Appendix B

# Upgrading the Firmware

Periodically, EndRun Technologies will make bug fixes and enhancements to our products available for download from our website. All such downloads are freely available to our customers, without charge. After you have downloaded the appropriate FLASH binary image file from the EndRun Technologies website, you are ready to perform the upgrade to your Præcis Cntp.

The firmware consists of two FLASH binary image files. One of these is the firmware for the Præcis Cntp itself. This firmware executes on the IBM-compatible single board computer and contains the embedded Linux operating system and NTP specific application software. The other file is the firmware for the CDMA time and frequency subsystem. This firmware executes in the Præcis Cntp CDMA time and frequency engine. Each of these files may be upgraded independently.

## What You Need To Perform the Upgrade

You will need to use **`ftp`** or **`scp`** to transfer the FLASH binary image file(s) to the Præcis Cntp. This means that you must place the previously downloaded file(s) in a place on your network which is accessible to the Præcis Cntp.

## Performing the Præcis Cntp Upgrade

There are two FLASH disk partitions which hold the compressed root file system images. These are normally unmounted. When an upgrade is to be performed they are mounted at */rootfs_0* and */rootfs_1*. The factory shipped image is always stored in the first of these partitions as */rootfs_0/rootfsX.XX.gz*. Where *X.XX* is the factory shipped version. It is stored with the immutable attribute set so that even *root* cannot inadvertently delete it or overwrite it. When performing an upgrade, you will be copying the new image to the partition that will be mounted on */rootfs_1*.

To perform the upgrade, log in as the *root* user to the Præcis Cntp using the local console serial I/O port, **telnet** or **ssh** and perform these operations:

First enable the upgrade partition by issuing this command at the shell prompt:

```
cntpenableupgrade
```

This command will mount the FLASH disk root file system partitions. Now change the working directory to the upgrade partition:

```
cd /rootfs_1
```

Now remove any previously installed root file system image that may be on the upgrade partition:

```
rm /rootfs_1/*.gz
```

If you are using **ftp** to perform the upgrade, transfer the previously downloaded file using *binary* transfer mode from the remote host to the working directory, */rootfs_1* using FTP (substitute the name of the root file system image that your are installing for *rootfsupgrade.gz*):

```
ftp remote_host      {perform ftp login on remote host}
bin                  {set transfer mode to binary}
get rootfsupgrade.gz {transfer the file}
quit                 {close the ftp session after the transfer }
```

If you are using **ssh**, you may open another command window on the remote computer and securely transfer the root file system image using **scp** from the remote computer. A command like this could be used:

```
scp –p rootfsupgrade.gz root@cntp.your.domain:/rootfs_1
```

Now you must leave the */rootfs_1* directory in order to execute the **updatelilo** command and complete the upgrade:

```
cd /root
```

Update the LILO configuration by executing this shell script (substitute the name of the root file system image that your are installing for *rootfsupgrade.gz*):

```
/boot/updatelilo 1 rootfsupgrade.gz
```

You should see these lines displayed if the update is successful:

```
Added PraecisCntp_0
Added PraecisCntp_1 *

Unmounting root file system partitions now.  Run cntpenableupgrade
again to remount them, should you need to re-run updatelilo.
```

The trailing asterisk following the second line indicates that the LILO configuration file is set to default to the new PraecisCntp_1 root file system that you just installed on */rootfs_1*. Now reboot the system by issuing this command at the shell prompt:

```
shutdown –r now
```

Wait about 30 seconds for the system to shutdown and re-boot. Then log in to the Præcis Cntp using **telnet** or **ssh**. If all has gone well, you should be able to log in the usual way. After you have entered your password, the system message will be displayed. You should notice that it now indicates the software version and date of the upgrade that you previously downloaded. You can also check this at any time by issuing

```
cntpversion
```

which will cause the system message to be re-displayed.

