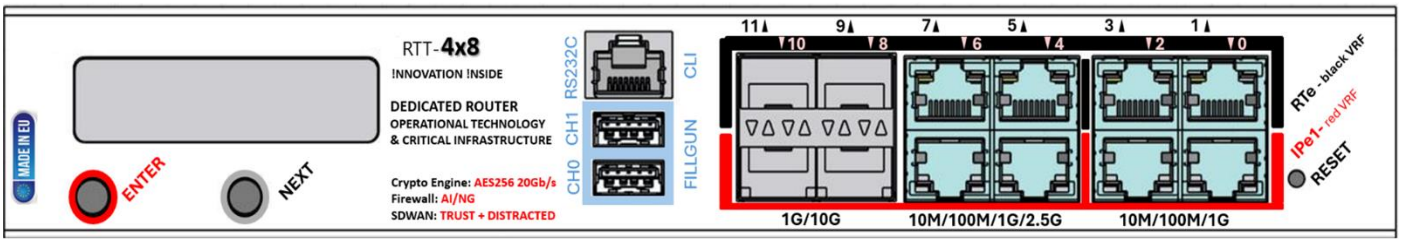
# ROUTER **RTT-4x8**

Datasheet 1.14




## Description

RTT - is a family of POLISH IPv4/IPv6/MPLS/SR routers for use in OT (Operational Technology), IT (Information Technology) systems and especially for building critical infrastructure.

The system includes ROSe software developed to support network devices and dedicated hardware platforms. Hardware solutions include a collection of the latest features and standards used in network systems, 10Gbps interfaces, dedicated network and cryptographic processors, dedicated security hardware, and extensive functions designed for continuous monitoring and built-in test (BIT). The device is designed for continuous operation

All devices in the RTT family have been developed, designed, programmed and manufactured in Poland

What distinguishes RTT devices from existing solutions are the extensive security functions and protection of transported data with maximum automation of operator activities. It is worth noting that the automation of human work is not a breakthrough in system security. Extensive three-factor security keys, full encryption of maintenance communications, certificates and MFA mechanisms, hardware cryptographic keys and identifiers are the highest global standards or pioneering solutions in this field.

The design of the device is fully compliant with www.commoncriteriaportal.org for network devices (Collaborative Protection Profile for Network Devices).

The RTT device meets stringent IEC 62443 standards at the SL4 level and Common Criteria ISO 15408, which qualifies it, for use in high-risk networks exposed to cyber and physical attacks.

## Use case

RTT routers are designed for applications in special systems where system security, protection of sensitive data, protection of teletransmission infrastructure and guarantees of information delivery are given priority.

**Special and unique RTT/ROSe features**

- Ultra-fast, automatic reconfiguration of network topology and system reorganization in ISO/L3. Full rebuild time up to 0.001s! (RAY2, RAY3).
- Lossless data transport in multipath networks (ZEROloss).
- Error-free radio, satellite and wired links correcting deep signal fades (up to 3s) and BER 10-3 bit errors.
- LAN/WAN system autoconfiguration (ZEROcfg)
- Aggregation of multiple links into fast network telestrades (HWAY, BOLT).
- Mechanisms for automatic entry into work in any legacy networks (OSPF/AC) with detection of settings and addressing of cooperating devices (any manufacturers).
- Multi-factor credentials, passwords and access keys (ODA).
- Multi-factor authentication in private and isolated networks (eDSP, xHODOR).
- Zero-overhead tunnel transport protocols (ZEROfrag).
- Zero-overhead routing (HSR).
- Tunnels – automatic, stateful, addressless, encrypted (ipsAKI, tunAKI).
- L2 addressless networks over multi-domain IPv4/IPv6 networks (AReLink).
- Personalization and construction of router functionality by a security administrator or integrator (sROSh).
- SDWAN – decentralized SDN system (AKI).
- Segmentation of network resources between 9 real internal routers and 4 internal switch modules



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Extensive data protection functions, very high network and cryptographic performance predispose the device to work in all environments with increased security and reliability requirements.

