

# ETX-5

## Ethernet Service Aggregation Platform



- Feature-rich CE2.0-certified aggregation platform, offering a cornerstone for service assured access (SAA) solution
- Ideal for carriers, wholesalers and mobile operators, building fully redundant networks with diverse topologies for delivery and monitoring of MEF-certified Ethernet and TDM-over-packet services
- Unmatched level of resiliency with self-healing Ethernet rings and LAG, enhanced traffic management capabilities for fully color-aware networks
- Hardware-based OAM and diagnostics for scalable and accurate traffic monitoring, quick fault detection and user-friendly troubleshooting
- Easy service provisioning, using Service Manager application and performance monitoring portal



The ETX-5 Carrier Ethernet aggregation platform, together with the ETX-2 Carrier Ethernet demarcation device, are the main component of RAD's Service Assured Access solution, providing SLA-based services, Ethernet business offerings, legacy TDM service emulation and mobile backhaul. It is ideal for carrier-to-carrier connectivity applications complying with MEF 26, as well as for high capacity grooming of Ethernet OAM and performance monitoring sessions. This 3U modular system features high port density for space-restricted facilities.

ETX-5 features non-blocking architecture, allowing wire-speed forwarding for all packet sizes. It is designed for high availability and "Always-On Service".

Operating over various network topologies (linear, daisy chain, and self-healing G.8032v2 rings), ETX-5 builds a complete color-aware access network solution.

ETX-5 provides CE2.0-certified Ethernet services including:

- E-Line (EPL and EVPL) for LAN-to-LAN, VoIP and IP-VPN connectivity, as well as for storage and dedicated Internet access
- E-LAN (EP-LAN and EVP-LAN) for multipoint Layer-2 VPN, transparent LAN services and multicast networks

- E-Tree (EP-Tree and EVP-Tree) for combining multiple Ethernet technologies across different domains
- E-Access for reaching the service provider's out-of-franchise subscriber locations as part of the end-to-end service
- 2G, 3GPP, LTE and LTE-A transport.

### INTEROPERABILITY

ETX-5 is interoperable with RAD's intelligent Ethernet demarcation devices (ETX-2, ETX-1, MiNID), and TDM pseudowire gateways (IPmux), to build optimized access networks – both TDM and packet-based – over PSN.

### CARRIER ETHERNET 2.0

ETX-5 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.

### Traffic Management

ETX-5 efficiently handles multi-priority traffic on a per-flow basis. Its 120-Gbps capacity enables simultaneous processing of thousands of flows, allowing service providers to deploy true traffic-engineered, color-aware networks.

The powerful H-QoS traffic manager performs hierarchical scheduling and shaping at port-, tunnel- and EVC-level. It employs two-rate, three-color policers and advanced color mapping/marking techniques to deliver a true multi-CoS solution. Multi-curve WRED profiles assure CIR traffic priority over EIR.

### OAM

Hardware-based OAM mechanism with Up and Down MEP support provides enhanced scale of line-rate CCM/DMM/LMM measurement for end-to-end service assurance.

### RESILIENCY

ETX-5 functions as a fully-redundant aggregation and demarcation point that enables end-to-end visibility and smooth service hand-off. ETX-5 offers various tools to ensure continuous availability and sub-50 ms restoration in the event of network outages.

The following port and service protection mechanisms are employed: LAG, ERP (G.8032v2), Ethernet protection grouping (dual homing), TDM APS.

Fault-tolerant hardware design with fully redundant timing, management and power sub-systems, prevents service downtime.



## Applications

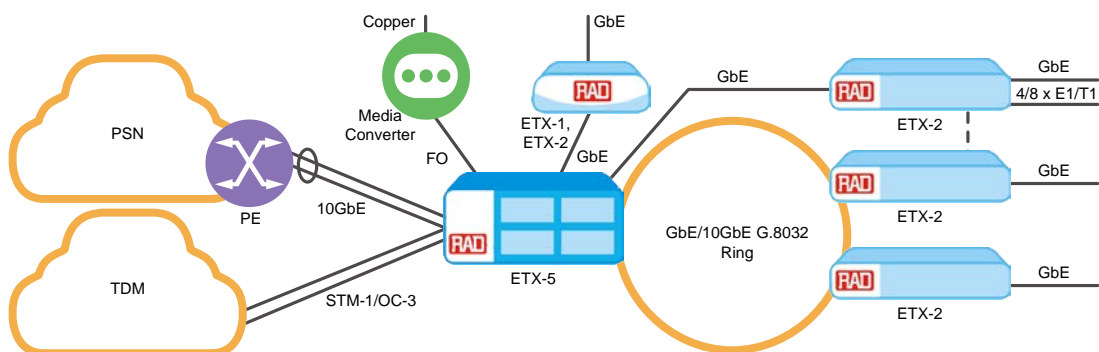


Figure 1. Access Aggregation with SLA-Based Services

ETX-5 supports multiple access topologies (linear, mesh and ring) and services (E-Line, E-LAN, E-Access) with redundancy (LAG, ring). It aggregates Ethernet traffic from a variety of advanced NIDs, featuring hardware OAM and traffic management.

