

**Installation Guide  
for the  
NeoClock4X radio controlled clock  
on Unix**

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# 1 Introduction

The NeoClock4X radio controlled clock is an active DCF77 or TDF radio controlled clock. The NeoClock4X radio controlled clock is available as an office version in a small blue case or as an industrial version in a IP67 case. The NeoClock4X radio controlled clock is connected to the serial interface using an approx. 5 m long cable. It has two internal ferrite rod antennas that receive the DCF77 or TDF signal. The received signals are then checked, processed and the best signal is evaluated by a micro processor. At the same time the internal quartz clock is continuously readjusted to be able to bridge the time gap in case of a transmitter failure. For further processing the decoded signal is then sent to the serial interface. To make the NeoClock4X radio controlled clock safely work with NTP, a customized firmware for the NeoClock4X radio controlled clock has been developed to meet the demands of the NTP–software.

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## 1.2 New versions of this document

The most recent version of this document is available on the internet at the address <http://www.linux-funkuhr.de>. You are reading the English translation of version 1.20 (2005-12-13).

Should you have suggestions or notice any errors, please don't hesitate to contact us via email at [neoclock4x@linum.com](mailto:neoclock4x@linum.com). We will be happy to incorporate your changes into revised versions of this document.

## 2 Installation of the NeoClock4X radio controlled clock

The installation of the NeoClock4X radio controlled clock is divided into different parts. As the various Unix versions differ in some points, e.g. device names for the serial interfaces and the paths to the log and NTP–software program files, you will probably have to use device names or paths other than the ones mentioned in this manual.

### 2.1 Preparation for the installation

This part of the installation guide is for the most part identical for all Linux and Unix versions. However, you should pay attention to use the correct device names for the serial interface. Work through the following list step by step. Make sure you read each paragraph to the end first, as mostly examples are given there that will help you to understand what happens.

- Attach the NeoClock4X radio controlled clock to an unused serial interface of your computer. Please pay attention to the directions regarding positioning „6. RECEIVER POSITIONING“ in the NeoClock4X radio controlled clock manual.
- Log in as *root* in a text console on the computer you want to install NeoClock4X radio controlled clock on.
- Create a symbolic link in the directory `dev` that has the name `neoclock4x-0` using the command „`ln -s`“. The symbolic link must point to the serial interface your NeoClock4X radio controlled clock is connected to. The symbolic link may be deleted using the command „`rm neoclock4x-0`“.

In case your NeoClock4X radio controlled clock is connected to the first serial interface, the command you need to issue is „`ln -s /dev/ttyS0 /dev/neoclock4x-0`“. Here, *ttyS0* is the name of the first serial interface, *ttyS1* the name of the second serial interface and so on. The names of the serial interfaces differ depending on your operating system. Generally, Linux uses `/dev/ttyS0`, while Sun Solaris uses `/dev/ttya` for the first serial interface.

```
unix/: # ln -s /dev/ttyS0 /dev/neoclock4x-0
```

- Use the command „date“ to check whether or not the clock of your computer is sufficiently exact. If the time differs more than 15 minutes, you will have to correct your system time. Again, you can do this using the „date“ command. For example, to set your system time to „Thursday, 13. January 2000 16:31:00 MET“, issue the following command: „date -s “Thu Jan 13 15:31:00 MET 2000““. Use this opportunity to make sure, the time zone of your computer is set correctly.

You are now ready to install the NTP–software.

## 2.2 Choosing the installation method

As support for the NeoClock4X radio controlled clock is compiled into the NTP–software by default from version 4.1.1a onwards, please check that you have a NTP–software of at least version 4.1.1a installed first. The exact version of your NTP–software can be display using „ntpd --version“. In case your ntpd does not know about the „--version“ command, you are running a very old version of the NTP–software that must be upgraded in any case.

```
unix/: # ntpd --version
ntpd: ntpd 4.1.1c-rc2@1.866 Mon May 5 11:27:18 CEST 2003 (1)
```

The NTP–software in the above example is therefore recent enough and has support for the NeoClock4X radio controlled clock built in. In this case, continue with chapter 2.5 on page 7.

