H1-Rail onboard router for Trains

LTE and Wi-Fi railway communications platform

Introduction

The H1-Rail router is the multi-service communications platform for railway environments. It provides reliable 4G/LTE and Wi-Fi broadband communications with redundancy, aggregation and advanced network security mechanisms options.

Hardware design according to railway regulations for installations on lightweight trains, trams or high speed trains, with protection against vibrations and emissions according to EN 50155, extended temperature range.

It also communications with dynamic configurations extremely reliable (through to positioning and communications quality).

Product Highlights

- Multi-service communications platform
- Multiple simultaneous WAN (aggregation & balance)
- According to railway regulations
- Geo-fencing: GPS-based dynamic configuration
- Isolation of standard-based services
- Integrated switch for connection to other systems
- Complete WiFi package (Management, Hot Spot & APs)

Interfaces	H1-Rail
Up to 2 x 4G/LTE Module	Yes (Depends on the model)
1 x Wi-Fi 802.11n (Client and AP)	Yes (Optional)
4 x Fast-Ethernet 10/100 Mbps (M-12)	Yes
Asynchronous Serial Port (RS-232)(DB-9)	Yes
Embedded GPS (NMEA)(FME connector)	Yes (Optional)
110Vdc power (M-12 connector)	Yes
2 Type-N LTE connectors (MIMO)	Yes
2 Type-N Wi-Fi connectors (MIMO)	Yes

Competitive Advange

Simultaneous use of several WWAN interfa	Multiple LTE and/or Wi-Fi access links. Simultaneous use, adding capacities, balancing loads or ensuring high application availability and continuity
Rugged railway hardware design	It supports extreme vibration and temperature conditions (-25 to 70º C). It complies with railway regulations (EN 50155, EN 50121-3-2, EN 301 511, EN 301 908-1)
GPS and service-based automatisms	Communication monitoring (availability and quality) and positioning for dynamic application of routing policies for each service, link and position.
Corporate networking software	It embarks the latest IP network technologies available in the vehicle, providing secure, quality and user-friendly multi-service mass deployment.

Scenarios

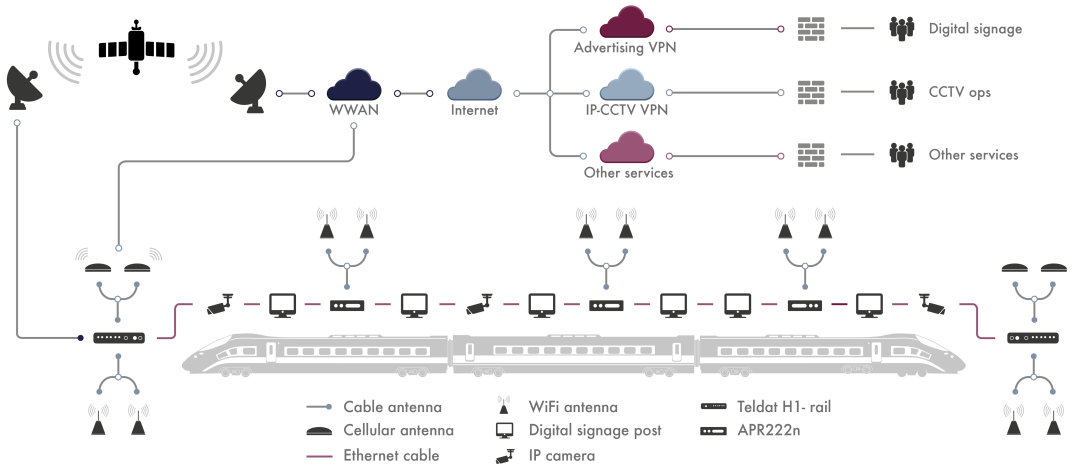

Figure: Linked train: New railway transport paradigm

Key Features

Broadband with simultaneous LTE connections Up to 2 WWAN modules (4G/LTE) can be installed. For separate operation or backup. One of the modules also supports Dual-SIM for operator redundancy.

4G/LTE dual-SIM for operator redundancy The double SIM facility with a single module for use by two telecommunications operators, using one as backup for the other using a single module.

Wi-Fi (802.11n) for travellers (AP) or depots (Client) 802.11n Wi-Fi module enables Wi-Fi services to be supplied to passengers during the journey (with multiple SSIDs and integration with HotSpot platforms) and act in client mode for connection to external Wi-Fi networks.

Railway hardware design Designed to support extreme vibration and temperature conditions (-25 to 70º C). It complies with railway regulations (EN 50155, EN 50121-3-2, EN 301 511, EN 301 908-1)

Embeddable on management platforms Easy integration in third party standard-based management tools SNMP) It is also integrated in the Teldat Colibri NetManager management platform for remote monitoring and management.

