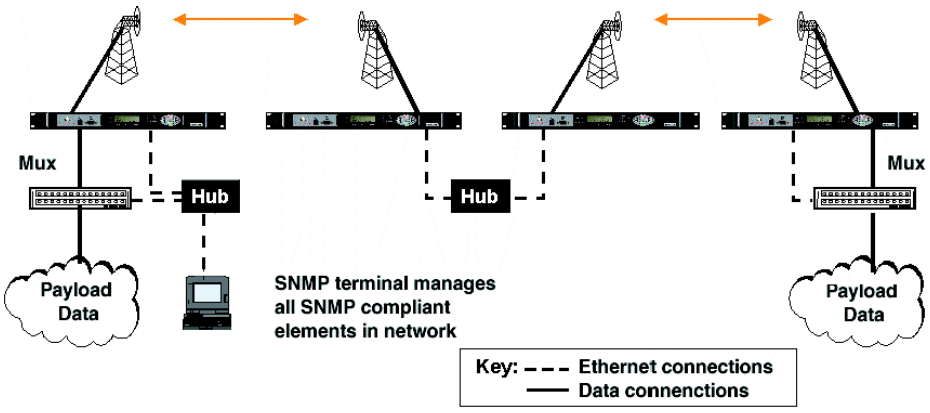
LEDR SNMP Handbook



Simple Network Management Protocol for use with LEDR Microwave Radios

MDS 05-3532A01, Rev. B
NOVEMBER 2000

Microwave Data Systems Inc.

Installation and Operation Guide

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1.0 INTRODUCTION

The LEDR Radio's Network Management System (NMS) allows configuration, performance monitoring, fault diagnosis and security administration of the entire LEDR Radio network and Simple Network Management Protocol (SNMP) compatible peripherals.

2.0 MANAGING THE LEDR RADIO

There are a number of ways to manage the LEDR Radio offering differing levels of management to satisfy the requirements of a variety of users.

This guide focuses mainly on the most comprehensive management method, SNMP. An extensive custom SNMP Management Information Base (MIB) is provided to allow network or element management by users who require detailed management of their entire network.

2.1 SNMP

SNMP NMS is the best option for users requiring detailed element management that operates over the entire radio network. The LEDR Radio contains greater than 250 custom SNMP manageable objects as well as the IETF standard RFC1213 for protocol statistics, also known as MIB II.

Off the shelf SNMP managers such as Castle Rock Computing SNMPc™ and HP OpenView may be used to access the LEDR Radio's SNMP Management Information Base (MIB) to manage the LEDR Radio. Using industry standard SNMP managers allows seamless integration of the LEDR network within existing networks.

NOTE: Refer to the documentation that accompanied your particular SNMP management software for installation and startup information.

Through integral IP routing, the LEDR Radio's in-band, non-payload service channel allows any SNMP Manager to manage all SNMP compliant network elements via a single interconnected management terminal placed anywhere in the network (see Figure 1). Refer to the LEDR radio user's guide for IP setup information.

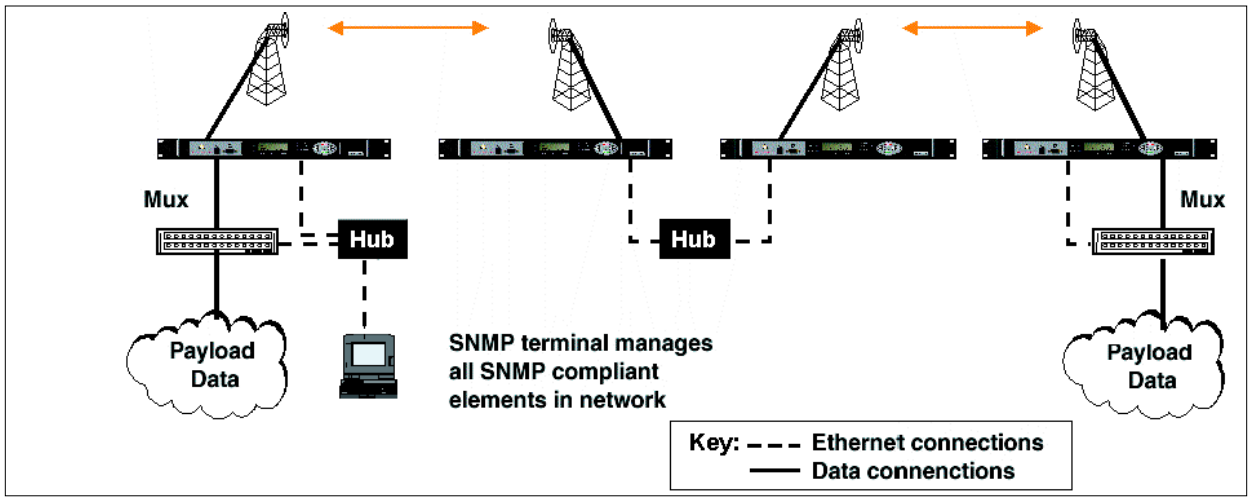

Figure 1. LEDR Radio SNMP Connectivity

2.2 Other Management Methods

In addition to SNMP, the LEDR Radio supports three complementary user interfaces to allow for varying degrees of element management:

- Front panel
- Telnet
- Local and remote element management via the console serial port

Front Panel

For simple local management, technicians and field personnel can use the front panel of the LEDR Radio. The front panel's six LEDs provide simple fault management. The LCD display and a 4-key keypad provide the ability to set and review parameters. The front panel menus provide access to typical management parameters. Users may login and control configurable parameters such as frequency, power output level, and modem characteristics, and may also monitor receive signal levels, signal-to-noise ratio, bit error rate, etc.

Also included at the front panel is a simple menu for the basic link parameters of remote radios. For example, users may request the received signal level from any radio in the LEDR Radio network.

Refer to the LEDR Radio user's guide for more information about the front panel.

Telnet

By connecting through a LAN, hub, or direct ethernet crossover cable, any Telnet application can connect to an LEDR Radio using the Telnet and IP protocols. Once connected, users may manage the remote device through its ASCII Console port interface as though connected directly to the radio.

Local and Remote Element Management

Using a VT-100 terminal or PC terminal emulator that connects via industry standard RS-232 to the LEDR Radio's Console port, users may operate the Console interface to quickly configure a system, monitor radio and link performance, or troubleshoot problems.

For detailed local management, users can operate the radio's Console port to manage, configure, control and monitor a local radio. The LEDR Radio Console interface is an ASCII based protocol with many simple commands and a menu system for more frequently used manageable parameters.

The Console port may also be used for remote element management purposes. By using remote login capability (**rlogin**), users may log into any radio in the network and manage the remote device.

Internet Protocol (IP) Considerations

The LEDR radio must have its IP address, netmask, gateway and port configured properly to communicate using SNMP. Also, for radios and other customer equipment not directly connected via ethernet, the IP routing must be properly configured on the LEDR radios as well as the SNMP Manager. Refer to the LEDR radio Installation & Operation Guide and the appropriate PC or Unix manual for IP routing information.

3.0 LEDR MIB

The LEDR MIB contains more than 250 SNMP manageable objects. It is physically broken up into five MIB files as follows:

- ledrroot.mib. This MIB file identifies the root of the MIB structure relative to the structure defined by the Internet Assigned Numbers Authority (IANA).
- commonledr.mib. This MIB file contains all objects that are common to all radios in the LEDR family.
- ledrsubrate.mib. This MIB file contains all objects that are specific to the subrate EIA-530 versions of the LEDR family.
- ledrframede1t1.mib. This MIB file contains all objects that are specific to the versions of the LEDR radio that contain fractional T1, full-rate E1, or fractional E1 interfaces.
- ledrredundant.mib. This mib file contains all objects specific to the protected or redundant versions of the LEDR radio.

These mib files *must* be included into the SNMP manager in the preceding order.

3.1 LEDR MIB Organization

Each object of the logical LEDR MIB is organized within the physical mib files. The tables of the following sections detail the objects, their descriptions and any value restrictions.

Common Objects

The common objects of the LEDR MIB fall into the following general categories within the commonledr.mib file.

- Performance Management Objects
- Configuration Management Objects
- Fault Management Objects
- Security Management Objects
- Alarm Contacts

Subrate EIA-530 Objects

The subrate EIA-530 interface objects of the LEDR MIB fall into the following categories within the ledrsubrate.mib file:

- G.821 Link Performance Management Objects
- EIA-530 Loopback Modes

Framed E1 and T1 objects

The framed (full-rate E1, fractional T1 and fractional E1) objects of the LEDR MIB fall into the following categories within the ledrframede1t1.mib file:

- Channel Provisioning
- Framed Clock Modes
- Line Configuration
- Framed Loopback Modes
- Channel and Frame Fault Management

Redundant or Protected Objects

The redundant or protected objects of the LEDR MIB fall into a single category within the ledrredundant.mib file for configuring and monitoring the redundant LEDR Radio system.

TRAP Objects

The trap objects are the asynchronous objects sent from the LEDR Radio to trap managers to notify that some event has taken place on a radio or on the link. Trap objects are selectable as SNMPv1 (version 1) or SNMPv2 (version 2). The objects are grouped as follows:

- SNMPv1 Traps
- SNMPv2 Traps

4.0 LEDR COMMON MIB OBJECTS

4.1 Common Performance Management Objects

Performance Management Objects are divided into the following categories:

- ledrPerformance
- ledrModem
- ledrG821

ledrPerformance

The following table lists ledrPerformance objects. Refer to the descriptions that follow the table for additional information about each object.