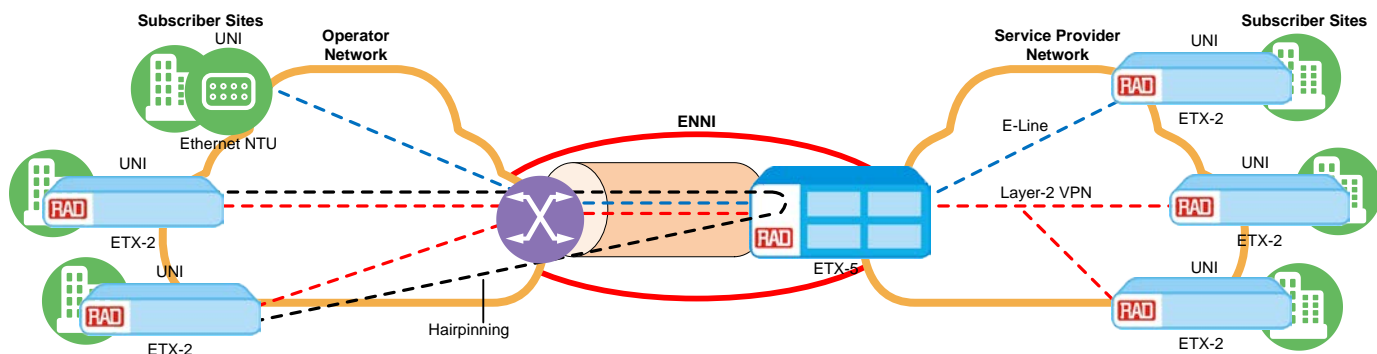


Figure 2. Carrier-to-Carrier Connectivity with SLA Preservation

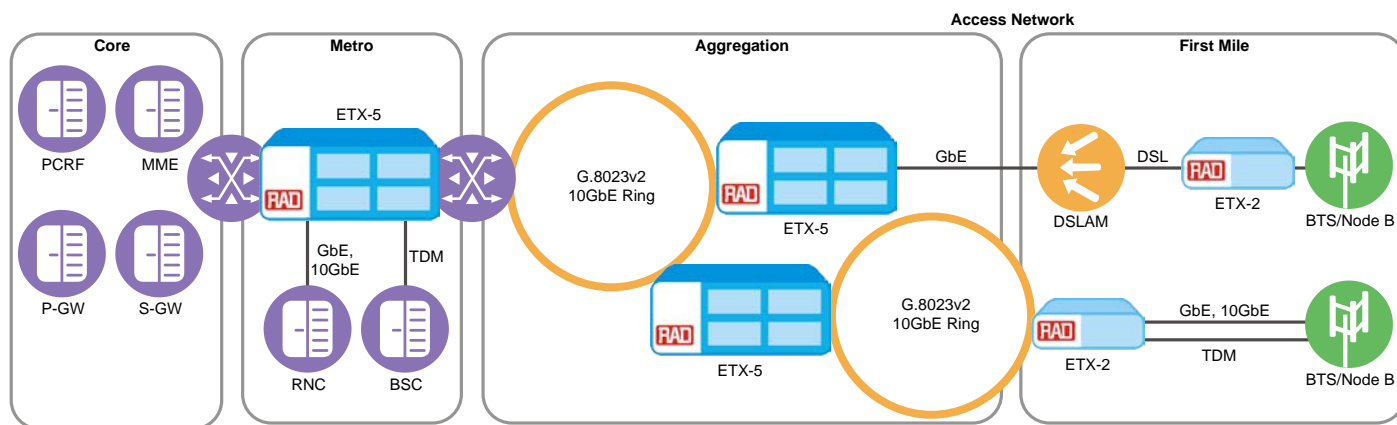


Figure 3. Mobile Backhaul

ETX-5 can be used by fixed and mobile carriers building their own access infrastructure to provide cell-site connectivity. It aggregates base station traffic, serves as an intelligent demarcation device with GbE/10GbE fiber connectivity and allows ring connectivity towards the backhaul.

