**H2-Rail: Communications Gateway for Railway**

Multi-service Communication Platform for Train-to-Ground communications

### Introduction

The H2-Rail router is a multi-service communications platform for railway environments. It provides reliable 4G/LTE broadband and Wi-Fi communications with redundancy options, bandwidth aggregation and advanced network security mechanisms.

The hardware design is compliant with railway regulations for installations on lightweight and high-speed trains or trams, is EN 50155 certified to meet vibration and emission requirements, and offers an extended operating temperature range.

The router also provides extremely reliable communications using dynamic configurations (based on location/communications quality data).

### Product Highlights

- Multi-service communications platform
- Multiple WWAN (bandwidth aggregation & load-balancing)
- Compliant with railway regulations
- Geo-fencing: GPS-based dynamic configuration
- Standard-based service isolation
- Built-in switch for connection to other systems
- Complete Wi-Fi solution (management, hotspot & APs)

### Interfaces

<table>
<thead>
<tr>
<th>H2-Rail</th>
<th>Up to 4 x 4G/LTE Module</th>
<th>Yes (depending on the model)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Up to 3 x 802.11ac Wi-Fi (client and AP)</td>
<td>Yes (optional)</td>
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<td></td>
<td>4 x 10/100/1000 Mbps Giga-Ethernet (M-12)</td>
<td>Yes</td>
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<td></td>
<td>Asynchronous serial port (RS-232) (DB-9)</td>
<td>Yes</td>
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<td></td>
<td>Built-in GPS (NMEA) (FME connector)</td>
<td>Yes (optional)</td>
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<td></td>
<td>72-110 or 24 VDC power input (M-12)</td>
<td>Yes</td>
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<td></td>
<td>2 x N-Type per LTE module (MIMO)</td>
<td>Yes</td>
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<tr>
<td></td>
<td>2 x N-Type per Wi-Fi module (MIMO)</td>
<td>Yes</td>
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### Competitive Advantage

<table>
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<tr>
<th>Advantage</th>
<th>Description</th>
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<tr>
<td>Concurrent multiple WWAN interfaces</td>
<td>Up to 4 simultaneous LTE and/or Wi-Fi radio links, with bandwidth aggregation and load-balancing to ensure maximum availability and application continuity.</td>
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<td>Ruggedized hardware</td>
<td>Designed to withstand vibrations and extreme temp (-25 to 70°C). Certified according to railway standards (EN 50155, EN 50121-3-2, EN 45545-2, EN 301 908-1)</td>
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<tr>
<td>Service and GPS-based automation</td>
<td>Communication monitoring (availability/quality) and location tracking for dynamic routing policies per-service/link/position.</td>
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<tr>
<td>Corporate networking software</td>
<td>Uses the latest IP networking technologies for vehicles, bringing security, quality and ease of use to large-scale, multi-service deployments.</td>
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Scenarios

Key Features

**Broadband with up to 4 concurrent LTE connections**  Support for up to 4 WWAN modules (4G/LTE). Each module can operate independently of the other or as backup. One of the modules also supports up to 2 x SIM for operator redundancy.

**4G/LTE Quad-SIM for telecom carrier redundancy**  Quad SIM feature – using a single module for two telecom operators, employing one to back up the other and using only one of the modules.

**Wi-Fi 802.11ac for passengers (AP) or stations(client)**  An 802.11ac Wi-Fi module means the device can provide Wi-Fi services to passengers throughout their journeys (multiple SSIDs & integration hotspot platforms) and act in client mode to connect to external Wi-Fi networks.

**Hardware design for use on trains**  Designed to withstand vibration and extreme temperatures (-25 to 70°C) and has full onboard train certifications (EN 50155, EN 50121-3-2, EN 301 511, EN 301 908-1, EN 45545-2).

**Compatible with standards-based management platforms**  Seamless integration with third party standards-based management tools (SNMP). It has also been integrated into Teldat’s Colibri network manager platform for remote monitoring and management.

**Bandwidth aggregation/load balancing**  Concurrent use of multiple WAN interfaces (LTE, Wi-Fi, satellite, etc.) to distribute and/or aggregate load from multiple services on different interfaces, thus optimizing coverage areas and enhancing overall performance.

**Secure, isolated multi-service communications**  The use of advanced networking protocols with multiple WAN links allows the services and management of the different solutions sharing the communications to be logically separated from each other.

**Location-based (GPS) dynamic behavior**  Ideal for telemarketing and fleet management. The device has a GPS (accessible via a TCP port) that provides real-time geo-location data in NMEA format.

**High throughput for demanding behavior**  Up to 628 Mbps of throughput to provide powerful communications for highly-demanding communication scenarios such as those requiring encryption, VRF, policy routing and QoS.

**Advanced troubleshooting (fine-tuned, cloud)**  Advanced troubleshooting (such as sniffer and syslog) for analyzing service/position/coverage problems along the route. Cloud management and auto-provisioning allow even unskilled personnel to install the equipment.
HARDWARE TECHNICAL FEATURES

- **Up to 4 concurrent WWAN Interfaces (LTE/HSPA+/HSPA/EDGE)**
- **Up to 4 built-in hardware modules with LTE/HSPA+**
- **2 external antennas with 1 x Type-N connector per module**
- **LTE/DC-**
- **HSPA+/HSPA/UMTS/EDGE/GPRS/LTE/EVDO/1xRTT (inquire about others)**

**802.11ac Wi-Fi interface**
- 802.11ac selectable band (2.4/5 GHz) with AP and client mode
- 2x2 MIMO external antennas (type-N connector) per module
- WEP, WPA, WPA2 security. WMM QoS. Multi SSID.

