

Designations of elements of the set for HYPERION-500

Hyperion 500 - Chassis 1U 19"

H500CH-1U8.x-X

H500CH	1U8.x	X
standard version (19" rack, 1U, 8 slots)	1U8.2	
IO version (19" rack, 1U, 8 slots, 1 relay output)	1U8.3	
On-board generator option		
OCXO generator		OCXO

Management module

MOD-CUS-Y-L

MOD	CUS	Y	L
central 10G module for switch system and module management	CUS.2		
Version			
4x SFP+ slot (1G/2.5G/10G) - 4SP version, up to 32 Ethernet ports available in modules		4SP	
Routing option			
Standard			-
Static routing			L3

Power supply module

MOD-PSU-Z

MOD	PSU	Z
AC/DC power supply module to power the enclosure and modules	PSU.1	
DC power supply module to power the chassis and modules	PSU.2	
Version		
75W AC/DC power supply		75W
75W DC power supply		75W

SFP or UTP Transceiver Module

MOD-TRX-B-K

MOD	TRX	B	K
Transmission module with transceivers	TRX.1		
SFP version (applies to one module)			
8 x SFP (100M/1G) (100Mbps speed on Optical Interface only works with optical SFP inserts)		8S	
RJ45 version (applies to one module)			
8x RJ45 (10M/100M/1G)		8UG	
Standard function			
built-in primary 4kV 10/700µs ITU K.44 surge protection in TRX.1 modules on RJ-45 ports			K ¹

Legend:

1 - Only available in module with electrical interfaces in version 8UG

Dual media converter module

MOD-DMC-Z

MOD	DMC	Z
dual media converter with MACSec	DMC.1	
Version		
2x SFP (100M/1G) +4x RJ45 (10M/100M/1G) (The 100Mbps speed on the Optical Interface only works with optical SFP cartridges)		4UG2S

GNSS receiver module

MOD-QUAZAR-GPS-OCXO-X-Y

MOD-QUAZAR	GPS	OCXO	X	Y
GNSS receiver for chassis and module synchronization	GPS.1			
On-board generator version				
Type of on-board generator		OCXO		
On-board generator version				
OCXO generator with ± 20 ppb stability with sustained stability for a minimum of 0.5 hours				L
OCXO generator with ± 1 ppb stability with sustained stability for a minimum of 8 hours				M
OCXO generator with ± 0.2 ppb stability with sustained stability for a minimum of 72 hours				H
Version				
1x GNSS signal antenna input				1A

REDBOX module

MOD-RBX-Y

MOD	RBX	Y
RedBox PRP/HSR module without PTP support	RBX.0	
RedBox PRP/HSR module	RBX.1	
Version		
2x SFP (100/1000Mb/s). (The 100Mbps speed on the optical interface only works with optical SFP cartridges)		2S

Serial port server module

MOD-SRL-RS

MOD	SRL	RS
serial port server module	SRL.1	
On-board generator version		
4x RS485/422/232 server module with RJ45 connectors		4MR

H500CH-1U8.X-X - Enclosure (chassis)