## TIMING AND SYNCHRONIZATION

Incorporating RAD's SyncToP synchronization over packet and Ethernet physical layer (SyncE), ETX-5 utilizes standard technologies to ensure accurate clock recovery and distribution, with IEEE-1588v2 grandmaster functionality and SyncE support over all Ethernet ports.

## MONITORING AND DIAGNOSTICS

### Performance Management Portal

ETX-5 is integrated into the Performance Management portal, a part of the RADview network management system, enabling real-time monitoring of Ethernet service performance by collecting KPI data from RAD devices.

### Y.1564

Standard service activation tool (Y.1564 generator/responder) is used to assess the configuration and performance of an Ethernet service prior to customer notification and delivery.

## MANAGEMENT AND SECURITY

The device can be managed via RADview, RAD's carrier-class NMS for Windows and Unix. ETX-5 also supports a variety of access protocols, including CLI over Telnet, SNMPv3, and TFTP. Security features include SSH, SNMPv3, RADIUS and TACACS+.

ETX-5 uses the **RADview Service Manager** provisioning system for creating, testing and monitoring networks.

# Specifications

## CAPACITY

### Switching

200 GB half duplex

### MTU

Up to 12 kB

### Classification

According to outer or outer+inner VLAN, P-bit, IP Precedence, DSCP, Ethertype, IP/MAC source/destination address

### VLAN Editing

Inner/outer VLAN editing per VLAN and P-bit

## 10GBE INTERFACES

Four 10GbE on main card, NNI

Two 10GbE on I/O card, UNI/NNI

XFP: 10GBASE-SR, 10GBASE-LR and 10GBASE-ER

## FE/GBE INTERFACES

20 GbE on I/O card, NNI or UNI, SFP or UTP

SFP: 100BaseFx/1000BaseSx/Lx,  
10/100/1000BaseTx

## FE/GBE AND 10GBE SFPs/XFPs

For the list of supported SFP/XFP transceivers, see the [SFP/XFP Compatibility](#) document on the product webpage.

**Note:** It is strongly recommended to order this device with **original** RAD SFPs/XFPs installed. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP/XFP devices. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs.

## SDH/SONET INTERFACES

4 channelized STM-1/OC-3 on I/O card

Compliance: G.783/G.825 (STM-1),  
Telecordia GR-253 core (OC-3), G.707

## NETWORK TOPOLOGY

Linear, ring per G.8032v2 with ladder topology

### Services

E-Line, E-LAN, E-Tree, E-Access

### Compliance

CE2.0, MEF 6, MEF 8, MEF 9,  
MEF 10/10.1/10.2, MEF 11, MEF 14,  
MEF 22, MEF 26

## BRIDGE

### Compliance

802.1D, 802.1Q, 802.1ad (provider bridge)

### Mode

VLAN-aware

## RESILIENCY

Hot-swappable cards

Card- and port-level traffic redundancy

Management sub-system redundancy

Domain clock redundancy

Dual power supply

Replaceable fan tray

### Link Aggregation

LAG with LACP between Ethernet ports on the same or different cards

### G.8032v2 Ring

Up to 16 simultaneous rings between Ethernet ports on the same or different cards

## APS

1+1 unidirectional between TDM ports on the same or different I/O cards

### Ethernet Dual Homing

Up to 8 1:1 bidirectional protection groups

## ROUTER

IP forwarding, static routing

## PSEUDOWIRE

### Payload Encapsulation

CESoPSN, SAToP

### Network Encapsulation

MEF 8, UDP/IP

### Capacity

Up to 252 E1 or 336 T1 TDM PWs per I/O card

## QUALITY OF SERVICE (H-QOS)

### Capacity

3 levels with EVC, tunnel and port-level scheduling and shaping

8 × CoS per EVC scheduling and shaping elements

### CoS Mapping

Per flow, P-bit, DSCP, IP precedence

### Congestion Avoidance

WRED per queue

### Shapers

Single- and dual-rate

### Policers

Dual-rate three color-aware policer on ingress flows with up to 10 Gbps rate

## OAM

### Type

Hardware-based, per EVC and EVC.CoS

### Compliance

IEEE-802.1ag, ITU-TY.1731

## TIMING

### Synchronous Ethernet

G.8261, G.8263, G.781

### 1588v2 PTP

Ordinary clock grandmaster or slave

E2E, one-step transparent clock (TC)

