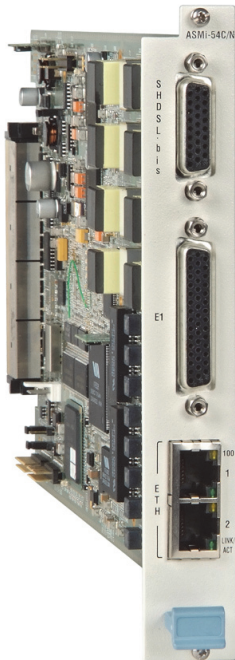LRS-102 Module

ASMi-54C/N

E1 and Ethernet over SHDSL/SHDSL.bis 8-Port Module

- E1 and Ethernet services over 2W (1 pair) or 4W (2 pairs) SHDSL/SHDSL.bis lines
- Data rates of up to 5.7 Mbps for 2W and up to 11.4 Mbps for 4W
- Operation opposite RAD's ASMi-52/ASMi-52L (SHDSL) and ASMi-54/ASMi-54L (SHDSL.bis)
- E1 and Ethernet extension over copper line in addition to LRS-102 fiber connectivity

ASMi-54C/N is a SHDSL/SHDSL.bis E1 and Ethernet multiplexer module for the LRS-102 chassis that delivers digital data to customer premises over existing copper cables of the distribution network while eliminating the need for repeaters. It forwards transparently E1 data and optionally Ethernet, over 1 or 2 pairs of SHDSL.bis/SHDSL copper lines to ASMi-54/ASMi-54L (SHDSL.bis) or ASMi-52/ASMi-52L (SHDSL) standalone modems on the remote site.

ASMi-54C/N operates in the LRS-102 chassis that can contain up to 12 card modules, to provide a simple and low-cost connectivity solution using High speed Digital Subscriber Line (SHDSL/SHDSL.bis) technology, as standardized by ITU-T Rec. G.991.2.

Using TC-PAM 16/32 line coding SHDSL/SHDSL.bis technology, the modem operates in full-duplex mode at the data rate of up to 5.7 Mbps per port.

Multiplexing E1 and Ethernet over SHDSL/SHDSL.bis copper lines

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The module operates as a Central SHDSL/SHDSL.bis (STU-C) Terminal Unit opposite up to 8 ASMi-54/ASMi-54L or ASMi-52/ASMi-52L standalone modems.

The following types of ports are available:

- Eight SHDSL/SHDSL.bis independently configurable external ports
- Eight independently configurable E1 ports for E1 services
- Two 10/100 Mbps Ethernet ports for Ethernet services (optional)