Technical specifications

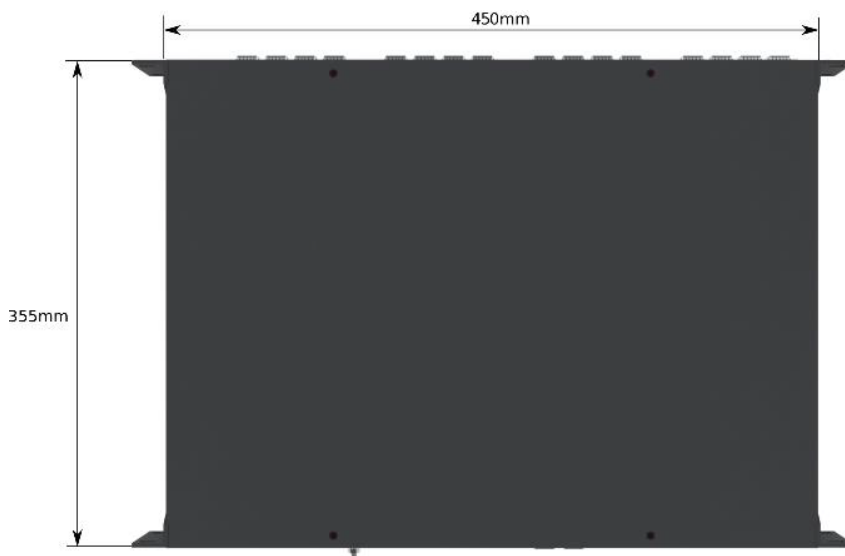
- ✓ 6 slots for various types of hot-swap modules,
- ✓ 2 dedicated slots for hot-swap power modules,
- ✓ The device is equipped with an OCXO on-board generator with parameters:
 - The stability over the temperature range of -40°C to $+85^{\circ}\text{C}$ is ± 10 ppb,
 - Holdover support of $\pm 1.5 \mu\text{s}$ - at constant temperature for a minimum of 1 hour,
- ✓ Local console: RS-232 CLI for management,
- ✓ Optional - 1 NO/NC relay output maximum switching current - 0.5A 60VDC with resistive load, screw connector
- ✓ Enclosure: Non-oxidizing metal housing with IP30 rating,
- ✓ Operating environment: Operating temperature: -40 to $+85^{\circ}\text{C}$ with a minimum airflow of 0.4m/s,
- ✓ Operating environment: Operating temperature: -40 to $+70^{\circ}\text{C}$ with a minimum airflow of 0.0m/s,
- ✓ The operating time at a maximum temperature of $+85^{\circ}\text{C}$ is up to 16 hours,
- ✓ Operating environment: Humidity (non-condensing): 5% -95%,
- ✓ Weight without modules: 5 kg,
- ✓ Dimensions with modules and mounting brackets [mm]: 483 x 367 x 45,
- ✓ A 19" high 1U kit for mounting in RACK cabinets.

