

QWTIME III MASTER CLOCK  
**User Manual**

Document: 1856en01.doc  
Author: PM  
Date: 2011-02-25  
Page: 1 of 23

# User Manual

## Master Clock WDP-WL



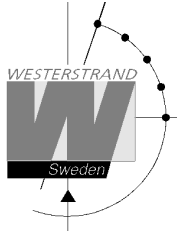
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Document: 1856en01.doc  
Author: PM  
Date: 2011-02-25  
Page: 2 of 23

## List of contents

<b>TECHNICAL SPECIFICATIONS</b> .....	<b>3</b>
<b>GENERAL DESCRIPTION</b> .....	<b>4</b>
<b>INSTALLATION</b> .....	<b>5</b>
SYNCHRONISATION INPUT .....	6
<i>General</i> .....	6
<i>Synchronisation from another Master Clock</i> .....	6
<b>PROGRAMMING</b> .....	<b>7</b>
GENERAL .....	7
RUNNING MODE .....	7
START UP .....	8
SET TIME WHEN IN OPERATION.....	8
<i>Summer to winter ( Day light saving )</i> .....	8
ALARMS .....	9
<i>Example 1, display alarms</i> .....	10
<i>Example 2, erase (clear) alarms</i> .....	11
SPEC.-FUNCTIONS .....	12
<i>Status</i> .....	13
<i>Keylock</i> .....	15
<i>Language</i> .....	17
<i>Country</i> .....	18
<i>Setup</i> .....	19
<b>FAULT TRACING</b> .....	<b>23</b>

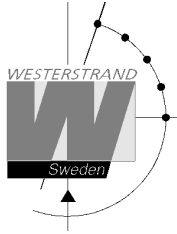
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## Technical specifications

Crystal Frequency:	4,915200 MHz.
Accuracy:	0,1 sec./24 hours (at +20°C).
Microprocessor:	HD6412394.
<b>Transmitter</b>	
Operating frequency:	869.525 MHz
Conducted RF power :	Selectable, 25 mW (+14dBm), 100 mW (+20dBm), 500 mW (+27dBm).
Modulation:	FSK (Frequency Shift Keying)
Transmission range:	The range is affected by the building's construction, number of floors, walls, etc.. The following values can be used as a guideline: Indoor: 100 - 200 meters without repeaters. 200-400 m with a repeater 300-600 m with 2 repeaters etc.. Outdoor: 1 km
Standards (radio):	EN 300 220, EMC: EN 301 489
Connection voltage:	230 50 Hz -5% +10%.
Power consumption:	10 VA.
Ambient temperature:	Between 0°C and +40°C.
Relative humidity:	Max. 85% non-condensing.
Case:	IP 65, light grey plastic (Polystyrol) with transparent protection cover.
CE-Approval, EMC	Emission acc. to EN61000-6-3, Immunity acc. to. EN61000-6-2.
Art. number:	WDP-WL 123386-00 (230V AC)

