

Teldat LTE H1-Auto+ Routers

Rugged wireless 4G routers for broadband-to-the-vehicle services



Enable secure, high speed 4G/LTE mobile broadband connectivity for buses, light rail and first responders for multimedia managed services including video, telemetry, passenger services, vehicle health, dispatch and tracking and ALPR.

The Teldat H1-Auto+ Series router is an integrated rugged communications platform that enables highly available, reliable and secure broadband cellular connectivity to the vehicle. Multiple services across departments and agencies can be delivered over a single platform reducing equipment, connectivity and operational costs of communications. This router combines a robust mechanical design, adequate for its installation at in-vehicle cabinets, with a versatile broadband wireless (wireless WAN and Wi-Fi) and wired (Ethernet) communications port layout. The router is powered by Teldat's Internetworking Software (CIT), offering a robust enterprise-class IP protocol stack for the efficient implementation of multiple managed VPN services on mobile access. The Teldat H1-Auto+ router installed base can be centrally managed by Teldat's network management platform (Teldages), or seamlessly integrated into existing IT network management systems.

Product Highlights

- One or two embedded 4G/LTE broadband radio interfaces for true high speed connectivity to on-board applications
- Dual 4G/LTE modem and SIM support for automatic failsafe backup through an alternative cellular broadband network
- Robust mechanical and electrical design, optimized for unattended vehicle cabinet installations
- Wi-Fi 11n interface, with configurable operation mode (Access Point or Client) and optimized transmission and reception features.
- 4-port Ethernet switch expands a professional LAN network for serving the vehicle devices, such as security cameras, on-board computers, etc.
- Standalone GPS with state of the art features, including fastest time to first fix in the market
- Hardware-based data encryption for the highest performance in multi-VPN transmission
- Teldat Internetworking Software (CIT): complete suite of IP networking protocols, security VPN and firewall features, professional router management tools, etc.
- Centralized router management through Teldages or third party platforms

Key Features

Reliable LTE wireless-WAN broadband performance

- Two 4G cellular interfaces provide uninterrupted vehicle connectivity and application continuity when travelling through poor coverage areas, for instance from a private city wireless network onto a commercial carrier service
- Automatic selection of the best available connection, based on network availability, signal reception level, quality of service, time of the day, cost, speed or position
 - ✓ Passive link supervision: both the signal coverage, the technology availability, the IP transmission service status and the transmission activity are permanently controlled
 - ✓ Poll-based link supervision: not only failures but also degradations on the 4G communications are detected, notified and corrected. The router controls error rate, link latency and jitter to guarantee utmost performance on the streaming transmission (i.e. real-time IP-CCTV image transmission or voice)

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- Tight integration of internal cellular modules for shock and vibration resilience, improved radio transmission and reception, protection against theft, advanced monitoring for troubleshooting, etc. (as opposed to non-professional USB based solutions)
 - Up to two antennas per radio interface, maximize coverage at any location
 - WWAN+ proprietary optimization of network protocols for improved communication over cellular networks.

Multipurpose embedded Wi-Fi

- Embedded WLAN interface with configurable or location based client / access point modes
- Vehicle proof Wi-Fi: multiple antennas for better transmission, flexible frequency operation (2,4 and 5 GHz), extended temperature range, reduced component aging, surge circuit protection, power efficiency, etc.
- State of the art Wi-Fi security guarantees communication privacy and confidentiality
- Multiple service coexistence based on independent SSIDs and Quality of Service.
- Intelligent roaming management based on signal level

Mechanical and hardware design optimized for in-vehicle installation

- Modular architecture provides a migration path for future cellular technologies
- Anti-shock and anti-vibration protection, and high temperature dissipation (-20°F to 160 °F / -30°C to +70°C)
- Fed from the vehicle 12VDC or 24VDC battery using robust connector
- User configurable power turn off delays
- Optimized power consumption expands the vehicle battery autonomy
- Wall, ceiling and horizontal surface mounting options. Small compact enclosure to minimize cabinet/trunk space
- Embedded advanced GPS, supporting state of the art features to support for critical location based applications
- Meets or exceeds relevant parts of SAE J1455 certification for shock, vibration, and drop

Fully Managed Ethernet Switch Ports

- Full VLAN support, per-VLAN QoS, per-port Ethernet diagnostics and SNMP management allows for the implementation of efficient and top secured LAN networks on board

