MiRICi-E3T3

Intelligent Miniature Ethernet to E3/T3 Remote Bridge

- E3/T3 connectivity to any Ethernet device with SFP MSA-compatible socket
- Full duplex, E3/T3 wire-speed packet forwarding
- GFP, RAD HDLC and cHDLC encapsulation
- VLAN support according to 802.1p, including VLAN stacking (Q-in-Q) capabilities for 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

System on an SFP™

MiRICi-E3T3 forwards Fast or Gigabit Ethernet packets to a TDM-based WAN at full duplex wire-speed, fully utilizing the expensive E3 or T3 TDM bandwidth.

MARKET SEGMENTS AND APPLICATIONS

MiRICi-E3T3 can be used in the following applications:

- Transparent LAN services over leased lines
- Remote branch connectivity over E3/T3 lines
- Connecting LANs over E3/T3 radio links or in campus applications.

INTEROPERABILITY

MiRICi-E3T3 operates opposite the following devices using standard GFP, RAD HDLC and cHDLC encapsulation:

- RAD's RICi-16, RICi-E3 and RICi-T3
- Third-party devices that support standard GFP, RAD HDLC and cHDLC encapsulation.

ETHERNET OVER PDH

Encapsulation
MiRICi-E3T3 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 (E3, T3) 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-E3T3 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-E3T3 provides single segment (link) OAM based on 802.3ah, including discovery, continuity check, and remote fault indication.

TIMING AND SYNCHRONIZATION

MiRICi-E3T3 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 I^2C channel (off the SFP edge connector)
- Inband via the Ethernet port using a Web browser.

MiRICi-E3T3 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-E3T3 automatically requests one from the DHCP server upon booting.

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OPERATION AND MAINTENANCE

File Operations
Application software can be downloaded to MiRICi-E3T3 via the central server, using TFTP.

Configuration Adapter
An optional configuration adapter module, SFP-CA, is available for configuring MiRICi-E3T3 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-E3T3 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)
- LOF (Loss of Frame)
- FEAC (Far-End Alarm and Control)
- RLOL (Receive Loss of Lock)
- 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.

Loop Detection
MiRICi-E3T3 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-E3T3 generates and detects pseudo-random patterns and repetitive patterns from 1 to 32 bits in length.
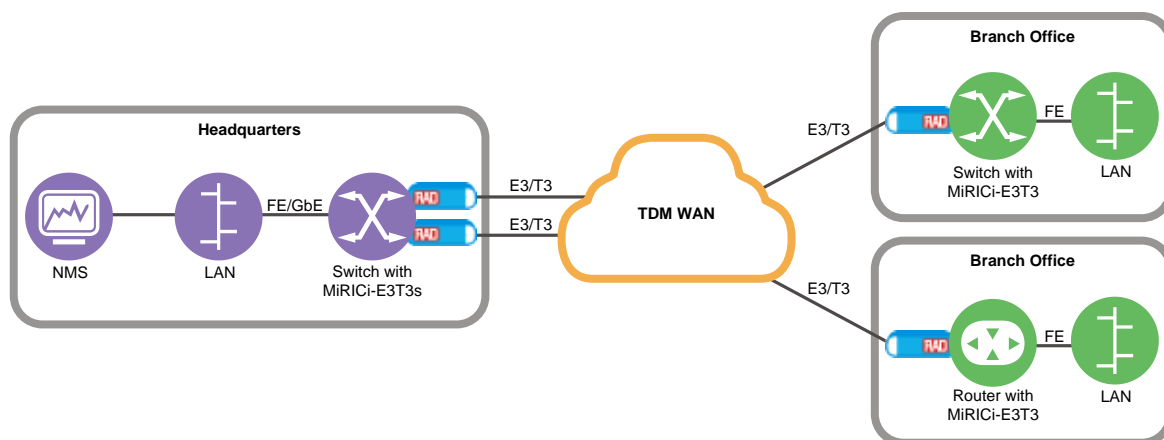
Application

Figure 1. Transparent LAN Services over Leased Lines

Specifications

TDM INTERFACE

Number of Ports
1, configurable as E3 or T3

Encapsulation
GFP (G.8040, G.7041/Y.1303)
RAD HDLC
cHDLC

E3 INTERFACE

Number of Ports
1

Compliance
G.703, G.775, G.823, G832, G.751

Data Rate
34.368 Mbps

Line Code
HDB3, AMI

Framing
Framed (G.832, G.751), unframed

Line Impedance
75W, unbalanced

Cable Length
Up to 275m (900 ft)

