Product page >

Data Sheet

General Availability

ETS-1-10G

Ethernet Access Switches

- L2+ switches
- Stacking support
- Multicast support (IGMP Snooping, MVR)
- Advanced security (with multi-layer ACL, IP Source Guard, and Dynamic ARP Inspection)

MARKET SEGMENTS AND APPLICATIONS

New generation access switches provide end users connectivity to large-scale corporate networks, small and medium business networks, and service provider networks, using 1G/10G interfaces.

The switches support physical stacking, VLANs, multicast groups, and advanced security.

ETHERNET INTERFACE

Head-of-line blocking (HOL) protection

Back pressure

Auto MDI/MDIX

Jumbo frames

Flow control (IEEE 802.3X)

Port mirroring

Stacking

LAYER 2

VLAN

Voice VLAN

802.1Q

Q-in-Q

Selective Q-in-Q

GVRP

L2 Multicast

Multicast profiles

Static Multicast groups

IGMP Snooping v1,2,3

Port/host-based IGMP Snooping Fast Leave

IGMP proxy-report (for PoE options)

IGMP authorization via RADIUS

MLD Snooping v1,2

IGMP querier

MVR

MAC Table

Independent learning mode per VLAN

MAC Multicast Support

Configurable aging time of MAC addresses

Static MAC Entries

MAC Flapping logging

ROUTING

Static IP routes

Dynamic routing protocols RIPv2, OSPFv2, OSPFv3, BGP (requires license, see Ordering)

Address Resolution Protocol (ARP)

VRRP

PIM SM, PIM DM, IGMP Proxy

ECMP Load Balancing

IP Unnumbered

RESILIENCY

Link aggregation

Static LAG

Dynamic LAG (LACP)

LAG Balancing Algorithm

L2PT over LAG

L2 Protection

STP (Spanning Tree Protocol, IEEE 802.1d)

RSTP (Rapid Spanning Tree protocol, IEEE 802.1w)

MSTP (Multiple Spanning Tree, IEEE802.1s)

STP Multiprocess

RAD

Your Network's Edge®

PVSTP+
Spanning Tree Fast Link option
STP Root Guard
STP Loop Guard
BPDU Filtering
STP BPDU Guard
VLAN-based Loopback Detection (LBD)
ERPS (G.8032v2)
Private VLAN
Layer 2 Protocol Tunneling

MANAGEMENT

Download and upload of configuration file via HTTP/TFTP/SCP
Redirecting output of CLI commands to an arbitrary file on ROM
SNMPv3
Command Line Interface (CLI)
Web interface
Syslog
SNTP (Simple Network Time Protocol)
Traceroute
LLDP (802.1ab) + LLDP MED
Access control – privilege levels
Management interface blocking
Local authentication
IP addresses filtering for SNMP
RADIUS, TACACS+ clients
SSH server
SSL
Macro commands
CLI commands logging
System log
PPPoE Circuit-ID tag
Flash File System
Debugging commands
Rate limit of traffic to CPU
Password encryption
Password recovery
Ping (IPv4/IPv6 support)
DNS server and client

DHCP

DHCP snooping
DHCP clients filtering
DHCP autoprovision
DHCP relay (IPv4 support)
DHCP Relay Option 82

