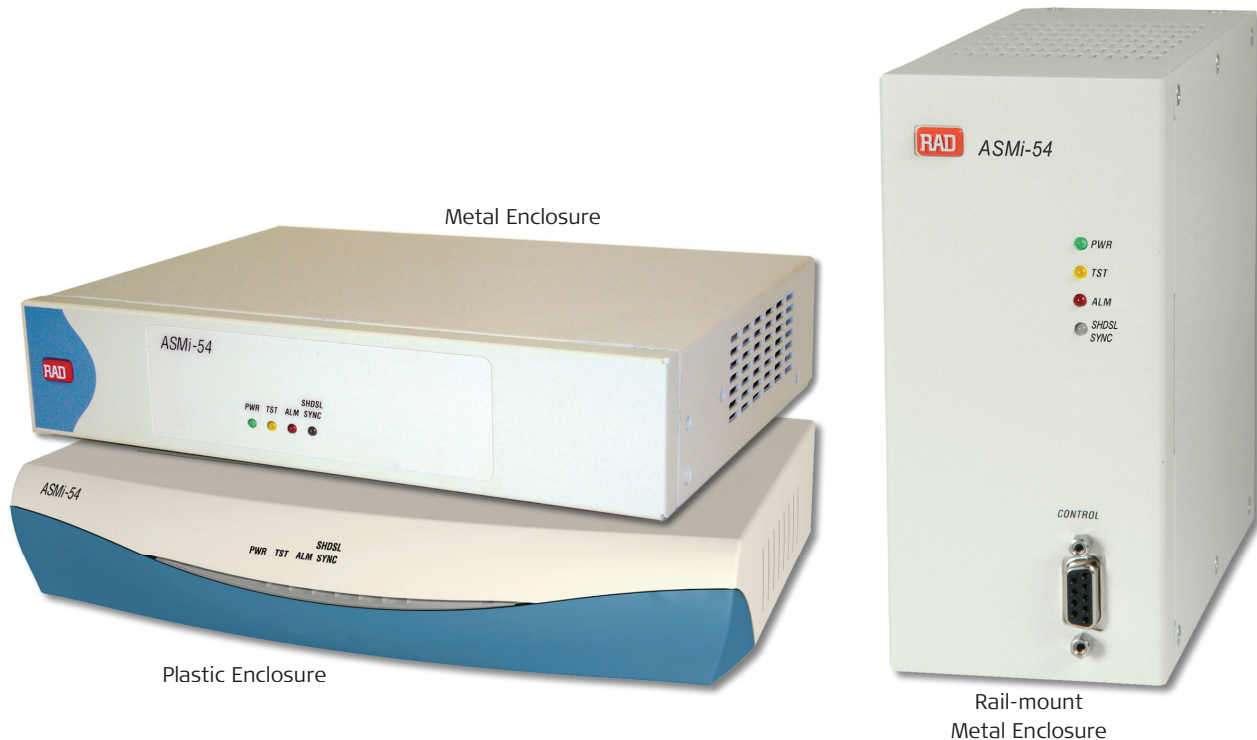


# ASMi-54

## SHDSL.bis Modem



High speed access of  
Ethernet and E1 over  
copper

- 2/4/8-wire managed modem operating at full-duplex data rates of up to 5.7 Mbps over 2-wire and 22 Mbps over 8-wire lines
- Dual Bearer mode for E1 and Ethernet HDLC over 2-wire and 4-wire lines
- SHDSL bonding – for EFM: PAF according to IEEE802.3, for HDLC: M-Pair according to G.991.2
- SHDSL ITU-T G.991.2 and ETSI 101524 compliance
- 4-port 10/100BaseT interface with integrated switch

ASMi-54 is a simple, cost-effective, dedicated managed SHDSL.bis modem that extends the range of high-speed services over existing copper pairs. The modem performs point-to-point Ethernet and E1 service extension at rates of up to 22 Mbps using EFM bonding technology, which enables

each link to synch at a different rate (see *Figure 1*).



**data communications**  
The Access Company

# ASMi-54

## SHDSL.bis Modem

Using TC-PAM 16 or TC-PAM 32 line coding SHDSL.bis technology, the modem operates in full-duplex mode over 2-wire lines at data rates of up to 5.7 Mbps.