**Dimensions and Weight**
- Length x Width x Height: 186 x 483 x 43,6 mm (1U on a rack)
- Approximate weight: 3.3 Kg
- Flexible installation: rack and horizontal

**Gigabit Ethernet interfaces**
- 4 x 10/100/1000 BaseT Giga-Ethernet switch (X-coded M-12 connector)
- LEDs on each port for installation troubleshooting
- Support duplex, IEEE 802.3u link-speed auto-negotiation, VLAN and 802.1x

**GPS Interface**
- Active GPS antenna with FME and NMEA protocol
- 48 channels, high sensitivity and WAAS support
- Provision of local and remote information

**Environmental specifications**
- Temperature: -25 to 70 °C
- Relative humidity: 5 to 95%
- Shock and vibration resistance (EN 61373)

SOFTWARE TECHNICAL FEATURES

**Specific Wi-Fi functions**
- Hotspot Gateway function for hotspot service support
- WLAN controller function for Teldat’s built-in APs
- Location-based dynamic function (AP or client)

**IP protocol (2)**
- Multicast: IGMP (v1, v2, v3), PIM-SM, MSDP, MLD, MLDv2
- PSLA service probes (delay, packet loss, jitter)
- High availability: VRRP, TVRP (HSRP compatible)

**Security (2)**
- Certificates: CSR, SCEP, X.509v3, PKIX, LDAP revocation
- Static and dynamic access lists and session-based firewall
- DoS/DDoS attack detection

**Quality of Service (QoS)**
- Classification, marking, BW management, BW prioritisation and limitation
- Up to 32 classes 16 queues per interface
- Priority Queuing (PQ), Low latency (LLQ), by weight/type (WFQ, CBWFQ)

**Management**
- CLI configuration and storage in a plain text file
- Assignment of user/group licenses
- RADIUS and TACACS+ compatible AAA support

**IP protocol**
- ARP, ARP Proxy, MTU discovery, NAT, ECMP, BFD
- RIP, OSPF, BGP, policy-based static and dynamic routing
- Virtual Router Forwarding (Multi-VRF)

**Security**
- IPSec support in transport and tunnel mode (including DMVPNs)
- Pre-shared authentication, RSA, Certificates, MDS, SHA-1
- DES (56 bits), 3DES (168 bits), AES (128, 192 and 256 bits), IKEv1, IKEv2

**IP Services**
- Telnet, DHCP, DNS, FTP, SFTP, and SSH server and client
- NTP, LDAP, Syslog, SCP client. TFTP server
- DHCP, dynDNS relay

**Specific WWAN functions**
- Automatic hand-over (passive and active probe-based detection)
- Advanced link monitoring (packet error, latency, jitter)
- Quadruple SIM and module associated with the hand-over mechanism

**Management (2)**
- Netflow, RMON V5 and V9, SNMPv1, v2c v3, Syslog support
- Manageable via SMS
- Wireshark-compatible remote traffic capture

ADDITIONAL TECHNICAL FEATURES

**Console interface and asynchronous serial port**
- DB-9 connector with proprietary pinouts (including adapter)
- Type RS232, N81
- Default speed 9600 bps. Maximum speed: 115200 bps

**Advanced GPS functions**
- GPS geo-fencing for location-based dynamic behavior
- Location-based link/route activation
- Location-based interface management (such as Wi-Fi as client/AP)

**Load balancing and bandwidth aggregation (OLA)**
- Open Link Aggregation Protocol
- Intelligent IPSec-based load balancing aggregation mechanism
- Application continuity and per-session load balancing

**Onboard environment ruggedness and power supply protection**
- 72-110 VDC or 24 VDC power supply
- Certifications: EN 50155, EN 50121-3-2, EN 301 511, EN 301 908-1, EN 45545
- 20 W consumption, screw-on connectors (M-12, type-N and FME)
FLEXIBLE COMMUNICATIONS SOLUTIONS THAT GROW WITH YOU.

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Teldat is a leading provider in Enterprise Communications equipment and Services for the top corporate to mid-sized and SME markets.

About TELDAT

Teldat Group is a leading technology holding that designs, manufactures and distributes advanced Internetworking platforms for corporate environments, providing new and cutting-edge communication solutions without ever losing sight of its customers real requirements. Teldat's solutions development is based on proprietary technology, which is in the Group's DNA. This allows Teldat to be a leading provider in Enterprise Communications equipment and Services for the top corporate to midsized markets, as well as the SME and SoHo markets.

From a geographical viewpoint, Teldat Group has a presence in all continents, with its corporate headquarters located in Spain, and operational affiliates in Europe (Germany, Austria, Portugal, Italy and France) and in LATAM (Mexico and Brazil), as well as two business development offices in USA and China.