ETX-202A
Carrier Ethernet Demarcation Device

Smart demarcation point between the service provider and customer networks

ETX-202A is a carrier Ethernet demarcation device owned and operated by the service provider and installed at the customer premises. The device is part of RAD's EtherAccess® portfolio and features Carrier Ethernet attributes, including Ethernet OAM for proactive SLA monitoring, quality of service (QoS) per Ethernet flow, advanced traffic management capabilities, and powerful bandwidth profiles for differentiated services – all starting at the service handoff points.

ETX-202A is equipped with two Ethernet network ports (copper or SFP-based interfaces), supporting link protection based on 802.3ad or dual homing for increased service resiliency. The 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 demarcation device delivering business services over fiber infrastructure
- MEF certified, supporting Ethernet Private Line (EPL) and Ethernet Virtual Private Line (EVPL) services with flexible mapping of user traffic into Ethernet flows
- Robust bandwidth control mechanism and Service Level Agreement (SLA) monitoring per Ethernet flow starting at customer premises
- Complete Ethernet OAM solution based on IEEE 802.3-2005 (formerly 802.3ah), IEEE 802.1ag, and ITU-T Y.1731 for Opex reductions
- Network link protection based on 802.3ad or dual homing for increased service resiliency
FLEXIBLE TRAFFIC MAPPING
Traffic is mapped to the Ethernet flows (EVCs) using very flexible classification criteria that can be combined, for example:
• Port-based (All-to-one bundling)
• VLAN + VLAN priority
• VLAN + IP precedence
• VLAN + DSCP
• Ether Type
• Untagged.
More classification criteria and combinations can be found in the user manual.

HIERARCHICAL SCHEDULING AND SHAPING PER FLOW
Every flow has its own queues and scheduler. ETX-202A supports up to 270 services, and a total of 30 queue blocks per network port. Each queue block is a group of eight queues per CoS. Each flow can be bound to each queue block.

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.
Traffic policing is applied per flow or group of flows, and operates according to the dual token bucket mechanism based on user-configurable CIR + CBS and EIR + EBS. Traffic can be limited to the line rate or the data rate.

For prioritizing user traffic, ETX-202A maps user traffic to eight separate queues. Each can be 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
Ethernet OAM is one of the important tools that has upgraded Ethernet technology to carrier Ethernet class. It enables providers to deliver ‘SONET/SDH-like’ quality over packet-switched networks. ETX-202A implements the full suite of Ethernet OAM standards, which can be monitored by performance monitoring systems such as RADview or a third-party tool.
The device provides these types of Ethernet OAM:
• Single-segment (link) OAM according to IEEE 802.3-2005 (formerly 802.3ah) for remote management and fault indication, including remote loopback, dying gasp, and MIB parameter retrieval
• End-to-end connectivity OAM based on IEEE 802.1ag that enables Ethernet service providers to monitor their services proactively and guarantee that customers receive the contracted SLA
• End-to-end service and performance monitoring based on ITU-T Y.1731. Fault monitoring and end-to-end performance measurement include frame delay, frame delay variation, frame loss and availability.

NETWORK INTERFACE REDUNDANCY
Two redundancy modes can be applied:
• 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 and/or layer-3 network integrity can be tested by a non-disruptive loopback performed per flow, with swapping of MAC address and optionally IP address. When the loopback is activated, ETX-202A exchanges the source and destination MAC address and IP address of the incoming packets. This loopback passes through Ethernet bridges (MAC address) and routers (IP address).

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

Figure 1. Ethernet Virtual Private Line

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 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.

**JUMBO FRAMES AND EGRESS MTU**
The unit supports large frames of up to 12 Kbytes. The egress MTU can be defined per port (UNI/NNI).

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

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**Specifications**

**NETWORK INTERFACE**

**Number of Ports**
Up to 2 (redundancy)

**Type**
Fiber optic:
- Fast Ethernet (100BaseFx, 100BaseLX10, 100BaseBx10), SFP-based
- Gigabit Ethernet (1000BaseSx, 1000BaseLX10, 1000BaseBx10), SFP-based

Copper: 10/100/1000BaseT (copper SFP or built-in)

**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 5

**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**
12,288 bytes

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**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

