

# T-Series NTP Network Time Server

Updating T-Series Firmware By Re-Flashing The File System  
Using TFTP (Trivial File Transfer Protocol)

Models Covered: T100, T300, T550

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

## Re-Flashing T-Series NTP Servers

Most T-Series firmware updates are provided as files that apply patches to the file system. However, periodically, major updates require replacing the boot-loader, kernel and file system.

The major firmware updates require that the T-Series memory be re-flashed from a USB flash drive or TFTP over Ethernet.

This article describes how to re-flash T-Series NTP servers with the latest firmware using TFTP (Trivial File Transfer Protocol). TFTP allows a client to download files from a remote host.

***If required, please refer to Document Number T1330 to Update T-Series Firmware By Re-Flashing The File System Using A USB Memory Stick.***

### Prerequisites

- Windows PC with RS232 serial port or USB to serial adapter.
- Serial console cable (supplied with T-Series unit) or RS232 null modem cable for PC to PC communication.
- Windows dumb terminal emulator. (e.g. PuTTY).
- Windows TFTP Server (e.g. Solarwinds Free TFTP Server).

### Preparation

#### 1. Establish Serial Communication Between PC and T-Series NTP Server.

Use the supplied serial console cable (RS232 null modem cable) to connect T-Series console port to PC RS232 COM port.

Open Windows dumb terminal emulator to communicate with serial COM port with the following settings:

**115200 baud, 8 data bits, 1 stop bit, no parity, no flow control.**

Press the return key on the dumb terminal emulator a couple of times to establish communications.

#### 2. Download Binary Image.

Download required binary image update file from:

<https://timetoolsltd.com/support/download/t-series-firmware/>

**INFORMATION:**

**Due to supply issues, later T-Series models have a slightly different Real-Time Clock (RTC) chip.**

**Older models therefore require slightly different firmware to support the RTC device.**

**The model revision can be determined from the devices serial number.**

**Alternatively, check the revision number of the existing firmware version of your device. Revision B models will have a 'B' postfix.**

Ensure that the downloaded firmware matches your model (T100, T300 or T550) and revision (A or B).

The binary image file name has the following format: image-<device>-<version><revision>.zip

e.g. for revision A models:

image-t100-20003A.zip

image-t300-20003A.zip

image-t550-20003A.zip

e.g. for revision B models:

image-t100-20003B.zip

image-t300-20003B.zip

image-t550-20003B.zip

### 3. Verify the Downloaded Image File.

Check the validity of the downloaded image by comparing the MD5 checksum of the file against the published checksum on the web page.

In Windows 10, the MD5 checksum of a file can be obtained using the 'CertUtil' command. The command has the following format:

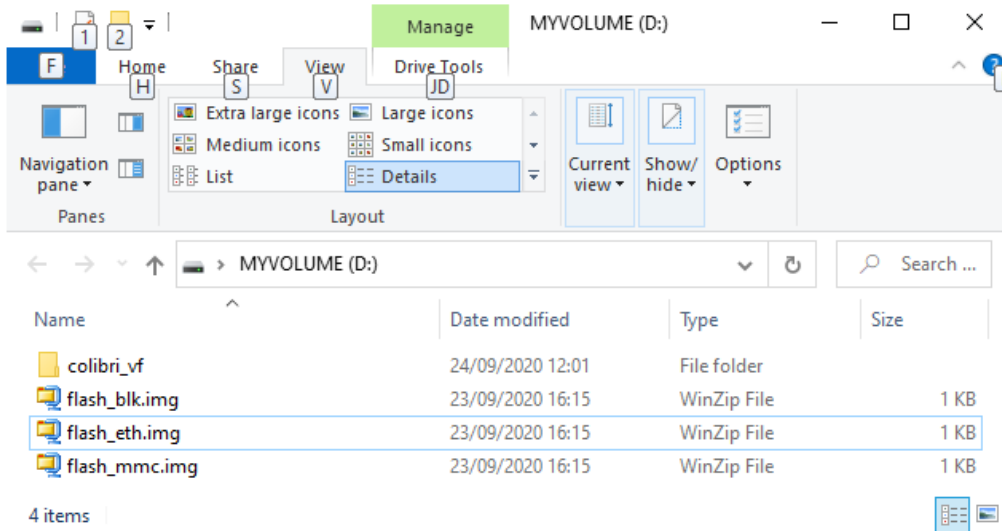
**CertUtil -hashfile <path-to-file> MD5**

Example:

```
C:\>
C:\>CertUtil -hashfile image-t100-20003A.zip MD5
MD5 hash of image-t100-20001.zip:
fc29de18fa97e6deb8733ff4b3d69787
CertUtil: -hashfile command completed successfully.
C:\>
```

## 4. Unzip Image to TFTP Server Directory

Unzip downloaded image file to TFTP Server root directory. For Solarwinds TFTP Server, the default root directory is [C:/TFTP-Root](#).



