General Availability

MiRICi-E1/T1

Intelligent Miniature Ethernet to E1/T1 Remote Bridge

- E1/T1 connectivity to any Ethernet device with SFP MSA-compatible socket
- Full duplex, E1/T1 wire-speed packet forwarding
- GFP, RAD HDLC and cHDLC encapsulation
- VLAN support according to 802.1p, including VLAN stacking (Q-in-Q) capabilities, allowing traffic separation and prioritization
- Fault propagation to LAN link
- Inband and out-of-band management for configuration, monitoring and diagnostics
- I2C management interface for simple management integration with host devices

MiRICi-E1/T1 forwards Fast or Gigabit Ethernet packets to a TDM-based WAN at full duplex wire-speed, fully utilizing the expensive E1 or T1 TDM bandwidth.

MARKET SEGMENTS AND APPLICATIONS

MiRICi-E1/T1 can be used in the following application:

- Transparent LAN services over leased lines
- Remote branch connectivity over E1/T1 lines
- Connecting LANs over E1/T1 radio links or in campus applications.

INTEROPERABILITY

MiRICi-E1/T1 operates opposite the following devices using GFP, RAD HDLC and cHDLC encapsulation:

- RAD's Megaplex-4 with VS-16E1T1-EoP module
- RAD's RICi-16, RICi-E1 and RICi-T1
- Third-party devices that support GFP, RAD HDLC and cHDLC encapsulation.

System™ on an SFP

ETHERNET OVER PDH

Encapsulation

MiRICi-E1/T1 employs the GFP, RAD HDLC and cHDLC WAN encapsulation protocols.

Flow Control

A flow control mechanism is activated when LAN traffic exceeds the WAN link (E1, T1) capacity and the watermarks of the internal frame buffer. Pause packets are transmitted to the LAN port, halting LAN traffic until the buffer is emptied to below the watermark limit.

Quality of Service (QoS)

MiRICi-E1/T1 facilitates differentiated services on the same link according to Ethernet or IP marking. Classification is based on VLAN (802.1p) or Differentiated Services Code Point (DSCP) priority, while classification results are mapped to transmit priority queues. Priority queues can be defined to be Strict Priority or Weighted Round Robin (WRR).

OAM

MiRICi-E1/T1 provides single segment (link) OAM based on 802.3ah, including discovery, continuity check, and remote fault indication.

RAD

Your Network's Edge®

MiRICi-E1/T1
Intelligent Miniature Ethernet to E1/T1 Remote Bridge

MANAGEMENT AND SECURITY

The unit can be monitored, configured, and tested using the following ports and applications:

- Out-of-band via the I^{2}C channel (off the SFP edge connector)
- Inband via the Ethernet port using a Web browser.

MiRICi-E1/T1 sends SNMP traps for up to eight management stations.

To facilitate integration of a new device into an IP network, if no IP address has been manually configured, MiRICi-E1/T1 automatically requests one from the DHCP server upon booting.

OPERATION AND MAINTENANCE

File Operations

Application software can be downloaded to MIRICi-E1/T1 via the central server, using TFTP.

Configuration Adapter

An optional configuration adapter module, SFP-CA.2, is available for configuring MiRICi-E1/T1 by connecting it to a PC via a USB port.

The configuration adapter is used for preliminary configuration, such as assigning an IP address for first use or specifying the operation mode. It is also used to download software to the MiRICi-E1/T1 units.

MONITORING AND DIAGNOSTICS

Fault Propagation

The LAN link is deactivated and the link status LED turns off if one of the following user-defined alarms is issued and fault propagation is enabled:

- LOS (Loss of signal)
- FDL (Facility Data Link)
- LOF (Loss of Frame)
- AIS (Alarm Indication Signal)
- RDI (Remote Defect Indication).

In addition, the above-listed error conditions are propagated toward the host by sending an electrical signal via the LOS pin on the MSA edge connector. The LOS LED turns ON, visually indicating the LOS condition.

Loopback Tests

Remote (RLB) and local loopbacks (LLB) are used for physical layer troubleshooting.

Statistics

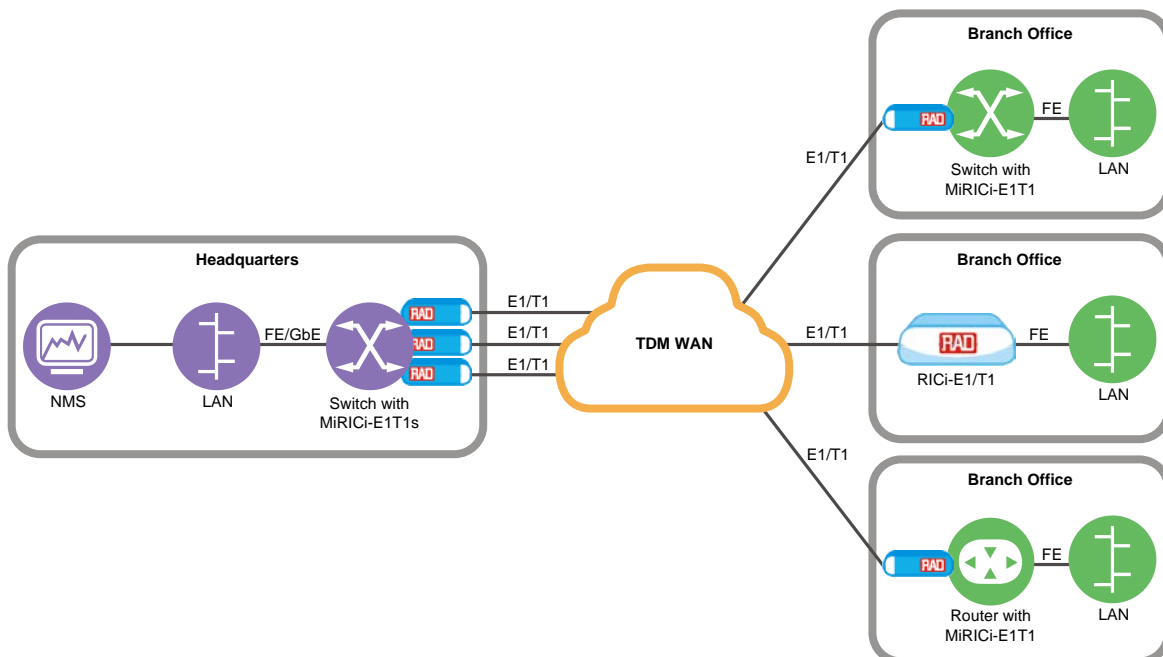Standard statistics for 15-minute time intervals are collected.

