



# BITSTREAM<sup>®</sup>

Leader in time synchronization and data transmission solutions



## Router Module MOD-RTR

*Designed for modern networks,  
where flexibility and security are key.*



Reliable



Easy to set up



Safe

# Features of MOD-RTR



## Reliable

The MOD-RTR router module has been designed to withstand operation in extreme environmental conditions. We have made a device that meets environmental standards for data transmission devices, and we additionally guarantee operational reliability at temperatures of -40° to +85°C with the conditions met.



## Sure

Discover the future of reliable data transmission with ZeroLoss, our innovative lossless transport mechanism designed specifically for multi-path systems. ZeroLoss ensures zero data loss, eliminating the risk of errors and packet loss, which is crucial for applications requiring the highest reliability, such as critical infrastructure systems. ZeroLoss is synonymous with modernity and reliability in the world of data transport.



## Easy to use

Introduce a new quality to your network infrastructure thanks to our unique **tunAKI and AReLink** solutions: Automatic, addressless full tunnels mesh is an innovative approach that eliminates the need to manually assign addresses, which significantly simplifies network management and increases its efficiency. Thanks to them, you choose an innovative, effective and safe solution that takes the quality of network management to a new level. Additionally, the module has an implemented ZEROcfg addressless mode for each physical and virtual interface. The function is an absolute novelty on the market and is a unique solution in this type of devices. Thanks to this function, the configuration process has been simplified as much as possible, which makes the device extremely user-friendly.



## The one you need

Dynamic routing protocol implemented in our module RAY, which was designed for critical infrastructure networks, offering millisecond response to network topology changes. It is characterized by zero overhead and neighbor authorization using the HMAC/SHA3 algorithm. Separate instances of the protocol run in each VRF, providing unparalleled flexibility and security.



## Safe

Our product uses Advanced Encryption Standard (AES) with a 256-bit key length, providing one of the highest levels of data security available on the market. AES is a symmetric encryption algorithm that is not only extremely effective, but also widely accepted around the world as a security standard. Thanks to the use of a 256-bit key, our device guarantees exceptional resistance to attempts to break encryption, protecting sensitive information against unauthorized access. The perfect solution for demanding applications that value the highest safety standards.

## Router module with full L3 layer for the Hyperion-500 industrial switch

- ✓ Module for creating and managing network elements and services with routing function.
- ✓ It supports dynamic routing protocols: RIP, OSPF, BGP and the very fast RAY routing protocol.
- ✓ Each port with MOD-CUS and MOD-TRX can work in router mode.
- ✓ 1Gbps transmission speed between switch and router
- ✓ Advanced transmission security using IPSEC protocols with support for AES256 or VERNAMA algorithms,
- ✓ Service Virtual Private Network-VPN protocol
- ✓ Built-in Layer 3 software firewall.
- ✓ Switch to an alternative route in less than 100 ms.
- ✓ Lossless redundancy with VRRP and ZeroLoss .
- ✓ Support for up to five independent routing engines with virtual routing and forwarding technology.
- ✓ Dynamic network address translation (NAT)
- ✓ Easy routing configuration with ZeroCnf .

## Key software functionalities implementing the transmission functions of the third layer router:

### General:

- ✓ VRF - Virtual Routing and Forwarding - RFC 7246, RFC 9381. Support for 5 independent virtual routing tables, enabling traffic isolation and flexible network management.
- ✓ VLS2 - Virtual Switch for Layer 2 - RFC 5650. Support for 4 virtual switches for layer two ( Layer 2), which allows for advanced traffic management in the local network.
- ✓ SDN architecture with full configurability . The interfaces can be connected to one of the 5 internal routers or one of the 4 internal switches.
- ✓ 802.1q (VLAN) - RFC4762, RFC7432, RFC6329, RFC8231, RFC8679, RFC6328.