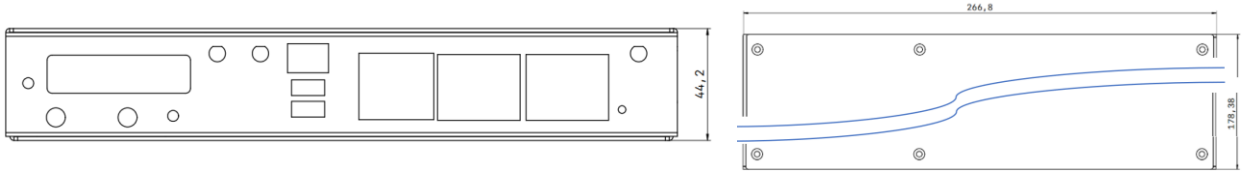
## Technical specs

| Function | Amount | Description |
|---|---|---|
| ETHERNET SFP / SFP+ | 4 | Interfaces support 1Gb/s and 10Gb/s speeds. Each module is independently derived from the network processor, without performance limitations when handling data (e.g. routing, DPI, compress, crypto). |
| ETHERNET RJ-45 2.5 Gb/s | 4 | The modules support 10/100/1000/2500 Mb/s throughput. Autonegotiation in throughput and duplex. 2.5Gb/s interface - does not require specialized cabling and works correctly on CAT5 or higher infrastructure. Interfaces connected directly to the processor. |
| ETHERNET RJ-45 1Gb/s | 4 | Modules support 10/100/1000 Mb/s throughput. Autonegotiation of throughput and duplex. Interfaces connected directly to the processor. |
| NET PROCESSOR | 8 | Specialized network processor. From 8 to 24 native 64bit cores in x86 architecture.<br>Extended operating temperature range, meeting industrial and military standards. |
| CRYPTO PROCESSOR | 2 | Dual cryptographic module based on QAT@INTEL technology. Support for AES256 family algorithms and SHA3 hash function. Cryptographic performance above 20Gb/s. |
| SECURE PROCESSOR | 1 | Secure digital vault for storing sensitive data and performing SECUREBOOT functions. Digital FUSES and write-once memory for storing serial numbers, public/private keys, PKI data. |
| STORAGE | 2 | Non-removable, permanently integrated with the router board, soldered and glued. Encrypted, secure.<br>DUALBOOT support with two independent system images.<br>In the event of a firmware failure, the device will start from a backup copy. |
| LOCAL CONSOLE | 2 | RS232 115200 8n1<br>USB-C device (virtual UART) |
| PORTY USB 3.0 | 2 | Dedicated to xHODOR access keys and FILLGUN keys for secure configuration transfer. Support for any external memory and drives. |
| POWER SUPPLY | - | RTT – AC230V IEC C14 socket, internally fully redundant with extended input tolerance 85-265V. RTT – fully redundant power supply including duplicated DC20–60V power connectors dedicated to telecommunication and industrial systems. |
| WEB UI | - | Graphical, OLED interface for monitoring and basic device control. Channel for MFA configuration. |
| MOUNT CASE | - | Metal EMC. Height 1U (44mm). Adapters for mounting in a 19” rack or rubber feet for mounting in an office space. |

## Mechanical and climatic classification

The RTT device can be used in industrial or special systems. It does not require air-conditioned rooms and cabinets.

- Operating temperature: -20°C to +65°C at 0.4 m/s air flow
- Operating temperature: -30 to +50°C with minimum airflow of 0.0 m/s.
- Operating time at maximum temperature of +65°C is up to 16 hours
- Available RTT industrial versions meeting IP66 and IP67



