Data Sheet

Egate-100

Gigabit Ethernet over TDM Aggregation Gateway

- Aggregating Gigabit Ethernet traffic over PDH and SONET/SDH infrastructure
- Combining data streams from multiple remote sites with varying link capacities and encapsulation technologies
- Gigabit port protection, STM-1/OC-3 redundancy, and dual power supply ensuring higher service uptime
- Priority and queuing schemes allowing differentiated services on the same link
- Transporting Ethernet services transparently in point-to-point and point-to-multipoint topologies by utilizing VLAN tagging, stacking, and switching

Extending Ethernet services over TDM access networks

EtherAccess

Egate-100 is a Gigabit Ethernet over TDM aggregation gateway that interconnects packet networks via PDH access. The device features next-generation Ethernet over PDH encapsulation and bonding capabilities. It also supports the standard protocols generic framing procedure (GFP, G-8040), virtual concatenation (VCAT), and link capacity adjustment scheme (LCAS).

The unit complies with RAD's unique set of EtherAccess™ features. The EtherAccess™ 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.

Egate-100 complements RAD's RICi-16 NTU to provide the first complete solution in the market supporting Ethernet over NG-PDH, both in central locations and in customer premises.

The device is an Ethernet traffic aggregator and Layer-2 switch. Ethernet traffic over E1/T1 lines over STM-1/OC-3c or T3 links is aggregated and transferred to the packet-switched network via the unit's Gigabit Ethernet ports.

CARRIER ETHERNET MEF Certified Compliant

RAD data communications
The Access Company

Egate-100

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Egate-100 provides the following aggregations (depending on the configuration):

- Up to 42 remote LANs over bonded n × E1/T1 lines
- Up to 63/84 remote LANs over E1/T1 circuits
- Up to 126 remote LANs over fractional E1/T1 circuits.

The unit replaces current high-priced solutions, such as channelized STM-1/OC-3 routers or multibox solutions based on converter racks and switches. Together with service scalability, small footprint, and low power consumption, equipment costs are significantly reduced and network operation is simplified.

Typically deployed at a central location (see figure below), Egate-100 aggregates user Ethernet traffic received from remote devices (such as RAD's RICi, FCD, or ASMi, or third-party devices), thus completing a full access solution from the service provider central site to the customer premises.

Typical applications include:

- IP DSLAM and IP base station traffic backhauling
- WiMAX BTS traffic backhauling
- Ethernet private line/LAN services
- Backhauling of network management traffic
- Aggregation of Ethernet traffic over PDH wireless links.

BRIDGE

Egate-100 acts as a bridge in an SDH/SONET environment, enabling service providers to achieve seamless interconnection between customers using the TDM network and customers using the packet network, maintaining the same service level attributes.