MANAGEMENT

Setup, control, and diagnostics are performed via a supervisory port on the LRS-102 CL module using an ASCII terminal, Telnet, or any SNMPc application. The remote ASMi-52/ASMi-52L modems can be configured and monitored from the central ASMi-54C/N card via EOC.
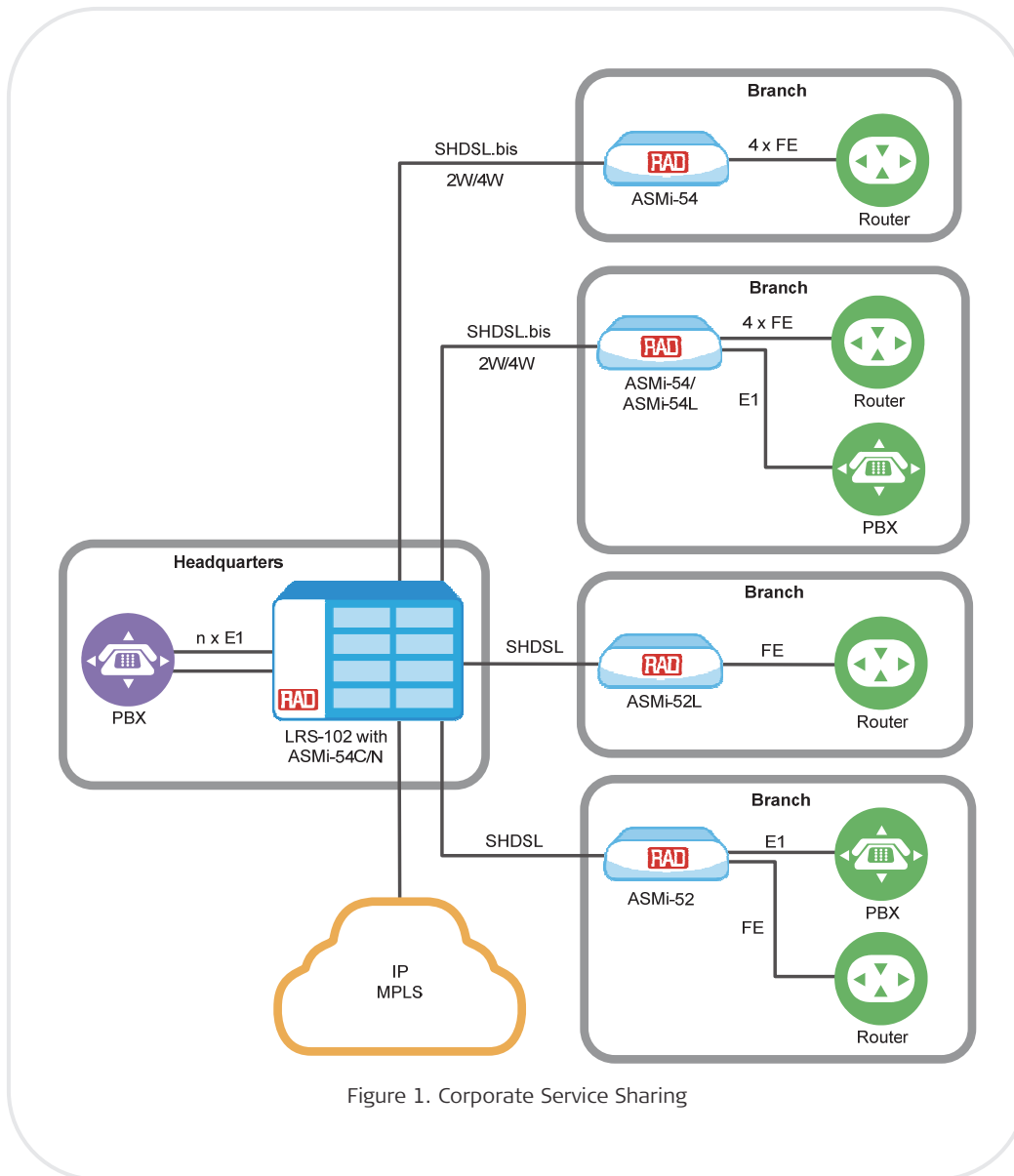

Figure 1. Corporate Service Sharing

Specifications

SHDSL.BIS INTERFACE

Number of Ports
8 x 2W (8 x 2W, 4 x 4W or any other combination of 2W/4W pairs up to 16W)

Compliance
ITU-T G.991.2, ETSI TS 101524

Signal Format
ASMi-52/52L: TC-PAM16
ASMi-54/54L: TC-PAM32/TC-PAM16

Connectors
DB-26 convertible to 8 RJ-45 connectors via adaptor cable (regular model)

Single-pair female 2-pin terminal block for each port (power-feed model)

Impedance
135Ω

Typical Range
See *Table 2*

E1 INTERFACE

Number of Ports
8

Coding
HDB3

Line Impedance
Balanced E1: 120Ω
Unbalanced E1: 75Ω (via adapter cable)

E1 Jitter Performance
As per ITU G.823

Connector
DB-44 convertible to RJ-45 or BNC connectors via adaptor cables

ETHERNET INTERFACE

Number of Ports
2 UTP or 2 fiber-optic

Data Rate
10/100 Mbps (Fast Ethernet)
Autonegotiation

Connectors
2 x RJ-45, shielded
2 x SFP transceivers (see *Ordering*)

SFP Characteristics
For full details, see the *SFP Transceivers* data sheet at www.rad.com

Maximum Frame Size
1600 bytes

Indicators (per port)
LINK/ACT
    On (green): link is up
    Off: link is down
    Flashes: frames are
    transmitted/received

100
    On (yellow): 100 Mbps mode
    Off: 10 Mbps mode

GENERAL

Diagnostics
Loopbacks on local and remote E1 ports
Loopbacks and BERT on the SHDSL line

