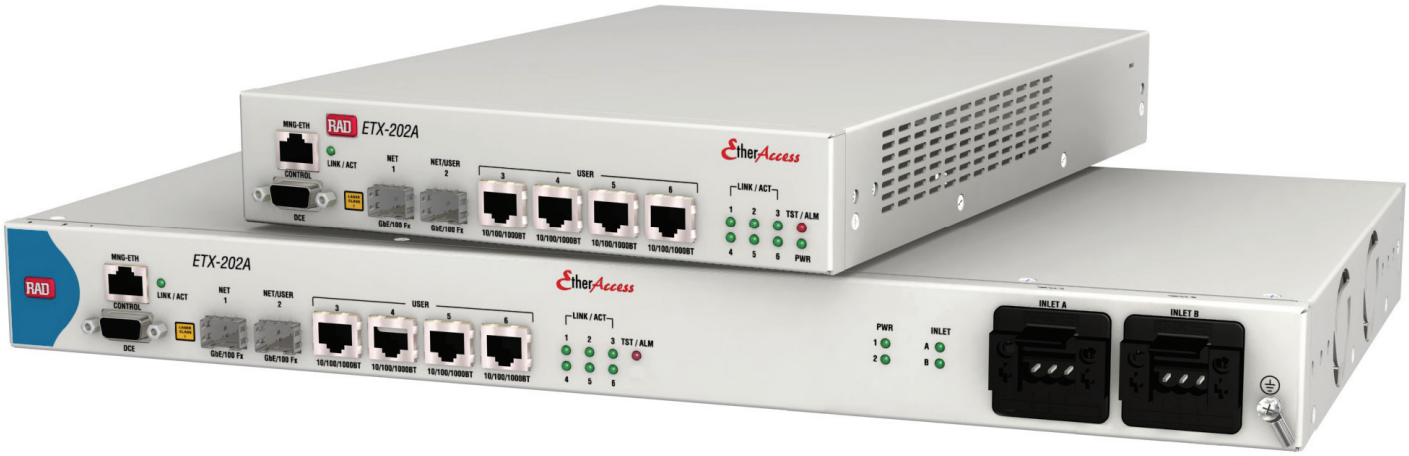
preliminary

Data Sheet

ETX-202A

Carrier Ethernet Demarcation Device



- Hierarchical scheduling and shaping per flow
- End-to-end OAM based on IEEE 802.1ag and ITU-T Y.1731
- Complete Ethernet OAM and Layer-2/3 loopback functionality for reduced Opex
- Network link protection based on 802.3ad or dual homing for increased service resiliency
- GbE network port, GbE network/user port, and up to four user ports; All ports can be UTP or SFP based
- Command line interface

Smart demarcation point between the service provider and customer networks

EtherAccess

ETX-202A is a carrier-class demarcation device owned and operated by the service provider and installed at the customer premises. ETX-202A supports powerful bandwidth profiles (CIR/CBS, EIR/EBS) for differentiated Ethernet services and includes comprehensive Ethernet OAM (Operation, Administration, and Maintenance) features together with SLA monitoring per flow.

IP address, IP mask, and default gateway can be automatically obtained using DHCP.

Two Ethernet network ports as well as up to four Ethernet subscriber ports use copper or SFP-based interfaces.

The SFP-based Ethernet ports accommodate a wide range of Fast Ethernet and Gigabit Ethernet SFP transceivers, allowing service providers to seamlessly connect customers located at different distances from the device.

CARRIER ETHERNET MEF Certified Compliant

RAD data communications
The Access Company

ETX-202A

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FLEXIBLE TRAFFIC MAPPING

Traffic is mapped to the Ethernet flows (EVCs) using the following per-port classification criteria:

- Port-based (All-to-one bundling)
- VLAN
- VLAN + VLAN priority
- VLAN + IP precedence
- VLAN + DSCP
- VLAN + source/destination MAC
- VLAN + source/destination IP address
- VLAN +inner VLAN
- VLAN + VLAN priority + inner VLAN
- VLAN + non-IP
- VLAN priority
- IP precedence
- DSCP
- Source/destination MAC
- Source/destination IP address
- Non-IP
- Ether Type
- Untagged.

The flows are unidirectional.

HIERARCHICAL SCHEDULING AND SHAPING PER FLOW

Every flow has its own queues and scheduler. ETX-202A supports up to 30 queue blocks per network port. Queue blocks are groups of eight queues per CoS. Each flow can be bound to each queue block.