<table>
<thead>
<tr>
<th>Feature</th>
<th>ETX-102 (Ver. 3.8)</th>
<th>ETX-201 (Ver. 3.8)</th>
<th>ETX-202 (Ver. 3.8)</th>
<th>ETX-201A (Ver. 1.67)</th>
<th>ETX-202A (Ver. 1.67)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network interface</td>
<td>Up to 2 × Fast Ethernet</td>
<td>Up to 2 × Gigabit or Fast Ethernet (auto-detect)</td>
<td>2 × Gigabit or Fast Ethernet (auto-detect)</td>
<td>Up to 2 × Gigabit or Fast Ethernet</td>
<td>Up to 2 × Gigabit or Fast Ethernet</td>
</tr>
<tr>
<td>Network/User interface</td>
<td>Not applicable</td>
<td>Gigabit or Fast Ethernet (auto-detect)</td>
<td>Gigabit or Fast Ethernet (auto-detect)</td>
<td>Gigabit or Fast Ethernet</td>
<td>Gigabit or Fast Ethernet</td>
</tr>
<tr>
<td>User interface</td>
<td>Up to 5 × Fast Ethernet</td>
<td>Up to 5 × Fast Ethernet</td>
<td>Up to 4 × Gigabit Ethernet</td>
<td>Optional 1 Gigabit and up to 4 × Fast Ethernet</td>
<td>Up to 5 × Gigabit Ethernet</td>
</tr>
<tr>
<td>Service type</td>
<td>EPL (port-based)</td>
<td>EPL (port-based)</td>
<td>EPL (port-based)</td>
<td>EPL and EVPL (flow-based)</td>
<td>EPL and EVPL (flow-based)</td>
</tr>
<tr>
<td>Forwarding mode</td>
<td>VLAN-aware/unaware bridging, 8K MAC addresses</td>
<td>VLAN-aware/unaware bridging, 8K MAC addresses</td>
<td>VLAN-aware/unaware bridging, 8K MAC addresses</td>
<td>Flow-based forwarding</td>
<td>Flow-based forwarding</td>
</tr>
<tr>
<td>Max. frame size</td>
<td>1,632 bytes</td>
<td>1,632 bytes</td>
<td>4,096 bytes</td>
<td>12,288 bytes</td>
<td>12,288 bytes</td>
</tr>
<tr>
<td>QoS</td>
<td>Rate limitation Traffic classification (802.1p bits, ToS, DSCP, port-based)</td>
<td>Rate limitation Traffic classification (802.1p bits, ToS, DSCP, port-based)</td>
<td>Rate limitation Traffic classification (802.1p bits, ToS, DSCP, port-based)</td>
<td>Rate limitation per flow Traffic classification (Port-based, VLAN, 802.1p bits, ToS, DSCP) Shaping</td>
<td>Rate limitation per flow Traffic classification (Port-based, VLAN, 802.1p bits, ToS, DSCP) Shaping</td>
</tr>
<tr>
<td>Bandwidth profile</td>
<td>CIR/CBS per port</td>
<td>CIR/CBS per port</td>
<td>CIR/CBS per port</td>
<td>CIR/CBS, EIR/EBS per EVC.COS</td>
<td>CIR/CBS, EIR/EBS per EVC.COS</td>
</tr>
<tr>
<td>Management interface</td>
<td>Menu-driven</td>
<td>Menu-driven</td>
<td>Menu-driven</td>
<td>Command line</td>
<td>Command line</td>
</tr>
</tbody>
</table>
## Ordering

**ETX-202A/7/+1/+2/+3**  
**ETX-202A/H/+1/+2/+3**  

*Note: The ETX-202A/H temperature-hardened version requires industrially-hardened SFP transceivers. The temperature-hardened version is available only with six ports.*

