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ETX-203AX

Carrier Ethernet Demarcation Device

Feature-rich demarcation point for SLA-based Ethernet business services

- Feature-rich Carrier Ethernet demarcation device delivering 'TDM-like' experience with Ethernet end-to-end service
- MEF-compliant services with CIR/EIR traffic profiles and hierarchical scheduling providing traffic management at the edge of Carrier Ethernet networks
- Quick network fault detection with complete hardware-based OAM toolset: ITU-T Y.1731, IEEE 802.1ag, IEEE 802.3ah
- Throughput testing across routed/switched networks up to line rate by using Layer-2 RFC-2544 traffic generator and analyzer, and Layer-2/3 loopbacks

The ETX-203AX Carrier Ethernet demarcation device delivers SLA-based business services to the customer premises over native Ethernet access networks.

ETX-203AX ensures SDH/SONET-like performance and Five Nines reliability for IP VPN and VoIP transport, as well as for dedicated Internet access and Layer-2 LAN-to-LAN services, all with differentiated quality of service and end-to-end monitoring.

The ETX-203AX architecture ensures powerful traffic management that allows the service provider to control bandwidth and enforce traffic SLA.

ETX-203AX features hardware-powered OAM for multiple flow monitoring at line rate. It provides 15 different SLA tools to assure and control service provider traffic around the clock.

ETX-203AX is a compact demarcation device that delivers MEF 9 and MEF 14 certified services. It provides Ethernet uplink NNI ports as well as UNI ports.

ETX-203AX

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TYPICAL APPLICATIONS

ETX-203AX is used as an Ethernet demarcation device. ETX-203AX separates the service provider network, the access provider network, and the customer network, providing proactive service monitoring and easy fault localization throughout the entire network (see *Figure 1*).

FLEXIBLE TRAFFIC MAPPING

Traffic is mapped to the Ethernet flows using very flexible classification criteria based on incoming port (port-based all-to-one bundling), VLAN ID, VLAN priority, IP precedence, DSCP, Ethertype, and IP/MAC source/destination address. Classification is defined for both VLAN-tagged as well as untagged traffic.

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

HIERARCHICAL QUALITY OF SERVICE (H-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.

Every flow per EVC or EVC.cos has its own queues and scheduler supporting strict priority and weighted fair queues (WFQ). Queue blocks of eight queues per EVC are scheduled and shaped, forming an H-QoS model with shaped services and prioritized classes of service. The queues use WRED mechanism for smart packet drop.

HARDWARE-BASED ETHERNET OAM

Featuring ultra fast, hardware-powered processing, ETX-203AX performs service OAM and PM measurements in line rate with maximum precision, offering the following powerful benefits:

- Immediate detection of loss of continuity (LOC), ensuring under 50 ms protection switching

- Highly accurate frame loss measurements of live traffic

- Flow-level monitoring, simultaneously processing multiple OAM sessions with E-LAN and E-TREE support

- Non-disruptive MAC and IP level loopback for network integrity testing.

ETX-203AX provides these types of Ethernet OAM:

- Single-segment (link) OAM according to IEEE 802.3-2005 for remote management and fault indication, including remote loopback, dying gasp with SNMP trap, and MIB parameter retrieval. Active and passive mode are supported.

- End-to-end connectivity OAM based on IEEE 802.1ag-D8 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 delay, delay variation, frame loss and availability.

FAULT PROPAGATION

The unit provides a user-configurable fault propagation mechanism in the network-to-user or user-to-network direction.

