Teldat-M1

Versatile Access Router

Figure 1: Teldat-M1 Router

"The Teldat-M1 router covers the existing gap between the compact access and the modular routers with the aim of combining the virtues of both architectures. Thus the Teldat-M1 router is a compact desktop router with integrated LAN and WAN interfaces together with an additional slot permitting it to adapt to new scenarios."

OVERVIEW

The Teldat-M1 satisfies the communication needs of the majority of remote branch offices thanks to its wealth of interfaces (both in local access as well as remote connectivity) and the possibility of adapting to new demands through a slot for different types of communication cards. Thus the Teldat-M1 router units the virtues of the compact routers, which typically include connectivity needed for remote branch offices together with the versatility of the module routers that can adapt to new scenarios with the aim of reducing stock and increase the return on investment.

The Teldat-M1 characteristics are as follows:

Interfaces	Teldat-M1
4x10/100/1000 Switch	Yes
Slots for WAN cards	Yes
Ethernet 1x10/100/1000 (WAN o LAN)	Depending on the model
Internal 3G/4G module	Depending on the model
WiFi 802.11 a/b/g/n	Optional (license)
USB 2.0 port	Optional (license)

And the WAN cards available for the slot are as follows:
- An SFP port
- A synchronous/asynchronous serial port
- A G.SHDSL 8-wire ATM/EFM port
- An E1/T1 port
- Un puerto VDSL/ADSL
- Un puerto Gigabit Ethernet con PoE-in

The Teldat-M1 covers connectivity scenarios for standard traffic at 100 Mbps under normal remote branch office conditions, both in clear as well as encrypted, and this rate can double for uncrypted traffic.

The Teldat-M1 router also has a "stateful" access list system (Firewalling based on states) and an Application Layer Gateway (ALG) feature thus providing the maximum level of perimeter protection for communications.

Teldat's hierarchic QoS System (Teldat BRS) allows priority, modeling and independent tagging in each traffic flow (VoIP, Data with priority 1, Data with priority 2, etc.), so it is appropriately handled in the transport network, simplifying the service level policy definitions (SLA) which are adapted to each of the branch applications.

The Teldat-M1 has a command interface (CLI) fully adapted for professional use. Additionally the router possesses all the functions and features needed in the corporate sector for efficient, detailed and centralized management over the TeldaGES management platform.

Corporate management features are fully supported (SNMPv1/2/3 fully parameterized complying with MIB-2 and Teldat's MIB, FTP, TFTP, RADIUS, Syslog, etc), simplifying seamless integration in the company's existing communications management platform.

