

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 Egate-20, Egate-100 (central Ethernet gateway)
- RAD's RiCi-16, RiCi-E1 and RiCi-T1
- Third-party devices that support GFP, RAD HDLC and cHDLC encapsulation.

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.

System™
on an **SFP**



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TIMING AND SYNCHRONIZATION

MiRiCi-E1/T1 uses Tx clock sources for the internal and receive clocks. Standard statistics for 15 minute time intervals are collected.

MANAGEMENT AND SECURITY

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

- Out-of-band via the I²C 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 towards 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.

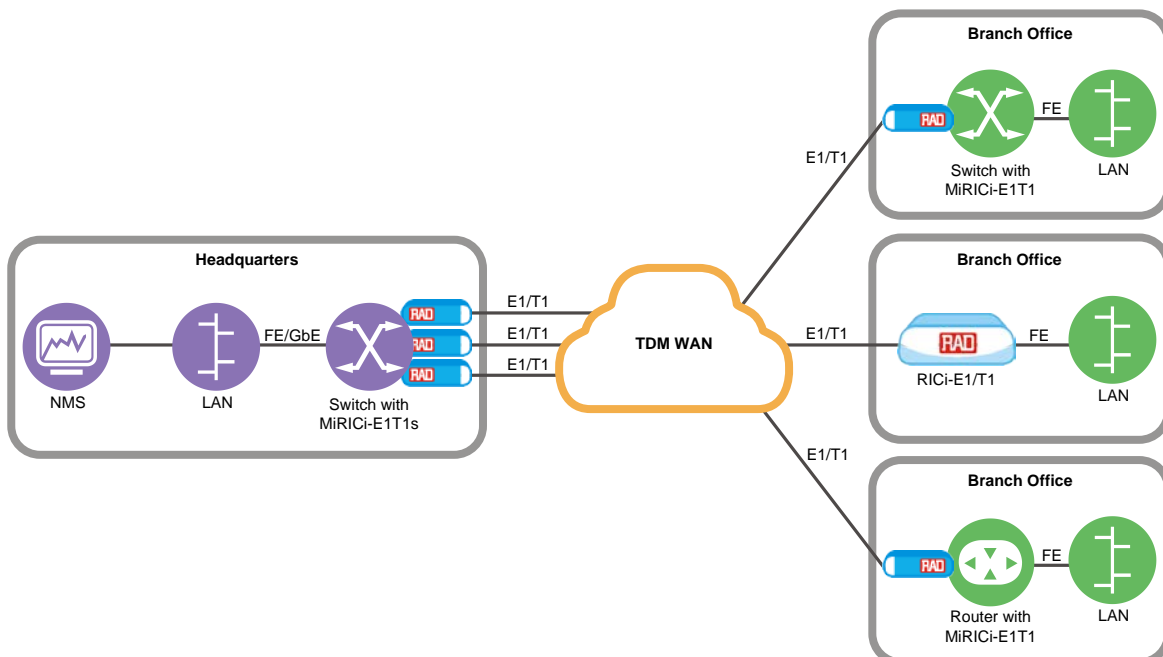


Figure 1. Transparent LAN Services over Leased Lines

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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, G.823

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) for AWG 22 cable

Connector

RJ-45

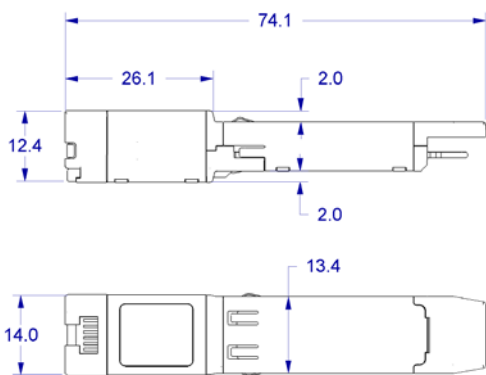


Figure 2. Physical Dimensions

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) for AWG 22 cable

Connector

RJ-45

ETHERNET INTERFACE

Type

Fast or Gigabit Ethernet port

Compliance

IEEE 802.3

Edge Connector

SFP-based, MSA-compliant

Frame Size

FE: 64–2016 Bytes

GE: Up to 10 kBytes (jumbo)

GENERAL

Indicators

LINK (green): Ethernet link status (MiRiCi-E1/T1/FE)

LINK/ACT (green): Ethernet link and activity status (MiRiCi-E1/T1/GbE)

LOS (red) – E1/T1 loss of signal

Physical

Height: 12.4 mm (0.49 in)

Width: 14 mm (0.55 in)

Depth: 74.1 mm (2.92 in)

Weight: 15.0 g (0.5 oz)

Power

3.3V with 1.25W dissipation

Environment

Temperature:

MiRiCi-E1/T1/FE:

Ambient: –40 to 70°C (–40 to 150°F)

Case: –40 to 78°C (–40 to 172°F)

MiRiCi-E1/T1/GE:

Ambient: –40 to 70°C (–40 to 150°F)

Case: –40 to 78°C (–40 to 172°F)

MiRiCi-E1/T1/FE with temperature-hardened enclosure:

–40 to 85°C (–40 to 185°F)

Humidity: Up to 90%, non-condensing

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Ordering

RECOMMENDED CONFIGURATIONS

MiRiCi-E1/T1/FE

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

MiRiCi-E1/T1/GE

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

SPECIAL CONFIGURATIONS

MiRiCi-E1/T1/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.

OPTIONAL ACCESSORIES

SFP-CA.2

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

International Headquarters

24 Raoul Wallenberg St., Tel Aviv 6971923, Israel
Tel 972-3-6458181 | Fax 972-3-7604732
Email market@rad.com

North American Headquarters

900 Corporate Drive, Mahwah, NJ 07430, USA
Tel 201-529-1100 | Toll Free: 800-444-7234 | Fax: 201-529-5777
Email market@radusa.com



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