

100G EADs

ETX-2i-100G

Business Access and Cell Site Gateway



- 100G Ethernet demarcation device built for mobile 4G/5G xHAUL service delivery
- High density 25GbE and 10GbE ports for flexible mobile RU site connectivity, and network interface operating at 100G, 40G, 10G or 25G rates
- Superior precise timing synchronization, complying with IEEE Class C and supporting SyncE
- Advanced TM with HQoS and dedicated fast lanes for latency sensitive special business and fronthaul traffic
- Ready for CPRI/eCPRI RoE mapping
- Small footprint (1 RU, 19 inch) and low-power consumption solution addressing today's key network challenges

The global proliferation of mobile, video, and cloud applications creates an increasing demand for high-bandwidth access, generating new opportunities for communication service providers.

ETX-2i-100G offers best in class traffic management capabilities, including advanced classification engine, VLAN manipulation, and sophisticated service shaping for full flexibility and control over traffic flows. ETX-2i-100G supports hierarchical QoS, thus enabling delivery of multiple prioritized service types along with best effort services, while efficiently utilizing available network bandwidth. ETX-2i-100G can forward delay sensitive mobile fronthaul (eCPRI) traffic flows, using dedicated "fast-lanes" for guaranteed low latency. (Details on ETX-2i 1G devices and ETX-2i 10G devices can be found in dedicated data sheets.)

ETX-2i-100G provides MEF 10.3 color-aware and unaware policers, delivering high-scale multi-CoS services with hierarchical Quality of Service (HQoS). It supports advanced scheduling, WRED per CoS, shaping per EVC and per port, with flexible classification rules and access lists.

ETX-2i-100G can be configured to forward or discard Layer-2 control frames (including other vendors' L2CP frames).

MARKET SEGMENTS AND APPLICATIONS

Incorporating a complete set of Carrier Ethernet service tools, ETX-2i-100G is ideal for carriers, service providers, municipalities, wholesale providers, and mobile operators seeking to offer unified SLA-based Ethernet business services, such as E-Line (EVL, EVPL), E-LAN (EPLAN, EVPLAN), E-Tree (EP-TREE, EVP-TREE),

Access E-Line, and Transit E-Line services certified with MEF 3.0 and CE 2.0.

ETX-2i-100G enables operators to deliver service level guarantees, by supporting multi-layer diagnostics, fine-grained SLA enforcement, and accurate performance monitoring. Built-in service activation testers verify end-to-end network performance.

INTEROPERABILITY

ETX-2i-100G features and services are standard-based and should work with any 3rd party equipment using standard based features and services.

NETWORK TOPOLOGIES

ETX-2i-100G supports several network topologies such as linear, daisy chain, and self-healing rings (G.8032v2), working with ETX-5 or any third-party standard-compliant Ethernet device.

SERVICES

ETX-2i-100G is capable of delivering up to 100 GbE services using a mix of 10GbE and 100GbE interfaces, while offering CE 2.0/MEF 3.0-certified service models, service monitoring, flexibility, and manageability.

ETX-2i-100G addresses the need to deliver flexible, high-bandwidth Ethernet services for deployment of 4G and 5G cell sites. It can aggregate multiple 4G and 5G RU (eCPRI, O-RAN) service flows over the network interface, creating a cost effective, hybrid fronthaul and backhaul delivery solution.

RESILIENCY

ETX-2i-100G offers fast protection for virtually any kind of failure, in any linear, ring, or dual-homing topology. The device employs IEEE 802.3ad link aggregation, which can be 1:1 LAG and load-balancing LAG, with or without LACP (Link Aggregation Control Protocol), ITU-T G.8032v2 Ethernet ring protection, and ITU-T G.8031 Ethernet linear protection, to ensure continuous availability and sub-50 ms restoration in the event of network outage.



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TIMING AND SYNCHRONIZATION

ETX-2i-100G incorporates RAD's advanced synchronization and timing over packet feature set to support mobile heterogeneous network 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 GNSS receiver and 1588v2 GM, ETX-2i-100G allows a Distributed Grandmaster timing design solution, offering mobile operators to cost-effectively provide reliable frequency and phase accuracy.