Table 1. ledrPerformance Objects

Object	Description	Reference
Receive Signal Strength	The signal strength of the addressed radio	Page 5
Signal to Noise Ratio	The signal to Noise ratio of the addressed radio	Page 5
Transmit Power Out	The power output level of the addressed radio	Page 5
Internal Temperature	The internal temperature of the addressed radio	Page 5

ledrRSSI This read-only object displays the received signal strength indication in dBm.

ledrSnr This read-only object displays the signal-to-noise ratio of the received signal in dB. The signal-to-noise ratio is an indication of the quality of the received signal. The higher the number, the higher the quality of the received signal.

ledrTxPowerOut This read-write object displays and sets the power output level of the addressed radio in dBm. For example, 29 dBm is set and displayed as **29**.

ledrInternalTemp This read-only object displays the internal temperature at the power amplifier of the addressed radio in degrees Celsius.

ledrModem

The following table lists ledrModem objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 2. ledrModem Objects

Object	Description	Reference
Demodulator Acquisition	Determines whether or not the LEDR modem has acquired a signal and is locked	Page 6
Pre FEC Errors	An estimated count of the raw bit errors on the link	Page 6
Pre FEC Bit Error Rate	An estimation of the uncorrected bit error rate on the link	Page 6
Post FEC Errors	A estimated count of the uncorrectable bit errors on the link after the Forward Error Correction has been decoded	Page 6
Post FEC Bit Error Rate	An estimation of the corrected bit error rate on the link	Page 6

Table 2. ledrModem Objects *(Continued)*

Object	Description	Reference
Demodulator Frequency Offset	The difference between carrier frequencies of the modulator and the demodulator	Page 6
Clear Specified FEC Count	This object is used to clear the FEC counts	Page 6

ledrDemodAcquisition This read-only object displays the signal acquisition state of the modem:

- acquired (1) – the modem is locked
- not acquired (0) – the modem is unlocked

ledrPreFECerrors This read-only object displays an estimated count of the raw bit errors on the link prior to the Forward Error Correction (FEC).

ledrPreFECBer This read-only object displays an estimation of the uncorrected bit error rate on the link based on the counted raw bit errors.

ledrPostFECerrors This read-only object displays an estimated count of the uncorrectable bit errors on the link after the Forward Error Correction has been decoded.

ledrPostFECBer This read-only object displays an estimation of the corrected bit error rate on the link based on the counted bit errors after the forward error correction has been applied.

ledrFreqOffset This read-only object displays the frequency difference between the modulator and demodulator. It is read directly from the modem and displayed in Hertz.

ledrClearFEC This object is used to clear the correctable and uncorrectable FEC counters as detailed below:

- clearFecCorrectableBytes(1)
- clearFecUnCorrectableBlocks(2)

4.2 Common Configuration Management Objects

Configuration Management Objects are divided into the following categories:

- ledrUnitID
- ledrLoopbackTimeout
- ledrLineInterface
- ledrConfiguration
- ledrServiceChannel
- ledrGeneral
- ledrFirmware
- ledrConfigFile

ledrUnitID

The ledrUnitID object is a simple object that contains the Unit ID of the addressed LEDR Radio. It is used for service channel identification and routing.

ledrLoopbackTimeout

The ledrLoopbackTimeout object is the timeout period for the loopback modes specified in minutes. If this value is set to zero (0), the loopback will not timeout. The maximum timeout period is 30 minutes.

ledrLineInterface

The ledrLineInterface object corresponds to the interface of the radio. It may have the following values:

- lineEIA530 (0) - The radio interface is EIA-530
- lineT1 (1) - The radio interface is fractional T1
- lineE1 (2) - The radio interface is full-rate E1

ledrConfiguration

The following table lists ledrConfiguration objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 3. ledrConfiguration Objects

Object	Description	Reference
Payload Table	The table which contains the dataRate, modulation type and minimum channel bandwidth	Page 8
Data Rate	The effective data rate at which payload data is transported across the link	Page 8
Modulation Type	The modulation scheme used to transport data and the raw service channel data	Page 8
Minimum Bandwidth	The minimum installed filter bandwidth in the radio	Page 8
Payload Active	A flag used to indicate which given data rate/modulation type combination is presently active	Page 8
Receive Frequency	The receive frequency of the addressed radio	Page 8
Transmit Frequency	The transmit frequency of the addressed radio	Page 8
Transmit Key	The transmit keyline enable of the addressed radio	Page 8
Minimum Transmit Frequency	Defines the minimum transmit frequency limit of the LEDR Radio.	Page 8
Maximum Transmit Frequency	Defines the maximum transmit frequency limit of the LEDR Radio.	Page 8
Minimum Receive Frequency	Defines the minimum receive frequency limit of the LEDR Radio.	Page 9
Maximum Receive Frequency	Defines the maximum receive frequency limit of the LEDR Radio.	Page 9
EIA 530 Clock Mode	Defines the clocking for the EIA-530 interface	Page 9

ledrPayloadChannel Table This non-accessible table contains the valid combinations of data rate, modulation type and minimum valid bandwidth.

ledrDataRate This read-only object displays the effective data rate at which payload data is transported across the link.

- rate64K (0) – 64 kbps
- rate128K (1) – 128 kbps
- rate256K (2) – 256 kbps
- rate384K (3) – 384 kbps
- rate512K (4) – 512 kbps
- rate768K (5) – 768 kbps
- rateE1 (6) – 1 x E1
- rate2E1 (7) – 2 x E1
- rate4E1 (8) – 4 x E1

ledrModulationType This read-only object corresponds to the modulation scheme used to transport the payload data and the raw service channel data:

- modQpsk (0) – QPSK
- mod16Qam (1) – 16 QAM
- mod32Qam (2) – 32 QAM
- mod64Qam (3) – 64 QAM

ledrMinBandwidth This non-accessible object corresponds to the minimum bandwidth filter necessary for a desired modulation/data rate:

- bw25KHz (1) – 25 kHz, Sub-Rate
- bw50KHz (2) – 50 kHz, Sub-Rate
- bw100KHz (3) – 100 kHz, Sub-Rate
- bw200KHz (4) – 200 kHz, Sub-Rate
- bw500KHz (5) – 500 kHz, Full-Rate
- bw1MHz (6) – 1 MHz, Full-Rate
- bw2MHz (7) – 2 MHz, Full-Rate

ledrPayloadActive This read-write object displays and sets a data rate/modulation type combination. Enabling a given combination disables the previous combination.

ledrReceiveFrequency This read-write object displays and sets the receive frequency of the addressed radio in Hz.

ledrTransmitFrequency This read-write object displays and sets the transmit frequency of the addressed radio in Hz.

ledrTransmitKey This read-write object displays and sets the transmit keyline enable of the addressed radio:

- The radio is actively transmitting (2)
- The radio is only receiving (1)

ledrMinTxFrequency This read-write object displays and sets the minimum transmit frequency limit of the LEDR Radio. Frequencies below this limit are not allowed.

ledrMaxTxFrequency This read-write object displays and sets the maximum transmit frequency limit of the LEDR Radio. Frequencies above this limit are not allowed.

ledrMinRxFrequency This read-write object displays and sets the minimum receive frequency limit of the LEDR Radio. Frequencies below this limit are not allowed.

ledrMaxRxFrequency This read-write object displays and sets the maximum receive frequency limit of the LEDR Radio. Frequencies above this limit are not allowed.

ledrEia530Clockmode This read-write object displays and sets the clocking for the EIA-530 interface of the sub-rate radio. It must be one of the following:

- internal (1) – Internal Tx, Recovered Rx
- external (2) – External Tx, Recovered Rx
- looped (3) – Tx locked to recovered Rx
- externalDCE (4) – External Tx, External Rx

ledrServiceChannel

The following table lists ledrServiceChannel objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 4. ledrServiceChannel Objects

Object	Description	Reference
Service Channel Character Size	Corresponds to the character size of the customer service channel	Page 9
Service Channel Parity	Corresponds to the parity of the customer service channel	Page 9
Service Channel Stop Bits	Corresponds to the number of stop bits of the customer service channel	Page 9
Service Channel Data Rate	Corresponds to the asynchronous data rate of the customer service channel	Page 9

ledrScCharacterSize This read-write object displays and sets the character size of the customer service channel:

- char8bits (1) – 8 bit character
- char7bits (2) – 7 bit character
- char6bits (3) – 6 bit character
- char5bits (4) – 5 bit character

ledrScParity This read-write object displays and sets the parity of the customer service channel:

- parityNone (1) – parity = None
- parityEven (2) – parity = Even
- parityOdd (3) – parity = Odd

ledrScStopBits This read-write object displays and sets the number of stop bits of the customer service channel:

- stopBits1 (1) – Stop Bits = 1
- stopBits15 (2) – Stop Bits = 1.5
- stopBits2 (3) – Stop Bits = 2

ledrScDataRate This read-write object displays and sets the asynchronous data rate of the customer service channel:

- rate9600 (1) – 9600 bps
- rate4800 (2) – 4800 bps
- rate2400 (3) – 2400 bps

- rate1200 (4) – 1200 bps
- rate600 (5) – 600 bps
- rate300 (6) – 300 bps

ledrGeneral

The following table lists ledrGeneral objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 5. ledrGeneral Objects

Object	Description	Reference
Model Number	The model number of the LEDR Radio	Page 10
Options ID	Identifies the type of options installed into the radio	Page 10
Owner String	A text field which may be used to define the radio location, radio type, or similar information	Page 10
Software Revision	Corresponds to the revision of the software of the LEDR Radio	Page 10
Serial Number	Corresponds to the Serial Number of the LEDR Radio	Page 10
Date	Corresponds to the date of the LEDR Radio in the programmed format	Page 10
Date Format	Corresponds to the date format of the LEDR Radio	Page 10
Time	Corresponds to the current time in 24 hour format	Page 11

ledrModelNumber This read-only object displays the model number of the LEDR Radio:

- mds400S (1) – 400 MHz, Sub-Rate
- mds400F (2) – 400 MHz, Full-Rate
- mds900S (3) – 900 MHz, Sub-Rate
- mds900F (4) – 900 MHz, Full-Rate
- mds1400S (5) – 1400 MHz, Sub-Rate
- mds1400F (6) – 1400 MHz, Full-Rate

ledrOptionsIdentifier This read-only object displays the type of options installed in the radio.

ledrOwnerString This read-write object displays and sets a text field, up to a maximum of 10 characters, that may be used to define the radio location, radio type, or similar information.

ledrSoftwareRev This read-only object displays the revision number of the software loaded on the LEDR Radio.

ledrSerialNumber This read-only object displays the serial number of the LEDR Radio.

ledrDate This read-write object displays and sets the date of the radio's internal real-time clock in the chosen format. The radio's real-time clock operates from an internal lithium battery so it is running even if the radio has no power applied.

The real-time clock is fully compliant with year 2000 standards.

ledrDateFormat This read-write object displays and sets the date format of the radio:

- US format (0) – [MM/DD/YYYY]
- European format (1) – [DD/MM/YYYY]
- Generic format (2) – [DD-Mon-YYYY]

ledrTime This read-write object displays and sets the time of the radio's internal real-time clock in the **[HH:MM[:SS]** 24 hour format. The radio's real-time clock operates from an internal lithium battery so it is running even if the radio has no power applied.

