

ASMi-54L

SHDSL.bis Modem



- Managed modem transmitting full-duplex at data rates of up to 5.7 Mbps over 2-wire and 11.4 Mbps over 4-wire lines
- Dual Bearer mode for E1 and Ethernet HDLC
- Extended rates of up to 11.4/15 Mbps over 2-wire with RAD proprietary solution
- SHDSL bonding – for EFM: PAF according to IEEE802.3, for HDLC: M-Pair according to ITU-T G.991.2
- 4-port 10/100BaseT interface with integrated Ethernet switch
- Full interoperability with Megaplex-4/LRS-102 ASMi-54C and ASMi-54C/N modules in point-to-point application

ASMi-54L is a simple, cost-effective, dedicated managed SHDSL.bis modem that extends the range of high-speed services over existing copper pairs.

A special RAD proprietary solution provides the extended rates of up to:

- 15 Mbps over 2-wire lines (30 Mbps over 4-wire lines) for EFM encapsulated data
- 11.4 Mbps over 2-wire line (22.8 Mbps over 4-wire lines) for HDLC encapsulated data.

SHDSL/SHDSL.BIS

The modem employs TPS-TC framing 64/65o for EFM (IEEE802.3) and HDLC (G.991.2) on the SHDSL/SHDSL.bis link.

ASMi-54L performs line probing according to G.991.2. When enabled, the DSL interface adapts its rate to the condition of the line (noise, loop attenuation, etc.). When disabled, traffic on the DSL line is transmitted at a fixed rate selected by the user.

ASMi-54L can operate as a CO device or a CPE device according to user configuration.

The modem uses an Embedded Operation Channel (EOC) for controlling and monitoring the SHDSL/SHDSL.bis repeaters. Up to eight SHDSL/SHDSL.bis repeaters can be installed in line to increase the operation range of E1- and Ethernet-based modems.

EFM BONDING

EFM bonding on the Ethernet interface ensures that a failure or addition of a link does not drop the traffic being transmitted over other wires in the group. The capacity of the group does not decrease when a new link is added at a lower rate.

ETHERNET

ASMi-54L features up to four Ethernet 10/100BaseT ports with half/full-duplex, autonegotiation and flow control. The fault propagation functionality enables the unit to shut down the Ethernet user port when an SHDSL line failure is detected. LANs are connected by bridging.

The internal forwarding of Ethernet traffic can be configured in two ways:

- By specifying the ports (a mode identified as **unaware** in accordance with Metro Ethernet Forum (MEF) standards). In this mode, all the Ethernet traffic reaching one of the ports is forwarded to the other port, and vice versa
- By using VLANs for classification: (a mode identified as **aware** in accordance with Metro Ethernet Forum (MEF) standards). In this mode, Ethernet traffic reaching one of the ports is forwarded to another port in accordance with its VLAN identifier

In VLAN aware mode, VLAN ID is presented in the MAC table, and the packets can be forwarded according to both MAC address and VLAN ID.



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TRAFFIC MANAGEMENT /QOS

The 802.1D, DSCP, Per Port, and Per VLAN ID priority schemes allow users to define different QoS levels according to application requirements.

The modem implements the IEEE's 802.1q standards to provide VLAN-tagging with four levels of prioritization, enabling carriers to offer differentiated Ethernet services.

VLAN tagging can also be employed to separate traffic, ensuring transparency of the customer traffic and bolstering security of management traffic. The user can activate or deactivate the priority mechanism, and each priority (VLAN priority, DSCP, per port, or per VLAN ID) can be configured and mapped to one of four priority queues.

Ingress data rate can be limited on each Ethernet port.

MANAGEMENT AND SECURITY

The ASMi-54L unit can be managed using the following connections:

- Local RS-232 terminal
- Telnet server, SNMP (Ver.1)
- Web server
- Inband management with or without dedicated VLAN.

ASMi-54L management traffic is protected with the Access Control List (ACL).

OAM

ASMi-54L complies with the IEEE 802.3ah (IEEE 802.3-2005) standard for Operation, Administration, and Maintenance (OAM), originally developed for Ethernet in the First Mile (EFM) applications. OAM is a set of functions designed to monitor network operation on an SHDSL line, in order to detect line faults and measure performance.

RESILIENCY

Dying Gasp condition occurs if there is an interruption in the ASMi-54L power source. ASMi-54L reports power failures to the specified network management stations by sending an SNMP trap. This helps a service provider identify and isolate the end-point device that experienced a power failure.

PHYSICAL

ASMi-54L is supplied in 1U-high plastic or metal 8.5 inch enclosures.

Modems in metal and plastic enclosures can be mounted alone or in pairs in a 19-inch rack using RAD's optional mounting kits.

Both plastic and metal enclosures are available in the extended temperature versions (by special request).

