

LRS-52

Managed SHDSL Modem Rack



FEATURES

- SHDSL transparent modem rack with SNMP management
- Operates over 2-wire and 4-wire lines, enabling service over any copper infrastructure
- Utilizes TC-PAM line coding for extending the operation range to 9.5 km (5.9 miles) while eliminating the need for repeaters
- Multiple data rates between 64 kbps and 4608 kbps enabling single-platform system upgrades
- Six, twelve, or twenty four V.35, X.21, or G.703/G.704 E1 DTE interfaces
- Each port operates in point-to-point configuration enabling independent connection of remote units
- Operates opposite RAD's ASMi-52 modems
- Embedded operation channel for end-to-end system management and supervision as per ITU-T G.991.2
- Operates in internal, external, or station clock modes
- Management via ASCII terminal, Telnet hosts or RADview-EMS
- Allows daisy-chaining of several units via Ethernet ports for uninterrupted management
- Extensive diagnostics, including loopbacks and performance monitoring of SHDSL and E1 links
- Optional dual hot-swappable power supply modules for load sharing and redundancy
- Alarm relay via dedicated pins on the station clock connector

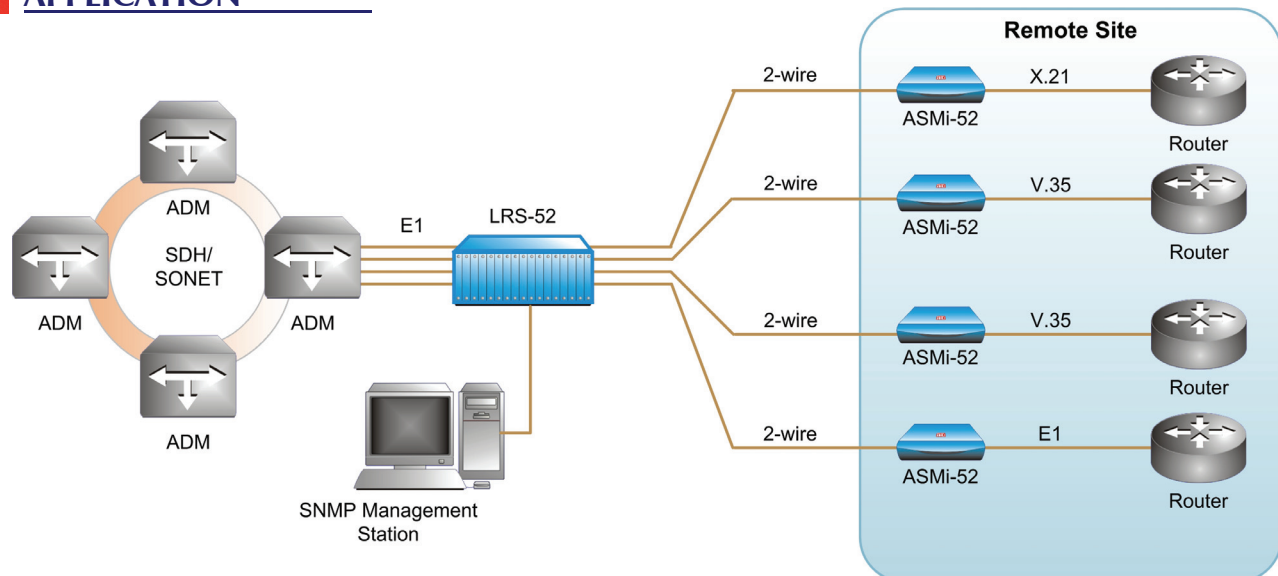
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DESCRIPTION

