

## TEL DAT 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 the 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 Advertisement through Digital Signage.

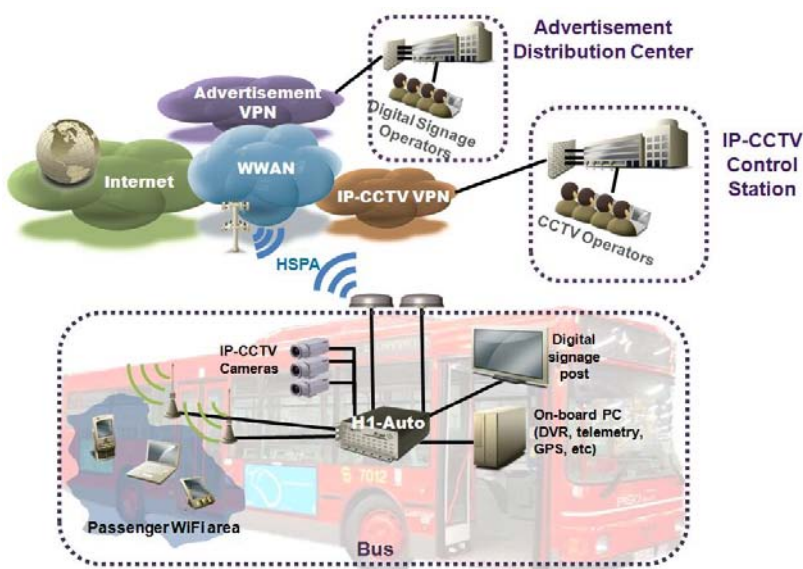
This router combines a robust mechanical design, adequate for its installation at unattended in-vehicle cabinets, with a versatile wireless (HSUPA and WiFi) and wired (Ethernet) communications port layout. The router is powered by the Teldat Internetworking Software (CIT), offering a business-graded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

The Teldat H1-Automotive router installed base is centrally managed by the Teldat Web-based Network Management Platform (TeldaGES), but also its wide support for management functionalities permits the router to be seamlessly integrated into the 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.
- 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 right figure 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 hosting the bus GPS, odometer and other metering applications are connected to the router Ethernet ports. Furthermore the router 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 to 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.

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## 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<sup>1</sup>. 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 criteria: Unexpected detach from the main network, the preferred mobile access technology (3G) is not available, the signal coverage drops below a predefined threshold, the IP communications quality is poor, etc.
  - Automatic fallback to EDGE/GPRS guarantees vehicle connectivity when travelling through non-3G areas.
  - Dual external RF antenna for diversity maximizes the 3G coverage at any location.
  - Non poll-based WWAN<sup>2</sup> 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 in a time basis (configurable sampling window) both in the router CLI<sup>3</sup> 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.
  
- **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 corporate 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 prioritization, labeling and shaping allows for an accurate SLA audit 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 (TeldGES) and guaranteed seamless integration into third party Network Management platforms.
  - Remote firmware and configuration upgraded through FTP and TFTP.

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<sup>1</sup> Other power feed options may be available depending on the specific Project needs. Please contact your Teldat representative.

<sup>2</sup> WWAN (Wireless-WAN): Depending on the mobile access technology, the WWAN service can be of type 2.5G (EDGE/GPRS) or 3G (HSPA/UMTS)

<sup>3</sup> 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  
 2 x 3G 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<sup>4</sup>

24 Vdc ±12  
 Power consumption (nominal/max.)<sup>5</sup>: 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)
<b>Technologies</b>	HSUPA, HSDPA, UMTS, EDGE, GPRS, GSM	HSUPA, HSDPA, UMTS, EDGE, GPRS, GSM
<b>Baseband processor</b>	Qualcomm MSM6290™	Qualcomm MSM6290™
<b>Frequency Bands (MHz)</b>	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
<b>Rx Diversity</b>	Yes (Two external antennas)	Yes (Two external antennas)
<b>WWAN backup</b>	Yes. Dual SIM	Yes. Dual SIM
<b>Data services (PS)</b>	<b>GPRS/EDGE</b> Class B. Multi-slot class 12 (CS1-CS4, MCS1-MCS9). 236 Kbps DL/UL (max.) <b>UMTS R99:</b> 384 Kbps DL/UL (max.) <b>HSDPA Cat 6/8/12:</b> 7.2 Mbps DL, 384 kbps UL (max.) <b>HSUPA Cat 3/5/6:</b> 7.2 Mbps DL, 2.0 Mbps UL (max.)	<b>GPRS/EDGE</b> Class B. Multi-slot class 12 (CS1-CS4, MCS1-MCS9). 236 Kbps DL/UL (max.) <b>UMTS R99:</b> 384 Kbps DL/UL (max.) <b>HSDPA Cat 6/8/12:</b> 7.2 Mbps DL, 384 kbps UL (max.) <b>HSUPA Cat 3/5/6:</b> 7.2 Mbps DL, 2.0 Mbps UL (max.)
<b>Dual PDP connection</b>	Yes	Yes
<b>Circuit-switched services (CS)</b>	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

