

PTP-NTP-GNSS MILITARY TIME SERVER

GRANDMASTER AND BRIDGE CAPABLE L2/L3 MANAGED SWITCH WITH UP
TO 26x ETHERNET PORTS AND SECURITY CAPABILITIES

RELY-MIL-TIME-SERVER



IEEE 1588 (PTP) Grandmaster

GNSS or standalone clock
source for PTP Master
operation

Time Bridge operation

NTP Server/Client
operation with PTP
bridging operation
capable

Layer 2 and layer 3 managed switch

Cutting edge multi-core
CPU with FPGA to support
user applications

Security-by-design

Multi-layered security to
protect the system
against heterogeneous
threats
Cybersecurity certified

MIL-STD

1st class military enclosure
MIL-STD-461G
MIL-STD-810G

Multiple media type

Support for 1G/10G Copper
and fiber based
connections

Overview

RELY-MIL-TIME-SERVER embeds high-end Ethernet networking, time server and cybersecurity capabilities in the same equipment. The technology core of this product is a reconfigurable platform that combines multiple CPU and FPGA in the same Integrated Circuit. This tight integration enables a combined hardware and software processing for high-speed switching and routing, accurate timing synchronization and smart operation to mitigate potential security threads.

The modern military networks demand reliable Ethernet links, combining the traditional copper media interfaces with Fiber Optic ones to support high speed backbones. The switching electronics is fully implemented on the FPGA, what offers a high level of flexibility and customization capabilities. RELY-MIL-TIME-SERVER addresses these challenges offering different personalities to support tens of 1G copper ports combined with Short and Long Range 1/10G Fiber Optic links. Latest media features, like single fiber bidirectional links are also supported. High-availability Ethernet, like HSR or PRP can be implemented to support zero-delay recovery time at network level.

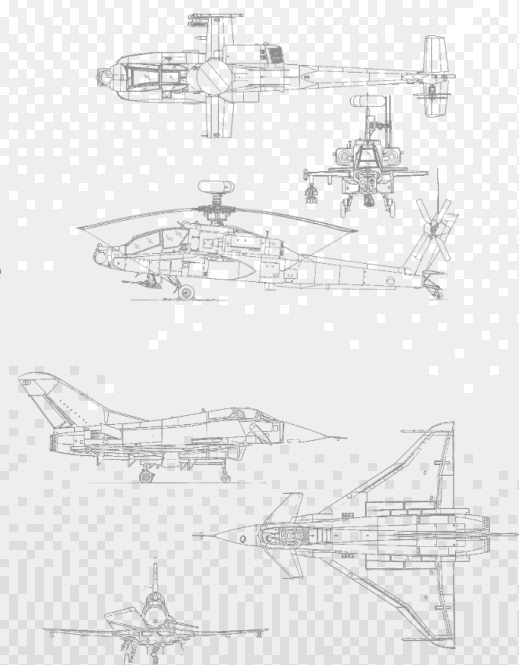
Time distribution in military infrastructures is done through multiple mechanisms, like IrigB, PTP, NTP or GNSS. RELY-MIL-TIME-SERVER comprises all these alternatives in one equipment. It is an NTP or PTP Grandmaster able to distribute the time reference through any of the networking ports. It supports different clock input sources like GNSS, NTP or IrigB. The switching matrix implements by hardware PTP Transparent Clock operation that ensures an accurate clock distribution. RELY-MIL-TIME-SERVER can share a network with other PTP Masters through Best Master Clock Algorithm (BMCA).

The security is a must in this critical equipment. RELY-MIL-TIME-SERVER includes hardware countermeasures like TPM 2.0, dedicated supervisor microcontroller and secure-boot. At networking level, there are implemented security mechanisms like MAC address filtering, selective enabling/disabling port capability, Firewall, anti-DoS and secure equipment management and upgrading.

RELY-MIL-TIME-SERVER is a military certified equipment. This certification includes environmental, mechanical and electromagnetic aspects according to MIL-STD-810G and MIL-STD-461G. Additionally, a specific personality has obtained the cybersecurity certification Common Criteria-LINCE by the Spanish Cryptologic National Center.