### Addressing modes:

- ✓ DHCP SERVER - RFC2131, RFC2136, RFC1541, RFC4776. Support for up to 32 IP addressing ranges. It works on physical interfaces, virtual VLAN interfaces and VSL2 modules ( AReX ).
- ✓ DHCP Relay - RFC3046, RFC5010 – d0 32 ranges for all interfaces.
- ✓ DHCP CLIENT - RFC2131, RFC2136, RFC1541, RFC4776
- ✓ DHCP CLIENT RELAY - RFC3046, RFC5010
- ✓ PPPoE client – initialization and maintenance of the PPPoE connection with the remote PPPoE server . Used for automatic addressing.
- ✓ PPPoE server – dynamically assigns network addresses to client interfaces.
- ✓ Multi-IP – Multiple parallel addresses on one network interface.
- ✓ **ZEROCfg** – Addressless mode for each physical and virtual interface. The function is an absolute novelty on the market and is **a unique solution** in this type of devices. Thanks to this function, the configuration process has been simplified as much as possible, which makes the device extremely user-friendly.

## Management:

- ✓ SSH v.2
- ✓ WWW/HTTPS
- ✓ SCP - secure file transfer using an encrypted connection
- ✓ SFTP
- ✓ SNMP 3.0
- ✓ IGMP
- ✓ DNS

## Routing:

- ✓ RIP
- ✓ OSPF
- ✓ BGP
- ✓ **RAY** - a revolutionary dynamic routing protocol, created specifically for critical infrastructure networks. Our solution offers immediate response to network topology changes in milliseconds, which is an absolute **novelty** on the market. Thanks to **ZEROoverhead** technology and neighbor authorization using the advanced HMAC/SHA3 algorithm, we guarantee unrivaled security and performance. Moreover, unique instances in each VRF provide exceptional flexibility and reliability.
- ✓ Routing Performance - The 1 Gbps communication link between the H-500 and the router is an integral part of the system, ensuring a reliable connection and efficient communication.
- ✓ Routing Table – 64K

## Detection processes:

- ✓ LLDP
- ✓ ARP scan
- ✓ **NLDP** - Network Layer Discovery Protocol , **a unique** solution designed to collect information about the IP layer in the OSI model (layer 3). **The innovative** NLDP protocol ensures accurate and effective monitoring of the network layer, making it an indispensable tool for professionals.

## Security and firewall:

- ✓ Anti-DDOS – supported technologies ARP-Flood, FIN Scan, ICMP-Death, NMAP-ID Scan, NMAP-Xmas Scan, Null Scan, SYN/FIN Scan, SYN/RST Scan, SYN-Flood
- ✓ Firewall filter - Filtering based on assigning interfaces to zones. It allows you to filter incoming, outgoing and redirecting traffic, as well as create rules with IP, port number, zone and protocol restrictions.
- ✓ RPF - Reverse Path Forwarding
- ✓ NAT
- ✓ IPSec - Internet Protocol Security is used to secure Internet Protocol (IP) communications by encrypting and authenticating each IP packet in the data stream. Hardware supported.
- ✓ IKE - Internet Key Exchange is responsible for negotiating IPSec security association parameters and securely exchanging keys needed to encrypt and decrypt data traffic
- ✓ ISA/IEC 62443

## Diagnostics:

- ✓ PING IPv4/IPv6
- ✓ NSLookup

- ✓ Find MAX MTU
- ✓ IPv4 Stress test
- ✓ Measurement Jitter
- ✓ Speed test
- ✓ Syslog
- ✓ Bandwidth charts
- ✓ Connection charts
- ✓ System load charts

## Tunneling :

- ✓ GRE TAP/TUN
- ✓ L2TP
- ✓ **tunAKI** - Automatic, addressless full tunnels mesh is **an innovative** approach that eliminates the need to manually assign addresses, which significantly simplifies network management and increases its efficiency.
- ✓ **AReLink** - Automatic, addressless full tunnels mesh is a **unique** network solution enabling addressless communication in a full mesh topology , dedicated to transporting Layer 2 (L2) data within Layer 3 (L3) of the OSI model. The system automatically configures tunnels between all nodes on the network, eliminating the need to assign IP addresses, simplifying management and configuration.
- ✓ **ipsAKI** - is **a unique** solution that ensures automatic creation of IPSEC tunnels for data transport. Tunneling is side -to- side , which means it provides secure connections between pairs of nodes on the network, protecting data during transmission.

