TELDAT H1-Automotive

Rugged 3G router for Broadband-to-the-vehicle services

"Enable Mobile Broadband connectivity into your bus, coach, van and car fleets for delivering smart metering, Internet and video applications on board."

The Teldat H1-Automotive router is an integrated rugged router that enables 3G connectivity in the vehicle for delivering triple play applications such as IP-CCTV, telemetry, fleet tracking services, passenger WiFi Internet access and on-site advertising through Digital Signage.

This router combines a robust mechanical design, adequate for its installation at unattended in-vehicle cabinets, with a versatile wireless (HSUPA and WiFi) and wired (Ethernet) communications port layout. Additionally, the router supports GPS in order to be able to dynamically alter its configuration according to its position. The router is powered by the Teldat Internetworking Software (CIT), offering a business-graded IP protocol stack for the efficient implementation of managed VPN services on 3G.

The Teldat H1-Automotive router's installed base is centrally managed by the Teldat Web-based Network Management Platform (TeldaGES), but its wide support for management functionalities allows the router to be seamlessly integrated into the previously existing Management Platform.

PRODUCT OVERVIEW

- Robust mechanical and electrical design optimized for unattended vehicle cabinet installations.
- Embedded 3G interface speeding up to 7.2Mbps (HSUPA DL peak rate) for true broadband connectivity to on-board applications.
- Embedded GPS interface to allow position-dependant configuration.
- 4-port Ethernet switch expands a professional LAN network for serving the vehicle security cameras, Computer Unit, etc.
- Hardware-based data encryption for the highest performance in VPN transmission.
- Embedded Wireless-LAN interface (optional) with IEEE 802.11i security and configurable operation mode (Access Point or Client).
- Dual SIM support for automatic failsafe backup through an alternative 3G network.
- Teldat Internetworking Software (CIT): Complete suite of communication protocols, professional router management engine, and centralized router management through TeldaGES or through the existing Network Management Platform.

APPLICATION SCENARIO
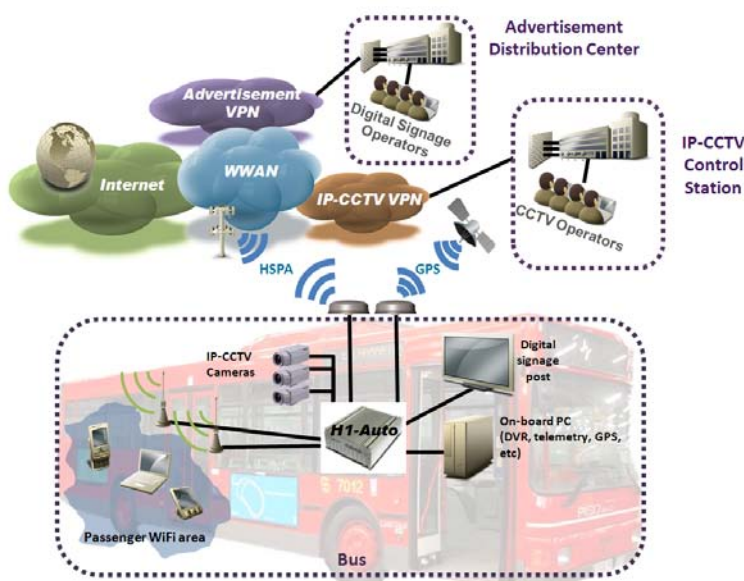
The figure on the left depicts an intelligent bus served by the Teldat H1-Automotive. The security IP cameras and local DVR, the Digital signage post and the Computer Unit, the odometer and other metering applications are connected to the router's Ethernet ports. Furthermore the router's internal WiFi Access Point has been enabled to provide Internet access to passengers.

With the bus on route, the Teldat H1-Automotive is permanently attached to the 3G service so it transmits the WiFi traffic to the Internet at the same time as it provides VPN access for the bus' IP applications.

When the bus completes its route, the router WiFi can switch to a Client mode, so it connects the bus to the WiFi network in the parking lot to carry out the most diverse maintenance operations including the bus' local CCTV image upload to the central DVR servers. This can be configured to happen automatically, based on the position of the bus determined by GPS.