Main Features

- Grandmaster, Master and Time Bridge operation: PTP, NTP, GNSS
- 20x 10/100/1000-BaseT copper ports
- Up-to 6x 1/10GbE SR/LR/BX Fiber Optic ports
- 1x 10/100/1000-BaseT Ethernet Service port
- Layer 2 switching and L3 routing
- Security Firewall and VPN services
- Latest generation ARM-Cortex-A53,-R5, GPU and FPGA hardware
- Support for wide redundancy alternatives: MSTP, PRP, HSR
- Auxiliary RS232 console port
- Edge computing capabilities for user defined applications
- General purpose, PPS and IRIGb Input and Output available on auxiliary connector
- Sealed military enclosure cold plate cooled
- Dual redundant MIL-STD-704 AC/DC power supply
- Optimized heat dissipation chassis design
- Advanced security mechanisms and services
- Tested and certified by independent official laboratories per MIL-STD-810G & MIL-STD-461G



General Functionalities

Time Server and Bridge operation

- PTP/ IEEE 1588v2: Grandmaster, Master, Slave, Transparent Clock
- NTP: Server/Client
- GNSS: Time source, geolocalization
- Optional extended holdover capability range
- Optional IrigB support
- Time Bridge operation: NTP <-> PTP <-> IrigB

Ports Configuration

- 4x 1/10G Base-SX/SR/LR Fiber Optic port
- 20x 10/100/1000Base-T copper ports
- Up-to 2x 10GBase-BX BiDir Fiber Optic link (optional)

Xilinx Zynq UltraScale + EG

- EG devices feature a quad-core ARM® Cortex-A53 platform running up to 1.5GHz. Combined with dual-core Cortex-R5 real-time processors, a Mali-400 MP2 graphics processing unit, and 16nm FinFET. EG devices have the specialized processing elements needed to excel in next generation Aerospace and Defence applications.

RAM Memory

- 32Gb DDR4 - 64-bit attached to processor subsystem

Redundancy

- IEC 62439-3 Clause 4 PRP "Parallel Redundancy Protocol"
- IEC 62439-3 Clause 5 HSR "High availability Seamless Redundancy"
- Optional IEEE 802.1w for (M)RSTP (Rapid Spanning Tree Protocol)

Layer 3 Functionalities (not applies to HSR/PRP ports)

- 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 Firewall
- L3 Tunneling: PPP, GRE/TAP, L2TPv2/v3

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), Ethertype (Up to 16)
- Broadcast protection configurable via register
- Layer 2 multicast filtering
- Jumbo frame support
- IEEE 1588 StateLess TC (Transparent Clock)

Security

- IEEE 802.1X access control: port & MAC based authentication
- Selective ports disabling capability
- Unsecure protocols disabling capability
- Selective port mirroring
- MAC port binding & authentication for login security
- TACACS+, and RADIUS authentication
- Secure Shell (SSH) Protocol v2
- Internal Gyroscope and Accelerometer for security and predictive maintenance purposes
- TPM 2.0 IC for identity authentication
- AES 256/HMAC/RSA 2048 encryption/authentication & signature for firmware and bitstream
- Firewall, VPN

Management/Monitoring/Telcontrol

- Protocol SNMP V1/V2/V3
- HTTPS WEB interface with secure firmware/bitstream update
- Graphic representation of Network status (HSR DANs & VDANs)
- Statistics independent per port
- DHCP (Client and Server)
- System Syslog
- MIB support
- Console port
- PBIT, BITE



MIL-STD Testing & System Dimensions

MIL-STD-461G	CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS101, RS103
MIL-STD-810G	Method: 501.5, 507.4, 508.5, 509.3 513.6, 514.6, 516.6
MIL-DTL-38999, MIL-STD-704F, MIL-STD-1474D, MIL-STD-110F, MIL-STD-1275D, IP66	



Dimensions (mm)	220 (W) 155 (D) 98 (H)
Weight (Kg)	1,9KG (metalwork) 3,4Kg (with PSU & Payload)
DC Power Input / Consumption	+28VDC, +48VDC, +270VDC / 50W
AC Power Input / Consumption	115VAC 40-800Hz, 220VAC 40-800Hz / 50W
I/O ports	Ethernet (5x4), fiber (2x2), RS232 (1), RJ45 (1), RF (1)
Power & Control	Miscellaneous (13 pin), Power (5 pin)