Figure 1. Transparent LAN Services over Leased Lines

Loop Detection

MiRICi-E1/T1 detects loops on the LAN side or WAN side by transmitting special loop detection frames.

If a loop is detected on the LAN side, a loop detection alarm is sent.

If a loop is detected on the WAN side, the unit blocks the traffic, and only then a loop detection alarm is sent.

BERT

The unit also performs Bit Error Rate (BERT) diagnostic tests. MiRICi-E1/T1 generates and detects pseudo-random patterns and repetitive patterns from 1 to 32 bits in length.
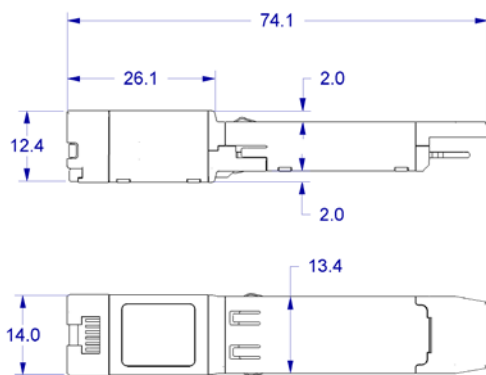
Specifications

TDM INTERFACE

Number of Ports	1, configurable as E1 or T1
Encapsulation	GFP (G.8040, G.7041/Y.1303), RAD HDLC, cHDLC

E1 INTERFACE

Number of Ports	1
Compliance	G.703, G.704, G.775, G732
Data Rate	2.048 Mbps
Line Code	HDB3, AMI
Framing	Framed (G.732.N, G.732.N CRC), unframed
Line Impedance	120Ω, balanced
Cable Length	Up to 2500m (8202 ft) max, over 22 AWG wire
Connector	RJ-45

T1 INTERFACE

Number of Ports	1
Compliance	G.703, G.775, G.823, T1.107, T1.403
Data Rate	1.544 Mbps
Line Code	B8ZS, AMI
Framing	Framed (ESF, D4), unframed
Line Impedance	100Ω, balanced
Cable Length	Up to 1829m (6000 ft) max, over 22 AWG wire
Connector	RJ-45

ETHERNET INTERFACE

Type	MiRICi-E1T1/FE: 100Base-X
	MiRICi-E1T1/GE, MiRICi-E1T1/GE/SYE: 1000Base-X
Compliance	IEEE 802.3
Edge Connector	SFP-based, MSA-compliant
Frame Size	FE: 64–2016 Bytes
	GE: Up to 10 kBytes (jumbo)

TIMING

Clock Sources	Sync-E clock, recovered from the MSA interface
	Internal crystal free-running oscillator-based clock
	Derived from the Receive clock of an E1/T1 port

Figure 2. Physical Dimensions

DIAGNOSTICS

Indicators	LINK (green): Ethernet link status (MiRICi-E1T1/FE)
	LINK/ACT (green): Ethernet link and activity status (MiRICi-E1T1/GbE)
	LOS (red) – E1/T1 loss of signal

GENERAL

Environment

Temperature	MiRICi-E1T1/FE: Ambient: –40 to 70°C (–40 to 150°F) Case: –40 to 78°C (–40 to 172°F)
	MiRICi-E1T1/GE, MiRICi-E1T1/GE/SYE Ambient: –40 to 70°C (–40 to 150°F) Case: –40 to 78°C (–40 to 172°F)
	MiRICi-E1T1/FE with temperature-hardened enclosure: -40 to 85°C (–40 to 185°F)
Humidity	up to 90%, non-condensing

Physical

Height	12.4 mm (0.49 in)
Width	14.0 mm (0.55 in)
Depth	74.1 mm (2.91 in)
Weight	15.0 g (0.5 oz)

Power

Power Supply	3.3V with 1.25W dissipation

Ordering

RECOMMENDED CONFIGURATIONS

MiRICi-E1T1/FE

Intelligent miniature Ethernet to E1/T1 remote bridge, Fast Ethernet SFP port

MiRICi-E1T1/GE

Intelligent miniature Ethernet to E1/T1 remote bridge, Gigabit Ethernet SFP port

SPECIAL CONFIGURATIONS

MiRICi-E1T1/FE/H

Intelligent miniature Ethernet to E1/T1 remote bridge, Fast Ethernet SFP port, temperature-hardened enclosure

Note: MiRICi-E1/T1 units with GbE interface are not available with temperature-hardened enclosure.

MiRICi-E1T1/GE/SYE

Intelligent miniature Ethernet to E1/T1 remote bridge, Gigabit Ethernet SFP port with SyncE support

OPTIONAL ACCESSORIES

SFP-CA.2

Configuration adapter for connecting MiRICi-E1/T1 to a PC

www.rad.com

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