

# ETS-1-10G/L2

## Ethernet Access Switches



- Advanced L2 functions
- Multicast support (IGMP Snooping, MVR)
- Advanced security (multilayer ACLs, IP Source Guard, and Dynamic ARP Inspection)

### MARKET SEGMENTS AND APPLICATIONS

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

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

### Specifications

#### CAPACITY

|                               |                                     |
|-------------------------------|-------------------------------------|
| Switching Capacity            | See Table 1                         |
| Throughput                    | See Table 1                         |
| MAC Address Table             | See Table 1                         |
| RAM (DDR3)                    | See Table 1                         |
| ROM (SPI Flash)               | 64 MB                               |
| VLAN Table                    | 4094                                |
| ARP Table                     | 1000                                |
| Jumbo Frames                  | 12288 bytes                         |
| L3 Interfaces                 | See Table 1                         |
| Link Aggregation Groups (LAG) | 24 groups, up to 8 ports in one LAG |
| QoS                           | 8 output queues priorities per port |

### ETHERNET INTERFACES

|                           |                                                                                                                                       |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Ports                     | See Table 1                                                                                                                           |
| Power over Ethernet (PoE) | PoE (15.4W per port): 802.3af<br>PoE+ (30W per port): 802.3at                                                                         |
| Features                  | Head-of-line blocking (HOL) protection<br>Auto MDI/MDIX<br>Flow control (IEEE 802.3X)<br>Jumbo frames<br>Port mirroring (SPAN, RSPAN) |

### MANAGEMENT

|               |                                                                                                                                                                                                                                                                                 |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration | Web-based interface<br>Command Line Interface (CLI)                                                                                                                                                                                                                             |
| Control Port  | RS-232 interface, RJ-45 connector                                                                                                                                                                                                                                               |
| Protocols     | SNTP (Simple Network Time Protocol)<br>Traceroute<br>LLDP (802.1ab) + LLDP MED<br>Simple Network Management Protocol (SNMP)<br>Management interface blocking<br>Download and upload of configuration file via TFTP/SFTP<br>Automated backup of configuration file via TFTP/SFTP |
| Access        | Access control – privilege levels<br>Local authentication<br>IP addresses filtering for SNMP<br>Flash File System<br>Limiting of traffic to CPU<br>Password encryption<br>Telnet client and server<br>SSH client and server<br>Macro commands                                   |
| IPv6          | IPv6 Host<br>Dual-stack IPv4, IPv6<br>Static IPv4/IPv6 routes                                                                                                                                                                                                                   |

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## Data Sheet

### SECURITY

|                          |                                                             |
|--------------------------|-------------------------------------------------------------|
| <b>ACL</b>               | L2-L3-L4 ACL                                                |
|                          | IPv4/IPv6 ACL for device control                            |
|                          | ACL based on:                                               |
|                          | • Physical port number                                      |
|                          | • IEEE 802.1p                                               |
|                          | • VLAN ID                                                   |
|                          | • EtherType                                                 |
|                          | • DSCP                                                      |
|                          | • Protocol type                                             |
|                          | • TCP/UDP port number                                       |
|                          | • User Defined Bytes                                        |
| <b>TACACS+</b>           | TACACS+ clients                                             |
|                          | Input commands authorization via TACACS+                    |
|                          | Input commands logging via TACACS+                          |
| <b>RADIUS</b>            | RADIUS clients                                              |
| <b>Syslog</b>            |                                                             |
| <b>Security Features</b> | IP Source Guard                                             |
|                          | IPv6 ND Inspection                                          |
|                          | IPv6 RA Guard                                               |
|                          | Dynamic ARP Inspection                                      |
|                          | Traffic segmentation                                        |
|                          | Debugging commands                                          |
|                          | MAC-based authentication, Port Security, Static MAC entries |
|                          | Two 802.1Q headers traffic control                          |
|                          | Support for several versions of configuration file          |
|                          | DoS attacks prevention                                      |
| <b>IEEE 802.1X</b>       | IEEE 802.1x based interface authentication                  |