Phase and frequency synchronization

TOD interface

1 PPS, 10 MHz signal

## Ethernet Service Aggregation Platform

**Clock Sources**

## Domain:

Synchronous Ethernet  
1588v2 packets  
BITS (2.048 MHz, 1.544 MHz)  
TOD interface (10 MHz)  
STM-1/OC-3

## E1/T1:

Tx clock derived from internal E1/T1  
Adaptive, recovered from TDM PW

**Domain Clock Resiliency**

Redundant clock sources per main card:

- 1588v2 grandmaster and slave
- GPS interface (1PPS/10 MHz/TOD)
- BITS

**Compliance**

GR-253-CORE (SONET), GR-1244-CORE (Stratum 3), ITU-G813 Option 1/2 (SDH Equipment Clock)

**MANAGEMENT****Ethernet Management Port**

Type: 10/100/1000BaseT

Connector: RJ-45

**Control Port**

Interface: V.24/RS-232 DCE

Connector: 9-pin D-type, female

**Management Options**

Command line interface with password protected access, authorization levels

Telnet/SSH, SNMPv2/v3, RADview, SFTP  
RADIUS, TACACS+, management ACL

**DIAGNOSTICS****Alarms**

Hard-coded alarm severity, masking

**Y.1564**

Verification of Ethernet service configuration and delivery

**Digital Diagnostics Monitoring SFPs**

SFF-8472-compatible SFPs, excluding external calibration

**General****Physical**

Height: 133 mm (5.2 in)  
Width: 440 mm (17.3 in)  
Depth: 380 mm (15 in), DC version  
Depth: 455 mm (23.6 in), AC version  
Weight: 8.9 kg (19.6 lb)

**Power**

AC: 100 to 240 VAC (115/230 VAC nominal), 50/60 Hz

DC: 40–72 VDC (48 or 60 VDC nominal)

**Power Consumption**

Up to 500W (fully populated chassis)

**Environment**

Temperature:

Operating: 0 to 50°C (32 to 122°F)

Storage: -20 to +70°C (0 to 150°F)

Humidity: Up to 93%, non-condensing

Cooling: Replaceable fan tray

**Ordering**

ETX-5 must be ordered with the RADcare BasicPlus Service Package (minimum 1 year) and the RADcare Professional Service Package.

In the USA and Canada, ETX-5 must be ordered with the RADcare Project Assurance Package only.

**RECOMMENDED CONFIGURATIONS****Chassis****ETX-5300A/AC**

Chassis with fan unit, AC power supply and AC power inlet

**ETX-5300A/ACDC**

Chassis with fan unit, AC and DC power supplies, AC and DC power inlets

**ETX-5300A/ACR**

Chassis with fan unit, two AC power supplies and two AC power inlets

**ETX-5300A/DC**

Chassis with fan unit, DC power supply and DC power inlet

**ETX-5300A/DCR**

Chassis with fan unit, two DC power supplies and two DC power inlets

**Main and I/O Cards****ETX-5300A-MC/4 XFP/AT**

Main card with four 10GbE ports, XFP slots, advanced timing capabilities

**ETX-5300A-ETH/20XGE/SFP**

GbE card with 20 GbE ports, SFP slots

**ETX-5300A-ETH/20XGE/UTP**

GbE card with 20 GbE ports, UTP

**ETX-5300A-ETH/2X10GE/XFP**

10GbE card with two 10GbE ports, XFP slots

**ETX-5300A-MS/CH/S4**

SDH/SONET card with four channelized STM-1/OC-3 ports, SFP slots

**Service Cards****ETX-5300A-FAN**

Fan unit

**ETX-5300A-PS/AC**

AC power supply

**ETX-5300A-PS/DC**

DC power supply

**ETX-5300A-PSI**

AC power inlet

**SPECIAL CONFIGURATIONS**

Contact your local RAD partner for additional configuration options

**SUPPLIED ACCESSORIES****RM-ETX-5300-3U-19-FRONT**

Hardware kit for front-edge mounting of ETX-5 into a 19" rack

**RM-ETX-5300-AC-3U-19-FRONT**

Hardware kit for front-edge mounting and rear-end fastening of ETX-5 in a 19" rack

**OPTIONAL ACCESSORIES****RM-ETX-5300-3U-23-FRONT**

Hardware kit for front-edge mounting of ETX-5 into a 23" rack

**RM-ETX-5300-3U-23-FRAME**

Hardware kit for mid-chassis mounting of ETX-5 into a 23" rack

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