- LRS-52 is a managed SHDSL modem rack, operating in full-duplex mode over 2-wire and 4-wire lines.
- Multiple data rates in the range of 64 to 4608 kbps are supported. The data rate depends on the line interface, DTE interface types, and operating clock modes.
- LRS-52 employs standard SHDSL TC-PAM technology to extend the transmission range (see *Table 1*), enabling carriers to reach more customers at lower costs.
- The following DTE interfaces are available:
 - V.35
 - X.21
 - G.703/G.704 E1.
 2-wire units include up to 24 DTE ports, 4-wire units include up to 12 DTE ports.
- Control and monitoring of the remote units is performed via an Embedded Operation Channel (EOC) for the unit. The management channel operates without interfering with the data transmission, in compliance with ITU-T G.991.2 requirements.
- LRS-52 operates in a CO (central office) mode with the following timing options:
 - Internal – All ports operate in CO mode and receive clocking from a built-in oscillator
 - External – All ports operate in CO mode and receive clocking from adjacent DTEs
 - Station Square – All ports operate in CO mode and receive RS-422 square-wave signals from an external dedicated station clock source
 - Station G.703 – All ports operate in CO mode and receive G.703 unframed “all 1s” signals from an external dedicated station clock source
 - Mixed – All ports operate in CO mode, and each of them can be individually set to operate with a master clock (internal or station) or an external clock.
- Each 4-wire line port can be configured to operate over 2-wire lines.
- The minor and major alarms are relayed to a remote alarm device via dedicated pins of the DB-15 rear panel station clock connector.
- Supervision and configuration activities are performed using ASCII terminals, IP hosts using the Telnet protocol, or RADview-EMS – a Java-based, modular, client-server, scalable element management system, providing secure configuration and fault management capabilities.
- One of the Ethernet management ports is configured for direct hub connection. The other Ethernet port is configured for LAN cross-connection. Several units can be managed by daisy-chaining their Ethernet ports.
- Comprehensive diagnostic capabilities include:
 - Real-time alarms to alert user on fault conditions
 - V.54 local analog and remote digital loopbacks
 - SHDSL and E1 statistics collection for 15-minute and day intervals.

APPLICATION



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Table 1. Typical operating Ranges over 26 AWG Lines

Data Rate [kbps]	2-wire		4-wire	
	[km]	[miles]	[km]	[miles]
64	7.2	4.5	–	–
128	6.4	4.0	7.2	4.5
256	6.3	3.9	6.4	4.0
512	5.9	3.7	7.2	4.5
1024	4.3	2.7	5.9	3.7
2048	3.5	2.2	4.7	2.9
2304	3.4	2.1	4.4	2.7
4096	–	–	3.5	2.2
4608	–	–	3.2	2.0

Notes:

- Typical ranges are based on error-free, real line lab tests without noise.
- LRS-52 supports higher data rates (2304 kbps over 2-wire and 4608 kbps over 4-wire) when it is equipped with a serial DTE interface and operates in external clock mode.


SPECIFICATIONS
LINE INTERFACE

- **Type**
2/4-wire unconditioned dedicated line (twisted pair)
- **Number of Ports**
 - 2-wire: 12 or 24 ports
 - 4-wire: 6 or 12 ports
- **Line Coding**
TC-PAM
- **Range**
See Table 1
- **Impedance**
135Ω
- **Standards**
 - ITU-T G.991.2
 - ETSI TS 101 524
- **Connector**
RJ-45

DTE INTERFACE

- **Type and Connector**
 - V.35: DB-25, female (via CBL-HS2/V1/M adapter cable, see *Ordering*)
 - X.21: DB-25, female (via CBL-HS2/X2/52/M adapter cable, see *Ordering*)
 - E1: RJ-45
- **Number of Ports**
 - 2-wire: 12 or 24 ports
 - 4-wire: 6 or 12 ports
- **Data Rate**
Depends on the DTE/line interface type, and clock mode:
 - 2-wire: 64–2304 kbps
 - 4-wire: 64–4608 kbps
- **E1 Coding**
HDB3
- **E1 Line Impedance**
 - 120Ω, balanced
 - 75Ω, unbalanced