The SHDSL line supports TPS-TC framing 64/65o for EFM (IEEE802.3) and HDLC (G.991.2).

ASMi-54 features 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, the DSL line operates at a fixed rate selected by the user.

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

### 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 the other wires in the group. The capacity of the group does not decrease when a new link is added at a lower rate.

### ETHERNET SUPPORT

ASMi-54 features up to four Ethernet 10/100BaseT ports with half/full-duplex autonegotiation and flow control. Fault propagation 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 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
- 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.

### QUALITY OF SERVICE

The 802.1D, DSCP, and per port 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 or per-port) can be configured and mapped to one of four priority queues.

### MANAGEMENT

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

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

Up to eight SHDSL repeaters can be installed in-line to increase the operation range of E1- and Ethernet-based modems.

### PHYSICAL

ASMi-54 is available with several power options:

- AC/DC wide range (100 to 240 VAC, -48 to -60 VDC nominal)
- 24 VDC
- via power feeding of DC voltage over the SHDSL line (4-wire and 8-wire Ethernet versions only).

The 2-wire and 4-wire devices are supplied in plastic enclosures, while the 8-wire device is supplied in a metal enclosure. A metal rail mount enclosure is available for 2-wire and 4-wire Ethernet over SHDSL devices. The plastic and metal enclosures are available in extended temperature versions (by special request).

All are standalone modems that can be mounted alone or in pairs in a 19-inch rack using RAD's optional mounting kits (see *Ordering*).

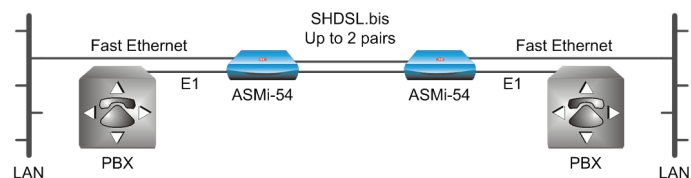


Figure 1. Multiplexing Services over SHDSL

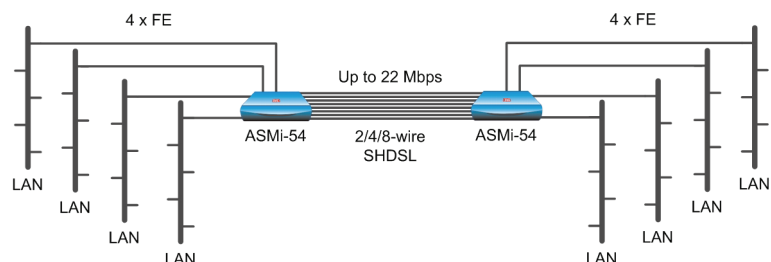


Figure 2. Fast Ethernet Services over SHDSL

## Specifications

### LINE INTERFACE

#### Line Type

Symmetrical PSD

2/4/8-wires unconditioned dedicated line  
(twisted pair)

#### EFM Bonding

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

#### Line Coding

16 or 32 TC-PAM

#### Frame Size

For EFM: 1580 bytes

For HDLC: 1530 bytes (while working with E1 or repeaters)

#### Line Rate

For EFM: 192 to 5696 kbps in steps of  $n \times 64$  kbps for each 2-wires

For HDLC: 192 to 22784 kbps in steps of  $n \times 64$  where  $n = 89/178/356$  for 2W/4W/8W

#### Range

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

Data Rate [kbps]	2-wire	
	[km]	[mi]
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

#### Impedance

135 $\Omega$

#### Connectors

2-wire/4-wire: 1 x RJ-45

8-wire: 2 x RJ-45

#### Compliance

ITU-T G.991.2, ETSI TS 101524

### E1 PORT

#### Coding

HDB3

#### Line Impedance

120 $\Omega$ , balanced 75 $\Omega$ , unbalanced  
(via adapter cable)

