Data Sheet

RIC-155GE

Gigabit Ethernet over STM-1/OC-3c Network Termination Unit

- Gigabit Ethernet to STM-1/OC-3c bridge
- User-configurable traffic separation between management and user traffic, and prioritization over the STM-1/OC-3c link
- Physical layer fault propagation
- SDH/SONET loop detection with auto-recovery mechanism
- Inband or out-of-band management using ASCII terminal, Web browser, Telnet, or RADview-Lite management application

Connects Gigabit Ethernet LANs over STM-1/OC-3c link

EtherAccess

The RIC-155GE network termination unit (NTU) bridges between Gigabit Ethernet and STM-1/OC-3c networks, providing simple, efficient, and cost-effective Gigabit Ethernet connectivity over SDH/SONET networks. The device offers a migration path for connecting future-ready IP devices to existing SDH/SONET networks at up to 155 Mbps access rates.

RIC-155GE 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 or E3/T3 over STM-1/OC-3c or STM-4/OC-12 to Gigabit Ethernet.

Typical applications include:

- High-bandwidth private LAN services (*Figure 1*)
- Enterprise connectivity
- IP DSLAM backhauling.

RIC-155GE is equipped with a single STM-1/OC-3c optical port. The unit has a Gigabit Ethernet port that can be ordered with an optical interface or electrical 1000BaseT interface.

To increase service uptime, RIC-155GE can be ordered in a 19-inch NEBS-compliant enclosure with dual AC/DC power supply. It is also available in an 8.5-inch enclosure.

RAD
data communications
The Access Company

RIC-155GE
Gigabit Ethernet over STM-1/OC-3c Network Termination Unit

BRIDGE

The RIC-155GE bridge operates in two forwarding modes:

- VLAN-unaware with MAC address learning
- VLAN-aware with user-configurable double tagging that ensures transparency of user VLAN, and optional traffic separation between Gigabit Ethernet user traffic and Fast Ethernet management traffic.

ENCAPSULATION

Ethernet traffic encapsulation over STM-1/OC-3c is performed by mapping Ethernet frames directly over HDLC framing, resulting in high throughput.

QUALITY OF SERVICE (QoS)

Based on VLAN priority tagging (802.1p), four priority queues can be defined to prioritize between users or user applications (VLAN-aware mode only).

FAULT PROPAGATION

The unit features a user-configurable bidirectional fault propagation mechanism that notifies local and remote equipment of faulty conditions. This enables routers and switches on both ends of the link to reroute traffic.

SDH/SONET alarms can optionally propagate and cause the Gigabit Ethernet link to shut down. The Gigabit Ethernet alarms can also be propagated over the SDH/SONET link.

DIAGNOSTICS AND STATISTICS

Comprehensive diagnostic capabilities include:

- Real-time alarms to alert user on fault conditions. Alarms are reported to the management station, recorded in the log file, and simultaneously relayed via an optional dry contact port.
- Ethernet and SDH/SONET link monitoring.

LOOP DETECTION

RIC-155GE detects SDH/SONET loops and avoids the resulting Ethernet loops and storming. RIC-155GE automatically recovers when the SDH/SONET loop clears.

MANAGEMENT

Setup, control, and monitoring are performed either inband within the Ethernet flow, or out-of-band using a dedicated Ethernet port or the terminal control port.

Management options include:

- ASCII terminal
- Telnet server
- ConfiguRAD via a Web browser
- RADview-Lite, an SNMP-based management service package, with ConfiguRAD element manager.

Specifications

STM-1/OC-3C INTERFACE

Number of Ports
1

Data Rate
155 Mbps

Operation Mode
SDH/SONET

Compliance
ANSI T1 646-1995
G.957 (S1.1 or L1.1)

Connectors
SC, ST

GIGABIT ETHERNET INTERFACE

Number of Ports
1

Interface Type
1000BaseSx, 850 nm
1000BaseLx, 1310 nm or 1510 nm
1000BaseT

Compliance
Relevant sections of IEEE 802.3

Data Rate
1000 Mbps

Maximum Frame Size
1664 bytes

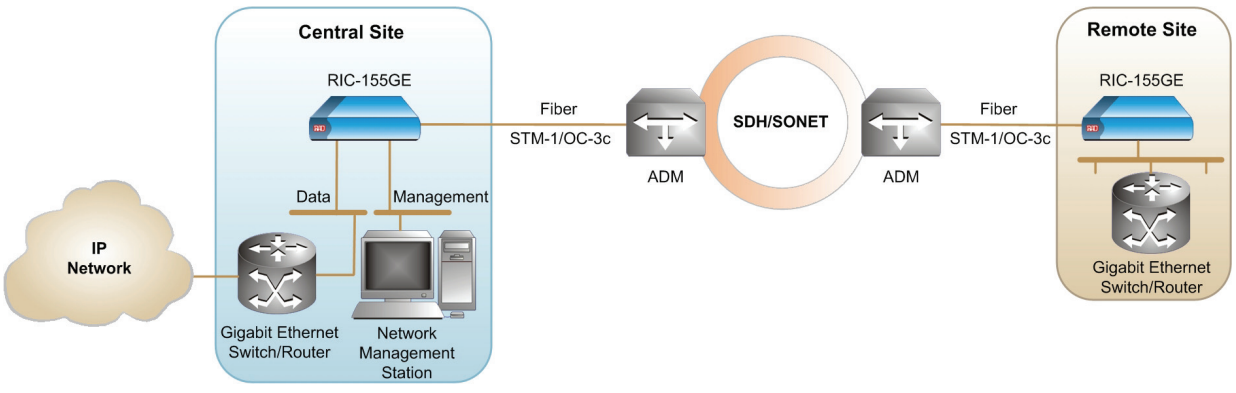

Figure 1. Connecting Gigabit Ethernet LANs over STM-1/OC-3c Lines

Duplex Mode
Full duplex

Connectors
LC (optical)
RJ-45 (electrical)

