TRX R1

Compact Modem/Router for Distributed Antenna Architectures

TRX R1 is a compact EN rail compliant modem/router for distributed connectivity architectures on board trains and buses. TRX R1 is designed to be positioned close to the antenna, requiring a maximum of 15 watts of power (when active on the mobile network).

TRX R1 supports Wi-Fi 6 and Gigabit Ethernet alongside a 4G or 5G modem. It is also a good fit for the radio function in the FRMCS TOBA architecture (OBRAD).

TRX R1 is underpinned by KlasOS Keel operating systems, ensuring the highest levels of protection of the device, administrative functions, and end-user data in transit.

KEY FEATURES

- Support for one cellular modem (3G/4G/5G)
- Wi-Fi and Ethernet connectivity
- Runs KlasOS Keel, enabling advanced networking, routing, and switching
- Easily managed through integrated Keel CLI or SNMP via a single IP address
- High power efficiency (max. 15 W when modem is active)
- Ideal for low noise environments, passively cooled
- Integrated with the Klas Blackrock fleet management solution
- Integrated with the Klas SD-WAN link aggregation solution
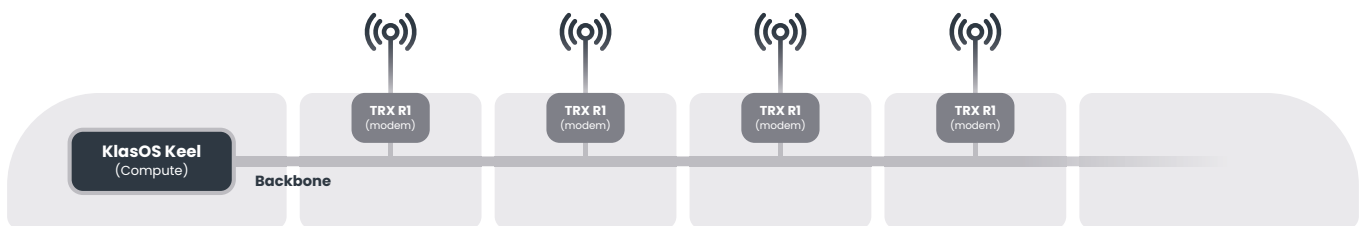
TRAINS   AUTONOMOUS   FLEET

KlasOS Keel
(Compute)

Backbone

TRX R1 (modem)   TRX R1 (modem)   TRX R1 (modem)   TRX R1 (modem)

Figure: TRX R1 distributed modem and connectivity architecture

KLAS

TRX R1

Specifications

ORDERING INFORMATION

- Part No: KLAS-TRX-R1

PROCESSING

- Quad Cortex-A53, 8GB RAM

STORAGE

- NVMe 2242 PCIe Gen3 x 4 SSD (256 GB)
- 64 GB eMMC
- Micro-SD card slot

MODEM OPTIONS

- Telit FN990A40 with x 2 SIMs
- Telit Cinterion MV31 with x 2 SIMs
- 4 x QMA antenna connectors

WI-FI

- 2 x 2 MIMO Wi-Fi 6
- 2 x QMA antenna connectors

GNSS

- Passive and active antenna support
- 1 x QMA antenna connector

NETWORKING AND INTERFACES

- 3 x Gigabit Ethernet in X-Code M12 format
- 1 x USB 3.1 Type-A
- 8 x GPIO
- 1 x microUSB-B console port
- 1 x HDMI

PHYSICAL SPECIFICATIONS

- 235.6 mm (W) x 130 mm (L) x 91.5 mm (H) (9.28" x 5.12" x 3.6")
- 2.1 kg (4.6 lb)

ELECTRICAL SPECIFICATIONS

- 24 - 110 VDC M12 A-coded connector
- Max 15 W with active modem
- Separate M6 earthing point
- Ignition protected

TEMPERATURE RANGE

- Fanless design with passive cooling
- Operating temp (OT4): -40°C to 70°C (-40°F to 158°F) (EN50155:2021 OT4 Class, ST1 +15C for 10 mins)
- Storage temperature: -40°C to 85°C (-40°F to 185°F)

COMPLIANCE

- EN 50155:2021 / OT4 Class, ST1
- EN50155:2021 Railway Applications - Electronic equipment used on rolling stock (EN50155: Heat, Cold, Vibration and Shock)
- FCC Part 15 B
- CE
- RoHS, REACH

OPERATING SYSTEM

- KlasOS Keel

MANAGEMENT

- Keel - SSH, Telnet, console
- SNMP v1/v2/v3
- Syslog
- Blackrock - Ansible automation and monitoring

Operating System Overview

KlasOS Keel

Keel is a lightweight Linux-based open source operating system, developed and maintained by Klas. Keel is optimized for TRX R1 and edge devices, providing routing and virtualized switching, SD-WAN, and firewall capabilities. Alongside cellular connectivity management, Keel offers traffic prioritization and dynamic routing over available WAN network paths. Keel is verified as a secure OS in accordance with NIST standards.

Learn more — https://www.klasgroup.com/keel/

KLAS

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