Data Sheet

RICi-622GE

Gigabit Ethernet over 2 x STM-4/OC-12 Network Termination Unit

- Gigabit-to-STM-4/OC-12 bridge, offering up to 1000 Mbps access rates
- MEF 9. MEF 14 EPL and EVPL certified. EPL and EVPL flow-based services with flexible mapping of the user traffic into Ethernet flows
- SDH/SONET loopback detection and bidirectional fault propagation
- High-resiliency product offering redundancy for Gigabit Ethernet port, SDH/SONET port, and power supply
- Inband or out-of-band management with various access methods and applications supporting SNMPv3, SSL, SSH, and RADIUS authentication

Connects Gigabit Ethernet LANs over up to two STM-4/OC-12 links

EtherAccess

RICi-622GE is a state-of-the-art network termination unit (NTU) that bridges between Gigabit Ethernet networks and STM-4/OC-12 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 1.2 Gbps access rates.

RICi-622GE 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 aggregating up to eight remote IP DSLAM backhauling sites (*Figure 1*), enterprise connectivity (*Figure 2*), and high-bandwidth private line services.

RICi-622GE is equipped with two STM-4/OC-12 ports with SFP-based optical interfaces, offering either 1.2 Gbps with link bonding using VCAT (G.707/Y.1322) and LCAS (G.7042), or 1+1 link protection mechanism (unidirectional MSP/APS) to increase service uptime. The unit has two Gigabit Ethernet ports that support Gigabit Ethernet link redundancy based on standard link aggregation protocol IEEE 802.3ad. The Gigabit Ethernet ports can be ordered with SFP-based optical interfaces or 10/100/1000BaseT interfaces.

CARRIER ETHERNET MEF Certified Compliant

RAD data communications
The Access Company

RICi-622GE
Gigabit Ethernet over 2 x STM-4/OC-12 Network Termination Unit

FLEXIBLE TRAFFIC MAPPING

The incoming customer traffic is mapped to the Ethernet flows (EVCs) using the following per-port criteria:

- Port-based (All-in-one bundling)
- User port + CE-VID
- User port + CE-VLAN priority.

Each Ethernet flow can either have a single service assigned to it or up to eight services that are differentiated by the CE-VLAN P-bits (EVC.CoS).

ENCAPSULATION

Traffic is encapsulated with:

- Generic Framing Procedure (ITU-T G.7041, ANSI T1-105.02), framed mode
- Link Access Procedure for SDH/SONET (LAPS) protocol following draft recommendation ITU-T X.86.

QUALITY OF SERVICE – QoS

Different service types require different levels of QoS to be provided end-to-end. QoS can be defined per subscriber as well as per service. QoS has two aspects: rate limitation and traffic prioritization.

Two policing mechanisms (upstream and downstream) are applied per service. The policing mechanisms operate according to the dual leaky bucket mechanism (CIR+CBS, EIR + EBS: two rates, three colors).

For prioritizing user traffic, RICi-622GE features up to four separate queues.

The queues handle traffic with different service demands, such as real-time traffic, premium data, or best-effort data.

The preceding capabilities allow service providers to offer different services and traffic types over the same link.

SDH/SONET TIMING OPTIONS

The user can define the following SDH/SONET clock sources:

- Internal
- Recovered from STM-4/OC-12 interface.

SDH/SONET LINK REDUNDANCY

The unit supports a 1+1 link protection mechanism (APS), according to the ITU-T G.841 requirements (unidirectional MSP). Additional protection is provided by the VCAT and LCAS protocols.

GIGABIT ETHERNET LINK REDUNDANCY

To allow reliable and uninterrupted service, the Gigabit Ethernet ports can be set to work in 1:1 or 1+1 automatic protection switching mode, according to link aggregation protocol (IEEE 802.3ad).

MEF COMPLIANCE

RICi-622GE is certified by the Metro Ethernet Forum (MEF) for the following services:

MEF 9: EPL, EVPL
MEF 14: EPL, EVPL

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.

MANAGEMENT

The unit can be managed with the following ports and applications:

- Out-of-band management via Fast Ethernet or RS-232 port
- Remote inband management via SDH/SONET or Gigabit Ethernet port. Remote management is performed using Telnet, Web browser, or an SNMP-based management system.

SECURITY

RICi-622GE supports the following security protocols, providing a high level of client-server communication security.

- SNMPv3
- RADIUS authentication
- SSL for Web-based management application
- SSH for Secure Shell communication session.

