

# T100 NTP Network Time Server

## Hardware Installation Guide

Models Covered: T100

Document Number: T1200-04  
08-Jun-21

The latest version of this user guide can be obtained from [TimeToolsLtd.com](http://TimeToolsLtd.com).

**Revision History**

Date	Doc. Rev.	Changes
27-Jan-17	T1200-01	Initial release.
01-Apr-19	T1200-02	TimeTools Limited postal address change. Updated EC Declaration Of Conformity.
18-Nov-20	T1200-03	Updated EC Declaration Of Conformity.
08-Jun-21	T1200-04	Updated EC Declaration Of Conformity. EN 62368-1 replaces EN 60950-1. 2015/863/EU compliance is implicit in compliance to 2011/65/EU.

## Important Safety Information:

### **Important Safety Information - Read the safety instructions before using this product.**

1. Please read the manuals and retain for future reference. Please follow all instructions and heed all warnings.
2. Do not use this apparatus near water.
3. Clean only with dry cloth.
4. Install in accordance with the manufacturer's instructions.
5. Do not install near any heat sources such as radiators, heat registers, or other apparatus (including amplifiers) that produce heat.
6. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
7. Only use attachments as specified by the manufacturer.
8. The unit has no user serviceable parts inside. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or power adapter is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
9. Use the power adapter to disconnect the apparatus from the AC mains. The power adapter shall remain easily accessible.
10. To completely disconnect unit power from the AC mains, disconnect the unit's power adapter from the mains socket. To reconnect power, plug the unit's power adapter into the mains socket following all safety instructions and guidelines.
11. Never push objects of any kind into this product through cabinet apertures as they may touch dangerous voltage points or short out parts that could result in fire or electric shock.

**For PERMANENTLY CONNECTED EQUIPMENT, a readily accessible disconnect device shall be incorporated external to the equipment.**

**For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.**

**Use only the supplied power adapter with the T100 NTP time server.**



**CAUTION:**

Before installing and configuring any T-Series NTP server appliance, please read the manuals and retain for future reference. Please follow all instructions and heed all warnings.

Full product documentation can be found at [TimeToolsLtd.com](http://TimeToolsLtd.com).

*While reasonable efforts have been taken in the preparation of this document to ensure its accuracy, TimeTools Limited assumes no liability resulting from any errors or omissions in this manual, or from the use of the information contained herein.*

*All claims based on information publicly available at time of printing.*

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## 1 Introduction

Network Time Protocol (NTP) can be used to synchronize the time on network clients, across an IP network, to the correct time of an NTP time server. TimeTools NTP Servers provide a stratum 1 NTP Time Server for ensuring the time is correct across an entire network.

The Network Time Server acquires time from the GPS satellite constellation and distributes time across a network using the TCP/IP Network Time Protocol (NTP).



## 2 Key Features

16-Channel, High Sensitivity GPS Timing Receiver.

Can operate with outdoor, indoor or window located antenna, saving on cabling costs.

Timing receiver synchronises to less than 15 nanoseconds (GPS Locked).

NTP accurate to less than 3 microsecond ( $3 \times 10^{-6}$  seconds) UTC (GPS Locked).

Synchronize in excess of 100,000 clients.

10/100 Mbit auto-sensing, auto-MDIX Ethernet ports.

IPv4 and IPv6 Internet Protocol.

Extremely cost-effective.

Universal AC/DC mains power adapter for world-wide operation.

Made in UK, with 12-month warranty and free lifetime support.

\*1. Assuming standard 128 sec NTP polling frequency.

### 3 Scope of Supply

TimeTools T100 shipment typically includes the following components:

T100	GPS NTP Server Appliance.
T-3040	Pole Mounting GPS Antenna .
MT4-GPS	Antenna Mount.
TCX-010	10m (30 ft) RG58 Cable.
GE12I07-P1J	7.5V DC Universal Power Supply.

RS232 Serial Console Lead.  
 Quick Start Guide.  
 CD containing user-guide, installation guide and white-papers.

#### 3.1 Optional Extras

TCX-010	10m RG58 Cable.
TCX-030	30m RG58 Cable.
TCX-050	50m LMR195 Equivalent Cable.
TCX-100	100m LMR400 Equivalent Cable.

Custom cable lengths available on request.

SPP-GPS	Multi-strike maintenance-free surge suppressor
T-AD200-8	GPS Amplifier – 20db

GPS over optical fibre systems.  
 GPS Splitters – 2 to 32 way, compact or rack-mount.  
 Digital NTP Wall clocks.  
 Analog NTP Wall clocks.

## 4 Front Panel

The T100 has the following front panel indicators/connectors: Alarm, USB, Power.



### 4.1.1 Alarm Indicator

A red / green bi-colour LED on the T100 front panel indicates status and fault conditions.

### 4.2 USB Port

A USB port is provided for convenient and easy installation of firmware updates. Standard USB flash memory devices can be used for firmware updates.

### 4.3 Power Socket

A 2.5mm DC power jack accepts 2.5 or 2.1 mm diameter plugs. The supplied power adapter can be used to power the device. Use only the power adapter supplied by TimeTools with the T100.