<sup>4</sup> Other power feed options may be available depending on the specific Project needs. Please contact your Teldat agent.

<sup>5</sup> The power consumption values 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

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## 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)  
PPPoE, 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-Cl, Pseudowire, L2TP/IPSec Server  
Advanced IP filters  
Advanced Firewall System (AFS)

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

### Data compression

IPComp (RFC 2393)  
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

## ORDERING INFORMATION

### Part no.

### Teldat H1-Automotive router models

<b>RWTHHIN1</b>	TEL DAT H1-AUTOMOTIVE (EU VERSION): RUGGED IP ROUTER, 1 HSPA/UMTS/EDGE/GPRS DUAL SIM 3G@2100MHz + 4-PORT ETH 10/100 SWITCH + HW ENCRYPTION + MOUNTING KIT
<b>RWTHHIN2</b>	TEL DAT H1-AUTOMOTIVE (UNIVERSAL VERSION): RUGGED IP ROUTER, 1 HSPA/UMTS/EDGE/GPRS DUAL SIM 3G@850/1900/2100MHz + 4-PORT ETH 10/100 SWITCH + HW ENCRYPTION + MOUNTING KIT

### SW licenses

<b>RWTHS101</b>	BASE IP SOFTWARE LICENSE FOR TEL DAT H
<b>RWTHS102</b>	IPSEC SOFTWARE LICENSE FOR TEL DAT H

### Kits, Antennas & Other accessories

<b>RWTHAW01</b>	WIRELESS-LAN KIT. IEEE 802.11a/b/g. CONFIGURABLE WIFI OPERATION MODE (AP/CLIENT)
<b>RWTHAAM1</b>	MULTI BAND 900-1800-2100 3G DIPOLE ANTENNA, 90 DEGREES MOUNT, SMA CONNECTOR
<b>RWTHAAM5</b>	MULTI BAND 900-1800-2100 3G ANTENNA, OUTDOOR WALL-MOUNT, EXTENSION CABLE OF 5M LENGTH, SMA CONNECTOR
<b>RWTHAAM6</b>	MULTI BAND 900-1800-2100 3G ANTENNA, OUTDOOR WALL-MOUNT, EXTENSION CABLE OF 10M LENGTH, SMA CONNECTOR
<b>RWTHAAM7</b>	MULTI BAND 900-1800-1900-2100 ANTENNA FOR PRE-DRILLED OUTDOOR SURFACE, 2.5M CABLE, SMA CONNECTOR
<b>RWTHAEM1</b>	MAGNETIC CRADLE FOR MULTIBAND 900-1800-2100 ANTENNAS, EXTENSION CABLE OF 2M LENGTH, SMA CONNECTOR

### Cables

<b>RWTHCAC1</b>	LOW LOSS COAXIAL CABLE: LMR400, 6M, SMA CONNECTOR
<b>RWTHCAC2</b>	LOW LOSS COAXIAL CABLE: RF-7MM, 10M, SMA CONNECTOR
<b>RWTHCAC3</b>	LOW LOSS COAXIAL CABLE: LMR400, 15M, SMA CONNECTOR
<b>RWTHCLAN</b>	PLAIN ETHERNET CABLE, UTP RJ45M-RJ45M, 2M
<b>RWTHCLCX</b>	CROSS-OVER ETHERNET CABLE, STP RJ45M-RJ45M, 2M
<b>RWTHCCON</b>	CONSOLE CABLE FOR TEL DAT H1-AUTOMOTIVE: DB9F - DB9M, 2M

#### TEL DAT DOCUMENTATION

This datasheet shall be used only for information purposes. Teldat reserves the right to modify any specification without prior notice.

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