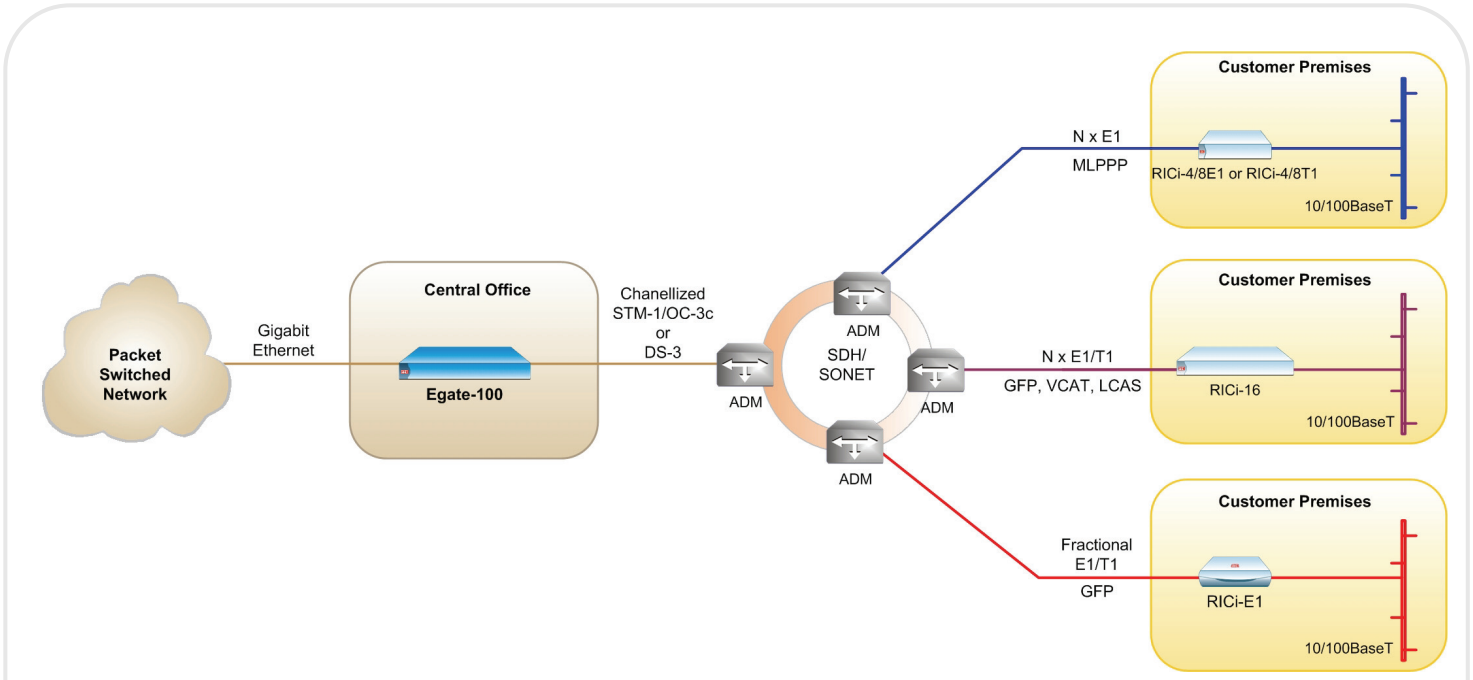
VLAN tagging and double tagging (Q-in-Q) allows adding a provider's VLAN to enable transparent LAN services in parallel to user VLAN settings.

The split horizon mechanism prevents network congestion and Ethernet loops by preventing traffic from being switched between local bridge ports.

S-TAG per 802.1ad for VLAN tagged frames, as well as proprietary Ethertype values, are supported.

In VLAN-aware mode (IVL), frames are forwarded according to VLAN tags and MAC address. This allows defining different user traffic domains in order to create point-to-point (E-Line) or point-to-multipoint (E-LAN) topologies. A VLAN tunnel can be created for separating management and user traffic.

In a typical service provisioning structure, Egate-100 links between users connected to a packet-switched network and users connected to a TDM network. Virtual channels are established between the far-end users by tagging separate user traffic channels with VLANs. These virtual channels enable transparent forwarding of all user traffic. In addition, all devices are managed over a separate dedicated VLAN, with secure separation between user traffic and management traffic.



Aggregating Ethernet Traffic over E1/T1 Lines

LINK REDUNDANCY

Egate-100 aggregates traffic from many remote sites. In order to increase the reliability of service and ensure continued operation, the device supports:

- Gigabit Ethernet port redundancy, based on standard link aggregation protocol 802.3ad
- 1+1 (MSP/APS) protection on the dual STM-1/OC3 ports.

QUALITY OF SERVICE

Egate-100 facilitates differentiated services on the same link according to Ethernet or IP marking. Classification is based on VLAN priority (802.1p), IP precedence, or DSCP, while the traffic is forwarded to four strict priority queues. Different service rates can be provided with TDM-based fractional E1/T1, n × E1/T1 granularity.

DIAGNOSTICS AND STATISTICS

Comprehensive diagnostic and performance monitoring capabilities include:

- Ping test for checking IP connectivity
- PRBS Test over E1 or T1 lines
- Statistics and alarms for the physical Ethernet interfaces, SDH/SONET ports, bridge ports, and logical layer.

ETHERNET OAM

Egate-100 provides single segment (link) OAM based on 802.3-2005 (formerly 802.3ah), including discovery, continuity check, and remote fault indication. OAM is supported over the PDH logical links.

MEF COMPLIANCE

Egate-100 is certified by the Metro Ethernet Forum (MEF) for MEF 9 EPL.

