



Teldat H1 RAIL

Installation Manual

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I Important Information



Caution

The manufacturer reserves the right to make changes and improvements to the appropriate features in both the software and hardware of this product, modifying the specifications of this manual without prior notice.

The images presented on the front and back panels of the devices are provided as information guideline only. Some small modifications may exist in the actual device.



Warning

The equipment is intended to be installed by Service Personnel and only handled by qualified personnel. If not, the device may be damaged and malfunction.

This device contains elements that are sensitive to electrostatic surges and shocks. Therefore, it is essential when handling the equipment that an antistatic wriststrap is connected to the device chassis and that this is placed on an antistatic mat. Furthermore, it is crucial to avoid any kind of contact between the device components and necklaces, bracelets, rings, ties etc.



Note

Please note that when the device operates for prolonged periods of time under extreme conditions (including high temperature and humidity) the service life of the device falls significantly.

Chapter 1 Description

1.1 Introduction

The **Teldat H1 RAIL** router is an IP router conceived to work in hostile and extreme environments and designed to be installed in rolling stock. Thanks to its ruggedized mechanics and special characteristics, allowing it to bear extreme temperatures, this router is particularly suited for: rolling stock, automotive applications, industrial environments, industrial telecontrol, distribution installations for electricity, gas, water, etc.

Moreover, it enables the access to data networks through cellular or mobile telephony technologies. Thanks to its modular design, this device can quickly adapt to the latest technologies.

The **Teldat H1 RAIL** family is, therefore, compatible with GPRS, EDGE, UMTS, HSDPA, HSUPA, HSPA, HSPA+, LTE, CDMA 2000 1xRTT, CDMA Ev-Do, etc.

The router can incorporate one or two cellular technology modules, thus permitting simultaneous connections to different carrier networks (to permanently increase its capacity, or to use them as backup when one of the networks is unavailable).

In addition, the latest technology in internal GPS (SiRF® Start IV) can be incorporated for positioning tasks in on-board environments.

The **Teldat H1 RAIL** family includes an integrated four-port Ethernet LAN Switch for local area networks.

Optionally, the **Teldat H1 RAIL** may incorporate a Wireless LAN MINI-PCI module.

This manual will show you how to install and connect these devices.



Fig. 1: Teldat H1 Rail: External aspect



Note

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Chapter 2 Installation

2.1 Connections



Note

Before connecting the router, please read the following instructions carefully.

Workplace Conditions. Main Characteristics

This device is designed to be installed in a 19" Rack.



The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables as shown in the following table:

To Connect	To Disconnect
Make sure that the power supply cable is not connected to the device.	Disconnect the power supply from the power supply cable.
Connect all data cables.	Disconnect the power supply cable from the device.
Connect the power supply cable to the device.	Disconnect the data cables.
Connect the power supply cable to the power supply.	

2.1.1 Connecting the power

The **Teldat H1 RAIL** router family is powered by an 110 V nominal DC power source. This device has no on/off switch or fuse.



To comply with electrical safety regulations, this equipment must be connected to the vehicle power network through a 1 amp approved thermo-magnetic circuit breaker (ABB-S281-UC-K-1 or equivalent).



As an additional EMC measure, the H1 Rail device has two functional earth terminals (on the front or back panel). One of the two must be grounded by means of a cable with a section not less than 2 mm² (AWG14).

The following image shows where the power connector is located. This is labeled as “**Power / 110 V DC**” .

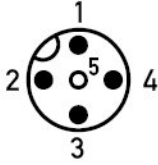


Fig. 2: Power supply connection

2.1.1.1 Power connector pins

The power connector installed on this device is an M12 4 pole code A male connector (Phoenix Contact SACC-E-MS-4CON-M16 / 0,5 SCO) or equivalent.

PIN	Signal	M12 4P Code A male
-----	--------	--------------------

1	110 V DC	
2	110 V DC	
3	0 V	
4	0 V	

Note
 Connections 1-2 and 3-4 are redundant. However, we recommend that you maintain the redundancy in order to guarantee device availability.

2.1.1.2 Power cable

The power cable is not supplied with the device. Maximum estimated consumption for the device operating at 110 V DC is approximately 150 mA; therefore any cable with a cable gauge greater or equal to 0.2 mm² (AWG24) is acceptable. However, the type of cable and its gauge will be determined by the characteristics of the female connector used.