### QUALITY OF SERVICE (QOS) AND RATE LIMITING

|                          |                                                                   |
|--------------------------|-------------------------------------------------------------------|
| <b>Class of Service</b>  | IEEE 802.1p Class of Service (CoS)                                |
| <b>Bandwidth Control</b> | Shaping                                                           |
|                          | Policing                                                          |
|                          | Scheduling algorithms: Strict Priority/Weighted Round Robin (WRR) |
|                          | ACL-based traffic classification                                  |
|                          | ACL-based VLAN assignment                                         |
|                          | ACL-based CoS/DSCP mark assignment                                |
|                          | DSCP to CoS/CoS to DSCP remarking                                 |
|                          |                                                                   |

### LAYER 2

|                     |                                          |
|---------------------|------------------------------------------|
| <b>VLAN</b>         | 802.1Q                                   |
|                     | Q-in-Q                                   |
|                     | Selective Q-in-Q (VLAN Translation)      |
|                     | GVRP                                     |
|                     | MAC-based VLAN                           |
| <b>MAC Table</b>    | Protocol-based VLAN rules                |
|                     | Independent learning mode per VLAN       |
|                     | MAC Multicast Support                    |
|                     | Configurable aging time of MAC addresses |
|                     | Static MAC Entries                       |
| <b>L2 Multicast</b> | MAC change events monitoring per ports   |
|                     | Multicast profiles                       |
|                     | Static Multicast groups                  |
| <b>IGMP</b>         | IGMP Snooping v1,2,3                     |
|                     | IGMP Snooping fast-leave                 |
|                     | IGMP querier                             |
|                     | IGMP proxy-report                        |
|                     | IGMP authorization via RADIUS            |
| <b>MVR</b>          |                                          |
| <b>MLD</b>          | MLD Snooping v1,2                        |
|                     | MLD Snooping fast-leave                  |
| <b>DHCP</b>         | DHCP snooping                            |
|                     | DHCPv6 Snooping                          |
|                     | DHCP clients filtering                   |
|                     | DHCP autoprovision                       |
|                     | DHCP relay (IPv4 support)                |
|                     | DHCP relay Option 82                     |
|                     | DHCP Option 82                           |
| <b>PPPoE</b>        | PPPoE Intermediate Agent                 |
| <b>BPDU</b>         | PPPoE Circuit-ID tag                     |
|                     | BPDU attacks prevention                  |
|                     | STP BPDU Guard                           |
|                     | BPDU Filtering                           |

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## Ethernet Access Switches

## Data Sheet

### RESILIENCY

|                  |                                                                             |
|------------------|-----------------------------------------------------------------------------|
| L2 Protection    | STP (Spanning Tree Protocol, IEEE 802.1d)                                   |
|                  | RSTP (Rapid Spanning Tree protocol, IEEE 802.1w)                            |
|                  | MSTP (Multiple Spanning Tree, IEEE802.1s)                                   |
|                  | STP Root Guard                                                              |
|                  | STP Loop Guard                                                              |
|                  | Spanning Tree Fast Link option                                              |
|                  | Layer 2 Protocol Tunneling                                                  |
|                  | Loopback Detection (LBD)                                                    |
|                  | Port isolation                                                              |
|                  | Storm control for different traffic (broadcast, multicast, unknown unicast) |
|                  |                                                                             |
| Link Aggregation | 8 groups                                                                    |
|                  | Static LAG                                                                  |
|                  | Dynamic LAG (LACP)                                                          |
|                  | LAG Balancing Algorithm                                                     |

### MONITORING AND DIAGNOSTICS

|            |                                                   |
|------------|---------------------------------------------------|
| Diagnostic | Ping (IPv4/IPv6 support)                          |
|            | Virtual Cable Testing (VCT)                       |
|            | Optical transceiver diagnostics                   |
| Monitoring | Statistics on interfaces                          |
|            | CPU utilization monitoring per task and per queue |
|            | RAM utilization monitoring                        |
|            | Temperature monitoring                            |
|            | TCAM utilization monitoring                       |
| OAM/CFM    | 802.3ah Ethernet Link OAM                         |
|            | Dying Gasp                                        |
|            | 802.3ah Unidirectional Link Detection (UDLD)      |