The real-time clock is fully compliant with year 2000 standards.

ledrFirmware

The following table lists ledrFirmware objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 6. ledrFirmware Objects

Object	Description	Reference
Firmware Program Table	A table which contains the objects of the embedded firmware to be programmed into the radio	Page 11
Reprogram Firmware TFTP Server IP	The address of the TFTP server from which the specified packed binary file is retrieved	Page 11
Reprogram Firmware Program Filename	The name of the packed binary file that is used to reprogram the radio	Page 11
Reprogram Firmware Start Programming	Erases and reprograms the radio firmware image	Page 11
Firmware Re-boot	Boots the radio from the desired image	Page 11

ledrFWProgTable A table node that contains the objects for the retrieval and programming of the embedded firmware of the radio.

ledrTftpServerIP This read-write object sets the IP address of the TFTP Server from which the specified packed binary file is retrieved.

ledrProgFilename This read-write object sets the name of the packed binary file that reprograms the radio. The filename must be specified as the path relative to the root path set on the TFTP server.

ledrStartProgramming This read-write object erases and reprograms the radio firmware image that is not active.

ledrBootFlashImage This read-write object boots the radio and executes a specified image in the flash EPROM:

- flashImage1 (1)
- flashImage2 (2)

ledrVersion

The following table lists ledrVersion objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 7. ledrFirmware Objects

Object	Description	Reference
SNMP Trap version	Version of SNMP traps currently active	page 12
Image 1 Application Firmware Version	Version information for the application firmware resident in the image 1 area of ROM	page 12
Image 1 DSP Firmware Version	Version information for the DSP firmware resident in the image 1 area of ROM	page 12
Image 1 FPGA Firmware Version	Version information for the FPGA firmware resident in the image 1 area of ROM	page 12
Image 1 Modem Script Version	Version information for the Modem acquisition script resident in the image 1 area of ROM	page 12
Image 1 Option FPGA Firmware Version	Version information for the Option FPGA Firmware resident in the image 1 area of ROM	page 12
Image 2 Application Firmware Version	Version information for the application firmware resident in the image 2 area of ROM	page 13
Image 2 DSP Firmware Version	Version information for the DSP firmware resident in the image 2 area of ROM	page 13
Image 2 FPGA Firmware Version	Version information for the FPGA firmware resident in the image 2 area of ROM	page 13
Image 2 Modem Script Version	Version information for the Modem acquisition script resident in the image 2 area of ROM	page 13
Image 2 Option FPGA Firmware Version	Version information for the Option FPGA Firmware resident in the image 2 area of ROM	page 13
Active Image	Specifies the currently active image area	page 13
Hardware Version	Version of the Hardware Assembly	page 13

ledrSnmpTrapVersion This read-write object selects the SNMP version to be used for sending the Traps:

- snmpv1 (0) - SNMPv1 Trap format
- snmpv2 (1) - SNMPv2 Trap Format

ledrImage1Firmware This read-only object corresponds to the Image 1 Application Firmware version of the LEDR Radio.

ledrImage1Dsp This read-only object corresponds to the Image 1 DSP Firmware version of the LEDR Radio.

ledrImage1Fpga This read-only object corresponds to the Image 1 FPGA version of the LEDR Radio.

ledrImage1Scripts This read-only object corresponds to the Image 1 Modem Acquisition Scripts of the LEDR Radio.

ledrImage1Option This read-only object corresponds to the Image 1 Option Firmware of the LEDR Radio.

ledrImage2Firmware This read-only object corresponds to the Image 2 Application Firmware version of the LEDR Radio

ledrImage2Dsp This read-only object corresponds to the Image 2 DSP Firmware version of the LEDR Radio.

ledrImage2Fpga This read-only object corresponds to the Image 2 FPGA version of the LEDR Radio.

ledrImage2Scripts This read-only object corresponds to the Image 2 Modem Acquisition Scripts of the LEDR Radio.

ledrImage2Option This read-only object corresponds to the Image 2 Option Firmware of the LEDR Radio.

ledrActiveImage This read-write object is used to view and select the active image of the LEDR Radio.

- image1 (0) - Image 1 is active
- image2 (1) - Image 2 is active

ledrHardwareRev This read-only object corresponds to the factory programmed revision of the radio printed circuit card of the LEDR Radio.

ledrConfigFile

The following table lists ledrConfigFile objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 8. ledrConfigFile Objects

Object	Description	Reference
Configuration File Table	A table which contains the objects necessary to send and retrieve the complete configuration of a LEDR radio to or from a file via a TFTP server	Page 13
Configuration File TFTP Server IP Address	The address of the TFTP server to which the configuration file is sent or from which it is retrieved	Page 13
Configuration File Name	The file name that will be stored on the TFTP server or retrieved from the server	Page 13
Radio Configuration Flag	Utilized during a configuration retrieval to set the radio specific configuration	Page 13
Transfer Configuration File	Starts the transfer of configuration data	Page 13

ledrConfigFileTable A table node that contains the objects for the retrieval and programming of the configuration of the radio.

ledrConfigFileTftp ServerIP This object contains the IP Address of the TFTP server which is used for configuration send or retrieval.

ledrConfigFilename This object contains the Filename used for the configuration send or retrieval.

ledrUseSpecific Configs

This object is used on a configuration retrieval to reprogram the radio's specific configuration. For example, the receive signal strength calibration, RF output calibration, etc. may or may not be retrieved.

- no (0) - Do no use radio specific configuration
- yes (1) - Use radio specific configuration

This object should be used by trained personnel only.

ledrTransferConfigFile

This object is used to transfer the configuration data.

- send (0) - Upload the configuration to the TFTP server
- retrieve (1) - Retrieve the configuration and reconfigure the radio

4.3 Common Fault Management Objects

Fault Management Objects are divided into the following categories:

- ledrAlarm
- ledrSelfTest
- ledrTrapManagement
- ledrPerfTrapThresholds
- ledrEventLog

ledrAlarm

The following table lists ledrAlarm objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 9. ledrInfo Objects

Object	Description	Reference
Alarm LED	Corresponds to the front panel Alarm LED of the addressed radio	Page 14
Radio Power LED	Corresponds to the front panel Power LED of the addressed radio	page 14
Rx Alarm LED	Corresponds to the front panel Rx Alarm LED of the addressed radio	Page 15
Tx Alarm LED	Corresponds to the front panel Tx Alarm LED of the addressed radio	Page 15
IO Alarm LED	Corresponds to the front panel I/O Alarm LED of the addressed radio	Page 15
Active LED	Corresponds to the front panel Active LED of the addressed radio	Page 15

ledrAlarmLed

This read-only object corresponds to the front panel Alarm LED of the radio:

- Active (1) – Alarm LED is active
- Inactive (2) – Alarm LED is inactive

ledrRadioPowerLed

This read-only object corresponds to the front panel Power LED of the radio:

- Active (1) – Rx Alarm LED is active
- Inactive (2) – Rx Alarm LED is inactive

ledrRxAlarmLed This read-only object corresponds to the front panel Rx Alarm LED of the radio:

- Active (1) – Rx Alarm LED is active
- Inactive (2) – Rx Alarm LED is inactive

ledrTxAlarmLed This read-only object corresponds to the front panel Tx Alarm LED of the radio:

- Active (1) – Tx Alarm LED is active
- Inactive (2) – Tx Alarm LED is inactive

ledrIOAlarmLed This read-only object corresponds to the front panel I/O Alarm LED of the radio:

- Active (1) – I/O Alarm is active
- Inactive (2) – I/O Alarm is inactive

ledrActiveLed This read-only object corresponds to the front panel Active LED of the radio:

- Active (1) – Active LED is active
- Inactive (2) – Active LED is inactive

ledrSelfTest

The following table lists ledrSelfTest objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 10. ledrSelfTest Objects

Object	Description	Reference
Result Flash	The results of the most recent self test initiated	Page 16
Result DRAM	The results of the most recent self test initiated	Page 16
Result Configuration Data	The results of the most recent self test initiated	Page 16
Result SRAM Battery	The results of the most recent self test initiated	Page 16
Result A/D	The results of the most recent self test initiated	Page 16
Result Tx Synthesizer	The results of the most recent self test initiated	Page 16
Result Rx Synthesizer	The results of the most recent self test initiated	Page 16
Result Real Time Clock	The results of the most recent self test initiated	Page 16
Result FPGA	The results of the most recent self test initiated	Page 16
Result DSP	The results of the most recent self test initiated	Page 16
Result DSP Codec	The results of the most recent self test initiated	Page 16

Table 10. ledrSelfTest Objects *(Continued)*

Object	Description	Reference
Results Bits	The results of the most recent self test initiated bit mapped into 2 octets	Page 16
Start	Initiates the self test process	Page 17

ledrResultFlash This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultDram This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultConfigData This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultSramBattery This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultAtod This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultTxSynthesizer This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultRxSynthesizer This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultRealTimeClock This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultFpga This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultDsp This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrResultDspCodec This read-only object displays the results of the last initiated self test.
- Failed (0)
- Passed (1)

ledrSelfTestResultsBits This read-only object displays the results of the last initiated self test. The results are packed into two octets to conserve bandwidth on the selfTestComplete trap.

ledrSelfTestStart This read-write object initiates one of the following tests:

- flashTest (0)
- ram (1)
- configData (2)
- sramBattery (3)
- atod (4)
- txSynthesizer (5)
- rxSynthesizer (6)
- realTimeClock (7)
- fpga (8)
- dsp (9)
- dspCodec (10)
- all (11)

Upon completion of the test, the results are stored in the appropriate self test result and passed back to the manager in the selfTestComplete trap. A set of this object initiates a self-test function.

ledrTrapManagement

The following table lists ledrTrapManagement objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 11. ledrTrapManagement

Object	Description	Ref.
Trap Community	The community name that is sent along with SNMP traps from the radio to the trap managers	Page 17
Number of Trap Managers	The number of SNMP trap managers assigned for the radio network	Page 17
Trap Manager Index	An index assigned to each SNMP trap manager	Page 17
Trap Manager Table	A list of the IP addresses of the trap managers for the radio network	Page 17
Trap Manager IP	The IP address to which SNMP traps will be forwarded	Page 18
Delete Trap Manager IP	The IP address of the SNMP trap manager to be deleted from the network	Page 18
Trap Filter	Filters the SNMP traps which may be generated by the LEDR radio	Page 18

ledrTrapCommunity This read-write object displays and sets the community name that is sent along with SNMP traps to trap managers.

ledrNumTrapManagers This read-only object displays the number of SNMP trap managers assigned for the radio network from 0 to 5.

ledrTrapManagerIndex This non-accessible object corresponds to the index assigned to each SNMP trap manager.

ledrTrapManagerTable A non-accessible list of the IP addresses of the trap managers for the radio network.

ledrTrapManagerIP This read-write object displays and sets an IP address to which SNMP traps will be forwarded.

ledrDelTrapManagerIP This read-write object sets the IP address of the SNMP trap manager to be deleted from the network.

ledrTrapFilter This read-write object displays and filters the event-related SNMP traps that are generated by the radio:

- none (0) – no traps
- critical (1) – only critical
- major (2) – only major
- critMajor (3) – critical and major
- minor (4) – only minor
- critMinor (5) – critical and minor
- majorMinor (6) – major and minor
- critMajorMinor (7) – critical, major, minor
- informational (8) – only informational
- criticalInf (9) – critical and informational
- majorInf (10) – major and informational
- critMajorInf (11) – critical, major, informational
- minorInf (12) – minor and informational
- critMinorInf (13) – critical, minor, informational
- majMinorInf (14) – major, minor, informational
- all (15) – no event-related traps are sent

ledrPerfTrapThreshold

The following table lists ledrPerfTrapThreshold objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 12. ledrPerfTrapTreshold Objects