KEY FEATURES

🔵 **Mechanical and hardware design adapted to in-vehicle unattended cabinet installations**

➢ Anodized aluminum case with anti-shock and anti-vibration protection and high temperature dissipation (-20° to +70°C).
➢ Fed from the vehicle 12Vdc or 24Vdc battery[1]. Optimized power consumption expands the vehicle battery autonomy.
➢ Wall, ceiling and horizontal surface mounting options.
➢ Visual troubleshooting through its line status LEDs.

🔵 **Outstanding Wireless-WAN performance and reliability**

➢ Automatic 3G backup. The router automatically switches to an alternative Wireless-WAN network based on the most complete set of criteria: Unexpected detachment from the main network, the preferred mobile access technology (3G) not being available, the signal coverage droppings below a predefined threshold, poor quality of the 3G link, etc.
➢ Automatic fallback to EDGE/GPRS guarantees vehicle connectivity when travelling through areas without 3G coverage.
➢ Dual external RF antenna for diversity maximizes the 3G coverage at any location.
➢ Non poll-based WWAN[2] supervision: Both the WWAN signal coverage, the technology availability, the IP transmission service status and the transmission activity are permanently controlled.
➢ Poll-based WWAN supervision: Not only failures but also degradations on the 3G communications are detected, notified and corrected. The router controls the IP packet error rate, link latency and jitter to guarantee utmost performance on the streaming transmission (i.e. real-time IP-CCTV image transmission).
➢ WWAN evolution reports: The router stores the measured WWAN parameters (signal strength, serving cell, etc) so they can be displayed on a time scales (configurable sampling window) both in the router's CLI[3] and in the Management Station.

🔵 **Best-in-class performance in mobile VPNs**

➢ Crypto-processor incorporated for link-speed data encryption.
➢ Fully parameterized IPSec Client/Server.
➢ Advanced IPSec features such as PKI encryption (Digital Certificates), extended authentication, Reverse-Route Injection, etc., allows for the implementation of VPN solutions based on multiple manufactures.
➢ DMVPNs, GET-VPNs, L2TP/IPSec.
➢ IP filtering, MAC filtering and SPI firewall protect the router against DoS attacks.

🔵 **100% Wireless solution.**

➢ Embedded WLAN Access Point with dual external WiFi antennas optionally equipped inside the router.
➢ WiFi IEEE 802.11i security guarantees communication privacy and confidentiality.
➢ GPS enables reporting of exact position and can trigger configuration changes.

🔵 **Fully managed Ethernet switch port**: 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.

🔵 **Teldat's Internetworking Intelligence**

➢ Dynamic routing protocols favor the implementation of scalable corportate VPN networks.
➢ Multi-VRRP Teldat's Multi-HSRPA support for network resiliency and traffic load balancing.
➢ IP forwarding policy based on the current status of the transmission link (RTT, frame error rate and UDP jitter).
➢ Teldat QoS: Hierarchical QoS system for traffic priorization, labeling and shaping allows for an accurate SLA audition and service accounting.

🔵 **Enterprise-graded management**

➢ Teldat CLI: Router management engine adapted for a professional use. Remote CLI access through Telnet and SSH2.
➢ The router configuration resides on a single human-readable configuration file (Teldat commands).
➢ Teldat Event Logging System: Detailed real-time trace logs displayed in the router CLI or notified into the management station on Syslog and SNMP alarms.
➢ SNMPv1/2/3 agent and full MIB2 and Teldat MIB support for the router interfaces, protocols and advanced functionalities.
➢ Integrated into the Teldat Management System (TeldaGES) and guaranteed seamless integration into third party Network Management platforms.
➢ Remote firmware and configuration can be upgraded through FTP and TFTP.

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[1] Other power feed options may be available depending on the specific Project needs. Please contact your Teldat representative.
[2] WWAN (Wireless-WAN): Depending on the mobile access technology, the WWAN service can be of type 2.5G (EDGE/GPRS) or 3G (HSPA/UMTS)
[3] CLI: Command Line interface

TECHNICAL SPECIFICATIONS

Hardware, Electrical and Environmental features

Hardware architecture
Microprocessor: Motorola MPC8272
Cache L1 16 Kbytes instructions / 16 Kbytes data
SDRAM memory: 64 Mbytes
FLASH memory: 16 Mbytes
NVRAM memory: 128 KBytes
Embedded crypto-processor
1 x Mini-PCI internal expansion for WiFi AP
7 LEDs state indicators
1 reset knob
2 Auto-regulated fans (optional)

