

# ETX-2

## Carrier Ethernet Demarcation



- Feature-rich demarcation and aggregation suite, offering a complete Service Assured Access (SAA) solution
- Ideal for service providers, wholesalers and mobile operators, seeking to deliver and monitor SLA-based MEF-certified Carrier Ethernet 2.0, Layer-3 VPN, and TDM-over-packet services
- Versatile offering of multi-rate Ethernet over fiber, SHDSL, PDH, and TDM, assuring unified service delivery over any access technology
- TWAMP and layer-2 OAM, as well as diagnostics for scalable and accurate traffic monitoring, quick fault detection, and troubleshooting of layer-2 and 3 networks
- Distributed network functions virtualization (D-NFV) for rapid rollout of new services and network capabilities

The ETX-2 Carrier Ethernet demarcation device, together with the ETX-5 Carrier Ethernet aggregation platform, are the main components of RAD's Service Assured Access solution, providing:

- Ethernet service uniformity over multiple access technologies including GbE and 10GbE, SHDSL, PDH, and SDH
- Operation in diverse topologies including ring, daisy chain, and hub and spoke
- PW functionality for mobile backhauling and business services
- Synchronization for mobile 2G, 3G, LTE, and LTE-A backhauling networks.

ETX-2 is offered in a variety of product options (ETX-203AM, ETX-203AX, ETX-205A, and ETX-220A). *Table 1* provides further information on the capabilities offered by each device.

### MARKET SEGMENTS AND APPLICATIONS

ETX-2 is ideal for carriers, service providers, wholesale providers, and mobile operators seeking to offer unified SLA-based Ethernet business services, such as Ethernet Private Line (EPL), Ethernet Virtual Private Line (EVPL), and

bridged E-LAN for enterprise and carrier-to-carrier applications as well as mobile backhauling applications.

### NETWORK TOPOLOGIES AND INTEROPERABILITY

ETX-2 supports several network topologies such as linear, daisy chain, and self-healing rings (G.8032v2), working with ETX-5 or third-party Ethernet devices.

### D-NFV

The D-NFV option integrates the HW-based ETX-2 NID functionality with a built-in standard Intel x86 core that hosts virtual machines providing virtual network functions (VFs) or value-added service capabilities. This enables service providers to quickly and easily provide new services and implement new network capabilities, with the benefit of function localization at the customer premises.

### CARRIER ETHERNET 2.0

ETX-2 incorporates a complete set of CE 2.0-certified Ethernet service tools that allow the service provider to distinguish between high- and low-priority traffic, and to optimize TCP sessions.



ETX-2 provides two-rate three-color policers, and delivers true multi-CoS with hierarchical Quality of Service (HQoS). Additionally, it supports advanced scheduling, WRED per CoS, shaping per EVC, and flexible classification rules.

### Services

ETX-2 delivers E-Line (EVL, EVPL), E-LAN (EPLAN, EVPLAN), and E-Tree (EP-TREE, EVP-TREE) services.

### End-To-End Service Assurance

ETX-2 provides wire-speed Ethernet OAM with delay measurements at line rate. Furthermore, ETX-2 offers service activation tools with multiple RFC-2544 and Y.1564 testers.

### Layer-2 Control Processing

ETX-2 can be configured to forward Layer-2 control frames (including other vendors' L2CP frames), with optional MAC change, across the network or to peer supported protocols (IEEE 802.3-2005 and LACP), or to discard the L2CP frames.

### ROUTING

ETX-2 features a 1G bidirectional router with Virtual Routing and Forwarding (VRF) instances, allowing service providers to deploy L2 and L3 VPNs.



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### ETHERNET OVER PDH

ETX-2 transports Ethernet over PDH infrastructure via the following NG-PDH technologies:

- Generic Framing Procedure (GFP G.7041)
- GFP o PDH (G.8040)
- PDH Virtual Concatenation (VCAT G.7043)
- Link Capacity Adjustment Scheme (VCAT G.7042).

NG-PDH solutions improve overall network availability by reducing latency and optimizing line utilization and throughput.

Integrated management of MiRiCi and MiTOP smart SFPs provides TDM (E1/T1/E3/T3/ OC-3/STM-1) connectivity over PDH or SDH legacy networks.

### TDM PSEUDOWIRE

ETX-2 provides pseudowire (PW) services via 4 or 8 integrated E1/T1 interfaces, as well as via a smart SFP (MiTOP).

The PWs can be encapsulated using CESoPSN per IETF RFC 5086 or SAToP per IETF RFC 4553. The PWs are transmitted over IP networks or L2 networks with UDP/IP or MEF-8 encapsulation.

### RESILIENCY

ETX-2 offers fast protection for virtually any kind of failure and in any linear, ring, or dual-homed topology. The device employs IEEE 802.3ad link aggregation (1:1 LAG), ITU-T G.8032v2 Ethernet ring protection, and ITU-T G.8031 Ethernet linear protection to ensure continuous availability and sub-50ms restoration in the event of network outages.

### TIMING AND SYNCHRONIZATION

ETX-2 incorporates RAD's advanced SyncTop synchronization and timing over packet feature set to support mobile heterogeneous network (HetNet) topology.