Object	Description	Ref.
Minimum RSSI	The minimum RSSI level that is allowed prior to generating a degraded performance trap	Page 19
Minimum SNR	The minimum Signal-to-Noise level that is allowed prior to generating a degraded performance trap	Page 19
Maximum PA Temperature	The maximum internal PA temperature that may be reached that is allowed prior to generating a degraded performance trap	Page 19
Maximum 15 Minute Errored Seconds	The maximum number of errored seconds which may occur in a 15 minute window prior to generating a degraded performance trap	Page 19
Maximum 15 Minute Severely Errored Seconds	The maximum number of severely errored seconds which may occur in a 15 minute window prior to generating a degraded performance trap	Page 19
Maximum 24 Hour Errored Seconds	The maximum number of errored seconds which may occur in a 24 hour window prior to generating a degraded performance trap	Page 19

Table 12. ledrPerfTrapTreshold Objects *(Continued)*

Object	Description	Ref.
Maximum 24 Hour Severely Errored Seconds	The maximum number of severely errored seconds which may occur in a 24 hour window prior to generating a degraded performance trap	Page 19
Performance Trap Object	Gives the manager an indication of which of the programmable thresholds caused the trap to be generated	Page 19

ledrMinRssi This read-write object displays and sets the minimum RSSI level allowed before a degraded performance trap is generated. The allowable range is -110 to -30 dBm.

ledrMinSnr This read-write object displays and sets the minimum signal-to-noise level allowed before a degraded performance trap is generated. The allowable range is 4 to 30 dB.

ledrMaxPATemp This read-write object displays and sets the maximum internal temperature, from –40 to 90 degrees Celsius, that may be reached before a degraded performance trap is generated.

ledrMax15MinuteErrSec This read-write object displays and sets the maximum number of errored seconds that may occur in a 15 minute period before a degraded performance trap is generated. The maximum value is 900 seconds.

ledrMax15MinuteSevere ErrSec This read-write object displays and sets the maximum number of severely errored seconds that may occur in a 15 minute period before a degraded performance trap is generated. The maximum value is 900 seconds.

ledrMax24HourErrSec This read-write object displays and sets the maximum number of errored seconds that may occur in a 24 hour period before a degraded performance trap is generated. The maximum value is 86400 seconds.

ledrMax24HourSevere ErrSec This read-write object displays and sets the maximum number of severely errored seconds that may occur in a 24 hour period before a degraded performance trap is generated. The maximum value is 86400 seconds.

ledrPerfTrapObject This read-only object displays which programmable threshold was exceeded to generate the degraded performance trap:

- none (0)
- rssiLevel (1)
- snrLevel (2)
- internalTemp (3)
- errors15Minutes (4)
- severeErrors15Minutes (5)
- errors24Hours (6)
- severeErrors24Hours (7)

ledrEventLog

The following table lists ledrEventLog objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 13. ledrEventlog Objects

Object	Description	Reference
Event Log Table	This table is used to upload the LEDR internal event log to a management station with a TFTP server	
Event Log TFTP Server IP	The address of the TFTP server to which the event log is uploaded	
Event Log Filename	The name of the event log that is uploaded	
Send Event Log	Initiates the event log upload process	

ledrEventLogtable This table may be used to upload the internal radio event log to a management station via TFTP.

ledrLogTftpServerIP This read-write object contains the IP address of the TFTP server to which the event log will be uploaded.

ledrLogFilename This read-write object is used as the filename to be uploaded.

ledrEventSendLog This read-write object is used to initiate the upload. A set of this object initiates the upload.

- send (0)

4.4 Common Security Management Objects

Security Management Objects fall into a single ledrUsers category.

ledrUsers

The following table lists ledrUsers objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 14. ledrUsers Objects

Object	Description	Reference
User Table	A list of users in the radio	Page 20
User Name	The name assigned to the user	Page 20
User Access Privileges	The access level assigned to the user	Page 21
User Active	The login status of the users	Page 21
User Password	The password assigned to the user	Page 21
Delete User	Used to delete a user	Page 21

ledrUserTable A non-accessible list of users in the radio.

ledrUserName This read-write object displays and sets the name assigned to the user.

ledrUserAccess Privileges

This read-write object displays and sets the access level assigned to a user:

- read only (0)
- write (1)
- network (2)
- administrator (3)
- reserved (4)
- reserved (5)

ledrUserActive

This read-only object displays the status of users:

- Active (1) – the user is currently logged in
- Inactive (2) – the user is not currently logged in

ledrUserPassword

This read-write object sets the password assigned to the user.

ledrDelUser

This read-write object deletes a referenced user name.

4.5 Common Alarm Contacts

ledrExtAlarmContacts

The following table lists Alarm Output Contacts. Refer to the object descriptions that follow the table for additional information about each object.

Table 15. ledrExtAlarmContacts Objects

Object	Description	Reference
External Alarm Output #1 Activated	Opens and closes contact of alarm relay contact 1	Page 22
External Alarm Output #2 Activated	Opens and closes contact of alarm relay contact 2	Page 22
External Alarm Output #3 Activated	Opens and closes contact of alarm relay contact 3	Page 22
External Alarm Output #4 Activated	Opens and closes contact of alarm relay contact 4	Page 22
External Alarm Output Name #1	The name of alarm input #1	Page 22
External Alarm Output Name #2	The name of alarm input #2	Page 22
External Alarm Output Name #3	The name of alarm input #3	Page 22
External Alarm Output Name #4	The name of alarm input #4	Page 22
External Alarm Input #1	Reads the status of alarm input #1	Page 22
External Alarm Input #2	Reads the status of alarm input #2	Page 22
External Alarm Input #3	Reads the status of alarm input #3	Page 23

Table 15. ledrExtAlarmContacts Objects *(Continued)*

Object	Description	Reference
External Alarm Input #4	Reads the status of alarm input #4	Page 23
External Alarm Input Name #1	The name of alarm input #1	Page 23
External Alarm Input Name #2	The name of alarm input #2	Page 23
External Alarm Input Name #3	The name of alarm input #3	Page 23
External Alarm Input Name #4	The name of alarm input #4	Page 23

ledrExtContactOutput1 This read-write object opens and closes alarm contact output 1 of the LEDR Radio:

- Open (0)
- Closed (1)

ledrExtContactOutput2 This read-write object opens and closes alarm contact output 2 of the LEDR Radio:

- Open (0)
- Closed (1)

ledrExtContactOutput3 This read-write object opens and closes alarm contact output 3 of the LEDR Radio:

- Open (0)
- Closed (1)

ledrExtContactOutput4 This read-write object opens and closes alarm contact output 4 of LEDR Radio:

- Open (0)
- Closed (1)

ledrExtContactOutput Name1 This read-write object sets a maximum 16 character text name for alarm output 1 of the LEDR Radio

ledrExtContactOutput Name2 This read-write object sets a maximum 16 character text name for alarm output 2 of the LEDR Radio

ledrExtContactOutput Name3 This read-write object sets a maximum 16 character text name for alarm output 3 of the LEDR Radio

ledrExtContactOutput Name4 This read-write object sets a maximum 16 character text name for alarm output 4 of the LEDR Radio

ledrExtContactInput1 This read-only object reads the status of alarm input 1 of the LEDR Radio:

- Open (0)
- Closed (1)

ledrExtContactInput2 This read-only object reads the status of the alarm input 2 of the LEDR Radio:

- Open (0) Closed (1)

ledrExtContactInput3 This read-only object reads the status of the alarm input 3of the LEDR Radio:

- Open (0)
- Closed (1)

ledrExtContactInput4 This read-only object reads the status of the alarm input 4 of the LEDR Radio:

- Open (0)
- Closed (1)

ledrExtContactInput Name1 This read-write object sets a maximum 16 character text name for alarm input 1 of the LEDR Radio

ledrExtContactInput Name2 This read-write object sets a maximum 16 character text name for alarm input 2 of the LEDR Radio

ledrExtContactInput Name3 This read-write object sets a maximum 16 character text name for alarm input 3 of the LEDR Radio

ledrExtContactInput Name4 This read-write object sets a maximum 16 character text name for alarm input 4 of the LEDR Radio

5.0 SUBRATE EIA-530 OBJECTS

5.1 G.821 Link Performance Management Objects

The G.821 Link Performance Objects provide a performance monitoring method which conforms to the ITU-T recommendation G.821.

ledrG821

The following table lists ledrG821 objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 16. ledrG821 Objects

Object	Description	Reference
Link Status	The operational status of the link	Page 23
Errored Seconds	A counter that represents the number of errored seconds of the link	Page 24
Severely Errored Seconds	A counter that represents the number of severely errored seconds of the link	Page 24
Available Seconds	A counter that represents the number of available seconds of the link	Page 24
Unavailable Seconds	A counter that represents the number of unavailable seconds of the link	Page 24
Error Counter Reset	Resets all of the G.821 counters to 0	Page 24

ledrStatus This read-only object displays the operational status of the link:

- error free (0) – no errors
- errored (1) – errors have been detected
- severely errored (2) – severe errors have been detected
- unavailable (3) – the link is unavailable

ledrErroredSeconds This read-only object displays the number of errored seconds of the link.

ledrSeverelyErrored Seconds This read-only object displays the number of severely errored seconds of the link.

ledrAvailableSeconds This read-only object displays the number of available seconds of the link.

ledrUnAvailable Seconds This read-only object displays the number of unavailable seconds of the link.

ledrResetAllCounters This read-write object resets all of the G.821 counters at once. By setting the value to resetAll (1), all counters are reset to 0.

ledrLoopbackModeEIA530

This object places the LEDR radio into loopback modes for diagnosis of network problems.

ledrLoopbackMode EIA530 This read-write object has the following possible values:

- loopbackNone(0) - No Loopback, normal operation
- loopbackLocalRf(1) - Local RF Loopback
- loopbackLocalModem(2) - Local Modem Loopback
- loopbackRemoteModem(8) - Remote Modem Loopback

6.0 FRAMED E1 AND T1 OBJECTS

The framed E1 and T1 objects may be organized as follows:

- Line Settings
- Span Timeslot Settings
- Framed Loopbacks
- Framed Clock Modes
- Framed G821 Line Statistics

The T1 and E1 objects are maintained separately. T1 objects apply to Fractional T1 interfaces and *not* E1 interfaces. The converse is also true, E1 objects apply to the E1 interfaces and do *not* apply to Fractional T1. Modifying objects which apply to an interface which is not installed will have no effect.