Interfaces & Connectors
4 x Fast-Ethernet 10/100Mbps (RJ-45F)
1 x HSPA/UMTS/EDGE/GPRS
2 x SIM trays
1 X 3G Antenna port (SMA-F)
1 x 3G/GPS Antenna ports (SMA-F)
1 x Wireless-LAN interface (Optional)
2 x WiFi Antenna ports (SMA-F)
1 x Local Console port, (DB-9F)

Console
RS-232 at 9600 bps (max 115200 bps)
8 bits without parity with 1 stop bit (8N1)

Power Supply[4]
24 Vdc ±12
Power consumption (nominal/max.)[5]: 7.5W / 8.5W

4 port Fast-Ethernet switch
10/100-BaseT automatic detection
Half/full duplex automatic negotiation
MDI / MDI-X crossover detection
Ethernet V2 / IEEE 802.3
LLC (802.2), ARP
IEEE 802.1Q (VLAN)
IEEE 802.1X
Managed Switch:
   - EtherLike-MIB (RFC 2665)
   - SNMP-REPEATER-MIB (RFC 2108)
   - MAU-MIB (RFC 2668)
2 status LEDs per port

Wireless LAN Interface
IEEE 802.11a/b/g
Two detachable external antennas (SMA connectors)

Environmental specifications
Operating Temperature: -20 / +70 °C
Relative Humidity: 5% to 95%

Dimensions and weight
Length x Width x Height: 205 x 165 x 60 mm
Approximate weight: 1.5 Kg

Wireless-WAN Interface:

Feature	Teldat H1-Automotion (EU version)	Teldat H1-Automotion (Universal version)
Technologies	HSUPA, HSDPA, UMTS, EDGE, GPRS, GSM	HSUPA, HSDPA, UMTS, EDGE, GPRS, GSM
Baseband processor	Qualcomm MSM6290™	Qualcomm MSM6290™
Frequency Bands (MHz)	Quad Band EGSM: 850/900/1800/1900 MHz WCDMA: 2100 MHz	Quad-Band EGSM: 850/900/1800/1900 MHz Tri-band WCDMA: 850/900/2100 MHz
Rx Diversity	Yes (Two external antennas)	Yes (Two external antennas)
WWAN backup	Yes. Dual SIM	Yes. Dual SIM
Data services (PS)	**GPRS/EDGE** Class B. Multi-slot class 12 (CS1-CS4, MCS1-MCS9). 236 Kbps DL/UL (max.) **UMTS R99**: 384 Kbps DL/UL (max.) **HSDPA Cat 6/8/12**: 7.2 Mbps DL, 384 kbps UL (max.) **HSUPA Cat 3/5/6**: 7.2 Mbps DL, 2.0 Mbps UL (max.)	**GPRS/EDGE** Class B. Multi-slot class 12 (CS1-CS4, MCS1-MCS9). 236 Kbps DL/UL (max.) **UMTS R99**: 384 Kbps DL/UL (max.) **HSDPA Cat 6/8/12**: 7.2 Mbps DL, 384 kbps UL (max.) **HSUPA Cat 3/5/6**: 7.2 Mbps DL, 2.0 Mbps UL (max.)
Dual PDP connection	Yes	Yes
Circuit-switched services (CS)	Synchronous transparent, V.110 UDI and V.120. Speeds: 64, 56, 38.4, 28.8 and 14.4 Kbps	Synchronous transparent, V.110 UDI and V.120. Speeds: 64, 56, 38.4, 28.8 and 14.4 Kbps

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[4] Other power feed options may be available depending on the specific Project needs. Please contact your Teldat agent.