The device combines Synchronous Ethernet (SyncE) with IEEE 1588v2 Precision Time Protocol per ITU-T G.8265.1 and G.8275.1 Telecom profiles for cost-effective synchronization of frequency and phase.

With an integrated GPS receiver and 1588v2 Grandmaster support, ETX-2 offers a Distributed GM™ solution, allowing mobile operators and service providers to cost-effectively provide reliable frequency and phase accuracy for LTE-A. The device also supports 1588v2 slave clock, boundary clock (BC), and transparent clock (TC), as well as a dual master operating simultaneously in G.8265.1 and G.8275.1 mode.

### MANAGEMENT AND SECURITY

The device can be managed via RADview, RAD's carrier-class NMS, or any SNMP-based management system. ETX-2 supports a variety of access protocols, including CLI over Telnet, SNMPv3, and TFTP.

Security features include SNMPv3, RADIUS (client authentication), TACACS+ (client authentication, authorization, and accounting), SSH, and SFTP.

Access Control Lists (ACL) can also be used to flexibly filter and mark management traffic, enabling service providers to maintain network security by dropping unwanted packets.

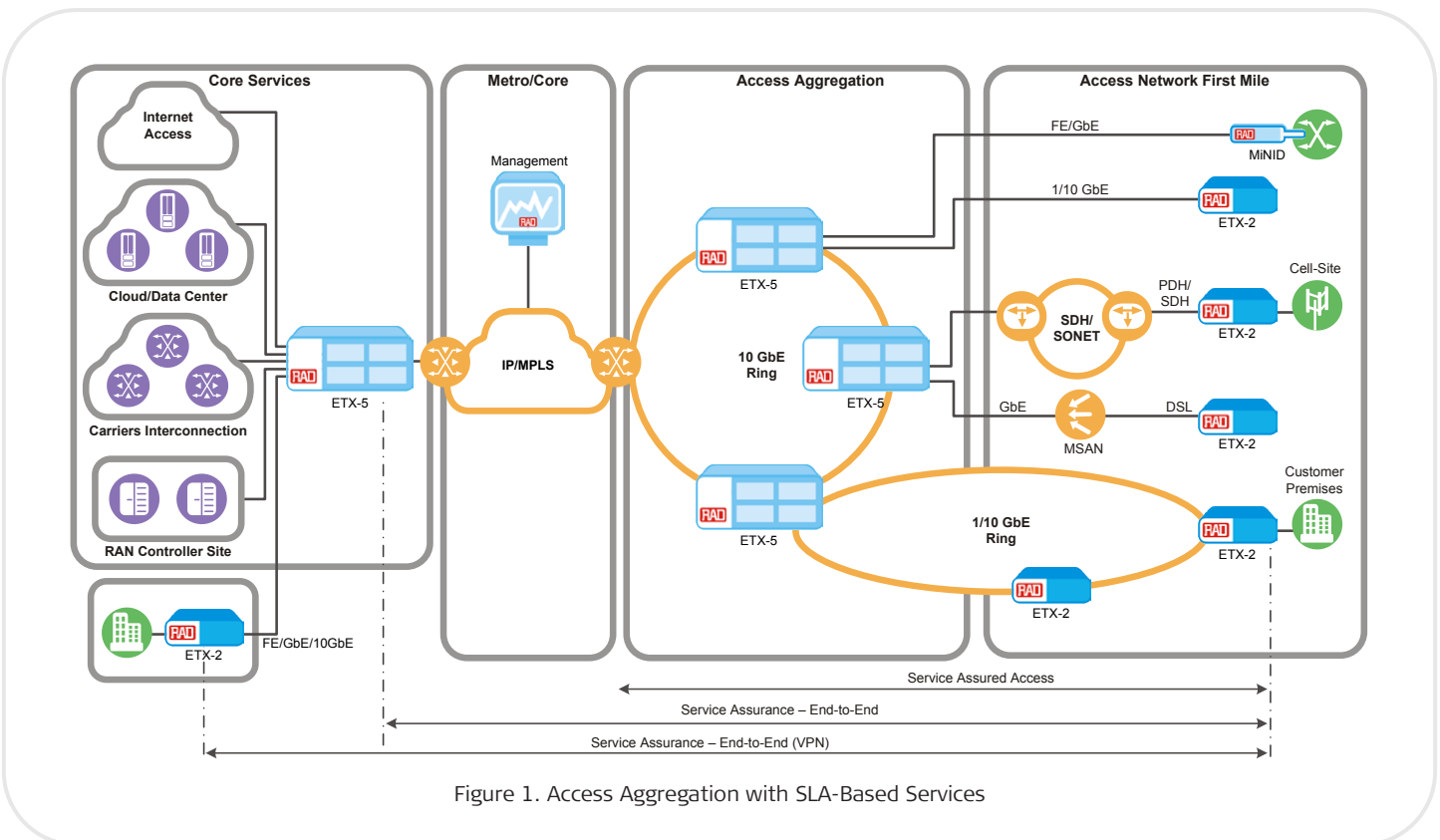


Figure 1. Access Aggregation with SLA-Based Services

Table 1. Feature Comparison

Service Assured Access Capabilities		ETX-203AX	ETX-203AM	ETX-205A	ETX-220A
Interfaces	10GbE XFP interfaces				✓
	FE/GbE SFP interfaces	✓	✓	✓	✓
	GbE combo interfaces		2 ports	✓	
	10/100/1000 electrical interfaces	✓	✓	✓	✓
	PDH network interfaces (GFP mapping)		✓ (4/8 E1/T1, 1/2 T3)		
	SHDSL network interfaces		✓		
	E1/T1 user interfaces (SAToP, CESoPSN, CAS)			✓	
	E1/T1/T3/STM-1/OC3 network interfaces via integrated smart SFP (MiRIC)	✓	✓	✓	✓
	E1/T1/T3 PWE services via integrated smart SFP (MiTOP)	✓	✓	✓	✓
	Timing interfaces (2 MHz, 2 Mbps, 1PPS, ToD)			✓	✓
Networking Capabilities	Ethernet E-Line, E-LAN, E-Tree services	✓	✓	✓	✓
	E-Line up MEP supporting C-Tag and S-Tag	✓	✓	✓	✓
	Wire-speed L2 forwarding	✓	✓	✓	✓
	1 Gbps wire-speed router with Virtual Routing Instances (VRF), supporting BFD, BGPv4, and OSPFv2 protocols		✓	✓	
	Flexible classification rules	✓	✓	✓	✓
	2-rate/3-color policing per EVC.CoS	✓	✓	✓	✓
	H-QoS shaping per EVC and EVC.CoS	✓	✓	✓	✓
	MultiCoS EVCs per MEF 10.3				✓
	Strict priority and weighted fare queuing (WFQ) scheduling	✓	✓	✓	✓
	G.8031 linear protection	✓	✓	✓	✓
	G.8032v2 ring protection	✓	✓	✓	✓
	1:1 link protection with 1:1 LAG/LACP	✓	✓	✓	✓
	1:1 link protection with dual homing	✓	✓	✓	✓
	LAG with load balancing				✓
	Jumbo frame support	✓	✓	✓	✓
	Synchronous Ethernet (SyncE) on all interfaces			✓	✓
	IEEE-1588v2 precision time protocol (PTP) per G.8265.1 and G.8275.1 Telecom profiles	TC	TC	Slave, TC, BC, GM with integrated GPS, dual mode master	Slave, TC, BC, dual mode master
	D-NFV capabilities with integrated x.86 processor			✓	

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### MONITORING AND DIAGNOSTICS