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## Construction solutions

• **True VRF** – the device supports 9 fully independent, separated, working on separate processors, virtual routers. VRFs enable traffic isolation, including independent instances of tunneling and routing protocols and flexible network management. (RFC7246, RFC9381)
• **OVS** – 4 virtual Layer 2 switches referred to as ARe1-4. ARe modules enable advanced traffic management in the local network, configuration of L2 tunnels, MACsec and automatic AReLink tunnels. (RFC5650)
• **SDN/SDWAN** with full dynamic configurability in the L2/L3 range with cryptography based on AES256/SHA3. Interfaces can be switched between all VRF and OVS instances. System compliant with the SDWAN concept with automatic orchestrator selection – removing the basic pain point of the SDWAN system in sensitive networks. • VLAN (IEEE 802.1q, RFC4762, RFC6328, RFC6329, RFC7432, RFC8231, RFC8679)
• **ZEROcfg** – a mechanism for automatic device configuration and address reduction. Using this mechanism simplifies network management to the maximum.
Routing
• **RAY** – a routing protocol inspired by military self-organizing radio networks. Thanks to its fast response to changes in the network (typically 0.256s), RAY ensures dynamic and responsive communication in changing conditions. Additionally, it is equipped with a mechanism for reducing management traffic and a mechanism for the permissible difference in throughput in building a neighborhood.
• **RIP** (RFC2082, RFC2453, RFC4822)
• **OSPF** (RFC2328, RFC5709, RFC6506, RFC7474)
• **OPSP/ZC** – a mechanism integrating the OSPF protocol with ZEROcfg technology. It allows for effective address management using ZEROcfg interfaces, without the need to declare areas and networks, which significantly simplifies configuration and optimizes network operation.
• **OSPF/AC** – a mechanism designed to work with any router supporting the OSPF protocol, which allows for automatic detection and adjustment of all settings to the existing, current OSPF configuration.
• **BGP** – basic routing used in wide area networks. (RFC2918, RFC4271, RFC4360, RFC4760, RFC6286)
• **Tunnel routing** – a routing solution dedicated to automatic tunnels. It is based on tunnel identifiers, which enables effective connection management without the need to refer to system names.
• **PIM** – in the ROSe system it works in cooperation with the IGMP protocol from version 1 to 3. (RFC1112, RFC2236, RFC3376, RFC3963, RFC4601)
Discovery
• **LLDP** – detection and presentation of devices in the LAN. (RFC6204, RFC6434, RFC7323)
• **NLDP** – Network Layer Discovery Protocol, a protocol whose task is to collect information about the network, present devices and their capabilities. Transmission fully encrypted with AES256 algorithms.
Tunnels
• **mGRE** (RFC6204, RFC6434, RFC7323)
• **L2TP** (RFC2661, RFC3519, RFC3931)
• **GRE** TAP/TUN (RFC2784, RFC2890)
• **AReLink** – a solution of stateful and automatic L2inL3 tunnels with packet assembly/disassembly.
• **tunAKI** – a proprietary solution of stateful and automatic L3inL3 tunnels.
Security
• **ODA** – three-component keys (Organization + Domain + Administration) – individual password components defined in 3 different places by 3 different centers. Organization key stored in the firmware, different for each primary recipient. Domain key defined by the Integrator. Administration key defined by the system Administrator. Compromising any two key components (e.g. Organization + Administration) does not threaten system security.
• **Integrator** – a role in the system performed by the Security Administrator in the Target Organization or the Security Officer. The Integrator creates security rules, sets keys and domain certificates, locates the device for a specific role in the system. Post-production of the device and user interface.
• **PKI** (RFC3280, RFC3647, RFC4210, RFC5280, RFC6960)
• **HODOR xKEY** – physical digital keys identifying the user. Communication via USB or Bluetooth.
• **MFA** using a proprietary mobile application generating one-time QR codes.
• **x509**.N3 certificates (RFC2459, RFC3279, RFC4120, RFC5280)
• **Rendevouz Point** – a mechanism that allows the establishment of ipsAKI, tunAKI and AReLink tunnels from private networks (also behind NAT) via the public Internet.
Secure Transport
• **VPN** – fully compliant with (RFC2401, RFC2406, RFC4301, RFC4306, RFC7255)



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• **ipsAKI** – proprietary solution for fully automatic IPsec tunnels in tunnel mode.

• **MACsec** (RFC4538, RFC5679, RFC7102, RFC8345, RFC9053)
• **IPsec** (RFC4301, RFC4302, RFC4303, RFC8221)
• **IKE** (RFC4306, RFC5996, RFC7296, RFC8247)
Cryptography
• **Elliptic Curves** (ECP521, ECP384, ECP256, ECP224, ECP192)
• **Specialized Elliptic Curves** (448, 25519)
• **Algorithms** (AES: 256, 192, 128; AESCTR: 256, 192, 128; Blowfish: 256, 192.128)
• **SHA** (512, 394, 256)
• **SHA/HMAC**
Reliability
• **ZEROLoss** – a proprietary solution that replicates output data to all parallel connections in a multipath system


## Guarantees, licenses, updates, training

• **Perpetual license** – no hidden costs associated with using ROSe software.
• **No forced updates** – the device does not require connection to the Internet or the manufacturer's domain to refresh licenses / certificates / keys.
• **3 functional updates per year** – containing new ROSe system functions. Updates are optional – the device will work properly without installing the update.

• **Security updates** – issued ASAP (typically 48h).
• **Service** – hot service devices, replacement of the device with a working one, minimizing system downtime.
• **Technical training** – carried out directly by the manufacturer, by people creating network solutions – this is the best source of information.
• **Warranty up to 66 months** – typically 24 months.



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## Software

• **ROSe** (Router Operating System – Enhanced) – an original project of eFAB, focused on efficient processing of network traffic at a very high level of security with unique features in terms of automatic configuration, security, separation and tunneling.

• **ROSe software** – a complete operating system dedicated to network devices.

• **ROSe** is software fully compliant with the SDWAN concept and is intended for network devices used in critical infrastructure systems such as energy, transport, water supply and military and government systems.

• Thanks to the use of advanced protection mechanisms, **ROSe** ensures reliability and security of operations in the most demanding environments, which makes it an irreplaceable tool in critical infrastructure management**.**



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