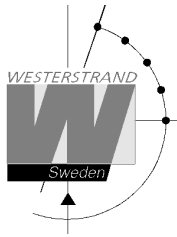
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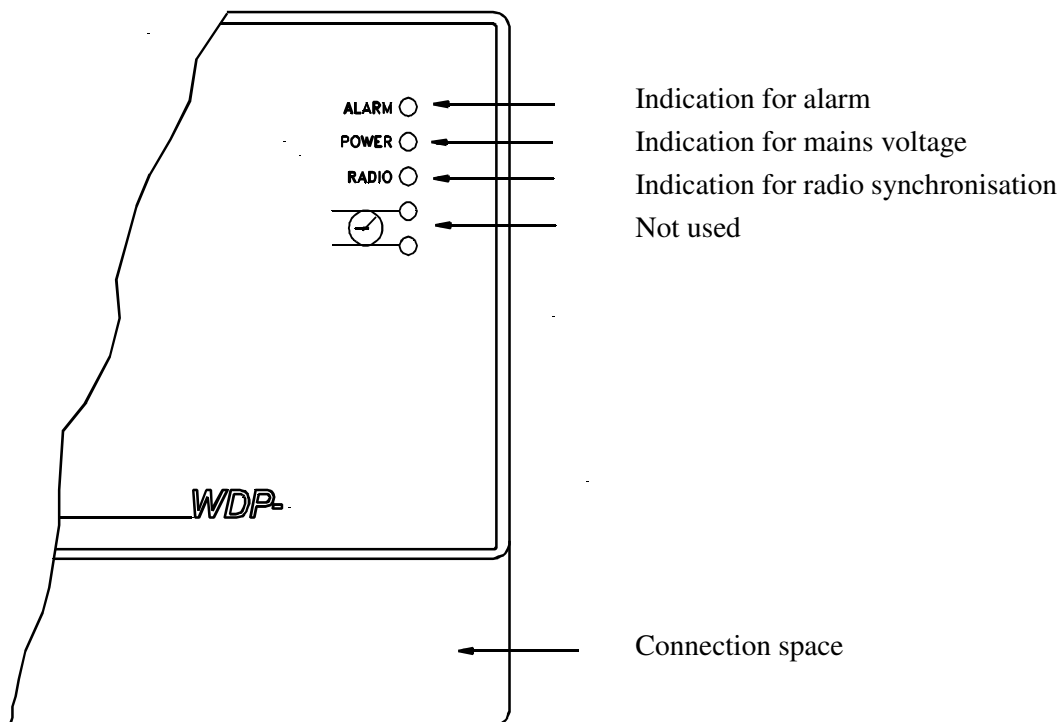
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## General description

Westerstrand master clock WDP-WL is a fully electronic Master Clock with built-in radio transmitter. WDP-WL is a part of Westerstrand Wireless Clock System, a fully automatic system for wireless control of analogue and digital clocks. The transmitter is a UHF crystal-based FSK transmitter using the licence free ISM band. The transmission frequency is 869.525 MHz with a 10% duty cycle. The transmitter sends a time message every ten seconds. The transmitter power can be adjusted in three steps: 25 mW (+14 dBm), 100 mW (+20 dBm), 500 mW (+27 dBm). For optimal range, the transmitter is equipped with a quarter-wavelength stub antenna.

Summer/winter time correction (daylight saving) is pre-programmed and fully automatic. In case of power failure the built in Real Time Clock keeps the internal time updated.



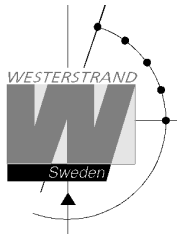
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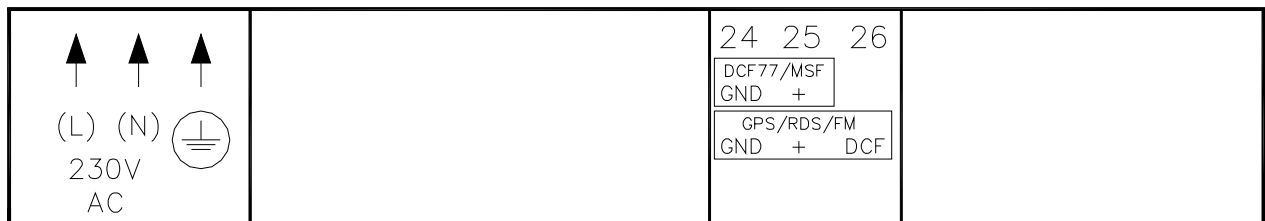
## User Manual

Document: 1856en01.doc  
Author: PM  
Date: 2011-02-25  
Page: 5 of 23

## Installation

The Master Clock is intended for wall mounting.

1. Screw in the upper fixing screw halfway and hang up the unit.
2. Screw in the two lower screws, accessible under the connection space cover.
3. Connect, if included, other accessories/options such as radio synchronisation.
4. Connect the supply voltage.

