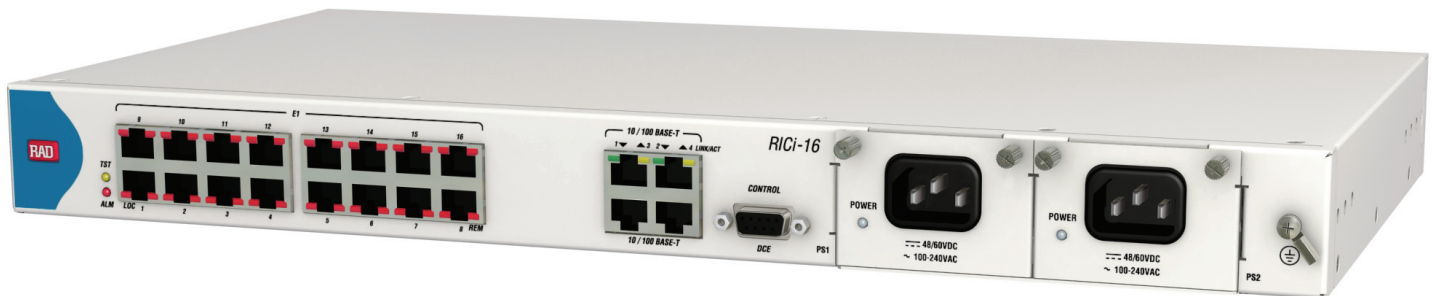


RICi-16

Fast Ethernet over Multiple E1/T1 Lines Network Termination Units



Connect Fast Ethernet LANs over up to 16 bonded E1 or T1 circuits

EtherAccess

- Bonds up to 16 E1 or T1 ports using GFP (G.7041/Y.1303, G.8040), VCAT (G.7043) and LCAS (G.7042) encapsulation and bonding protocols
- VLAN tagging, stacking and stripping fully separates Ethernet user traffic from management data
- Local and remote inband management
- Monitoring and diagnostic tools for quick fault isolation on TDM and Ethernet ports
- Fault propagation mechanism, initiating traffic to be rerouted upon error report

RICi-16 is a Network Termination Unit (NTU) connecting Fast Ethernet LANs over 16 bonded E1 or T1 circuits. RICi-16 enables service providers to supply high-capacity Ethernet services to remote locations, and can be used to transparently connect corporate LANs over existing E1 or T1 lines.

RICi-16 complies with RAD's unique set of EtherAccess™ features. This feature set provides services and carrier backhaul applications over low and high-speed SDH/SONET and PDH circuits from fractional and full E1/T1, E3/T3 over STM-1/OC-3, STM-4/OC-12 to Ethernet networks.

The device's bonding function creates a scalable, virtual pipe comprised of up to 16 E1 or T1 lines combined together.

The device uses the standard encapsulation and bonding protocols; Generic Framing Procedure (GFP), Virtual Concatenation (VCAT), and Link Capacity Adjustment Scheme (LCAS).

The bonding is performed at the physical layer providing a flexible bandwidth for different applications.



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Standard bonding and encapsulation protocols make RICi-16 interoperable with third-party devices.

Typical applications include:

- Ethernet private E-Line/E-LAN services
- IP DSLAM, cellular IP and WiMAX base station backhauling
- Inter-office or enterprise LAN connection.

VLAN stacking and stripping option at ingress and egress enables transporting user traffic transparently, keeping all the user VLAN settings intact. In addition, the management traffic may be tagged with a different VLAN, fully separating user traffic from management data.

The 802.1p, DSCP and per port priority schemes enable users to define four different QoS levels, according to the application requirements, providing high priority to real time applications such as voice and video.

The internal bridge can be configured to filter or transparent mode. In filter mode, the bridge learns MAC addresses and filters local traffic accordingly. In transparent mode it forwards the received packets ignoring the MAC addresses.

The device is managed inband from the Fast Ethernet user ports or remotely through the TDM port. Access is available using Telnet, Web browser, and SNMP (for RADview-Lite). Management traffic and user Ethernet traffic are transported together on the same Ethernet flow, separated by different VLANs. Local management is supported via an ASCII terminal.

The devices compensate for a differential delay of up to 250 ms between traffic received on different circuits.

FAULT PROPAGATION

If an error is detected on the GFP port, a fault propagation mechanism deactivates the Fast Ethernet link and reports this error to the Ethernet network. This enables routers and switches connected on both ends of the link to reroute the traffic to the redundancy path.