USER SCENARIOS
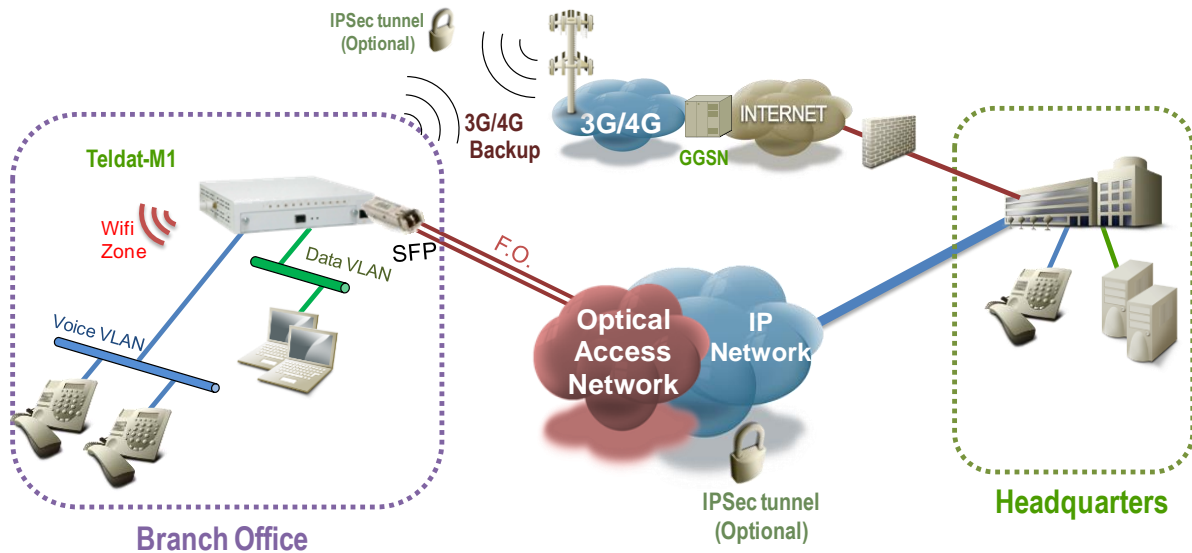## Optical Connectivity

Figure 2. Optical Connectivity

Optic fiber network deployment covers more and more territory everyday, permiting simplier, more efficient and scalable scenarios. The Teldat-M1 is compatible with scenarios with fiber with direct connectivity to the router through the SFP expansion card and the appropriate SFP device for the type of fiber. In line with the high speed WAN accesses, the 4-port gigabit switch provides high speed in the internal network and further supports high speed WWAN 3G/4G connections through the internal module or the external USB device, normally used for backup, as well as the rest of the options (WAN, LAN/WAN gigabit port).

The investment in the Teldat-M1 pays off in scenarios where optic fiber networks are expected to be deployed, where migration from a G-SHDSL, E1, Serial or Ethernet WAN scenario (cablemodem, radio links, etc.) towards future fiber scenarios are made perfectly possible by simply adding an expansion card, thus maintaining the same device with the additional advantage of minimal changes in the configuration
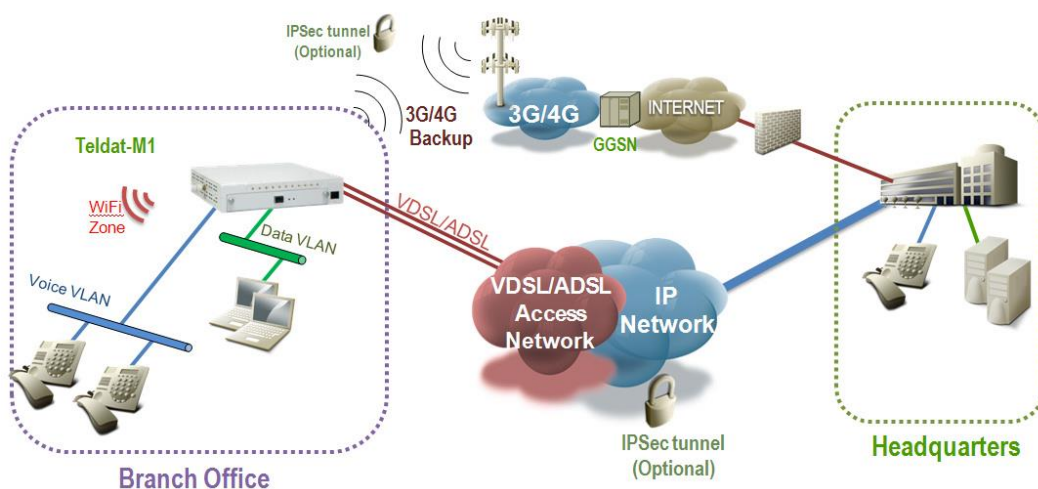
VDSL/ADSL Connectivity