Featuring multi-layer OAM and PM tools, ETX-2 performs hardware-based monitoring and diagnostics at high scale and precision. End-to-end connectivity OAM (IEEE 802.1ag) as well as single-segment OAM (IEEE 802.3-2005) ensure flow-level fault management and performance monitoring over Layer-2 networks and also quickly detect connectivity failures for robust protection. RFC-5357 TWAMP light delivers the same functionality over Layer-3 networks, as well as one-way TWAMP with counters for loss, delay, fragmented packets, reorders and duplication, in addition to configurable test packet size. Layer-2 and 3 wire-speed loopbacks offer flexible diagnostic tools.

The Performance Management Portal is an SLA assurance system that is part of the RADview management system, enabling real-time monitoring of Ethernet service performance by collecting KPI data from RAD devices.





### Digital Diagnostics Monitoring

ETX-2 supports digital diagnostics monitoring (DDM) SFP functions according to SFF-8472, excluding external DDM calibration.

### Service Activation Tests

The ETX-2 family provides TWAMP light generators and responders. A new option offers a high-scale TWAMP generator based on ETX-205A with a dedicated enclosure.

Table 1. Feature Comparison (Continued)

	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A
<b>Service Assured Access Capabilities</b>				
8 built-in RFC-2544 service activation testers	✓	✓	✓	✓
8 built-in Y.1564 service activation testers	✓	✓	✓	✓ (up to 10G services)
OAM and Diagnostics	Continuity fault management (CFM) per IEEE 802.3ag	✓	✓	✓
	Service utilization and performance monitoring per ITU-T Y.1731.2012, including synthetic loss measurement	✓	✓	✓
	Delay and loss measurements per MEF 36	✓	✓	✓
	Accurate one-way delay measurement (microsecond accuracy)			✓
	TWAMP light generator and responder	✓	✓	✓
	High-scale TWAMP light generator			✓
	LLDP discovery per IEEE 802.1AB	✓	✓	✓
	Link-level OAM per IEEE 802.3-2005	✓	✓	✓
	RMON2 port-level counters	✓	✓	✓
	On-demand Layer-2 and 3 loopbacks	✓	✓	✓
General and Management	Automatic flow and profile name completion in CLI	✓	✓	✓
	Zero-touch provisioning (DHCP, PPPoE)	✓	✓	✓
	SNMPv1/v2/v3	✓	✓	✓
	RADIUS and TACACS+ AAA	✓	✓	✓
	Network time protocol (NTP)	✓	✓	✓
	Power supply redundancy			✓*
	NEBS option	✓	✓	✓*
	Temperature-hardened option		✓	✓*
MEF CE2.0	✓	✓	✓	

\* Not applicable with D-NFV option

## Specifications

### CAPACITY

#### Max. Frame Size

12,288 bytes

ETX-203AM:

SHDSL uplink module: 2,048 bytes

E1/T1/T3 EoPDH uplink module:

10,240 bytes

### BRIDGE

#### Compliance

802.1D, 802.1Q, 802.1ad

#### Mode

VLAN-aware, VLAN-unaware

### ROUTER

(ETX-203AM, ETX-205A)

Integrated router (if ordered) providing:

- Up to 1 Gbps Layer-3 IPv4 and IPv6 forwarding with performance of over 2 MPPS
- Bidirectional forwarding detection (IP-BFD single hop) for fast forwarding path failure detection
- Inbound ACLs
- Static routing, or routing with OSPFv2 and BGPv4 control protocols.