## Reliability:

- ✓ **ZEROloss - Innovative** loss-free transport mechanism in multi-path systems
- ✓ VRRP
- ✓ STP

## Synchronization time :

- ✓ NTP Client/Server
- ✓ SNTP Client/Server

## Encryption :

- ✓ Crypto - Supported: AES 256. Software cryptography 200Mb/s.
- ✓ SHA256
- ✓ RSA
- ✓ X509.N3
- ✓ AES256

## User management:

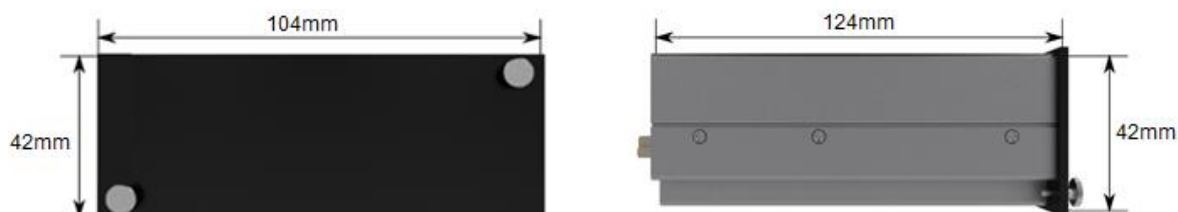
- ✓ Possibility to create up to 1,000 unique user accounts in the system, each protected by 2FA and permission level configuration
- ✓ Possibility authorization users behind help multi-factor authentication

## Supported standards and recommendations\*:

RFC7246, RFC9381, RFC5650, RFC4762, RFC7432, RFC6329, RFC8231, RFC8679, RFC6328, RFC2131, RFC2136, RFC1541, RFC4776, RFC3046, RFC5010, RFC2131, RFC2136, RFC15 41, RFC4776, RFC3046, RFC5010, RFC4253, RFC4251, RFC4252, RFC4256, RFC4254, RFC2660, RFC2818, RFC5251, RFC3410, RFC3411, RFC3412, RFC3413, RFC3414, RFC3415, RFC3418, RFC3376, RFC2236, RFC4604, RFC4541, RFC1112, RFC1034, RFC10 35, RFC9499, RFC1886, RFC2136, RFC2328, RFC3630, RFC5340, RFC5185, RFC7474, RFC4271, RFC4456, RFC4893, RFC4272, RFC7911, RFC 938, RFC4957, RFC7212, RFC3825, RFC4113, RFC7891, RFC8704, RFC5496, RFC1631, RFC2663, RFC4787, RFC78 57, RFC4301, RFC4302, RFC4303, RFC4307, RFC2401, RFC2402 RFC2406, RFC2409, RFC7296, RFC4307, RFC7321, RFC3164, RFC5424, RFC5425, RFC5848, RFC5426, RFC1701, RFC1702, RFC 2784, RFC 2890, RFC2637, RFC2890, RFC8086, RFC2661, 3931, RFC3308, RFC3371, RFC5798, RFC3768, RFC6527, RFC2338, IEEE 802.1D, RFC7727, RFC5905, RFC5906, RFC7822, RFC5907, RFC5908, RFC8914, RFC3410, RFC3411, RFC3412, RFC3413, RFC3414, RFC3415, RFC3418, RFC6234, RFC4634, RFC 8017, RFC2313, RFC3447, RFC5280, RFC6187, RFC3962, RFC3565, RFC3686, RFC6188, ISA/IEC 62443

\* - the list of supported standards may change as the device develops.

## Mechanical drawing



## Designations

**ROUTER module**

**MOD-RTR**

MOD

**Router module**

RTR

RTR.1



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