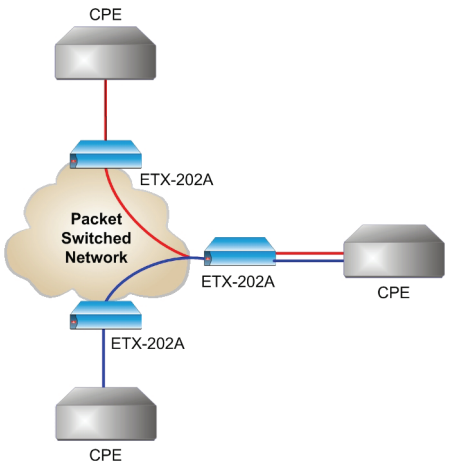

Figure 1. Ethernet Virtual Private Line

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 three aspects: rate limitation, traffic shaping, and traffic prioritization.

A single policer can be applied per flow, or a policer aggregate can be applied to a group of up to five flows. The policers operate according to the dual token bucket mechanism based on user-configurable CIR + CBS, EIR + EBS. A special mechanism compensates for Layer 1 headers. Traffic can be limited to the line rate or the data rate.

For prioritizing user traffic, ETX-202A features up to eight separate queues for each flow, configured as strict priority queues or weighted fair queues (WFQ). The queues handle traffic with different service demands, such as real-time traffic, premium data, or best-effort data.

The device uses the WRED policy to ensure that queues are not congested and high-priority traffic is not dropped.

ETHERNET OAM

ETX-202A provides two types of Ethernet OAM:

- End-to-end OAM based on IEEE 802.1ag and ITU-T Y.1731, that enables Ethernet service providers to monitor their services proactively, measure end-to-end performance, and guarantee that the customers receive the contracted SLA. Fault monitoring and performance measurement include frame delay, frame delay variation, frame loss and availability.
- Single segment (link) OAM according to IEEE 802.3ah for remote management and fault indication, including remote loopback, dying gasp, and MIB parameter retrieval.

L2CP HANDLING

ETX-202A can be configured to pass through Layer-2 control frames across the network, to peer-supported protocols (802.3ah), or to discard the L2CP frames.

NETWORK INTERFACE REDUNDANCY

Two redundancy modes can be applied, if port 2 is configured as a network port:

- Link aggregation (LAG) based on 802.3ad
- Dual homing (1:1), allowing ETX-202A to be connected to two different upstream devices.

TYPICAL APPLICATIONS

ETX-202A is used in the following MEF-defined applications:

- Ethernet Virtual Private Line (EVPL) – Site-to-site connectivity over shared bandwidth with service multiplexing (see *Figure 1*)
- Ethernet Private Line (EPL) – Site-to-site connectivity over dedicated bandwidth without service multiplexing (see *Figure 2*).

LAYER-2/ LAYER-3 LOOPBACK WITH MAC AND IP ADDRESS SWAPPING

Layer-2 link and/or layer-3 network integrity can be tested by a non-disruptive loopback with swapping of MAC address and optionally IP address. When the loopback is activated, ETX-202A exchanges the source and destination MAC/IP addresses of the incoming packets. This loopback can be performed per flow. It passes through Ethernet bridges (MAC address) and routers (IP address) and does not disrupt traffic flows.

JUMBO FRAMES AND EGRESS MTU

The unit supports large frames of up to 13 Kbytes. The egress MTU can be defined per port (UNI/NNI).

Figure 2. Ethernet Virtual Line

FAULT PROPAGATION

The unit provides a user-configurable fault propagation mechanism. When a link failure is detected at the network port, ETX-202A optionally shuts down a user port until the network link is restored. The fault propagation mechanism enables routers and switches connected to both ends of the link to reroute the traffic to the redundancy path.

DYING GASP

Units equipped with a single AC power supply report power failures to defined network management stations by sending traps, thus enabling the unit to properly disconnect from the network.

MANAGEMENT

The unit 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 routed via separate VLANs, Telnet, or RADview, RAD's 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.

SECURITY

The following security protocols are provided by ETX-202A to ensure client server communication privacy and correct user authentication:

- SNMPv3
- RADIUS (client authentication only)
- SSH for Secure Shell communication session.