### VLAN Editing

Inner/outer VLAN editing per VLAN and p-bit values

### HIERARCHICAL QUALITY OF SERVICE (HQOS)

#### Policing

Dual token bucket with user-configurable CIR + CBS and EIR + EBS

ETX-220A: Bandwidth policing per MEF 10.3

#### Scheduling

8 × CoS per EVC scheduling elements  
Strict Priority (SP) and Weighted Fair Queue (WFQ)

#### Shaping

Single- and dual-rate per EVC/EVC.CoS

### FLOWS

#### Classification

Per port, outer VLAN or outer + inner VLAN, PCP, TOS/DSCP, Ethertype, or IP/MAC source/destination address

#### Max. Number of Concurrent Flows

ETX-203AM, ETX-203AX, ETX-205A: 270  
ETX-220A: 2000

### RESILIENCY

#### Dual Homing

Dual homed link redundancy

#### Link Aggregation

IEEE 802.1ax (802.3ad) 1:1 LAG with LACP for pairs of network or user Ethernet ports

#### Ethernet Ring

G.8032v2 rings with sub 50 ms protection for Ethernet traffic

#### Ethernet Path Protection

G.8031, for linear 1:1 protection

### DIAGNOSTICS

#### Loopback Tests

Non-disruptive loopback per flow, with swapping of MAC address and optionally IP address

Loopbacks at Ethernet port level

#### Service Activation Tests

RFC-2544: 8 built-in wire-speed testers

ITU-T Y.1564: 8 built-in wire-speed testers

Table 2. Ethernet Interfaces

Specifications	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A	
10GbE	Number of Ports				
	Network: 1 or 2 User: 1 or 2				
	Type				
	XFP				
Fiber Optic (XFP-based)					
10GBaseSR, 10GBaseER, 10GBaseLR, 10GBaseZR					
Connector					
XFP slot					
XFP Transceivers					
See <i>Note</i>					
GbE	Number of Ports		Network: 2 User: 4		
	Network: 2 with GbE network module, or 1 with router module User: 4 (3 with router module)		Network: 2 User: 4 with regular router, or 2 with wire-speed router or D-NFV option		
	Type		SFP or copper port		
	Network: SFP/copper combo port User: SFP or copper port		SFP/copper combo port		
	Fiber Optic (SFP-based)		SFP or copper port		
	Fast Ethernet: 100BaseFx, 100BaseLX10, 100BaseBx10 Gigabit Ethernet: 1000BaseSx, 1000BaseLX10, 1000BaseBx10		Copper		
10/100BaseT or 10/100/1000BaseT		Connector			
Port 1: SFP slot All other ports: SFP slot or RJ-45		Replaceable module with SFP slot and RJ-45		SFP slot or RJ-45	
SFP Transceivers		See <i>Note</i>		See <i>Note</i>	
<p><b>Note:</b> It is strongly recommended to order this device with <b>original</b> RAD SFPs/XFPs. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs/XFPs. For full details on SFP/XFP transceivers, see the SFP/XFP Transceivers data sheet at <a href="http://www.rad.com">www.rad.com</a>. For the list of SFP/XFP transceivers supported by ETX-220A, see the <a href="#">SFP/XFP Compatibility</a> document.</p>					

## SHDSL INTERFACES

(ETX-203AM: SHDSL network module)

### Type

SHDSL.bis

### Number of Ports

2 or 4

### Number of Wires

4 or 8

### Connector

Replaceable network module, with one RJ-45 for 4-wire ordering option or two RJ-45s for 8-wire ordering option

### Line Coding

16 or 32 TC-PAM

### Line Rate

192–5696 kbps (see *Table 3*)

### Impedance

135Ω

### Compliance

ITU-T G.991.2, ETSI TS 101524

### Bonding

According to IEEE 802.3ah, ITU-T G.998.2

## E1/T1 INTERFACES

(ETX-203AM: EoPDH E1/T1 network module)

### Number of Ports

4 or 8

### Compliance

G.703, G.823

### Data Rate

E1: 2.048 Mbps

T1: 1.544 Mbps

### Line Coding

E1: HDB3

T1: B8ZS

### Framing

E1: Framed (G732N with CRC)

T1: Framed (ESF)

### Impedance

E1: 120Ω, balanced

75Ω, unbalanced (via adapter cable)

T1: 100Ω, balanced

### Connector

Replaceable module, with four RJ-45 connectors:

Four E1/T1 ports:

One E1/T1 interface per RJ-45

Eight E1/T1 ports:

Two E1/T1 interfaces per RJ-45, with adapter cable

## T3 INTERFACES

(ETX-203AM: EoPDH T3 network module)

### Number of Ports

1 or 2

### Compliance

G.703, G.823

### Data Rate

44.736 Mbps

### Line Code

B3ZS

### Framing

C-bit parity

### Line Impedance

75Ω, unbalanced

### Connector

Replaceable network module, with one or two pairs of BNC connectors:

One T3 port – One pair

Two T3 ports – Two pairs

## E1/T1 INTERFACES

(ETX-205A: Built-in TDM PW E1/T1 ports)

### Number of Ports

4 or 8

### Compliance

E1: G.703, G.732N, G.732S

T1: ANSI T1.101, ANSI T1.403

### Data Rate

E1: 2.048 Mbps

T1: 1.544 Mbps

### Line Coding

E1: HDB3

T1: B8ZS

### Framing

E1: Framed (G.732N with or without CRC)

Framed with CAS (G.732S with or without CRC)

Unframed

T1: Unframed or ESF

### Impedance

E1: 120Ω, balanced

75Ω, unbalanced (via adapter cable)

T1: 100Ω, balanced

### Connector

Electrical, RJ-45

Table 3. SHDSL Typical Ranges (26 AWG)

Data Rate	4-wire		8-wire		
	[kbps]	[km]	[mi]	[km]	[mi]
192	8	4.9	8	4.9	
512	6.7	4.1	6.7	4.1	
1536	6	3.7	6.5	4	
2048	5.7	3.5	6.4	3.9	
4096	5.1	3.1	5.7	3.5	
4608	5	3	5.5	3.4	
5696	4.6	2.8	5.1	3.1	
11392	2.9	1.8	4.6	2.8	
17088	–	–	3.5	2.1	
22784	–	–	2.9	1.8	

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### PSEUDOWIRE (ETX-205A)

#### Payload Encapsulation

CESoPSN, SAToP

#### Network Encapsulation

MEF 8, UDP/IP

### TIMING

#### Synchronous Ethernet

ITU-T G.8261-G.8264

#### 1558v2

Slave clock (ETX-205A, ETX-220A)

Boundary clock (ETX-205A, ETX-220A)

Master clock with GPS (ETX-205A)

Dual master operating simultaneously in G.8265.1 and G.8275.1 mode (ETX-205A, ETX-220A)

Transparent clock (TC)

Phase and frequency synchronization

#### Station Clock

##### (ETX-205A, ETX-220A)

Type: Balanced E1, unbalanced E1 (via adapter cable)

Connector: RJ-45

#### PTP Ports

##### (ETX-205A, ETX-220A)

TOD/1PPS (RJ-45)

External clock (BNC)

1PPS (BNC)

### D-NFV

The D-NFV option is available for ETX-205A in general infrastructure mode, or in high-scale TWAMP mode based on a dedicated x86 CPU. Both options are available in a 1U 19" enclosure, with the following options:

- Four Ethernet interfaces (FE/GbE combo ports)
- X86 processor: Dual-core 2.5GHz Xeon or quad core 1.8 GHz Xeon
- Storage: Hard drive (HDD) 256 GB or solid state disk (SSD) 128 GB
- Single AC power supply: 100 to 240V (dying gasp and TDM are not supported)
- Operating temperature: 0 to 50°C (32 to 122°F)
- Management and control ports as in regular ETX-205A 19" enclosure

Any D-NFV option must be ordered together with a RADcare Package and RADcare Project Assurance Package.

### MANAGEMENT

#### Ethernet Management Port

Type: 10/100/1000BaseT

Connector: RJ-45

#### Control Port

Interface: V.24/RS-232 DCE

Connector: RJ-45

Format: Asynchronous

Data rate: 9.6, 19.2, or 115.2 kbps

#### Management Options

Password-protected access, authorization levels

Secure CLI via SSH

Telnet, SNMPv3, SFTP

RADIUS or TACACS+ authentication

Plug and play zero touch provisioning

#### Routing for Management

IP forwarding, dual-stack IPv4 and IPv6 routing, static routing

### GENERAL

#### Compliance

CE 2.0, MEF 6 (E-Line – EPL and EVPL, E-LAN – EPLAN and EVPLAN), MEF 10, MEF 9, MEF 14, MEF 20, MEF 36, IEEE 802.3, 802.3u, 802.1q, 802.1p, 802.3ad, 802.3-2005, 802.1ax, 802.1ag, ITU-T Y.1731, G.8031, G.8032v2, G.8262, G.8265, RFC-2544, ITU-T Y.1564