E.g. for a female Phoenix Contact SACC-M12FS-4CON-PG7-M or equivalent, we would recommend a cable with an exterior diameter of 4-6 mm with 4 AWG24-AWG18 conductors.

The cable does not have to be shielded. If you use a shielded cable, we recommend that you connect the cable shield to the ground at the other end of the device, in the power source or in both.

2.1.2 Data connection

The **Teldat H1 RAIL** router has the following available data connectors:

2.1.2.1 LAN SWITCH

The **Teldat H1 RAIL** router incorporates a 4 port Switch, 10/100BaseT with automatic MDI/MDIX to connect to a local area network (LAN).

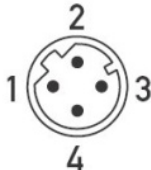
This device has a LINK LED indicating the state of the connection.



Fig. 3: LAN Switch ports (4)

2.1.2.1.1 LAN connector pins

The LAN connector installed in the device is an M12 4 pole code D male connector (Phoenix Contact SACC-CI-M12FSD-4CON-L90 SCO) or equivalent.

PIN	Signal	M12 4P Code D Female
1	Tx+	

2	Rx+	
3	Tx-	
4	Rx-	



Note

As the Switch integrated in the device has an automatic MDIX feature, you can use a PIN to PIN cable in order to connect to another device without having to cross the Tx-Rx pairs.

2.1.2.2 AUX

The **Teldat H1 RAIL** router family has a DB9 female connector on the front panel labeled **AUX**. This can be used as a configuration port for the router or as a V.24 asynchronous serial port by means of a configuration command. The behavior or functionality of this interface must be previously configured. By default, this interface is configured in the router's configuration port mode. This section focuses on the connection to operate in asynchronous port mode.

This interface allows you to connect asynchronous serial devices that do not need hardware control signals. E.g. this permits the connection of external modems or an asynchronous PPP WAN.

Another interesting feature of this port is the possibility of using it as a GPS data source, in NMEA sentences (GPS-DATA).

This interface only operates complying with the V24 norm; it does not have control signals, only data signals. Therefore, this interface cannot control hardware flow. It does, however allow for software flow control (XON/XOFF).

You cannot configure parity in MARK and SPACE modes.

In order to configure this, you need to connect the **AUX** port to an asynchronous terminal (or to a PC with terminal emulation).

To use this as a configuration port for the router, please see section [Configuration connection](#) on page 7.



Fig. 4: AUX Port

2.1.3 Connecting to a WWAN antenna

The **Teldat H1 RAIL** router has up to 4 N connectors to connect the WWAN antennas (3G).

Name	3G Module	Antenna Function
MOD.1 ANT.1	MD1	Main
MOD.1 ANT.2	MD1	Aux. / diversity
MOD.2 ANT.1	MD2	Main
MOD.2 ANT.2	MD2	Aux. / diversity

The device does not have internal antennas, so the installation of antennas in the **Teldat H1 RAIL** routers is essential in order to improve the quality of the signal received and transmitted by the Wireless WAN module (GPRS, UMTS, HSDPA, HSUPA, HSPA+, LTE, etc.).

The cable used to connect the antennas must be a cable which is valid for RF signal communications of up to 2.6 GHz frequencies and a 50 Ohm impedance. Please note that the quality and the length of the antenna cable (loss) may have an impact on the quality of the RF signals transmitted and received and, consequently, on device cover-

age and the speed at which the data is exchanged.



Note

For the Wireless WAN interface to be operative, the device must have the corresponding software license incorporated.

For each module, the device has two WWAN antenna connectors incorporated (**ANT.1** and **ANT.2**).

Depending on the technology used for the connection, it will be necessary to use one (e.g. GPRS) or two antennas (e.g. LTE).

Installation of the antenna in the **ANT.1 (Main)** connector is mandatory. The antenna for the **ANT.2 (Ext.Diversity)** connector may not be necessary.

In some models, if you are not going to install the ANT.2 Ext Diversity antenna you must configure the router accordingly (disabling this antenna) to obtain optimum performance.

When you install both the ANT.1 Main and the ANT.2 Ext.Diversity antennas, the minimum distance between them must be 7 cms and the maximum recommended distance is 25 cms.