When correctly unzipped, a folder and 3 files will be present in the TFTP server root directory:

**Folder:** colibri\_vf  
**File:** flash\_blk.img  
**File:** flash\_eth.img  
**File:** flash\_mmc.img



**INFORMATION:**

TFTP communicates using UDP port 69. Ensure that UDP port 69 is open on host PC firewall.

**Consider temporarily disabling Windows Firewall or any Anti-Virus software!**

## Re-Flashing T-Series Firmware.

T-Series firmware is updated in three parts:

- U-Boot boot loader (if required).
- File system.
- GNSS system firmware (if required).



**WARNING:**

**After re-flashing, the device will revert to default configuration.**

**WARNING:**

**DO NOT power-off the unit when it is updating.**

**Wait until it has finished!**

Update the T-Series firmware by re-flashing the device as follows:

### 1. Enter Boot Loader

Power up the T-Series device.

Within 1 second of powering up, press the space bar on the PC dumb terminal emulator.

The device will enter the boot loader U-Boot. The boot loader prompt 'Colibri VFxx #' should be visible:

```
U-Boot 2016.11-2.8.6+g83a53c1 (Jul 14 2020 - 10:25:54 +0000)
.....
Model: Toradex Colibri VF50 128MB V1.2B, Serial# 08466601
Net: FEC
Hit any key to stop autoboot: 0
Colibri VFxx #
```

### 2. Check Boot Loader Version

Check the current U-Boot version.

```
U-Boot 2016.11-2.8.6+g83a53c1 (Jul 14 2020 - 10:25:54 +0000)
```



**INFORMATION:**

**Older versions of U-Boot prior to 2016.11-2.8.6 will need to have U-Boot updated separately.**

**If required, go to Appendix A: Updating U-Boot.**

### 3. Configure U-Boot Network Settings

U-Boot can be configured with a static IP address, or get a dynamic IP address from a DHCP server.

**INFORMATION:**

Ensure that U-Boot is provided with an IP address in the same network segment as the TFTP Server!

#### **Option 1: Static IP Address.**

Set static IP address, network mask and IP address of TFTP Server:

```
Colibri VFxx #  
Colibri VFxx # setenv ipaddr <ip_address>  
Colibri VFxx # setenv netmask <network_mask>  
Colibri VFxx # setenv serverip <ip_address_of_tftp_server>
```

#### **Option 2: Dynamic IP Address From DHCP Server**

Set dynamic IP address and then IP address of TFTP Server:

```
Colibri VFxx #  
Colibri VFxx # setenv autoload  
Colibri VFxx # dhcp  
Colibri VFxx # setenv serverip <ip_address_of_tftp_server>
```

### 4. Verify Network Configuration

Use U-Boots ping command to verify that the network configuration is working as expected.

```
Colibri VFxx #  
Colibri VFxx # ping <ip_address_of_tftp_server>  
Using FEC device  
host <ip_address_of_tftp_server> is alive  
Colibri VFxx #
```

## 5. Update Flash File System

Once the boot loader has been successfully updated, the flash file system can be updated.

Run the 'setupdate' and 'update' scripts as follows:

```
Colibri VFxx #
Colibri VFxx # run setupdate
.....
Colibri VFxx # run update
.....
resetting ...
```

When the 'update' script has completed, the device will automatically reboot.

The login prompt will be shown:

```
The Angstrom Distribution NTP001 ttyLP0

Angstrom v2017.12 - Kernel

Colibri-VF_Console-Image 2.8b6 20200908

NTP001 login: admin
Password:
```

## 6. Updating the GNSS System Firmware

The GNSS system firmware will be updated automatically, if necessary, when the system reboots.

The status of the GNSS firmware update is available on the T-Series LCD and main status web/SSH/console page.



**WARNING:**

**GNSS system firmware updates are completed automatically, if necessary.**

**It can take several minutes to complete.**

**DO NOT power-off the unit until the GNSS firmware update is complete.**

Login to the device using the user name 'admin' and default password 'admin'.

Use the 'nts status' command to check the progress of the GNSS firmware update.

```
admin@NTP001:~$ nts status
.....
GNSS Status: Updating
.....
```

## 6. Check Update.

Use the 'nts status' command to check the model and firmware build, to ensure that the update has completed successfully:

```
admin@NTP001:~$ nts status
.....
Model: T300
Firmware Build: Rev. 2.0.003B 22-OCT-21
.....
.....
```

The update is now complete.

The unit can be configured as required.