Figure 3. VDSL/ADSL Connectivity

When a fiber deployment does not reach remote branches, VDSL/ADSL is a good alternative to offer high speed symetric accesses. The Teldat-M1 supports these scenarios through the VDSL/ADSL expansion card. As is logical, the rest of the options are maintained as in the previous case.
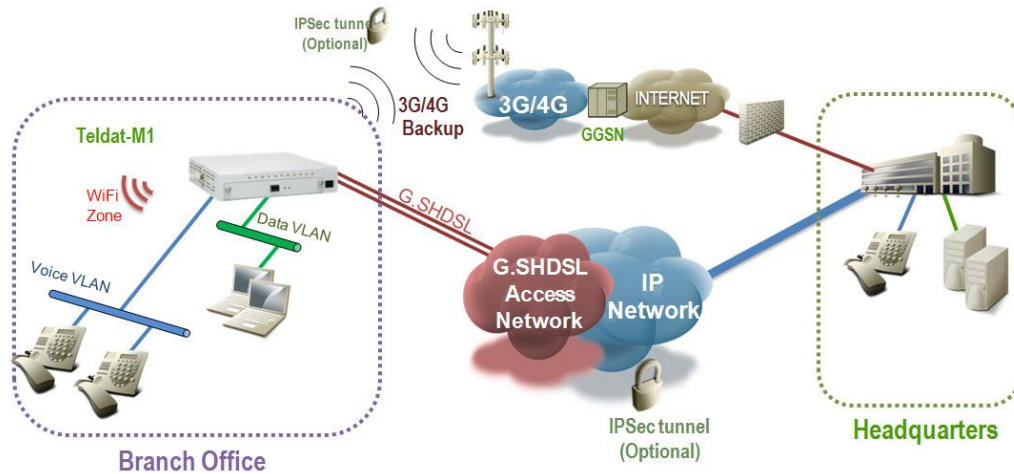
G.SHDSL Connectivity

Figure 4. G.SHDSL Connectivity

When the fiber deployment doesn't reach remote branch offices, G.SHDSL is an excellent alternative to offer symetrical high speed accesses. The Teldat-M1 supports these scenarios through the G.SHDSL expansion card, capable of supporting up to 4 pairs, both with ATM as well as EFM networks. As expected, the rest of the options remain as given in the previous case.
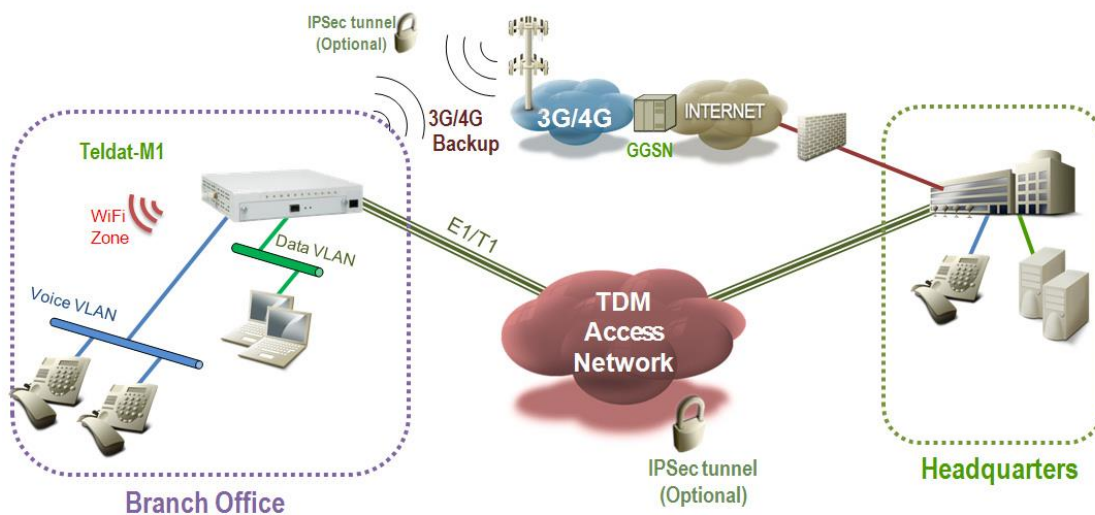
E1/T1 Connectivity