Aggregation/balance for application continuity Simultaneous use of WAN interfaces (LTE, Wi-Fi, Satellite, etc.) to share and/or aggregate the load from different services using different interfaces, optimising coverage areas and total performance solutions.

Isolated and secure multi-service communications The use of advanced products such as VRF, VLANs, QoS and Policy Routing together with multiple WAN links enables logical separation of each service and management of different solutions sharing the communications.

Embedded GPS (NMEA) easily integrated with 3d parties Ideal for fleet management or telemarketing applications. The equipment comes with a GPS that can be accessed through a TCP port that supplies information on real time geo-positioning using NMEA data.

Dynamic performance based on positioning (GPS) Dynamic configuration according to the GPS position and use of Wi-Fi as an AP or client for data synchronisation at depots or use of a SIM or other card to optimise coverage and data consumed.

Advanced troubleshooting (fine adjustment in the cloud) Advanced troubleshooting such as sniffer and syslog to analyse problems according to service, position and coverage along the route. Cloud management with self-provisioning allows installation by non-qualified personnel.

HARDWARE TECHNICAL FEATURES

Up to 2 simultaneous WWAN Interfaces (LTE/HSPA+/HSPA/EDGE)

Up to 2 integrated hardware modules with HSPA+or LTE/HSPA + technology
2 external antennas with a Type-N connector per module
LTE/DC-HSPA+/HSPA+/HSPA/UMTS/EDGE/GPRS;
LTE/EVDO/1xRTT (Inquire for others)

Ethernet interfaces

10/100BaseT Fast Ethernet switch with 4 ports (4-pole M-12 connector)
LEDs per port for installation troubleshooting
Duplex support, speed link auto-negotiation IEEE 802.3u, VLAN y 802.1X

Wi-Fi interface (802.11abgn)

Access Point and client mode 802.11abgn selectable 2.4/5GHz
MIMO 2x2 with external antennas (Type-N connector) per module
WEP, WPA, WPA2 security. WMM QoS service quality Multi SSID

GPS interface

GPS antenna activates FME and NMEA protocol
48 channels, high sensitivity and WAA support
Supply of local and remote information

Dimensions and Weight

Length x Width x Height: 240 x 483 x 45 mm (1U on a rack)
Approximate weight: 3.3 Kg
Flexible installation: On a rack and horizontal

Environmental specifications

Temperature: -25 to 70 º C
Relative humidity: 5 to 95%
Shock and vibration-proof (EN 60068-2)

SOFTWARE TECHNICAL FEATURES

Specific Wi-Fi functions

HotSpot Gateway function for HotSpot service support
WLAN controller function for Teldat embarked APs
Dynamic function (AP or client) according to position

IP protocol

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

IP protocol (2)

Multicast: IGMP (v1,v2, v3), PIM-SM, MSDP, MLD, MLDv2
IPSLA service probes (delay, package loss, jitter)
High availability: VRRP, TVRP (HSRP compatible)

security

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

security (2)

Certificates: CSR, SCEP, X.509v3, PKIX, LDAP revocation
Static and dynamic access lists and session-based Firewall
Detection of DoS and DDoS attacks

IP services

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

Service quality

Classification, marking, BW management, BW prioritisation and limitation
Up to 32 types 16 queues per interface
Strict policies (PQ), Low latency (LLQ), according weight/type (WFQ, CBWFQ)

Specific WWAN functions

Automatic hand-over (passive and active probe-based detection)
Advanced link monitoring (package, latency, jitter error)
Double SIM and double module associated with the hand-over mechanism

Management

CLI configuration and storage in a plain text file
Assignment of user and group licenses
RADIUS and TACACS+ AAA support

Management (2)

Netflow, RMON V5 and V9, SNMPv1, v2c y v3, Syslog support
Manageable via SMS
Remote Wireshark compatible traffic collection

ADDITIONAL TECHNICAL FEATURES

Traffic balance and broad band aggregation

Type RS232, N81
Default speed 9600 bps, maximum speed 115200 bps
Multipath per session (TCP/IP)

Advanced GPS functions

IPSec-based Smart Balancing aggregation mechanism
Use of DMVPNs and dynamic routing for application continuity
GPS geo-fencing for dynamic performance according to position

Railway environment ruggedness and power supply protection

Activation of routes and links according to position
Interface management (such as Wi-Fi as client/AP) according to zones
110 Vdc power supply (see possibility of obtaining other voltages)

DB-9 connector with proprietary pinouts (including adapter)

Certifications: EN 50155, EN 50121-3-2, EN 301 511, EN 301 908-1
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

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Teldat Group is a leading technology holding that desings, 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.

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 Publish Date: February 19, 2016 - **Version:** 20160219093128