Performance Monitoring
Per ITU-T Rec G.991.2, G.826

Power Consumption
ASMi-54C/E1/N: 7.3W
ASMi-54C/E1/ETH/N: 12W

Table 1. Typical Ranges

| Data Rate | 2-wire | | 4-wire | |
[kbps]	[km]	[mi]	[km]	[mi]
192	6.6	4.1	-	-
1536	4.9	3.0	5.05	3.14
2048	4.5	2.8	5.0	3.11
4096	3.2	2.0	4.2	2.6
4608	3.0	1.9	4.0	2.5
5696	2.6	1.6	3.6	2.2

Note: The typical ranges are based on error-free lab tests without noise and obtained on a 26 AWG cable line simulator (DLS-400). For ASMi-52/52L on the far end, only ranges up to 2048 are relevant.

Ordering

ASMi-54C/E1/N
E1 over SHDSL 8-Port Module

ASMi-54C/E1/ETH/#/N
E1 and Ethernet over SHDSL/SHDSL.bis
8-port module

Legend
Interface and Connectors
  UTP 2 UTP (RJ-45 connectors)
  SFP& 2 SFP sockets including SFP
    transceivers (see below for **&**)
& SFP transceivers for Ethernet
  100BaseFx Interface
  1 Fast Ethernet/STM-1, 1310 nm,
    multimode, LED, 2 km (1.2 mi)
  1D Fast Ethernet/STM-1, DDM,
    internal calibration, 1310 nm,
    multimode, LED, 2 km (1.2 mi)
  2 Fast Ethernet/STM-1, 1310 nm,
    single mode, laser, 15 km
    (9.3 mi)
  2D Fast Ethernet/STM-1, DDM,
    internal calibration, 1310 nm,
    single mode, laser, 15 km
    (9.3 mi)
  3 Fast Ethernet/STM-1, 1310 nm,
    single mode, laser, 40 km
    (24.8 mi)

3D Fast Ethernet/STM-1, DDM,
  internal calibration, 1310 nm,
  single mode, laser, 40 km
  (24.8 mi)
10a Fast Ethernet/STM-1,
  Tx - 1310 nm, Rx - 1550 nm,
  single mode (single fiber), laser
  (WDM) , 20 km (12.4 mi)
10b Fast Ethernet/STM-1,
  Tx - 1550 nm, Rx - 1310 nm,
  single mode (single fiber), laser
  (WDM) , 20 km (12.4 mi)
18a STM-1/OC-3, Tx - 1310 nm,
  Rx - 1550 nm, 9/25 single mode
  (single fiber), laser (WDM),
  40 km (24.8 mi)
18b STM-1/OC-3, Tx - 1550 nm,
  Rx - 1310 nm, 9/25 single mode
  (single fiber), laser (WDM),
  40 km (24.8 mi)
19a STM-1/OC-3, Tx - 1490 nm,
  Rx - 1570 nm, 9/25 single mode
  (single fiber), laser (WDM) ,
  80 km (49.7 mi)
19b STM-1/OC-3, Tx - 1570 nm,
  Rx - 1490 nm, 9/25 single mode
  (single fiber), laser (WDM) ,
  80 km (49.7 mi)

Notes:

- *For the complete list of SFPs, refer to the SFP Transceivers data sheet.*

- *It is strongly recommended to order ASMi-54C/N with original RAD SFPs installed. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP devices. RAD cannot guarantee full compliance to product specifications for ASMi-54C/N units using non-RAD SFPs.*

OPTIONAL ACCESSORIES

CBL-DB26-8SHDSL
Cable for splitting a single 26-pin
SHDSL.bis connector to 8 x RJ-45
connectors

Note: *This cable is required for the module operation. It can either be ordered from RAD or manufactured by the customer according to pinouts provided in the manual.*

Cables for E1 Interface

CBL-G703-8/RJ45
Splitter cable for splitting the
44-pin E1 module connector to 8 E1
balanced RJ-45 connectors

CBL-G703-8/RJ45/X

Splitter cross-cable for splitting the
44-pin E1 module connector to 8 E1
balanced RJ-45 connectors

CBL-G703-8/COAX

Splitter cable for splitting the
44-pin E1 module connector to 8 pairs of
E1 unbalanced BNC connectors

CBL-G703-8/OPEN/2M
Open-ended cable with DB-44 connector
for balanced E1 applications

All cables are 2m (6.6 ft) long.

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