

# ASMi-54

## SHDSL.bis Modem



Metal Enclosure

Plastic Enclosure

Rail-mount Metal Enclosure

19-inch Metal Enclosure

High-end SHDSL.bis  
multiservice access  
equipment

**ACCESS<sup>+</sup>**

- SHDSL.bis managed modem operating at full-duplex data rates of up to 5.7 Mbps per copper pair
- Ethernet service over 8-wire line of up to 22.8 Mbps in Point-to-Point, Multipoint, Daisy Chain and Ring topologies
- Two platforms for Ethernet encapsulation with up to 22 Mbps throughput over 8-wire lines: HDLC and SHDSL EFM bonding (in Point-to-Point topology)
- Optional 4xE1 service in addition to HDLC encapsulated Ethernet in Multipoint, Daisy Chain and Ring topologies

**RAD**

data communications

The Access Company

# ASMi-54

## SHDSL.bis Modem

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 features a variety of topologies, which extend up to 4 E1 and 4 ETH ports with integrated switch to the SHDSL line.

ASMi-54 operates in the following topologies:

- Point-to-Point – extending traffic on four Ethernet links at rates of up to 22.8 Mbps (EFM bonding)

**Note:** Refer to Table 1 for the EFM supporting options.

- Daisy-chain and Ring topologies for Ethernet connectivity – ASMi-54 enables service resiliency and protection by implementing the ITU-T G.8032 ETH ring protection switching standard for bandwidth of up to 11.4 Mbps
- Multipoint – each ASMi-54 operates with four ASMi-54L modems to enable extension of E1 and HDLC-encapsulated Ethernet traffic, while connectivity towards the IP network can be either copper or fiber, using an SFP transceiver
- Point-to-Point – four Ethernet links (HDLC encapsulation) in addition to four E1 ports, up to 22.8 Mbps.

Table 1 illustrates the topologies and features supported by selected ASMi-54 options.

The modem also features line probing according to G.991.2. When enabled, the SHDSL interface adapts its rate to the condition of the line (noise, loop attenuation, etc.). When disabled, the SHDSL 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.

Up to eight SHDSL 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 the other wires in the group. The capacity of the group does not decrease when a new link is added operating at a lower rate.

The modem transports Ethernet point-to-point at the rate of up to 22.8 Mbps using EFM bonding technology, which enables each link to synchronize at a different rate.

**Note:** This feature relates to Ethernet service in point-to-point topology only (see EFM supporting options in Table 1).

### ETHERNET

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 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.

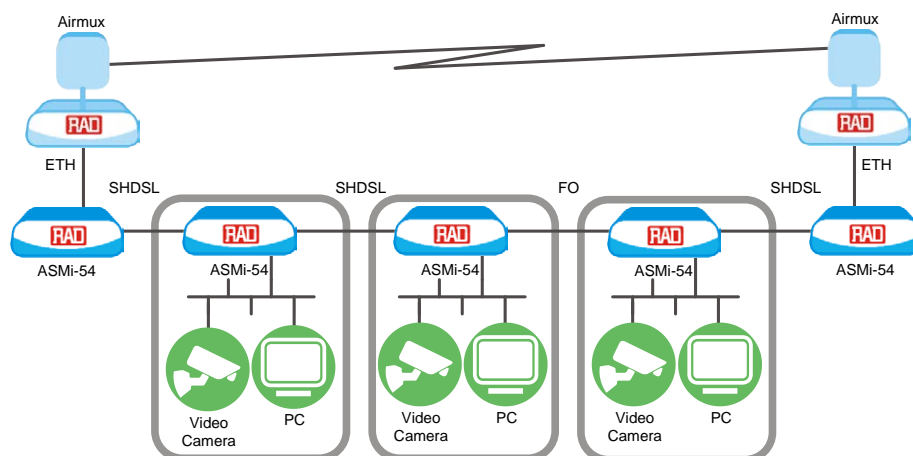


Figure 1. Daisy Chain over any Infrastructure for HDLC-Encapsulated Ethernet

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) can be configured and mapped to one of four priority queues.