In order to achieve optimum features, the installed radio frequency accessories (antennas and cables) should be those recommended by Teldat.

The following image shows you where to find the antenna connectors for the WWAN modules.



Fig. 5: Antenna connectors for WWAN

2.1.3.1 Positioning the antenna

The antenna orientation and its location with respect to other wireless devices and radiation devices (such as communication devices, personal computers, etc.) can influence significantly the device performance.

The antennas transmit and receive radio signals. Performance is also affected by environmental factors (such as the distance between the device and the base station), physical obstacles and other interferences due to radio frequencies (RF).

To achieve the best coverage, follow these steps:

- Whenever possible, place the antenna where there are no physical obstacles. Obstacles between the antenna and the base station degrade the wireless signal. Place the antenna above ground level and steer it towards the nearest base station.
- Density of materials also affects the antennas. Place them away from any type of wall, metal screens, mirrors, etc.
- Do not place the antenna near columns that can produce shadow areas and reduce the coverage zone.
- Keep the antenna away from metal pipes such as canals, air-conditioning, etc.
- Please bear in mind that other wireless devices such as telephones, microwaves, etc., can temporarily interfere with the quality of the wireless signal.
- We do not recommend that you install the antennas near or between racks containing communication devices, computers, etc. Use an extension cable and position the antenna outside.

The following recommendations are applicable to all wireless devices:

- Do not touch or move the antenna while the device is transmitting or receiving.
- When the antenna is transmitting, do not touch any equipment that contains devices that radiate very close to, or touching, any exposed part of the body (particularly face and eyes).
- Do not install the device in areas where the atmosphere is potentially explosive.

- Wireless devices can cause interference in other devices. Do not use the device in areas where medical equipment is installed.

2.1.4 Connecting the WLAN antenna

The **Teldat H1 RAIL** has N connectors to connect up to 2 WLAN (Wi-Fi) antennas in the models that have this interface.

The device does not have internal antennas, so the installation of antennas in the **Teldat H1 RAIL** routers is essential in order to improve the quality of the signal received and transmitted by the Wireless LAN module.

The cable used to connect the antennas must be a cable which is valid for RF signal communications of up to 2.4 GHz (5.7 GHz for 802.11a) frequencies and a 50 Ohm impedance. Please note that the quality and the length of the antenna cable (loss) may have an impact on the quality of the RF signals transmitted and received and, consequently, on device coverage and the speed at which the data is exchanged.

For the Wireless WAN interface to be operative, the device must have the corresponding software license incorporated.

The following image shows you where to find the antenna connectors for the WLAN modules.



Fig. 6: Antenna connectors for WLAN

2.1.5 Connecting the GPS antenna

The **Teldat H1 RAIL** router has an FME connector to connect an active GPS antenna in the models equipped with this interface.

The device does not have internal antennas, so the installation of an active 3.3V external antenna in the **Teldat H1 RAIL** routers is essential in order to improve the quality of the signal received by the GPS module.

The cable used to connect the antennas must be a cable which is valid for RF signal communications of up to 1.5 GHz frequencies and a 50 Ohm impedance. Please note that the quality and the length of the antenna cable (loss) may have an impact on the quality of the RF signals received and, consequently, the accuracy and speed at which the position is obtained.

The following image shows you where to find the antenna connector for the GPS module.



Fig. 7: Antenna connector for GPS

2.1.6 Configuration connection

2.1.6.1 Configuring through the local console (AUX connector)

The **Teldat H1 RAIL** router has a DB9 female connector on the front panel known as “**AUX.**”, which provides access to the device’s local console or may operate as an asynchronous serial port. The behavior or functionality of this interface must be previously configured. By default, this interface is configured in local console mode. This section focuses on the connection for the local console mode.

To configure this, you must connect the “**AUX.**” port to an asynchronous terminal (or to a PC with terminal emulation).

**Note**

Configuration for the terminal must be as follows:

- Speed: 9600 bps.
- Eight data bits.
- One stop bit.
- No parity bit.
- No type of flow control.

Connection to the configuration port can be carried via a DB9 Male and DB9 Female connector. If the terminal has DB25 connectors, you will need to use an additional adapter.