Connector
DIN 1.0/2.3

T3 INTERFACE

Number of Ports
1

Compliance
GR-499-CORE, T1.107, T1.404, G.703,
G.704, G.775, G.824

Data Rate
44.736 Mbps

Line Code
B3ZS, AMI

Framing
Framed (C-bit, M23), unframed

Line Impedance
75W, unbalanced

Cable Length
Up to 275m (900 ft)

Connector
DIN 1.0/2.3

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-E3T3/FE)

LINK/ACT (green): Ethernet link and
    activity status (MiRICi-E3T3/GbE)

LOS (red) – E3/T3 loss of signal

Power
3.3V with 1.25W dissipation

Environment
Temperature:

   MiRICi-E3T3/FE:
        Ambient: −40 to 65°C (−40 to 149°F)
        Case: −40 to 78°C (−40 to 172°F)

   MiRICi-E3T3/GE:
        Ambient: −40 to 65°C (−40 to 149°F)
        Case: −40 to 78°C (−40 to 172°F)

   MiRICi-E3T3/FE with temperature-
   hardened enclosure:
        -40 – 85°C (−40 to 185°F)

Humidity: Up to 90%, non–condensing

Physical
Height: 12.4 mm (0.49 in)
Width: 14 mm (0.55 in)
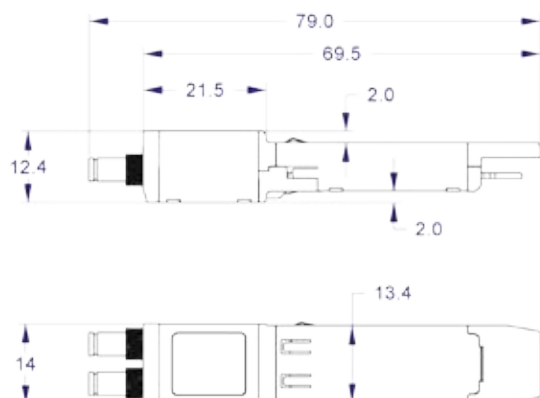Depth: 79 mm (3.11 in)
Weight: 15.0 g (0.5 oz)

Figure 3. Physical Dimensions

Figure 2. SFP-CA Module

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Ordering

RECOMMENDED CONFIGURATIONS

MiRICi-E3T3/FE

Intelligent miniature Ethernet to E3/T3 remote bridge, Fast Ethernet SFP port

MiRICi-E3T3/GE

Intelligent miniature Ethernet to E3/T3 remote bridge, Gigabit Ethernet SFP port

SPECIAL CONFIGURATIONS

MiRICi-E3T3/FE/H

Intelligent miniature Ethernet to E3/T3 remote bridge, Fast Ethernet SFP port, hardened enclosure

Note: *MiRICi-E3T3 units with GbE interface are not available with temperature-hardened enclosure.*

SUPPLIED ACCESSORIES

CBL-MINIBNC-BNC

Two 1m (3.28 ft) DIN 1.0/2.3 to BNC cable adapters

OPTIONAL ACCESSORIES

SFP-CA

Configuration adapter module for configuring MiRICi-E3T3 by connecting it to a PC.

Table 1. MiRICi Family Product Comparison

Feature	MiRICi-E1/T1 (Ver. 3.0)	MiRICi-E3/T3 (Ver. 3.0)
Protocol type	GFP (G.8040, G.7041/Y.1303) RAD HDLC cHDLC	GFP (G.8040, G.7041/Y.1303) RAD HDLC cHDLC
Framing	G.732.N, G.732.N CRC, unframed(E1) ESF, D4, unframed (T1)	G.832, G.751, unframed (E3) C-bit, M23, unframed (T3)
QoS	VLAN priority (802.1p, strict priority, WRR)	VLAN priority (802.1p, strict priority, WRR)
Loop detection	Yes (LAN or WAN)	Yes (LAN or WAN)
Fault propagation	Yes (LOS, FDL, LOF, AIS, RDI)	Yes (LOS, LOF, FEAC, RLOL, AIS, RDI)
SNMP traps	Yes, up to 8 management stations	Yes, up to 8 management stations

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