[5] The power consumption values were measured in Teldat Labs. with the Teldat H1-Automotive router transmitting on 3G the traffic from four users connected to its Ethernet switch port and ten users connected served by the router WiFi

Software features

IP protocol
IP, ARP, Proxy ARP
Static IP Routing, RIPv1/2, OSPFv2, BGP-4 & Policy Routing
Quality of backup: Routing based on network quality measurements
Multi-path per IP packet (with static & dynamic routing)
Weighted balancing per TCP/IP session
Multicast: IGMP, IGMP-proxy, MOSPF & PIM-SM **[1]**
DHCP client, server & relay
DNS client & proxy. DNS cache. Dynamic Updates in DNS (RFC 2136)
NAT/PAT/Port Mapping/NAT Exceptions
PAT fire-walling
Multiple addresses per interface
Loopback interfaces
Bidirectional Forwarding Detection (BFD) Protocol
Hot Standby Routing Protocol (HSRP) compatible
RFC 2281 VRRP – Virtual Router Redundancy Protocol
VRF-Lite

PPP & PPPoE protocol
PPP (RFC 1661), PAP/CHAP, IPCP
PPP Multilink
Multi-Class Extension to Multi-Link PPP (RFC 2686)
PPPoEoE, PPPoE Bridge + routing (PPPoE pass-through)
PPP Multilink over PPPoE
Re-negotiation based on PADT

Quality of service (QoS)
Packet labeling (DiffServ) per interface, subinterface, protocol, port and MAC addresses
Congestion control: FIFO, queuing priority, BRS proprietary system, WFQ
Low Latency Queuing (LLQ)
Traffic Shaping
Fragmentation in PPP & MPPP

Security and VPNs
IPSec client & server. Fully parameterized, compatible with third party IPSec peers
IPSec security services: ESP & AH
IPSec operation modes: tunnel & transport
Encryption: RC4, DES, 3DES & AES
Authentication: SHA-1 & MD5
IKE Protocol
ISAKMP. Oakley groups 1, 2, 5, 15
NAT-Traversal
Reverse Route Injection (RRI)
Digital certificates X.509v3, LDAP, PKIX, PEM, DER
SCEP Protocol
Tunnel End-point Discovery Protocol (TED)
IPSec PMTU Discovery
GRE & multi-GRE. RC4 encryption in GRE tunnels
Next Hop Resolution Protocol (NHRP)
Dynamic Multipoint IPSec VPNs (DMVPN)
Gateway Encryption Transport VPNs (GET VPN)
Radius Access Control (RFC 2138)
L2TPv2: Client (LAC), Server (LNS), L2TP-CI, Pseudowire, L2TP/IPSec Server
Advanced IP filters
Advanced Firewall System (AFS)
  - Statefull Firewall
  - Advanced packet classification and marking
  - URL & content filtering

Data compression
IPHC Compression
Van Jacobson & STA LZS compression algorithms

Bridge
Bridge over PPP (BCP)
STP "Spanning Tree Protocol" (IEEE 802.1d)
RSTP "Rapid Convergence Spanning Tree Protocol"(IEEE 802.1w)
Multiple bridge domains
Simultaneous bridging & routing
IEEE 802.1p CoS ("Class of Service")
PVST ("Per VLAN Spanning Tree Protocol") **[1]**
Source Routing, MAC filtering & NetBIOS

3G specific functionalities
Automatic handover
Passive detection of Wireless-WAN service failure
Active poll-based failure detection
GSM call or SMS remote "wake-up" for on-demand 3G services
Advanced RF interface real-time monitoring
Dual SIM tray w/ multiple selection criteria:
  - Signal level
  - Available WWAN technology (GPRS, HSPA, etc)
  - IP link quality (frame error rate, latency, jitter)
  - Based on time schedule
Dual PDP context for simultaneous attachment to two APNs
OTA WWAN module firmware upgrade

Wireless LAN specific functionalities
Selectable transmission power
Manual or automatic selectable speed
Turbo mode (108 Mbps)
802.11i, WPA, WPA2
EAP, EAPOL
Authentication (open, shared, WPA)
Encryption (AES, TKIP, WEP)
ESSID
MAC Filtering
Quality of Service (QoS) AIFS, CWmin, CWmax

Management
Command line interface on console, telnet & SSH
SNMPv1/2/3, MIB2 & Teldat-MIB
Event Logging System
Netflow V5 and V9
Syslog Client
Network Time Protocol (NTP)
DynDNS Client
FTP & TFTP Software, BIOS & configuration uploading
Internal Protocol Analyzer, compatible with WireShark
Default configuration reset knob
Radius Accounting (RFC 2139)
Integrated in Teldages (Teldat professional management platform)

[1] Feature under development
[2] IPSec-related functionalities require IPSec software license
[3] WLAN features apply to routers with Wireless-LAN support