Continue the installation with the part of the this installation guide that matches your situation.

- A NTP–software version 4.1.1a or newer is already installed on your system. In this case only the configuration file of the NTP–software has to be adjusted. Please continue reading chapter 2.5 on page 7.
- For SuSE i386 Linux from version 7.1 to SuSE i386 Linux 9.0 continue in chapter 2.3 on the following page.
- For SuSE Linux up to version 7.0 you will have to manually compile the NeoClock4X radio controlled clock sources of the NTP–software. Continue reading chapter 2.4 on page 6.
- For all non-Linux or Unix systems with an NTP–software older than 4.1.1a, you will have to manually compile the NeoClock4X radio controlled clock sources of the NTP–software. Please continue reading chapter 2.4 on page 6.

## 2.3 Installation on SuSE i386 Linux version 7.1 and newer

The installation of the NeoClock4X radio controlled clock is just a matter of minutes thanks to the precompiled RPM packages. Work through the following list step by step. Make sure you read each paragraph to the end first, as mostly examples are given there that will help you to understand what happens.

- Check, whether the NTP–software is already installed on your computer. Use the command „rpm -qa | grep ntp“ to find it out. Its output has the form „xntp-4.1.1“ if the NTP–software is already installed. If this is the case, you need to stop it. Use the command „/etc/init.d/xntpd stop“ to do it and then remove the priorly installed NTP–software using the command „rpm -e xntp“ or „rpm -e <name of the NTP package from the last command’s output>“.

```
suse/: # rpm -qa | grep ntp
xntp-4.1.1
suse/: # /etc/init.d/xntpd stop
Shutting network time protocol daemon (NTP) done
suse/: # rpm -e xntp
```

- Insert the „*LS-Tools for networks*“–CD in your CD– or DVD–drive and mount the medium using „mount /media/cdrom“ or „mount /cdrom“, in case the first command fails. If you are using a DVD–drive, please use „mount /media/dvd“ or „mount /dvd“.
- Install the NeoClock4X radio controlled clock NTP–software from the installation–CD. Depending on your SuSE Linux version you will have to install a different package.

The installation of the RPM package is done using „rpm -i path to CD– or DVD–drive/SUPPORT/NEOCLK4X/<RPM-file>“. Where <RPM-file> has to be replaced with the actual file name according to the following table, depending on your SuSE Linux version.

SuSE 7.1	→	SuSE-7.1-xntp-4.1.2-1.i386.rpm
SuSE 7.2	→	SuSE-7.2-xntp-4.1.2-1.i386.rpm
SuSE 7.3	→	SuSE-7.3-xntp-4.1.2-1.i386.rpm
SuSE 8.0	→	SuSE-8.0-xntp-4.1.2-1.i386.rpm
SuSE 8.1	→	SuSE-8.1-xntp-4.1.2-1.i386.rpm
SuSE 8.2	→	SuSE-8.2-xntp-4.1.2-1.i386.rpm
SuSE 9.0	→	SuSE-9.0-xntp-4.1.2-1.i586.rpm

The installation will create a file `ntp.conf` in the directory `/etc`. This file already contains all the instructions needed for the NeoClock4X radio controlled clock. In case you already had a NTP–software installed on your computer,

the old `ntp.conf` will not be overwritten. Instead, the new file will be created as `ntp.conf.rpmnew`. Either check the file `ntp.conf` manually or insert the statements needed by the NeoClock4X radio controlled clock yourself (see chapter 2.5 on the next page) or just copy the file `ntp.conf.rpmnew` to `ntp.conf` overwriting that file.

- Start the NTP–software using the command „`/etc/init.d/xntpd start`“.

You have now successfully installed the program files of the NTP–software. Continue reading chapter 3 on page 9.

