Manual
Analogue
NTP Clock

Contents

General

The NTP Clock is an analogue clock with sweeping hour hand and stepping minute hand. The clock is equipped with control electronics for reception of a time code message according to the Network Time Protocol, NTP. Each clock has its own microprocessor to receive the time code, detecting the position of the hands and thereafter automatically set the hands to correct time. The control electronics is placed on a separate p.c.b mounted inside the housing. The clock movements, which are connected to the electronics via a pluggable connector, do not contain any electronic except for the hand sensors.

LAN connection

The analogue clocks are equipped with an RJ45 (10BASE-T) connector for direct connection to the LAN via a Power-Over-Ethernet switch.
Each clock has a unique IP address. The IP address, gateway, subnetmask and server IP address is set up by program TELNET or via WEB-browser.
The clock has standard IP address 192.168.3.XX and sub network mask 255.255.240.0.
XX could be between 10 up to 200. The IP address is on a label at the clock housing.

NTP

To distribute correct time to different users in a Local Area Network (LAN) the Network Time Protocol (NTP) is used. NTP is a part of the protocol family TCP/IP. Westerstrand analogue clocks type Ethernet LAN are operated and controlled by Time distributed in the Network

Functional description

Start up

When the mains is connected to the electronics the hands will step forward to the 12-position and wait.
As soon as the clock has received and accepted the NTP signal, it will step forward to correct time by rapid impulses.

Automatic "take over function"

In case the NTP would disappear, the built-in quartz crystal will take over control of correct time. After 12-hours of lost signal the hands will rapid impulse to 12-position, stop there, and wait for a valid signal.

Hand control

Automatic feedback control of the hands at 12.00 and 00.00.
Automatic feedback control of the minute-hand each time it reaches 12-position.

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Installation.

Note! the clock has to be mounted with an external safety switch

1. Loosen 4 screws for the clock side "service side".
2. Disconnect the cable to the movement and remove the clock side.
3. Mount the clock.
4. Connect the power cables for the electronics and illumination.
5. Connect the network cable on the master electronic.
6. Connect the cable for the movement and remount the clock side.
7. Tighten the 4 clock side screws.
8. Connect the power to the clock.
9. The clock is ready for configuration.

Configuration using a WEB-browser

Password

A password is required. Always enter user *admin*. Default password is *password*. If the first letter of the password is blank no question about user and password will appear.

If you forget the password, then start TELNET. The last line shows a number of characters within square brackets []. Contact Westerstrand and enter this value.

Anslut till 192.168.14.201

Användarnamn och lösenord krävs för servern 192.168.14.201 på Klockan höger om kartan..

Varning: Den här servern begär att du ska skicka ditt användarnamn och lösenord på ett sätt som inte är säkert (grundläggande autentisering utan säker anslutning).

Användarnamn: admin

Lösenord: ••••

☐ Kom ihåg lösenordet

OK   Avbryt

After login a list of functions is displayed:

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Sweden

Status >>

General >>

Network >>

NTP >>

Help >>

Status >>

Show status of the clock. Press *Refresh* for update of the information.

Alarms

A/B_Hour/Min/Sec	Side A or side B. No signal from hour, minute or second sensor, e.g. 'B_Min' - no signal from minute sensor on side B

General >>

Program general parameters

Name	Symbolic name, max. 48 signs. This name is shown in the status menu.

Model	Type of clock:

	Single	Single sided without second pointer
	Single with second	Single sided with second pointer
	Double	Double sided without second pointer
	Double with second	Double sided with second pointer

Sec. Pointer speed (uS)	Speed of second pointer in interval 9500-10040. A lower value indicates higher speed. Default value 9800.

A/B Min adj.	Adjustment of minute pointer in steps. For a ½-minute model (firmware NUR-B) each step is ½ minute. For a 1/1 model (firmware NUR-A) each step is 1 minute. E.g. value *-1* means ½ minute after for a ½ minute model. Default value 0.

Password	Enter a new password. The password must be repeated. Ignore password by setting a blank in the first position.

Firmware Download	Open the clock for firmware download. After restart this value always is Off. Also see section Firmware below.