IPv6

IPv6 Host
Dual-stack

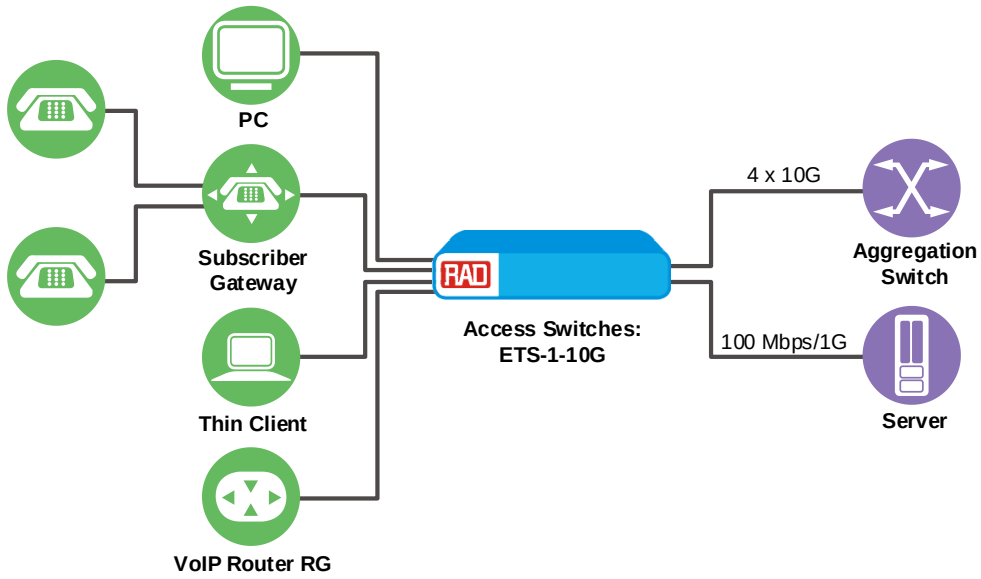

Figure 1. ETS-1-10G Ethernet Access Switches Use Case

SECURITY

IP Source Guard

Dynamic ARP Inspection

sFLow

MAC-based authentication, Port Security, Static MAC entries

Port-based authentication IEEE 802.1x

DoS attack prevention

Traffic segmentation

Protection against non-authorized DHCP servers

BPDU attacks prevention

NetBIOS/NetBEUI filtering

PPPoE Intermediate Agent

ACL (Access Control Lists)

L2-L3-L4 ACL

Time-Based ACL

IPv6 ACL

ARP ACL over GRE tunnel

ACL based on:

- Physical port number
- IEEE 802.1p
- VLAN ID
- EtherType
- DSCP
- Protocol type
- TCP/UDP port number
- User Defined Bytes

COMPLIANCE

EMC: EN 55032: 2015, EN 55035, EN 61000-3-2, EN 61000-3-3

Safety: EN 62368-1

Quality of Service (QoS) and rate limiting

QoS statistics

Shaping, policing

IEEE 802.1p Class of Service (CoS)

Storm Control

Bandwidth management

Scheduling algorithms: Strict Priority/Weighted Round Robin (WRR)

ACL-based traffic classification

Setting the IEEE 802.1p priority for management VLAN

DSCP to CoS/CoS to DSCP remarking

ACL-based VLAN assignment

802.1p, DSCP mark assignment for IGMP

MONITORING AND DIAGNOSTICS

Statistics on interfaces

RMON/SMON

CPU utilization monitoring per task and per traffic type

Temperature monitoring

TCAM utilization monitoring

RAM utilization monitoring

Virtual Cable Testing (VCT)

Optical transceiver diagnostics

Green Ethernet

OAM/CFM

802.3ah Ethernet Link OAM

Dying Gasp

802.3ah Unidirectional Link Detection (UDLD)

802.1ag Connectivity Fault Management (CFM)