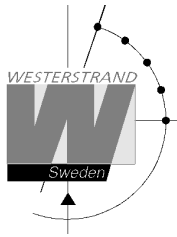


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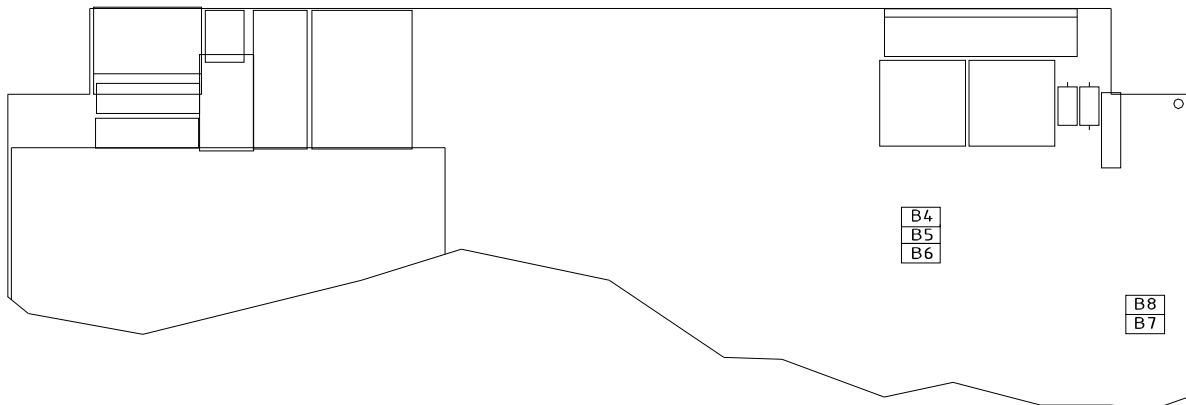
## Synchronisation input

### General

The Master Clock is equipped with a synchronisation input intended for connection to an external synchronisation source. The sync. source can be either a radio receiver type GPS, RDS, MSF, DCF77 or another Master Clock that transmits synchronisation pulses. The Master Clock is factory prepared for connection to a radio receiver. Detailed connection diagram for different radio receivers can be found in the separate manual delivered together with respectively receiver. If the Master Clock is going to be synchronised from another Master Clock it has to be reconfigured. See below.

### Synchronisation from another Master Clock

1. Turn off power.
2. Open the Master Clock by loosening the four screws holding the front panel. Lift the panel and set the jumpers B4-B6 according to the instruction below.
3. Remount the front panel and turn on the power again.
4. Set the sync. source parameter by using the special function *SETUP/SYNC.SOURCE* .
5. Connect the sync. pulses to screw terminal 25 and 26.
6. Set the master clock to correct time +/- 30 sec.
7. When the synchronisation pulses have been accepted by the master clock the colon (:) between hours and minutes in the display starts to flash.



	B4	B5	B6	
PREPARED FOR RADIO RECEIVER	X	X		FACTORY DEFAULT
PREPARED FOR SYNC. PULSE FROM ANOTHER MASTER CLOCK			X	

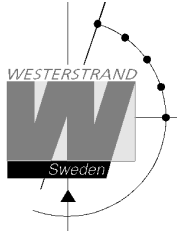
X = Closed

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## Programming

### General

Using 6 buttons and a 2-row 16-character display carries out all programming.  
Programming is self-instructive and to simplify the dialogue Yes/No questions are used.

### Running mode

When the Master Clock is in operation it shows date and time in the display.

This is called *running mode* in this documentation.

LTs = Local Time summer.

LTw = Local Time winter.

MON 14 MAR 2011  
10:11:00 LTw

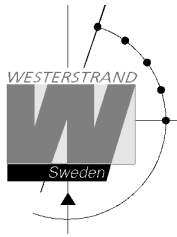
- |                              |     |
|------------------------------|-----|
| 1- Select function           | ↑↓  |
| 2- Enter programming mode    | YES |
| 3- Move sideways             | ← → |
| 4- Change/scroll             | ↑↓  |
| 5- Accept                    | YES |
| 6- Cancel / Leave prog. mode | ←   |

MON 14 MAR 2011  
10:11:00 LTw

SET TIME

ALARMS

SPEC.-FUNCTIONS



## Start up

STARTING

LANGUAGE  
ENGLISH?

