

ETX-1002

10-Gigabit Carrier Ethernet Aggregation Switch



- 10-Gigabit, wire speed, Layer-2, non-blocking carrier Ethernet aggregation switch delivering business services over fiber infrastructure
- 24 Fast Ethernet/Gigabit Ethernet SFP-based ports and up to four 10-Gigabit Ethernet XFP ports
- MEF 9 and 14 compliant, providing Ethernet Private Line (EPL) and Ethernet Virtual Private Line (EVPL) services
- Several network resiliency protocols including sub 50 msec switchover time in Carrier Ethernet ring, and network link protection
- Advanced QoS features and Ethernet OAM per IEEE 802.3-2005 and IEEE 802.1ag

Aggregating carrier Ethernet services

EtherAccess

ETX-1002 is a 10-Gigabit non-blocking Carrier Ethernet aggregation switch that grooms traffic from up to 24 Fast Ethernet/Gigabit Ethernet links over a 10-Gigabit connection at wire speed. The device features two redundant 10-GbE XFP network ports, with two additional ports available via an expansion module. Deployed in a hub and spoke topology, the high-capacity edge switch provides a central aggregation solution for Carrier Ethernet demarcation devices deployed at the customer premises.

In addition, it supports resilient GbE/10GbE Carrier Ethernet access rings. ETX-1002 can aggregate packet-based services with QoS control for Layer-2 business applications, such as LAN-to-LAN connections. Alternatively, the device is ideal for transport aggregation of Layer-3 business services, such as IP VPN, VoIP, and dedicated Internet access, converging voice and data services over a unified Ethernet, IP or MPLS network.



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ETHERNET OAM

Ethernet OAM is one of the important tools that upgraded Ethernet technology to carrier Ethernet class. It gives providers end-to-end control of Ethernet services.

ETX-1002 performs the following types of Ethernet OAM:

- Single-segment (link) EFM OAM according to IEEE 802.3-2005 (formerly 802.3ah) for device discovery and link status propagation
- End-to-end CFM OAM based on IEEE 802.1ag for service-level fault management to enable Ethernet service providers to monitor their services proactively and guarantee that customers receive the contracted SLA.

QUALITY OF SERVICE

ETX-1002 handles multi-priority traffic, ensuring latency, jitter, and packet delivery performance on a per-port or per-flow basis. The device classifies traffic according to user-defined criteria, including VLAN priority (P-bit), MAC address, EtherType, DiffServ, ToS, DSCP, TCP, and UDP ports.

In addition, metering, policing, and shaping functionalities help carriers to rate-limit user traffic according to predefined CIR (committed information rate) and EIR (excess information rate) profiles.

Quality of service is further enhanced by a configurable 8-queue per port scheduling mechanism that combines Strict Priority (SP), weighted round robin (WRR), and modified deficit round robin (MDRR) queuing, to efficiently handle real-time, premium, and best-effort traffic.

TYPICAL APPLICATIONS

ETX-1002 is typically used in the following applications:

- Cost-effective metro Ethernet access and aggregation rings
- Hub & spoke layer-2 fiber aggregation
- Layer-2 VPN service
- High-speed access
- Data center consolidation
- Triple-play service and broadband aggregation.

SECURITY

ETX-1002 provides a comprehensive set of security mechanisms for access control, user authentication/authorization, and isolation between different users.

The supported security mechanisms include RADIUS and TACACS+ access control, VLAN and port-based security, DoS protection features, Access Control List (ACL), and secured management access.

RESILIENCY FEATURES

ETX-1002 uses the IEEE 802.3ad Link Aggregation (LAG) for increased bandwidth and high availability links between switches. Link Aggregation Control Protocol (LACP) ensures smooth and steady traffic flow by automating the configuration, re-configuration, and maintenance of aggregated links.

The device supports industry-standard spanning-tree protocols IEEE 802.1d Spanning Tree (STP), IEEE 802.1w Rapid Spanning Tree (RSTP), and IEEE 802.1s Multiple Spanning Tree (MSTP).

ETX-1002 supports fast ring solution, allowing service providers to offer Ethernet rings with sub 50 ms failover time for mission-critical applications.

MANAGEMENT

ETX-1002 can be managed using the following ports and applications:

- Local management via an ASCII terminal connected to the RS-232 port
- Remote inband management via user or network ports, with Telnet, SSH, or an SNMP-based management system
- Out-of-band management via a dedicated management port.