Fig. 8: Connection for configuration

2.1.6.2 Configuring through the IP terminal (LAN1..4 connectors)

The **Teldat H1 RAIL** router includes a default configuration that activates if the device has not been previous configured.

The router's default configuration establishes the following IP access address and mask:

- IP Address: 192.168.1.1
- IP Mask: 255.255.255.0

**Note**

Some devices leave the factory with a customized configuration for a specific client. This personalization can mean that the default configuration is different from the one shown above.

This initial configuration means you can access the device's configuration console through the Telnet IP protocol. To do this, carry out the following steps:

- Configure the Ethernet interface on the IP terminal (normally a PC) using the IP address from the following range [192.168.1.2, 192.168.1.254] and mask 255.255.255.0. E.g. 192.168.1.2, 255.255.255.0.
- Connect the IP terminal's Ethernet interface to any of the Ethernet Switch ports on the **Teldat H1 RAIL** router (the LAN1..4 connectors) through an appropriate Ethernet cable (M12 to RJ45).
- Start a Telnet session from the IP terminal to IP address 192.168.1.1 (the **Teldat H1 RAIL** router default address).
- The default configuration does not ask for login credentials (user/password) to access the console.

For further information on how to fully configure the device, please see the manuals provided by Teldat on the documentation CD or through the WEB page.

2.2 Installing the SIM card

The **Teldat H1 RAIL** has one or two Wireless WAN interfaces. For them to operate, you may have to insert at least one SIM card in the device.

There are certain services (CDMA) provided by several carriers in some countries that do not require SIM cards. In installations where a SIM card is required, you must always insert at least one.

The **Teldat H1 RAIL** has two SIM trays. Both are located inside the device.

In cases where it incorporates two modules, a SIM tray is automatically assigned to each module.

When only one SIM card is going to be used, it can be inserted into either of the two SIM trays. However, you must remember to configure the router correctly so it selects the appropriate tray.

Having 2 SIM trays allows you to carry out some special configurations. One example is installing two SIMs and using one as a backup to the other. To carry out this type of configuration, you must set the tray that has to be associated to each SIM (since each SIM requires different configuration parameters).



Warning

This device is compatible with 1.8V and 3V SIMs. Do not install SIMs that do not support these voltages.

Never install the SIM cards when the device is switched on.

Always disconnect the device from the main power supply before installing the SIM cards.

Always disconnect the device before removing the casing to access the trays.

When inserting the SIM cards, please protect yourself against electrostatic discharges (ESD).

Do not touch the SIM cards connectors.

To access the SIM trays you need to open the upper casing of the device. To do this, you need to undo the two screws located on the upper part of the front panel, the two located on each of the side panels and the screw on the upper part of the rear panel.

2.2.1 Identifying the SIM cards

The location of the modules and the SIM trays are shown in the following figures:



Fig. 9: SIM tray #1 for MD1 Module

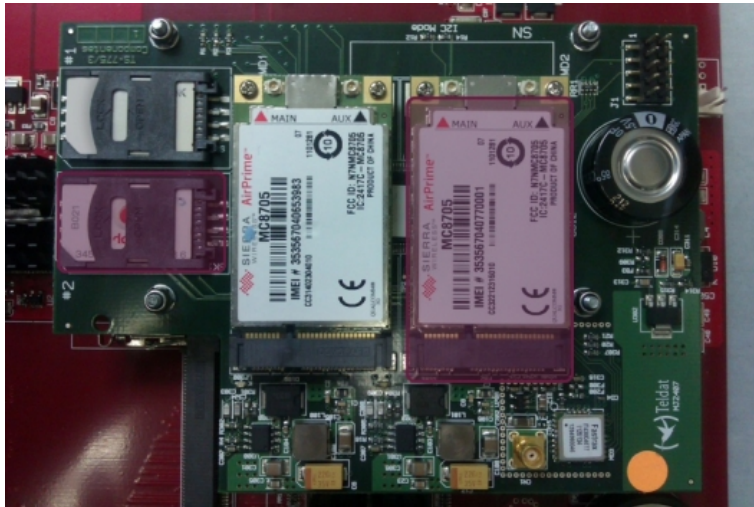


Fig. 10: SIM tray #2 for MD2 Module

When there are two modules installed, the SIMs' tray assignment is set and is as follows:

- Module MD1 for SIM #1
- Module MD2 for SIM #2

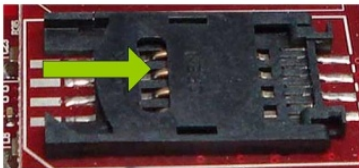
In devices where a single WWAN module is installed (MD1), if only one SIM card is going to be used, it can be inserted in either SIM tray (#1 or #2). However, you must remember to configure the router correctly so it selects the appropriate tray.