LOOP DETECTION

E1/T1 loops are immediately detected when they occur and the bridge port is closed to avoid Ethernet loops. Once the E1/T1 loops are released, normal operation resumes.

MANAGEMENT

The unit can be managed with various ports and applications:

- Local out-of-band management via an ASCII terminal connected to the RS-232 port, or via dedicated Fast Ethernet port
- Remote inband management via one of the Gigabit Ethernet ports, performed using Telnet, Web browser, or RADview-Lite, RAD's SNMP-based EMS.

A dedicated VLAN can be used to secure the management traffic and separate it from user traffic.

SYSLOG

System logs are forwarded to the network according to predefined criteria.

SECURITY

The following security mechanisms are provided:

- Access control for SNMP, Telnet, and Web-based management interfaces enables granting access only to users that appear in the manager list.
- SSL/SSH for Telnet and secure Web access
- RADIUS protocol for password management and user authentication.

SIMPLE NETWORK TIME PROTOCOL

Egate-100 uses Simple Network Time Protocol (SNTP) to synchronize to an accurate time from an NTP server at user-selectable intervals.

Specifications

STM-1/OC-3 INTERFACE

Number of Ports
2 (1+1)

Compliance
G.957 S1.1, G.957 L1.1,
ANSI T1.646-1995, G. 825 (jitter),
G.841 (APS)

Data Rate
155 Mbps

Mapping
E1 over VC12 over STM-1
T1 over VT1.5 over STS-1 over OC-3

Operation Mode
SDH/SONET

APS
MSP 1+1 optimized (ITU-T G.841 Annex B compliant)
MSP 1+1 unidirectional (ITU-T G.841 compliant)

SFP Transceivers
For full details, see the SFP Transceivers data sheet at www.rad.com

Connector
SFP slot (for transceivers, see *Ordering*)

T3 INTERFACE

Number of Ports
3

Compliance
T1.107, GR-499-CORE

Data Rate
44.736 Mbps

Mapping
28 T1s mapped into T3 (via M13 mux)

Framing
M23
C-Bit parity

Line Interface
75Ω coax up to 100m (328 ft)

GIGABIT ETHERNET INTERFACE

Number of Ports
2

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

Compliance
Relevant sections of IEEE 802.3

Data Rate
Optical: 1000 Mbps
Electrical: 10/100/1000 Mbps

Max Frame Size
1600 bytes

Gigabit Ethernet Redundancy
Link aggregation according to IEEE 802.3ad

SFP Transceivers
For full details, see the SFP Transceivers data sheet at www.rad.com

Connector
Optical :
SFP slot (for transceivers, see *Ordering*)
Electrical : RJ-45

Electrical Cable Type
Cat. 5

ENCAPSULATION PROTOCOLS

GFP (ITU-T G.8040, G.7041/Y.1303)
VCAT (ITU-T G.7043)
LCAS (ITU-T G.7042)
RAD proprietary HDLC compatible with RAD products
PPP/BCP (RFC 1661, RFC 3518)
MLPPP (BCP) according to: RFC 1661, RFC 1990, RFC 3518

INTERNAL BRIDGE

Operation Mode
VLAN-aware, VLAN-unaware learning bridge

Number of VLANS
Up to 1024

Compliance
Relevant sections of 802.1Q

LAN Table
Up to 64,000 MAC addresses (learned)

MANAGEMENT PORTS

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

Control Port
Interface: V.24/RS-232 DCE
Connector: 9-pin D-type, female (DB-9)
Data rate: 9.6, 19.2, 38.4, 57.6, or 115.2 kbps

GENERAL

Indicators
POWER:
On (green): Power supply performing properly
Off (red): Power supply error or not connected to power

ALM (red):
On: Interface (GbE, SDH/SONET/T3) or system error
Off: No error

ACT (yellow):
Blinking: Ethernet frame received or sent within the last second
Off: No frame received or sent within the last second

