

Hermod II (RC SS1/001-yz)



Rugged 10 Gigabit TSN Ethernet Switching System

Key Features

Hermod II is a Commercial Off the Shelf (COTS) Ethernet Switch for applications that demand deterministic communications in a rugged environment. Hermod II supports both 1 and /10 Gigabit Time Sensitive Networking with optional GNSS timeserver functionality.



- Up to 20 Ethernet ports in total and 68Gbps switching capacity:
 - Up to 6x 10G Fibre Optic ports
 - Up to 16x 1G Copper ports
- Options for full and basic TSN support
- High-availability Seamless Redundancy (HSR)
- Parallel Redundancy Protocol (PRP)
- Time-Sensitive Networking (TSN)
- Precision Time Protocol (PTP)
- Optional Grand Master/Time Server/Clock bridging capabilities
- Tested and qualified for challenging environments
- IP67 Dust/Waterproof Aluminium Chassis
- Circular Black Zinc-Nickel MIL-DTL-38999 Connectors
- 50ms Hold Up Capability
- Quality of Service (QoS)
- Security and management capability

Time-Sensitive Networking (TSN) is the new generation Ethernet with support for communicating real-time traffic. It allows merging hard real-time, soft real-time and best effort traffic in the same network.

TSN guarantees the delivery of messages on-time, the interoperability and standardization of all the devices in a Deterministic Ethernet network. Additionally, thanks to the TSN seamless redundancy mechanism (IEEE802.1CB) the availability of the system is drastically improved compared to other traditional redundancy mechanisms.

The product supports accurate time distribution via PTP and NTP. If GNSS sourced Grand Master operation is required, GNSS/PTP/NTP Grand Master Clock capability can be included.

Layer 2 General Functionalities

- IEEE 802.3-2000
- Automatic MAC address learning and aging
- Static MAC Table
- Port-Based Virtual LANs (VLANs)
- IEEE 802.1Q for VLAN tagging
- IEEE 802.1Q for VLAN based Ethernet priorities
- Ethertype based switching
- IEEE 802.1p for Class of Service (CoS)
- IEEE 802.1ab for Link Layer Discovery Protocol (LLDP)
- Priority Modes: PCP (802.1p)
- Broadcast protection configurable via register
- Layer 2 multicast filtering
- Jumbo frame support
- IEEE 1588 StateLessTC (Transparent Clock)
- Link Aggregation Support for designated ports
- IEEE 802.1s/w for (M)RSTP (Rapid Spanning Tree Protocol)

High-availability Ethernet

- IEC 62439-3 Clause 4 PRP "Parallel Redundancy Protocol"
- IEC 62439-3 Clause 5 HSR "High-availability Seamless Redundancy"

Layer 3 General Functionalities

- IPv4/IPv6 unicast and multicast routing
- Static routing
- Dynamic Routing:
 - OSPFv2, OSPFv3, RIPv2, BGPv4, BGPv6
 - EIGRP, PIM-DM, PIM-SM
 - VRRP
- IGMP Snooping
- DSCP ToS
- L3 Tunnelling:
 - PPP
 - GRE/TAP
 - L2TPv2/v3 support
- L3 VPN
- L3 Firewall
- L3 NAT

Time-Sensitive Networking (TSN)

- IEEE 802.1 AS - Clock synchronization protocols.
- IEEE 802.1 Qav - AVB Credit Based Scheduler (CBS)
- IEEE 802.1 Qbv - Time Aware Scheduler (TAS)
- IEEE 802.1 Qci - Per stream ingress policing 2.
- IEEE 802.1 CB - Redundancy, Frame replication

Wire-speed cryptographic

- In-line hardware implemented crypto-processor to cipher or decipher traffic.

Synchronization

- IEEE 1588v2 PTP "Precision Time Protocol" profiles with E2E mode and P2P mode of operation
- IEEE 1588v2 PTP "Precision Time Protocol" over HSR & PRP
- Grand Master capability
- S(NTP) & Client

Management and Monitoring

- Protocol SNMP V1/V2/V3
- HTTPS Web GUI interface with secure firmware/bitstream update
- Graphic representation of Network status (HSR DANs & VDANs)
- Statistics independent per port
- SNMP RFC 1157/RFC
- DHCP (Client and Server)
- System Syslog
- MIB support
- Console port
- Built-In-Test

Software Features

- Software Features can be accessed through the RS232 port, which uses a simple menu-driven interface to display the configuration and prompt for changes.
- Built-In Test Responder:
 - Power-On BIT results
 - Periodic BIT results
- Commanded BIT and results:
 - Memory tests
 - Virtual Cable Test
 - Loopback Test
 - Authentication and Port Security:
 - Usernames and passwords
 - Ethernet Port Status
 - Ethernet Port Speed and Duplex
 - Ethernet Port Enable and Security
 - User Management
 - Set the IPv4 address and the IPv6 address.
 - Display manufacturing data such as firmware version, serial number, assembly, revision, etc.

Qualification

- Operating Temp: -40°C to $+71^{\circ}\text{C}$
- Non-Operating Temp: -51°C to $+85^{\circ}\text{C}$
- Shock and Vibration to MIL-STD-810H
- EMC to MIL-STD-461 and CA/CE
- IP67 dust and water protection

Power

- 28VDC, 45W
- 50ms Hold Up
- OC, OV, and inrush protected
- MIL-STD-1275F