- Module MD1 # SIM #1 (default) or SIM #2

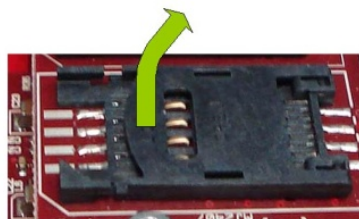
2.2.2 Installing the SIM

In order to insert a SIM card in the internal tray, locate the retaining flange (metal fastening with OPEN and LOCK on it) so you can open the tray and place the SIM card on it. The steps are as follows:

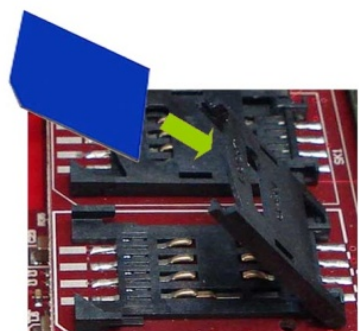
- (1) Push the fastening to the right (OPEN) until the tray is released.



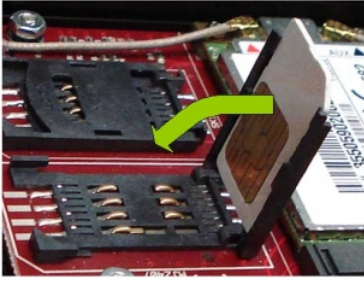
- (2) Open the upper part of the tray.



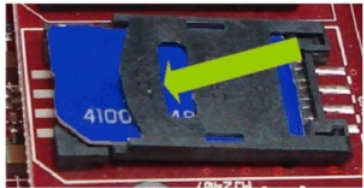
- (3) Fully insert the SIM card using the guides.



- (4) Return the tray to its original position.



- (5) While pressing on the tray, push the fastening towards the inside of the tray (LOCK).



- (6) The card should be completely held by the tray.



2.2.3 Closing the device

After installing the SIM card, you can then close the device. To do this, carry out the steps used to open the device in reverse order paying special attention to communication modules' Thermal Pad.

This element must be placed over the communication modules to expel the heat from the module outside through the device metal casing; the module should be in contact with the casing.

This Pad quite often sticks to the casing when you open up the device simply due to its rubbery consistency as no adhesive is used.

Due to this, and in order to assemble the device again, you need to carry out the following steps:

- (1) Check that the Thermal Pad is located on top of the module. If it isn't, check to see if it's stuck to the casing. If it is, remove from the casing and place on top of the module.
- (2) Refit the lid, first sliding it horizontally and then vertically so as not to 'drag' it over the Pad.
- (3) Replace the seven screws holding the cover.



Fig. 11: Example of a Thermal Pad assembled over the WWAN MD1. This must be assembled in both.

Chapter 3 Meaning of the LEDs

The following figure shows the positions of the LEDs on the front panel of the device:



Fig. 12: Teldat H1 Rail: Front panel

A	Wireless WAN interface channel 0 (cellular10/1). OFF: Interface not available, not installed or not registered ON Registered, or registered and connected in the SIM operator Network. - STEADY: Not transferring data. - FLASHING: Transferring data.
B	Wireless WAN interface channel 1 (cellular11/1). OFF: Interface not available, not installed or not registered ON Registered, or registered and connected in the SIM operator Network. - STEADY: Not transferring data. - FLASHING: Transferring data.
C	The device has a MINI-PCI slot where a Wireless LAN daughter card can be installed. OFF: Interface not available, not installed or not registered ON: Connecting, or connected and communication established. - STEADY: Not transferring data. - FLASHING: Transferring data.
LNK(4)	Associated to each Ethernet switch connector (LAN1, LAN2, LAN3 and LAN4) ON Ethernet link established. - STEADY: Not transferring data. - FLASHING: Transferring data.