COMMAND LINE INTERFACE

Databases and scripts of commonly used commands can be easily created and applied to multiple units using command line interface. The CLI complies with the de facto industry standard.

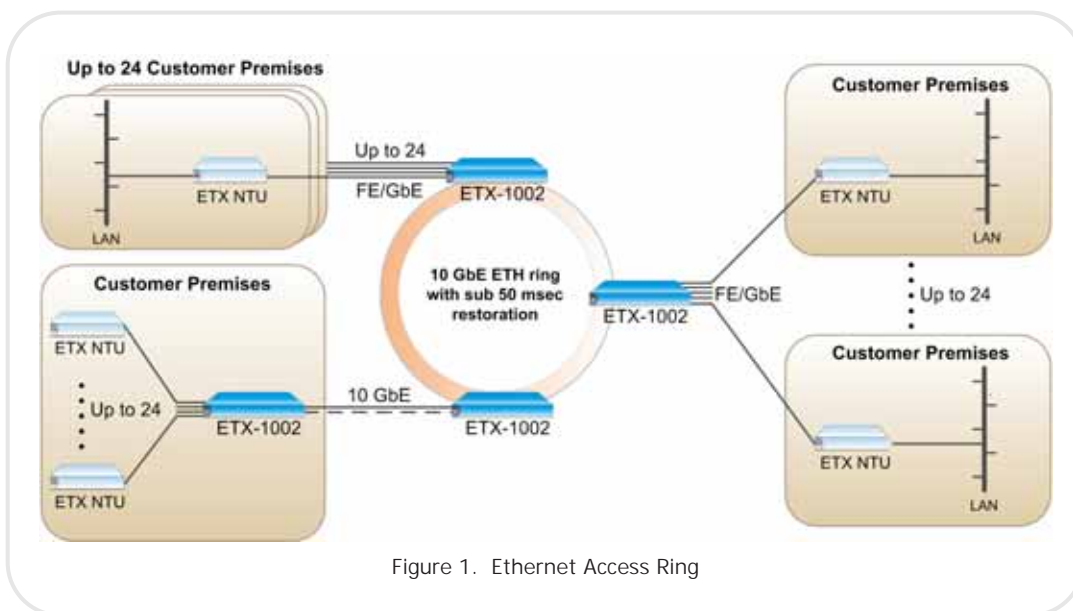


Figure 1. Ethernet Access Ring

Specifications

10-GIGABIT XFP PORTS

Number of Ports

Up to 4

Type

Fiber optic, XFP-based
10-Gigabit Ethernet (10GBaseSR,
10GBaseER)

Connector

XFP slot

XFP Transceivers

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

FAST/GIGABIT ETHERNET SFP PORTS

Number of Ports

24

Type

Fiber optic, SFP-based
Fast Ethernet (100BaseFx, 100BaseLX)
Gigabit Ethernet (1000BaseSx,
1000BaseLX, 1000BaseLH)

Connector

SFP slot

SFP Transceivers

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

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.

GENERAL

Max. Frame Size

9,216 bytes

Forwarding Bandwidth

64 Gbps

Forwarding Rate

95 Mpps

MAC Address Table

Up to 32,000

VLANs

Up to 4K

Certifications

MEF 9, MEF 14: EPL and EVPL

Compliance

MEF 6 (E-Line – EPL and EVPL), MEF 10
IEEE 802.1d Spanning Tree Protocol (STP)
IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
IEEE 802.3ad Link Aggregation Groups (LAG)
IEEE 802.3ad Link Aggregation Control Protocol (LACP)
IEEE 802.1ag OAM-CFM
IEEE 802.3-2005 (formerly 802.3ah) OAM-EFM
IEEE 802.1p QoS
IEEE 802.1q VLANs
IEEE 802.3 Ethernet LANs
IEEE 802.3u Fast Ethernet

Management

Out-of-band via:

Dedicated terminal port:
V.24/RS-232 DCE; 9.6 kbps
RJ-45 connector

Ethernet management port:
10/100BaseT, autonegotiation

Inband: via Ethernet network or user ports

Security

Access List (ACL)
ICMP rate-limiting
Port and VLAN security
RADIUS
SNMPv3
SSHv2
TACACS+