Save	Save parameters. If new password was entered then the clock will restart. Then the web reader (e.g. Internet Explorer) also must be restarted.

Network >>

Enter general network parameters.

Network

DHCP	⊙ Off ○ On
IP	192.168.14.201
Gateway	192.168.1.1	Subnetmask	255.255.240.0
DNS	192.168.1.1

SNMP Setting

SNMP	⊙ Off ○ On
SNMP server	192.168.14.1

[Save and restart] Wait 15 seconds after [Save and restart], then press Refresh

If DHCP is enabled then a question about DHCP fallback address is shown.

Network

DHCP	○ Off ⊙ On		
IP	192.168.2.22	IP fallback	192.168.14.201

If the network cable is released then the DHCP address is released. When the network is back the clock tries to acquire a new DHCP address.

NTP >>

Enter NTP parameters.

NTP

DHCP option 042	○ Off ⊙ On
NTP server	192.168.1.5
Country	CHE ▾
Interval(s)	60

[Save and restart] Wait 15 seconds after [Save and restart], then press Refresh

DHCP option 042   DCHP option 042 is used to automatically receive the IP address of a time server. If DHCP option 042 is enabled (On) the clock will broadcast to locate a DCHP server with option 042 configured. The DHCP server will respond with the IP address of the time server. The clock then uses the IP address to contact and synchronise with the time server.

NTP server   NTP server also can be entered as an URL, e.g. *ntp1.sp.se*

Country   Enter country GBR, SWE, FIN or CHE. The NTP protocol is based on UTC time so a country must be selected. Rules for DST (daylight saving time) for each country is hardcoded in the firmware.

Help>>

A help file in PDF format is displayed.

TELNET

Programming via TELNET will be removed in future versions of the, so please program via the web.

This program is used for setting of parameters after the network controller has an IP address. Start a telnet session.
Press [?] + [Enter]

```
C d      Country code
D        Display data
G i*     Gateway
I d      Interval in seconds
N i*     Subnetmask
S c      NTP server
T        Remove all alarms
U c      Clock identification
X 20/21  Single/Double-sided,     X 22/23 Pointers HM/HMS
X 35/36* SNMP OFF/ON
X 47/48  Firmware download OFF/ON
X 54 i*  Static IP address,       X 55 i* Nameserver
X 56 i*  SNMP server
X 71  *  Use static IP address,   X 72  * Use DHCP
X 93     Quit without save
X 98     Save,                    X 99    Save and restart
d digit, c character, i IP address, * restart required

(? Help) >
```

Functions can be written with capital- or lower case letters. Changes are saved with function X98 or X99.

C - Country code

Select country. This info is used for calculation of local time from the UTC time in the NTP message. The
controller contains day-light saving rules. Example:
>C 46 [Enter]
for Sweden.

D – Display data

Clock information is displayed

```
NUR-B104
Westerstrand Urfabrik AB
http://www.westerstrand.se
** Platform 4 clock C
!! B_Hour B_Min

UTC=2006-12-22  07:48:44.787 Fri
LT =2006-12-22  08:48:44.787 Fri (Winter)
Synchronized 1 minutes ago
Number of timesettings:1005
Mode: 1/2Minute Double HM SNMP.

MAC=00-90-C2-CF-19-E6
IP=192.168.14.201 (Static)
Gateway    =192.168.1.1
Subnetmask =255.255.240.0
Name server=192.168.1.6
SNMP server=192.168.14.2
NTP  server=192.168.1.237
Interval=60 s
Country=46
WS=Sun 25 Mar 1:00 (utc)
SW=Sun 25 Oct 1:00 (utc)
```

G – gateway

Enter network gateway, e.g.
>g 192.168.1.1

I – Interval in seconds

Defines how often, in seconds, the NTP client will ask the NTP-server for correct time.

N – Subnetmask

Enter sub network mask., e.g.
>n 255.255.255.240

S – NTP server

Select NTP server. Only 1 server , e.g.
>s 192.168.1.237
>s ntp1.sp.se

T – remove all alarms

Removes all alarms

U – clock identification

Write a text for identify the clock, e.g.
>U Platform 4 Clock C

Maximum 48 characters.