6.1 Line Settings

The Line settings are in the following tables:

- ledrLineNamesTable
- ledrLineConfigurationTable1
- ledrLineConfigurationTable2
- ledrLineCodeTable
- ledrT1B7ZSEnableTable
- ledrT1IdlePatternsTable
- ledrE1IdlePatternsTable

ledrLineNamesTable

The following table lists ledrLineNamesTable objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 17. ledrLineNamesTable Objects

Object	Description	Ref.
Line Names Table	This is a table that contains a list of the user-defined names for the framed line interfaces	Page 25
Line Number	Refers to the number of the framed line interface	Page 25
Line Name	Contains the user-defined name of the specified line	Page 25

ledrLineNamesTable This table is used to define a name for any of the framed line interfaces of the LEDR Radio.

ledrLineNumber This non-accessible object displays the number of the framed line being accessed. It ranges from 1 to 4.

ledrLineName This read-write object is used to define a name for the selected line interface.

ledrLineConfigurationTable1

The following table may be used to configure the line interfaces for E1 or Fractional T1. It is used in conjunction with ledrLineConfigurationTable2. Refer to the object descriptions that follow the table for additional information about each object.

Table 18. ledrLineConfigurationTable1 Objects

Object	Description	Ref.
Line Configuration Table 1	This is a table that contains a list of framing and reframing parameters for the framed line interfaces	Page 25
T1 Frame Structure	Refers to the framing structure of the T1 line interface	Page 25
E1 Frame Structure	Refers to the framing structure of the E1 line interface	Page 26
T1 Reframe Criteria	Refers to the reframing criteria of the T1 line interface	Page 26
E1 Reframe Criteria	Refers to the reframing criteria of the T1 line interface	Page 26

ledrLineConfiguration Table1 This table is used to define framing and reframing formats and criteria for any of the framed line interfaces of the LEDR Radio. It is used with ledrLineConfigurationTable2 to fully configure the line interfaces.

ledrT1FrameStructure This read-write object allows the user to select the frame structure of the T1 line interface

- ftOnly(0) - Terminal Framing F-bit in ESF multi-framing structure; A 1, 0 pattern indicating the most basic framing alignment in the D4 and ESF formats
- esf(1) - Extended Super Frame
- esfANDprm(2) - Extended Super Frame + Performance Report Message
- sf(3) - Super Frame; The combination of frames to form a larger structure for the purposes of error detection coding and various data links
- sfANDjyel(4) - Super Frame + F-bit 12 of every D4 superframe set to 1; An alternate method of indicating RAI or yellow alarm. Only terminal framing may be recovered in the D4 superframe when the JYEL condition exists
- esfANDcrc(5) - Extended Super Frame + Cyclical Redundancy Check
- esfANDcrcANDprm(6) - Extended Super Frame + Cyclical Redundancy Check + Performance Report Message
- none(7) - N/A

ledrE1FrameStructure This read-write object allows the user to select the frame structure of the E1 line interface

- fas(0) - Frame Alignment Signal; Refers to the 1, 0 pattern in alternate frames of T1 D4 and ESF framing
- fasANDbslip(1) - Frame Alignment Signal + Bit Slip; FAS Bit Slip Enable; Applicable only for Dutch national applications. The framer is allowed to change the timebase by ±1 bit when a 1-bit FAS pattern slip is detected
- fasANDcrc(2) - Frame Alignment Signal + Cyclical Redundancy Check
- fasANDcrcANDbslip(3) - Frame Alignment Signal + Cyclical Redundancy Check + Bit Slip
- fasANDcas(4) - Frame Alignment Signal + Channel Associative Signaling; Signaling included within the T1/E1 frame associated with each timeslot, commonly referred to as AB (D4 format) or ABCD (ESF and E1 format) bits indicate call progress and other information
- fasANDcasANDbslip(5) - Frame Alignment Signal + Channel Associative Signaling + Bit Slip
- fasANDcrcANDcas(6) - Frame Alignment Signal + Cyclical Redundancy Check + Channel Associative Signaling
- fasANDcrcANDcasANDbslip(7) - Frame Alignment Signal + Cyclical Redundancy Check + Channel Associative Signaling + Bit Slip
- none(8) - N/A

ledrT1ReframeCriteria This read-write object defines the tolerance level of bit errors in the T1 framing pattern before loss/acquisition of framing is detected.

- reframecriteria2of4(0) - 2 of 4 bit errors
- reframecriteria2of5(1) - 2 of 5 bit errors
- reframecriteria2of6(2) - 2 of 6 bit errors

ledrE1ReframeCriteria This read-write object defines the tolerance level of bit errors in the E1 framing pattern before loss/acquisition of framing is detected.

- cfas(0) - Consecutive FAS errors (default)
- crc(1) - 915 CRC (rx framer only)
- none(2) - N/A

ledrLineConfigurationTable2

The following table may be used to configure the line interfaces for E1 or Fractional T1. It is used in conjunction with ledrLineConfigurationTable1. Refer to the object descriptions that follow the table for additional information about each object.

Table 19. ledrLineConfigurationTable2 Objects

Object	Description	Ref.
Line Configuration Table 2	This is a table that contains a list of other line interface parameters for the framed line interfaces	Page 27
Cable Type	Refers to the transmit pulse characteristics based upon the cable type	Page 27
Line Specification	Refers to the short-haul line interface unit configuration	Page 27
Span Mapping	Refers to the over the air span in which the indexed line is transmitted	Page 28
AIS Generation	Enables the generation of the Alarm Indication Signal	Page 28
AIS or RAIS Forwarding	Enables forwarding of the AIS and the RAIS Signals	Page 28
Error Reporting	Enables the line error reporting from the indexed line	Page 28

ledrLineConfiguration Table2

This table is used to define other line interface characteristics for any of the framed line interfaces of the LEDR Radio. It is used with ledrLineConfigurationTable1 to fully configure the line interfaces.

ledrCableSpec

This read-write object allows users to support various line transmit pulse templates according to the following cable characteristics:

- cable1-133ft-100 ohmTwisted(0) - 1-133 ft, 100 Ohm Twisted Pair
- cable133-266ft-100 ohmTwisted(1) - 133-266 ft, 100 Ohm Twisted Pair
- cable266-399ft-100 ohmTwisted(2) - 266-399 ft, 100 Ohm Twisted Pair
- cable399-533ft-100 ohmTwisted(3) - 399-533 ft, 100 Ohm Twisted Pair
- cable533-655ft-100 ohmTwisted(4) - 533-655 ft, 100 Ohm Twisted Pair

In E1 mode, the system supports only line transmit pulse templates according to the following cable characteristics:

- cableITU-T-G703-120ohmTwisted(8) - ITU-T G.703, 120 Ohm Twisted Pair

ledrLineSpec

This read-write object allows the E1 receive line interface unit configuration to be:

- g775(0) - ITU-T G.775
- i431(1) - ITU-T I.431

In T1 the line interface unit may only be configured as ITU-T G.775

ledrSpanMapping This read-write object over-the-air span in which the selected or indexed line is being transmitted. Spans are defined as A (first), B, C, D (last)

- a(0) - Span A
- b(1) - Span B
- c(2) - Span C
- d(3) - Span D

ledrAISGeneration This read-write object enables or disables the generation of the Alarm Indication Signal for the indexed line.

- off(0) - Disable AIS Generation
- on(1) - Enable AIS Generation

ledrAISorRAISForwarding This read-write object enables the forwarding of the AIS and RAIS signaling.

- off(0) - Disable AIS/RAIS Forwarding
- on(1) - Enable AIS Forwarding

ledrErrorReporting This read-write object allows the user to enable or disable line error reporting or to clear the error counters.

- off(0) - Disable Line Error reporting
- on(1) - Enable Line error Reporting
- clear(2) - Clear the Line Error Counters

ledrLineCodeTable

The following table may be used to configure the line code for the lines. Refer to the object descriptions that follow the table for additional information about each object.

Table 20. ledrLineCodeTable Objects

Object	Description	Ref.
Line Code Table	This is a table that contains a list of the line codes for the framed line interfaces	Page 28
Line Code	Refers to the line code for the indexed line	Page 28

ledrLineCodeTable This table is used to define the line codes from the LEDR framed line interfaces. For B7ZS operation, it is used with the ledrT1B7ZSEnableTable.

ledrLineCode This table is used to define the line codes for the LEDR framed line interfaces. These modes suppress zeros in the line signal, aiding in timing recovery in the network.

- ami(0) - AMI
- b8zs(1) - B8ZS
- b7zs(2) - B7ZS
- hdb3(3) - HDB3

ledrT1B7ZSEnableTable

The following table may be used to configure the B7ZS signaling in the timeslots of the T1 frame when B7ZS line code is selected in the ledrLineCode object. *Please note that this table only applies when the interface type of the LEDR Radio is T1 for the fractional T1 interface*. Refer to the object descriptions that follow the table for additional information about each object.

Table 21. LedrT1B7ZSEnableTable Objects

Object	Description	Ref.
T1 Bit 7 Zero Suppression (B7ZS)	This is a table that enables the B7ZS signaling for the selected timeslot on the addressed LEDR Radio.	Page 29
T1 Time Slot 1 B7ZS	Refers to B7ZS in the first time slot of the T1 frame.	Page 29
T1 Time Slot N B7ZS	Refers to B7ZS in the N^{th} time slot of the T1 frame. N varies from 1 to 24.	Page 29
T1 Time Slot 24 B7ZS	Refers to B7ZS in the 24^{th} time slot of the T1 frame.	Page 29

ledrT1B7ZSEnable Table

This table allows the user to enable bit 7 Zero suppression for the desired timeslots of the T1 when (and only when) B7ZS is selected for the line code.

ledrT1Ts1B7

This read-write object enables or disables bit 7 zero suppression from time slot 1 in the T1 frame only when the line code object is set to B7ZS signaling. It may be set as follows:

- on (0) - enable B7ZS
- off (1) - disable B7ZS

ledrT1TsNB7

This read-write object enables or disables bit 7 zero suppression from time slot “N” in the T1 frame only when the line code object is set to B7ZS signaling. It may be set as follows:

- on (0) - enable B7ZS
- off (1) - disable B7ZS

ledrT1Ts24B7

This read-write object enables or disables bit 7 zero suppression from time slot 24in the T1 frame only when the line code object is set to B7ZS signaling. It may be set as follows:

- on (0) - enable B7ZS
- off (1) - disable B7ZS

ledrT1IdlePatternsTable

The following table may be used to configure the idle pattern which is auto-inserted into unassigned time-slot channels of the T1 frame. *Please note that this table only applies when the interface type of the LEDR Radio is T1 for the fractional T1 interface*. Refer to the object descriptions that follow the table for additional information about each object.