Figure 5. E1/T1 Connectivity

E1/T1 is another connectivity option for remote office branches using a TDM network. The Teldat-M1 supports this scenario through an expansion card with the said interface for full speed connections at 2.048 Mbps for the E1 interface, 1.536 Mbps for T1 or in fractions of n x 64Kbps. The rest of the options are supported in the same way as the previous scenarios (WLAN, WWAN, etc.)
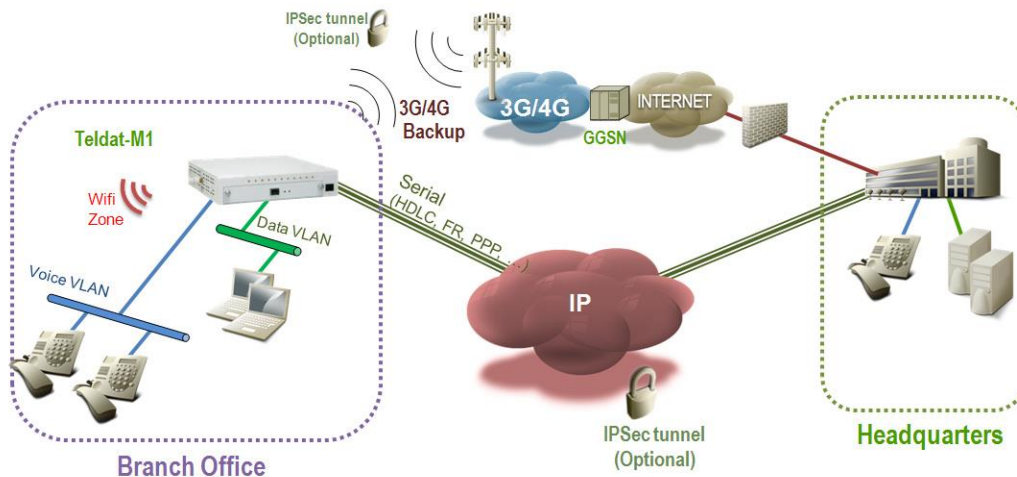
Serial to Access Network Connectivity

Figure 6. Serial to network Connectivity

The Teldat-M1also supports serial connectivity through the expansion card for a serial port, with the support of synchronous and asynchronous communications and different link protocols such as Frame Relay, PPP or HDLC.
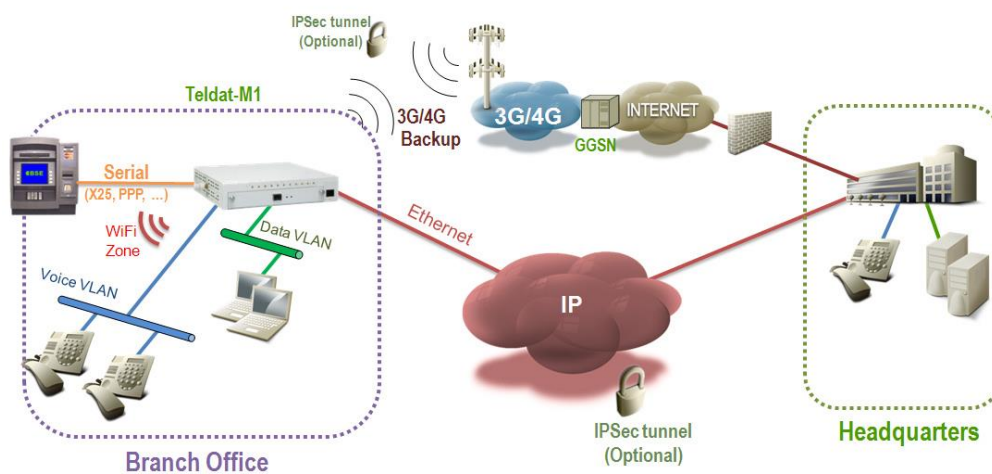
Serial Device Connectivity

Figure 7. Serial Device Connectivity

A serial port expansion card can also be used to connect ATMs and other devices with serial connectivity through protocols such as X25 or SDLC (SNA), while connectivity to the WAN network is carried out through the motherboard Ethernet port and/or WWAN.