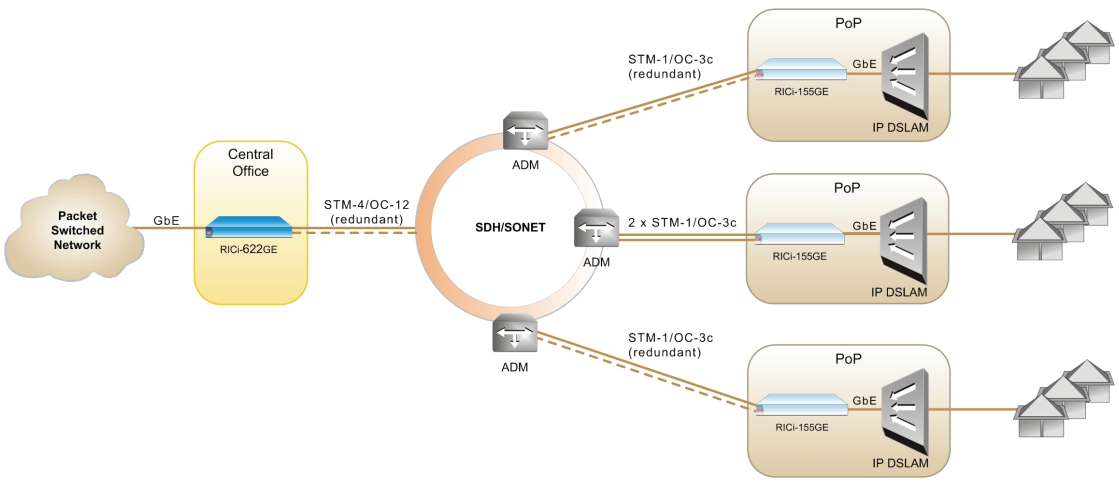

Figure 1. Aggregation of IP DSLAM Backhauling

Specifications

STM-4/OC-12 INTERFACE

Number of Ports
2

SFPs
SFP-5: 850 nm multimode, 550 m (1804 ft)
SFP-6: 1310 nm single mode, 10 km (6.2 miles)
SFP-6D: 1310 nm single mode, DDM, 10 km (6.2 miles)

Data Rate
Up to 1.2 Gbps

Operation Mode
SDH/SONET

Compliance
SDH: ITU-T G.957
SONET: GR-253-core

Framing
SDH: ITU-T G.707, G.708, G.709
SONET: ANSI T1.105-1995, GR-253-core
Both OC-3 and OC-3c are supported

Encapsulation
Generic Framing Procedure (ITU T G.7041, ANSI T1-105.02)
Link Access Procedure for SDH/SONET (LAPS) (ITU-T X.86)

Bonding
Link Capacity Adjustment Scheme (LCAS): compliant with G.7042
Virtual Concatenation (VCAT): compliant with G.707/Y.1322

Timing
Internal
Recovered from STM-4/OC-12 interface

Interface Type
Optical SFP-based

Connector
LC, SC/APC

GIGABIT ETHERNET INTERFACE

Number of Ports
2

Port Combinations
2 built-in electrical (RJ-45)
2 fiber optic (SFP)

Interface Type
1000BaseLx/1000BaseSx, or
10/100/1000BaseT

SFPs
SFP-5: 850 nm multimode, 550 m (1804 ft)
SFP-6: 1310 nm single mode, 10 km (6.2 miles)
SFP-6D: 1310 nm single mode, DDM, 10 km (6.2 miles)

Compliance
Relevant sections of IEEE 802.3
MEF 9: EPL, EVPL
MEF 14: EPL, EVPL

Data Rate
1000BaseLx/1000BaseSx: 1000 Mbps
10/100/1000BaseT: 10/100/1000 Mbps

Maximum Frame Size
9600 bytes

Connector
SFP-based optical interface: LC
Electrical interface: RJ-45

MANAGEMENT PORTS

Out-of-Band Ethernet Management Port
Type: 10/100BaseT
Connector: RJ-45

Control Port
Interface: V.24/RS-232 DCE
Connector: 9-pin D-type, female
Format: Asynchronous
Data rate: 9.6, 19.2, or 115.2 kbps
Selectable word format: 7 or 8 bits, no parity, 7-bit odd or even parity

INDICATORS

General
RDY (green) – Startup status
TST (yellow) – Test status
MAJ ALM (red) – Major alarm status
MIN ALM (red) – Minor alarm status
PWR (green, on power supply) – Power status ()

GbE, MNG ETH (per port)
LINK (green) – LAN link integrity status
ACT (yellow) – LAN data activity status