Mechanical drawing

View - side

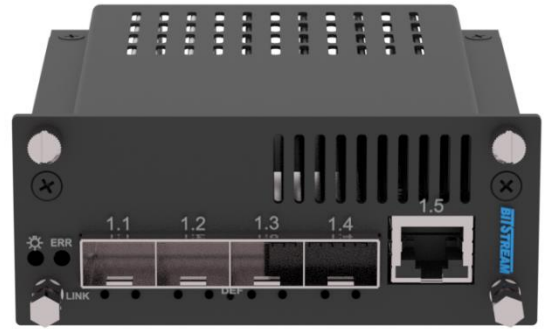


View - top



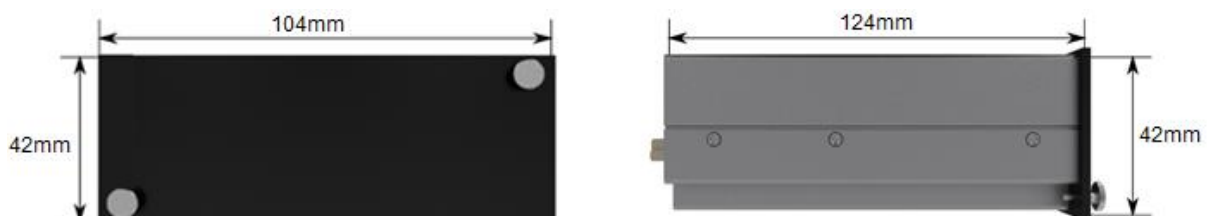
MOD-CUS - Central management module

Technical specifications



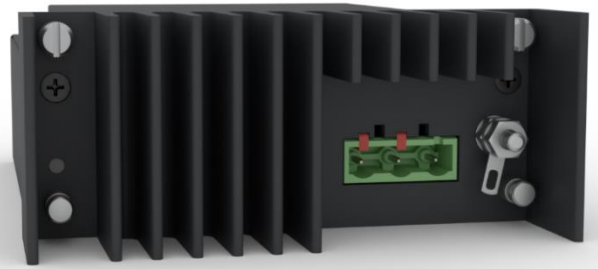
- ✓ Uplink interface: 4x SFP+ slots (1G/2.5G/10G),
- ✓ RJ45 10/100Mbps local Ethernet port for management,
- ✓ Independent management via own IPv4, IPv6, HTTP, HTTPS, Telnet, SSH and SNMP v1/v2c/v3, TRAP, Syslog,
- ✓ Support for DHCP Client, Server, Relay Option 82,
- ✓ The processor allows the creation of up to 10 interfaces with different IP addresses, separated by VLANs,
- ✓ Support for STP, RSTP and MSTP protocols,
- ✓ Ethernet Redundancy: ITU-T G.8032v2 Ethernet Ring Protection Switching, with connection reconfiguration in <20ms and ITU-T G.8031 EPS 1+1, 1:1,
- ✓ IEEE802.1x authentication, Radius, Tacacs+ - AAA,
- ✓ Synchronous Ethernet support on optical ports,
- ✓ IEEE 1588-2008 v2 PTP support,
- ✓ Support for NTP protocol in server/client mode and SNTP
- ✓ SFP DDMI: Monitoring of insert parameters for all SFP slots,
- ✓ Port Mirroring: independently copy network traffic to a specific port, monitor traffic on selected ports,
- ✓ Enclosure: Non-oxidizing metal enclosure with IP30 rating,
- ✓ Operating environment: Operating temperature: -40 to +85°C with a minimum airflow of 0.4m/s,
- ✓ Operating environment: Operating temperature: -40 to +70°C with a minimum airflow of 0.0m/s,
- ✓ The operating time at a maximum temperature of +85°C is up to 16 hours,
- ✓ Operating environment: Humidity (non-condensing): 5% -95%,
- ✓ Weight: 0.6 kg,
- ✓ Dimensions [mm]: 124 x 104 x 42.

Mechanical drawing



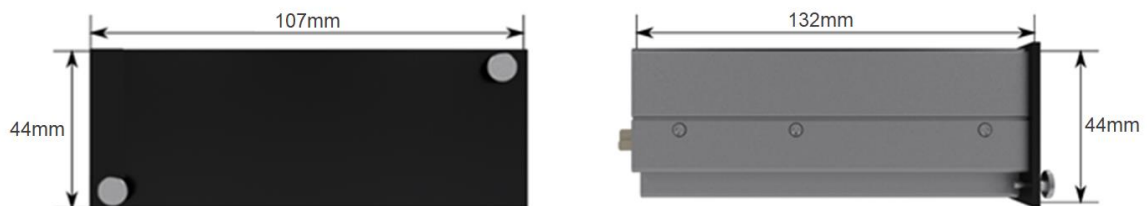
MOD-PSU - Power Supply Unit

Technical specifications



- ✓ Input voltage range: 80-350 V DC, 75-240 V AC,
- ✓ Power: 75 W,
- ✓ Input voltage range: 36-60 V DC,
- ✓ Power: 75 W,
- ✓ Connector: screw terminal - Terminal block,
- ✓ Power supply redundancy supported by Load Balance ,
- ✓ Enclosure: Non-oxidizing metal housing with IP30 rating,
- ✓ Operating environment: Operating temperature: -40 to +85°C with a minimum airflow of 0.4m/s,
- ✓ Operating environment: Operating temperature: -40 to +70°C with a minimum airflow of 0.0m/s,
- ✓ The operating time at a maximum temperature of +85°C is up to 16 hours,
- ✓ Operating environment: Humidity (non-condensing): 5% -95%,
- ✓ Weight: 0.5 kg,
- ✓ Dimensions [mm]: 132 x 107 x 44.