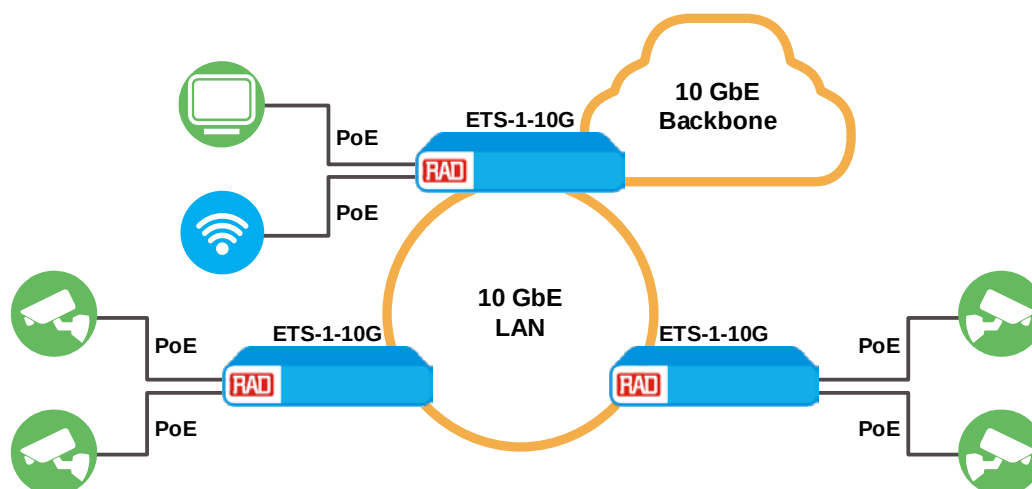
### GENERAL

#### Environment

See Table 1

#### Physical and Power

See Table 1



# ETS-1-10G/L2

## Ethernet Access Switches

### Data Sheet

Table 1. Technical Features

| Specification                              | ETS-1-10G/L2/<br>4SP/24P/AC                                                    | ETS-1-10G/L2/<br>4SP/48P/AC                                                    | ETS-1-10G/L2/<br>4SP/24U/AC                                                  | ETS-1-10G/L2/<br>4SP/24S                                                     |
|--------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <b>Interfaces</b>                          |                                                                                |                                                                                |                                                                              |                                                                              |
| 10/100/1000BASE-T PoE/PoE+                 | 24                                                                             | 48                                                                             | –                                                                            | –                                                                            |
| 10/100/1000BASE-T (RJ-45)                  | –                                                                              | –                                                                              | 24                                                                           | –                                                                            |
| 100BASE-FX/1000BASE-X (SFP)                | –                                                                              | –                                                                              | –                                                                            | 24                                                                           |
| 1000BASE-X (SFP)/10GBASE-R (SFP+)          | 4                                                                              | 4                                                                              | 4                                                                            | 4                                                                            |
| <b>Performance</b>                         |                                                                                |                                                                                |                                                                              |                                                                              |
| Packet Processor                           | Realtek RTL9301                                                                | Realtek RTL9311                                                                | Realtek RTL9301                                                              | Realtek RTL9311                                                              |
| Switching Capacity                         | 128 Gbps                                                                       | 176 Gbps                                                                       | 128 Gbps                                                                     | 128 Gbps                                                                     |
| Throughput on 64-byte packets*             | 95.2 MPPS                                                                      | 130.9 MPPS                                                                     | 95.2 MPPS                                                                    | 95.2 MPPS                                                                    |
| Buffer memory                              | 1.5 MB                                                                         | 2 MB                                                                           | 1.5 MB                                                                       | 2 MB                                                                         |
| RAM (DDR3)                                 | 512 MB                                                                         | 512 MB                                                                         | 512 MB                                                                       | 1 GB                                                                         |
| MAC Table                                  | 16384                                                                          | 32768                                                                          | 16384                                                                        | 32768                                                                        |
| L2 Multicast groups (IGMP Snooping)        | 1023                                                                           | 4094                                                                           | 1023                                                                         | 4094                                                                         |
| L3 Multicast groups (IGMP Proxy)           | 512                                                                            | 2048                                                                           | 512                                                                          | 2048                                                                         |
| L3 interfaces                              | 8 VLANs, up to 5 of IPv4 for each VLAN, up to 300 IPv6 GUA total for all VLANs | 8 VLANs, up to 5 of IPv4 for each VLAN, up to 300 IPv6 GUA total for all VLANs | 20 VLANs, up to 5 IPv4 for each VLAN, up to 124 IPv6 GUA total for all VLANs | 20 VLANs, up to 5 IPv4 for each VLAN, up to 512 IPv6 GUA total for all VLANs |
| L3 IPv4 Unicast routes                     | 496                                                                            | 992                                                                            | 496                                                                          | 2048                                                                         |
| VRRP routers                               | 32                                                                             | 32                                                                             | 32                                                                           | 32                                                                           |
| SQinQ rules                                | 384 (ingress)/ 512 (egress)                                                    | 768 (ingress)/ 1024 (egress)                                                   | 384 (ingress)/512 (egress)                                                   | 768 (ingress)/1024 (egress)                                                  |
| MAC ACL rules                              | 509                                                                            | 766                                                                            | 509                                                                          | 766                                                                          |
| IPv4/IPv6 ACL rules                        | 384/192                                                                        | 640/320                                                                        | 384/192                                                                      | 640/320                                                                      |
| *Values are given for one-way transmission |                                                                                |                                                                                |                                                                              |                                                                              |
| <b>Physical and Power</b>                  |                                                                                |                                                                                |                                                                              |                                                                              |
| Dimensions (W x D x H)                     | 430 x 44 x 225                                                                 | 440 x 44 x 447                                                                 | 430 x 44 x 203 mm                                                            | 430 x 44 x 275                                                               |
| Weight                                     | 3.36 kg                                                                        | 7.46 kg                                                                        | 2.44 kg                                                                      | 4.69 kg                                                                      |
| Power Supply                               | 176-264 VAC, 50–60 Hz                                                          | 176-264 VAC, 50–60 Hz                                                          | 100–240 VAC, 50–60 Hz<br>18–72 VDC                                           | Hot Swappable Power Supplies, see Ordering (ordered separately)              |
| PoE budget                                 | 370 W                                                                          | 720 W                                                                          |                                                                              |                                                                              |
| Maximum power consumption (including PoE)  | 420 W                                                                          | 820 W                                                                          | 25 W                                                                         | 55 W                                                                         |
| Operating temperature                      | -20 to +50°C                                                                   | -10 to +50°C                                                                   | -20 °C to +50 °C                                                             | -10 to +45°C                                                                 |
| Storage temperature                        | -40 to +70 °C                                                                  |                                                                                |                                                                              |                                                                              |
| Operating humidity                         | no more than 80%                                                               |                                                                                |                                                                              |                                                                              |
| Cooling                                    | 2 fans                                                                         | 4 fans                                                                         | 2 fans                                                                       | 4 fans                                                                       |
| Hardware support for Dying Gasp            | yes                                                                            | no                                                                             | yes                                                                          | no                                                                           |