X 20/21 – Single/Double-sided

>X20   Single sided clock. Movement connected to output A
>X21   Double sided clock

X22/23 – Pointers HM/HMS

>X22   Clock with hour- and minute pointer.
>X23   Clock with hour-, minute- and second pointer.

X35/36 – SNMP ON/OFF

>X 35   Inactivate SNMP
>X 36   Activate SNMP. See section SNMP below for info.

X47/48 – Firmware download OFF/ON

To download new firmware this function must be activated. See section Firmware below.
>X47   Do not accept firmware download.
>X48   Accept firmware download.
This is not saved.. When starting up the Firmware download is always OFF.

X 54 – Static IP address

Enter a new static IP address, e.g.
>X 54 192.168.14.202
If DHCP is activated, this is the fallback address, i.e. ,the address, if not the DHCP is working.

X 55 – Nameserver

Select DNS server, e.g.
>x 55 192.168.1.5

X 56 – SNMP server

Select SNMP server, e.g.
>x 56 192.168.14.1
See section SNMP

X 71 – static IP address

Inform that function X 54 refers to static IP address

X 72 - DHCP

Inform that the unit assigns IP-address automatically by DHCP.

X 93 – Quit without save

Quit without saving settings to memory.

X 98 – Save

Save settings to memory. The program is not restarted. Telnet is interrupted.

X 99 – Save and restart

Save and restart the program. Telnet is interrupted.

SNMP

General

SNMP is activated from TELNET by function X36. Further more a management server must be set. That is made by function X56. Traps is sent to this server. The MIB-file has the name WESTERSTRAND_EN_xxx.MIB. The xxx is the version e.g. 110.

MIB browser

SNMP could be tested with a freeware program from IReasoning. This program can be downloaded from http://www.ireasoning.com. The MIB-file also have been compiled and tested with Castle Rocks Management Console SNMPc.

Community

These 'community' control word are defined:
Public, read-only.   Control word = public
Private, read/write.   Control word = private
Trap.   Control word = trap

The control word can not be changed.

Poll with program Ireasoning

Start the program on the server, e.g. 192.168.14.1. Import MIB file, here it is WESTERSTRAND_EN_110.MIB. Enter IP address for the clock, here it is 192.168.14.201. Enter
'Operations Walk'. Mark the MIB file and then Go. All the parameters is collected from the clock:

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ClientInterval	Interval, how often in seconds, the NTP client will ask the NTP-server for correct time.
SyncTime	Tid till klockan blir osynkroniserad. Minuter??
LastError	Last error
LastInfo	Latest information
LastErrorIndex	Latest trap message
Errormask	Detta tal i binär form visar en 32 bitars mask ?????
AlarmTexts	Present fault in text
AlarmNumbers	Present fault in numerical code
Firmware	firmware and when it was compiled.
NumberOfAlarms	Number of fault
Ipdefault	IP address
Ipfallback	IP fallback address by DHCP
Ipgateway	Gateway
Ipsubnetmask	Sub network mask
IpSNMPserver	SNMP management server
NTPserver	NTP server
Uptime	Amount of seconds since the clock were started.
Nationcode	Country code
ClockType	Type of clock
Manual	Manual for the clock
ClockIdent	Text for identify the clock

Trap with program Ireasoning

Enter function *Tools*/*Trap Receiver*. The traps are indicated from connected clocks.

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RASER

This program are used for finding network clocks and setting parameters. RASER sends broadcast messages on UDP port 9999. All Westerstrand Ethernet controllers will answer.

Install with setup file SETUP_RASERxxx.EXE (xxx=version e.g. 105). Icon 'RaSer' is created on the desktop. Start the program. Click on button [Help]. Manual RASER.PDF is displayed. Check this manual for further information.

### Find a Westerstrand Ethernet module

1. Set firmware mask. Examples:

*	Search all Westerstrand Ethernet modules (default)
NUR-A	Search only modules with firmware text 'NUR-A' as first letters, e.g. NUR-A114

2. Set IP mask. Examples:

255	Broadcast to all, i.e. 255.255.255.255 (default)
13	Only show answers from segment 255.255.13.255

3. Click on button [Search]. The box becomes green. Program RASER will timeout after 5 seconds. Break a search by a click on [Break].