## 2.4 Manually compiling the NTP–software from source

If you choose to compile the NeoClock4X radio controlled clock NTP–software from source, we recommend you install the NTP–software of your specific Unix variant first. The installation routine of your software vendor will create all start and stop scripts automatically for you as well as other changes to your system that may be needed. After you’re finished compiling the sources all you have to do, is replacing the binaries with your newly compiled files.

You must be aware however that this method may cause problems with your package manager or installation tool that monitors installed packages using a checksum such as md5.

- Insert the „*LS-Tools for networks*“–CD into your CD– or DVD–drive and mount the installation CD.
- Change to the directory `/usr/local/src` using the command „`cd /usr/local/src`“. In case the directory `/usr/local/src` doesn’t exist yet, create it.
- Unpack the NTP–software’s sources, version 4.1.2 using the command „`tar xzf <path to drive>/SUPPORT/NEOCLK4X/ntp-4.1.2.tar.gz`“.
- Change directory to `/usr/local/src/ntp-4.1.2`.
- Execute the command „`./configure`“. In case there are any error messages from this script, you will have to fix them. Unless the script `configure` has finished successfully, it is not possible to compile the NTP–software!
- Create all NTP–software binaries using the command „`make`“. Depending on your machine’s speed, this may take a few minutes. During the compilation process, you will see a few warnings that can be safely ignored.
- Shut down your NTP–software daemon in case one is running.



- Look for the original NTP–software binaries using the commands „which“ or „locate“. You will have to replace the files `ntpd`, `ntpq` and `ntpdate`. To replace e.g. the file `ntpd`, use the command „which `ntpd`“ to locate the file `ntpd` that is already installed. The following example illustrates how to do it.

```
unix/: # cd /usr/local/src/ntp-4.1.2
unix/: # which ntpd
/usr/sbin/ntpd
unix/: # mv /usr/sbin/ntpd /usr/sbin/ntpd.old
unix/: # cp ntpd/ntpd /usr/sbin
unix/: # which ntpq
/usr/sbin/ntpq
unix/: # mv /usr/sbin/ntpq /usr/sbin/ntpq.old
unix/: # cp ntpq/ntpq /usr/sbin
unix/: # which ntpdate
/usr/sbin/ntpdate
unix/: # mv /usr/sbin/ntpdate /usr/sbin/ntpdate.old
unix/: # cp ntpdate/ntpdate /usr/sbin
```

- Edit the file `/etc/ntp.conf` as described in chapter 2.5.
- You may now start the new NTP–software daemon with support for the NeoClock4X radio controlled clock. Use your normal NTP–software startscript to do this.

You have now successfully installed the program files of the NTP–software. Continue reading chapter 3 on page 9.

## 2.5 Customizing the configuration file `ntp.conf`

To enable support for the NeoClock4X radio controlled clock, you will have to change the configuration file of your NTP–software.

Use a simple text editor like “emacs“, “vi“ or “joe“ to edit the file `/etc/ntp.conf`. Many more comfortable editors such as “kwrite“ insert invisible control sequences into the file. Those control sequences are incorrectly interpreted by the NTP–software and cause errors.

Insert the following lines into your `etc/ntp.conf`:

```
server 127.127.44.0
fudge 127.127.44.0 flag1 1
fudge 127.127.44.0 flag4 1
```

These statements are necessary to make the NTP–software recognize the NeoClock4X radio controlled clock attached to your computer. What each line means is explained in chapter A.1 on page 23. There, you will also find a sample version of the configuration file in case your `ntp.conf` is missing. This file is also contained on the CD in the directory `SUPPORT/NEOCLCK4X/ntp.conf`.

## 3 Verify your installation

After installation and configuration of the NTP–software you will have to check whether the NeoClock4X radio controlled clock actually receives a radio signal and whether the NTP–software works correctly.

### 3.1 Checking the LEDs

Look at the two LEDs of your NeoClock4X radio controlled clock. Depending of the kind of radio signal the NeoClock4X radio controlled clock<sup>1</sup> receives, the two LEDs have a different meaning.