MANAGEMENT

- **ASCII Terminal**
 - Interface: V.24/RS-232, DTE/DCE
 - Format: 7 or 8 bits; odd, even or no parity
 - Baud rate: 9.6, 19.2, 38.4, 57.6, 115.2 kbps
 - Connector: 9-pin, D-type, female
- **Ethernet Ports**
 - Number of ports: two, straight and cross
 - Protocol: Telnet
 - Connector: RJ-45

GENERAL

- **Timing**
 - Internal, from internal oscillator
 - External, from attached DTE
 - Station square, from an external dedicated square-wave station clock source
 - Station G.703, from an external dedicated G.703 station clock source
- **Diagnostics**
Loopbacks:
 - Local analog loopback in compliance with ITU V.54
 - Remote digital loopback in compliance with ITU V.54
 Performance monitoring:
 - SHDSL and CRC-6 statistics collection
 - E1 with CRC-4: per ITU G.706
 - E1 without CRC-4: BPV

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• Front Panel Indicators

- PS1/2 (green) – Power supply is On
- ALARM (red) – Alarm is present
- TEST (red) – Test is active

• Rear Panel Indicators

General:

- POWER (green/red) – A power supply is On (green) or Off (red)
- TST (red) – Test in progress
- ALM (red) – An alarm enters the buffer

DSL:

- SYNC (green/red) – Sync status of DSL line (2-wire only)
- SYNC A/B (green/red) – Sync status of DSL line A or B (4-wire only)

E1:

- SYNC (red) – Loss of E1 sync
- AIS (yellow) – “All 1s string” is received

Ethernet:

- ACT (green) – Ethernet traffic status
- LINK (yellow) – Ethernet link integrity

• Physical

- LRS-52/E1:
Height: 88 mm (3.4 in)
Width: 438 mm (17.2 in)
Depth: 240 mm (9.4 in)
- LRS-52/V.35, LRS-52/X.21:
Height: 133 mm (5.2 in)
Width: 438 mm (17.2 in)
Depth: 240 mm (9.4 in)
Weight: 5–9 kg (11–20 lbs), depending on the option

• Power

- AC: 100–240 VAC, 50–60 Hz, 100 VA max
- DC: -48 VDC nominal, 2A, 100W max

Notes: Two hot-swappable power supply modules can be installed for redundancy and load-sharing. AC and DC power modules cannot be installed together in the same unit.

• Environment

- Temperature: 0°–50°C (32°–122°F)
- Humidity: Up to 90%, non-condensing

ORDERING

LRS-52*/\$/#

Managed SHDSL modem rack

* Specify power supply:

AC for 100 to 240 VAC

DC for -48 VDC

ACR for AC power supply with redundancy

DCR for DC power supply with redundancy

\$ Specify DTE interface type:

E1B for E1 balanced interface

E1U for E1 unbalanced interface

V35 for V.35 interface

X21 for X.21 interface

Specify the number and type of ports:

24/2W for 24 ports, 2-wire

12/2W for 12 ports, 2-wire

12/4W for 12 ports, 4-wire

6/4W for 6 ports, 4-wire

SUPPLIED ACCESSORIES

AC power cord (when AC power supply is ordered)

PLUG-DC/TB/J (when DC power supply is ordered)

CBL-RJ45-2BNC/E1 (when unbalanced E1 is ordered)

CBL-HS2/V/1/M (when V.35 is ordered)

CBL-HS2/X2/52/M (when X.21 is ordered)

OPTIONAL ACCESSORIES

RM-36

Hardware for mounting one LRS-52/E1 unit in an ETSI or ANSI-type 19-inch rack

RM-38/ETSI

Hardware for mounting one LRS-52/V.35 or LRS-52/X.21 unit in an ETSI-type 19-inch rack

RM-38/ANSI

Hardware for mounting one LRS-52/V.35 or LRS-52/X.21 unit in an ANSI-type 19-inch rack

CBL-DB9F-DB9M-STR

Control port cable



data communications

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