KEY CHARACTERISTICS

- **Wealth of ports integrated on the motherboard plus an expansion slot**
    - ✓ Gigabit Ethernet WAN and LAN conectivity on the motherboard.
    - ✓ Expansion slot to adapt to complex or changing scenarios. Available expansion cards: Serial, SFP, G.SHDSL, VDSL/ADSL, Ethernet PoE and E1/T1.
    - ✓ WLAN and WWAN slots on motherboard.
    - ✓ USB port.

● **Corporate Services**
  ✓ Border router for different dynamic routing domains (RIP, OSPF, BGP), administrative distance in IP routes, route filtering based on route-maps and policy-based routing (PBR) favor the implementation of converging corporate services, which combine Wireless WAN and landline access.
  ✓ VRF to adapt to complex or multiclient environments.
  ✓ Multi-HSRP and Multi-VRRP for network redundancy and load balancing applications
  ✓ Link quality monitoring through the Teldat NSM/NSLA system adapts the routing policy based on link quality (RTT, erroneous frame rate and UDP jitter).
  ✓ Teldat's hierarchic QoS system. Flexible application for flow priority, traffic marking and classification means that efficient use is made of the network resources and an accurate definition of the service level agreements (SLAs).
  ✓ USB 2.0 port for connecting external 3G/4G modems.
  ✓ Absence of fans so the routers can be installed anywhere in the branch.

● **Ethernet Services**
  ✓ Ethernet WAN: Gigabit-Ethernet 10/100/1000 port (requires license).
  ✓ Integrated Ethernet Switch: 4 x Gigabit-Ethernet 10/100/1000 ports.
  ✓ Complete and independent SNMP management per Ethernet port on the router.
  ✓ High processing capacity so performance in Ethernet communications is not affected.
  ✓ Full VLAN support (trunking, filtering, QinQ, etc).
  ✓ State of the art in router and bridge over Ethernet.

● **Integrated WWAN communications Service**
  ✓ Embedded 3G/4G interface (depending on the model), permanently monitored by the router's management engine.
  ✓ Double SIM tray. In cases of problems with the WWAN connectivity with a carrier, connectivity is carried out with an alternative carrier, consequently doubling the reliability of the connection. It's also possible to establish which SIM card to use based on timetables to manage tariffs.
  ✓ Fully managed router engine: Teldat WWAN interface commands and interface are integrated in the generic network management platforms (SNMP management through the Teldat-MIB on the WWAN interface).
  ✓ Full integration of the WWAN interface in the router's internetworking protocols architecture (CIT features), providing high quality and efficient WWAN/VPN services.
  ✓ Improves the stability of the WWAN signal received in areas with low WWWAN coverage: Two SMA ports for external antennas (Rx Diversity).
  ✓ Mechanisms for passive WWAN supervision (unnecessary to transmit polling traffic): Thanks to the permanent monitoring the router executes over the signal coverage, connection to the mobile network, the IP connection and the detailed monitoring of the office traffic transmitted and received over the WWAN link, the router can accurately and dynamically detect incidences in the device performance and take the appropriate actions (WWAN backup, incident reports, etc.), minimizing unavailable time for the communications service.
  ✓ Mechanisms for active WWAN supervision (polling traffic): the router is also capable of detecting an excessive degrading in the WWAN service using the established parameters (delay, jitter, error rate) to execute the appropriate actions.
  ✓ Advanced WWAN Diagnostics: In addition to the instant diagnostics from the radio interface, the router can search for relevant WWAN parameters such as signal coverage, offering reports on the evolution over time either on the device console or in the Teldat central network management platform (TeldaGES).
  ✓ Audio GSM calls supported, simultaneously with WWAN data transmission for emergency telephony services (currently being developed).
  ✓ AT commands interface to complement the Teldat WWAN interface commands for low level personalization of the embedded communications module (SIM lock/unlock, etc.).
  ✓ WWAN+: proprietary management system to improve the IP network protocols to be used in mobile networks.