The device also supports 1588v2 slave clock, boundary clock (BC), and transparent clock (TC), as well as dual master operating simultaneously in G.8265.1 and G.8275.1 modes.

The device is ready for Enhanced SyncE (eSyncE) and 1588v2 BC Class C.

MONITORING AND DIAGNOSTICS

Featuring multi-layer OAM and PM tools, ETX-2i-100G performs hardware-based monitoring and diagnostics at high scale and with 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 to quickly detect connectivity failures for robust protection. Layer-2 and 3 loopbacks offer flexible diagnostic tools.

RFC-5357 TWAMP Light delivers the same functionality over Layer-3 networks, as do one-way TWAMP and two-way ICMP Echo with counters for loss, delay, fragmented packets, reorders, and duplication, in addition to configurable test packet size. Multiple VRFs support the robust TWAMP setup.

ETX-2i-100G offers service activation tools with multiple Y.1564 and L3 SAT testers.

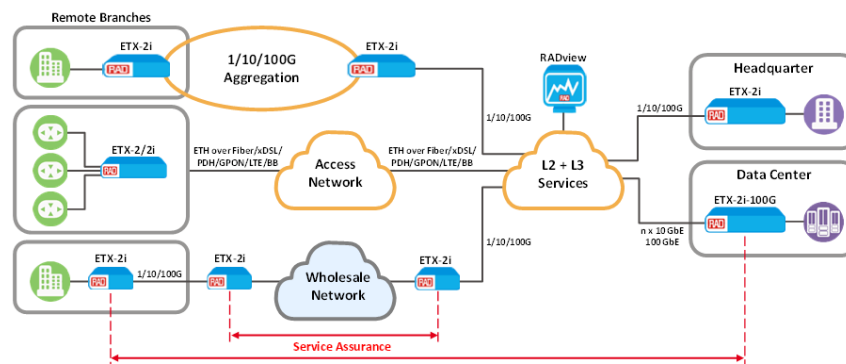
SDN READY MANAGEMENT AND CONTROL

ETX-2i-100G leverages RAD's field-proven, carrier grade operating system, integrated in the entire ETX-2/2i family, to provide a familiar and uniform interface for provisioning, administration, and maintenance operations.

ETX-2i-100G can be managed using RADview, RAD's carrier-class NMS, or any SNMP-based management system. The device supports a variety of access protocols, including CLI over Telnet, SNMPv3, and TFTP, with a comprehensive security suite including SNMPv3, RADIUS, TACACS+, SSH, SFTP, and flexible Access Control Lists.

ETX-2i-100G implements RAD's unique ZT process, allowing devices to onboard automatically and securely without human intervention, reducing operational costs and enabling operators to provision services easily and reliably.

ETX-2i-100G is delivered ready for SDN transformation with comprehensive support for the NETCONF/YANG protocol, enabling operators to utilize modern network service orchestrators on a general level...



ETX-2i-100G Demarcation and Aggregation

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Specifications

ETHERNET INTERFACE PORTS

100G/4Q	4 QSFP28 100GbE
	16 SFP+ 1/10GbE or 8 SFP+ 1/10GbE and 8 SFP28 10/25GbE

Note: It is strongly recommended to order this device with **original** RAD transceivers. RAD cannot guarantee full compliance to product specifications for units using non-RAD transceivers. For full details on SFP/SFP+/QSFP28/QSFP+ transceivers, see the [Pluggable Transceivers data sheet](#).

