

How To Install a GpsNtp-Pi – A Quick Start Guide

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Here is a Quick Start guide to getting a GpsNtp-Pi up and running on your LAN and setting up a PC to use the GpsNtp-Pi as its timing source.

OVERVIEW

Computers engaged in radio astronomy necessarily require accurate timing. Often a PC is used as a data recording device and the Windows system clock is used to add time stamps to the data recorded.

Making a PC's clock accurate involved hardware and software. The hardware is usually based around a GPS receiver used to provide very accurate time. The software consists of an Network Time Protocol (NTP) server and an NTP client. The NTP server distributes accurate time over a network to NTP clients. The NTP client software keeps the PC's clock accurate.

In the present system, we have the following components:

- GpsNtp-Pi
 - <http://www.reeve.com/RadioScience/Raspberry%20Pi/GpsNtp-Pi.htm>
 - Hardware that uses GPS signals to obtain accurate time.
 - An NTP server that distributes time over a computer network.
 - Runs Linux on a Raspberry-Pi computer.
 - Configured via Telnet interface.
- Meinberg NTP for Windows
 - <https://www.meinbergglobal.com/english/sw/ntp.htm>
 - An NTP client that uses NTP time data to keep a PC's clock accurate.
 - Configured from a command line interface.
- Meinberg NTP Time Server Monitor
 - <https://www.meinbergglobal.com/english/sw/ntp-server-monitor.htm>
 - Software that provides an easy-to-use graphical user interface for the NTP for Windows software.
 - Also provides an easy way to plot NTP log data to see how accurate a PC's clock is over time.
 - Note that Meinberg NTP Time Server Monitor will work with any NTP server and any NTP client software.

PROCEDURE

- 1) Connect the GpsNtp-Pi to a power supply.
 - a. The unit has a female 2.1x5.5mm barrel connector, center positive. It requires 8 to 16 VDC and will demand no more than 250 mA. The current draw of the unit at AJ4CO Observatory was measured shortly after start up at 185 mA at 9 VDC, 145 mA at 12 VDC, and 135 mA at 15 VDC.
 - b. One may purchase an inexpensive linear regulated 12 VDC wall wart from Jameco (P/N DDU120050F0980) that has a suitable connector already installed on its output.
 - c. Alternatively, the GpsNtp-Pi ships with a nice locking male connector that can be soldered to a DC power cord attached to an observatory's DC bus.
- 2) Connect the GpsNtp-Pi to the LAN router or switch serving the PC being used. A standard Category 5 Ethernet cable is required.
- 3) Connect the GPS antenna to the SMA connector on the GpsNtp-Pi. Place the GPS antenna where it will have a good view of the sky. This is especially important at the higher latitudes.
- 4) Using reference document 2 listed below, install the Meinberg NTP client software on the Windows PC (see page 1 of that document).
 - a. If you have not set up the GpsNtp-Pi to use a static IP address, use your router's "attached devices" function to find the IP address of the GpsNtp-Pi.
 - b. When the installation routine asks if you want to edit the NTP configuration file, do so and enter the following line as shown at the bottom of page 3 in the installation instructions:

```
server www.xxx.yyy.zzz iburst
```

where `www.xxx.yyy.zzz` is the IP address of the GpsNtp-Pi.
 - c. If you have already set up the GpsNtp-Pi with a static IP address as used at AJ4CO Observatory, you would enter:

```
server 192.168.1.99 iburst
```

in the `ntp.conf` file.

- d. Follow the rest of the procedure in the installation instructions for the NTP client.
- 5) Using reference documents 1 and 2 listed below, install the Meinberg NTP Time Server Monitor software on the Windows PC per those instructions (see page 6 of that document).
- 6) This completes basic installation. Configuration of advanced settings and options are described in the documents referenced below.
- 7) To shut down the GpsNtp-Pi, see page 2 of document 7 below. Using the power switch alone may work, but there is a slight change of data corruption if the proper Linux shutdown command is not used.

REFERENCES

The following documents are very helpful for technical details:

- 1) How To Set Up Meinberg Time Server Monitor:
<http://www.radiojove.org/SUG/Pubs/How%20To%20Set%20Up%20Meinberg%20Time%20Server%20Monitor%202019%2010%2020,%20Typinski.pdf>
- 2) Setup instructions for the Meinberg NTP Client and NTP Monitor:
http://www.reeve.com/Documents/Articles%20Papers/Reeve_NTP-MeinMon_Install.pdf
- 3) Overview of the GpsNtp-Pi system:
http://www.reeve.com/Documents/Articles%20Papers/Reeve_GpsNtp-Pi.pdf
- 4) Detailed setup instructions for the GpsNtp-Pi system:
http://www.reeve.com/Documents/Articles%20Papers/Reeve_GpsNtp-Pi_Setup.pdf
- 5) Overview of the Meinberg NTP monitoring software:
http://www.reeve.com/Documents/Articles%20Papers/Reeve_MeinbergMonGuide.pdf
- 6) How to set up a GpsNtp-Pi with a static IP address:
[http://www.radiojove.org/SUG/Pubs/How%20To%20Set%20Up%20a%20GpsNtp-Pi%20With%20a%20Static%20IP%20Address,%20Typinski%20\(SUG,%202019\).pdf](http://www.radiojove.org/SUG/Pubs/How%20To%20Set%20Up%20a%20GpsNtp-Pi%20With%20a%20Static%20IP%20Address,%20Typinski%20(SUG,%202019).pdf)
- 7) How to use a GpsNtp-Pi without a LAN router:
[http://www.radiojove.org/SUG/Pubs/How%20To%20Connect%20a%20PC%20to%20a%20Gps-Ntp-Pi%20Without%20Using%20a%20Router,%20Typinski%20\(SUG,%202019\).pdf](http://www.radiojove.org/SUG/Pubs/How%20To%20Connect%20a%20PC%20to%20a%20Gps-Ntp-Pi%20Without%20Using%20a%20Router,%20Typinski%20(SUG,%202019).pdf)
- 8) Meinberg NTP for Windows:
<https://www.meinbergglobal.com/english/sw/ntp.htm>
- 9) Meinberg NTP Time Server Monitor:
<https://www.meinbergglobal.com/english/sw/ntp-server-monitor.htm>