Table 22. ledrT1IdlePatternsTable Objects

Object	Description	Ref.
T1 Idle Patterns Table	This is a table that users may use to modify the idle pattern which is auto-inserted by the framer/Line Interface Unit at the Line Transmitter end	Page 30
T1 Time Slot 1 Idle Pattern	Refers to the idle pattern for the first time slot in the T1 frame.	Page 30
T1 Time Slot N Idle Pattern	Refers to the idle pattern for the N^{th} timeslot in the T1 Frame. N varies from 1 to 24.	Page 30
T1 Time Slot 24 Idle Pattern	Refers to the idle pattern for the 24^{th} timeslot in the T1 Frame.	Page 30

ledrT1IdlePatterns Table This table allows the user to modify the transmitted idle pattern for the selected time slot of the T1 frame.

ledrT1Ts1IP This read-write object is the idle pattern for time slot 1 in the T1 frame. It is specified as a single octet hexadecimal value (for example: 07F).

ledrT1TsNIP This read-write object is the idle pattern for time slot “N” in the T1 frame. It is specified as a single octet hexadecimal value (for example: 07F).

ledrT1Ts24IP This read-write object is the idle pattern for time slot 24 in the T1 frame. It is specified as a single octet hexadecimal value (for example: 07F).

ledrE1IdlePatternsTable

The following table may be used to configure the idle pattern which is auto-inserted into unassigned time-slot channels of the E1 frame. *Please note that this table only applies when the interface type of the LEDR Radio is E1 for the full-rate E1 interface*. Refer to the object descriptions that follow the table for additional information about each object.

Table 23. ledrE1IdlePatternsTable Objects

Object	Description	Ref.
E1 Idle Patterns Table	This is a table that users may use to modify the idle pattern which is auto-inserted by the framer/Line Interface Unit at the Line Transmitter end	Page 31
E1 Time Slot 1 Idle Pattern	Refers to the idle pattern for the first time slot in the E1 frame.	Page 31
E1 Time Slot N Idle Pattern	Refers to the idle pattern for the N^{th} timeslot in the E1 Frame. N varies from 1 to 32.	Page 31
E1 Time Slot 32 Idle Pattern	Refers to the idle pattern for the 32^{nd} timeslot in the E1 Frame.	Page 31

ledrE1IdlePatterns Table This table allows the user to modify the transmitted idle pattern for the selected time slot of the E1 frame.

ledrE1Ts1IP This read-write object is the idle pattern for the time slot 1 in the E1 frame. It is specified as a single octet hexadecimal value (for example: 07F).

ledrE1TsNIP This read-write object is the idle pattern for the time slot “N” in the E1 frame. It is specified as a single octet hexadecimal value (for example: 07F).

ledrE1Ts32IP This read-write object is the idle pattern for the time slot 32 in the E1 frame. It is specified as a single octet hexadecimal value (for example: 07F).

ledrSABytesTable

The following table may be used to configure the SA Bytes in the E1 superframe. *Please note that this table only applies when the interface type of the LEDR Radio is E1 for a fractional E1 interface*. Refer to the object descriptions that follow the table for additional information about each object.

Table 24. ledrSABytesTable Objects

Object	Description	Ref.
SA Bytes Table	This is a table that users may use to modify the SABytes inserted by the Line Transmitter.	Page 32
SA Byte 1	Refers to the first SA Byte in the E1 superframe.	Page 32
SA Byte 2	Refers to the second SA Byte in the E1 superframe.	Page 32
SA Byte 3	Refers to the third SA Byte in the E1 superframe.	Page 32

Table 24. ledrSABytesTable Objects *(Continued)*

Object	Description	Ref.
SA Byte 4	Refers to the fourth SA Byte in the E1 superframe.	Page 32
SA Byte 5	Refers to the fifth SA Byte in the E1 superframe.	Page 32

ledrSABytesTable This table allows the user to modify the transmitted SA Bytes for the selected time slot of the E1 superframe.

ledrSAByte1 This read-write object is the value of the first SA Byte in the E1 superframe. It is specified as a single octet hexadecimal value (for example: 07F).

ledrSAByte2 This read-write object is the value of the second SA Byte in the E1 superframe. It is specified as a single octet hexadecimal value (for example: 07F).

ledrSAByte3 This read-write object is the value of the third SA Byte in the E1 superframe. It is specified as a single octet hexadecimal value (for example: 07F).

ledrSAByte4 This read-write object is the value of the third SA Byte in the E1 superframe. It is specified as a single octet hexadecimal value (for example: 07F).

ledrSAByte5 This read-write object is the value of the third SA Byte in the E1 superframe. It is specified as a single octet hexadecimal value (for example: 07F).

6.2 Span Timeslot Settings

A span is defined as the frame which is sent over the RF channel by the LEDR radio. In fractional modes, the timeslots on the line may be mapped into the span. This mapping is managed by the following tables and index:

- ledrSpanSlotMapIndex
- ledrT1SpanSlotMapTable
- ledrT1SpanSlotMapPendingTable
- ledrE1SpanSlotMapTable
- ledrE1SpanSlotMapPendingTable

These table objects contain the current span slot map objects and a temporary (pending) area for new span map objects. The span slot mapping is changed by setting a new mapping in the temporary area and then performing a **set** operation on the commitPendingMap object.

Note: These tables only apply to fractional T1 and fractional E1 radios.

ledrSpanSlotMapIndex

The ledrSpanSlotMapIndex object is used to index into the ledrT1SpanSlotMapTable and ledrE1SpanSlotMapTable. It may range from 1 to 32 for each 64 kilobits wide timeslot. The maximum value is limited by the installed and authorized bandwidth of the LEDR Radio. For example, a 25 kHz bandwidth limits the radio to 64 kilobits of data and therefore the number of timeslots and the index to 1; a 200 kHz wide bandwidth limits the radio to 768 kilobits of data and therefore the number of timeslots and the index to 12.

ledrT1SpanSlotMapTable

The following table may be used to verify the span slot mapping for the fractional T1 interface. *This table only applies when the interface type of the LEDR Radio is T1 for a fractional T1 interface*. Refer to the object descriptions that follow the table for additional information about each object.

Table 25. ledrT1SpanSlotMapTable Objects

Object	Description	Ref.
T1 [current] Span Slot Table	Refers to the table of the current settings of the T1 span slots	page 33
T1 [current] Span Slot Map	Refers to the current T1 span slots mapped for the span	page 33
T1 Pending Span Slot Table	Refers to the table of the pending settings of the T1 span slots	page 34
T1 Pending Span Slot Map	Refers to the pending T1 span slots mapped for the span	page 34
T1 Commit Pending Map	Used to commit the pending T1 slot map into the current table	page 34

ledrT1SpanSlotMap Table

This table contains the current list of the timeslots as they are mapped in the span.

ledrT1SpanSlotMap

Each of these objects corresponds to the current T1 timeslot that has been mapped into the span. It may take the values as follows:

- ledrT1Slot1(1) - T1 Timeslot 1
- ledrT1Slot2(2) - T1 Timeslot 2
- ledrT1Slot3(3) - T1 Timeslot 3
- ledrT1Slot4(4) - T1 Timeslot 4
- ledrT1Slot5(5) - T1 Timeslot 5
- ledrT1Slot6(6) - T1 Timeslot 6
- ledrT1Slot7(7) - T1 Timeslot 7
- ledrT1Slot8(8) - T1 Timeslot 8
- ledrT1Slot9(9) - T1 Timeslot 9
- ledrT1Slot10(10) - T1 Timeslot 10
- ledrT1Slot11(11) - T1 Timeslot 11
- ledrT1Slot12(12) - T1 Timeslot 12
- ledrT1Slot13(13) - T1 Timeslot 13
- ledrT1Slot14(14) - T1 Timeslot 14
- ledrT1Slot15(15) - T1 Timeslot 15

- ledrT1Slot16(16) - T1 Timeslot 16
- ledrT1Slot17(17) - T1 Timeslot 17
- ledrT1Slot18(18) - T1 Timeslot 18
- ledrT1Slot19(19) - T1 Timeslot 19
- ledrT1Slot20(20) - T1 Timeslot 20
- ledrT1Slot21(21) - T1 Timeslot 21
- ledrT1Slot22(22) - T1 Timeslot 22
- ledrT1Slot23(23) - T1 Timeslot 23
- ledrT1Slot24(24) - T1 Timeslot 24
- ledrT1NotAvailable(25) - Timeslot not used

ledrT1SpanSlotMap PendingTable

This table contains the pending list of the timeslots that will be mapped to the span.

ledrT1PendingSlotMap

Each of these read-write objects corresponds to the pending T1 timeslot mapping for the span. It may take the values as follows:

- ledrT1PendingSlot1(1) - T1 Pending Timeslot 1
- ledrT1PendingSlot2(2) - T1 Pending Timeslot 2
- ledrT1PendingSlot3(3) - T1 Pending Timeslot 3
- ledrT1PendingSlot4(4) - T1 Pending Timeslot 4
- ledrT1PendingSlot5(5) - T1 Pending Timeslot 5
- ledrT1PendingSlot6(6) - T1 Pending Timeslot 6
- ledrT1PendingSlot7(7) - T1 Pending Timeslot 7
- ledrT1PendingSlot8(8) - T1 Pending Timeslot 8
- ledrT1PendingSlot9(9) - T1 Pending Timeslot 9
- ledrT1PendingSlot10(10) - T1 Pending Timeslot 10
- ledrT1PendingSlot11(11) - T1 Pending Timeslot 11
- ledrT1PendingSlot12(12) - T1 Pending Timeslot 12
- ledrT1PendingSlot13(13) - T1 Pending Timeslot 13
- ledrT1PendingSlot14(14) - T1 Pending Timeslot 14
- ledrT1PendingSlot15(15) - T1 Pending Timeslot 15
- ledrT1PendingSlot16(16) - T1 Pending Timeslot 16
- ledrT1PendingSlot17(17) - T1 Pending Timeslot 17
- ledrT1PendingSlot18(18) - T1 Pending Timeslot 18
- ledrT1PendingSlot19(19) - T1 Pending Timeslot 19
- ledrT1PendingSlot20(20) - T1 Pending Timeslot 20
- ledrT1PendingSlot21(21) - T1 Pending Timeslot 21
- ledrT1PendingSlot22(22) - T1 Pending Timeslot 22
- ledrT1PendingSlot23(23) - T1 Pending Timeslot 23
- ledrT1PendingSlot24(24) - T1 Pending Timeslot 24
- ledrT1NotAvailable(25) - Timeslot not used

ledrT1CommitPending Map

This read-write object is used to attempt to move the pending timeslot assignments into the current area. Upon receiving a **set** command, the pending map is checked for consistency and then moved into the current operating area. Please refer to the LEDR radio manual for guidelines on what mappings are allowed.

ledrE1SpanSlotMapTable

The following table may be used to verify the span slot mapping for the fractional E1 interface. *This table only applies when the interface type of the LEDR Radio is fractional E1 for a fractional E1 interface*. Refer to the object descriptions that follow the table for additional information about each object.