● **Secure Communications**
  ✓ Encryption processor incorporated; optimizes device performance in scenarios with IPSec tunnels.
  ✓ Fully parameterized IPSec Client/Server. Advanced IPSec features such as PKI encryption (Digital Certificates), extended authentication and Reverse-Route Injection guaranteeing compatibility with other commercial VPN solutions.
  ✓ Latest generation meshed topology VPN networks (Dynamic Multipoint VPN technology).
  ✓ IP filtering, MAC filtering and SPI firewall all protect the router from DoS attacks.

- **WLAN Module, Advanced Features**
  - ✓ Embedded WLAN module (depending on the model) IEEE 802.11 a/b/g/n, MIMO 2x2 up to 300 Mbps (requires license).
  - ✓ Professional security (IEEE 802.11i/WPA-2).
  - ✓ Configurable "Access-Point" and "Client" operation mode, either for rerouting from the WiFi terminals to the mobile network (accessing Internet or corporate VPN, depending in the service specifications, when operating as "Access-Point") or to connect the router to the branch WiFi network to access certain applications in the branch ("Client" mode).

- **Efficient Communications Management**
  - ✓ Powerful Teldat commands console, adapted for professional-class device management.
  - ✓ The Syslog client reports any event detected by Teldat's Events Logging System.
  - ✓ SNMPv3 Agent with trap sending support and read MIB2 and Teldat-MIB depending on the defined management communities. The Teldat-M1 routers can be easily integrated into the existing network management platform.
  - ✓ Network clock synchronization (NTP Client).
  - ✓ Intuitive and efficient management of the Teldat-M1 routers through the Teldat network management platform (TeldaGES).
  - ✓ Telnet, SSH2, FTP, TFTP and RADIUS Client.

- **IP Telephony**
  - ✓ IP telephony integrated server capable of managing up to 100 telephones with SIP, H323, Alcatel NOE or SCCP (Skinny) protocols.

TECHNICAL SPECIFICATIONS

General

Interfaces and connectors (availability of interfaces depends on the model and license)
1 x 10/100/1000 Gigabit Ethernet, RJ-45F (WAN/LAN) (depending on the model)
4 x 10/100/1000 Gigabit Ethernet, RJ-45F (LAN)
1 x integrated LTE/HSPA+/HSPA/UMTS/EDGE/GPRS interface (depending on the model)
1 x WLAN 802.11abgn MIMO 2x3 non simultaneous Dual Interface up to 300 Mbps (optional)
1 x USB Host 2.0 Interface for USB/3G modems (optional)
1 x expansion slot
1 x RJ-45F consol port
1 x power ON/OFF switch

Ethernet Wan Port (requires a license)
10/100/1000-BaseT detection
Automatic semiduplex/duplex negotiation
MDI /MDI-X detection ("crossover detection")
Ethernet V2 / IEEE 802.3
LLC (802.2), ARP
IEEE 802.1Q(VLAN) up to 4096 VLANs
2 status and activity LEDs

Ethernet Switch
10/100/1000-BaseT detection
Automatic semiduplex/duplex negotiation
MDI /MDI-X detection ("crossover detection")
Ethernet V2 / IEEE 802.3
LLC (802.2), ARP

IEEE 802.1Q (VLAN) up to 4096 VLANs
Manageable Switch:
- EtherLike-MIB (RFC 2665)
- SNMP-REPEATER-MIB (RFC 2108)
- MAU-MIB (RFC 2668)
2 status and activity LEDs per port