## Appendix A: Update Boot Loader

Enter the boot loader (see Section 1). Check the current U-Boot version.

```
U-Boot 2015.04+fs1c+gb66337d (Jan 18 2016 - 19:49:13)
```

Older versions of U-Boot prior to 2016.11-2.8.6 will need U-Boot updated separately, as follows.

- Complete Section “**3. Configure U-Boot Network Settings**”.
- Complete Section “**4. Verify Network Configuration**”

At the dumb terminal emulator, update the boot loader by running the 'setupdate' and 'update\_uboot' scripts and resetting the device, as follows:

```
Colibri VFxx #
Colibri VFxx # run setupdate
.....
Colibri VFxx # run update_uboot
.....
Colibri VFxx # reset
resetting ...
```

Within 1 second of rebooting, press the space bar on the PC dumb terminal emulator to re-enter the boot loader.



### INFORMATION:

**If the space key is not pressed in time to enter the boot loader, simply power the device off and back on and retry.**

The U-Boot prompt 'Colibri VFxx #' should be visible.

Check the U-Boot version to ensure that the boot loader update has completed correctly.

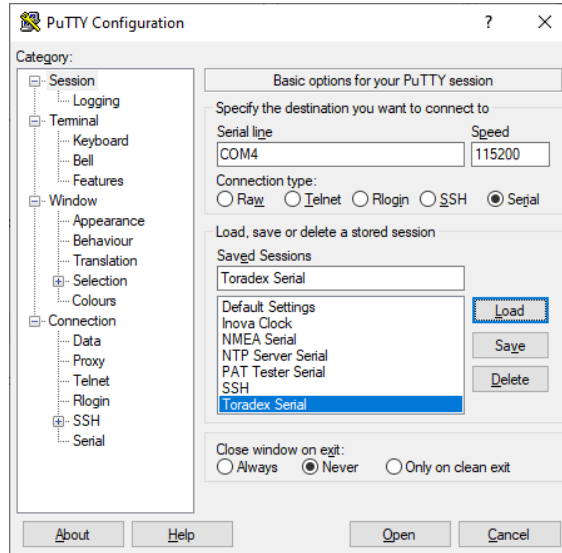
```
U-Boot 2016.11-2.8.6+g83a53c1 (Jul 14 2020 - 10:25:54 +0000)
.....
Model: Toradex Colibri VF50 128MB V1.2B, Serial# 08466601
Net: FEC
Hit any key to stop autoboot: 0
Colibri VFxx #
```

**The file system now needs to be updated, go back to Section “3. Configure U-Boot Network Settings”.**

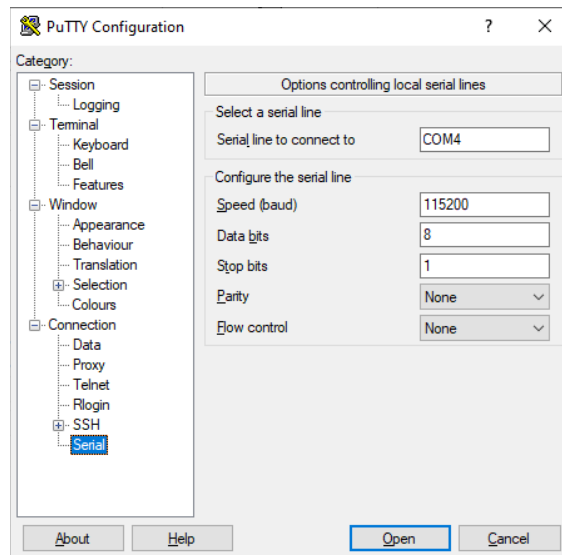
## Appendix B: Dumb Terminal Emulator Configuration

PuTTY, a free dumb terminal emulator for Windows, is easy to install and configure. It is available for download here: <https://www.putty.org/>

From the 'Session' menu category, select Serial connection type.



From the 'Serial' menu category, set the serial line COM port, speed 115200 baud, 8 data bits, 1 stop bit, no parity and no flow control.





## Appendix C: TFTP Server Configuration

The Solarwinds Free TFTP server for Windows is easy to install and configure. It is available for download here:

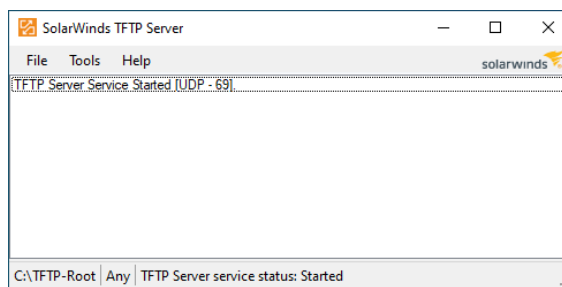
<https://www.solarwinds.com/free-tools/free-tftp-server>



