

PRODUCT NOTE

Stratum 2 Configuration

EndRun Technologies Network Time Servers are designed for Stratum 1 operation. This Product Note explains how to configure your Time Server for Stratum 2 operation.



PRODUCTS

The instructions below pertain to the following EndRun products:

Sonoma, Meridian II, Tycho II: All models and all firmware versions.

Tempus LX, Unison, Meridian: At the command line interface type this command:

cntpversion (if a CDMA unit), or
gntpversion (if a GPS unit).

If your root file system firmware (part number 6010-0042-000 or 6010-0044-000) is prior to version 3.02, then please upgrade before continuing. Go here for latest firmware:

<http://www.endruntechnologies.com/download.htm>

EDIT NTP.CONF

First, you must log-in as the "root" user. Then edit the *ntp.conf* file in order to point your Stratum 2 server at a Stratum 1 server. At the Linux console port, type **edit** to see a list of keystrokes needed for using the editor. It will then prompt you for a file name. In this case type: */etc/ntp.conf*

Your *ntp.conf* file will look something like this:

```
# NTP Configuration File

# RefClock Driver
# These lines must not be removed!!!
server 127.127.39.0 prefer
fudge 127.127.39.0 flag2 1

driftfile /boot/drift

# Restrict Control/Query Access and Peering to ALL
restrict default nomodify noquery nopeer

# The following two lines will Allow queries only from this host.
# DO NOT REMOVE these lines. Local IPV4 and IPV6 loopback addresses.
# They must be present for the internal status monitoring functionality.

restrict 127.0.0.1 nomodify
restrict ::1 nomodify

# Authentication
keysdir /etc
keys /etc/ntp.keys
trustedkey 1 2
```

Add these two lines (preferably after the fudge line) to the *ntp.conf* file:

```
# Stratum 2 server  
server 192.168.1.243 maxpoll 8
```

Lines starting with # are a comment.

Use your Stratum 1 Time Server IP address instead of our example 192.168.1.243.

Maxpoll 8 controls the polling rate and is the exponent factor of 2.

In this case, 2 to the 8th power is a polling rate of every 256 seconds.

Save the file by using these keystrokes: **Control-K x** (To exit without saving: **Control-K q**)

Now copy your saved file to the non-volatile flash partition and then reboot:

```
cp -p /etc/ntp.conf /boot/etc  
reboot
```

CONFIRM

After you reboot, then type this command at the Linux console port: **ntpq -c pe**

You will see something similar to this:

remote	refid	st	t	when	poll	reach	delay	offset	jitter
*GPS_PRAECIS(0)	.GPS.	0	1	8	16	377	0.000	-0.003	0.004
+192.168.1.243	.GPS.	1	u	63	64	377	0.740	0.065	0.119

This example shows that this Time Server is using GPS_PRAECIS(0) as its timing reference (indicated by the *). But it also has access to your other Time Server 192.168.1.243 (indicated by the +). In this case, if the GPS reference were to lose lock, then this Time Server would start operating as a Stratum 2 Time Server by using 192.168.1.243 as its timing reference.

MASK ALARM

Normally, an alarm will be indicated when there is a loss of signal (GPS/CDMA) or if the antenna is not connected (GPS only). For Stratum 2 operation you may not want to see these alarms. You can mask them (prevent them from showing) by using the console port (serial/network) commands **setsig-fltmask** and **setantfltmask** (GPS only).

USE AUTHENTICATION

Depending on your network environment, you may want to configure both your Stratum 1 and Stratum 2 servers to use authentication. In addition, you may want to require that all your NTP clients use authentication. As shipped from the factory, the Time Server is configured to respond to NTP requests from clients that may or may not be using MD5 authentication. You will need to modify the factory-default MD5 keys and then configure your clients to use the same MD5 authentication keys. For instructions, see your User Manual.

WHY USE STRATUM 2?

Operating your EndRun Time Server as a Stratum 1 server is the recommended mode. However, there are times when Stratum 2 operation is a good strategy:

1. When you want a backup source of time. In this case, your Time Server will operate as Stratum 1 while it is using the GPS/CDMA signal as its timing reference. If it loses lock on the signal, then your Time Server will start to drift away from "perfect" time. Eventually, when it has drifted 10 milliseconds, it will switch to Stratum 2 operation, using another Time Server as its timing reference. When the GPS/CDMA signal is restored, then it will switch back to Stratum 1.
2. When you want a high-reliability time distribution system on a large enterprise network. Stratum 2 servers can be placed in subnets to eliminate unnecessary NTP data from being transmitted across the enterprise network. They help reduce the load on the Stratum 1 servers, are easy to install (i.e. no antenna required), and can be configured to use redundant paths to the Stratum 1 server, increasing reliability.