#### 3.1.1 The meaning of the LEDs for the NeoClock4X radio controlled clock, DCF77 version

The Status–LED is the LED on the left hand side when you look at the office case from the front or the one labeled with *Power* on the industrial case.

**red blinking:** The time signal of the DCF77 transmitter has not yet been correctly received since last power up.

**green blinking:** The NeoClock4X radio controlled clock has been successfully synchronized with the DCF77 radio signal. The internal quartz clock of your NeoClock4X radio controlled clock has been adjusted and the data sent via RS–232 is in sync with the DCF77 time signal.

The Reception–LED is the LED on the right hand side when you look at the office case from the front or the one labeled with *Radio Signal* on the industrial case.

**off:** The DCF77 radio signal is not being correctly received, it is not possible to synchronize with the DCF77 transmitter.

**green:** The DCF77 time signal has been correctly received within the last 2 seconds.

---

<sup>1</sup> On the bottom side of your NeoClock4X radio controlled clock you will find a sticker stating what radio signal your clock is receiving.

It is important that this LED is not flashing but stays on continuously. To receive a complete DCF77 time signal, the NeoClock4X radio controlled clock needs correct reception for at least 60 seconds. If your LED is flashing (even if it turns off only for small amount of times), the reception at this location is not sufficient. You will have to position the clock somewhere else. Move the NeoClock4X radio controlled clock around slowly and give it about 10–20 seconds to adapt to the new situation and check the signal quality again.

### 3.1.2 The meaning of the LEDs for the NeoClock4X radio controlled clock, TDF version

The Status-LED is the LED on the left hand side when you look at the office case from the front or the one labeled with *Power* on the industrial case.

**red blinking:** The time signal of the TDF transmitter has not yet been correctly received since last power up.

**green blinking:** The NeoClock4X radio controlled clock has been successfully synchronized with the TDF radio signal. The internal quartz clock of your NeoClock4X radio controlled clock has been adjusted and the data sent via RS-232 is in sync with the TDF time signal.

The Reception-LED is the LED located on the right hand side when you look at the office case from the front or the one labeled with *Radio Signal* on the industrial case.

**off:** The TDF radio signal has not been correctly received, time synchronization is not possible. The quality of the TDF signal has not been sufficient for the last minute at least, the current location of your NeoClock4X radio controlled clock is unsuitable for correct reception.

**red blinking:** The TDF time signal received is very weak. If possible, position your NeoClock4X radio controlled clock somewhere else.

**green blinking:** The TDF time signal received is sufficient, yet does not have the optimal strength.

**green:** The TDF time signal received is good. Your NeoClock4X radio controlled clock has optimal reception.

### 3.1.3 Common causes for problems

The following is a list of common causes for errors when your LEDs do not show the expected behavior, sorted by frequency of occurrence:

**Right LED off:** If your Reception-LED does not light up, no time signal is received. Position your NeoClock4X radio controlled clock somewhere else. Please pay attention to the directions regards positioning, chapter „6.2 IMPORTANT REMARKS“ in the NeoClock4X radio controlled clock manual.

**Both LEDs off:** Maybe your NeoClock4X radio controlled clock has been connected to the wrong serial interface? In this case, attach it to the other interface or change the symbolic link of your NeoClock4X radio controlled clock. Following is a description how to change it to the second serial interface „ttyS1“: Stop the running NTP-software using „/etc/init.d/xntpd stop“. Then, delete the old symbolic link like this: „rm /dev/neoclock4x-0“. Now create a new symbolic link. Use this command: „ln -s /dev/ttyS1 /dev/neoclock4x-0“

**Both LEDs off:** You are using an inappropriate extension cord. In this case, connect your NeoClock4X radio controlled clock directly to the serial interface of your computer and then try other extension cords.

**Both LEDs off:** The serial interface of your computer is not working. Test the interface by attaching another device such as a modem or a null modem cable and a second computer.