Table 1. Technical Features – ETS-1-10G Devices with Internal Power Supply

Specification	ETS-1-10G/ 4SP/24U	ETS-1-10G/4SP/ 4CMB/20S/DC ETS-1-10G/4SP/ 4CMB/20S/12V/AC	ETS-1-10G/ 4SP/48S/AC	ETS-1-10G/ 4SP/24P	ETS-1-10G/ 4SP/48P	ETS-1-10G/4SP/ 48U/12V/AC
Packet Processor	Marvell 98DX3236-A1 (AlleyCat3)					
	Interfaces					
10/100/1000BASE-T (RJ-45)	24	-	48	-	-	48
10/100/1000BASE-T (RJ-45) PoE/PoE+	-	-	-	24	48	-
1000BASE-X/100BASE-FX (SFP)	-	20	-	-	-	-
10/100/1000BASE-T/1000BASE- X/100BASE-FX Combo	-	4	-	-	-	-
10GBASE-R (SFP+)/1000BASE-X (SFP)	4	4	4	4	4	4
Console port	RS-232/RJ-45					
	Performance					
Bandwidth	128 Gbps					176 Gbps
Throughput for 64 bytes	92.1 MPPS	92.1 MPPS	130.9 MPPS	93.1 MPPS	130.9 MPPS	130.9 MPPS
Buffer memory	12 Mbit	12 Mbit	24 Mbit	12 Mbit	24 Mbit	24 Mbit
RAM (DDR3)	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB
ROM (RAW NAND)	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB
MAC table	16K	16K	16K	16K	16K	16K
VLAN table	4K	4K	4K	4K	4K	4K
L2 Multicast groups	2K	2K	2K	2K	2K	2K
Quality of Service (QoS)	8 egress queues per port					
TCAM	For routing: 1024 x IPv4 For traffic processing: 1024 x 24B					
ARP table	1K					
L3 IPv4 routes	818					
L3 IPv6 routes	210					
L3 IPv4 Mutlicast (IGMP Proxy, PIM)	412					
L3 IPv6 Mutlicast (IGMP Proxy, PIM)	103					
Link Aggregation Groups (LAG)	16, up to 8 ports per LAG					
Maximum size of ECMP groups	8					
Jumbo frame size	10240 bytes					
Stacking	8 devices					

Table 2. Technical Features – ETS-1-10G with Dual Hot Swappable Power Supplies

Specification	ETS-1-10G/4SP/ 4CMB/20S	ETS-1-10G/4SP/ 4CMB/20U	ETS-1-10G/4SP/ 4CMB/4S	ETS-1-10G/4SP/ 48U	ETS-1-10G/4SP/ 48S
Packet Processor	Marvell 2x98DX3336-A1 (PonCat3)				
Interfaces					
10/100/1000BASE-T (RJ-45)	-	20		48	
10/100/1000BASE-T (RJ-45) PoE/PoE+	-				
1000BASE-X/100BASE-FX (SFP)	20		4		48
10/100/1000BASE-T/1000BASE-X/100BASE-FX Combo	4	4	4	-	-
10GBASE-R (SFP+)/1000BASE-X (SFP)	4	4	4	4	4
Console port	RS-232/RJ-45				
Performance					
Bandwidth	128 Gbps	128 Gbps	96 Gbps	176 Gbps	
Throughput for 64 bytes	95 MPPS	95 MPPS	71 MPPS	130.9 MPPS	
Buffer memory	12 Mbit			24 Mbit	
RAM (DDR3)	512 MB			512 MB	
ROM (RAW NAND)	512 MB			512 MB	
MAC table	16K			16K	
VLAN table	4K				
L2 Multicast groups	4K				
Quality of Service (QoS)	8 egress queues per port				
TCAM	For routing: 1024 x IPv4 For traffic processing: 1024 x 24B			For routing: 13K For traffic processing: 3Kx24B	
ARP table	4K				
L3 IPv4 routes	12866				
L3 IPv6 routes	3222				
L3 IPv4 Mutlicast (IGMP Proxy, PIM)	4024				
L3 IPv6 Mutlicast (IGMP Proxy, PIM)	1006				
Link Aggregation Groups (LAG)	16, up to 8 ports per LAG				
Maximum size of ECMP groups	8				
Jumbo frame size	10240 bytes				
Stacking	8 devices				

Table 3. Power, Physical, and Environmental Specifications – ETS-1-10G with Internal Power Supply