Specifications

NETWORK INTERFACE

Number of Ports
2 (redundancy) or 1, if the second network interface is used as an additional user port

Type
Fiber optic:
Fast Ethernet (100BaseFx, 100BaseLX10, 100BaseBx10), SFP-based
Gigabit Ethernet (1000BaseSx, 1000BaseLX10, 1000BaseBx10), SFP-based
Copper: 10/100/1000BaseT

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

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.*

USER INTERFACE

Number of Ports
Up to 4 or 5, if the second network interface is used as an additional user port

Type
See the network interface specifications

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

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

GENERAL

Max. Frame Size
13,312 bytes

Certifications
MEF 9, MEF 14: EPL and EVPL

Compliance
MEF 6 (E-Line – EPL and EVPL), MEF 10
IEEE 802.3, 802.3u, 802.1d, 802.1q, 802.1p, 802.3ad, 802.3ah, 802.1ag,
ITU-T Y.1731

Management
Out-of-band via:
Dedicated terminal port:
V.24/RS-232 DCE; 9.6, 19.2, 115.2 kbps; DB-9 female connector
Ethernet management port:
10/100BaseT, autonegotiation
Inband: via Ethernet network or user ports

Indicators
PWR (green):
On –ETX-202A is powered up
TST/ALM (red):
On – One of the Ethernet links is down
Blinking – Diagnostic loopback is active
LINK/ACT (green):
On – Ethernet link OK
Blinking – Data is being transmitted and received on the Ethernet link

Power
AC power supply:
100–240 VAC, 50/60 Hz
Wide-range DC power supply:
24/48V (20–72VDC)

Power Consumption
18.5W max

Physical
Unit with single power supply:
Height: 43.7 mm (1.7 in)
Width: 215 mm (8.4 in)
Depth: 300 mm (11.8 in)
Weight: 2.4 kg (5.2 lb)

Unit with dual power supply:
Height: 43.7 mm (1.7 in)
Width: 440 mm (17.4 in)
Depth: 240 mm (9.5 in)
Weight: 3.1 kg (6.8 lb)

Environment
Temperature:
ETX-202A: 0–50°C (32–122°F)
ETX-202A/H: -40– 65°C (-40–149°F)

Humidity: Up to 90%, non-condensing

Table 1. ETX Family Comparison Table

Feature	ETX-201 (Ver. 3.8B)	ETX-202 (Ver. 3.8B)	ETX-201A (Ver. 1.67B)	ETX-202A (Ver. 1.67B)
				
Network interface	Gigabit or Fast Ethernet (auto-detect)	Gigabit or Fast Ethernet (auto-detect)	Gigabit or Fast Ethernet	Gigabit or Fast Ethernet
Network/ User interface	Gigabit or Fast Ethernet (auto-detect)	Gigabit or Fast Ethernet (auto-detect)	Gigabit or Fast Ethernet	Gigabit or Fast Ethernet
User interface	Up to 4 × Fast Ethernet	Up to 4 × Gigabit Ethernet	Up to 4 × Fast Ethernet	Up to 4 × Gigabit Ethernet
Service type	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	Flow-based forwarding	Flow-based forwarding
Max. frame size	1,632 bytes	4,096 bytes	13,312 bytes	13,312 bytes
QoS	Rate limitation Traffic classification (802.1p bits, ToS, DSCP, port-based)	Rate limitation Traffic classification (802.1p bits, ToS, DSCP, port-based)	Rate limitation per flow Traffic classification (Port-based, VLAN, 802.1p bits, ToS, DSCP) Shaping	Rate limitation per flow Traffic classification (Port-based, VLAN, 802.1p bits, ToS, DSCP) Shaping
Bandwidth profile	CIR/CBS per port	CIR/CBS per port	CIR/CBS, EIR/EBS per EVC.COS	CIR/CBS, EIR/EBS per EVC.COS
Management interface	Menu-driven	Menu-driven	Command line	Command line

ETX-202A

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Ordering

ETX-202A/?/!/+1/+2/+3

Legend

? Temperature range (Default=Regular enclosure):

- **H** Temperature-hardened enclosure

***Note**: The ETX-202A/H version requires industrially-hardened SFP transceivers.*

! Power supply (Default=Single AC power supply in 1U 8.4" enclosure):

- **WRDC** Single wide-range DC power supply in 1U 8.4" enclosure
- **ACR** Dual AC power supply in 1U 17.4" enclosure
- **DCR** Dual wide-range DC power supply in 1U 17.4" enclosure

***Note**: Temperature-hardened units are available only with dual wide-range DC power supply in 1U 17.4" enclosure (DCR).*