**Both LEDs off:** The NeoClock4X radio controlled clock is defective. If you're suspecting that your NeoClock4X radio controlled clock might be defective, call our customer support at +49 5561 9267 30 or write an email to [neoclock4x@linum.com](mailto:neoclock4x@linum.com).

Before you continue with the installation, both LEDs have to be in the above described state. If you cannot solve a specific problem, do not try to continue installation. Contact the customer support.

## 3.2 Verifying your NTP-software's installation

Start the program `ntpq` using the command „`ntpq`“ at the command prompt. When the program asks for input, enter the command „`pe`“. Except for the numbers in the columns “delay“, “offset“ and “jitter“ the output should look like this:

```
ntpq> pe
 remote      refid      st t when poll reach delay offset jitter
=====
NEOCLK4X(0) .neol.    0 1  - 64  0 0.000 0.000 4000.00
LOCAL(0)    LOCAL(0) 10 1  1 64  1 0.000 0.000  0.008
ntpq>
```

If you are missing the line containing NEOCLK4X(0), there is something wrong with your configuration of the NTP-software or your ntpd daemon does not support the NeoClock4X radio controlled clock. Check the logfiles “syslog“ or “messages“ and “/var/log/ntp“ of your computer for hints. If you encounter the entry „refclock-open: /dev/neoclock4x-0: No such file or directory“ in any one of those logfiles, the symbolic link to “/dev/neoclock4x-0“ is missing. Check, whether the version of your NTP-software matches the one you installed. Maybe you forgot to replace the NTP-software’s program files (see 2.4 on page 7). Correct your configuration until the line containing NEOCLK4X(0) shows up when you use the monitoring program ntpq. Should you be unable to resolve the problem, contact our customer support.

Exit the program ntpq by typing „exit“. Now, watch the NTP-software’s logfile /var/log/ntp. Use the command „tail -f /var/log/ntp“ to do it. In it, you should find the following lines:

```
NeoClock4X(0): received data: S/NXXXXXXDCF0305021704500005CSX000091
NeoClock4X(0): calculated UTC date/time: 2002-05-03 15:04:50.000
```

If you find those lines in the logfile, your NeoClock4X radio controlled clock is successfully communicating with your NTP-software. If you do not find those lines, check whether the file “/etc/ntp.conf“ contains the statement „fudge 127.127.44.0 flag4 1“. Without this statement, those log messages will not be written. Either activate it or continue with the verification process.

Stop monitoring the NTP-software’s logfile by pressing CTRL-C and start the program “ntpq“ again by entering „ntpq“ on the command prompt. Enter the command „pe“. After a few minutes, you should find an „\*“-sign in front of the line containing the *NEOCLK4X(0)* entry. This „\*“ flags the preferred time source of your NTP-software. Just retry after a few minutes in case it does not show up for you. As soon as the „\*“-sign is shown in front of your entry with NEOCLK4XN(0), the NTP-software works properly.

```
ntpq> pe
remote      refid      st t when poll reach delay offset jitter
=====
*NEOCLK4X(0) .neol.    0 1   36   64  377  0.000 15.046 0.649
LOCAL(0)    LOCAL(0) 10 1   28   64  377  0.000  0.000 0.008
ntpq>
```

You can have a look at some status informations of your NeoClock4X radio controlled clock by entering the command „cv“. For example, the serial number of your NeoClock4X radio controlled clock, the firmware version and a value representing the quality of reception for both antennas will be shown.

```
ntpq> cv
```

```
status=0000 clk_okay, last_clk_okay,  
device="NeoClock4X",  
timecode="S/NXXXXXXDCF0305021744070005ASI262696",  
poll=56, noreply=0, badformat=0, baddata=0,  
fudgetime1=169.583, stratum=0, refid=neol,  
flags=11, calc_utc="2002-05-03 15:44:07.000",  
radiosignal="DCF", antenna1="38", antenna2="38",  
timesource="radio", quartzstatus="synchronized",  
dststatus="summer",  
firmware="(c) 2002 NEOL S.A. FRANCE / L0.01 NDF:A:*",  
serialnumber="XXXXXX"  
ntpq>
```

Optionally you may choose to alter your `/etc/ntp.conf` to prevent your NTP–software from logging all received time fragments. Open the file `/etc/ntp.conf` using an appropriate text editor and look for the line `fudge 127.127.44.0 flag4 1`. Add an „#“ as first character on this line to disable logging all received time fragments. Restart your NTP–software afterwards.

