

RelyUm[®] Rugged



Time Server and L2/L3
Military Switch Router

MIL-GM

MIL-10GM

Overview

The MIL-GM and MIL-10GM series are military-certified time servers that take full advantage of SOC-E's advanced and well-known synchronization technology to ensure reliable, continuous and accurate timing in mission-critical applications. The switching electronics are implemented in a high-performance FPGA, allowing the devices to be fully customised to each customer's specific requirements.

This MOTS approach, based on a field-proven COTS solution to minimise project

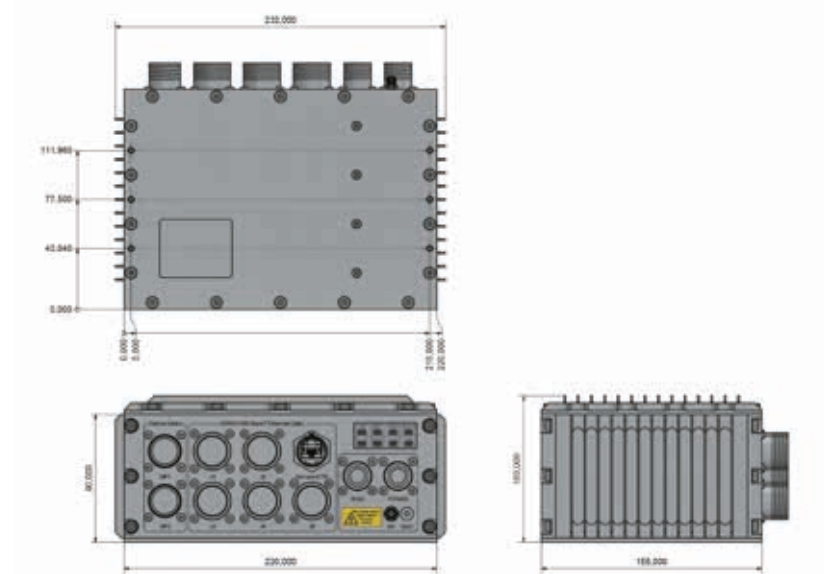
risk, results in a SWaP interoperable all-in-one device, that combines time server and bridging functionality with switching, routing, firewall and edge computing capabilities in a single hardware platform.

With fully customisable external network connectivity and a lightweight and compact MIL-STD-810G certified chassis, the MIL-GM / MIL-10GM series can adapt to almost any situation and meet the requirements of a Digital Backbone (DBB) in the most demanding military programmes.

Key Features

- **Grand Master and Clock bridging** (NTP <-> PTP <-> GNSS) capabilities with accurate time distribution via IEEE 1588 (PTP).
- **Optional support** for IRIG-B and IEEE 802.1AS.
- Up to 26 configurable **Ethernet 10/100/1000BASE-T and 1GbE/10GbE** Fibre Optic ports.
- Full in-house design (including networking and synchronization IP Cores) based on a **reconfigurable MPSoC platform** with edge computing capabilities.
- **Advanced security means** including IEEE 802.1X and MACsec, and optional firewall and VPN capabilities.
- **Simplified management and monitoring** via a user-friendly HTTPS web interface or a flexible console port.
- **Sealed military grade and compact enclosure** with MIL-STD-704/ MIL-STD-1275E power supply.

Dimensions



Technical Specifications

Communication Interfaces

- Up to 22x 10/100/1000BASE-T Copper Ethernet ports
- Up to 6x 1GbE/10GbE Fibre Optic Ethernet ports
- 1 x 10/100/1000BASE-T Ethernet Service port
- 1 x PPS output (Miscellaneous connector)
- 1x optional IRIG-B output (Miscellaneous connector)
- 1 x RS-232 serial line (Miscellaneous connector)
- 2 x General purpose input/output pins or PPS/IRIG-B input (Miscellaneous connector)

Synchronization

- Time reference obtained from an internally populated GPS chipset (external antenna required through the antenna connector), or from an external provided PPS and serial (NMEA message) input
- GNSS: Time source, geolocation. GPS L1, Galileo, GLONASS G1 and BeiDou B1 frequencies
- Extended time source holdover capability range (optional)
- IRIG-B Master support through IRIG-B output (optional) for all the IRIG-B Time Code Formats (distributed as DCLS pulse-width coded signal)
- Battery backup high accuracy RTC (deviation of ± 3 ppm typ., ± 250 ms/day)
- Support for IEEE 802.1AS (optional)
- Time Bridge operation: NTP <-> PTP <-> GNSS
- IEEE 1588-2008 v2 (PTPv2): Grand Master, Master, Slave, Transparent Clock:
 - PTP Grand Master synchronization accuracy to the reference clock: ± 50 ns (± 25 ns in optimized mode for static position with GNSS reference)
 - Boundary Clock support (optional)
- NTP: Server/Client:
 - NTP v4 (RFC 5905), compatible with NTP v3 (RFC 1305), v2 (RFC-1119) and v1 (RFC-1059)
 - SNTP (RFC 4330)

Layer 2 Features

- IEEE 802.3-2008 (Ethernet)
- Automatic MAC address learning and aging
- Static MAC Table
- IEEE 802.1AB for Link Layer Discovery Protocol (LLDP)
- Storm control for flooded broadcast, multicast and unicast
- IGMP Snooping (up to 1024 multicast filters)
- Flexible Link Aggregation (up to 4 groups with 8 members each) (Expected 2025)
- Port rate limiting
- Layer 2 multicast filtering
- Port-Based Virtual LANs (VLANs):
 - Logical segmentation of network for optimal use of bandwidth
 - IEEE 802.1Q for VLAN tagging (up to 4K VLAN groups)
 - IEEE 802.1p for Class of Service (CoS) / Quality of Service (QoS)