***** Port 1 (network) interface:

- **SFP-1** Fast Ethernet/STM-1, 1310 nm, multimode, LED, 2 km (1.2 mi)
- **SFP-1D** Fast Ethernet/ STM-1, DDM, internal calibration, 1310 nm, multimode, LED, 2 km (1.2 mi)
- **SFP-2** Fast Ethernet/ STM-1, 1310 nm, single mode, laser, 15 km (9.3 mi)
- **SFP-2D** Fast Ethernet/ STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 15 km (9.3 mi)
- **SFP-2H** Fast Ethernet/ STM-1, industrially hardened, 1310 nm, single mode, laser, 15 km (9.3 mi)
- **SFP-3** Fast Ethernet/ STM-1, 1310 nm, single mode, laser, 40 km (24.8 mi)
- **SFP-3D** Fast Ethernet/ STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 40 km (24.8 mi)
- **SFP-3H** Fast Ethernet/ STM-1, industrially hardened, 1310 nm, single mode, laser, 40 km (24.8 mi)
- **SFP-4** Fast Ethernet/ STM-1, 1310 nm, single mode, laser, 80 km (49.7 mi)
- **SFP-4D** Fast Ethernet/ STM-1, DDM, internal calibration, 1310 nm, single mode, laser, 80 km (49.7 mi)
- **SFP-5** Gigabit Ethernet, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
- **SFP-5D** Gigabit Ethernet, DDM, internal calibration, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
- **SFP-5H** Gigabit Ethernet, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
- **SFP-5DH** Gigabit Ethernet, DDM, internal calibration, industrially hardened, 850 nm, multimode, VCSEL, 0.55 km (0.3 mi)
- **SFP-6** Gigabit Ethernet, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
- **SFP-6D** Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
- **SFP-6H** Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 10.0 km (6.2 mi)
- **SFP-7** Gigabit Ethernet, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
- **SFP-7D** Gigabit Ethernet, DDM, internal calibration, 1550 nm, single mode, laser, 80.0 km (49.7 mi)
- **SFP-8** Gigabit Ethernet, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
- **SFP-8D** Gigabit Ethernet, DDM, internal calibration, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)
- **SFP-8H** Gigabit Ethernet, industrially hardened, 1310 nm, single mode, laser, 40.0 km (24.8 mi)
- **SFP-8DH** Gigabit Ethernet, DDM, internal calibration, industrially hardened, 1310 nm, single mode (single fiber), laser, 40.0 km (24.8 mi)
- **SFP-10A** Fast Ethernet/ STM-1, Tx - 1310 nm, Rx - 1550 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
- **SFP-10B** Fast Ethernet/ STM-1, Tx - 1550 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 20 km (12.4 mi)
- **SFP-18A** Fast Ethernet/ STM-1, Tx - 1310 nm, Rx - 1550 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
- **SFP-18B** Fast Ethernet/ STM-1, Tx - 1550 nm, Rx - 1310 nm, 9/25 single mode (single fiber), laser (WDM), 40 km (24.8 mi)
- **SFP-19A** Fast Ethernet/ STM-1, Tx - 1490 nm, Rx - 1570 nm, 9/25 single mode (single fiber), laser (WDM), 80 km (49.7 mi)
- **SFP-19B** Fast Ethernet/ STM-1, Tx - 1570 nm, Rx - 1490 nm, 9/25 single mode (single fiber), laser (WDM), 80 km (49.7 mi)
- **UTP** UTP port (RJ-45-connector)
- **NULL** Empty SFP slot

% Port 2 (network/user) interface:

Refer to the network port 1 options above

Data Sheet

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& Ports 3–6 (user) interfaces and combinations:

1NULL	Port 3: 1 empty SFP slot
1NULL3UTP	Port 3: 1 empty SFP slot Ports 4–6: 3 built-in 10/100/1000BaseT ports (RJ-45 connector)
1UTP	Port 3: 1 built-in 10/100/1000BaseT port (RJ-45 connector)
2NULL2UTP	Ports 3–4: 1 empty SFP slot Ports 5–6: 2 built-in 10/100/1000BaseT ports (RJ-45 connector)
4NULL	4 empty SFP slots
4UTP	4 built-in 10/100/1000BaseT ports (RJ-45 connector)

SUPPLIED ACCESSORIES

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

RM-34
Hardware kit for mounting one ETX-202A unit with 17.4" enclosure in a 19" rack

***Note**: The RM-34 rack-mounting kit is supplied only with units in 17.4" enclosures.*

OPTIONAL ACCESSORIES

RM-35/+
Hardware kit for mounting one or two ETX-202A units with 8.4" enclosure in a 19" rack

\+ Rack mount kit (Default=Both kits):

P1	Kit for mounting one unit
P2	Kit for mounting two units

WM-35
Hardware kit for mounting one ETX-202A unit with 8.4" enclosure on a wall

WM-34
Hardware kit for mounting one ETX-202A unit with 17.4" enclosure on a wall

CBL-DB9F-DB9M-STR
Control port cable

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