Indicators

Status (green):

Blinking – System is not fully loaded
On – System is out of boot phase and running normally

Major (red):

Blinking – New major alarm
On – Alarm cutoff button has been pressed but fault still exists

Minor (yellow):

Blinking – New minor alarm
On – Alarm cutoff button has been pressed but fault still exists

Fan (red):

On – Fan tray not connected

Management (green):

Blinking – Management packets being forwarded to the CPU

ETH (green):

On – Cable physically connected to management port

Blinking – Activity on port

2/1, 2/2, 3/1, 3/2 (XFP ports) (green):

On – Ethernet link OK

Blinking – Activity on port

1/1–1/24 (SFP ports) (green):

On – Ethernet link is OK

Blinking – Activity on port

Alarm Relay

Type: Dry relay contacts for major and minor alarms

Connector: DB-15, female

Status: Currently not operational

Physical

Height: 66.68 mm (2.625 in)

Width: 482.6 mm (19 in)

Depth: 254 mm (10 in)

Weight: 5.2 kg (11.46 lb)

Environment

Temperature:

-20° to 65°C (-4° to 149°F)

Humidity: 5% to 95%, non-condensing

Power

Redundant hot-swappable power supplies (both power supplies should be the same type)

AC power supply:

100–240 VAC, 50/60 Hz

DC power supply:

-36 to -72VDC (-48VDC nominal)

Power Consumption

Input power: 150W

Power consumption: 50W, typical

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Ordering

STANDARD CONFIGURATIONS

ETX-1002/AC

Single AC power supply

ETX-1002/DC

Single DC power supply

Note: ETX-1002 is supplied with 24 FE/GbE SFP ports and 2 10-GbE XFP ports (activation of the 10-GbE XFP ports requires software license).

SUPPLIED ACCESSORIES

Terminal port cable

AC power cord (when AC power supply is ordered)

DC connection kit (when DC power supply is ordered)

ETX-1002-FAN

Fan tray

ETX-1002-SBRKT

Side brackets kit

OPTIONAL ACCESSORIES

ETX-1002-SW10G

Software license to activate 10 GbE ports

ETX-1002-2x10G

Plug-in module with 2 10-GbE XFP ports (requires ETX-1002-SW10G)

ETX-1002-PS/@

Legend

@ Spare power supply:


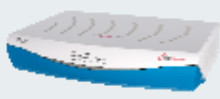



AC AC power supply with power cord

DC DC power supply (-48VDC) with DC feed connector

RAD SFPs and XFPs

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

Table 1. ETX Family Comparison Table

Feature	ETX-102 (Ver. 3.8)	ETX-201 (Ver. 3.8)	ETX-202 (Ver. 3.8)	ETX-204A (Ver. 2.2)	ETX-1002 (Ver. 1.01)
					
Network interface	Up to 2 × Fast Ethernet	Up to 2 × Gigabit or Fast Ethernet (auto-detect)	2 × Gigabit or Fast Ethernet (auto-detect)	Up to 2 × Gigabit or Fast Ethernet SFP/UTP combo ports	Up to 4 × 10-Gigabit XFP-based ports
Network/ user interface	Not applicable	Gigabit or Fast Ethernet (auto-detect)	Gigabit or Fast Ethernet (auto-detect)	Gigabit or Fast Ethernet	4 Gigabit or Fast Ethernet SFP-based ports configurable to user or network ports
User interface	Up to 5 × Fast Ethernet	Up to 5 × Fast Ethernet	Up to 4 × Gigabit Ethernet	Up to 5 × Gigabit Ethernet	24 Gigabit or Fast Ethernet SFP-based ports configurable to user or network ports
Service type	EPL (port-based)	EPL (port-based)	EPL (port-based)	EPL and EVPL (flow-based)	EPL and EVPL (flow-based)
Forwarding mode	VLAN-aware/unaware bridging, 8K MAC addresses	VLAN-aware/unaware bridging, 8K MAC addresses	VLAN-aware/unaware bridging, 8K MAC addresses	Flow-based forwarding	Flow-based forwarding
Max. frame size	1,632 bytes	1,632 bytes	4,096 bytes	12,288 bytes	9,216 bytes
Management interface	Menu-driven	Menu-driven	Menu-driven	Command line	Command line

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