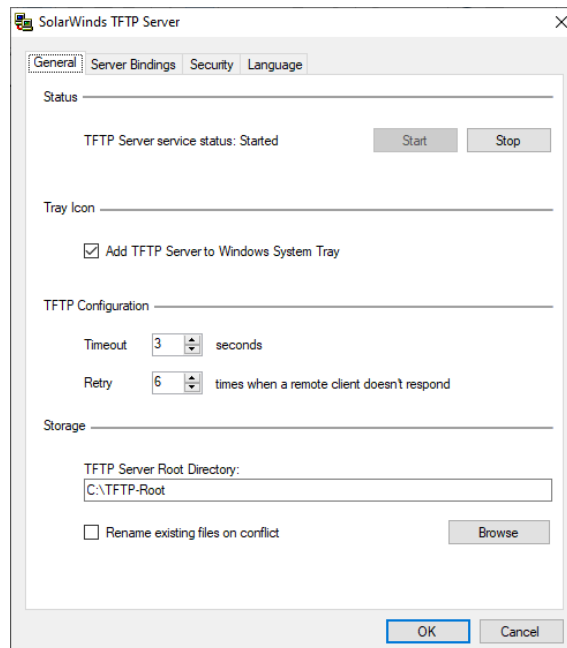
**INFORMATION:**

**TFTP communicates using UDP port 69. Ensure that UDP port 69 is open on host PC firewall. Consider temporarily disabling Windows Firewall or any Anti-Virus software!**

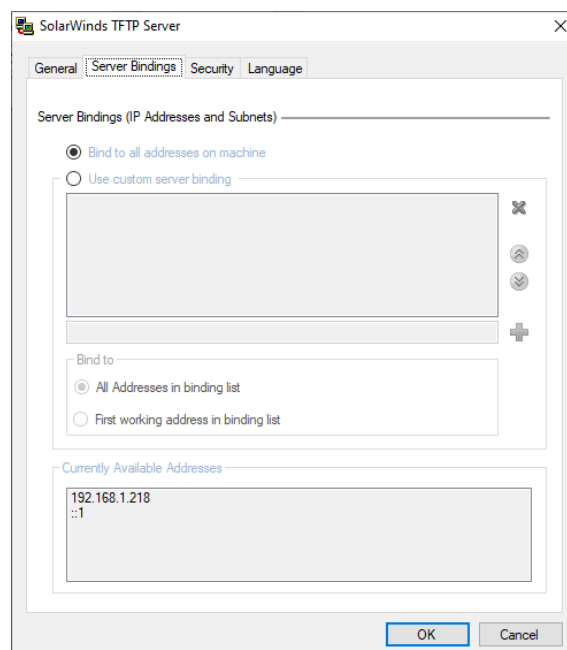
When running, the Solarwinds TFTP Server, shows the status of the service (TFTP Server Service Started) and the root directory (C:\TFTP-Root)



The TFTP service can be started and stopped from the File → Configure menu. The TFTP Server Root Directory can also be changed, if required:



By default, the TFTP server will bind to all IP addresses on the host PC:

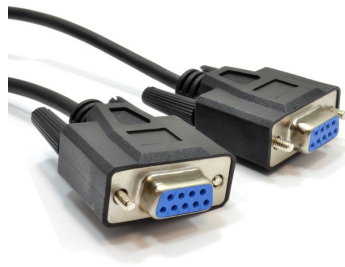


## ***Appendix D: Serial Console Cable (RS232 Null Modem)***

A serial console cable is required to re-flash the T-Series.

One is supplied with all T-series models.

The cable is a RS232 null modem cable with DB9 female connectors used for PC to PC communication.



A null-modem cable is wired as follows:

pin 2 ...to... pin 3  
pin 3 ...to... pin 2  
pin 4 ...to... pin 6  
pin 5 ...to... pin 5  
pin 6 ...to... pin 4  
pin 7 ...to... pin 8  
pin 8 ...to... pin 7

## **Appendix E: Troubleshooting**

### **No PC To T-Series Serial Communications**

- Ensure that the TimeTools supplied serial console cable or Null-modem cable is being used.
- Check the serial cable connection between PC serial port and T-Series console port.
- Check PC dumb terminal emulator communications settings.

### **File System Does Not Update**

- Ensure that U-Boot is provided with an IP address in the same network segment as the TFTP Server.
- Check that the TFTP service has been started on the host PC.
- Ensure that UDP port 69 is open on host PC firewall. Consider temporarily disabling Windows Firewall or any Anti-Virus software.
- Check the validity of the downloaded image file with MD5 checksum.
- Ensure update files have been placed in host PC TFTP server root directory.
- Ensure that boot-loader has been correctly updated before updating the flash file system.

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