

# ETX-5

## Ethernet Service Aggregation Platform



- Feature-rich CE2.0-certified aggregation platform, the cornerstone of RAD's 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 the 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 of all packet sizes. It is designed for high availability and "Always-On Service".

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

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.

ETX-5 is available as a NEBS-compliant (DC only) chassis intended for street-cabinet and cellular-tower installation.



## TIMING AND SYNCHRONIZATION

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

## MONITORING AND DIAGNOSTICS

### Performance Management Portal

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

### Y.1564

A 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

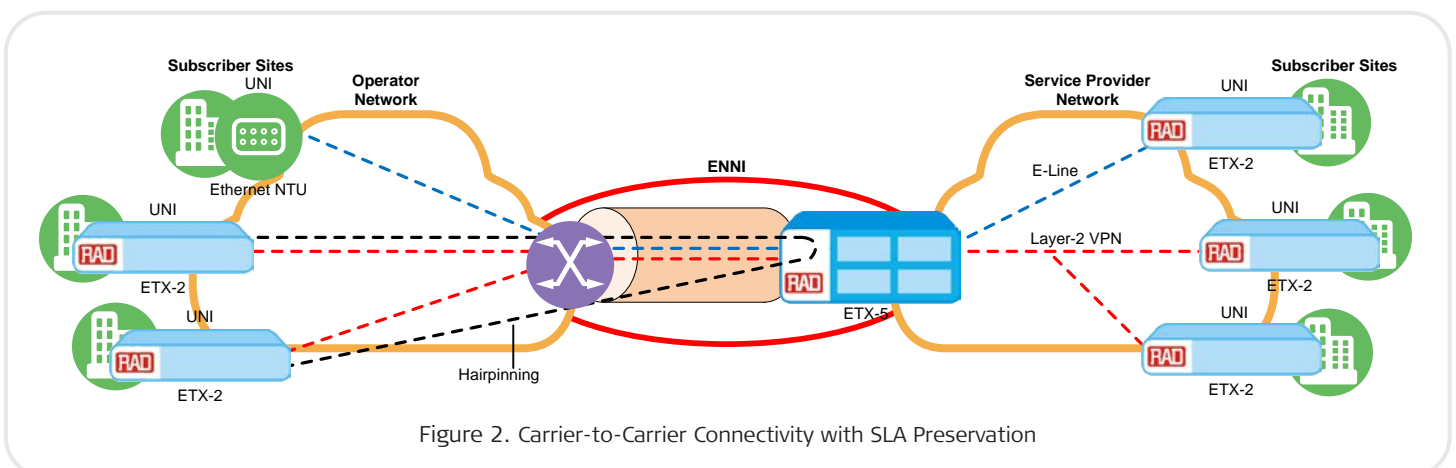


Figure 2. Carrier-to-Carrier Connectivity with SLA Preservation

# ETX-5

## Ethernet Service Aggregation Platform

### 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

#### Spanning Tree Protocols

Up to 32 RSTP/MSTP instances per chassis

### 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

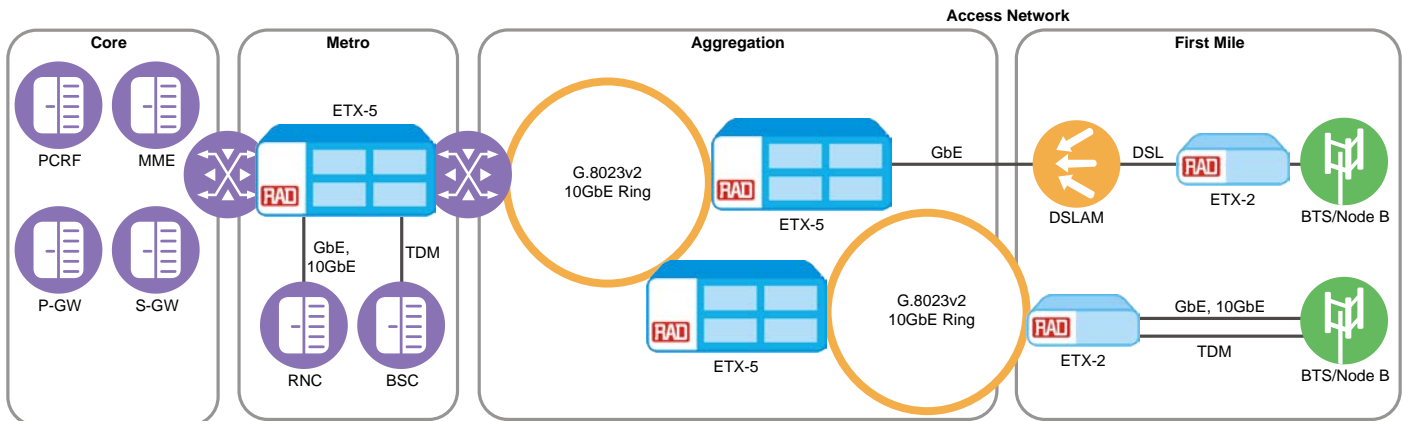


Figure 3. Mobile Backhaul

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.

**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 CFM****Type**

Hardware-based, per EVC and EVC.CoS

**Compliance**

IEEE-802.1ag, ITU-TY.1731

**OAM EFM****Type**

Active, passive

**Functions**

Discovery, event notification, loopback control

**Compliance**

IEEE 802.3ah

**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

**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)

# ETX-5

## Ethernet Service Aggregation Platform

### 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

### 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

Protection or load-balancing LAG with LACP between Ethernet ports on the same or different cards as per IEEE 802.3-2005, and 802.1ax requirements

#### 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

### DIAGNOSTICS

#### Alarms

Hard-coded alarm severity, masking

#### ITU Y.1564

Verification of Ethernet service configuration and delivery

#### Digital Diagnostics Monitoring SFPs

SFF-8472-compatible SFPs, excluding external calibration

### GENERAL

#### Physical

Regular chassis:  
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: 12 kg (26.4 lb), maximum

NEBS-compliant chassis:  
Height: 132.5 mm (5.2 in)  
Width: 541.6 mm (21.3 in)  
Depth: 385.2 mm (15.1 in)  
Weight: 20 kg (44 lb), maximum

#### 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

##### ETX-5300A/NB/DC

NEBS-compliant chassis with fan unit, DC power supply and DC power inlet

##### ETX-5300A/NB/DCR

NEBS-compliant chassis with fan unit, two DC power supplies and two DC power inlets

**Notes:** NEBS-compliant chassis must be ordered with air filter (ETX-5300A-AF), see the Service Card section below.

#### 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-FAN/NB

NEBS-compliant fan unit

##### ETX-5300A-PS/AC

AC power supply

##### ETX-5300A-PS/DC

DC power supply

##### ETX-5300A-PSI

AC power inlet

##### ETX-5300A-AF

Air filter, required for NEBS-complaint chassis

### SPECIAL CONFIGURATIONS

Contact your local RAD partner for additional configuration options.

## ETX-5

### Ethernet Service Aggregation Platform

#### 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

**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](http://www.rad.com)

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