You have successfully installed the NTP–software on your computer.

## 4 FAQ

This is a collection of the most frequently asked questions.

**Question:** After starting the program `ntpq`, why do I always get the error `ntpq: read: Connection refused` when I enter a command?

Most likely, the NTP-software has not been started. Check using `„ps ax|grep ntp“`, whether the `ntpd` daemon is running. For example, the `ntpd` daemon terminates by default for security reasons if the time transmitted by the radio controlled clock differs more than 15 minutes from the computer's system time. In this case, an error will be written to the logfile.

**Question:** After starting `„ntpq“` entering the command `„pe“` results in a timeout.

If you enter the `„pe“` immediately after starting the `ntpd`, it has not yet initialized correctly. Wait a few seconds and try again. The NeoClock4X radio controlled clock needs a few seconds after the serial interface has been initialized that provides the NeoClock4X radio controlled clock with power to start up and read the firmware.

**Question:** What file system does the Installation-CD use?

The `„LS-Tools for networks“-CD` is a hybrid CD in ISO9660/Joliet format with RockRidge Extensions.

**Question:** The filenames on the Installation-CD do not match the ones mentioned in this guide. What's wrong?

Your version of Unix can neither mount the CD in Joliet format nor as a ISO9660 CD with RockRidge Extension. In this case, consult the file `TRANS.TBL` for the correct file names.



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Version 1.1, March 2000

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# A Appendix

## A.1 Example file ntp.conf

```
#####  
## /etc/ntp.conf  
##  
## Example file for NTP  
## The package 'xntp-doc' contains further documentation as  
## well as a FAQ and a mini-HowTo.  
##  
## The changes to support the NeoClock4X have been made by  
## Linum Software GmbH. If you have any questions regarding  
## the configuration of NTP with the NeoClock4X or want to  
## suggest improvements, please contact the customer support  
## via email: neoclock4x@linum.com.  
##  
#####  
  
#####  
##  
## For NTP, radio controlled clocks directly attached to the  
## computer have addresses in the form 127.127.t.u.  
## 127.127.t.u is not a valid IP address, thus NTP "knows"  
## that this device has to be a radio controlled clock  
## attached to the computer.  
##  
## "t" is the clock type, "u" is a unit number for this  
## clock type.  
##  
## NTP supports attaching more than one radio controlled  
## clock to a single computer by specifying several entries  
## of the same clock type ("t") with different unit numbers.  
## For each clock type, you can use up to four devices.  
##  
## To find out which radio controlled clock is referenced
```

```
## by the entry 127.127.44.0, refer to your NTP
## documentation's "Reference Clock Drivers" manual. You
## will see that type 44 (which is our "t" here) is the
## clock type NeoClock4X. There's also a link to further
## information on the NeoClock4X. This document contains
## special notes on how to install the specific radio clock.
## Most of these clocks require you to add a symbolic link
## so NTP is able to map the particular hardware device
## involved to a unit number (see "u" above).
##
## In our case, the NeoClock4X needs a symbolic link in the
## form /dev/neoclock4x-u -> /dev/tty<Interface> to be
## created.
## Where "u" corresponds to the unit number from the
## statement "server 127.127.44.u" above. So the statement
## "server 127.127.44.0" really means that a NeoClock4X
## radio controlled clock that is attached to
## /dev/neoclock4x-0 should be used. /dev/neoclock4x-0 has
## to be a symbolic link to the serial interface that the
## NeoClock4X radio controlled clock is attached to.
## For example in a Linux environment where a NeoClock4X
## radio controlled clock is attached to the first serial
## interface: /dev/neoclock4x-0 -> /dev/ttyS0.
##
# Entry for the first NeoClock4X
server 127.127.44.0

# Entry for the second NeoClock4X
#server 127.127.44.1
## If you want to use more than one NeoClock4X, you will
## have to repeat each fudge-statement for every NeoClock4X
## radio controlled clock (=unit).

##
## It takes 169,58333 milliseconds for data from the
## NeoClock4X to be received by the serial interface. This
## time has to be added to every time stamp, to make sure
## the resulting time is correct. If you are using the
## DCF77 version of the NeoClock4X, you should add any
## latency time your system may need to process the signal
## as well as the time the DCF77 signal needs to reach your
## location to the 0.16958333 seconds if you need very high
```