## MANAGEMENT AND SECURITY

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

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

The following security protocols are provided by ASMi-54 to ensure client server communication privacy and correct user authentication:

- Access control for SNMPv3, Telnet and Web-based management interface for granting access only to users that appear in the manager list
- SSL/SSH for Telnet and secure Web access
- RADIUS for password management and user authentication.

**Note:** Refer to Table 1 for the security protocols supporting options.

## POWER

ASMi-54 is available with several power options:

- AC/DC wide-range (100 to 240 VAC, -48 to -60 VDC nominal)

- Redundant AC/DC wide-range power supply configuration in a 1U-high 19-inch metal enclosure (Ring and Daisy-chain topology only)
- 24 VDC
- Via power feeding of DC voltage over the SHDSL line (4-wire and 8-wire Ethernet versions only).

## PHYSICAL

ASMi-54 is supplied in 1U-high plastic, metal (8.5- or 19-inch), or rail-mount enclosures.

Modems with metal and plastic enclosures can be mounted alone or in pairs in a 19-inch rack using RAD's optional mounting kits. 8.5-inch units in metal enclosure can also be mounted in an 8.5-inch rack (see *Ordering*).

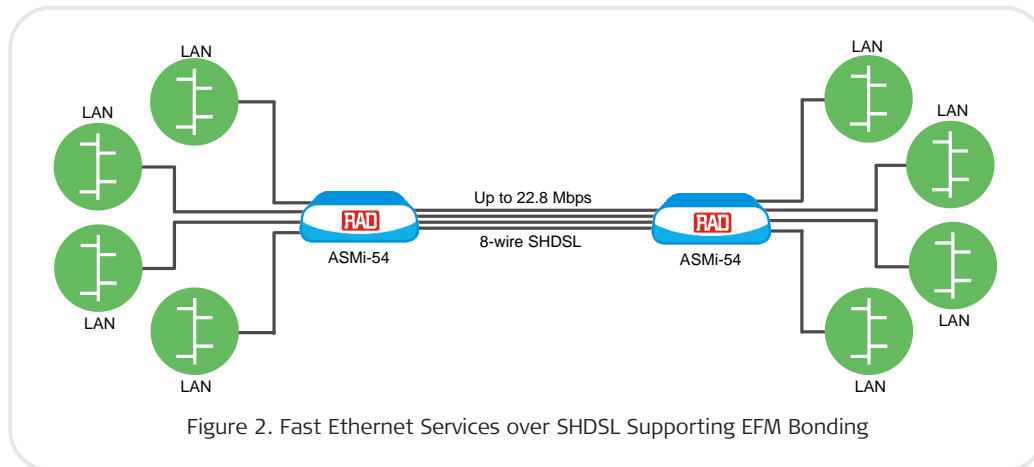


Figure 2. Fast Ethernet Services over SHDSL Supporting EFM Bonding

Table 1. Special Topologies and Features

ASMi-54 Options	Topology	EFM	SFP Socket	Security Protocols
ASMi-54/4ETH/8W	Point-to-point	Yes	No	No
ASMi-54/4E1/4ETH/8W	<ul style="list-style-type: none"> <li>• Multipoint opposite LRS-102, Megaplex-4100 or ASMi-54L</li> <li>• Point-to-point</li> </ul>	No	Yes	Yes
ASMi-54/4ETH/8W/D	Daisy-chain and Ring	No	Yes	Yes
ASMi-54/4ETH/8W/M	Multipoint	No	Yes	Yes

# ASMi-54

## SHDSL.bis Modem

### Specifications

#### SHDSL INTERFACE

**Number of Ports**

2

**Type**

Symmetrical PSD  
8-wires unconditioned dedicated line  
(twisted pair)

**Connectors**

RJ-45

**Bonding**

Per IEEE802.3ah and ITU-T G.991.2

*Note:* Applicable to Ethernet service in the point-to-point topology only.