#### Jitter Performance

As per ITU G.823

#### Connector

RJ-45

#### Diagnostics

Local analog loopback

Remote digital loopback

### CONTROL PORT

#### Interface

V.24/RS-232

#### Type

DCE

#### Format

Asynchronous; 8 bits, 1 stop bit, no parity

#### Data Rate

9.6, 19.2, 115.2 kbps

#### Connector

9-pin, D-type, female

### ETHERNET PORTS

#### Interface

10/100BaseT

#### Connectors

4 x RJ-45

#### Frame Size

1580 bytes

### INDICATORS

#### Front Panel

PWR (green) –

On: power supply is on

TST (yellow) –

On: a test is active

ALM (red) –

On: a new alarm is detected in the alarm buffer

SHDSL SYNC (green/red) –

Green: at least one line is synchronized and can pass data

Green flashing: no line is synchronized and at least one line is in training process

Red flashing: no line is synchronized or in training process and at least one line is in PAF establishment stage

Red: no line is synchronized, in training process, or in PAF 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

### GENERAL

#### Power Supply

Wide-range AC/DC: 100 to 240 VAC,  
-48 to -60 VDC nominal

DC: 24 VDC nominal

Remote power feeding: via SHDSL line,  
120 VDC maximum (4-wire and 8-wire Ethernet versions only)

# ASMi-54

## SHDSL.bis Modem

### Timing

For CO:  
 Internal – derived from the modem  
 External – derived from E1 port  
 For CPE:  
 Receive – derived from the SHDSL line

### Performance Monitoring

SHDSL and E1 statistics collection

### Physical

Plastic enclosure:  
 Height: 43.7 mm (1.7 in)  
 Width: 217 mm (8.5 in)  
 Depth: 170 mm (6.7 in)  
 Weight: 0.6 kg (1.3 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)

Rail-mount metal enclosure:  
 Height: 150 mm (5.9 in)  
 Width: 70 mm (2.8 in)  
 Depth: 163 mm (6.4 in)  
 Weight: 0.9 kg (1.9 lb)

### Environment

Temperature: 0°–50°C (32°–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

ASMi-54/\$/@/#/^/\*/%

### Legend

- \$ Optional DC power supply (Default=wide-range AC/DC power supply):  
**24V** 24 VDC
- @ User interface: (Default=no E1 interface)  
**E1** E1 interface
- # Ethernet interface (mandatory):  
**4ETH** Four-port ETH module with 4 x RJ-45 connectors
- ^ Extended temperature for device with 4 X ETH interface (Default=0°–50°C/32°–122°F):  
**ETR** -20° to 70°C (-4° to 158°F) range (per special request)
- \* SHDSL interface:  
**2W** 2-wire (1 pair), plastic enclosure  
**4W** 4-wire (2 pairs), plastic enclosure  
**8W** 8-wire (4 pairs), metal enclosure (for Ethernet only version)  
*Note: Compliant with NEBS for Ethernet services in temperature range -5° to 55°C (23°–131°F)*

% Enclosure (Default = plastic enclosure):

**RAIL** Rail-mount enclosure

### Notes:

- For 2-wire and 4-wire Ethernet only model
- Always supplied with extended temperature (ETR) option

### SUPPLIED ACCESSORIES

Power cord  
 AC/DC adapter for -48 VDC

### OPTIONAL ACCESSORIES

**RM-33-2**  
 Hardware kit for mounting one or two plastic ASMi-54 units in a 19-inch rack

**RM-35/@**  
 Hardware kit for mounting one or two metal ASMi-54 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**  
 Control cable

**CBL-RJ45/2BNC/E1**  
 Interface adapter for converting a balanced E1 RJ-45 connector into a pair of BNC unbalanced coaxial connectors

Table 2. Modem Comparison Chart

	ASMi-52	ASMi-52L	ASMi-54	ASMi-54L	ASM-61
Max. data rate (Mbps)	2.3/4.6	2.3/4.6	5.7/11/22	5.7/11.4 (11.4/15 per pair with license key)	10
Interface	V.35, RS-530, X.21, E1, IP, ETH	V.35, X.21, E1, ETH, 4 x ETH	4 x ETH, E1	4 x ETH, E1	ETH
Line	2W/4W	2W/4W	2W/4W/8W	2W/4W	2W

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