Specifications

SHDSL LINE INTERFACES

Line Type

Symmetrical PSD, 2/4-wires unconditioned dedicated line (twisted pair)

EFM Bonding

Per IEEE802.3ah and ITU-T G.991.2 (for Ethernet only)

OAM

According to IEEE 802.3ah (passive and active)

Line Coding

TC-PAM 16/32/64/128

Max. Frame Size

2047 bytes

Line Rate

Up to 5.7 Mbps over 2-wire and 11.4 Mbps over 4-wire lines

Extended Rate

License key for extended rate transmitting:

- For EFM encapsulation: 192 to 15296 kbps in steps of $n \times 64$ kbps for each pair
- For HDLC encapsulation: 192 to 11456 kbps in steps of $n \times 64$ kbps for each pair

Range

See *Table 1*.

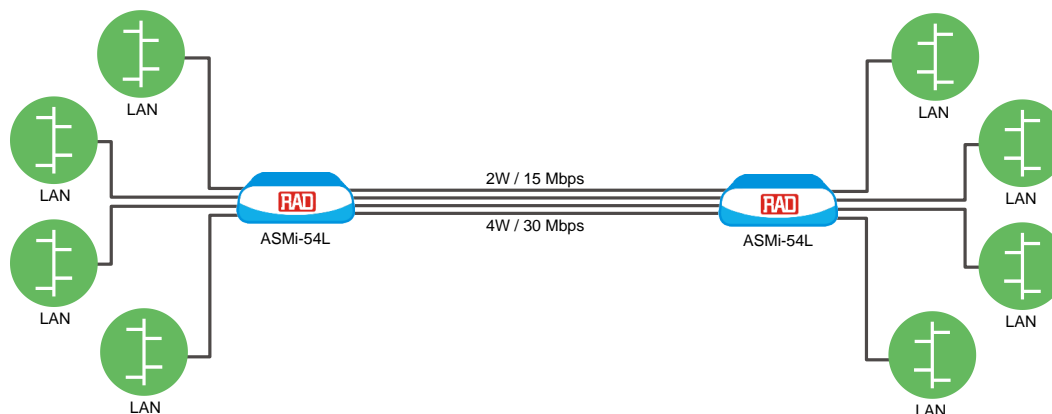


Figure 1. Extended Rates over 2- and 4-wire Lines (EFM Encapsulation)

Impedance

135Ω

Connectors

RJ-45

Compliance

ITU-T G.991.2, ETSI TS 101524

E1 USER INTERFACE

Coding

HDB3

Impedance

120Ω, balanced
75Ω, unbalanced (via adapter cable)

Jitter

As per ITU G.823

Connectors

RJ-45

Diagnostics

Local analog loopback
Remote digital loopback

Table 1. Typical Ranges
(26 AWG, noise free)

Data Rate [kbps]	Range	
	[km]	[miles]
192	6.6	4.1
1536	4.9	3.0
2048	4.5	2.8
4096	3.2	2.0
4608	3.0	1.9
5696	2.6	1.6
11400	1.2	0.7

ETHERNET INTERFACES

Type

10/100BaseT

Ports Number

4

Connectors

RJ-45

Max. Frame Size

2047 bytes

CONTROL PORT

Interface

V.24/RS-232

Type

DCE

Format

Asynchronous; 8 bits, 1 stop bit, no parity

Rate

9.6, 19.2, 115.2 kbps

Connector

9-pin, D-type, female

INDICATORS

Front Panel

PWR (green) -

On: power supply is on
Off: power supply is off

TST (yellow) -

On: a test is active
Off: no test is active

ALM (red) -

On: new alarm in the alarm buffer
Off: no alarms in the alarm buffer

SHDSL SYNC (green/red) -

Green: the SHDSL line is synchronized and can transfer data
Green flashing: the SHDSL line is in training process
Red flashing: the SHDSL line is in PAF/M-pair establishment stage
Red: the SHDSL line is either not synchronized, or in training process, or in PAF/M-pair establishment stage

Rear Panel

Ethernet Ports LINK/ACT (per port)
ACT (yellow) -
Flashing: Ethernet traffic on the port
LINK (green) -
On: Ethernet port link is up
Off: No Ethernet link on the port
E1 LOC (red) -
On: Loss of signal or sync loss (in framed mode only) or unframed AIS is received on the E1 port
E1 REM (red) -
On: Remote alarm is received on the E1 port

TIMING

System Clock

For CO mode:
Internal - derived from the modem
External - derived from E1 port

For CPE mode:
Receive - derived from the SHDSL line

SHDSL Clock

For ASMi-54L with E1+Ethernet user interfaces:
Clock Mode 1 or 2
For ASMi-54L with Ethernet user interface only:
Clock Mode 3a

PERFORMANCE MONITORING

SHDSL and E1 statistics collection

GENERAL

Power

Wide-range AC/DC power supply:
100 to 240 VAC
-48 to -60 VDC nominal
DC power supply: 24 VDC nominal

ASMi-54L**SHDSL.bis Modem****Physical**

Plastic enclosure:

Height: 43.7 mm (1.7 in)

Width: 220 mm (8.6 in)

Depth: 170 mm (6.7 in)