Specification	ETS-1-10G/ 4SP/24U	ETS-1-10G/4SP/ 4CMB/20S/DC	ETS-1-10G/4SP/ 4CMB/20S/12V/AC	ETS-1-10G/ 4SP/48S/AC	ETS-1-10G/ 4SP/24P	ETS-1-10G/ 4SP/48P	ETS-1-10G/ 4SP/48U/12V/AC
Maximum power consumption	25W	35W	45W	85W	410W	1600W	85W
Power supply	110 – 264 VAC, 50 Hz or 36 – 72 VDC	36 VDC – 72 VDC	176 – 264 VAC, 50 Hz or 12 VDC	110 – 264 VAC, 50 Hz	176 – 264 VAC, 50 Hz or 36 – 72 VDC	100 – 240 VAC, 50 Hz (up to 2 hot-swappable power supplies)	100 – 240 VAC, 50 Hz or 12 VDC
PoE budget	-	-	-	-	380W	1440W (dual PS) 720W (single PS)	
Operating temperature	-10 to 45°C (14 to 113°F)					-40 to 60°C (-40 to 140°F)	-10 to 45°C (14 to 113°F)
Storage temperature	-40 to 70°C (-40 to 158°F)						
International Protection Code	IP 20 Grade						
Operating humidity	Up to 95% non-condensing						
Cooling	Passive	4 fans	4 fans	4 fans	2 fans	4 fans	4 fans
Form factor	19", 1U						
Dimensions W x D x H mm (in)	430 x 158 x 44 (17 x 6.2 x 1.7)	430 x 243 x 44 (17 x 9.6 x 1.7)	430 x 243 x 44 (17 x 9.6 x 1.7)	440 x 280 x 44 (17 x 11 x 1.7)	440 x 203 x 44 (17 x 7.9 x 1.7)	440 x 490 x 44 (17 x 19 x 1.7)	440 x 280 x 44 (17 x 11 x 1.7)
Weight	2.7	4.15	4.15	6.31	16.3	3.62	3.85

Table 4. Power, Physical, and Environmental Specifications – ETS-1-10G with Dual Hot Swappable Power Supplies

Specification	ETS-1-10G/4SP/4CMB/4S	ETS-1-10G/4SP/ 4CMB/20U	ETS-1-10G/4SP/ 4CMB/20S	ETS-1-10G/4SP/48U	ETS-1-10G/4SP/48S
Maximum power consumption	25W	35W	45W	45W	55W
Power supply	Hot Swappable Power Supplies, see Optional Accessories (ordered separately)				
PoE budget	-	-	-	-	-
Operating temperature	-10 to 45°C (14 to 113°F)	-10 to 55°C (14 to 131°F)		-10 to 45°C (14 to 113°F)	
Storage temperature	-40 to 70°C (-40 to 158°F)				
Operating humidity	Up to 95% non-condensing				
Cooling	2 fans	4 fans	4 fans	2 fans	4 fans
Form factor	19", 1U				
Dimensions W x D x H mm (in)	430 x 275 x 44 (17 x 10.8 x 1.7)			440x316x44 (17 x 12.4 x 1.4)	
Weight (kg)	3.15	3.25	3.50	3.95	4.0

Ordering

ETS-1-10G/4SP/24U/AC
L2+ Ethernet switch, 24 ports of 10/100/1000BASE-T, 4 ports of 10GBASE-X (SFP+)/1000BASE-X (SFP), 110 – 264 VAC

ETS-1-10G/4SP/24U/DC
L2+ Ethernet switch, 24 ports of 10/100/1000BASE-T, 4 ports of 10GBASE-X (SFP+)/1000BASE-X (SFP), 36 – 72 VDC

ETS-1-10G/4SP/4CMB/20S/DC
L2+ Ethernet switch, 20 ports of 1000BASE-X/1000BASE-FX (SFP), 4 ports of 10/100/1000BASE-T/1000BASE-X/100BASE-FX Combo, 4 ports of 10GBASE-X (SFP+)/1000BASE-X (SFP), 36 – 72 VDC

ETS-1-10G/4SP/4CMB/20S/12V/AC
L2+ Ethernet switch, 20 ports of 1000BASE-X/100BASE-FX (SFP), 4 ports of 10/100/1000BASE-T/1000BASE-X/100BASE-FX Combo, 4 ports of 10GBASE-R (SFP+)/1000BASE-X (SFP), 176 – 264 VAC or 12 VDC

ETS-1-10G/4SP/24P/AC
L2+ Ethernet switch, 24 ports of 10/100/1000BASE-T with PoE/PoE+, 4 ports of 10GBASE-X (SFP+)/1000BASE-X (SFP), 176 – 264 VAC