Table 4. Power, Physical, and Environmental Specifications

Specifications	ETX-203AX	ETX-203AM	ETX-205A	ETX-220A	
Power	AC/DC inlet connector with auto detection AC (wide range): 85–264 VAC, 47/63 Hz DC: 48 VDC (40–370 VDC)	AC: 100–230 VAC ( $\pm 10\%$ ), 47–63 Hz DC: -48 VDC (36–72 VDC)	AC: 100–240 VAC, 50/60 Hz DC: 19": - 24/48 VDC nominal (20–72 VDC) $\frac{1}{2}$ 19": 48 VDC (-48 to 60 VDC)	AC: 100–240 VAC, 50/60 Hz DC: -48 VDC nominal (-40 to 72 VDC)	
	Power Consumption	15W max	GbE uplink module: 15W max SHDSL uplink module (4-wire): 15W max SHDSL uplink module (8-wire): 17W max E1/T1/T3 uplink module: 5W max	19": 22W max $\frac{1}{2}$ 19": 21W max D-NFV option: 90W max	70W max
Physical	Height	43.7 mm (1.7 in)	43.7 mm (1.7 in)	43.7 mm (1.7 in)	
	Width	220 mm (8.6 in)	215 mm (8.5 in)	19": 440 mm (17.4 in) $\frac{1}{2}$ 19": 215 mm (8.5 in)	440 mm (17.4 in)
	Depth	170 mm (6.7 in)	300 mm (11.8 in)	19": 240 mm (9.5 in) $\frac{1}{2}$ 19": 300 mm (11.8 in)	Non-NEBS: 240 mm (9.5 in) NEBS: 300 mm (11.8 in)
	Weight	0.7 kg (1.54 lb)	2.3 kg (5.1 lb)	19" (regular): 3.1 kg (6.8 lb) 19" (D-NFV): 3.9 kg (8.6 lb) $\frac{1}{2}$ 19": 2.4 kg (5.2 lb)	Non-NEBS: 3.1 kg (6.8 lb) NEBS: 3.6 kg (7.94 lb)
Environment	Temperature	Regular and NEBS: 0 to 50°C (32 to 122°F)	Regular: 0 to 50°C (32 to 122°F) Temperature-hardened and NEBS: -20 to 65°C (-4 to 149°F)	Regular: 0 to 50°C (32 to 122°F) Temperature-hardened and NEBS (not applicable for D-NFV): -40 to 65°C (-40 to 149°F)	Regular: 0 to 50°C (32 to 122°F) Temperature-hardened and NEBS: -20 to 65°C (-4 to 149°F)
	Humidity	Up to 90%, non-condensing	Up to 90%, non-condensing	Up to 90%, non-condensing	Up to 90%, non-condensing

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### Ordering

#### RECOMMENDED CONFIGURATIONS

##### ETX-203AX:

Configuration examples:

##### ETX-203AX/2SFP/4SFP

2 SFP fast Ethernet ports, 4 empty SFP slots

##### ETX-203AX/GE/2SFP/4SFP

2 SFP GbE Ethernet ports, 4 empty SFP slots

##### ETX-203AX/GE30/2SFP/4SFP

2 SFP GbE Ethernet ports, 4 empty SFP slots, multiple shapers per port

##### ETX-203AX/2SFP/2UTP2SFP

2 SFP Ethernet ports, 2 UTP Ethernet ports, 2 SFP Ethernet ports

##### ETX-203AX/2SFP/4UTP

2 SFP Ethernet ports, 4 Ethernet UTP ports

##### ETX-203AX/2UTP/4UTP

2 UTP Ethernet ports, 4 Ethernet UTP ports

##### ETX-203AX/1SFP1UTP/4UTP

1 SFP Ethernet slot, 1 UTP Ethernet port, 4 Ethernet UTP ports

*Note for ETX-203AX: All ordering options are available with FE, GE, or GE30 options.*

#### SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options for ETX-203AX.

#### SUPPLIED ACCESSORIES

AC power cord

##### CBL-RJ45/D9/F/6FT

Control port cable with male RJ-45 and female DB-9 connector

#### OPTIONAL ACCESSORIES

DC connection kit

##### RM-33-2

Hardware kit for mounting one or two ETX-203AX units in a 19" rack

##### RM-35/23-TYPE1-NEBS

Hardware kit for mounting one or two NEBS-compliant ETX-203AM or ETX-203AX units in a 19" rack

##### ETX-203AX-SW/GE30

Software license for 1 Gbps per port, and up to 64 shaped EVCs per port

##### ETX-203AX-SW/GE

Software license for 1 Gbps per port

#### RECOMMENDED CONFIGURATIONS

##### ETX-203AM:

Configuration examples:

##### ETX-203AM/DC/GE30/2ETH/2SFP2UTP

DC power supply, GbE Ethernet ports with multiple shapers, Ethernet network module, 2 SFP Ethernet ports, 2 copper Ethernet ports

##### ETX-203AM/AC/SH4W/4UTP

AC power supply, fast Ethernet ports, SHDSL 4-wire network module, 4 copper Ethernet ports

##### ETX-203AM/AC/GE/2ETH/4SFP

AC power supply, GbE Ethernet ports, Ethernet network module, 4 SFP Ethernet ports

##### ETX-203AM/AC/GE30/8E1T1/4UTP

AC power supply, GbE Ethernet ports, multiple shaped EVCs, E1/T1 8-port network module, 4 copper Ethernet ports

##### ETX-203AM/AC/GE/4UTP

AC power supply, GbE Ethernet ports, no network module, 4 copper Ethernet ports

##### ETX-203AM/AC/GE30/RTR/4SFP

AC power supply, GbE Ethernet ports, multiple shaped EVCs, router module, 4 SFP Ethernet ports

##### Notes for ETX-203AM:

- All ordering options are available with FE, GE, or GE30 options
- Only the Ethernet network module (2ETH) is NEBS certified.

#### SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options for ETX-203AM.

#### SUPPLIED ACCESSORIES

AC power cord (if AC power supply is ordered), or DC connector kit (if DC power supply is ordered)

##### CBL-RJ45/D9/F/6FT

Control port cable with male RJ-45 and female DB-9 connector

##### CBL-E1-SPLT

Cable to extract 2 E1/T1 ports from one RJ-45 connector of ETX-203AM E1/T1 network module (four cables are supplied if 8 E1T1 option is ordered)

#### OPTIONAL ACCESSORIES

##### CBL-RJ45/2BNC/E1/X

Balanced E1 (RJ-45) to unbalanced E1 (2 BNC) adapter cable

##### RM-35/@

Hardware kit for mounting one or two ETX-203AM units in a 19" rack

@ Rack mount kit (Default=Both kits):

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

##### RM-35/23-TYPE1-NEBS

Hardware kit for mounting one or two NEBS-compliant ETX-203AM or ETX-203AX units in a 19" rack

##### WM-35

Wall mount hardware kit for one ETX-203AM unit

##### ETX-203AM-SW/GE30

Software license for 1 Gbps per port, and up to 64 shaped EVCs per port

##### ETX-203AM-SW/GE

Software license for 1 Gbps per port

##### ETX-M/2ETH

Ethernet uplink module for ETX-203AM with two combo ports

##### ETX-M/SH4W

EFM bonded uplink module for ETX-203AM with 2 SHDSL ports (4-wire)

##### ETX-M/SH8W

EFM bonded uplink module for ETX-203AM with 4 SHDSL ports (8-wire)

##### ETX-M/4E1T1

Ethernet uplink module for ETX-203AM with 4 E1/T1 ports

**ETX-M/8E1T1**

Ethernet uplink module for ETX-203AM with 8 E1/T1 ports

*Note: The CBL-E1-SPLT cables must be ordered separately when ordering this module.*

**ETX-M/1T3**

Ethernet uplink module for ETX-203AM with 1 T3 port

**ETX-M/2T3**

Ethernet uplink module for ETX-203AM with 2 T3 ports

**ETX-M/RTR**

Ethernet module with integrated 1 Gbps router

**RECOMMENDED CONFIGURATIONS****ETX-205A:**

Configuration examples:

**ETX-205A/AC/19**

AC power supply, 19" enclosure

**ETX-205A/AC/19/4E1T1**

AC power supply, 19" enclosure, 4 E1/T1 ports

**ETX-205A/AC/19/8E1T1**

AC power supply, 19" enclosure, 8 E1/T1 ports

**ETX-205A/AC/19/SYE**

AC power supply, 19" enclosure, SyncE

**ETX-205A/AC/19/PTP**

AC power supply, 19" enclosure, 1588v2 timing and SyncE

**ETX-205A/AC/19/4E1T1/PTP**

AC power supply, 19" enclosure, 4 E1/T1 ports, 1588v2 timing and SyncE

**ETX-205A/AC/19/8E1T1/PTP**

AC power supply, 19" enclosure, 8 E1/T1 ports, 1588v2 timing and SyncE

**ETX-205A/AC/19/GPS**

AC power supply, 19" enclosure, integrated grandmaster and GPS receiver

**ETX-205A/AC/19/RTR**

AC power supply, 19" enclosure, integrated 1 Gbps router

**ETX-205A/AC/PTP**

AC power supply, half 19" enclosure, 1588v2 timing and SyncE

**ETX-205A/DC/4E1T1/PTP**

DC power supply, half 19" enclosure, 4 E1/T1 ports, 1588v2 timing and SyncE

**ETX-205A/HN/DCR/19/PTP**

Dual DC power supply, temperature-hardened NEBS-certified 19" enclosure, 1588v2 timing and SyncE

*Note for ETX-205A: 19" ordering options are available with any combination of AC or DC power supplies*

**ETX-205A (D-NFV):****ETX-205A/AC/19V/DC2X/250H**

AC power supply, dual core 2.5 GHz x86 processor, 250 GB hard drive (HDD)

**ETX-205A/AC/19V/DC2X/128S/HST**

AC power supply, dual core 2.5 GHz x86 processor, 128 GB solid state disk (SSD), high-scale TWAMP application

**ETX-205A/AC/19V/QC18/250H**

AC power supply, 1.8 GHz x86 processor, 256 GB hard drive (HDD)

**ETX-205A/AC/19V/DC2X/128S**

AC power supply, dual core 2.5 GHz x86 processor, 128 GB solid state disk (SSD)

**ETX-205A/AC/19V/QC18/128S**

AC power supply, 1.8 GHz x86 processor, 128 GB solid state disk (SSD)

*Note for ETX-205A (D-NFV): The D-NFV options are available with a single AC power supply, and do not support NEBS, dying gasp, TDM ports, or timing options.*

**SPECIAL CONFIGURATIONS**

Please contact your local RAD partner for additional configuration options for ETX-205A.