### Legend

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
</table>
| ?    | Power supply for regular enclosure  
(Default=Single AC power supply in 1U 8.4" enclosure):  
| WRDC | Single wide-range DC power supply in 1U 8.4" enclosure |
| !    | Power supply for temperature-hardened enclosure:  
| ACR  | Dual AC power supply in 1U 17.4" enclosure  
| DCR  | Dual wide-range DC power supply in 1U 17.4" enclosure |
| +1Port 1 (network) interface:  
| UTP  | UTP Ethernet port  
(RJ-45-connector)  
| NULL | Empty SFP slot  
| 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  
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  
laser, 40.0 km (24.8 mi)  
| SFP-10A | Fast Ethernet/ STM-1,  
Tx - 1310 nm,  
Rx - 1550 nm, single mode  
laser (WDM), 20 km (12.4 mi)  
| SFP-10B | Fast Ethernet/ STM-1,  
Tx - 1550 nm,  
Rx - 1310 nm, single mode  
laser (WDM), 20 km (12.4 mi)  
| SFP-17A | Gigabit Ethernet,  
Tx - 1310 nm,  
Rx - 1490 nm, single mode  
laser (WDM), 10.0 km (6.2 mi)  
| SFP-17AD | Gigabit Ethernet, DDM,  
internal calibration  
Tx - 1310 nm,  
Rx - 1490 nm, single mode  
laser (WDM), 10.0 km (6.2 mi)  
| SFP-17B | Gigabit Ethernet,  
Tx - 1490 nm,  
Rx - 1310 nm, single mode  
laser (WDM), 10.0 km (6.2 mi)  
| SFP-17BD | Gigabit Ethernet, DDM,  
internal calibration  
Tx - 1490 nm,  
Rx - 1310 nm, single mode  
laser (WDM), 10.0 km (6.2 mi)  
| SFP-18A | Fast Ethernet/ STM-1,  
Tx - 1310 nm,  
Rx - 1550 nm,  
9/25 single mode  
laser (WDM), 40 km (24.8 mi)  
| SFP-18AD | Fast Ethernet/ STM-1,  
DDM, external calibration  
Tx - 1310 nm,  
Rx - 1550 nm,  
9/25 single mode  
laser (WDM), 40 km (24.8 mi)  
| SFP-18B | Fast Ethernet/ STM-1,  
Tx - 1550 nm,  
Rx - 1310 nm,  
9/25 single mode  
laser (WDM), 40 km (24.8 mi)  
| SFP-18BED | Fast Ethernet/ STM-1,  
DDM, external calibration  
Tx - 1550 nm,  
Rx - 1310 nm,  
9/25 single mode  
laser (WDM), 40 km (24.8 mi)  
| SFP-19A | Fast Ethernet/ STM-1,  
Tx - 1490 nm,  
Rx - 1570 nm,  
9/25 single mode  
laser (WDM), 80 km (49.7 mi)  
| SFP-19A | Fast Ethernet/ STM-1,  
Tx - 1490 nm,  
Rx - 1570 nm,  
9/25 single mode  
laser (WDM), 80 km (49.7 mi)  
| SFP-19A | Fast Ethernet/ STM-1,  
Tx - 1490 nm,  
Rx - 1570 nm,  
9/25 single mode  
laser (WDM), 80 km (49.7 mi)
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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)

SFP-20  Gigabit Ethernet, 1550 nm,  
single mode, laser,  
120.0 km (74.5 mi)

SFP-21AED  Gigabit Ethernet, DDM,  
external calibration,  
Tx - 1310 nm,  
Rx - 1490 nm, single mode (single fiber), laser (WDM),  
40.0 km (24.8 mi)

SFP-21BED  Gigabit Ethernet, DDM,  
external calibration,  
Tx - 1490 nm,  
Rx - 1310 nm, single mode (single fiber), laser (WDM),  
40.0 km (24.8 mi)

SFP-22A  Gigabit Ethernet,  
Tx - 1490 nm,  
Rx - 1570 nm, single mode (single fiber), laser (WDM),  
80.0 km (49.7 mi)

SFP-22B  Gigabit Ethernet,  
Tx - 1570 nm,  
Rx - 1490 nm, single mode (single fiber), laser (WDM),  
80.0 km (49.7 mi)

SFP-23A  Gigabit Ethernet,  
Tx - 1310 nm,  
Rx - 1550 nm, single mode (single fiber), laser (WDM),  
40.0 km (24.8 mi)

SFP-23AED  Gigabit Ethernet, DDM,  
external calibration,  
Tx - 1310 nm,  
Rx - 1550 nm, single mode (single fiber), laser (WDM),  
40.0 km (24.8 mi)

SFP-23B  Gigabit Ethernet,  
Tx - 1550 nm,  
Rx - 1310 nm, single mode (single fiber), laser (WDM),  
40.0 km (24.8 mi)

SFP-23BED  Gigabit Ethernet, DDM,  
external calibration,  
Tx - 1550 nm,  
Rx - 1310 nm, single mode (single fiber), laser (WDM),  
40.0 km (24.8 mi)

SFP-30  10/100/1000BaseT (with SGMII), RJ-45 connector,  
100 m (328 ft)

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

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

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

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

CBL-DB9F-DB9M-STR  Control port cable