You can also check to see which root file system image the system is currently booted under by issuing this command at the shell prompt:

```
cntprootfs
```

Which should cause this to be printed to the console:

```
BOOT_IMAGE=PraecisCntp_1
```

If so, and your unit seems to be operating normally, you have successfully completed the upgrade. If your unit does not boot up successfully, and you are not able to **telnet** or **ssh** into the system after 30 seconds, then there has been some kind of problem with the upgrade. It is possible that the file downloaded was corrupt or that you forgot to set your FTP download file mode to binary when downloading the file--either from the EndRun Technologies website or when transferring it to the Præcis Cntp.

## Recovering from a Failed Upgrade

To restore your Præcis Cntp to a bootable state using the factory root file system, you must use the serial I/O port and re-boot the Præcis Cntp by cycling the power. Refer to Chapter 1 – *Connect the Serial I/O Port* and *Test the Serial I/O Port* for setup details. When you have connected your terminal to the serial I/O port, apply power to the Præcis Cntp.

Pay close attention to the terminal window while the unit is re-booting. When the LILO prompt is displayed, you must press the ESC key once on your keyboard within five seconds to let LILO know that you are going to enter the name of a root file system label that it should boot in place of the default. Now type

```
PraecisCntp_0
```

This tells LILO to boot the factory root file system. Now watch the rest of the boot process to make sure that you have successfully recovered from the failed upgrade. If the system boots normally, then you should resolve the problems with the previous upgrade and re-perform it.

## Performing the CDMA Upgrade

To perform this upgrade, log in as the *root* user to the Præcis Cntp using either the local console serial I/O port, **telnet** or **ssh** and perform these operations:

Change the working directory to the */tmp* directory:

```
cd /tmp
```

If you are using **ftp** to perform the upgrade, transfer the previously downloaded file using *binary* transfer mode from the remote host to the working directory, */tmp* (substitute the name of the CDMA sub-system image that your are installing for *cdmaupgrade.bin*):

```
ftp remote_host      {perform ftp login on remote host}
bin                  {set transfer mode to binary}
get cdmaupgrade.bin  {transfer the file}
quit                 {close the ftp session after the transfer }
```

If you are using **ssh**, you may open another command window on the remote computer and securely transfer the CDMA sub-system image to the */tmp* directory using **scp** from the remote computer. A command like this could be used:

```
scp –p cdmaupgrade.bin root@cntp.your.domain:/tmp
```

Now issue the following command to the Præcis Cntp CDMA engine to initiate the upload:

```
echo –e "upload\r" > /dev/ttyS0
```

This command tells the Præcis Cntp CDMA engine to enter the 'waiting for download' mode. Now issue this command to start the transfer of the binary file using the XMODEM protocol:

```
lsz –Xk cdmaupgrade.bin < /dev/ttyS0 > /dev/ttyS0 2>&1
```

After issuing this command you will have to wait for about one minute for the transfer to complete before the prompt will be re-displayed. There will be no diagnostic error messages displayed if the upload is successful. Following a successful upload, you will see the front panel ALARM and LOCK LEDs go through the start-up sequence.

After about one minute, you should query the CDMA firmware version using the command:

```
cdmaversion
```

The new version information should be displayed.

## Problems with the CDMA Upgrade

Should you have difficulties with the upgrade due to a corrupt file, power failure during upload, or other accident, do not be alarmed. Even though you may have lost the existing application program, the Præcis Cntp CDMA engine boot loader program will remain intact. On boot up, it will check to see if a valid application program is in the FLASH memory. If there is not, it will immediately go into the 'waiting for download' mode. You may verify this by issuing this command:

```
cat < /dev/ttyS0
```

You should now see the 'C' character being received every three seconds. This is the character that the Præcis Cntp CDMA engine boot loader sends to indicate to the XMODEM utility that it is wating for a download. You may now re-try the upload procedure, assuming that you have corrected any original problem with the binary file. First kill the **cat** command by typing CTRL-C. You should see a command prompt. Now issue this command to start the transfer of the binary file using the XMODEM protocol:

```
lsz –Xk cdmaupgrade.bin < /dev/ttyS0 > /dev/ttyS0 2>&1
```

# Notes