FAST ETHERNET INTERFACE

Number of Ports
1

Interface Type
100BaseT

Compliance
Relevant sections of IEEE 802.3

Data Rate
100 Mbps

Maximum Frame Size
1664 bytes

Connector
RJ-45

INTERNAL BRIDGE

Number of Ports
4 (host, SDH/SONET, GbE, FE)

LAN Table
16,384 MAC addresses with automatic learning and aging

Maximum Frame Size
1664 bytes

GENERAL

Management
Out-of-band via dedicated terminal port:
Interface: V.24/RS-232 DCE
Format: asynchronous
Data rate: 9.6 to 115.2 kbps
Connector: DB-9, female

Out-of-band via dedicated 10/100BaseT management port

Inband via Gigabit Ethernet port

Timing (STM-1/OC-3c)
Internal, from internal oscillator
LBT, from received signal

Indicators
PWR (green) – Power status

ALM (red) – Alarm status

MNG LINK (green) – 10/100BaseT Ethernet link integrity

MNG ACT (yellow) – 10/100BaseT Ethernet link activity

DATA LINK (green) – Gigabit Ethernet link integrity

DATA ACT (yellow) – Gigabit Ethernet activity

SYNC (green) – STM-1/OC-3c port synchronization status

Alarm Relay
Type: Dry relay contacts for major and minor alarms

Connector: DB-9, female

Alarm Output Contact Ratings
Maximum 30 VDC across open contacts
Maximum 2 ADC through closed contacts

Note: *The alarm relay is available only with the 8.5-inch unit.*

Power
AC: 100 to 240 VAC (±10%), 50/60 Hz
DC: -48/-60 VDC (nominal)

Power Consumption
Regular unit: 20W
NEBS-compliant unit: 29W

Physical
Regular unit:
Height: 43.7 mm (1.7 in) 1U
Width: 215 mm (8.5 in)
Depth: 300 mm (11.8 in)
Weight: 2.1 kg (4.7 lb)

NEBS-compliant unit:
Height: 43.7 mm (1.7 in) 1U
Width: 430 mm (17.0 in)
Depth: 240 mm (9.4 in)
Weight: 3.7 kg (8.2 lb)

Environment
Temperature:
Operating: 0 to 50°C (32 to 122°F)
Storage: -20 to 70°C (-4 to 158°F)

Humidity: Up to 90%, non-condensing

Product Comparison Table

Feature	RIC-155GE (Ver. 2.0)	RICi-155GE (Ver. 1.0)
Frame Size (Bytes)	64–1664	64–9600
Ethernet Flows	No	Yes
QoS	802.1p	802.1p Port-based
MEF Certification	No	MEF 9: EPL, EVPL MEF 14: EPL, EVPL
Number of Queues	4 (strict)	4 (strict)
Encapsulation	Packet-over-SDH/SONET (POS)	GFP (G.7041), LAPS (X.86)
Traffic Mapping	N/A	Port-based (All-in-one bundling) User port + CE-VID User port + CE-VLAN priority
SDH/SONET Redundancy	No	APS 1+1
Gigabit Ethernet Redundancy	No	Yes
Hot-Swappable Power Supplies	Yes (NEBS-compliant unit)	Yes

Data Sheet

RIC-155GE

Gigabit Ethernet over STM-1/OC-3c Network Termination Unit

Ordering

RIC-155GE/*/%/$/&/+/^

Legend

* Number of power supplies and type:
- **AC** 100 to 240 VAC
- **48** –48 VDC
- **ACR** Dual 100 to 240 VAC, NEBS-compliant
- **48R** Dual –48 VDC, NEBS-compliant

% STM-1/OC-3c connector type:
- **SC** Fiber optic SC connector
- **ST** Fiber optic ST connector

$ STM-1/OC-3c optical wavelength:
- **13** 1310 nm multimode, 2.3 km (1.4 miles), SC or ST connector
- **13L** 1310 nm single mode S1.1, 15 km (9.4 miles), SC connector
- **13LH** 1310 nm single mode L1.1, 40 km (25 miles), SC connector

& Gigabit Ethernet port type:
- **85** 850 nm multimode, 270 m (1000 ft), LC connector
- **13L** 1310 nm single mode, 5 km (3.1 miles), LC connector
- **15LH** 1550 nm single mode, 40 km (25 miles), LC connector
- **UTP** 1000BaseT, 100m (330 ft), RJ-45 connector

\+ NEBS-3 compliancy:
- **N3** NEBS-3 compliant

***Note**: If **N3** is not specified, the unit supplied is 8.5-inch, not NEBS-3 compliant.*

^ Alarm relay port (only for 8.5-inch unit):
- **ALM** Alarm relay port

SUPPLIED ACCESSORIES

AC power cord (if AC option is ordered)

DC connection kit (if DC option is ordered)

RM-34
Hardware kit for mounting one 19-inch unit (if NEBS-compliant unit is ordered)

CBL-DB9F-DB9M-STR
DB9-to-DB9 control port cable (if NEBS-compliant unit is ordered)

OPTIONAL ACCESSORIES

RM-35/@
Hardware kit for mounting one or two 8.5-inch units in a 19-inch rack

Legend

@ Rack mounting kit type:
- **P1** For mounting one unit
- **P2** For mounting two units

WM-34
Hardware kit for mounting one NEBS-compliant unit on wall

WM-35-TYPE1
Hardware kit for mounting one 8.5-inch unit on wall

CBL-DB9F-DB9M-STR
DB9-to-DB9 control port cable

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