Weight: 0.6 kg (1.2 lb)

Metal enclosure:

Height: 43.7 mm (1.7 in)

Width: 215.5 mm (8.5 in)

Depth: 153 mm (6.0 in)

Weight: 0.7 kg (1.5 lb)

Environment

Temperature: 0° to 50°C (32° to 122°F)

Extended temperature (4 x ETH interface

version only): -20° to 70°C

(-4° to 158°F)

Humidity: Up to 90%, non-condensing

Ordering**RECOMMENDED CONFIGURATIONS****ASMi-54L/4ETH/2W/ETR****ASMi-54L/4ETH/4W/ETR****ASMi-54L/24V/4ETH/4W/ETR****ASMi-54L/4ETH/4W/E1/ETR****ASMi-54L/4ETH/2W/E1****ASMi-54L/4ETH/4W/E1****ASMi-54L/4ETH/4W****SPECIAL CONFIGURATIONS**

Please contact your local RAD partner for additional configuration options

SUPPLIED ACCESSORIES

Power cord

AC/DC adapter for -48 VDC

OPTIONAL ACCESSORIES**RM-33-2**

Hardware kit for mounting one or two plastic ASMi-54L units in a 19-inch rack

RM-35/@

Hardware kit for mounting one or two metal ASMi-54L units in a 19-inch rack

Legend

@ Rack mount kit (Default=both kits):

P1 Mounting one unit**P2** Mounting two units**CBL-DB9F-DB9M-STR**

Standard 9-pin male to female RS-232 control port cable

CBL-RJ45/2BNC/E1

Interface adapter for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors

ASMi-54L-LIC/HR

License key for extended data rate

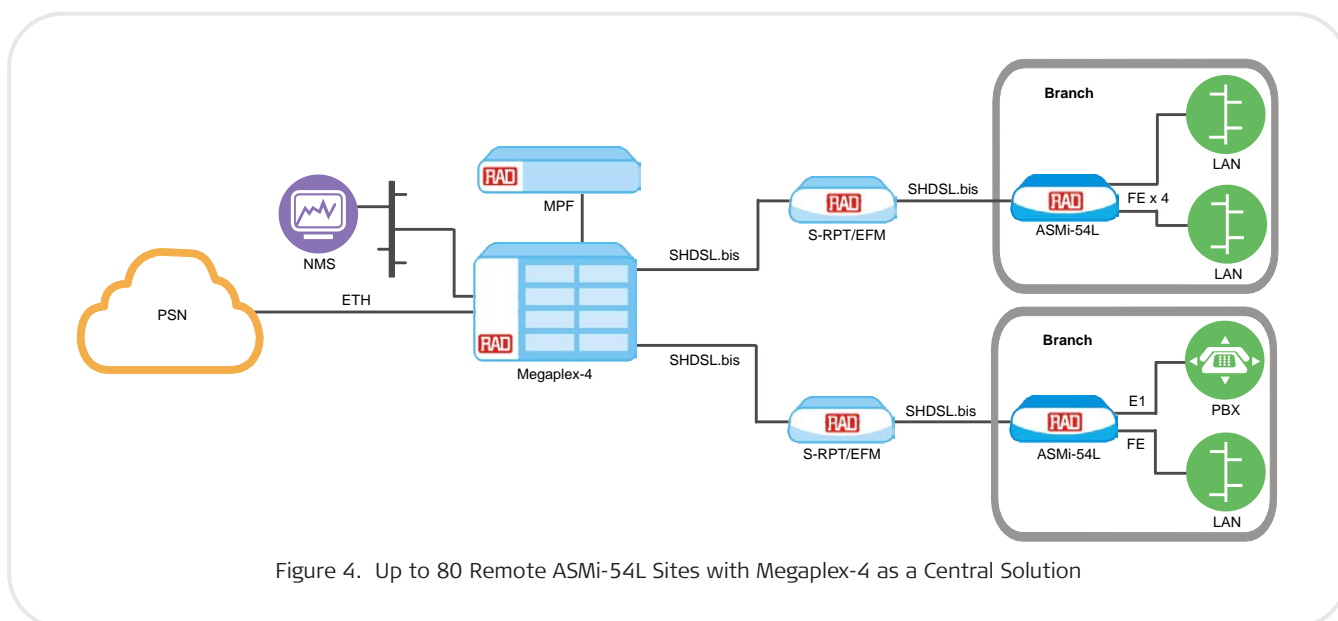


Figure 4. Up to 80 Remote ASMi-54L Sites with Megaplex-4 as a Central Solution

International Headquarters

24 Raoul Wallenberg Street

Tel Aviv 69719, Israel

Tel. 972-3-6458181

Fax 972-3-6498250, 6474436

E-mail market@rad.com<http://www.cbnetworks.fr>12 avenue des prés
78059 St Quentin en Yvelines

Tel: 33 (0)1 77 55 03 00

Fax: 33 (0)1 30 44 11 95

E-mail: sales@cbnetworks.fr

Your Network's Edge