Note

During device initialization and boot LEDs A, B, C and Link can turn on, turn off and flash. Once the device has booted, the LEDs display functions described in the table above.

Chapter 4 Microswitches

The **Teldat H1 RAIL** routers have a block of 8 available micro-switches used for maintenance and test tasks. In this case, they are only used to load the default configuration.

This block of micro-switches can be found inside the **Teldat H1 RAIL** routers. You need to remove the top casing in order to handle them, following the instructions set forth in section *Installing the SIM* on page 10.

These switches should not be handled by the user other than to establish the default configurations.



Note

For the device to operate correctly, all micro-switches must be in the OFF position.

4.1 Procedure to ignore the configuration

Follow the steps below if you have to discard the whole configuration of the device (for instance, if you cannot remember the password). When doing this, the device is generally connected to a terminal (PC) through the Console port (AUX).

- Turn off the device.
- Using a screwdriver, move micro-switch '5' to the ON position.
- Power up the device.

When the device is switched on, a message similar to the one shown below will appear on the configuration console (AUX port):

```
*****
*****
*****

BOOT CODE VERSION: 03.02  Apr 28 2009 11:25:37
  gzip  Apr 28 2009 11:19:34
P.C.B.: C8  MASK:0C10  Microcode:00E1
START FROM FLASH
BIOS CODE DUMP.....
BIOS DATA DUMP...
End of BIOS dump

BIOS CODE VERSION: 03.02
CLK=262144 KHz  BUSCLK=65536 KHz  PCICLK=32768 KHz  L1
Date: 05/25/09, Monday  Time: 13:37:06

SDRAM size: 64 Megabytes
  BANK 0: 64 Megabytes (detected)
I_Cache: ON
D_Cache: ON  Write-Back
FLASH: 16 Mb.
NVRAM: 128 Kb.
EEPROM: 2048 Bytes.
DPRAM: 8192 Bytes.
SWITCH 10/100
SECURITY ENGINE
PCI device: Host bridge
  (Bus: 0, Device: 0, Function: 0)
  (Vendor: 0x1057, Device: 0x18C1)
```

```

(Subs. Vendor: 0x0000, Subs. Device: 0x0000)
Slot 1 - PCI device: serial bus controller
  (Bus: 0, Device: 10, Function: 0)
  (Vendor: 0x1131, Device: 0x1561)
  (Subs. Vendor: 0x5444, Subs. Device: 0x2800)
Slot 1 - PCI device: serial bus controller
  (Bus: 0, Device: 10, Function: 2)
  (Vendor: 0x1131, Device: 0x1562)
  (Subs. Vendor: 0x5444, Subs. Device: 0x2800)
Slot 2 - PCI device: Ethernet controller
  (Bus: 0, Device: 29, Function: 0)
  (Vendor: 0x168C, Device: 0x0013)
  (Subs. Vendor: 0x185F, Subs. Device: 0x1012)
Current production date: 09 21
Current software license: 20 12
S/N: 682/00100
BIOS MAC Add: 00-a0-26-c8-00-64
>>
.....
TRYING APP CODE DUMP
  (CONFIGURED) APPCODE1.BIN ver.: 0.10.7.32 0.0.0.0 .....
.....
.....
APP DATA DUMP.....
Running application
Default configuration used
Parsing text mode configuration ...
Configuration parsed
Initializing

Press any key to get started

```

On reaching this point, you can set micro-switch '5' in the OFF position (you don't have to power off the device). This way, the saved configuration will run next time you restart the device. Also, bear in mind that the device configuration is *ignored* on start up but it is *not deleted*.

Appendix A Technical Information

A.1 Troubleshooting

Below, you will find a table that will help you solve problems during the installation of the device. If you cannot solve the problem, please ask your distributor for further information.

Problem	Solution
None of the LEDs lights up on the device.	Check the power supply to the device (power supply cable, main power outlet).
The LAN LED does not light up in green.	Check that the LINK LED is lit up; if it isn't, check the Ethernet cable and the network connection.
LED A remains OFF.	Check that the SIM card has been inserted correctly, or Check that the SIM PIN is correct, or Check that the antenna is properly installed (been screwed in correctly), or Check that the SIM tray configuration is correct.