Mechanical drawing

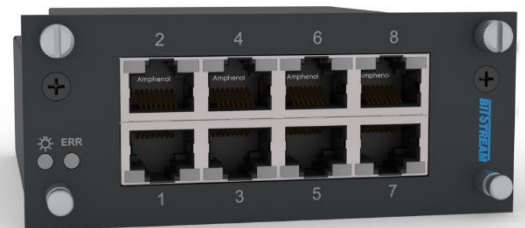


MOD-TRX - Transceiver module 8x UTP or 8xSFP

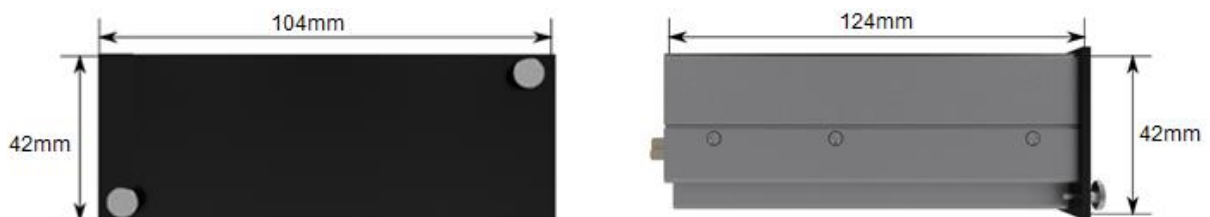
Technical specifications



- ✓ Transceiver module with 8x UTP RJ45 10/100/1000M ports,
- ✓ The transceiver module has 8x 100/1000M SFP slots for various types of optical SFP or copper modules (The 100Mbps speed on the Optical Interface only works with optical SFP inserts),
- ✓ Synchronous Ethernet support in 8xSFP optical module,
- ✓ IEEE 1588-2008 v2 PTP support,
- ✓ NTP protocol support in server/client mode and SNTP mode
- ✓ ITU K.44 - built-in primary, 4kV, 10/700us overvoltage protection in TRX.1 modules on RJ-45 ports in accordance with the requirements: Resistibility tests for telecommunication equipment exposed to overvoltages and overcurrents - Basic Recommendation,
- ✓ Reflectometer test in UTP module: Each RJ45 port can perform a reflectometric test of all pairs (4 pairs for 1000Base-T and 2 pairs for 10/100Base-Tx) for twisted-pair cable, that is, diagnostics of short circuits or breaks in pairs and the total length of the cable to the next active device,
- ✓ SFP DDMI: Monitoring of insert parameters for all SFP slots
- ✓ Signaling alarms and module status by LEDs,
- ✓ Enclosure: Non-oxidizing metal enclosure with IP30 rating,
- ✓ Operating environment: Operating temperature: -40 to +85°C with a minimum airflow of 0.4m/s,
- ✓ Operating environment: Operating temperature: -40 to +70°C with a minimum airflow of 0.0m/s,
- ✓ The operating time at a maximum temperature of +85°C is up to 16 hours,
- ✓ Operating environment: Humidity (non-condensing): 5% -95%,
- ✓ Weight: 0.5 kg,
- ✓ Dimensions [mm]: 124 x 104 x 42.



