Digital Energy
MDS

LEDR Series

Scalable, Long Range Licensed Point-to-Point

Backhaul | Subrate and Fullrate

The MDS LEDR Series provides full duplex and scalable bandwidth in both subrate and fullrate models. Designed to connect to industry-standard sources, the LEDR Series is available in protected configurations with displays, integrated web servers, and management systems.

Key Benefits

- Deployment flexibility gained with multiple frequency options
- Scalable throughput based on channel size desired and selectable modulation (64 – 768 kbps subrate and up to 8.192 Mbps fullrate)
- Long range resulting from excellent sensitivity (-102 dBm subrate and -89 dBm fullrate) and licensed support in propagation-friendly frequencies
- Highly robust communications with forward error correction (FEC), interleaver, and adaptive equalizer

Application Specific Wireless Solution

Energy & Utilities

- SCADA and substation backhaul, fiber extensions, voice/PBX, video surveillance, and LAN/WAN backhaul, building connectivity, and cellular/ carrier backhaul

Water & Wastewater

- SCADA and water monitoring facility backhaul, fiber extensions, video surveillance and LAN/WAN backhaul, building connectivity

Oil & Gas

- Pump on and pump off SCADA control backhaul, WAN networks for Oil company remote offices, backhaul for oil field, backhaul for disaster recovery, video surveillance, and voice/PBX connectivity

Public Safety

- Trunked radio repeater control, leased line replacement, voice/PBX connectivity

Private Network

- One time investment; no recurring leased fees
- Single, cost-effective solution for voice and data (E1/T1)
- Dedicated bandwidth—not sharing with other outside users
- Network Operations Center (NOC) "chain of custody" control—not dependent on external NOC

Flexible Configuration

- Optional interfaces for direct connection to fractional E1/T1 or full E1s
- Optional 1+1 hot standby protected configuration
- Optional space diversity
- Configurable for multiple frequency ranges including 330 MHz to 512 MHz, 800 MHz to 960 MHz, and 1350 MHz to 1535 MHz

Advanced Management

- Front panel displays for easy maintenance and link monitoring
- Built-in NMS element manager
- SNMP network management for Fault, configuration, performance and security management
- Integrated HTML web server allows network wide management via the Internet
- Built-in 9600 bps data service channel
- Local loopback and remote loopback
- 8 Relay alarm contacts per radio
- DTMF compatible orderwire

imagination at work

Specifications

GENERAL	
Frequency Bands (Subrate)	
Non-ETSI	400S: 330-512 MHz 900S: 800-960 MHz 1400S: 1350-1535 MHz
ETSI	1400S: 1350-1535 MHz
Frequency Bands (Fullrate)	
Non-ETSI	400F: 330-512 MHz 900F: 800-960 MHz 1400F: 1350-1535 MHz
ETSI	1400F: 1350-1535 MHz
Channel size (Subrate)	
Non-ETSI	25, 50, 100, 200 kHz
ETSI	25, 75, 250 kHz
Channel size (Fullrate)	
Non-ETSI	500 kHz, 1 MHz, 2 MHz
ETSI	500 kHz, 2 MHz
Data rates (Subrate)	
Non-ETSI	64, 128, 256, 384, 512, 768 kbps
ETSI	64, 128, 768 kbps (fractional E1/ T1 available at 768 Kbps)
Data rates (Fullrate)	
Non-ETSI	1-E1 up to 4-E1
ETSI	1xE1, 3xE1
Modulation (Subrate)	
Non-ETSI	32-QAM, 16-QAM, QPSK
ETSI	16-QAM
Modulation (Fullrate)	
Non-ETSI	32-QAM, 16-QAM, QPSK
ETSI	32-QAM
Voltage range	
Non-ETSI	±12 Vdc (w/external power supply), ±24 Vdc or ±48 Vdc (±20%)
ETSI	±24 Vdc or ±48 Vdc (±20%)
Voltage range (Fullrate)	
Non-ETSI	±12 Vdc (w/external power supply), ±24 Vdc or ±48 Vdc (±20%)
ETSI	±24 Vdc or ±48 Vdc (±20%)

TRANSMITTER	
Output control range	10 steps of up to 10 dB
Frequency stability	1.5 ppm
Output power	+30dBm
TRANSMITTER	
Residual BER	$<1x10^{-6}$
Dynamic range	>65 dB
INTERFACES	
Data	EIA-530 / G.703 (option available)
Orderwire	DTFM capable
Data Service Channel	RS-232, 300 – 9600 bps
Ethernet NMS	10 Base-T
Console Port	RS-232, 300 bps – 115.2 Kbps
Alarms	4 programmable outputs, 4 programmable inputs
Antenna	50 Ohms impedance
NETWORK MANAGEMENT	
Local LED Indicators	Front panel LED status indicate: Power, Active, General Alarm, Rx Alarm, Tx Alarm, I/O Alarm
Front Panel LCD	Display & keypad for management of local & remote radio
Element Management	Full management of LEDR network via command line interface
SNMP Management	Full IP- based management of LEDR network and SNMP-enabled peripherals via customer enterprise MIB
HTML Webserver	Full IP-based management of LEDR network and web-enabled peripherals via web browser
ENVIRONMENTAL	
Temperature	-10C to +50C
Humidity	< 95% non-condensing