## A Appendix

---

```
## precision (<20msecs).
##
## Warning: This value is specified in seconds!
## Default value is 0.16958333
##
#fudge 127.127.44.0 time1 0.16958333

##
## The NeoClock4X has a built in temperature stabilized
## quartz clock that is able to bridge the time gap in case
## of a transmitter failure. In most cases it makes sense to
## synchronize the system clock with this quartz clock as the
## latter has a much better precision than the RTC built in to
## your computer.
##
## Quartz clock should be used for time synchronization:
## flag1 1
##
## Quartz clock should NOT be used for time synchronization:
## flag1 0
##
## Default value if fudge is not specified: 0
##
fudge 127.127.44.0 flag1 1

##
## After a restart of the NeoClock4X the backup clock of the
## NeoClock4X may not be correct. This may happen, if there
## was a change from summer to winter time while it was
## offline. The backup clock can not notice such a change.
## Therefore, the backup clock should only be used for
## synchronization in special cases. A restart of the
## NeoClock4X happens, when the serial interface does not
## provide power to the NeoClock4X. Even if this happens for
## just a few seconds, it will cause a restart.
##
## Use backup clock for time synchronization:
## flag2 1
##
## DON'T use backup clock for time synchronization:
## flag2 0
##
```

## A Appendix

---

```
## Default value if fudge is not specified: 0
##
fudge 127.127.44.0 flag2 0

##
## It is helpfull to generate as much log messages as possible
## during the installation of your NeoClock4X. That way, you
## will be able to tell very fast (normally within 5-15
## seconds) whether or not the radio controlled clock is
## attached to the correct interface and what is the status of
## your NeoClock4X radio controlled clock. As soon as you're
## finished installing the NeoClock4X radio controlled clock,
## you should reduce log messages.
##
## Generate extra log messages:
## flag4 1
##
## Do not generate extra log messages:
## flag4 0
##
## Default value if no fudge is specified: 0
##
fudge 127.127.44.0 flag4 1

##
## As backup for extreme cases you should use the local clock
## of your computer. The following statements make sure,
## the local clock is only used in real emergency situations.
##
server 127.127.1.0          # local clock (LCL)
fudge 127.127.1.0 stratum 10 # LCL is unsynchronized

##
## Depending on your requirements, you may choose to contact
## additional NTP servers to stabilize your system time.
##
## A list of publicly accessible NTP server can be found on
## the website of www.ntp.org:
## http://www.eecis.udel.edu/~mills/ntp/servers.htm
##
## In Germany, the PTB operates two publicly accessible time
## servers:
```

## A Appendix

---

```
## ptbtime1.ptb.de und ptbtime2.ptb.de
##
## IP address or DNS entry of additional NTP server
## server 192.53.103.103
#server ptbtime1.ptb.de

##
## Misc
##
# path for drift file
driftfile /etc/ntp.drift

##
## To prevent others from manipulating your system time
## you should not allow any external access to your NTP
## server. If you specified additional NTP servers using the
## "server ip-address" statement, you have to adjust the
## security rules for those cases.
##
## Trust no other time servers
restrict 0.0.0.0 mask 0.0.0.0 notrust

##
# alternate log file
logfile /var/log/ntp

# logconfig =syncstatus + sysevents
logconfig =all
```