Mechanical drawing



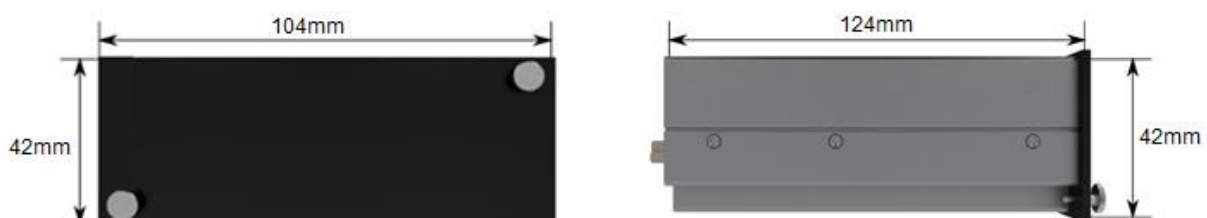
MOD-DMC Dual media converter module

Technical specifications



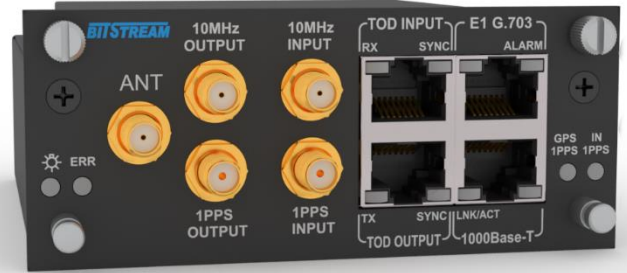
- ✓ The module has the following interfaces: 2x SFP 100/1000M slot and 4x UTP RJ45 10/100/1000M Ethernet port (The 100Mb/s speed on the optical interface works only with optical SFP inserts),
- ✓ Number of ports with **MacSec** encryption support: 2x SFP 100/1000M slot and 2x UTP RJ45 10/100/1000Mbit/s Ethernet port,
- ✓ Advanced transmission security with IEEE 802.1AE MAC security (MACsec) encryption and data integrity, GCM-AES-128 support, 128-bit AES keys,
- ✓ IEEE 802.1AEbn-2011 MAC security (MACsec) - encryption and data integrity support GCM-AES-256, 256-bit AES keys,
- ✓ Synchronous Ethernet support,
- ✓ IEEE 1588-2008 v2 PTP support,
- ✓ NTP protocol support in server/client mode and SNTP mode
- ✓ Independent management via its own IPv4, IPv6, HTTP, HTTPS, Telnet, SSH and SNMP v1/v2c/v3, TRAP, Syslog, as well as communication with the switch via an internal port, and the ability to block the module's communication with the HYPERION-500,
- ✓ Support for DHCP Client, Server, Relay Option 82,
- ✓ The processor has up to 10 interfaces with different IP addresses, separated by a VLAN,
- ✓ Support for STP, RSTP and MSTP protocols.
- ✓ Ethernet Redundancy: ITU-T G.8032v2 Ethernet Ring Protection Switching, with connection reconfiguration in <20ms and ITU-T G.8031 ELPS 1+1, 1:1,
- ✓ Support for IEEE 802.1x Port Based Network Access Protocol, EAP, TACACS+, RADIUS - authentication, authorization and accounting functions - AAA ,
- ✓ SFP DDMI: Monitoring of insert parameters for all SFP slots,
- ✓ Port Mirroring: independently copy network traffic to a specific port, Monitor traffic on selected ports,
- ✓ Enclosure: Non-oxidizing metal housing with IP30 rating,
- ✓ Operating environment: Operating temperature: -40 to +85°C with a minimum airflow of 0.4m/s,
- ✓ Operating environment: Operating temperature: -40 to +70°C with a minimum airflow of 0.0m/s,
- ✓ The operating time at a maximum temperature of +85°C is up to 16 hours,
- ✓ Operating environment: Humidity (non-condensing): 5% -95%,
- ✓ Weight: 0.5 kg,
- ✓ Dimensions [mm]: 124 x 104 x 42.

Mechanical drawing



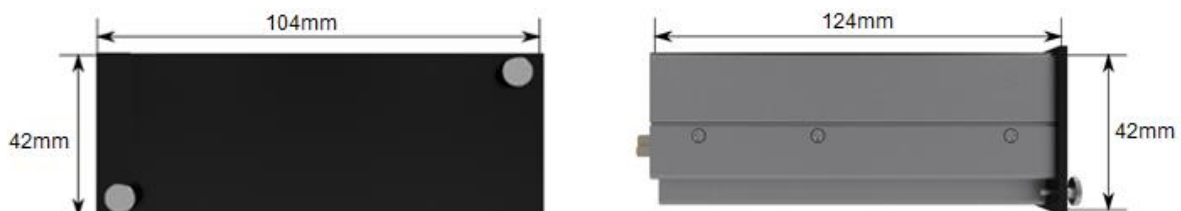
MOD-QUAZAR-GPS - GNSS receiver module for clock synchronization

