

T-Series NTP Network Time Server

Updating T-Series Firmware By Re-Flashing The File System
Using A USB Memory Stick

Models Covered: T100, T300, T550

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The latest version of this user guide can be obtained from 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 a FAT formatted USB flash drive.

If required, please refer to Document Number T1331 to Update T-Series Firmware By Re-Flashing The File System Using TFTP (Trivial File Transfer Protocol).

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 or Hyper-terminal.
- A FAT formatted USB flash drive with at least 1 GB of free space.

Preparation

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

Power down and isolate the T-Series from any networks by disconnecting network cables to the device.

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.

2. Prepare A USB Flash Drive.

Prepare a USB flash drive with a FAT formatted primary partition with at least 1 GB of free space.

See "Creating a FAT Formatted USB Flash Drive" below.

3. 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

4. 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:

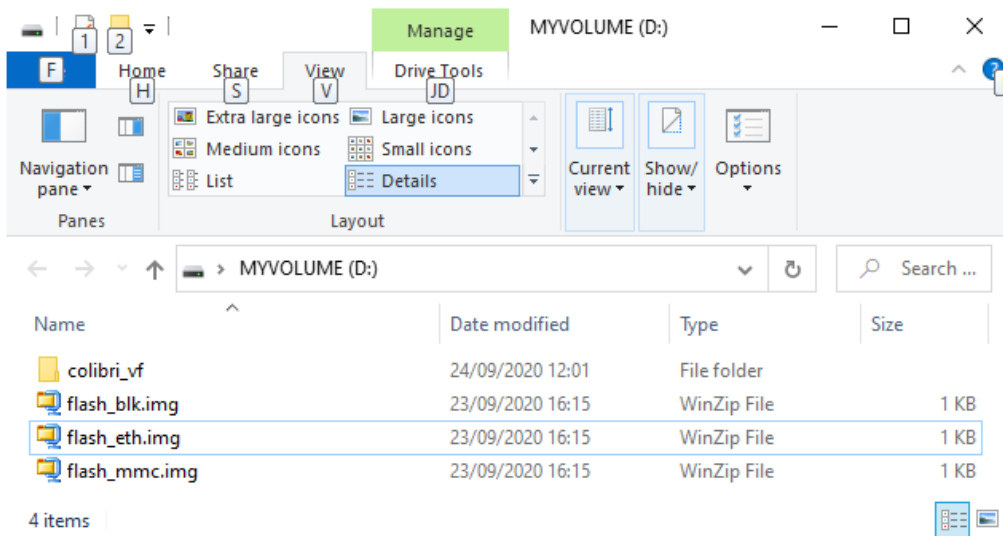
CertUtil -hashfile <path-to-file> MD5

Example:

```
C:\>
C:\>CertUtil -hashfile image-t100-20003A.zip MD5
MD5 hash of image-t100-20001.zip:
a5710ec0a263f1182a45661a8ae26f06
CertUtil: -hashfile command completed successfully.
C:\>
```

5. Unzip Image to USB Flash Drive

Unzip downloaded image file to root directory of prepared FAT formatted USB flash drive.



When correctly unzipped, a folder and 3 files will be present on the USB flash drive:

Folder: colibri_vf
File: flash_blk.img
File: flash_eth.img
File: flash_mmc.img

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. Update Flash File System

The flash file system can be updated by running 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:
```

4. 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  
.....
```

5. 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: Updating U-Boot

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.



INFORMATION:

Older versions of U-Boot may only recognise USB 1.0 or 1.1 memory sticks.

Alternatively, consider using TFTP.

Insert prepared USB flash drive into front panel of T-Series unit.