SDH/SONET
ON LINE (green) – STM-4/OC-12 link connection status
LOS (red) – STM-4/OC-12 loss of signal status

GENERAL

Power
AC: 100 to 240 VAC ±10%, 50/60 Hz
DC: –48 VDC (–40 to –72 VDC)

Power Consumption
AC: 40W
DC: 38W

Physical
Regular unit:
Height: 43.7 mm (1.7 in)
Width: 440 mm (17.3 in)
Depth: 240 mm (9.4 in)
Weight: 4 kg (8.8 lb)

NEBS-compliant unit:
Height: 43.7 mm (1.7 in)
Width: 541 mm (21.3 in)
Depth: 240 mm (9.4 in)
Weight: 4.9 kg (10.8 lb)

Environment
Temperature:
Regular unit:
0–50°C (32 –122°F)
NEBS-compliant unit:
0–55°C (32 –131°F)

Humidity: Up to 90%, non-condensing

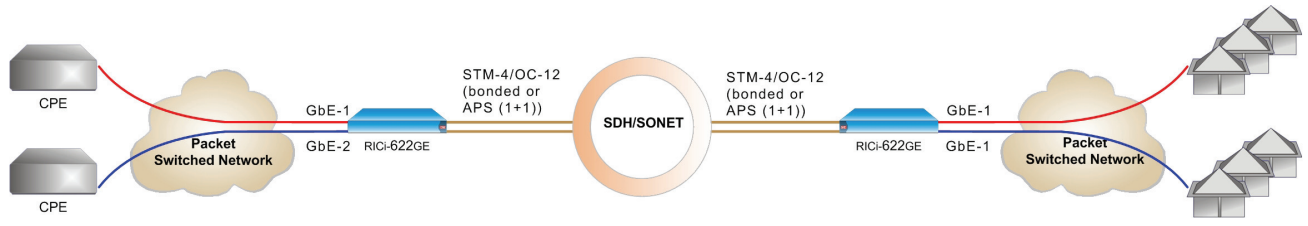

Figure 2. Point-to-Point Ethernet Private Line over SDH/SONET

Data Sheet

RICi-622GE

Gigabit Ethernet over 2 x STM-4/OC-12 Network Termination Unit

Ordering

RICi-622GE/*/%/&/S

Legend

* Number of power supplies and type:

AC	100 to 240 VAC
48	–48 VDC
ACR	Dual 100 to 240 VAC
48R	Dual –48 VDC

% Gigabit Ethernet port interface types:

SFP5	Single SFP-5 transceiver
SFP6	Single SFP-6 transceiver
SFP6D	Single SFP-6D transceiver
2XSFP5	Dual SFP-5 transceivers
2XSFP6D	Dual SFP-6D transceivers
2XUTP	Dual built-in 10/100/1000BT, RJ-45 connector
NULL	Two empty SFP slots

***Note**: If a single SFP is ordered, the second slot is empty.*

& SDH/SONET port interface types:

SFP5	Single SFP-5 transceiver
SFP6	Single SFP-6 transceiver
SFP6D	Single SFP-6D transceiver
2XSFP5	Dual SFP-5 transceivers
2XSFP6	Dual SFP-6 transceivers
2XSFP6D	Dual SFP-6D transceivers
NULL	Two empty SFP slots

***Notes**:*

- *If a single SFP is ordered, the second slot is empty.*
- *For detailed specifications of the SFP transceivers, see the SFP Transceivers data sheet.*
- *It is strongly recommended to order this device with original RAD SFPs installed. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP devices. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs.*

S NEBS-3 compliancy:

N3	NEBS-3 compliant

***Note**: If N3 is not specified, the unit supplied is 19-inch, not NEBS-3 compliant.*

SUPPLIED ACCESSORIES

AC power cord
DC power connection kit (if DC power supply is ordered)

RM-34
Hardware kit for mounting one regular RICi-622GE unit in a 19-inch rack (if the non-NEBS option is ordered)

RM-34-23
Hardware kit for mounting one NEBS-compliant RICi-622GE unit in a 23-inch rack (if the NEBS option is ordered)

CBL-DB9F-DB9M-STR
Control port cable

OPTIONAL ACCESSORIES

RICi-622GE-PS/AC
100-240 VAC power supply module

RICi-622GE-PS/48
-48 VDC power supply module

WM-34
Hardware kit for mounting one regular RICi-622GE unit on a wall (if the non-NEBS option is ordered)

Product Comparison Table

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

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523-100-05/08 Specifications are subject to change without prior notice.