Example: Here a search for all modules with firmware 'NUR-*' was made. Total 11 module were found, but only 3 corresponds to mask 'NUR-'
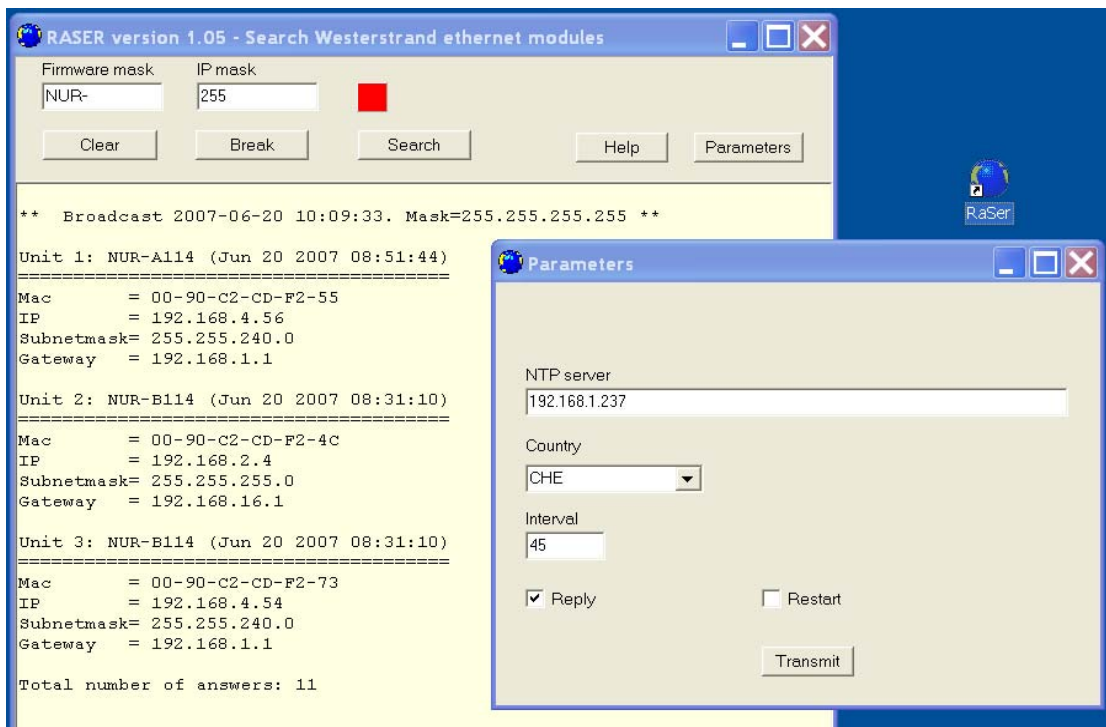
Click on button [Parameters] for setting of parameters. Here NTP server 192.168.1.237, country CHE (=Schweiz) and interval 45 seconds was chosen.

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Parameters

Set parameters in selected clocks. Blank fields will be ignored by the controller.

Parameter setting is possible in these firmwares:

Firmware	Version
DUX	>=102
NUR	>=114

NTP server

Select NTP server, e.g.
192.168.1.237
ntp1.sp.se

Country

Select country. This information is used by the controller to calculate the local time from the NTP server message.

Interval

Set interval in seconds between time requests.

Reply

Send an answer from modules affected by the parameters. This assumes that checkbox [Restart] is unmarked.
See section *Find a Westestrand Ethernet module* above for the reply format.

Restart

Restart the controller.

Transmit

Send selected parameters. At least 4 letters in the beginning of the firmware mask must correspond to the real firmware name.