Redundancy

- Zero-Recovery Time redundancy (optional):
 - High-availability Seamless Redundancy (HSR) - IEC 62439 - 3 Clause 5
 - Parallel Redundancy Protocol (PRP) - IEC 62439 - 3 Clause 4
- Spanning Tree Protocol:
 - IEEE 802.1D (STP)
 - IEEE 802.1w (RSTP)
 - IEEE 802.1s (MSTP)

Layer 3 Features

- IPv4/IPv6 unicast and multicast routing
- Static routing
- Virtual Router Redundancy Protocol (VRRP)
- DSCP ToS/QoS (optional)
- Source/Destination NAT (optional)
- Dynamic routing:
 - OSPFv2, OSPFv3
 - RIPv1, RIPv2, RIPv2
 - BGPv4
 - EIGRP
 - PIM-SM (IPv4 and IPv6)

Gateway

- Edge-computing capabilities for user defined applications
- Optional RS-232 / RS-422 / RS-485 buses with Modbus/Serial console
- Optional CAN 2.0 integrated ports
- Support for DDS standard and MQTT protocol in KVM Virtual Machine for user application

Security

- IEEE 802.1X for port-based network access control
 - MAC port binding & authentication for login security
 - RADIUS authentication
 - LDAP (Lightweight Directory Access Protocol)
 - RBAC (Role Based Access Control)
 - Selective ports disabling capability
 - Unsecure protocols disabling capability
 - Per port ingress and egress port mirroring including 10G mirroring
 - Mirroring per VLAN and per content awareness match
 - Secure Shell (SSH) Protocol v2 for command line interface
 - TPM 2.0 IC for identity authentication
 - Encryption / authentication & signature for firmware and bitstream
 - HTTPS for web interface
 - Secure-boot capability
 - IEEE 802.1AE - MACsec (Media Access Control Security) support
 - Custom ACLs (optional)
 - Other optional security features (MIL-SSR and MIL-10SSR Series):
 - Virtual Private Network (VPN)
 - Stateful inspection firewall
 - Intrusion Prevention System / Intrusion Detection System
 - Certifications:
 - Tempest Level B rated
 - LINCE (Common Criteria based) certification
- Not all the features may be supported in all the product models.

Configuration & Management

- HTTPS web interface
- SSHv2 command line interface (CLI)
- SNMP V1/V2c/V3 protocol support
- SNMP V3 encrypted authentication and access security
- SNMP over TLS support (optional)
- Netconf protocol support (optional)
- Encrypted and digitally signed firmware / bitstream upgrades
- Saving and restoring configuration
- Graphic representation of Network status (only in HSR/PRP networks)
- Statistics independent per port
- Event notification through Syslog
- Internal status monitoring and logging
- DHCP/DHCPv6 server and relay (optional)
- Built-in-Test capability including:
 - PBIT (Power-on BIT)
 - CBIT (Continuous BIT)
 - IBIT (Initiated BIT)
- In-band management via any Ethernet switch port or out-of-band via Ethernet service port
- RS-232 serial console

Processing	- Xilinx UltraScale+ MPSoC device: 4x 64bit CPU ARM-Cortex-A53 2x 32bit CPU ARM-Cortex-R5F 1x GPU ARM-Mali 400MHz 1x 16nm UltraScale+ FPGA	- Up to 4GB DDR4 RAM memory 32GB eMMC Flash memory 512Mb QSPI Flash memory
Physical & Electrical Characteristics	- Military certified fanless rugged design - Dimensions (mm): 220(W) 155(D) 103(H) - Weight: 3kg (combination of metalwork, PSU and payload) - Power Input: 28VDC* - Power consumption: 20-35W - Copper, Fibre optic, Power supply	and Miscellaneous port with RS-232/PPS/IRIG-B (optional) capability via D38999 connector Service port via RJ45 or D38999 connector * Other PSU available under demand. Contact your sales representative for more information.
MTBF	200,000 hours GB@25	MTTR = 0.5 hour
Certifications	- MIL-STD-461: CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103 - MIL-STD-810: Methods: 500.5, 501.5, 502.5, 504.1, 506.5, 507.4, 508.6, 509.5, 513.6, 514.6, 516.6 - RTCA DO-160: Section 22 - MIL-STD-704F, MIL-STD-1275E - ESD EN61000-4-2	MIL-DTL-38999, MIL-STD-1474D, IP66, DO-254/DO-178 DAL-D certifiable A qualification campaign is currently underway to incorporate new standards and tests. For more information, please contact your sales representative.
Warranty	2 years	
Export Control	ITAR Free	

Ordering Code

Ordering code			
CCFF-GM-XX.YY	MILCCFF-GM: 1G Time Server and L2/L3 Military Switch Router		
CCFF-GM-XX.YY	MILCCFF-10GM: 1G/10G Time Server and L2/L3 Military Switch Router		
CC: Number of copper parts	FF: Number of FO ports	XX: Firmware personality code*	YY: Hardware platform code*

*In most cases, this code is defined upon receipt of the order.

To know more about other available references, please contact your sales representative.

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