Enterprise Class Internetworking Intelligence

- Dynamic routing protocols favor the implementation of scalable corporate VPN networks
- Multiple service support, based on advanced QoS: hierarchical traffic analysis, labeling and prioritization, guarantees bandwidth to critical applications when sharing limited bandwidth resources
- IP forwarding policy based on the real time status of the transmission link (packet loss, delay, jitter)
- Multiple virtual router instances, for simultaneous but independent agency / jurisdiction service over the same platform

Key Advantages over Modems and Gateways

- Supports multiple embedded or existing access links (P25, etc.), to guarantee service continuity
- Extends public safety data network security requirements to the fixed remote and mobile edge
- Manages multiple services from various agencies and jurisdictions over a single converged platform, with each agency maintaining its own virtual network ownership experience
- Efficiently uses links to transmit various applications, based on application criticality, required bandwidth, nominal and available bandwidth, etc.
- Allows for shared access to in-vehicle resources (e.g. cameras, displays, etc.)

Meets mobile access security imperatives

- Best in class performance in Mobile VPNs
 - ✓ Advanced IPSec features such as digital certificates, extended authentication, reverse-route injection, etc.
 - ✓ Multiple simultaneous secured tunnels for application continuity
 - ✓ IP filtering, MAC filtering and stateful firewall protect the router against attacks
 - ✓ Compatible with external SIEM systems
- Crypto-processor incorporated for wire-speed data encryption

Enterprise-Grade Management

- Router management engine adapted for mission-critical applications
- The router configuration resides on a single human-readable, editable text configuration file
- Comprehensive cellular interface event logging system (signal strength, serving cell, etc.) , to facilitate remote troubleshooting on moving vehicles
- SNMP and Teldat MIB support for all the router interfaces, protocols and advanced functionalities
- Integrated into the Teldat Management System (Teldages) and into existing third party Network Management platforms
- Teldatges platform is a centralized graphical interface for efficient fleet communications management: network health, statistics, alarms, advanced real time access to router status and configuration, massive configuration and software upgrades, comprehensive inventory, etc.
- Remote firmware and configuration upgraded through FTP and TFTP

Technical Specifications: Hardware

Interfaces & Connectors

4 x Fast-Ethernet 10/100Mbps (RJ-45F)
 Up to 2 x Wireless-WAN interfaces:
 - LTE/DC-HSPA+/HSPA+/HSPA/UMTS/EDGE/GPRS
 - LTE/EVDO/1xRTT
 - LTE Band 14, secondary Wi-Fi, 4.9 GHz, etc.
 Wi-Fi 802.11n interface
 1 x Standalone GPS (Optional)
 Flexible antenna connector layout:
 - LTE antenna ports (SMA)
 - Wi-Fi antenna ports (SMA-RP)
 - GPS active antenna port (FME)
 1 x Auxiliary serial port, (DB-9F)
 4 x status LEDs
 Accessible Fuse
 Two internal SIM trays
 Embedded crypto-processor

Power Supply

24 VDC
 Min operating power, 9 V
 Min operating power, 39 V
 M12 power connector
 Power consumption (nominal/max.): 8.5W / 9.5W
 Programmable time delay for device shut down
 Full protection against power-on / power-off transients:
 inverse polarity, surges, spikes, etc.
 Accessible fuse protection

GPS

Embedded standalone GPS (Optional)
 48 channels
 Ultra high sensitivity
 Fastest time to first fix
 WAAS support
 Assisted GPS support
 NMEA protocol
 Local and remote data delivery
 Position logging
 Active antenna

Cellular Interfaces

Up to 2 interfaces:
 - LTE/HSPA+/HSPA/UMTS/EDGE/GPRS (AT&T)
 - LTE/EVDO/1xRTT (Verizon)
 - LTE/DC-HSPA+/HSPA+/HSPA/UMTS/EDGE/GPRS (Europe)
 - For other interfaces (LTE Band 14, secondary Wi-Fi, Wi-MAX, 4.9 GHz, etc., contact your local dealer)

Wi-Fi Interface

IEEE 802.11a/b/g/n 2x2
 High power transmission on both 2.4/5GHz
 Low noise amplifiers for improved sensitivity
 Dual power supply & special heat sink
 RF electrostatic discharge and surge protection circuits
 Low output ripple
 Two detachable external antennas (SMA connectors)

4 port Fast-Ethernet switch

Ethernet V2 / IEEE 802.3
 10/100-BaseT automatic detection
 Half/full duplex automatic negotiation
 MDI / MDI-X crossover detection
 Managed Switch: EtherLike MIB (RFC 2665), SNMP-
 REPEATER-MIB (RFC 2108), MAU-MIB (RFC 2668)
 2 status LEDs per port

Auxiliary serial port

Asynchronous RS-232 serial, up to 115200 bps

Environmental specifications

Operating Temperature: -20°F to 160 °F (-30°C to +70 °C)
 Designed to meet industry standards for foreign object and
 water ingress
 Shock and vibration proof
 Relative Humidity: 5% to 95%

Dimensions and weight

Length x Width x Height: 206 x 165 x 62 mm; 8.1 x 6.5 x 2.4 in
 Approximate weight: 1,5 kg; 3.3 lbs
 Flexible mounting: wall, ceiling, horizontal, etc.