BRIDGE

Compliance	802.1D, 802.1Q, 802.1ad
Frame Size (max)	9600 bytes
Mode	VLAN-aware, VLAN-unaware
VLAN Editing	Inner/outer VLAN editing per VLAN and p-bit values

NETWORKING CAPABILITIES

Flow Classification Rules	Outer VLAN or outer + inner VLAN PCP TOS/DSCP EtherType IP/MAC source/destination address
Layer-2 Forwarding	Jumbo frame support
Policing	Color aware/unaware dual token bucket with user-configurable CIR + CBS and EIR + EBS 2-rate/3-color policing per EVC.CoS Bandwidth policing per MEF 10.3 Hierarchical envelope policer per MEF 10.3 MultiCoS EVCs per MEF 10.3 Large flow policing (Fat pipe) - ETX-2i-100G/4Q, ETX-2i-100G/40G user ports
Scheduling	8 × CoS per EVC scheduling elements Strict Priority (SP) and Weighted Fair Queue (WFQ)
Services	Ethernet E-LAN, E-Line, E-Tree MEF CE2.0 compliant Layer-2 services with available bandwidth
Shaping	Per port Per EVC Per EVC.CoS

DIAGNOSTICS

Alarm relay (optional)	Type: Dry contacts with three "in" Connector: Terminal block, 9-pin
Connectivity Fault Management (CFM)	Per IEEE 802.1ag
Counters	RMON2 port-level counters
Delay and Loss Measurements	Per MEF 36
EFM Link-fault OAM	Per IEEE 802.3ah
ICMP Echo	Over L2 and L3 services Tests IP connectivity (PING)
KPI Measurements	Accurate one-way KPI measurements
Limiting Multicast Traffic Flooding	DHCP and MLDv2 snooping
Link-Level OAM	Per IEEE 802.3-2005
LLDP Discovery	Per IEEE 802.1AB
Loop Prevention	Using MSTP and RSTP
Loopback Tests	Non-disruptive loopback per flow, with MAC/IP address swap Loopbacks at Ethernet port level On-demand Layer-2 and 3 loopbacks
Service Activation Tests	RFC-2544: 8 built-in wirespeed testers ITU-T Y.1564: 8 built-in wirespeed testers
Service Utilization and Performance Monitoring	Per ITU-T Y.1731.2012, including synthetic loss measurement
TWAMP	RFC 5618 TWAMP responder and receiver TWAMP sender RFC 5357 TWAMP – Light generator and responder (SW license) ITU-T Y.1731 PM (SLM; DM)

RESILIENCY

Dual Homing	Dual homed link redundancy
Ethernet Path Protection	G.8031 linear 1:1 protection
Ethernet Ring	G.8032v2 rings with sub 50 ms protection for Ethernet traffic
Link Aggregation	Load balancing LAG with up to 4 ports in a LAG group (on 10G ports)

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MANAGEMENT AND SECURITY

Management Options	Local management via LAN port or serial port Remote management via in-band VLAN
Plug and Play Zero Touch Provisioning	DHCP auto-configuration XML configuration files download via TFTP/SCP Configuration backup and restore
Protocols and Security	Password-protected access Authorization levels SSH (Secure CLI) Telnet SNMPv3 SFTP NETCONF/YANG management interface Dual Stack IPv4 and IPv6 RADIUS or TACACS+ authentication Access Control List (ACL)

Control Port

Interface	V.24/RS-232 DCE Optional native USB on ETX-2i-100G/4Q
Connector	Micro USB
Format	Asynchronous
Data Rate	9.6, 19.2, or 115.2 kbps

Ethernet Management Port

Type	10/100BASE-T
Connector	RJ-45

PHYSICAL

Height	44 mm (1.7 inch)
Width	440 mm (17.3 inch)
Depth	377.5 mm (14.2 inch)
Weight	7.35 kg (16.2 lb) – when using 2 power supplies 6.58 kg (14.5 lb) – when using 1 power supply

ENVIRONMENTAL

Storage Temperature	-40 to 85°C (-40 to 185°F)
Operating Temperature	Regular: 0 to 50°C (32 to 122°F) Hardened: -20 to 65°C (-4 to 149°F)
Humidity	5% to 90%, non-condensing
Fans	8 (simultaneous fan operation; automatic fan level control)
Airflow	Front to back airflow