Table 26. ledrE1SpanSlotMapTable Objects

Object	Description	Ref.
E1 [current] Span Slot Table	Refers to the table of the current settings of the E1 span slots	page 35
E1 [current] Span Slot Map	Refers to the current E1 span slots mapped for the span	page 35
E1 Pending Span Slot Table	Refers to the table of the pending settings of the E1 span slots	page 36
E1 Pending Span Slot Map	Refers to the pending E1 span slots mapped for the span	page 36
E1 Commit Pending Map	Used to commit the pending E1 slot map into the current table	page 36

ledrE1SpanSlotMap Table

This table contains the current list of the timeslots as they are mapped in the span

ledrE1SpanSlotMap

Each of these objects corresponds to the current E1 timeslot that has been mapped into the span. It may take the values as follows:

- ledrE1Slot1(0) - E1 Timeslot 0
- ledrE1Slot1(1) - E1 Timeslot 1
- ledrE1Slot2(2) - E1 Timeslot 2
- ledrE1Slot3(3) - E1 Timeslot 3
- ledrE1Slot4(4) - E1 Timeslot 4
- ledrE1Slot5(5) - E1 Timeslot 5
- ledrE1Slot6(6) - E1 Timeslot 6
- ledrE1Slot7(7) - E1 Timeslot 7
- ledrE1Slot8(8) - E1 Timeslot 8
- ledrE1Slot9(9) - E1 Timeslot 9
- ledrE1Slot10(10) - E1 Timeslot 10
- ledrE1Slot11(11) - E1 Timeslot 11
- ledrE1Slot12(12) - E1 Timeslot 12
- ledrE1Slot13(13) - E1 Timeslot 13
- ledrE1Slot14(14) - E1 Timeslot 14
- ledrE1Slot15(15) - E1 Timeslot 15
- ledrE1Slot16(16) - E1 Timeslot 16
- ledrE1Slot17(17) - E1 Timeslot 17
- ledrE1Slot18(18) - E1 Timeslot 18
- ledrE1Slot19(19) - E1 Timeslot 19
- ledrE1Slot20(20) - E1 Timeslot 20
- ledrE1Slot21(21) - E1 Timeslot 21
- ledrE1Slot22(22) - E1 Timeslot 22
- ledrE1Slot23(23) - E1 Timeslot 23
- ledrE1Slot24(24) - E1 Timeslot 24
- ledrE1Slot24(25) - E1 Timeslot 25
- ledrE1Slot24(26) - E1 Timeslot 26
- ledrE1Slot24(27) - E1 Timeslot 27
- ledrE1Slot24(28) - E1 Timeslot 28
- ledrE1Slot24(29) - E1 Timeslot 29
- ledrE1Slot24(30) - E1 Timeslot 30
- ledrE1Slot24(31) - E1 Timeslot 31
- ledrE1NotAvailable(32) - Timeslot not used

ledrE1SpanSlotMapPendingTable

This table contains the pending list of the timeslots that will be mapped to the span

ledrE1PendingSlotMap

Each of these read-write objects corresponds to the pending E1 timeslot mapping for the span. It may take the values as follows:

- ledrE1PendingSlot1(0) - E1 Pending Timeslot 0
- ledrE1PendingSlot1(1) - E1 Pending Timeslot 1
- ledrE1PendingSlot2(2) - E1 Pending Timeslot 2
- ledrE1PendingSlot3(3) - E1 Pending Timeslot 3
- ledrE1PendingSlot4(4) - E1 Pending Timeslot 4
- ledrE1PendingSlot5(5) - E1 Pending Timeslot 5
- ledrE1PendingSlot6(6) - E1 Pending Timeslot 6
- ledrE1PendingSlot7(7) - E1 Pending Timeslot 7
- ledrE1PendingSlot8(8) - E1 Pending Timeslot 8
- ledrE1PendingSlot9(9) - E1 Pending Timeslot 9
- ledrE1PendingSlot10(10) - E1 Pending Timeslot 10
- ledrE1PendingSlot11(11) - E1 Pending Timeslot 11
- ledrE1PendingSlot12(12) - E1 Pending Timeslot 12
- ledrE1PendingSlot13(13) - E1 Pending Timeslot 13
- ledrE1PendingSlot14(14) - E1 Pending Timeslot 14
- ledrE1PendingSlot15(15) - E1 Pending Timeslot 15
- ledrE1PendingSlot16(16) - E1 Pending Timeslot 16
- ledrE1PendingSlot17(17) - E1 Pending Timeslot 17
- ledrE1PendingSlot18(18) - E1 Pending Timeslot 18
- ledrE1PendingSlot19(19) - E1 Pending Timeslot 19
- ledrE1PendingSlot20(20) - E1 Pending Timeslot 20
- ledrE1PendingSlot21(21) - E1 Pending Timeslot 21
- ledrE1PendingSlot22(22) - E1 Pending Timeslot 22
- ledrE1PendingSlot23(23) - E1 Pending Timeslot 23
- ledrE1PendingSlot24(24) - E1 Pending Timeslot 24
- ledrE1PendingSlot24(25) - E1 Pending Timeslot 25
- ledrE1PendingSlot24(26) - E1 Pending Timeslot 26
- ledrE1PendingSlot24(27) - E1 Pending Timeslot 27
- ledrE1PendingSlot24(28) - E1 Pending Timeslot 28
- ledrE1PendingSlot24(29) - E1 Pending Timeslot 29
- ledrE1PendingSlot24(30) - E1 Pending Timeslot 30
- ledrE1PendingSlot24(31) - E1 Pending Timeslot 31
- ledrE1NotAvailable(32) - Timeslot not used

ledrE1CommitPendingMap

This read-write object is used to attempt to move the pending timeslot assignments into the current area. Upon receiving a **set** command, the pending map is checked for consistency and then moved into the current operating area. Please refer to the LEDR radio manual for guidelines on what mappings are allowed.

6.3 Framed Loopbacks

ledrLinkLoopbackMode

This read-write object is used to place the LEDR radio link into one of the following loopback modes:

- none(0) - loopback disabled
- localdigital(1) - local digital loopback prior to the modem
- remotedigital(2) - remote digital loopback prior to the modem

- remoteLocalDigital(3) - digital loopback on the remote radio
- rf(4) - RF loopback
- iOlocal(5) - any local line is in looped back
- iOremote(6) - any remote line is looped back
- iOremotelocal(7) - any line is looped back on the remote radio

This object is not used for individual line loopback modes. Please refer to Table 27 (ledrIOLoopback) for line loopbacks.

ledrIOLoopbackTable

The following table may be used to set any of the individual lines into loopback. *This table only applies when the interface type of the LEDR Radio is set to E1 or fractional T1*. Refer to the object descriptions that follow the table for additional information about each object.

Table 27. ledrIOLoopbackTable Objects

Object	Description	Ref.
I/O Loopback Table	Refers to the table used to set the individual I/O Lines into loopback mode	page 37
I/O Line Loopback enable	Refers to the object used to set the loopback mode for each I/o line	page 37

ledrIOLoopbackTable This table contains the state of the loopbacks for the I/O lines. It is indexed by the line name.

ledrIOLoopbackEnable This read-write object is used to loopback the individual I/O line which is indexed by the line name. It may take on the following values:

- active(0) - indexed line is looped back
- inactive(1) - indexed line is not looped back

6.4 Framed G821 Line Statistics

These objects are used to estimate performance of the I/O interfaces of the LEDR radio.

ledrFramedG821Table

The following table lists ledrFramedG821Table objects. Refer to the object descriptions that follow the table for additional information about each object.

Table 28. ledrFramedG821Table Objects

Object	Description	Reference
Framed G821 Table	This table contains the G821 performance statistics for each line	page 38
Link Status	The operational status of the link	page 38
Errored Seconds	A counter that represents the number of errored seconds of the link	page 38
Severely Errored Seconds	A counter that represents the number of severely errored seconds of the link	page 38

Table 28. ledrFramedG821Table Objects *(Continued)*

Object	Description	Reference
Available Seconds	A counter that represents the number of available seconds of the link	page 38
Unavailable Seconds	A counter that represents the number of unavailable seconds of the link	page 38
Error Counter Reset	Resets all of the G.821 counters to 0	page 38

ledrFramedG821Table This table is indexed by the line name and is made up of the objects which describe the LEDR G821 Performance statistics for each I/O line.

ledrFramedG821Status This read-only object displays the operational status of the line:

- error free (0) – no errors
- errored (1) – errors have been detected
- severely errored (2) – severe errors have been detected
- unavailable (3) – the link is unavailable

ledrFramedG821 ErroredSeconds This read-only object displays the number of errored seconds of the line.

ledrFramedG821 SeverelyErrored Seconds This read-only object displays the number of severely errored seconds of the line.

ledrFramedG821 AvailableSeconds This read-only object displays the number of available seconds of the line.

ledrFramedG821 UnavailableSeconds This read-only object displays the number of unavailable seconds of the line.

ledrFramedG821Reset AllCounters This read-write object resets all of the G.821 counters for the selected line at once. By setting the value to resetAll (1), all counters are reset to 0.

7.0 REDUNDANT AND PROTECTED OBJECTS

7.1 LEDR Redundant/Protected Objects

ledrRedundant

The following table lists ledrRedundant objects. Refer to the object descriptions that follow the table for additional information about each object.

NOTE: These objects are valid only when the radio exists as part of a redundant configuration.

Table 29. ledrRedundant Objects

object	Description	Reference
Associated Radio IP	The IP address of the radio associated with this radio in a redundant configuration	Page 39
Mode	The redundant mode of the radio	Page 39
Transceiver Active	Corresponds to whether the addressed radio is the active (transmitting) radio in a redundant configuration	Page 39
Default Radio	Indicates if the addressed radio is the default	
Status	Indicates the redundant status of the addressed radio	
Associated Radio Status	Indicates the status of the associated (sibling) radio	
Hitless Switching	Enables or disables the receiver hitless switching function	
Force Transceiver Switch	Forces the active radio to become inactive and the standby radio to become active	Page 40

ledrAssociateRadioIP This read-write object contains the address of the second radio (sibling) in the redundant configuration. It is used for radio-to-radio communications via the ethernet hub in the switching chassis.

ledrRedundMode This read-write object contains the redundant mode of the radio. It may contain the values:

- standAlone (0) - The radio is not in a redundant configuration
- protected1Plus1Hot (1) - The radio is part of a hot-standby redundant system
- protected1Plus1Warm (2) - The radio is part or a warm standby redundant system

ledrXcvrActive This read-only object displays whether the addressed radio is the active transmitting radio in a redundant Configuration. It can take on the following values:

- false (0) - The radio is not the active transmitter
- true (1) - The radio is the active transmitter

ledrDefaultRadio This read-only object indicates whether or not the addressed radio is the default in the redundant configuration. It may have the values:

- false (0) - The radio is not the default radio
- true (1) - The radio is the default transmitter

ledrRedundantStatus This read-only object indicates if the addressed redundant radio is in a failed state that may have or will cause a redundant switch. It may take on the values:

- ok (0) - The radio is operating correctly
- powerFailure(1) - Power has failed
- fanFailure(2) - A fan has failed

- temperatureFailure(3) - The temperature threshold has been exceeded
- pllFailure(4) - The phase-locked loop has failed

ledrAssociatedRadioStatus

This read-only object indicates if the associated redundant radio is in a failed state.