H1 Auto+ Wireless-WAN Cellular Options

	LTE/HSPA+ (Americas)	LTE/EVDO/HSPA+ (Americas)	LTE/HSPA+ (Europe)
4G	LTE Bands: 700 (Band 17), AWS	LTE Bands: 700 MHz (Band 13)	LTE Bands: 2600/2100/900/800
3G	HSPA+, HSUPA, HSPA, UMTS Bands: 850/AWS/1900/2100 MHz	EVDO Bands: 850/1900 MHz HSPA+, HSUPA, HSPA, UMTS Bands: 850/900/1900/2100 MHz	DC-HSPA+, HSPA+, HSUPA, HSPA, UMTS Bands: 900/2100 MHz
2G	EGDE, GPRS, GSM Bands: 850/900/1800/1900 MHz	1xRTT Bands: 850/1900 MHz EDGE, GPRS, GSM Bands: 850/900/1800/1900 MHz	EGDE, GPRS, GSM Bands: 850/900/1800/1900 MHz
Chipset	Qualcomm MDM9200	Qualcomm MDM9600	Qualcomm MDM9200
Carrier	AT&T and America's GSM carriers	Verizon and America's CDMA carriers	GSM Carriers out of Americas
Max. Speeds*	100 Mbps Down / 50 Mbps Up	100 Mbps Down / 50 Mbps Up	100 Mbps Down / 50 Mbps Up

* Actual speeds in the field depend on various factors such as carrier service, cell saturation, signal level reception, etc.

Technical Specifications: Software Features

Cellular interface specific functionalities

Simultaneous operation of up to 2 embedded modems
Flexible support of 4G and 3G technologies
Future support of LTE B14
Automatic handover
Policy routing based on different criteria

- Signal level
- Network quality probing: delay, jitter, packet loss
- Radio technology (LTE, DC-HSPA+, HSPA+, EVDO, UMTS, GPRS, LTE B14)
- Time schedules

Passive interface failure detection (analyzing received traffic)
Active interface failure detection (network probing poll)
Diversity antenna
Dual SIM
OTA WWAN module firmware upgrade
SMS management commands: reset device, reset cellular interface, connect/disconnect cellular data link, etc.
Comprehensive RF real-time monitoring for troubleshooting
WWAN+ (Advanced management of network protocols for improved communication over cellular networks)

Wi-Fi specific functionalities

802.11 a, b, g, n
Client mode or access point mode
High transmission power
High reception sensibility
Manual or automatic channel selection
Manual or automatic selectable speed
Multiple SSID
Security:

- 802.11i, WPA, WPA2
- EAP, EAPOL
- Authentication (open, shared, WPA)
- Encryption (AES, TKIP, WEP)

Quality of Service (QoS) AIFS, CWmin, CWmax
ESSID
MAC Filtering
Location based mode selection

Ethernet switch specific functionalities

VLAN support with 802.1q
Routing per VLAN
IEEE 802.1x port based network access control
LLC(802.2), ARP
Manageable Switch
Real time events for troubleshooting
Quality of service, IEEE 802.1p CoS ("Class of Service")
Multiple bridge domains
Simultaneous bridging & routing
Source Routing, MAC filtering and NetBIOS
IEEE 802.1w
Bridge over PPP (BCP) and GRE.
Bridge over PPP (BCP)
STP "Spanning Tree Protocol" (IEEE 802.1d)
RSTP "Rapid Convergence Spanning Tree Protocol"(IEEE 802.1w)
PVST ("Per VLAN Spanning Tree Protocol")

IP protocol stack

IP, ARP, Proxy ARP
Static IP Routing
RIP I, RIP II
BGPv4
OSPFv2
Policy Routing with rich selection criteria
Virtual router instances, w. Multi-VRF
DHCP client, server & relay
DynDNS Client
NAT/PAT/Port Mapping/NAT exceptions
PAT fire-walling
Application continuity
Compatible with HSRP
VRRP – Virtual Redundancy Router Protocol
DNS client & proxy. DNS cache.
DNS dynamic updating
Bidirectional Forwarding Detection protocol (BFD)
NTP Client
Multiple addresses per interface
Loopback Interfaces
IPv6 enabled code version available