Technical specifications



- ✓ Can be equipped with stable on-board generators with different parameters:
 - OCXO generator with -40 to $+85^{\circ}\text{C}$ stability of ± 20 ppb and holdover time of ± 1.5 μs at constant temperature for 0.5 hours,
 - OCXO generator with stability in the temperature range of -40 to $+85^{\circ}\text{C}$ of ± 1 ppb and holdover time of ± 1.5 μs at constant temperature for 8 hours, in the range of ± 8 μs at constant temperature for 12 hours,
 - OCXO generator with -40 to $+85^{\circ}\text{C}$ stability of ± 0.2 ppb and holdover time of ± 1.5 μs for a minimum of 72 hours,
- ✓ A 72-channel GNSS receiver that works with GPS, GLONASS, BeiDou, Galileo,
- ✓ Antenna input with SMA connector and support for active antennas,
- ✓ GNSS receiver sensitivity (max/min): $-167\text{dBm}/-159\text{dBm}$ with LNA option ,
- ✓ GNSS PPS signal precision: $\pm 40\text{ns}$ (Clear sky) ,
- ✓ Synchronous Ethernet support ,
- ✓ IEEE 1588-2008 v2 PTP support,
- ✓ Support for NTP in server/client mode and SNTP protocol
- ✓ Construction designed in accordance with the requirements of IEC61850-3, IEEE1613 standards,
- ✓ Enclosure: Non-oxidizing metal enclosure with IP30 rating,
- ✓ Operating environment: Operating temperature: -40 to $+85^{\circ}\text{C}$ with a minimum airflow of 0.4m/s ,
- ✓ Operating environment: Operating temperature: -40 to $+70^{\circ}\text{C}$ with a minimum airflow of 0.0m/s ,
- ✓ The operating time at a maximum temperature of $+85^{\circ}\text{C}$ is up to 16 hours,
- ✓ Operating environment: Humidity (non-condensing): 5% - 95% ,
- ✓ Weight: 0.5 kg,
- ✓ Dimensions [mm]: $124 \times 104 \times 42$.

Mechanical drawing



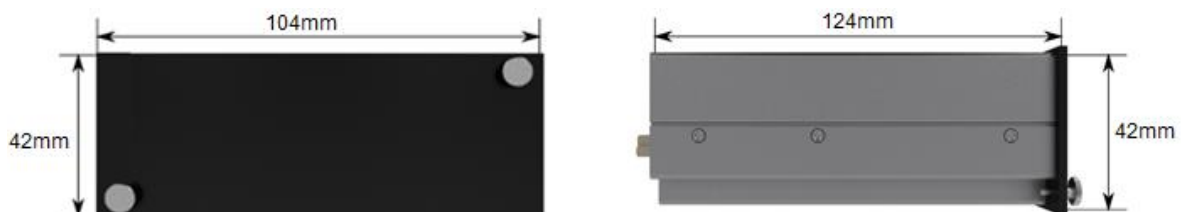
MOD-RBX - REDBOX module

Technical specifications



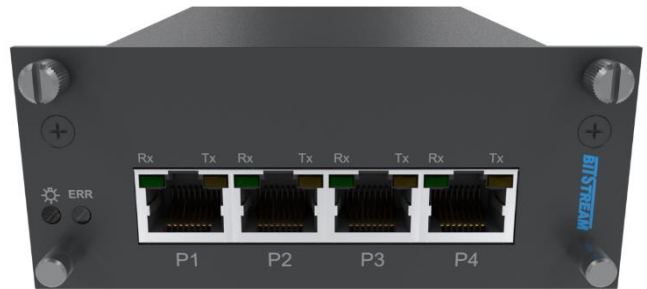
- ✓ A module that enables the creation of networks with lossless redundancy,
- ✓ In MOD-RBX module - 2x SFP slots (100/1000M supporting HSR (High-availability Seamless Redundancy) or PRP (Parallel Redundancy Protocol) protocols for network redundancy, Note: (100Mbps speed on Optical Interface only works with optical SFP inserts)
- ✓ 1x internal Ethernet port for communication with the switch,
- ✓ IEEE 1588-2008 PTP v2 support for PRP protocol and HSR protocol support - TC, BC modes supported,
- ✓ Construction designed in accordance with the requirements of IEC61850-3, IEEE1613 standards,
- ✓ Support for IEC 62439-3 Clause 4 standard,
- ✓ Ready for Mandatory Clause 4 2012 standard,
- ✓ Prepared for upgrade to Clause 4 2016 standard,
- ✓ Support for IEC 62439-3 Clause 5 standard,
- ✓ Prepared for upgrade to Clause 5 2016 standard,
- ✓ Enclosure: Non-oxidizing metal enclosure with IP30 rating,
- ✓ Operating environment: Operating temperature: -40 to +85°C with a minimum airflow of 0.4m/s,
- ✓ Operating environment: Operating temperature: -40 to +70°C with a minimum airflow of 0.0m/s,
- ✓ The operating time at a maximum temperature of +85°C is up to 16 hours,
- ✓ Operating environment: Humidity (non-condensing): 5% -95%,
- ✓ Weight: 0.5 kg,
- ✓ Dimensions [mm]: 124 x 104 x 42.