- failed (0) - The radio is operating correctly
- ok (1) - Power has failed

ledrHitlessSwitching

This read-write object allows the receiver hitless switching function to be enabled and disabled as follows:

- disable (0) - Disables the function
- enable (1) - Enables the function

TledrForceXcvrSwitch

This read-write object allows the user to force a switch of the active radio. When set to true, the active radio becomes inactive and the inactive radio becomes active.

- false (0) - Does not force a switch
- true (1) - Forces a manual switch

8.0 TRAP OBJECTS

8.1 SNMP Traps

SNMP Traps return the following type of events to the LEDR Radio in a format compatible with SNMP managers:

- Critical events adversely affect the performance of the payload data and require immediate action.
- Major events affect the performance of the non-payload features and require immediate action.
- Minor events may affect future performance and may require future action.
- Informational events generally do not require action.

SNMP Traps may be set to either SNMPv1 or SNMPv2 format. In either case, the trap object is returned in the selected format as either a trapTypev1 or trapTypev2.

The following table lists SNMP Traps. Refer to the object descriptions that follow the table for additional information about each object.

Table 30. SNMP Traps

Object	Description	Ref.
Critical Event Set	Signifies that a critical event has occurred	Page 41
Critical Event Clear	Signifies that a critical event has been cleared	Page 41
Major Event Set	Signifies that a major event has occurred	Page 41
Major Event Clear	Signifies that a major event has been cleared	Page 41
Minor Event Set	Signifies that a minor event has occurred	Page 41
Minor Event Clear	Signifies that a minor event has been cleared	Page 41

Table 30. SNMP Traps *(Continued)*

Object	Description	Ref.
Informational Event Set	Signifies that a informational event has occurred	Page 41
Informational Event Clear	Signifies that a informational event has been cleared	Page 41
Alarm Input Event Set	Signifies that a critical alarm input is active	page 41
Alarm Input Event Clear	Signifies that a critical alarm input is inactive	page 41
Event Object	Represents the most recently sent event trap	Page 41

ledrCriticalEventSet This trap object signifies that a critical event as specified in the eventObject has occurred.

ledrCriticalEventClear This trap object signifies that a critical event as specified in the eventObject has been cleared.

ledrMajorEventSet This trap object signifies that a major event as specified in the eventObject has occurred.

ledrMajorEventClear This trap object signifies that a major event as specified in the eventObject has been cleared.

ledrMinorEventSet This trap object signifies that a minor event as specified in the eventObject has occurred.

ledrMinorEventClear This trap object signifies that a minor event as specified in the eventObject has been cleared.

ledrInfoEventSet This trap object signifies that an informational event as specified in the eventObject has occurred.

ledrInfoEventClear This trap object signifies that an informational event as specified in the eventObject has been cleared.

ledrAlarmInputSet This trap object signifies that a critical alarm input has gone active.

ledrAlarmInputClear This trap object signifies that a critical alarm input has gone inactive.

ledrEventObject This trap object represents the most recently sent event trap. It may be a critical, major, minor, or informational event:

- extAlarmIn1 (0)
- extAlarmIn2 (1)
- extAlarmIn3 (2)
- extAlarmIn4 (3)
- modulatorEv (4)
- demodulatorEv (5)
- modSelfTest (6)
- demodSelfTest (7)
- permRegnChecksum (8)
- app1RegnChecksum (9)
- app2RegnChecksum (10)
- bootRegnChecksum (11)

- conf1RegnChecksum (12)
- conf2RegnChecksum (13)
- rtcTest (14)
- bbramTest (15)
- batteryLow (16)
- txSynthLock (17)
- rxSynthLock (18)
- digPowerRef (19)
- temperature (20)
- txPowerLoop (21)
- demodSnrLow (22)
- demodAgcRssi (23)
- demodFecRecover (24)
- demodFecUnrecover (25)
- demodMultipath (26)
- demodAcquisition (27)
- txToRemoteRx (28)
- redundantAlarm (29)
- wdogTimeOut (30)
- rxOff (31)
- softwareTxOff (32)
- rtcNotSet (33)
- io1DigLocLoopback (34)
- io2DigLocLoopback (35)
- io3DigLocLoopback (36)
- io4DigLocLoopback (37)
- rfLocalLoopback (38)
- io1DigRemLoopback (39)
- io2DigRemLoopback (40)
- io3DigRemLoopback (41)
- io4DigRemLoopback (42)
- rawServiceChannel (43)
- atodReference (44)
- newConfigRev (45)
- fpgaLoad (46)
- dateTimeChange (47)
- hardwareTxOff (48)
- inactiveOn (49)
- noOptionUnit (50)
- vocoderInitErr (51)
- vocoderError (52)
- powerOnReset (53)
- extHardReset (54)
- extSoftReset (55)
- inactConfigSync (56)
- newFirmwareLoaded (57)
- d (58)
- selftestComplete (59)
- performDegraded (60)
- duplicateUnitId (61)
- linkUnavailable (62)
- eventLogCleared (63)
- fan1Trouble (64)
- fan2Trouble (65)

Refer to the LEDR Radio manual for a complete description of each event object.

ledrExtAlarmInput

This object contains the name of the most recent external alarm input that caused an alarm trap to be generated. It is sent along with the alarm input traps.

9.0 GLOSSARY

If you are new to digital radio systems and SNMP, some of the terms used in this guide may be unfamiliar . The following glossary defines many of these terms, and will prove helpful in understanding the operation of the LEDR Radio.

AMI

Alternate Mark Inversion. A bipolar format where consecutive marks (ones) have the polarity inverted. Spaces (ones) are represented by zero volts. This technique prevents long sequences of positive or negative voltages.

BERT

Bit-error rate test. The results of a BERT are normally expressed as a ratio (power of 10) of the number of bits received in error compared to the total number received.

BER

Bit-error rate. See also *BERT*.

Bit

Binary digit. The smallest unit of digital data, often represented by a one or a zero. Eight bits usually comprise a byte.

bps

Bits-per-second. A measure of the information transfer rate of digital data across a communication channel.

Console Port

The radio port used for to manage, control and monitor a local radio through an ASCII based protocol interface.

dBi

Decibels of gain relative to an isotropic radiator. (A hypothetical antenna which radiates equally in all directions.) Used to express antenna gain.

dBm

Decibels relative to one milliwatt. An absolute unit used to measure signal power, as in transmitter power output, or received signal strength.

Decibel (dB)

A measure of the ratio between two signal levels. Frequently used to express the gain or loss of a system.

DRAM

Dynamic Random Access Memory.

DSP

Digital Signal Processing. Advanced circuit technique to increase radio performance, primarily in modulation and demodulation.

E1

An international telephony standard that operates at 2.048 megabits-per-second (Mbps). This transmission speed is commonly used throughout the world except for North America (which uses T1 1.544 Mbps). Framed E1 consists of 30 digitized telephone channels and two 64 Kbps control channels.

FEC

Forward Error Correction. An algorithm capable of detecting errors in a data stream and correcting them.

FPGA

Field Programmable Gate Array.

Fresnel Zone

A point of maximum width or girth of the transmitted radio signal. Obstructions in this region (the “first Fresnel zone”) can have a detrimental effect on reception quality. As a general rule, 60 percent of the first Fresnel zone should be free of obstructions in a well designed system. (Additional considerations are also required when planning a microwave path.

G.821

The ITU standard by which data transmission quality is measured. The analysis considers available vs. unavailable time.

HDB3

High density bipolar order of 3. A line interface standard for E1 transmission that employs coding to eliminate data streams with four or more consecutive zeros.

IETF

Internet Engineering Task Force.

IP

Internet Protocol.

kbps

Kilobits-per-second.

Linecode

Refers to the data coding format used by the radio for the line interface. (It does not pertain to the radio's modulation coding.) The available linecode selections are HDB3 and AMI.

Mbps

Megabits-per-second.

MIB

Management Information Base. A database of mobjects that can be monitored by a Network Management System.

Multiplexer

A signal processing unit that combines multiple streams of data into one for transmission across a single data channel.

NMS

Network Management System.

Payload

The EIA-530 data transmitted or received by the radio independent of the network management protocol.

Raw Service Channel

The radio channel used to provide network management.

RSSI

Received signal strength indication. Expressed in dBm.

SNMP

Simple Network Management Protocol.

SNR

Signal-to-noise ratio. Expressed in decibels (dB).

SRAM

Static Random Access Memory.

TCP/IP

Transmission Control Protocol / Internet Protocol.

Telnet

Part of the TCP/IP suite of internet protocols. Enables a user to log on to a remote computer and enter commands as if using a text-based terminal.

TFTP

Trivial File Transfer Protocol. A standard network protocol used to send and receive files between two devices.

Trap

An asynchronous event and alarm indication generated by means of SNMP.

IN CASE OF DIFFICULTY...

MDS products are designed for long life and trouble-free operation. However, this equipment, as with all electronic equipment may have an occasional component failure. The following information will assist you in the event that servicing becomes necessary.

FACTORY TECHNICAL ASSISTANCE

Technical assistance for our products is available from our Customer Support Team during business hours (8:00 A.M.–5:30 P.M. Eastern Time). When calling, please give the complete model number of the radio, along with a description of the trouble symptom(s) that you are experiencing. In many cases, problems can be resolved over the telephone, without the need for returning the unit to the factory.

Please use the following telephone numbers for product assistance:

716-242-9600 (Phone)

716-242-9620 (FAX)

FACTORY REPAIRS

Component-level repair of radio equipment is *not* recommended in the field. Many components are installed using surface mount technology, which requires specialized training and equipment for proper servicing. For this reason, the equipment should be returned to the factory for any PC board repairs. The factory is best equipped to diagnose, repair and align your radio to its proper operating specifications.

If return of the equipment is necessary, you will be issued a Returned Material Authorization (RMA) number. The RMA number will help expedite the repair so that the equipment can be repaired and returned to you as quickly as possible. Please be sure to include the RMA number on the outside of the shipping box, and on any correspondence relating to the repair. *No equipment will be accepted for repair without an RMA number.*

A statement should accompany the radio describing, in detail, the trouble symptom(s), and a description of any associated equipment normally connected to the radio. It is also important to include the name and telephone number of a person in your organization who can be contacted if additional information is required.

The radio must be properly packed for return to the factory. The original shipping container and packaging materials should be used whenever possible. All factory returns should be addressed to:

Microwave Data Systems Inc.
Customer Service Department
(RMA No. XXXX)
175 Science Parkway
Rochester, NY 14620 USA

When repairs have been completed, the equipment will be returned to you by the same shipping method used to send it to the factory. Please specify if you wish to make different shipping arrangements.

Microwave Data Systems Inc.

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Web: www.microwavedata.com