# ETS-1-10G/L2

## Ethernet Access Switches

## Data Sheet

### Ordering

#### ETS-1-10G/L2/4SP/24P/AC

L2 Ethernet switch, 24 ports of 10/100/1000BASE-T (PoE/PoE+),  
4 ports of 1000BASE-X/10GBASE-R, 176-264 VAC

#### ETS-1-10G/L2/4SP/48P/AC

L2 Ethernet switch, 48 ports of 10/100/1000BASE-T (PoE/PoE+),  
4 ports of 1000BASE-X/10GBASE-R, 176-264 VAC

#### ETS-1-10G/L2/4SP/24U/AC

L2 Ethernet switch, 24 ports of 10/100/1000BASE-T, 4 ports of  
1000BASE-X, 10GBase-R, 220V AC

#### ETS-1-10G/L2/4SP/24S

L2+ Ethernet aggregation switch, 24 ports of 100BASE-  
FX/1000BASE-X (SFP), 4 ports of 1000BASE-X (SFP)/10GBASE-R  
(SFP+), dual PS slots (PSs not included)

### Hot Swappable Power Supplies

Separately ordered per needed quantity (1 or 2) and type (DC or  
AC)

#### ETS-1-10G-PS/AC220/160W

AC Power Supply Module for ETS-1-10G/L2/4SP/24S, 100-264  
VAC, 50-60 Hz, 160W

#### ETS-1-10G-PS/DC48/100W

DC Power Supply Module for ETS-1-10G/L2/4SP/24S, 36-76 VDC,  
100W

### OPTIONAL ACCESSORIES

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

RJ-45 to DB-9 console cable

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