ETS-1-10G/4SP/24P/ACW
L2+ Ethernet switch, 24 ports of 10/100/1000BASE-T with PoE/PoE+, 4 ports of 10GBASE-X (SFP+)/1000BASE-X (SFP), 110 – 240 VAC

ETS-1-10G/4SP/24P/DC
L2+ Ethernet switch, 24 ports of 10/100/1000BASE-T with PoE/PoE+, 4 ports of 10GBASE-X (SFP+)/1000BASE-X (SFP), 36 – 72 VDC

ETS-1-10G/4SP/48P/AC
L2+ Ethernet switch, 48 ports of 10/100/1000BASE-T with PoE/PoE+, 4 ports of 10GBASE-X (SFP+)/1000BASE-X (SFP), single 100 – 240 VAC

ETS-1-10G/4SP/48P/ACR

L2+ Ethernet switch, 48 ports of 10/100/1000BASE-T with PoE/PoE+, 4 ports of 10GBASE-X (SFP+)/1000BASE-X (SFP), dual 100 – 240 VAC

ETS-1-10G/4SP/48U/12V/AC

L2+ Ethernet switch, 48 ports of 10/100/1000BASE-T (RJ-45), 4 ports of 10GBASE-R (SFP+)/1000BASE-X (SFP), single 100 – 240 VAC or 12 VDC

ETS-1-10G

Ethernet Access Switches

Data Sheet

Switches with Dual Power Supply Slots

(Power Supplies are ordered separately)

ETS-1-10G/4SP/48U
L2+ Ethernet-switch, 48 x 10/100/1000Base-T ports, 4 x 10GBase-R (SFP+)/1000Base-X (SFP) ports, dual PS slots (PSs not included)

ETS-1-10G/4SP/48S
L2+ Ethernet switch, 48 x 1000BASE-X/100BASE-FX (SFP) 4 x 10GBASE-R/1000BASE-X (SFP+/SFP), dual PS slots (PSs not included)

ETS-1-10G/4SP/4CMB/4S
L2+ Ethernet switch, 4 ports of 1000BASE-X/100BASE-FX (SFP), 4 Combo ports of 10/100/1000BASE-T/1000BASEX/100BASE-FX, 4 ports of 10GBASE-R (SFP+)/1000BASE-X (SFP), dual PS slots (PSs not included)

ETS-1-10G/4SP/4CMB/20U
L2+ Ethernet switch, 1 port of 10/100/1000BASE-T (OOB), 20 ports of 10/100/1000BASE-T, 4 Combo ports of 10/100/1000BASE-T/1000BASEX/100BASE-FX, 4 ports of 10GBASE-R (SFP+)/1000BASE-X (SFP), L2+, dual PS slots (PSs not included)

ETS-1-10G/4SP/4CMB/20S
L2+ Ethernet switch, 1 port of 10/100/1000BASE-T (OOB), 20 ports of 1000BASE-X/100BASE-FX (SFP), 4 Combo ports of 10/100/1000BASE-T/1000BASEX/100BASE-FX, 4 ports of 10GBASE-R (SFP+)/1000BASE-X (SFP), L2+, dual PS slots (PSs not included)

Hot Swappable Power Supplies

Separately ordered per needed quantity (1 or 2) and type (DC or AC) for the devices with dual slots for removable power supplies

ETS-1-10G-PS/AC220/160W
AC Power Supply Module for ETS-1-10G, 100-264 VAC, 50-60 Hz, 160W

ETS-1-10G-PS/DC48/100W
DC Power Supply Module for ETS-1-10G, 36-76 VDC, 100W

OPTIONAL ACCESSORIES

ETS-1-BGP-LIC

License for using BGP protocol

CBL-SGW-RJ45-D9-F-6FT

RJ-45 to DB-9 console cable

Transceivers

For the list of available transceivers, see the **Pluggable Transceivers data sheet** at **www.rad.com**

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

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