Rugged Ethernet Gateway (REG)

Rugged 20-Port GbE Switch, Fully Managed

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S E R V I C E S

Overview

The REG is a family of small to medium form factor rugged Gigabit Ethernet (GbE) switch systems optimized for demanding Size, Weight and Power (SWaP) constraints of embedded space computer network systems applications.

To enhance reliably and availability, the unit can feature a dual-lane architecture for single failure tolerance with a fully customized mechanical packaging and a fully customized redundancy handling module.
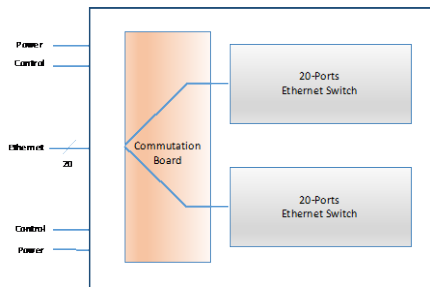
The unit can interface Ethernet via RJ45 type connectors or high performance circular connectors. Integrated filtering is designed to meet power input voltage, spikes, surges, transients and EMI/EMC requirements of typical space deployments. The REG enables reliable Local Area Network (LAN) switching across extended operating temperature ranges (-23°C to +63°C), shock/vibration and radiation conditions.

The REG features 20 triple-speed (10/100/1000 Mbps) ports and combines layer-2 managed network switch functions with remote management capabilities for optimizing communications, prioritizing critical information and layer 3 routing.

Product Family

Products	Redundancy	Radiation	Mass	Dimensions (mm)	Power
REG-20-RT-R	Cold Redundant	Radiation Tolerant	5,2kg	268x180x147	15W
REG-20-RT-S	Not Redundant	Radiation Tolerant	2,5kg	190x160x65	15W
REG-20-RH-S	Not Redundant	Radiation Hard	3,4kg	277x208x100	24W

A variant of the product with Time-Triggered Ethernet capability is planned.

Applications

The REG is an elegant solution for connecting a large number of IP-enabled (embedded) devices, including cameras, sensors, payload, command-and-control equipment and other avionics deployed in space transportation system platforms and orbital infrastructures at the network edge.

Specification Summary

Architecture

- Single or Dual-lane.

Ports

- 20x 10/100/1000BaseT Gigabit (GbE) Ethernet ports.
- RS422 management console/ health and status monitoring (one per channel).
- Power inputs (one per channel).

Layer 3 routing

- Layer 3 IPv4 / IPv6 unicast static routing to attached WAN/radio port.

Layer 2 switching

- Port control: port-speed, duplex mode, flow control, port frame size (jumbo frames), port state, port status (link monitoring), port statistics (MIB counters).

APPLICATIONS

- **Space:** Space transportation systems, orbital infrastructures, portable ground stations.
- **Aerospace:** Military and civil aircraft.
- **Defence:** Battlefield communication, rugged networks, combat vehicles.
- **Others:** Mining, transportation, oil & gas industries.

SERVICES AVAILABLE

Unit customization.

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ABOUT SPACE APPLICATIONS SERVICES

Space Applications Services NV/SA is an independent Belgian company founded in 1987, with a subsidiary in Houston, USA.
Our aim is to research and develop innovative systems, solutions and products and provide services to the aerospace and security markets and related industries. Our activities cover manned and unmanned spacecraft, launch/re-entry vehicles, control centres, robotics and a wide range of information systems.

REG
SPACE APPLICATIONS SERVICES

- Quality of Service (QoS) traffic prioritization and queuing: 8 priorities, 8 CoS queues per port, strict or deficit-weighted RR scheduling, shaping/policing per queue and per port, storm control.
- VLAN: 8K MAC addresses, 4K VLANs, 802.1Q static VLAN, protocol-based VLAN, MRP, MVRP, MVR, IEEE-80210ad provider bridge, link aggregation (IEEE-802.3ad).
- IEEE-802.1 D/w/s (Spanning Tree, Rapid Spanning Tree, Multiple Spanning Tree Protocol).
- L2 IEEE-1588v2 Precision Timing Protocol (PTP).

Management

- In-band Ethernet management using web GUI (HTTP/HTTPS) or Simple Network Management Protocol (SNMP) v1/v2/v3 or Command Line Interface (CLI) Console Terminal over RS-422 or Telnet/SSH.
- DHCP client, IEEE 802.1X authentication, system Syslog, SSHv2, IPv6 management, IGMP/MLD/DHCP snooping, Access Control Lists (ACLs), port mirroring, BPDU Guard, RMON, Cisco Discovery Filtering, IEEE-802.10AB LLDP.
- Built-In Test (BIT) functionality to detect system faults.

Security

- NAS IEEE-802.1X, RADIUS accounting, MAC address limit, TACACS, web and CLI authentication, ACLs, IP source guard.
- Declassification: data zeroization / sanitization support to erase non-volatile Flash memory and restore board to factory default configuration.

Power

- Power Input: 28 VDC nominal steady state
- Survivability to abnormal steady state voltage, ripple, surges, spikes and transients
- Power consumption (estimated): < 30 Watt.

Physical

- Connectors: RJ45 or Circular MIL-DTL-38999.
- Cooling: passive thermal management; conductive cooling.
- Enclosure/finish: corrosion resistant, aluminium alloy.

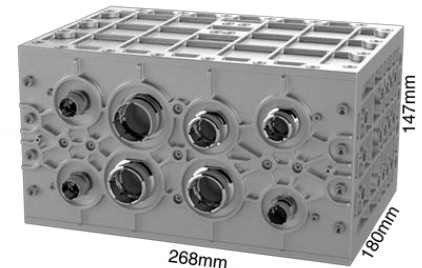## Environmental

- Temperature operation: -23°C to +63°C

EMI/EMC

- Designed to Meet MIL-STD-461F & RTCA/DO-160G section 22.

Export jurisdiction

- ITAR-free.

Quality

- Assembled to IPC-A-610 Class III workmanship.
- No moving parts.
- Conformal coated PCBs.