Specifications

E1 INTERFACE

Number of Ports

4, 8, or 16

Compliance

G.703

G.704

Data Rate

2.048 Mbps

Line Code

HDB3, AMI

Framing

Framed (G732N with CRC)

Line Impedance

120Ω, balanced

75Ω, unbalanced (via adapter cable)

Connector

RJ-45, balanced

System Clock

Internal or loopback timing

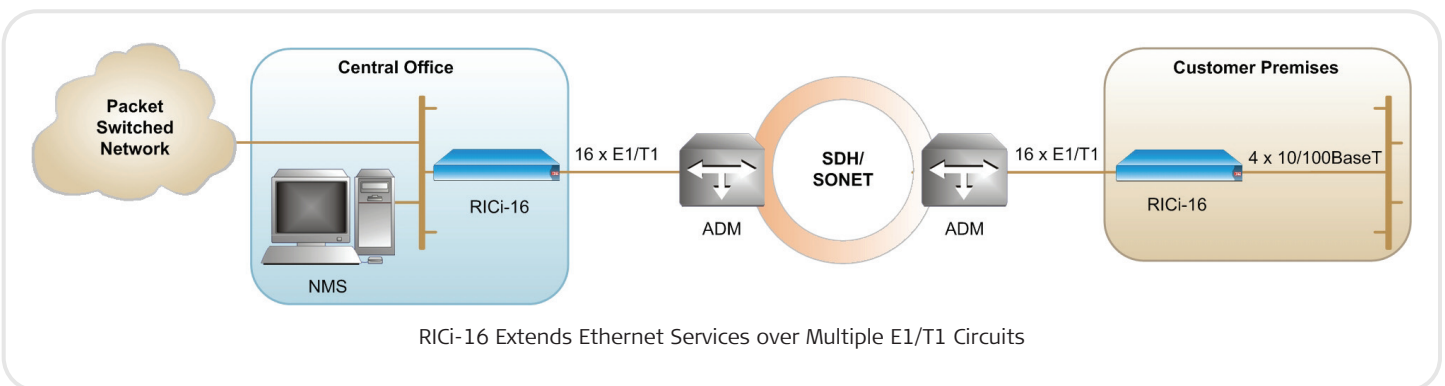
T1 INTERFACE

Number of Ports

4, 8, or 16

Compliance

T1.403



Data Rate

1.544 Mbps

Line Code

B8ZS, AMI

Framing

ESF

Line Impedance

100Ω, balanced

System Clock

Internal or loopback timing

Connector

RJ-45

WAN PROTOCOL**Type**

GFP (G.7041/Y.1303, G.8040)

VCAT (G.7043)

LCAS (G.7042)

Delay Compensation

Up to 250 ms

ETHERNET INTERFACE**Number of Ports**

4

Type

10/100 Mbps, autonegotiation, full/half duplex, flow control, MDI/MDX crossover

Max Frame Size

1600 bytes

Compliance

Conforms to the relevant sections of IEEE 802.3 and 802.3u

INTERNAL BRIDGE**LAN Table**

Up to 1.024 MAC addresses (learned)

Operation Mode

VLAN-aware, VLAN-unaware

Filtering and Forwarding

Transparent or filtered

TERMINAL CONTROL PORT**Type**

RS-232/V.24 (DCE asynchronous)

Data Rate

9.6, 19.2, 115.2 kbps

Connector

9-pin, D-type, female

GENERAL**Indicators**

PWR (green, per power supply) – Power status

TST (yellow) – Self test status

ALM (red) – Alarm status

PowerAC/DC: 100–240 VAC
or –48 VDC (-40/-60)**Power Consumption**

9W

Physical

Height: 43.7 mm (1.7 in) 1U

Width: 21.5 cm (8.5 in)

Depth: 30.0 cm (11.8 in)

Weight 2.2 kg (4.7 lb)

Environment

Temperature: 0–50°C (32–122°F)

Humidity: Up to 90%, non-condensing

RICi Family Product Comparison Table

Feature	RICi-E1, RICi-T1	RICi-E3, RICi-T3	RICi-4E1, RICi-4T1 RICi-8E1, RICi-8T1	RICi-16
Protocol Type	RAD HDLC HDLC IS GFP (G.8040, G.7041/Y.1303)	RAD HDLC X.86 (LAPS)	MLPPP	GFP (G.8040, G.7041/Y.1303) VCAT (G.7043) LCAS (G.7042)
Fault Propagation	Yes	Yes	Yes	Yes
MAC Address Table	1024	512	2048	1024
QoS	802.1p IP Precedence	802.1p	802.1p DSCP Per port	802.1p DSCP Per port
QoS Mechanism	Strict	Strict	Strict	Strict
Host VLAN	Yes	Yes	Yes	Yes
VLAN Stacking Support	Yes	Yes	Yes	Yes

RICi-16

Fast Ethernet over Multiple E1/T1 Lines Network Termination Units

Ordering

RICi-16E1/B//S

Fast Ethernet over multiple E1 lines network termination unit

RICi-16T1/B//S

Fast Ethernet over multiple T1 lines network termination unit

Legend

- B** Number of E1/T1 ports:
leave blank for 16 ports.
4 Four ports
8 Eight ports
- |** Number of power supplies:
leave blank for one power supply.
R Two power supplies
- \$** E1 Interface type:
U Unbalanced E1 interface via the CBL-RJ45/2BNC/E1 adapter cable
- S** NEBS compliancy:
leave blank for non-compliant.
N3 NEBS level 3, types 2, 3, and 4 compliant

SUPPLIED ACCESSORIES

AC power cord

DC power adapter

CBL-RJ45/2BNC/E1

RJ-45 to BNC adapter cable (if an unbalanced E1 interface is ordered)

OPTIONAL ACCESSORIES

OP-34-PS

Spare wide range power supply module (100-240 VAC/ -48 VDC).

RM-34

Hardware kit for mounting one RICi-16 unit into a 19-inch rack

CBL-DB9F-DB9M-STR

Control port cable

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