When the Master Clock is connected for the first time correct/requested language has to be entered. Press **NO** until requested language occurs in the display e.g. English. Accept with **YES**.

COUNTRY  
BEL-1 ?

Press **NO** until correct country code occurs.  
For Belgium, select BEL-1. Accept with **YES**.

SET TIME  
110314 09:07

Set, by using the arrows, the right time format i.e. year, month, day and hour but a few minutes in advance.  
Wait for the right time and synchronise using **YES**.

MON 14 MAR 2011  
09:07:00 LT<sub>w</sub>

The Master Clock is now in running mode.

## Set time when in operation

MON 14 MAR 2011  
09:07:00 LT<sub>w</sub>

Select function using ↓.

SET TIME

Enter the programming mode with **YES**.

SET TIME  
110314 10:13

Set, by using the arrows, the right time.  
Format; year, month, day and hour but a few minutes in advance.  
Wait for the right time and synchronise using **YES**.

SET TIME

Leave programming mode by pressing ← several times.

MON 14 MAR 2011  
10:13:00 LT<sub>w</sub>

The Master Clock is now back in running mode.

## Summer to winter ( Day light saving )

Resetting between summer and wintertime is fully automatic and does not need programming.

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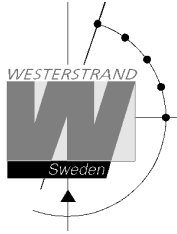
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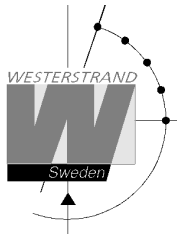
## Alarms

The Master Clock is equipped with several supervision facilities to detect functional disturbances. When a functional disturbance is detected the following will happen:

- Red alarm LED is lit.
- An alarm message is displayed in function ALARM.

The function ALARM is used to display and erase (clear) alarm messages.

Type of alarm	Indication	Reason for alarm	Action
<b>NO RADIO</b>	Red alarm LED lit. Alarm relay activated.	The radio receiver is not working.	Check the radio receiver. If OK, clear the alarm.
<b>POWER DOWN</b>	Red alarm LED lit. Alarm relay activated Works only if the master clock is equipped with batteries for running reserve.	By some reason the power to the master clock has been switched off.	Check the mains. If OK, clear the alarm.



# QWTIME III MASTER CLOCK

## User Manual

Document: 1856en01.doc  
Author: PM  
Date: 2011-02-25  
Page: 10 of 23

ALARMS- DISPLAY

To show the alarms

ALARMS- ERASE

To erase the alarms

### Example 1, display alarms

MON 14 MAR 2011  
09:07:00 LT<sub>w</sub>

Select function using  $\uparrow\downarrow$ .

ALARMS

Accept with YES.

ALARMS- DISPLAY

Press NO until the wished function is shown.  
Accept with YES.

09MAR 15:52  
NO RADIO

The alarm is displayed.  
Press  $\uparrow\downarrow$  to see next alarm.  
Return to running mode press  $\leftarrow$ .

ALARMS- DISPLAY

$\leftarrow$ .

ALARMS

$\leftarrow$ .

MON 14 MAR 2011  
09:07:00 LT<sub>w</sub>

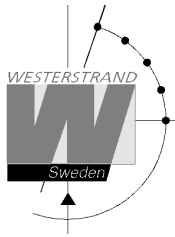
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## Example 2, erase (clear) alarms

MON 14 MAR 2011 09:07:00 LT <sub>w</sub>	Select function using ↑↓.
ALARMS	Accept with YES.
ALARMS- ERASE	Press NO until the wished function is shown. Accept with YES.
09MAR 15:52 NO RADIO	The alarm is displayed. Press YES to erase the alarm.
ERASE?	Accept with YES.
ALARMS- ERASE	Return to running mode press ←.
ALARMS	←.
MON 14 MAR 2011 09:07:00 LT <sub>w</sub>	

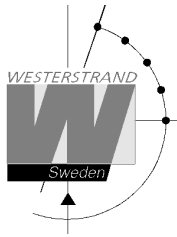
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## Spec.-Functions

The special functions contain functions used during setup and configuration of the Master Clock. If the default settings are used no configuration is needed.