Mechanical drawing



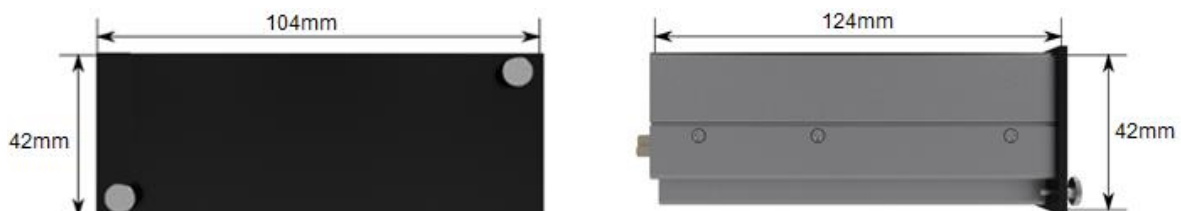
MOD-SRL - serial port server module

Technical specifications



- ✓ 4x RS485/422/232 server module with RJ45 connectors
- ✓ Available modes: SERVER, CLIENT, SSH,
- ✓ Raw socket encapsulation transmission for SERVER mode,
- ✓ Transmission speeds range from 300 to 230400 for RS232 bit/s and up to 1 Mbps on RS422/485,
- ✓ RS485 in full duplex mode (4 wires) or in half duplex mode (2 wires),
- ✓ Data bits: 5,6,7,8,
- ✓ Stop bits: 1, 1.5, 2,
- ✓ Parity bits: None, Even, Odd, Space, Mark,
- ✓ TCP and UDP protocols can operate in point-to-point or point-to-multipoint topologies,
- ✓ Sniffer mode (duplication) on each port and data stream,
- ✓ Loop function on the serial port and data transmitted in both directions,
- ✓ Independent management system using SSH, HTTPS, SNMP v.3 protocols with its own credentials,
- ✓ Enclosure: Non-oxidizing metal enclosure with IP30 rating,
- ✓ Operating environment: Operating temperature: -40 to +85°C with a minimum airflow of 0.4m/s,
- ✓ Operating environment: Operating temperature: -40 to +70°C with a minimum airflow of 0.0m/s,
- ✓ The operating time at a maximum temperature of +85°C is up to 16 hours,
- ✓ Operating environment: Humidity (non-condensing): 5% -95%,
- ✓ Weight: 0.5 kg,
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Mechanical drawing



Overview of licenses that extend the capabilities of the HYPERION-500 switch

SYNCE LICENSE - Synchronous Ethernet G.8261 - a license to add Synchronous Ethernet G.8261 (Timing and synchronization aspects in packet networks) functionality on optical ports , providing precise synchronization of internal clocks of devices using frequencies for energy applications, among others.

PTP SYNCHRONIZATION LICENSE with POWER PROFILE - License to extend in IEEE1588 PTPv2 protocol with POWER PROFILE - IEEE C37.238-2011, IEEE C37.238-2017 and IEC61850-9-3 for precise time synchronization among other applications in the power industry

Summary of licenses that extend the capabilities of the MOD-QUAZAR-GPS module

LICENSE 1P1T1E - license to extend the functionality of the GNSS module with additional output signals 1x 1PPS signal input and 1x 1PPS signal output, 1x 10Mhz signal input and 1x 10Mhz signal output, 1x TOD (Time-of-Day) signal input and 1x E1 G.703, G.704 signal output for synchronization in power networks, among others; with support for IEEE 1588 v2 Precision Time Protocol and SyncE,