When a link failure is detected or OAM failure received, ETX-203AX can shut down the affected port or forward the OAM failure message. The fault propagation mechanism enables routers and switches connected to both ends of the link to reroute the traffic to the redundancy path.
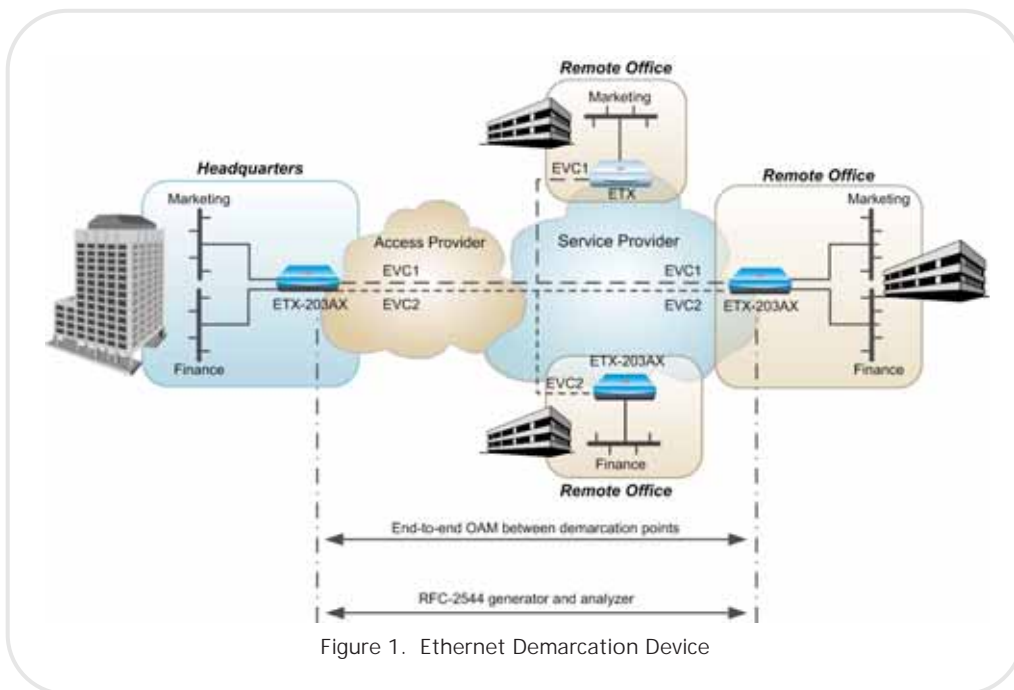

Figure 1. Ethernet Demarcation Device

RFC-2544

The device provides a built-in RFC-2544 wirespeed traffic generator and analyzer for unidirectional and bidirectional testing of throughput, latency, and frame loss. Based on standard OAM messages, the tests can be simultaneously performed over multiple flows, at the EVC.CoS level.

Enhanced RFC-2544 functionality provides service-oriented KPI analysis. SLA conformance is measured per service bandwidth and packet size, within a user-defined amount of time, for faster service introduction.

NETWORK INTERFACE RESILIENCY

ETX-203AX provides the following network interface protection modes:

- Link aggregation (LAG) based on 802.3ad, providing 1:1 link protection with Link Aggregation Control Protocol (LACP) support
- Dual homing (1:1), allowing ETX-203AX units to be connected to two different upstream devices.

FLOW LEVEL RESILIENCY

ETX-203AX applies standard ITU-T G.8031 Ethernet linear protection switching for fast protection of one or more EVCs from end to end basis. With standard APS functionality, Ethernet OAM messages provide bandwidth-efficient unidirectional or bidirectional 1:1 protection.

The EVC protection path can be configured as follows:

- On same network port as the active path – Protection is applied on the transport network by transmitting the working and protection traffic on separate paths.
- Separate from the working path – The user benefits from protection for link and network failure and can also achieve load balancing on network interfaces by splitting traffic between two ports.

The performance of the hardware-based Ethernet OAM together with protection switching for physical layer failure ensures fast protection in any scenario.

The flow level protection provides a full set of manual commands for maintenance purposes.

INTEGRATED SMART SFP

Integrated management of MiRICi smart SFPs provides TDM (E1/T1/E3/T3/OC-3/STM-1) connectivity over PDH or SDH legacy networks. ETX-203AX supports configuration and statistic collection for the smart SFP TDM port.

COLOR-AWARE P-BIT RE-MARKING

The VLAN priority bit in Ethernet frames can be modified at network ingress according to the 'color' of the frame. This allows service consistency and QoS continuity across color-aware (Drop Eligible-enabled) as well as color-unaware networks.

DYING GASP

ETX-203AX reports power failures to defined network management stations by sending an IEEE 802.3-2005 message or SNMP trap, thus enabling the unit to properly disconnect from the network with notification of the reason for the service problem.

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-203AX exchanges the source and destination MAC/IP addresses of the incoming packets. This loopback passes through Ethernet bridges (MAC address) and routers (IP address).

SECURITY

The following security protocols are provided by ETX-203AX to ensure client server communication privacy and correct user authentication:

- SNMPv3
- RADIUS (client authentication)
- TACACS+ (client authentication, authorization, and accounting)
- SSH (secure shell communication session).
- SFTP (secure file transfer).

TRAP SYNCHRONIZATION

Traps are sent with sequence IDs to network manager groups, to enable the managers to detect when traps are lost and request the traps be sent again.

ZERO TOUCH PROVISIONING

IP address, IP mask, default gateway, and link to configuration manager can be automatically obtained using standard DHCP client functionality. This enables seamless node setup and configuration for quick and scalable network setup and deployment as well as configuration consistency when nodes must be replaced.

MANAGEMENT

The unit can be managed using the following ports and applications:

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

COMMAND LINE INTERFACE

Databases and scripts of commonly used commands can be easily created and applied to multiple units using command line interface.