MON 14 MAR 2011 09:07:00 LT <sub>w</sub>	Select function using ↓.
SPEC.-FUNCTIONS	Accept with YES.
SPEC.-FUNCTIONS STATUS	Press NO until wished function is shown. Accept with YES.
STATUS	Show status information of the different output/ input in the Master Clock.
KEYLOCK	Keylock and password function.
LANGUAGE	Language selection.
COUNTRY	Country selection.
SETUP	Setup / configuration of the different impulse system, type of synchronisation etc.
DISPLAY FORMAT	Display format in running mode.
SOFTWARE VERSION	Present software version.
SPEC.-FUNCTIONS STATUS	Return to running mode press ←.
MON 14 MAR 2011 09:07:00 LT <sub>w</sub>	

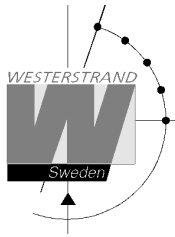
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## Status

With this function each input/output status can be checked.

Example:

Check the status of the radio receiver.

MON 14 MAR 2011 09:07:00 LT <sub>w</sub>	Select function using ↓.
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS STATUS	Accept with YES.
STATUS SYNC.SOURCE	Press NO until wished input/output is shown. Accept with YES.
DCF77           60% 13MAR 19:59:00	The radio receiver has accepted 60% of the radio messages. Last reception was 14/10 19:59:00.
STATUS SYNC.SOURCE	Return to running mode press ←.
SPEC.-FUNCTIONS STATUS	←
SPEC.-FUNCTIONS	←
MON 14 MAR 2011 09:07:00 LT <sub>w</sub>	

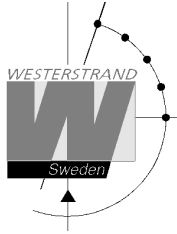
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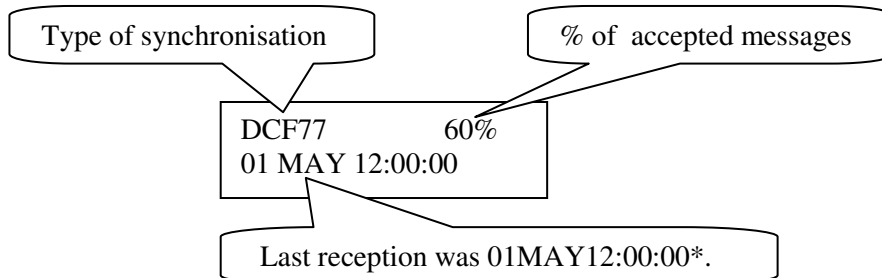
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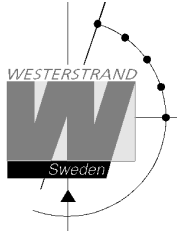
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### Status sync. source



\*Remark: The marked position always shows the actual second. This information is updated every other second.



## Keylock

With this function it is possible to lock the keyboard. When activated the keylock will lock all buttons in the Master Clock.

There are two levels of keyboard protection.

1. Low level protection  
Keylock **ON** : Keyboard locked, press ← YES to open.
2. High level protection  
Keylock with **Password** : Keyboard locked, enter password to open.

