



ASMi-54, ASMi-54C, ASMi-54L, ASMi-54LRT



SHDSL.bis Modems with Integrated Router or Multiplexer

DSL MODEMS

- Point-to-point E1 and Fast Ethernet extension over multiple SHDSL.bis lines
- Standards-compliant SHDSL (ITU-T G.991.2 and ETSI 101524)
- 11.4 Mbps over 2-wire; up to 30 Mbps over 4-wire
- EFM (Ethernet in the First Mile) bonding per IEEE 802.3-2005; M-Pair bonding for HDLC per G.991.2
- TC-PAM 16 or TC-PAM 32 line coding
- Ethernet bridging and routing
- VLAN prioritization and Ethernet QoS support
- Daisy-chain or ring topology with STP support per IEEE 802.1D
- Managed via SNMP, Telnet and ASCII terminal
- Optional rail mountable metal enclosure for extreme temperatures (ASMi-54)

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The ASMi-54 product line includes a range of cost-effective, managed devices for extending E1 and mid-band Ethernet services over multi-pair bonded copper links. Ensuring reliable performance over poor quality or noisy lines, the ASMi-54 SHDSL.bis modem and ASMi-54C module operate in full duplex mode over 2-wire, 4-wire or 8-wire lines, achieving variable data rates of up to 22.8 Mbps. The ASMi-54L and ASMi-54LRT provide access rates of up to 11.4 Mbps over 4-wire connections. The devices can achieve an extended service range of up to 2.6 km (1.825 miles) for each 5.7 Mbps pair at 26 AWG. The ASMi-54 line is part of the ACCESS+ portfolio of multiservice access and First Mile solutions.

The ASMi-54 modems are ideal for carriers, service providers and mobile operators, as well as corporate, utilities and transportation companies looking for economical delivery of voice and broadband data traffic in point-to-point or hub and spoke communications. In addition, ASMi-54's ruggedized design ensures reliable operation in industrial applications and harsh environments.

Alternatively, RAD's high performance SHDSL technology supports increased throughput for

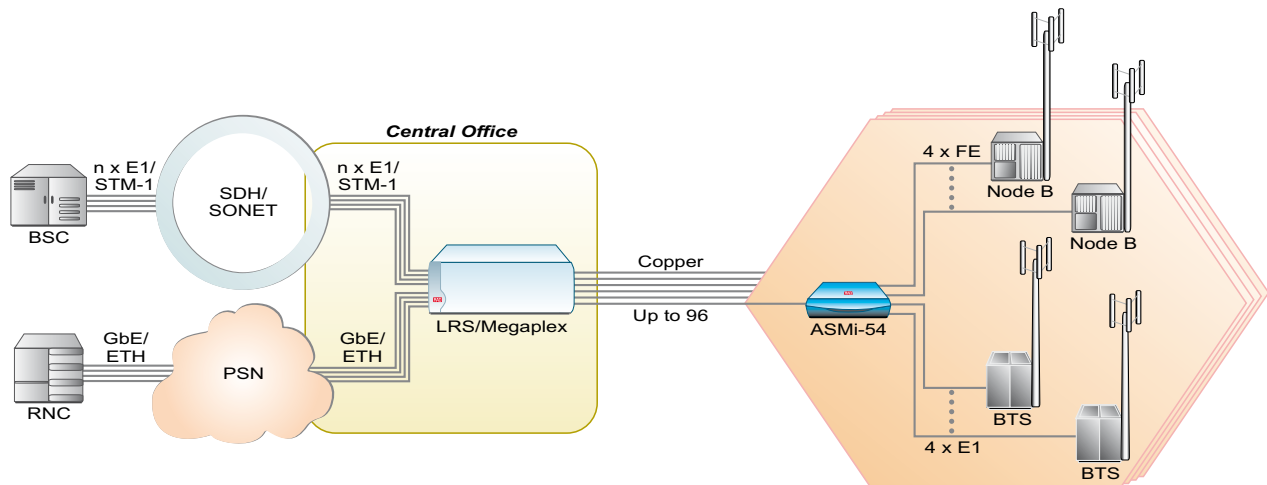
Ethernet services of 11.4 Mbps over 2-wire and up to 30 Mbps over 4-wire.

Ethernet capabilities and QoS support

Featuring a built-in Ethernet switch, the ASMi-54 SHDSL.bis modems include up to four 10/100BaseT user ports and support VLAN-aware and VLAN-unaware bridging. VLAN stacking (Q-in-Q) and stripping functionalities enable transparent traffic delivery over packet switched networks with optimal efficiency.