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Specifications

NETWORK INTERFACE

Number of Ports
Up to 2:
- Ports 1 and 2 can serve as an uplink with redundancy
- Port 2 can serve as a network or user port

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

Connector
Port 1: SFP slot
Port 2: SFP slot or RJ-45

ETX-203AX can be ordered with low-cost MiRICi SFPs (managed by ETX-203AX), for packet over PDH and SDH applications.

USER INTERFACE

Number of Ports
Up to 5 (port 2 can function as network or user)

Type
SFP or UTP port

Connector
SFP slot or RJ-45

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

MANAGEMENT PORTS

Out-of-Band Ethernet Management
Type: 10/100BaseT, 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

GENERAL

Max. Frame Size
12,288 bytes

Compliance
MEF 6 (E-Line – EPL and EVPL), MEF 10, MEF 9, MEF 14: EPL and EVPL, MEF 20, IEEE 802.3, 802.3u, 802.1q, 802.1p, 802.3ad, 802.3-2005, 802.1ag-D8, ITU-T Y.1731, G.8031, G.8262, RFC-2544

Indicators
PWR (green):
    On –ETX-203AX is powered up
1–4 (green):
    On – Corresponding Ethernet link OK
    Blinking – Data is being transmitted and received on the Ethernet link
LINK/ACT (green):
    On – Ethernet link OK
    Blinking – Data is being transmitted and received on the Ethernet link

Power
AC/DC inlet connector with auto detection
Wide-range AC power supply:
    100–240 VAC, 50/60 Hz
DC power supply:
    48V (40–370 VDC)

Power Consumption: 15W max

Physical
Plastic enclosure:
Height: 43.7 mm (1.7 in)
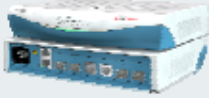Width: 220 mm (8.6 in)
Depth: 170 mm (6.7 in)
Weight: 0.7 kg (1.54 lb)

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

Table 1. ETX Family Comparison Table

Feature	ETX-203AX (Ver. 4.01)	ETX-205A (Ver. 4.01)
Bandwidth	100/1000 Mbps per port, depending on license option	100/1000 Mbps per port
Ethernet Ports (Net/net/user)	1/1/4 SFP/copper	1/1/4 SFP/copper combo
Network interface	Up to 2 × GbE or FE SFP or copper ports	Up to 2 × GbE or FE SFP/copper combo ports
User interface	Up to 5 × GbE or FE SFP or copper ports	Up to 5 × GbE SFP/copper combo ports
Number of flows (EVC.cos) / shapers / MEPs	192/2/128 or 192/30/128, depending on license option	192/30/128
Service type	EPL and EVPL (flow-based)	EPL and EVPL (flow-based)
Forwarding mode	Flow-based	Flow-based
Bandwidth profile	CIR/CBS, EIR/EBS per EVC.CoS	CIR/CBS, EIR/EBS per EVC.CoS
Max. frame size	12,288 bytes	12,288 bytes
E1/T1, E3/T3, OC-3/STM-1 bridging	Supported, includes integrated management	Supported, includes integrated management
Timing options	1588v2 TC (Transparent Clock)	Synchronous Ethernet (SyncE), 1588v2 TC (Transparent Clock)
G.8031 protection	Yes	Yes
RFC-2544 testing	Yes	Yes
Management	Command line RADview-EMS	Command line RADview-EMS
Temperature-hardened option	No	Yes
Power supply	Universal AC/DC	AC or DC
Power supply redundancy	No	Yes

ETX-203AX
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Ordering

STANDARD CONFIGURATIONS

ETX-203AX/2SFP/4UTP

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

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

ETX-203AX/2SFP/2SFP2UTP

ETX-203AX/GE/2SFP/2SFP2UTP

ETX-203AX/GE30/2SFP/2SFP2UTP

SPECIAL CONFIGURATIONS

ETX-203AX/NP/ +2/+3

Legend
NP Software package (Default=
     100 Mbps per port)

GE	1 Gbps per port
GE30	1 Gbps per port, 30 shaped EVCs

+2 Ethernet network ports

2SFP	2 SFP slots
2UTP	2 UTP Ethernet ports
1SFP1UTP	1 SFP slot + 1 UTP Ethernet port

+3 Ethernet user ports

4SFP	4 SFP slots
4UTP	4 UTP Ethernet ports
2SFP2UTP	2 SFP slots + 2 UTP Ethernet ports

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 (if DC power supply is
ordered)

RM-33-2
Hardware kit for mounting one or two
ETX-203AX units in a 19" rack

www.rad.com Order this publication by Catalog No. 803996

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