ELECTRICAL	
Power Consumption	< 60W (non protected), < 135W (protected)
MECHANICAL	
Dimensions	4.5 H (1U) x 48 W x 30 D cm (1.75 H x 19 W x 12 D in)
AGENCY APPROVALS	
LEDR 400S & 400F	
Transmission	FCC Part 90, 74, 22, IC RSS-119
EMC	ETS 300 385 (LEDR 400S), FCC Part 15
LEDR 900S & 900F	
Transmission	FCC Part 101, IC RSS-119
EMC	FCC Part 15
LEDR 1400S & 1400F	
Transmission	ETS 300 630, MPT 1717 Class 3
Environmental	ETS 300 019, Class 3.2
EMS	ETS 300 385
Safety	CE Mark
MISCELLANEOUS	
Options	Space Diversity Hot-standby Protected Bandwidth Upgrade Kits (consult factory) Bandpass Duplexers
Accessories	110/240 Vac, 50/60 Hz Power Supply Orderwire Handset G.703 120 Ohms to 75 Ohms balun
Protected	Configuration: 2 x LEDR radios, connected via protected switch box Total size: 2 x 1 RU high + 1 x 2 RU high Transmit/Receive Branching Loss: 2 dB/5 dB Receive Switching: Hitless

System Performance Fullrate, Non-ETSI

Channel Spacing	500 kHz	1.0 MHz	2.0 MHz
Capacity	1 x E1	2 x E1	4 x E1
Receiver Sensitivity (10^{-6} BER)[1] (32 QAM)	-89 dBm	-86 dBm	-83 dBm
System Gain (10^{-6} BER) (32 QAM)	119 dB	116 dB	113 dB

Modulation Type	Threshold Differential	Norm System Gain Differential
QPSK	-4.5 dB	-5.5 dB
16 QAM	-1.5 dB	-2.5 dB
32 QAM	0 dB	0 dB

1. Receiver sensitivity for 10-3 BER are typically 3 dB better
2. Additional overhead channels over and above capacity shown

System Performance Subrate, Non-ETSI

Channel Spacing	25 kHz	50 kHz	100 kHz	200 kHz
Capacity*	64 kbps	128 kbps	256 kbps	768 kbps
Receiver Sensitivity (10^{-6} BER)[1] (32 QAM)	-101 dBm	-99 dBm	-96 dBm	-91 dBm
System Gain (10^{-6} BER) (32 QAM)	131 dB	127 dB	126 dB	121 dB

Modulation Type	Threshold Differential	Norm System Gain Differential
QPSK	-4.5 dB	-5.5 dB
16 QAM	-1.5 dB	-2.5 dB
32 QAM	0 dB	0 dB

1. Receiver sensitivity for 10-3 BER are typically 3 dB better

System Performance Fullrate, ETSI

Channel Spacing	500 kHz	2.0 MHz
Capacity	1 x E1	3 x E1
Receiver Sensitivity (10^{-6} BER)[1] (32 QAM)	-89 dBm	-83 dBm
System Gain (10^{-6} BER) (32 QAM)	119 dB	113 dB

System Performance Subrate, ETSI

Channel Spacing	25 kHz	75 MHz	250 kHz
Capacity plus overhead	72 kbps	152 kbps	800 kbps
Capacity w/o overhead	64 kbps	128 kbps	768 kbps
Receiver Sensitivity (10^{-6} BER)[1] (32 QAM)	-101 dBm	-99 dBm	-91 dBm
System Gain (10^{-6} BER) (32 QAM)	131 dB	127 dB	121 dB

Fractional T1/E1 Interface Card

General Specifications	
Line rate	T1 (1.544 Mbps); E1 (2.048 Mbps)
Channel size	200 kHz
Data rate	768 kbps (12 x 64 kbps)
Framing	SF, ESF (T1), FAS, CAS, CRC (E1)
Signaling	RBS (T1); Time Slot 16 CAS (E1)
Line codes	AMI, B8ZS, B7ZS (T1), AMI, HDB3 (E1)
Interface	RJ48C Balanced Interface, 100 Ohms (T1), 120 Ohms (E1)
Physical	
Size	15.24 cm x 12.7 cm (6 in x 5 in)
Configuration	Option card, fitted internal to LEDR chassis
Availability ETSI	Fractional and full E1 (1400S)
Availability Non-ETSI	Fractional T1 (400S, 900S, 1400S) Fractional E1 (400S, 900S, 1400S) Full E1 (400F, 900F, 1400F)

To order the LEDR visit www.GEMDS.com/LEDR