**Line Coding**

16 or 32 TC-PAM

**Frame Size**

EFM: 1580 bytes

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

**Line Rate**

EFM

192 to 5696 kbps in steps of 64 kbps for each 2-wires

**HDLC**

2W: 192 to 5696 kbps (n x 64 kbps, n=3 to 89)

4W: 384 to 11392 kbps (n x 64 kbps, n=6 to 178)

8W: 768 to 22784 kbps (n x 64, n = 12 to 356)

**Range**

Typical Ranges  
(26 AWG, noise-free)

Data Rate [kbps]	2-wire	
	[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

**Impedance**

135Ω

**Compliance**

ITU-T G.991.2, ETSI TS 101524

#### E1 INTERFACES

**Number of Ports**

4 x RJ-45

**Coding**

HDB3

**Impedance**

120Ω, balanced

75Ω, unbalanced (via adapter cable)

**Jitter**

As per ITU G.823

**Connectors**

RJ-45

**Loopback Tests**

Local analog loopback

Remote digital loopback

#### ETHERNET INTERFACES

**Number of Ports**

4 x UTP

3 x UTP + 1 SFP socket

2 x UTP + 2 SFP socket

**Type**

10/100BaseT

100BaseFx

**Connectors**

n x RJ-45

n x SFP

**Frame Size**

2048 bytes

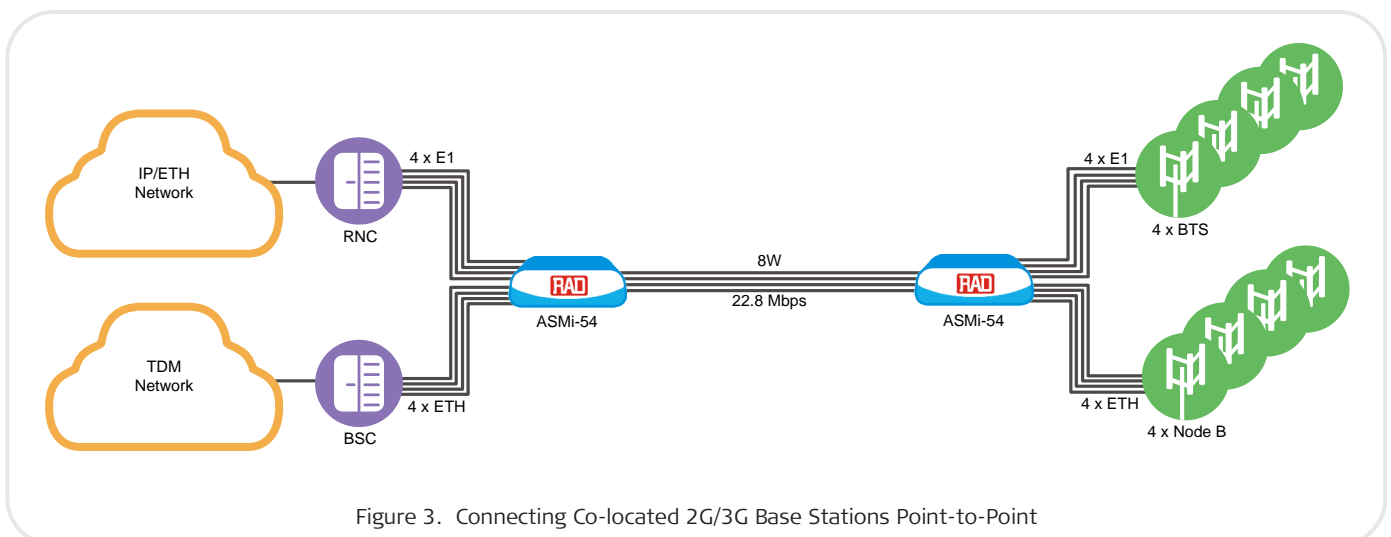


Figure 3. Connecting Co-located 2G/3G Base Stations Point-to-Point

## 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

## MONITORING AND DIAGNOSTICS

Real-time alarms

SHDSL, E1, and Ethernet statistics collection

Local and remote loopbacks

## TIMING

CO mode:

