, used to provided recorded information to callers.

RTC

Real Time Clock. System clocking influenced/determined by connection to a time process external to processing by the system.

SBC

Sub-Band Coding. Algorithm used by Meridian Mail for compressing speech data down to just over a quarter of its original size.

Scalable architecture

A way of designing a system that allows it to be resized with relative ease; the cost required to increase its size in proportion to the new size.

SDI

Serial Data Interface. For some Meridian switches, provides ports between the CPU and external devices like a teletype or maintenance telephone. More generally, an SDI is a mechanism for changing the parallel arrangement of data within computers to the serial form used on transmission lines, and vice versa.

SL-1

Generic term given to Nortel digital switches. Meridian 1 refers specifically to the current series of Nortel PBX’s

SMP

System Management Project/Product. An OA&M GUI interface to Nortel switches now being developed.

STA

Single Terminal Access.

VxWorks

Wind River RTOS (Real Time Operating System). See RTOS.

.WAV

File format used for storing voice files created under Microsoft Windows.

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Meridian 1

Meridian Integrated RAN

Description, installation, and operation

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