PRODUCT IMAGES

Teldat H1-Automotive Router: Front panel

Teldat H1-Automotive Router: Rear panel

ORDERING INFORMATION

Part No.	Product Description
Teldat H1-Automotive Router	
RWTHHIN1QEU	TELDAT H1-AUTOMOTIVE: ROUTER, 1 HSUPA 900/2100 + 4 PORT SWITCH FE + WIFI (OPTIONAL)
RWRHHIN2QLAT	TELDAT H1- AUTOMOTIVE: ROUTER, 1 HSUPA 850/1900/2100 + 4 PORT SWITCH FE + WIFI (OPTIONAL)
Software for the Teldat H1-Automotive Router	
RCTHSCIT	TELDAT H APPLICATION SOFTWARE VERSION 10.7 LATEST
RCTHSCIT-NF	TELDAT H APPLICATION SOFTWARE. INCLUDES LATEST DEVELOPEMENTS
Licenses	
CSTHS104	IP TELEPHONY LICENCE FOR THE TELDAT H FAMILY
CSTHSA00	ALCATEL TOIP LICENCE FOR THE TELDAT -H
CSTHSC00	CISCO TOIP LICENCE FOR THE TELDAT-H

CSTHSE00	AASTRA-ERICSSON TOIP LICENCE FOR THE TELDAT -H
RWTHS101	IP BASE SOFTWARE LICENCE FOR THE TELDAT H FAMILY
RWTHS102	IPSEC SOFTWARE LICENCE FOR THE TELDAT H FAMILY
RWTHS103	SNA SOFTWARE LICENCE FOR THE TELDAT H FAMILY

Accessories

RWTHAF220AUTO	AC-110/220V POWER SOURCE FOR THE H1 AUTO
RWTHAW10	WIRELESS-LAN ACCESS POINT 802.11A/B/G KIT FOR THE TELDAT H1-IND. AP/CLIENT MODE
RCATAAWE	WIFI OUTDOOR WALL MOUNT ANTENNA, ONE METER LONG CABLE AND SMA-MALE CONNECTOR
RWTHCAEU	POWER CABLE, EUROPEAN PLUG, 2M
RWTHCAUK	POWER CABLE, UK PLUG, 2M
RWTHCAUS	POWER CABLE, AMERICAN PLUG, 2M
RWTHCLAN	UTP ETHERNET CABLE RJ45M-RJ45M, 2M
RWTHCLCX	STP ETHERNET CABLE RJ45M-RJ45M CROSSOVER, 2M
RWTHACON	CONSOLE CABLE: DB9FEMALE-DB9MALE, 2M.

3G Antennas

RWTHAAM1	3G MULTI-BAND 900-1800-2100 DIPOLE ANTENNA 90 DEGREES MOUNT
RWTHAAM2	3G MULTI-BAND 900-1800-2100 DIPOLE ANTENNA MAGNETIC BASE, 1.5M CABLE
RWTHAAM4	CDMA BIBAND 800-1900 DIPOLE ANTENNA 90 DEGREES MOUNT
RWTHAAM5	3G MULTI-BAND 900-1800-2100 ANTENNA FOR OUTDOOR WALL MOUNT, 5M CABLE
RWTHAAM6	3G MULTI-BAND 900-1800-2100 ANTENNA FOR OUTDOOR WALL MOUNT, 10M CABLE
RWTHAAM7	3G 900-1800-1900-2100 ANTENNA FOR PRE-DRILLED OUTDOOR SURFACE, 2.5 M CABLE, SMA CONNECTOR
RWTHAAM8G	3G MULTI-BAND 850-900-1800-1900-2100 ANTENNA FOR PRE-DRILLED OUTDOOR SURFACE, 2,5M CABLE, SMA CONNECTOR

3G Cables

RCATAAC1	RF COAXIAL CABLE. LMR400. SMA CONNECTORS, 6M IN LENGTH
RCATAAC2	RF COAXIAL CABLE. LMR400. SMA CONNECTORS, 15M IN LENGTH
RCATAAC3	RF COAXIAL CABLE. RF-7MM, SMA CONNECTORS, 10M IN LENGTH
RCATAAC4	ONE METER PIGTAIL CABLE FOR ANTENNAS (SMA CONNECTOR)

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