## 5 Rear Panel

The rear of the T100 has the following connectors: Eth0, Antenna, Console.



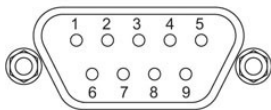
### 5.1 Ethernet Port - Eth0

The T100 has a single RJ45 10/100 Mbit auto-sensing, auto-MDIX Ethernet port labelled Eth0.

Link: 10/100 Mbit, auto-sensing, auto-MDIX  
 Connector: RJ45  
 Cable Type: CAT 5.0  
 Modes: Half/Full Auto-negotiation.

### 5.2 Console

The Console port is a 9-way D-type female RS232 serial connection for device configuration using dumb terminal emulator. Null modem cable supplied for connection to standard 9-way PC serial interface.



RS232 Console port pin-outs:

Pin 2: RX  
 Pin 3: TX  
 Pin 5: GND

The appliance has a secondary serial port for optional serial time code output. It is combined into the same 9-way D-type connector as the console port. A custom serial cable is required to utilise the secondary serial port.

Secondary RS232 Serial Port pin-outs:

Pin 7: TXB  
 Pin 8 : RXB

### 5.3 GPS Antenna Connection

The GPS antenna connector is a 50 ohm TNC female connector. It accepts a coax cable to a 5V GPS antenna. Use only the antenna and cable supplied by TimeTools with the T100.

Connector: TNC female, 50 ohm  
 Cable: Coax, 50 ohm  
 Antenna Output Voltage: 5VDC

## 6 Installation

### 6.1 Locating the T100

Locate the appliance safely in a rack, on a shelf, or in a cupboard. The device should not be supported by the attached cables.



**CAUTION:**

Do not install the T100 appliance where the operating ambient temperature may drop below 0°C (32°F) or exceed 50°C (122°F).

### 6.2 Antenna Connection

The T100 antenna connection is a TNC female RF connector. It is provided for connection of an active 5 volt GPS antenna via a coax cable.



**WARNING:**

Any local installation regulations for outdoor or rooftop mounted antennas in the country where the antenna is installed must be observed.

Please refer to the GPS/GNSS Antenna Installation Guide (Document Number: T1202-01) for further information on antenna installation.

### 6.3 Connecting Ethernet

The T100 has a single 10/100 Mbit BaseT RJ45 auto-sensing, auto-MDIX Ethernet port.

The auto MDI-X feature, automatically detects the required cable connection type and configures the connection appropriately, removing the need for crossover cables for peer to peer connection.

Connect one end of a CAT-5 patch cable to the RJ-45 network interface on the rear of the T100. Connect the other end to a port on your network switch.

**Alternatively, the T100 can be connected directly to a host PC Ethernet network port using a CAT-5 patch cable for configuration purposes.**



**IMPORTANT:**

When first installing the T100 on your network, ensure that no other device on your network conflicts with the default IP address of the appliance.

Default IP Address (Eth0): 192.168.3.222

## 6.4 Connecting RS232 Serial Console Cable

The T100 Console port is a RS232 serial port on a standard 9-way D-type connector. The console serial port can be used to configure the device from a host PC.

Using the supplied null modem cable, connect the T100 console port to the RS232 serial port on a PC.

A terminal emulation program, such as Hyper-Terminal or Putty, can then be used to configure the device.

Terminal settings:

Connect Using:	Direct to COMx	(where x is the serial port number)
Bits per second:	115200	
Data bits:	8	
Parity:	None	
Stop bits:	1	
Flow control:	None	
Terminal Emulation:	VT100 / ANSI	

Please refer to the T-Series User Guide (Document Number T1300-01) for configuration information.

## 6.5 Applying Power

The T100 has a 2.5 mm power jack on the front panel of the appliance.

Apply power by connecting the supplied power adapter into the power jack at the rear of the NTP server and into an appropriate AC power source.



**CAUTION:**

For PERMANENTLY CONNECTED EQUIPMENT, a readily accessible disconnect device shall be incorporated external to the equipment.

For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.

Power Adapter Specification:

Manufacturer:	MEAN WELL Enterprises Co., Ltd.
Model:	GE12I07-P1J
Input Voltage Range:	90 ~ 264VAC
Input Frequency Range:	47 ~ 63Hz
Output Voltage:	7.5VDC 1.33A

## 7 Configuration

Before configuring the NTP server, you will need to acquire the following basic configuration information:

IP address,  
Network mask,  
Default Gateway,  
Domain name servers

or confirm availability of a network DHCP server for dynamic networking configuration.

The T100 can be configured in any one of three ways:

- Over a network using a web browser on a PC connected to the same network segment.
- Using a web browser on a PC using a peer-to-peer (direct cable) network connection.
- Using a dumb terminal emulator on a PC using a RS232 serial connection.

Please refer to the T-Series User Guide (Document Number T1300-01) for configuration information.

## 8 Certification and Compliance

### 8.1 RoHS Compliance Statement

This document certifies that the products manufactured by TimeTools do not contain the substances listed in the table below in the concentrations exceeding the Maximum Concentration Value (MCV).