A.2 Maintenance

The **Teldat H1 RAIL** routers are designed to be highly available and durable. Therefore, they do not have any moving parts. *This design makes any maintenance unnecessary.*

A.2.1 Upgrading the software

The **Teldat H1 RAIL** router family can be upgraded to new software releases. Please contact your distributor for information on the new releases.

There are various ways to upgrade a Teldat router.

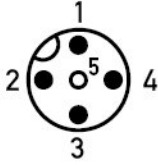
The software required to update the Teldat routers is supplied in a format known as distribution. This consists of a single file that contains all the files needed to upgrade your device as well as in-depth information on the contents of the said upgrade.

A.3 Connectors

A.3.1 POWER Connector

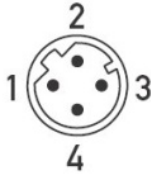
The power connector installed in the device is an M12 4 pole code A connector (Phoenix Contact SACC-E-MS-4CON-M16/0,5 SCO).

PIN	Signal	M12 4P A Code Male
-----	--------	--------------------

1	110 V DC	
2	110 V DC	
3	0 V	
4	0 V	


A.3.2 LAN Connector

The installed LAN connector type in this device is an M12 4 pole code D connector (SACC-CI-M12FSD-4CON-L90 SCO).

PIN	Signal	M12 4P D Code Female
1	Tx+	
2	Rx+	
3	Tx-	
4	Rx-	


A.3.3 WWAN Connectors

The installed WWAN connector type is N female coaxial.

PIN	Signal	N Connector
Internal	RF In/Out	
External	Gnd	

A.3.4 WLAN Connectors

The installed WWAN connector type is N female coaxial in those devices equipped with this interface.

PIN	Signal	N Connector
Internal	RF In/Out	
External	Gnd	

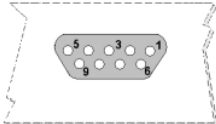
A.3.5 GPS Connector

The installed GPS connector type is an FME female in those devices equipped with this interface.

PIN	Signal	FME Connector
Internal	RF In	
External	Gnd	

A.3.6 Configuration Connector

The installed configuration connector is a DB9 female.

PIN	Signal	DB 9 Female
2	RxD (Input)	
3	TxD (Output)	
5	GND	

A.4 Technical Specifications

Hardware Architecture

PROCESSORS	Motorola PowerPC MPC82xx
MEMORY	64 Mbytes in SDRAM
STORAGE UNIT	FLASH Memory (16 Mbytes) EEPROM 2 Kbytes, NVRAM 128 Kbytes

LAN Interface

PROTOCOLS	Ethernet (802.3)
PORTS	4 port switch managed through MDI/MDX autodetection
SPEED	10/100 Mbps (BaseT)
CONNECTOR	M12 4 Poles Code D

Wireless WAN Interface

STANDARDS	GPRS, UMTS, HSDPA, HSUPA, HSPA+, LTE ... Depending on the wireless WAN version the device has incorporated.
SPEED	Depending on the wireless WAN version the device has incorporated. Please see the manual on the appropriate module.
CONNECTOR	Up to 4 coaxial connectors, type N
ANTENNA	The antennas are supplied independently to the device

Wireless LAN Interface

STANDARDS	802.11n a/b/g 2x2
SPEED	802.11a: 6, 9, 12, 18, 24, 36, 48, and 54 Mbps 802.11b: 1, 2, 5.5, 6, 9, and 11 Mbps 802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, and 54 Mbps 802.11n: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54, and m0-m15
CONNECTOR	Up to 2 coaxial connectors, type N
ANTENNA	The antennas are supplied independently to the device

GPS Interface

STANDARDS	SiRFstarIV
CONNECTOR	FME male
ANTENNA	3.3 V Active. These are supplied independently to the device

Configuration Interface

INTERFACES	This can be configured in two modes: <i>Asynchronous Port:</i> V24 DCE. Does not permit Hardware flow control. <i>Local Console:</i> V.24 DCE only 8-N-1, without flow control.
PROTOCOLS	<i>Asynchronous Port:</i> AT, PPP, GPS-DATA
SPEED	<i>Asynchronous Port:</i> 300 at 115,200 bps <i>Local console:</i> 9,600 bps (configurable up to 115,200)
CONNECTOR	DB9 female located on the front panel of the device.