- Internal – derived from the modem
- External – derived from E1 port

CPE mode:

- Receive – derived from the SHDSL line

## GENERAL

### Power Supply

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

*Note: Redundant AC/DC wide-range power supply configuration is available in a 19-inch metal enclosure (for Ring or Daisy-chain topologies only).*

DC: 24 VDC nominal

### Remote Power Feeding

Via SHDSL line, 120 VDC maximum (4-wire or 8-wire, for units with Ethernet service only)

## Indicators

Front Panel

PWR

Green (on) - Power supply on

TST

Yellow (on) – Test in process

ALM

Red (on) – Alarm is detected

SHDSL SYNC (per line)

Green (on) - Line is synchronized and can pass data

Green (flashing) - Line is in training process

Red (on) - Line is not synchronized

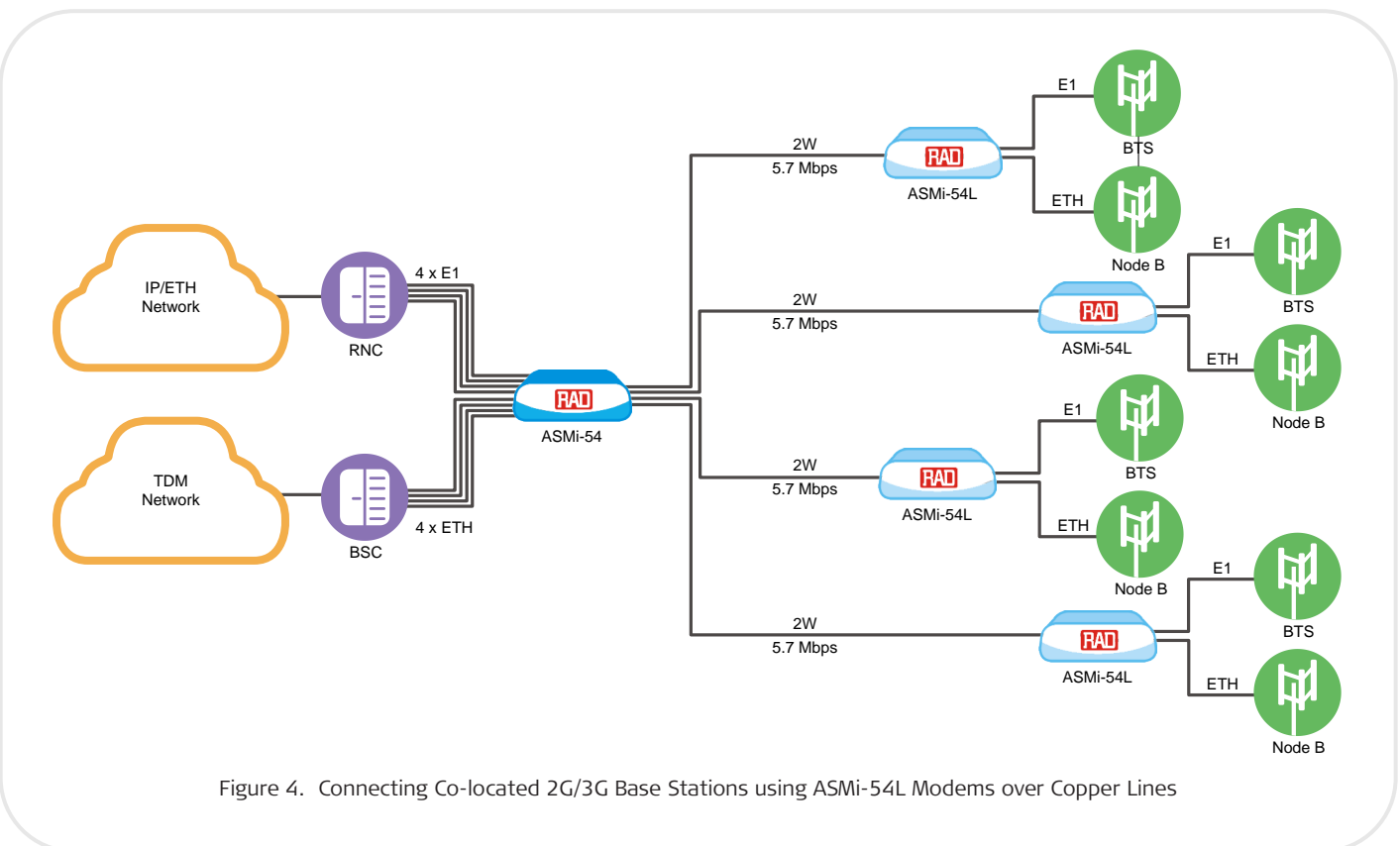


Figure 4. Connecting Co-located 2G/3G Base Stations using ASMi-54L Modems over Copper Lines

# ASMi-54

## SHDSL.bis Modem

### Rear Panel

#### Ethernet Ports ACT (per port)

Yellow (flashing) - Ethernet traffic on the port

#### Ethernet Ports LINK (per port)

Green (on) - Ethernet port link is up  
Green (off) - No Ethernet link on the port

#### E1 LOC

Red (on) - Loss of signal or sync loss (framed mode only), or unframed AIS is received on the E1 port

#### E1 REM

Red (on) - Remote alarm is received on the E1 port

### 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 (1.3 lb)

#### 8.5-inch 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)

#### 19-inch metal enclosure:

Height: 44 mm (1.7 in)  
Width: 427 mm (17.0 in)  
Depth: 258 mm (10.1 in)  
Weight: 4.0 kg (8.8 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° 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