QoS (quality of service) levels are defined according to VLAN priority (802.1p), IP Precedence, DSCP, or per port, offering users flexibility in differentiating traffic handling depending on application requirements. Up to four priority queues are supported using Strict Priority (SP) scheduling.

Fault propagation enables the units to shut down the Ethernet user port when an SHDSL line failure is detected and to switch traffic to an alternate route. EFM bonding capabilities ensure that a failure or addition of a link does not drop the traffic being transmitted over the other wires in the group. Capacity is also maintained when a new link is added at a lower rate during Ethernet transmission.



Mobile backhaul over DSL infrastructure



ASMi-54, rail-mount enclosure



IP routing functionalities

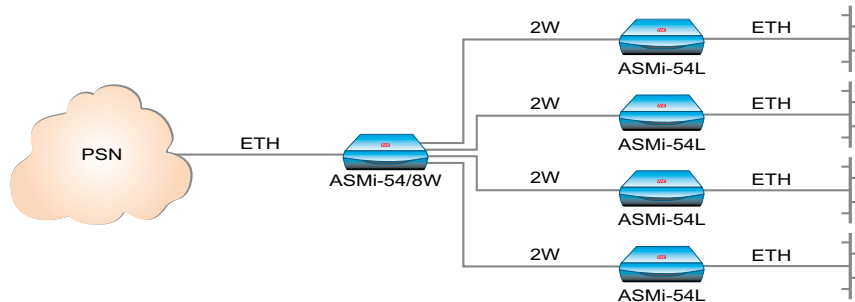
In addition to its Ethernet bridging attributes, the ASMi-54LRT incorporates a built-in router to allow secure and efficient Layer 3 IP connectivity over packet switched networks. The device enables port forwarding whereby packets are delivered according to a static NAT/PAT (network address translation/port address translation) table. This allows multiple LAN devices to share a single public IP address, so that outgoing traffic appears to originate from a single device – the ASMi-54LRT.

Solid Firewall™ protection for the LAN and WAN interfaces, as well as for the DMZ sub-network, provides security against unauthorized network access, including malicious denial of service (DoS) attacks. Protective measures include rate limiting for ingress packets of vulnerable types, stateful packet inspection (SPI) and service authorization, among others.

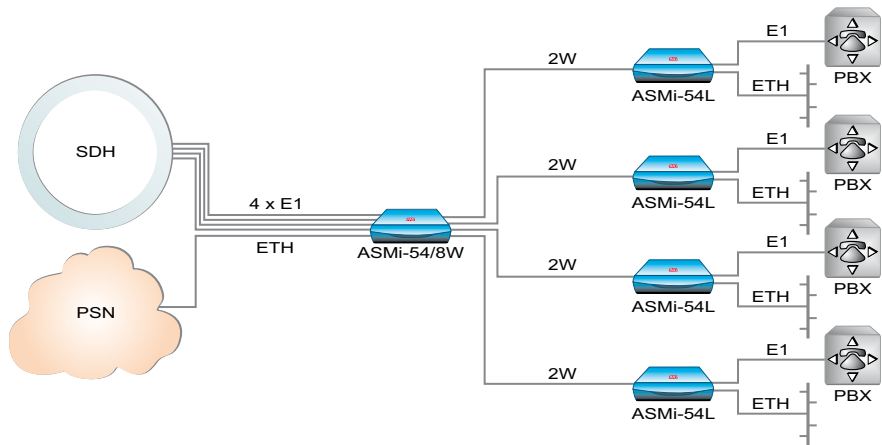
The ASMi-54LRT supports QoS differentiation for IP applications with four priority queues, Strict Priority scheduling and user-configurable classification according to DSCP values.

Pico-DSLAM functionality

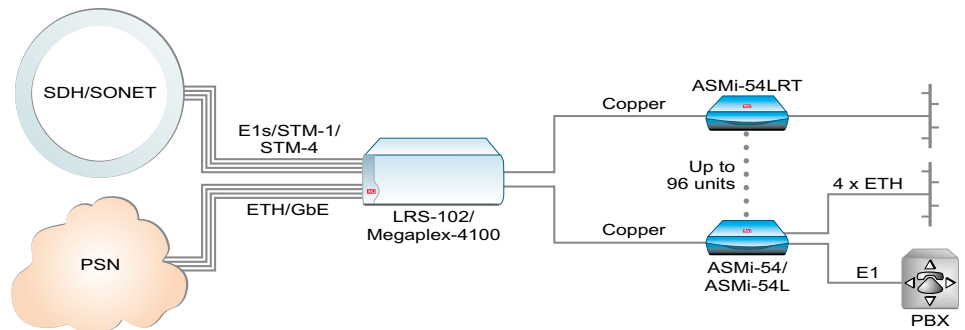
The ASMi-54 supports multipoint connectivity for E1 and Ethernet services when working opposite four modems or ASMi-54L devices. As a pico-DSLAM, it aggregates Ethernet traffic from remote ASMi-54L units over a fiber or copper Fast Ethernet connection to the PSN.