POWER

Power Supply	Hot swappable, redundant AC or DC PS AC: 100-240 VAC nominal (±10%), 2.5A/1A, 50/60 Hz DC: 48 VDC (40-60 VDC), 5A
Power Consumption	200-250W (maximum) 120W (average) 100W (minimum) ~410 BTU/h (heat generated per hour in British Thermal Units (BTU)) Up to 5.5W per QSFP28 slot; 2W per SFPP slot (at working temp. 0-50°C)

TIMING AND SYNCHRONIZATION

Synchronous Ethernet (eSyncE ready)	ITU-T G.8261-G.8264
1588v2	Slave clock Boundary clock (Class C ready) Dual master operating simultaneously in G.8265.1 and G.8275.1 modes Transparent clock (TC) Phase and frequency synchronization
PTP ports	ToD/1PPS (RJ-45) External clock (CONN.COAX SMA) 1PPS (CONN.COAX SMA) 2M (SMA)
Station clock	Type: Balanced E1, unbalanced E1 (via adapter) Connector: RJ-45
GNSS	Connector: SMA (HW ready)

STANDARDS COMPLIANCE

CE	CE 2.0
MEF 3.0	E-Access: Access EPL, Access EVPL E-LAN: EP-LAN, EVP-LAN E-LINE: EPL, EVPL E-Tree: EP-Tree, EVP-Tree
MEF 6	E-Line: EPL and EVPL E-LAN: EPLAN and EVPLAN
MEF	MEF 9, MEF10, MEF 14, MEF 20, MEF 36, MEF 46
IEEE	802.3, 802.3u, 802.1D, 802.1Q, 802.1p, 802.3ad, 802.3-2005, 802.1ax, 802.1ag
ITU-T	Y.1731, G.8031, G.8262, G.8265, RFC-2544, Y.1564

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Ordering

The information below represents examples of supported configurations. For additional configuration options, please contact your local RAD partner.

ETX-2i-100G SOFTWARE

ETX-2-SW TWAMP

License to activate and operate TWAMP related functionalities in ETX-2i-100G

ETX-2i-100G HARDWARE

(See **Ordering Options** below for options explanations.)

ETX-2i-100G/ACRF/4Q/16SFPP/PTP*

ETX-2i-100G/ACRF/4Q/16SFPP/G*

ETX-2i-100G/DCRF/4Q/16SFPP/PTP*

ETX-2i-100G/DCRF/4Q/16SFPP/G*

ETX-2i-100G/ACRF/4Q/16SFPP

ETX-2i-100G/DCRF/4Q/16SFPP

ORDERING OPTIONS

Some options are not supported by all models. Some option combinations are invalid or may require a minimum order. To determine the BOM for your application, please contact your local RAD partner.

Ethernet Network or User Port	4Q	4 QSFP28 100GbE ports
Ethernet User Port	16SFPP	16 SFPP 1/10GbE ports
Power Supply	ACF	Front access AC power supply
	ACRF	Front access redundant AC power supply
	DCF	Front access 48V DC power supply
	DCRF	Front access redundant DC power supply
Special Options	Default	No special option
	DRC	Dry contacts

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Temperature Range	Default	Regular
	H	Temperature hardened
Timing Options	Default	No timing
	G	Integrated GPS, Sync-E
	PTP	1588v2 timing and Sync-E

SUPPLIED ACCESSORIES

AC power cord (for AC models)

DC power cord (for DC models)

RM-50/19

HW kit for mounting ETX-2i-100G in a 19-inch rack (flat installation)

OPTIONAL ACCESSORIES

CBL-UUSB-DB9F

Serial/RS-232 Micro USB cable to connect the ETX-2i-100G/4Q, ETX-2i-100G/40G to a serial port

ETX-2i-100G-PS/!

100G power supply

!	Power Supply	
	ACF	Front access single AC power supply
	DCF	Front access single 48V DC power supply

RM-50/19/A

Hardware kit for mounting ETX-2i-100G 100mm deep into a 19-inch rack

Note: RM-50/19/A can also be used for flat installation

RM-50/23

Hardware kit for mounting ETX-2i-100G into a 23-inch rack

RM-50/23F

Hardware kit for mounting ETX-2i-100G into a 23-inch frame

**Future availability*

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