STM-1/OC-3 Option
SYNC (green):
On: STM-1 port is synchronized
Off: LOS, LOF

T3 Option
SYNC (green):
On: T3 port is synchronized
Off: LOS

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

Power Consumption
40W max

Physical
Height: 43.7 mm (1.7 in) 1U
Width: 440 mm (17.3 in)
Depth: 240 mm (9.4 in)
Weight: Single power supply: 3.5 kg (7.7 lb)
Dual power supply: 4.0 kg (8.8 lb)

NEBS level 3, types 2 and 4 compliant

Note: *By default, the T3 option is NEBS-3 compliant. For SDH/SONET, NEBS 3 compliance is optional.*

Environment
Temperature: 0°–50°C (32°–122°F)
Humidity: Up to 90%, non-condensing

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Egate and RICi Comparison Table

Feature	Egate-100 (Ver. 3.0)	Egate-20 (Ver. 1.1)	RICi-E1,RICi-T1 (Ver. 2.1)	RICi-E3,RICi-T3 (Ver. 1.1)	RICi-16 (Ver. 2.1)	RICi-4E1,RICi-4T1 RICi-8E1,RICi-8T1 (Ver. 2.0B)
Protocol Type	• GFP (G.8040) VCAT (G.7043) LCAS (G.7042) • RAD HDLC • PPP/BCP • MLPPP (BCP)	RAD HDLC	• RAD HDLC • HDLC IS • GFP (G.8040)	• RAD HDLC • X.86 (LAPS)	GFP (G.7041), GFPoPDH (G.8040) VCAT (G.7043) LCAS (G.7042)	MLPPP (BCP)
MAC Address Table	64000	2048	512	512	2048	2048
QoS	802.1p DSCP IP precedence	802.1p DSCP IP precedence Per port	802.1p IP precedence	802.1p	802.1p DSCP Per port	802.1p DSCP Per port
QoS Mechanism	Strict	Strict	Strict	Strict	Strict	Strict
Hot-Swappable Power Supplies	Yes	No	No	No	No	No
Host VLAN	Yes	Yes	Yes	Yes	Yes	Yes
VLAN Tagging and Stacking	Yes	Yes	Yes	Yes	Yes	Yes

Data Sheet

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Ordering

Egate-100/!/#/+/+/TR/S
Aggregation gateway with SFP slots for STM-1/OC-3 interfaces

Egate-100-T3/!/+/+/TR
Aggregation gateway with three T3 ports

Legend

! Power supply:
- **AC** Single AC power supply
- **ACR** Dual AC power supply
- **48** Single DC power supply
- **48R** Dual DC power supply

TDM interface:
- **SFP1** Single SFP-1 transceiver: Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
- **SFP2** Single SFP-2 transceiver: Fast Ethernet/ STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
- **SFP3** Single SFP-3 transceiver: Fast Ethernet/ STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
- **2XSFP1** Dual SFP-1 transceivers
- **2XSFP2** Dual SFP-2 transceivers
- **2XSFP3** Dual SFP-3 transceivers
- **NULL** Two empty SFP slots

+ Ethernet port:
- **SFP5** Single SFP-5 transceiver: Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
- **SFP6** Single SFP-6 transceiver: Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
- **SFP7** Single SFP-7 transceiver: Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
- **SFP8** Single SFP-8 transceiver: Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
- **UTP** Built-in 10/100/1000BaseT, RJ-45 connector
- **NULL** Empty SFP slot

Note: *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.*

TR Tributary port:

T3 option
- **1T3** One T3 port (ports 2 and 3 are disabled)
- **3T3** Three T3 ports

STM-1/OC-3 option
- **DIS** Activation of 30 E1 and 42 T1 ports
- **FULL** Activation of 63 E1 and 84 T1 ports

S NEBS compliancy
(Default=Non NEBS-compliant unit)
- **N3** NEBS level 3, type 2 and 4 compliant

  Note: *By default, the T3 option is NEBS-3 compliant. For SDH/SONET, NEBS-3 compliance is optional.*

SUPPLIED ACCESSORIES

AC power cord
DC connection kit (if a DC-powered unit is ordered)

RM-34
Hardware kit for mounting one Egate-100 unit in a 19-inch rack

CBL-DB9F-DB9M-STR
Control port cable

OPTIONAL ACCESSORIES

WM-34
Hardware kit for mounting one Egate-100 unit on a wall

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