Data Sheet

ETX-201A

Carrier Ethernet Demarcation 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 the 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

Smart demarcation point between the service provider and customer networks

EtherAccess

ETX-201A 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-201A 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 MEF Certified Compliant

RAD data communications
The Access Company

ETX-201A

Carrier Ethernet Demarcation Device

FLEXIBLE TRAFFIC MAPPING

Traffic is mapped to the Ethernet flows (EVC.COS) 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-201A supports up to 130 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-201A 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-201A 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-201A to be connected to two different upstream devices.

TYPICAL APPLICATIONS

ETX-201A 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-201A exchanges the source and destination MAC/IP addresses of the incoming packets. This loopback passes through Ethernet bridges (MAC address) and routers (IP address).

L2CP HANDLING

ETX-201A 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.

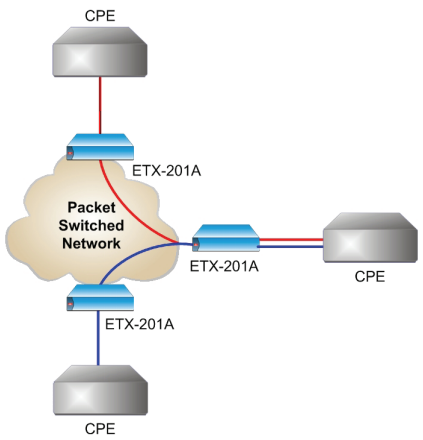


Figure 1. Ethernet Virtual Private Line

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-201A 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-201A to ensure client server communication privacy and correct user authentication:

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

DHCP

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

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).

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
Fiber optic: 100BaseFx, 100BaseLX10, 100BaseBx10, SFP-based
Copper: 10/100BaseT

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

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-201A 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/DC power supply (units with 3 ports):
100–240 VAC, 50/60 Hz or 48/60 VDC nominal (40–72 VDC)

AC power supply (units with 4–6 ports):
100–240 VAC, 50/60 Hz

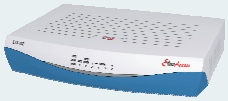
Wide-range DC power supply (units with 4–6 ports):
24/48V (20–72VDC)

Power Consumption
15W max

Physical
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)

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

Table 1. ETX Family Comparison Table

Feature	ETX-102 (Ver. 3.8)	ETX-201 (Ver. 3.8)	ETX-202 (Ver. 3.8)	ETX-201A (Ver. 1.67)	ETX-202A (Ver. 1.67)
					
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	Up to 2 × Gigabit or Fast Ethernet
Network/ User interface	Not applicable	Gigabit or Fast Ethernet (auto-detect)	Gigabit or Fast Ethernet (auto-detect)	Gigabit or Fast Ethernet	Gigabit or Fast Ethernet
User interface	Up to 5 × Fast Ethernet	Up to 5 × Fast Ethernet	Up to 4 × Gigabit Ethernet	Optional 1 Gigabit and up to 4 × Fast Ethernet	Up to 5 × Gigabit Ethernet
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	12,288 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 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 per port	CIR/CBS, EIR/EBS per EVC.COS	CIR/CBS, EIR/EBS per EVC.COS
Management interface	Menu-driven	Menu-driven	Menu-driven	Command line	Command line

Ordering

ETX-201A/!/+1/+2/+3

Legend

! Power supply
(Default for units with 3 ports= built-in AC/DC power supply, default for units with 4–6 ports= built-in AC power supply):

WRDC Wide-range DC power supply

+1 Port 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 (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-17A Gigabit Ethernet, Tx - 1310 nm, Rx - 1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)

SFP-17AD Gigabit Ethernet, DDM, internal calibration, Tx - 1310 nm, Rx - 1490 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)

SFP-17B Gigabit Ethernet, Tx - 1490 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 mi)

SFP-17BD Gigabit Ethernet, DDM, internal calibration, Tx - 1490 nm, Rx - 1310 nm, single mode (single fiber), laser (WDM), 10.0 km (6.2 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-18AED Fast Ethernet/ STM-1, DDM, external calibration, 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-18BED Fast Ethernet/ STM-1, DDM, external calibration, 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)

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

ETX-201A

Carrier Ethernet Demarcation Device

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 (238 ft)

+2 Port 2 (network/user) interface: Refer to the network port 1 options above

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

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

SUPPLIED ACCESSORIES

AC power cord

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

OPTIONAL ACCESSORIES

RM-35/+

Hardware kit for mounting one or two ETX-201A units 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-201A unit on a wall

CBL-DB9F-DB9M-STR

Control port cable

International Headquarters
24 Raoul Wallenberg Street
Tel Aviv 69719, Israel
Tel. 972-3-6458181
Fax 972-3-6498250, 6474436
E-mail market@rad.com

North America Headquarters
900 Corporate Drive
Mahwah, NJ 07430, USA
Tel. 201-5291100
Toll free 1-800-4447234
Fax 201-5295777
E-mail market@radusa.com

www.rad.com

Order this publication by Catalog No. 803820

RAD data communications
The Access Company