Power

INPUT VOLTAGE	+110 V DC
INPUT CURRENT	150 mA @110 V DC
MAXIMUM POWER	15 W

Dimensions and Weight

TYPE	Ruggedized casing for 19" rack
LENGTH x WIDTH x HEIGHT	240 x 445 x 44 mm
WEIGHT	3.8 kg

Environmental Specifications

AMBIENT TEMPERATURE	ON: -25 °C to 70 °C In storage: -30 °C to 85 °C
RELATIVE HUMIDITY	Annual average < 75 % During 30 consecutive days per year < 95 %

Appendix B Safety information

B.1 Recycling and the Environment







Please do not, under any circumstances, throw away any **Teldat H1 RAIL** with normal domestic waste. Ask your local town hall for information on how to correctly dispose of them in order to protect the environment against e-waste. Always respect the current laws regarding waste material. Anyone found violating the environmental laws will be subject to fines and any additional steps established by law.

All the packing materials i.e. the cardboard box, plastic and any other packaging, together with the pieces making up a **Teldat H1 RAIL**, must be recycled complying with the current active laws regarding recycling materials.

The below symbol with a cross over the rubbish container can be seen on the device. This means that, when a device reaches the end of its life, it must be taken to the official recycling/disposal centers where it must be disposed of in an environmentally responsible manner and separately from normal domestic waste.



B.2 Translated Safety Warnings

	<p>The equipment is intended to be installed by Service Personnel and only handled by qualified personnel. If not, the device may be damaged and malfunction.</p>
	<p>El equipo está diseñado para ser instalado por personal del servicio técnico y su manejo debe realizarlo personal cualificado. De lo contrario, el equipo puede resultar dañado y quedar inservible.</p>
	<p>This device contains elements that are sensitive to electrostatic surges and shocks. Therefore, it is essential when handling the equipment that an antistatic wriststrap is connected to the device chassis and that this is placed on an antistatic mat. Furthermore, it is crucial to avoid any kind of contact between the device components and necklaces, bracelets, rings, ties, etc.</p>
	<p>Este equipo contiene componentes sensibles a las sobrecargas y descargas electroestáticas. Por eso, durante la manipulación del equipo, utilice una pulsera antiestática conectada al chasis del equipo y colóquelo sobre una esterilla antiestática. Evite también el contacto de colgantes, pulseras, anillos, corbatas, etc. con cualquier componente del equipo.</p>
	<p>The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set forth in Connections on page 3.</p>
	<p>La tensión eléctrica de los cables de alimentación, de los cables de la línea telefónica y de los cables de comunicación es peligrosa. Para evitar descargas, antes de instalar, mover o abrir las cubiertas de este equipo, conecte y desconecte los cables siguiendo el orden que se detalla en el apartado "Conexiones".</p>
	<p>To comply with electrical safety regulations, this equipment must be connected to the vehicle power network through a 1 amp approved thermo-magnetic circuit breaker (ABB-S281-UC-K-1 or equivalent).</p>
	<p>Para cumplir con la normativa de seguridad eléctrica, este equipo deberá ser conectado a la red de alimentación del vehículo mediante un interruptor magnetotérmico homologado de 1 amperio (ABB-S281-UC-K-1 o equivalente).</p>
	<p>This device is compatible with 1.8V and 3V SIMs. Do not install SIMs that do not support these voltages.</p>
	<p>Este equipo es compatible con SIMs de 1,8V y 3V. No instale SIMs que no soporten estas tensiones.</p>
	<p>Never install the SIM cards when the device is switched on.</p> <p>Always disconnect the device from the main power supply before installing the SIM.</p> <p>Always disconnect the device before removing the casing to access the trays.</p> <p>When inserting the SIM cards, please protect yourself against electrostatic discharges (ESD).</p>

	Do not touch the SIM cards connectors.
	<p>No instale nunca las tarjetas SIM con el equipo encendido.</p> <p>Desconecte siempre el equipo de la red antes de instalar las tarjetas SIM.</p> <p>Desconecte siempre el equipo antes de desmontar la carcasa para acceder a las bandejas.</p> <p>Al insertar las tarjetas SIM, protéjase contra descargas electroestáticas (ESD).</p> <p>No toque los conectores de las tarjetas SIM.</p>