Security and VPNs

IPSec client & server, compatible with third party IPSec peers
IPSec security services: ESP & AH
IPSec operation modes: tunnel & transport
Encryption: AES, DES, 3DES & RC4
Dedicated hardware crypto-processor
Authentication: SHA-1 & MD5
IKE Protocol
ISAKMP Configuration Methods. Oakley groups 1, 2, 5 & 15
Next Hop Resolution Protocol
Dynamic Multipoint IPSec VPNs (DMVPN)
Gateway Encryption Transport VPN (GET VON)
Radius Access Control
Tacacs Access Control
IPSec Server, compatible with Microsoft clients
L2TPv2: Client (LAC), Server (LNS), L2TP-CI, Pseudowire
Telnet, SSH & FTP console access user & password protected
User & permission levels
Advanced Firewall System (AFS)

- Stateful Firewall
- Advanced packet classification and marking
- URL & content filtering

Static and dynamic access controls
Reverse Route Injection (RRI)
Tunnel End-point Discovery Protocol (TED)
Event generation for SIEM interaction
Non-hackable operating system (not Linux or Windows)
NAT-Traversal
X.509v3, LDAP, PKIX, PEM, DER digital certificates
SCEP Protocol
IPSec PMTU Discovery
GRE & multi-GRE. GRE RC4 encryption
IPSec Stateful Failover

Quality of service (QoS)

Access lists, based on:

- IP source and destination addresses
- Protocol
- Input interface / subinterface
- Output interface / subinterface
- Incoming DSCP, precedence, ToS field
- Port
- Value of CoS field
- Http URL
- Hex string or text in the packet
- Packet length
- Traffic encapsulated or de-encapsulated in IPsec
- NAT
- Session life time

Packet labeling (DiffServ) depending on above classification criteria

Congestion control queuing mechanisms:

- First In First Out, FIFO
- Low Latency Queuing, LLQ
- Weighted Fair Queuing, WFQ
- Class Based Weighted Fair Queuing, CBWFQ

Traffic limiting in queues, with overflow to lesser priority queues

Policy routing based on network quality probes (delay, jitter, packet loss)

Policy routing based on priority, speed, time, location, cost, etc.

Controlled packet discard for TCP traffic congestion

Fragmentation in PPP & MPPP

Traffic shaping

PPP protocol for external modem & WAN link aggregation

PPP (RFC 1661), PAP/CHAP, IPCP

Dynamic assignment of IP addresses (own or peer)

PPP Multilink

Multi-Class Extension to Multi-Link PPP

PPPoE protocol

PPPoE over Ethernet

PPPoE Bridge + routing (PPPoE pass-through)

PPP Multilink over PPPoE

Re-negotiation based on PADT

Traffic balancing

Multi-path per IP packet (with static and dynamic routing)

Weighted balancing per TCP/IP session

Weighted to the speed ratio of the different lines

Multicast: IGMP, IGMP-proxy, MOSPF & PIM-SM

Management

Command line interface on aux serial port, telnet & SSH

Editable text based configuration

Access/execution user levels (local or AAA based)

AAA secure access: RADIUS and TACACS+ authentication, authorization and accounting

SNMPv1/2/3: MIB-2, Teldat Private MIB

Comprehensive Event Logging System (+7000 events)

Network/link quality guarantee agent

Netflow V5 & V9

Syslog Client

Network Time Protocol (NTP)

DynDNS Client

FTP & TFTP software, BIOS & configuration updating

Integrated protocol analyzer compatible w. Ethereal/Wireshark

Radius access control and accounting

Interoperability with third party management platforms such as Openview, Tivoli, Netcool, InfoVista, etc.

Centralized remote management system, TELDAGES

IP PBX Survivability

SIP based Back to Back user agent (B2BUA)

Under loss of network connectivity:

- Calls between IP terminals connected over WiFi or Ethernet
- Supervised and blind transfers
- Multiple terminal simultaneous ring
- Hunt groups
- Call groups
- Overflow
- Forward if busy, no answer or unconditional
- Locution on hold, streaming mode from file

Data compression

PPP compression

IPHC Compression

Van Jacobson & STAC LZS compression algorithms

TELDAT DOCUMENTATION

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