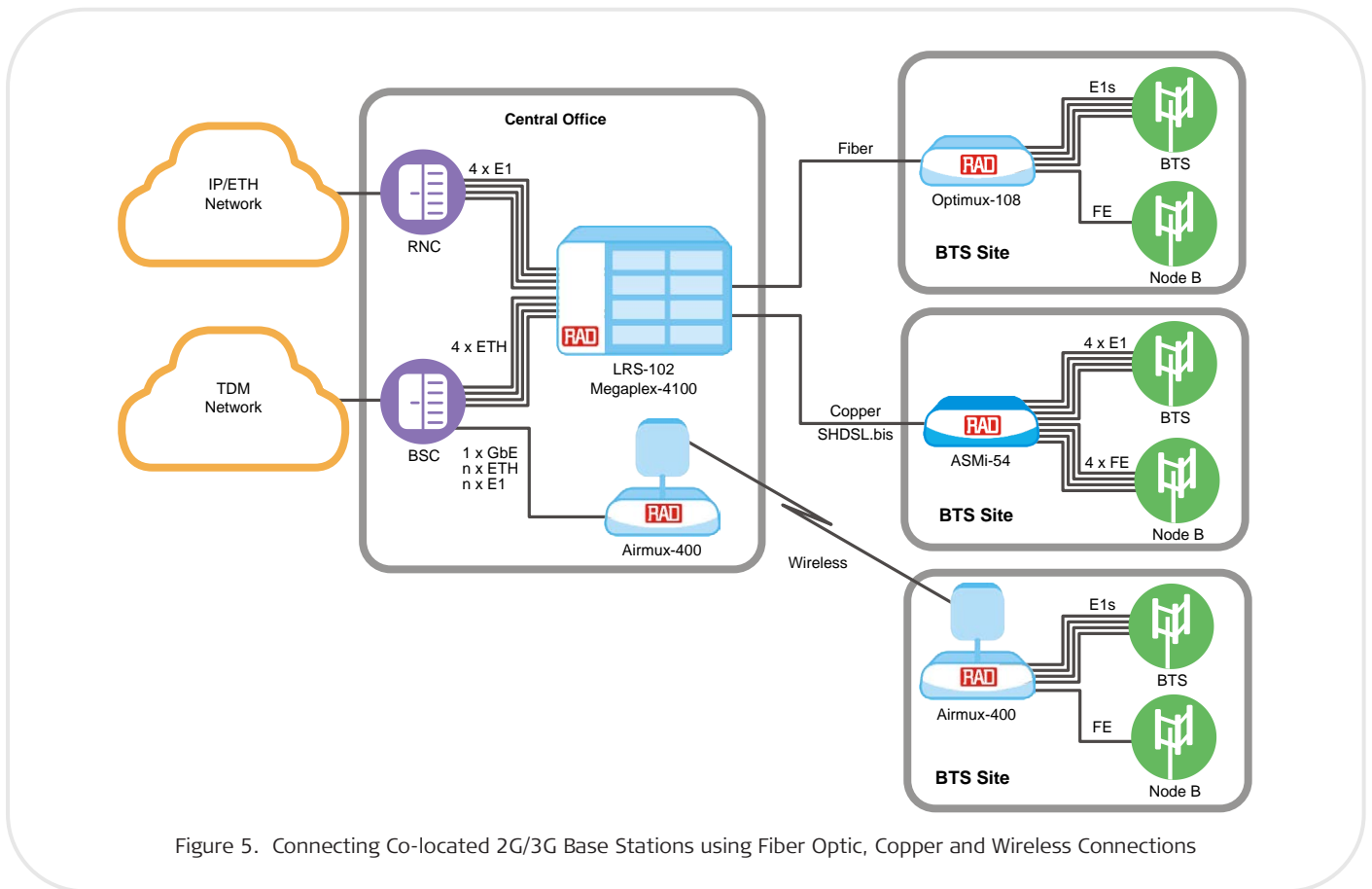


Figure 5. Connecting Co-located 2G/3G Base Stations using Fiber Optic, Copper and Wireless Connections

## Ordering

### RECOMMENDED CONFIGURATIONS

ASMi-54/4E1/4ETH/8W

ASMi-54/4ETH/8W/M

ASMi-54/4ETH/8W/D

ASMi-54/4ETH/8W/D/R (19-inch metal enclosure with redundant AC/DC wide-range power supply)

ASMi-54/4ETH/8W

### SPECIAL CONFIGURATIONS

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

#### Legend

- \$ Power supply (Default= wide-range AC/DC power supply):
  - 24V Optional 24 VDC power supply
- @ User interface (Default=no E1 interface):
  - 4E1 Four E1 ports

- # Ethernet interface (mandatory):
  - 4ETH Four-port ETH module (Default=4 x RJ-45 connectors)
- ^ Extended temperature for device with 4 ETH interfaces (Default=0° to 50°C (32° to 122°F):
  - ETR -20° to 70°C (-4° to 149°F)
  - Note 1:** For 8W/M and 8W/D options ETR is -20° to 65°C (-4° to 149°F).
  - Note 2:** Complies with NEBS for Ethernet services in temperature range -5° to 55°C (23° to 131°F).
- \* SHDSL interface:
  - 8W 8-wire (For plastic enclosure with (4ETH + 4E1) option or metal enclosure only)
  - 8W/D 8-wire with daisy-chain/ring capabilities (4W on each side)
  - 8W/M 8-wire with multipoint capabilities
  - Note:** 8W/D and 8W/M interfaces are for Ethernet service only, with no EFM support.

- % Enclosure (Default=plastic enclosure):
  - ME 8.5-inch metal enclosure (For 8W/D or 8W/M options only)
  - RAIL Rail-mount enclosure (For 8W with Ethernet port, 8W/D and 8W/M options only)
  - Note:** For 19-inch enclosure, see Recommended configurations
- ~ One or two SFP sockets on the ETH interface (Default=4 x RJ-45 connectors, no SPF sockets)
  - 1NULL3UTP SFP socket on Port 1 + UTP Ports 2, 3, 4
  - 2NULL2UTP SFP sockets on Ports 1,2 + UTP Ports 3, 4
  - Note:** For the 4ETH/8W/D, 4ETH/8W/M or 4E1/4ETH/8W options only.