Remark: "PASSWORD --" means that no password is used

### Example 1:

Activate keylock without password

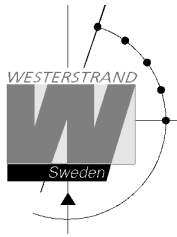
MON 14 MAR 2011 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS KEYLOCK	Accept with YES.
KEYLOCK <b>OFF</b> PASSWORD --	Change to keylock ON.
KEYLOCK <b>ON</b> PASSWORD --	Accept with YES.
KEYLOCK <b>ON</b> PASSWORD --	Accept with YES.
SPEC.-FUNCTIONS KEYLOCK	Return to running mode press ←.
MON 14 MAR 2011 09:07:00 LT	

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Document: 1856en01.doc  
Author: PM  
Date: 2011-02-25  
Page: 16 of 23

Example 2:  
Activate keylock with password

MON 14 MAR 2011 09:07:00 LT	Select function using ↓.
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS KEYLOCK	Accept with YES.
KEYLOCK OFF PASSWORD --	Change to keylock ON.
KEYLOCK ON PASSWORD --	Accept with YES.
KEYLOCK ON PASSWORD 99	Enter, by using the arrows, a 2-digit password. Accept with YES.
SPEC.-FUNCTIONS KEYLOCK	Return to running mode press ←.
MON 14 MAR 2011 09:07:00 LT	

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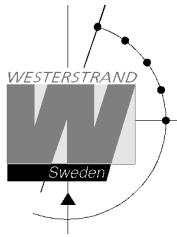
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## Language

With this function the language be selected.

Example:

MON 14 MAR 2011 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS LANGUAGE	Accept with YES.
LANGUAGE ENGLISH?	Select, by using the arrows, the wished language. Accept with YES.
SPEC.-FUNCTIONS LANGUAGE	Return to running mode press ←.
MON 14 MAR 2011 09:07:00 LT	

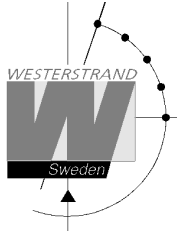
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Document: 1856en01.doc  
Author: PM  
Date: 2011-02-25  
Page: 18 of 23

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### Country

With this function the Country can be selected.

Example:

MON 14 MAR 2011 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS COUNTRY	Accept with YES.
COUNTRY BEL-1 ?	Select, by using the arrows, the wished country. Accept with YES.
SPEC.-FUNCTIONS COUNTRY	Return to running mode press ←.
MON 14 MAR 2011 09:07:00 LT	

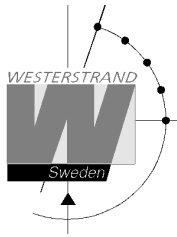
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Document: 1856en01.doc  
Author: PM  
Date: 2011-02-25  
Page: 19 of 23

### Setup

With this function the different output and input can be configured. If the default setup is used no configuration is needed.

Example:

Set the alarm limit for *radio alarm* to 1 hour. (Default setting is 12 hours.)

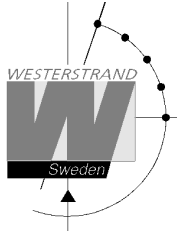
MON 14 MAR 2011 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS SETUP	Accept with YES.
SETUP SYNC SOURCE	Press NO until wished input/output is shown. Accept with YES.
DCF77 AL.LIMIT --h -- m	Set, by using the arrows, the alarm limit to 1 hour (01h).
DCF77 AL.LIMIT 01h 00 m	Accept with YES
SETUP SYNC SOURCE	Return to running mode press ←.
SPEC.-FUNCTIONS SETUP	←
SPEC.-FUNCTIONS	←
MON 14 MAR 2011 09:07:00 LT	

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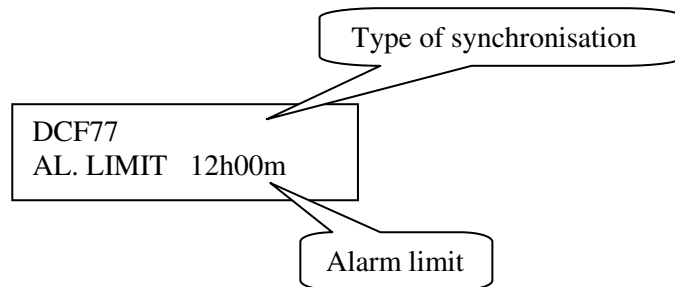
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## Setup sync. source

Below is a description of the different configuration parameters available in the setup menu for *sync. source*. Please remark that if default settings are used no configuration is needed.