**SUPPLIED ACCESSORIES**

Power cord (one per power supply)

**CBL-RJ45/D9/F/6FT**

Control port cable with male RJ-45 and female DB-9 connector

**RM-34**

Hardware kit for mounting one 19" ETX-205A unit in a 19" rack

**OPTIONAL ACCESSORIES****CBL-RJ45/2BNC/E1/X**

Balanced E1 (RJ-45) to unbalanced E1 (2 BNC) adapter cable

**RM-34-23**

Hardware kit for mounting one 19" ETX-205A unit in a 23" rack

**RM-35/@**

Hardware kit for mounting one or two half 19" ETX-205A units in a 19" rack

@ Rack mount kit (Default=Both kits):

**P1** Kit for mounting one unit

**P2** Kit for mounting two units

**WM-34**

Wall mount hardware kit for one 19" ETX-205A unit

**WM-35**

Wall mount hardware kit for one half 19" ETX-205A unit

**ETX-205A\_PS/!**

! Power supply

**AC** Single AC power supply

**DC** Single DC power supply

**RECOMMENDED CONFIGURATIONS****ETX-220A:**

Configuration examples:

**ETX-220A/AC/2XFP/20S/SYE/ESK**

AC power supply, 2 XFP 10GbE ports, 20 SFP GbE ports, SyncE, enhanced SW key

**ETX-220A/AC/2XFP/10U10S/SYE/ESK**

AC power supply, 2 XFP 10GbE ports, 10 copper GbE ports, 10 SFP GbE ports, SyncE, enhanced SW key

**ETX-220A/AC/3XFP/10S/SYE/ESK**

AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, enhanced SW key

**ETX-220A/AC/3XFP/10U/SYE/ESK**

AC power supply, 3 XFP 10GbE ports, 10 copper GbE ports, SyncE, enhanced SW key

**ETX-220A/AC/3XFP/10S/PTP/ESK**

AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, 1588v2, enhanced SW key

## ETX-2

## Carrier Ethernet Demarcation

**ETX-220A/H/DCR/2XFP/20S/SYE/ESK**

Temperature hardened, dual DC power supplies, 2 XFP ports, 20 SFP GbE ports, SyncE, enhanced SW key

**ETX-220A/AC/4XFP/10U/SYE/ESK**

AC power supply, 4 XFP 10GbE ports, 10 copper GbE ports, SyncE, enhanced SW key

**ETX-220A/AC/4XFP/SYE/ESK**

AC power supply, 4 XFP 10GbE ports, SyncE, enhanced SW key

**ETX-220A/AC/2XFP/20S/SYE/BSK**

AC power supply, 2 XFP 10GbE ports, 20 SFP GbE ports, SyncE, basic SW key

**ETX-220A/AC/2XFP/10U10S/SYE/BSK**

AC power supply, 2 XFP 10GbE ports, 10 copper GbE ports, 10 SFP GbE ports, SyncE, basic SW key

**ETX-220A/AC/3XFP/10S/SYE/BSK**

AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, basic SW key

**ETX-220A/AC/3XFP/10U/SYE/BSK**

AC power supply, 3 XFP 10GbE ports, 10 copper GbE ports, SyncE, basic SW key

**ETX-220A/AC/3XFP/10S/PTP/BSK**

AC power supply, 3 XFP 10GbE ports, 10 SFP GbE ports, SyncE, 1588v2, basic SW key

**ETX-220A/DC/4XFP/10S/SYE/BSK**

DC power supply, 4 XFP 10GbE ports, 10 SFP GbE ports, SyncE, basic SW key

**ETX-220A/DC/4XFP/10U/SYE/BSK**

DC power supply, 4 XFP 10GbE ports, 10 copper GbE ports, SyncE, basic SW key

**ETX-220A/DC/4XFP/SYE/BSK**

DC power supply, 4 XFP 10GbE ports, SyncE, basic SW key

**Notes for ETX-220A:**

- *The Enhanced Software (ESK) option provides all Ver. 5.0 features; the (Basic Software) BSK option contains all features provided by ESK, except the BSK option supports one level of QoS with two shapers per NNI port (2x8 CoS)*
- *All ordering options are available with AC, DC, dual AC (ACR) or dual DC (DCR) power supplies*
- *Temperature-hardened options are available; please contact your local RAD partner for further information.*

**SPECIAL CONFIGURATIONS**

Please contact your local RAD partner for additional configuration options for ETX-220A.

**SUPPLIED ACCESSORIES**

Power cord (one per power supply)

**CBL-RJ45/D9/F/6FT**

Control port cable with male RJ-45 and female DB-9 connector

**RM-34**

Hardware kit for mounting one ETX-220A unit in a 19" rack

**OPTIONAL ACCESSORIES****RM-34-23**

Hardware kit for mounting one ETX-220A unit in a 23" rack

**WM-34**

Wall mount hardware kit for one ETX-220A unit

**ETX-220A\_PS/!**

! Power supply:  
**AC** Single AC power supply  
**DC** Single DC power supply

**ETX-220A\_PS/H/!**

! Power supply for temperature-hardened enclosure:  
**AC** Single AC power supply  
**DC** Single DC power supply

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