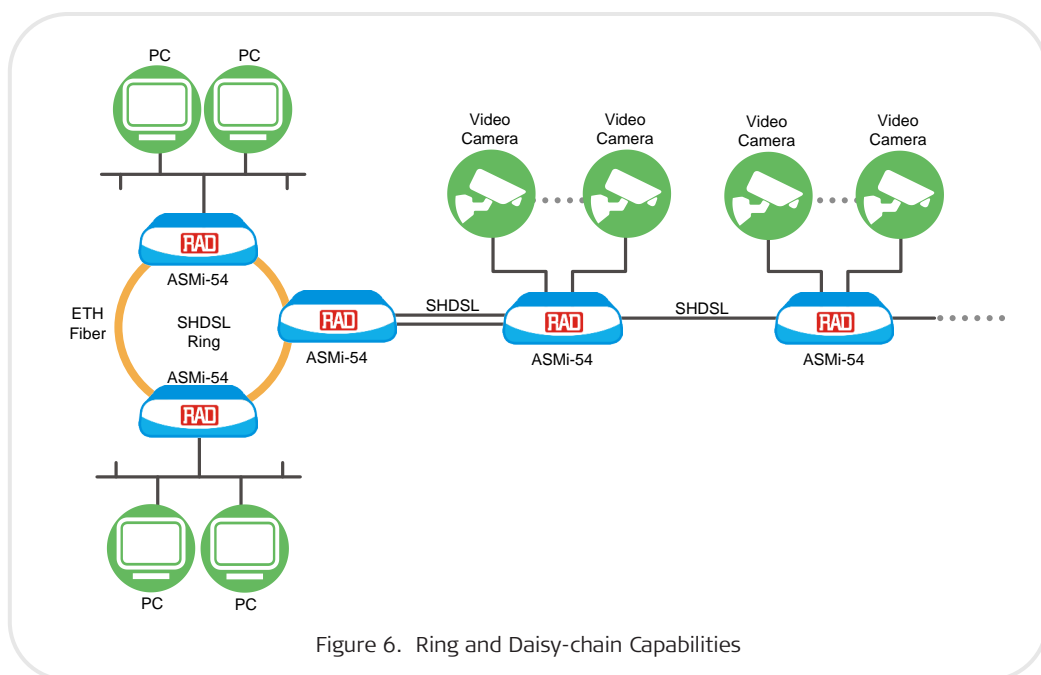


Figure 6. Ring and Daisy-chain Capabilities

## ASMi-54

## SHDSL.bis Modem

## SUPPLIED ACCESSORIES

AC power cord  
AC/DC adapter for -48 VDC

**RM-34**

Mounting kit for installation of one  
ASMi-54/4ETH/8W/D/R in a 19-inch rack

## 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  
8.5-inch metal ASMi-54 units in a 19-inch  
rack

*Legend*

@ Rack mount kit (Default=both kits):

- P1** Mounting one unit
- P2** Mounting two units

**WM-35-TYPE4**

Wall mounting kit for 8.5-inch units with  
metal enclosure






**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

Modem Comparison Table

Feature	ASMi-52 (Ver.2.98)	ASMi-52L (Ver.2.01)	ASMi-54 (Ver.3.54)	ASMi-54L (Ver.2.70)	ASMi-54LRT (Ver.2.14)
					
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)	5.7/11/22
Interface	V.35, RS-530, X.21, E1, ETH	V.35, X.21, E1, ETH, 4 x ETH	4 x ETH, 4 x E1	4 x ETH, E1	4 x ETH, E1
Router	-	-	-	-	✓
Line	2W/4W	2W/4W	2W/4W/8W	2W/4W	2W/4W/8W

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