## Type of synchronisation

State type of external synchronisation. The following time sources can be selected:

-----	No external synchronisation.
DCF77	Radio synchronisation DCF77.
GPS	Radio synchronisation GPS.
RDS	Radio synchronisation RDS.
MSF	Radio synchronisation MSF/RUGBY.
1/1M SYNC	Polarised 1/1-minute impulse, sync.
1/1M SLAVE	Polarised 1/1-minute impulse, slave.
1/2M SYNC	Polarised 1/2-minute impulse, sync.
1/2M SLAVE	Polarised 1/2-minute impulse, slave.
TC	Time code type hard wired DCF.
TC-POL	Polväxlande tidkod typ ledningsbunden DCF-kod.
FMSF	Finnish FM time signal.
NTP CLIENT	The Master Clock is NTP client*
AFNOR	Time code according to AFNOR NFS-87500 (IRIG-B with date)**

\*Only applicable if the Master Clock is equipped with option Ethernet.

\*\*Only applicable if the Master Clock is equipped with option IRIG-B.

## Alarm limit

The configuration parameter *Alarm limit* specifies the time delay before the radio alarm is activated. Default setting is that the radio alarm is inactivated, AL.LIMIT --h--m.

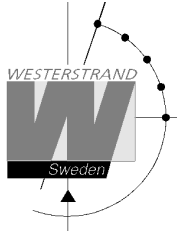
---

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# QWTIME III MASTER CLOCK User Manual

Document: 1856en01.doc  
Author: PM  
Date: 2011-02-25  
Page: 21 of 23

## Software version

This function shows the software version for the Time Base module.

MON 14 MAR 2011 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS SOFTWARE VERSION	Accept with YES.
QW3-A031 123342-00 11m	The software version is QW3-A031. 11m = Uptime for this Master Clock.
SPEC.-FUNCTIONS SOFTWARE VERSION	Return to running mode press ←.
SPEC.-FUNCTIONS	←
MON 14 MAR 2011 09:07:00 LT	

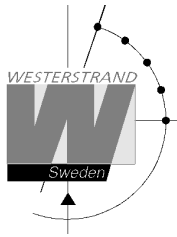
---

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## Display format

With this function the display format in running mode can be selected.

The following two formats can be selected:

MON 14 MAR 2011  
10:11:00 LTw

Standard format, default format.  
LT = Local Time. (LTs when summer time)  
NT = Normal Time (Winter time).  
UTC = Universal Time Coordinated.

MON 14 MAR 2011  
LTw

Format 2, used for test / fault finding.

Example:

MON 14 MAR 2011  
09:07:00 LT

Select function using ↓.

SPEC.-FUNCTIONS

Accept with YES.  
Press NO until wished function is shown.

SPEC.-FUNCTIONS  
DISPLAY FORMAT

Accept with YES.

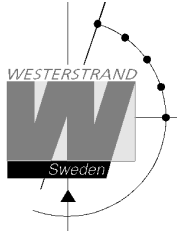
DISPLAY FORMAT  
STANDARD

Select, by using the arrows, the wished display format.  
Accept with YES.

SPEC.-FUNCTIONS  
DISPLAY FORMAT

Return to running mode press ←.

MON 14 MAR 2011  
09:07:00 LT



## Fault tracing

*The display is blank*

- A. The green LED "POWER" is light?
  - A1. No.
    - A1A. Check the supply voltage.
    - A1B. Power supply wires connected correctly?
  - A2. Yes.
    - A2A. Restart the master clock by switching the supply voltage off and on.

## RADIO

*Radio synchronisation is not working (DCF)*

Check that the LED in the antenna is flashing in second's rhythm. The antenna should be mounted in the clear, with the arrow on the box aiming south. Check that the LED "Radio" on the master clock is flashing in second's rhythm.

Use special functions "Radio Stat" and "Radio Last" for information on the reception quality.

Accepted radio reception is shown by a flashing colon (:) between hours and minutes in the display.

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