Wireless LAN Interface (requires a license)
IEEE 802.11 a/b/g/n MIMO 2x2 Non-simultaneous dual up to 300 Mbps
Two detachable external antennas (SMA ports)

3G/4G internal module (depending on the model)
Compatible LTE, HSPA+, HSPA, UMTS, GPRS
Two detachable external antennas (SMA connector)
Double SIM tray (internal and external). Automatic management of SIM trays with criteria:
- Signal level
- Cell technology (EGPRS, WCDMA, etc.)
- Schedule programming
Automatic Handover
Passive detection of WWAN network down based on monitoring the processed traffic
Active detection of WWAN network degrading based on traffic polls (monitoring of delay, jitter and loss rate)
Real time advanced monitoring of the radio interface
Local storing of WWAN statistics for reporting coverage evolution
Simultaneous context for dual APN (dual PDP)

Remote upgrading for module firmware over the air
Proprietor management system to improve the IP network protocols to be used in cellular networks (WWAN+)

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

Power source
AC external adapter: 90 – 240 Vac; 50/60Hz (default)

Dimensions and weight
Length x Width x Height: 245 x 210 x 45 mm
Weight: 1.432 Kg

Protocols and features

IP Protocol
IP, ARP, Proxy ARP
Static IP Routing, RIP I, RIP II, OSPFv2, BGP-4 & Policy Routing
BFD Protocol
Compatible with HSRP
RFC 2281 VRRP – Virtual Router Protocol
VRF-Lite
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 and PIM-SM
DHCP client, server & relay
DNS client & proxy. DNS cache. Dynamic upgrades in DNS (RFC 2136)
SNAT/DNAT/NAPT. Visible subnets, Port Mapping
PAT fire-walling
Multiple addresses per interface
Loopback Interfaces

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

ATM
SAR AAL5
PVCs: 31 y SVCs
Complete VPIs and VCIs range
PVC dynamic creation and destruction
Traffic Shaping: CBR, UBR, VBR-nrt, VBR-rt
OAM F4/F5

Encapsulation over ATM
IP routing RFC 1483 LLC y VC based
PPPoA RFC 2364 LLC y VC based
PPPoE RFC 2516 LLC y VC based
RFC 2225, Classical IP over ATM
Ethernet Bridged RFC 1483 LLC y VC based
Frame Relay over ATM: FRF.5 y FRF.8

Quality of Service (QoS)
Packet marking (DiffServ) depending on the interface, subinterface, protocol, port and MAC and size

Format: Desktop. Additional 19" rack bracket

Environmental specifications
Working Temperature: 0 to 45 ºC (32 to 113 ºF)
Storing Temperature: -40 to 70 ºC (-40 to 158 ºF)
Relative Humidity: 5% to 95% (without condensation)
Altitude: 0 to 3000m. (0 to 10,000 ft)
Barometric pressure: 700 mbar to 1060 mbar

Noise
0 db (without fans)

Congestion control: FIFO, queuing priority, BRS proprietary system, WFQ
Proprietor traffic modulation (BRS), ATM and FR
Fragmentation in FR (FRF.12), PPP & MPPP

Data compression
X.25 and PPP compression
IPHC compression
Van Jacobson & STA LZS compression algorithms

Wireless LAN specific features
Selectable transmission power source
Manual or automatic speed selection
20 and 40MHz channels
802.11i, WPA, WPA2
EAP, EAPOL
Authentication (open, shared, WPA)
Encryption (AES, TKIP, WEP)
ESSID
MAC filtering
Quality of Service (QoS) AIFS, CWmin, CWmax