More functions

If the info window is right-clicked more functions are displayed.
[Clear]   Blank the info window
[Log communication]   Logg communication. Test.
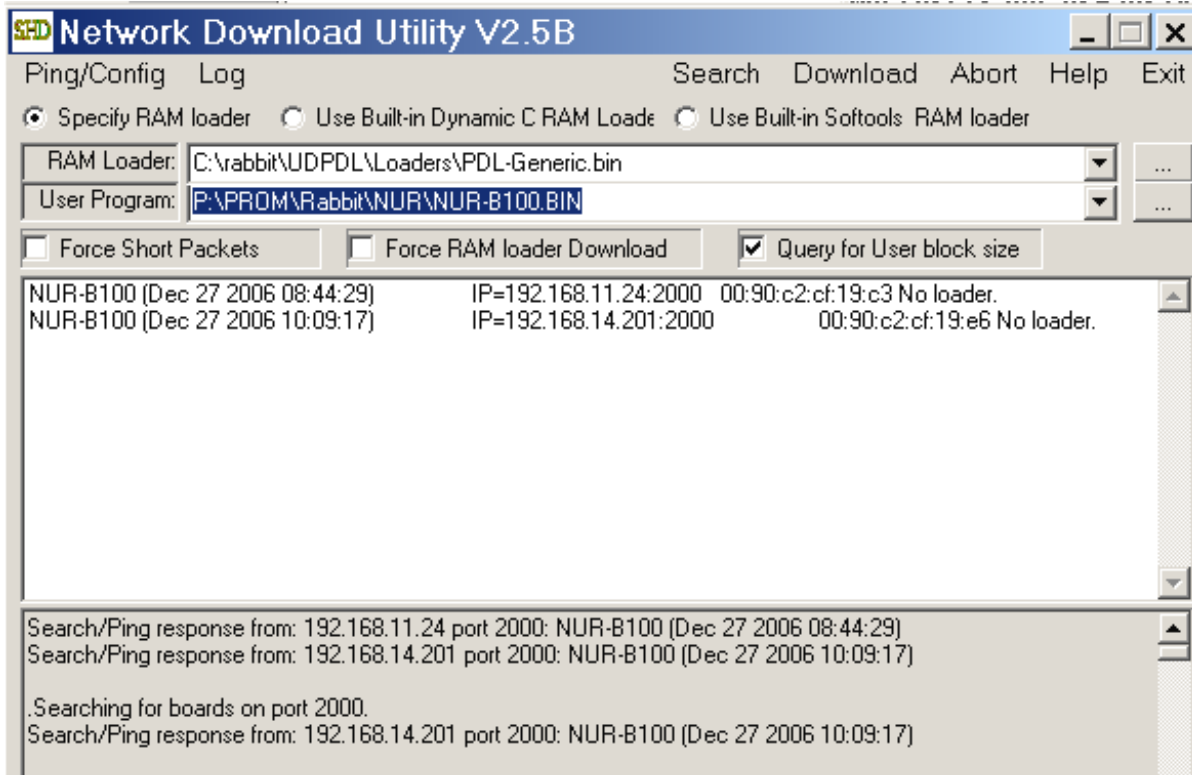[About]   Show program information

Firmware

With program UDPDownload.exe new firmware could be download via Ethernet.
First the clock must be activated in Telnet:
>*X 48*
The row MODE shows FIDO (=FIrmware Download). Let the telnet be opened. Start the program
UDPDownload.exe. The program searches for activated download units.

Units with IP addresses 192.168.11.24 and 192.168.14.201 have been found. A new search could be done by
entering *Search*.
The row 'RAM loader' should always state file 'PDL-Generic.bin'.
The row 'User Program' state new download firmware, e.g. NUR-B100.BIN

Select the clocks for downloading new firmware.
Enter *Download*. The download starts automatically. After download the clocks restarts and the white screen will
be blank.
Check again that all the clocks are at the network with the program RASER.

Technical data

Network:
Protocols supported: TCP/IP ,NTP RFC 1305,RFC 1361, HTTP, Telnet
IP address assignment: Dynamic, using DHCP, or fixed IP-address
Compatibility: Ethernet version 2/IEEE 802.3
Ethernet: Supports 10BASE-T (RJ45) connections
Device Management: Web-Based (requires web browser) or via Telnet
Additional information: Support for DNS
Temperature range: –20 ºC till +50 ºC.

Power electronic: Elektronic 230V AC 50 Hz/4.5VA