SHDSL bis pico-DSLAM – cost-effective solution for Ethernet connectivity



Multipoint topology for E1 and Ethernet over rural areas



Deploying Ethernet and E1 services over SHDSL bis





Metal case version

ASMi-54, ASMi-54C, ASMi-54L, ASMi-54LRT

(Continued)

High flexibility with daisy-chain and ring topologies

The ASMi-54 supports drop-and-insert (daisy-chain) applications, enabling bi-directional delivery of high rate Ethernet traffic over DSL lines by connecting multiple locations in a multidrop network.

Alternatively, the device can be deployed in ring architecture, featuring spanning tree protocol (STP) support to ensure high availability and service resiliency in the event of link failure. The ASMi-54L meets EN-50121-4 industry standard for high electromagnetic reliability.

Card version for modem rack

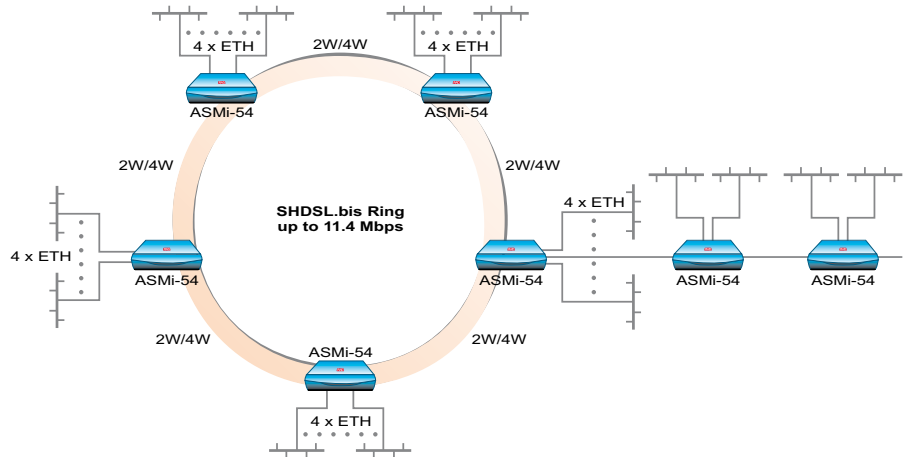
The ASMi-54C is a card version for mounting in a central LRS-102/Megaplex-4100 rack. The ASMi-54C SHDSL.bis module multiplexes E1 and Ethernet over one, two or four pairs of SHDSL.bis copper lines. It is installed in an LRS-102 chassis which can contain up to 12 card modules, each with eight E1 interfaces and/or two 10/100BaseT Ethernet ports, to provide a cost-effective central-site solution for up to eight ASMi-54 standalone units over 2-wire or any other combination up to

8-wire. Alternatively, the ASMi-54C can work opposite remote ASMi-52/52L 2/4-wire SHDSL modems in applications requiring lower rates over SHDSL lines. Management traffic for all remote units is delivered via one of the ASMi-54C's Fast Ethernet ports, using a dedicated management VLAN. By supporting both E1 and Ethernet access at the central office (CO), the ASMi-54C modules enable an easy migration from TDM to IP networks.

Management options

The ASMi-54 standalone units support the following management connections for configuration, monitoring and diagnostics:

- Local RS-232 terminal
- Telnet server, SNMP (ver.1)
- RADview-EMS Web server
- Network links for Inband management with a dedicated VLAN



Ring and daisy-chain topology for Ethernet services with link redundancy

	ASMi-54	ASMi-54C	ASMi-54L	ASMi-54LRT
E1 user ports	Up to 4	8	1	1
10/100BaseT user ports	Up to 4	2	4	4
SHDSL.bis network links and associated data rates	5.7 Mbps over 2-wire (1 pair)	5.7 Mbps over 2-wire (1 pair)	5.7 Mbps over 2-wire (1 pair), 11.4 Mbps over 2-wire (1 pair)	5.7 Mbps over 2-wire (1 pair)
	11.4 Mbps over 4-wire (2 pairs)	11.4 Mbps over 4-wire (2 pairs)	11.4 Mbps over 4-wire (2 pairs)	11.4 Mbps over 4-wire (2 pairs)
	22.8 Mbps over 8-wire (4 pairs)	22.8 Mbps over 8-wire (4 pairs)		
Built-in router	-	-	-	✓
Daisy-chain and ring support	✓	-	-	-
Multipoint topology	✓	✓	-	-