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)
```

Go back to Section “3 Update Flash File System”.



Appendix B: Creating a FAT Formatted USB Flash Drive

To update T-Series firmware requires a FAT formatted USB flash drive with at least 1 GB of free space. A FAT formatted primary partition can be created on a USB flash drive using Windows 10 Disk Manager. The new FAT primary partition must be the first partition on the drive.

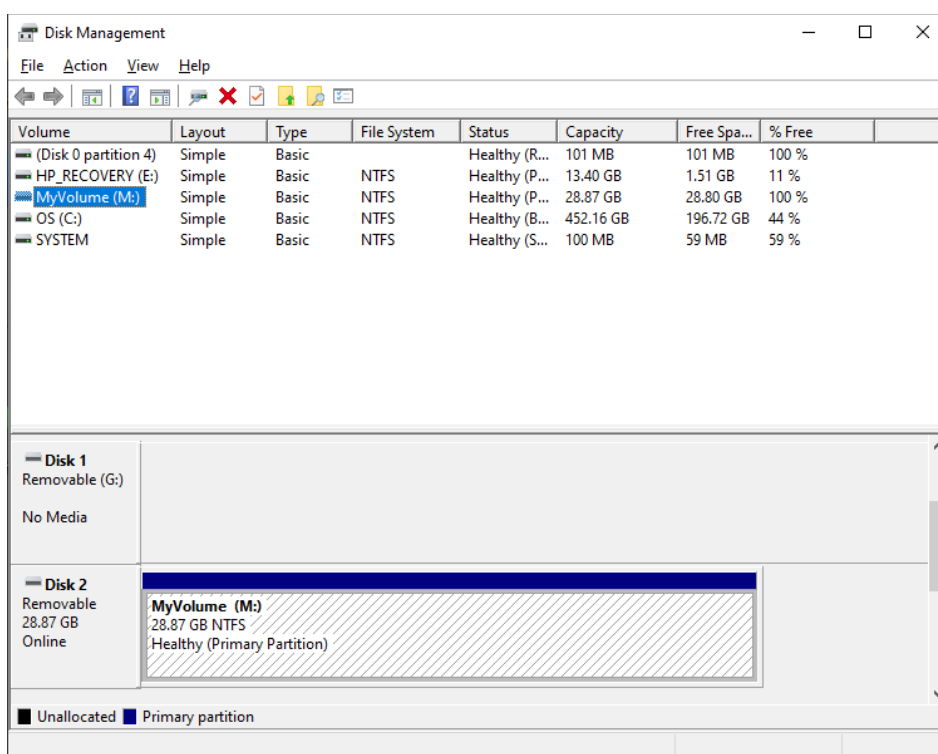
**WARNING:**

This process will erase the contents of the USB flash drive.

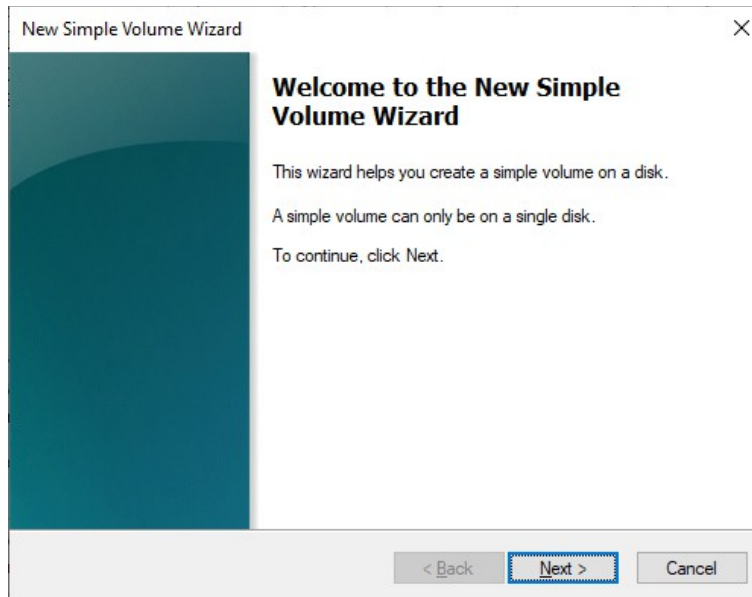
Insert the flash drive into a USB port on a Windows 10 PC.

Open Disk Manager.

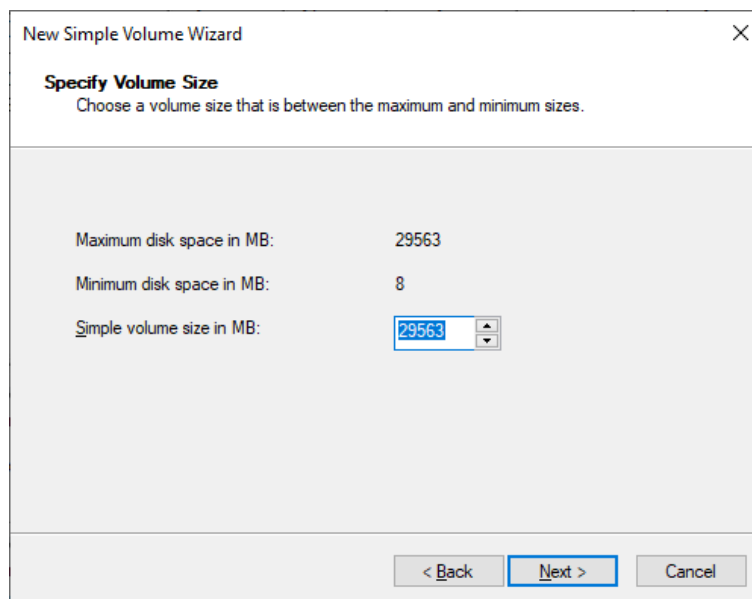
Delete any non-FAT partitions by right-clicking on the flash drive partition and clicking “Delete Volume”.



Right click on the unallocated drive and click “New Simple Volume...” to run the new simple volume wizard:

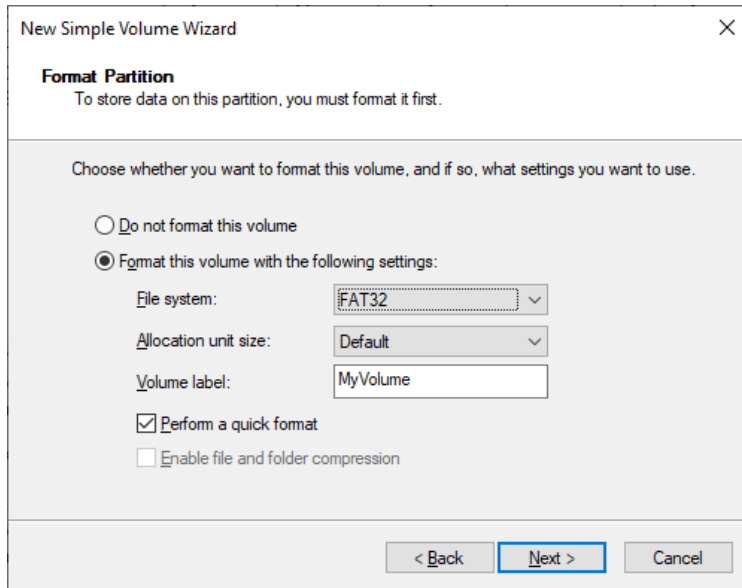


Create a partition of at least 100 MB:

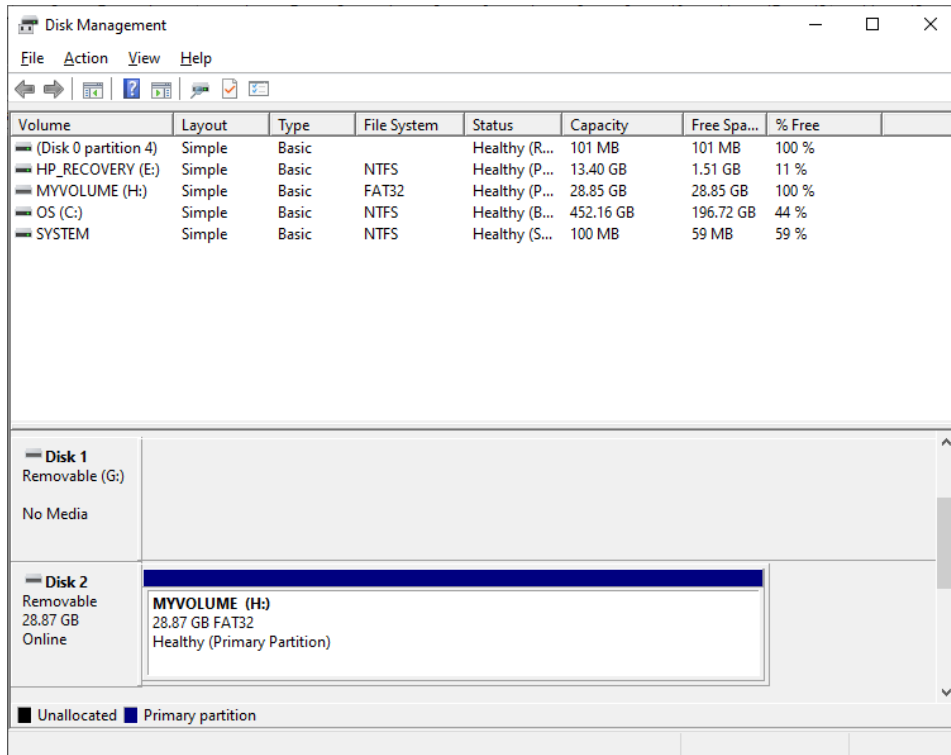


Click 'Format this volume with the following settings:'.

Enter a volume label and select 'Format as FAT32'.



When formatting is complete the USB flash drive should have a Healthy FAT32 Primary Partition:

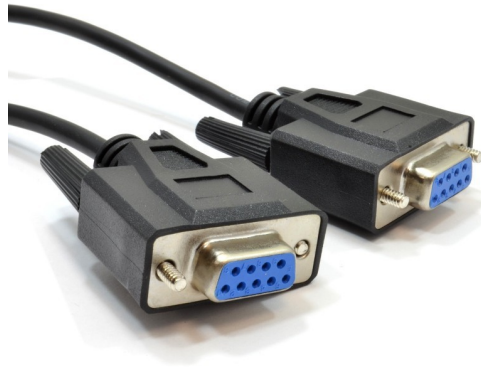


Appendix C: Serial Console Cable (RS232 Null Modem)

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 D: Troubleshooting

No PC To T-Series Serial Communications

- Ensure that the TimeTools supplied serial console cable or compatible 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 USB flash drives primary partition is formatted to FAT32.
- The partition must be the first partition on the drive.
- Check the validity of the downloaded image file with MD5 checksum.
- Ensure that downloaded image file has been correctly unzipped to the USB flash drive.
- Ensure that boot-loader has been correctly updated before updating the flash file system.

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