Security and VPNs
IPSec Client/Server, fully parameterized, compatible with third party IPSec ends
IPSec security services: ESP & AH
IPSec operation modes: Tunnel and transport
Encryption: RC4, DES, 3DES & AES
Authentication: SHA-1 & MD5
IKE Protocol
ISAKMP Configuration method. Oakley groups 1, 2, 5 and 15
NAT-Traversal
Reverse Route Injection (RRI)
Digital certificates X.509v3, LDAP, PKIX, PEM, DER
SCEP Protocol
TED Protocol
IPSec PMTU Discovery
GRE & multi-GRE. GRE RC4 encryption
NHRP Protocol
Dynamic Multipoint IPSec VPNs (DMVPN)
Gateway Encryption Transport VPN (GET VPN - GDOI) RFC 3547
Radius Access Control (RFC 2138)
L2TP (LAC) client, L2TP initiation and L2TP server (LNS)
L2TP/IPSec server, compatible with Microsoft clients
IP advanced filters
Advanced Firewall System (AFS)
   - Stateful Firewall

- Advanced packet classification and tagging
- URL & contents filtering

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 and routing
IEEE 802.1p CoS ("Class of Service")
PVST ("Per VLAN Spanning Tree Protocol")
Source Routing, MAC & NetBIOS filtering

Telephony over IP (ToIP)

Signaling:
- SIP: RFC 3261, RFC 3262, RFC 3264, RFC 3265
- SIP transport over UDP, TCP and TLS
- X509 over TLS authentication
- SIP SDP: RFC2327
- SIP SDES: RFC4568
- H.323, H.245, H.225
- RAS
- UA-NOE (Alcaltel) (server function)
- SCCP (skinny) (server function)
- SIP and H323 modified AASTRA (server function)

Simultaneous telephone survival for SIP/H323/SCCP/UA-NOE/SIP (AASTRA)/ H323(ASTRA) terminals

Emergency switchboard functionality
PBX Features
- Supervised and blind transfers
- Simultaneous ringing in multiple terminals
- Hunt groups
- Call groups
- Overflow
- Forward if busy, no answer or unconditional
- Music on hold in streaming mode from the file

RTP, RTCP, SRTP
Data fragmentation FRF.12
Header compression CRTP
Numeric expansion and compression

Management

Command line interface via telnet & SSH
SNMP: MIB-2, Teldat private MIB
Events Logging System
Netflow V5 and V9
Syslog Client
NTP Protocol
DynDNS Client
FTP & TFTP Software, configuration updating & BIOS
Internal protocol analyzer, compatible with Ethereal/Wireshark
Radius Accounting (RFC 2139)
Integrated in TeldaGES (Teldat professional management platform)

PRODUCT PHOTOS

Figure 8: Perspective View of Teldat-M1 router with WLAN antennas

Figure 9: Teldat-M1 router: view of connectors panel

TELDAT DOCUMENTATION

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Teldat logo / QR	**www.teldat.com**	
	TELDAT S. A. ESPAÑA Parque Tecnológico de Madrid. 28760 Tres Cantos, Madrid (España). Tel: +34 91 807 65 65 Anna Piferrer 1-3. 08023 Barcelona (España). Tel: + 34 93 253 02 22	
bintec elmeg GmbH ALEMANIA Suedwestpark 94. 90449 Nuremberg (Alemania) Tel: +49 911 9673 0. Fax: +49 911 688 0725	**TELDAT MEXICO** Diagonal 27. Colonia del Valle, Mexico D. F. 03100 (Mexico). Tel: +52(55)55232213	**TELDAT USA** **Silicon Valley Offices** 718 University Ave, Suite 210 Los Gatos, CA 95032 (USA) Tel.: +1 (408) 892-9363 Fax: +1 (408) 300-9375
TELDAT ITALIA Viale Edison 637. 20099 Sesto San Giovanni (MI) (Italia) Tel:+39(02)24416624	**TELDAT FRANCIA** 6 Avenue Neil Armstrong Immeuble le Lindbergh 33692 MERIGNAC Cedex (Francia) Tel: +33(0) 57356300	**TELDAT CHINA** A 060, F10 SOHO Nexus Centre No19A, East 3rd Ring North Road, Chaoyang District, Beijing 100020 (China). Tel: +86 10 57351071