Substance Maximum Concentration Value

Lead 0.1% by weight (1000 ppm)  
Mercury 0.1% by weight (1000 ppm)  
Cadmium 0.01% by weight (100 ppm)  
Hexavalent Chromium 0.1% by weight (1000 ppm)  
Polybrominated Biphenyls (PBB) 0.1% by weight (1000 ppm)  
Polybrominated Diphenyl Ethers (PBDE) 0.1% by weight (1000 ppm)

Products containing the substances listed in the table above, in concentrations below the MCV, are understood to be in compliance with Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronics equipment (RoHS Directives). The stated components are deemed as compliant as accord to definitions given in the directives (refer to directives). This document also certifies that the materials declaration as provided by TimeTools is accurate to the best of our knowledge.

### 8.2 REACH Regulation (EC) No 1907/2006

TimeTools hereby certifies that to the best of its knowledge, and based on our suppliers' information, parts and products produced by TimeTools do not contain any of the substances referenced in the current list of Substances of High Concern (SVHCs are defined in Article 57 of Regulation (EC) No 1907/2006.) in concentrations greater than 0.1% weight by weight.

### 8.3 Environmental Policy

TimeTools is committed to minimising the risk of any environmental damage or pollution caused by the company . We ensure compliance with EU Directive 2002/96/EC Waste Electrical and Electronic Equipment, more commonly known as the "WEEE directive".

The WEEE Directive aims to:

Reduce waste associated with electrical and electronic equipment.

Improve the environmental performance of companies involved in the life cycle of electrical and electronic equipment.

For further information on the WEEE Directive or if you would like to arrange the collection and disposal of an old, unserviceable or redundant piece of equipment that was originally supplied by TimeTools, please contact TimeTools via email at [info@TimeToolsLtd.com](mailto:info@TimeToolsLtd.com)

### 8.4 EC Declaration Of Conformity

Please see the EC Declaration Of Conformity for TimeTools T100 model below.



## EU Declaration Of Conformity

Product: NTP Network Time Server  
Model Numbers: T100  
Serial Number: TA51003

Manufacturer Address: TimeTools Limited.  
2 Silverend Business Park, Brettell Lane, Brierley Hill. DY5 3LG. UK.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

2014/53/EU Radio Equipment Directive.  
2011/65/EU Restriction of the use of certain hazardous substances.

The following harmonised standards and technical specifications have been applied:

Radio: EN 300 440 V2.1.1  
EMC: EN 55032: 2012 +AC: 2013  
EN 55024: 2010  
EN 61000-3-2: 2014  
EN 61000-3-3: 2013  
Safety: EN 62368-1:2014/AC:2015  
RoHS: EN 50581:2012

Signed for and on behalf of : TimeTools Limited.  
Place and date of issue: Brierley Hill, UK, 8 June 2021



Name: Andrew Shinton  
Position: Managing Director



## 9 Warranty

TimeTools Limited warrants the T100 NTP Time Servers to be free from defects in material and workmanship during a 12-month period.

TimeTools Limited warrants GPS/GNSS antennas , GPS amplifiers, antenna cables and any integral batteries to be free from defects in material and workmanship during a 12-month period.

The Warranty begins on the date the unit is shipped from TimeTools.

TimeTools' liability under this Warranty is limited to repairing or replacing, at TimeTools' option, the defective equipment and providing upgrade version changes for firmware. In case of repair, the product must be returned to an authorized TimeTools Solutions Service Centre.

This Warranty does not apply if repairs are required due to acts of nature beyond TimeTools' control such as, but not limited to, lightning strikes, power surges, misuse, damage, neglect, or if repairs/modifications have been made or attempted by anyone other than personnel authorized by TimeTools.

### Disclaimer

IN NO EVENT WILL TIMETOOLS LIMITED BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES FROM THE SALE OR USE OF THIS PRODUCT.

THIS DISCLAIMER APPLIES BOTH DURING AND AFTER THE TERM OF THE WARRANTY. TIMETOOLS LIMITED DISCLAIMS LIABILITY FOR ANY IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A SPECIFIC PURPOSE.

### Repair and Returns

To obtain service under this Warranty, contact TimeTools at the address below during the Warranty period to receive a Return Material Authorization (RMA) number and shipping instructions. Then ship the product, transportation prepaid, for inspection.

### Ship to:

TimeTools Limited  
Attn: RMA XXXXXXXX  
2 Silverend Business Park,  
Brettell Lane,  
Brierley Hill. DY5 3LG.  
UK.

One-way shipping is the Customer's responsibility. TimeTools will pay the charges to return ship the equipment. However, if the returned product is not found to be defective, then the buyer will be liable for all shipping charges. If the buyer is located outside of the UK, then they will be liable for any duties and taxes payable, if applicable.

TimeTools will not be responsible for dismounting and remounting of the NTP server, for unauthorized returns or for returns that do not list the RMA number and quantity returned on a packing list attached in plain view on the outside of the shipping container.



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