



User Manual

Master Clock WDP-Q



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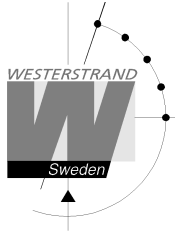
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QWTIME III MASTER CLOCK
User Manual

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User Manual

Master Clock WDP-Q

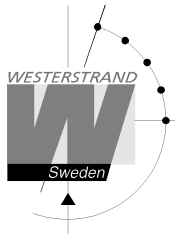


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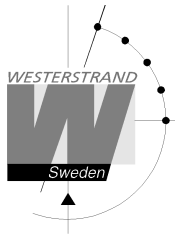
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Technical specifications

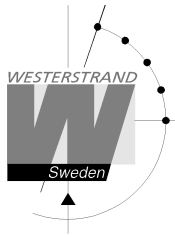
Crystal Frequency:	4,915200 MHz.
Accuracy:	0,1 sec./24 hours (at +20°C).
Microprocessor:	HD6412394.
Max. load impulse output:	Minute 1A, second 0,5A. (The output is equipped with short circuit protection which resets automatically.)
Impulse duration:	Minute 2 sec. selectable 0.1-9.9 sec. Seconds 0.5 sec. selectable 0.1-1 sec.
Impulse memory:	72 hours (impulse memory with rapid impulsing after power failure).
Connection voltage:	230 alt. 115 V 50 Hz -5% +10% alt. 24 V DC -5% +20 %.
Max ripple (24V DC):	0,7V RMS.
Power consumption:	30 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. numbers:	123312-00 (230V AC) 123313-00 (115V AC) 123310-00 (24V DC)

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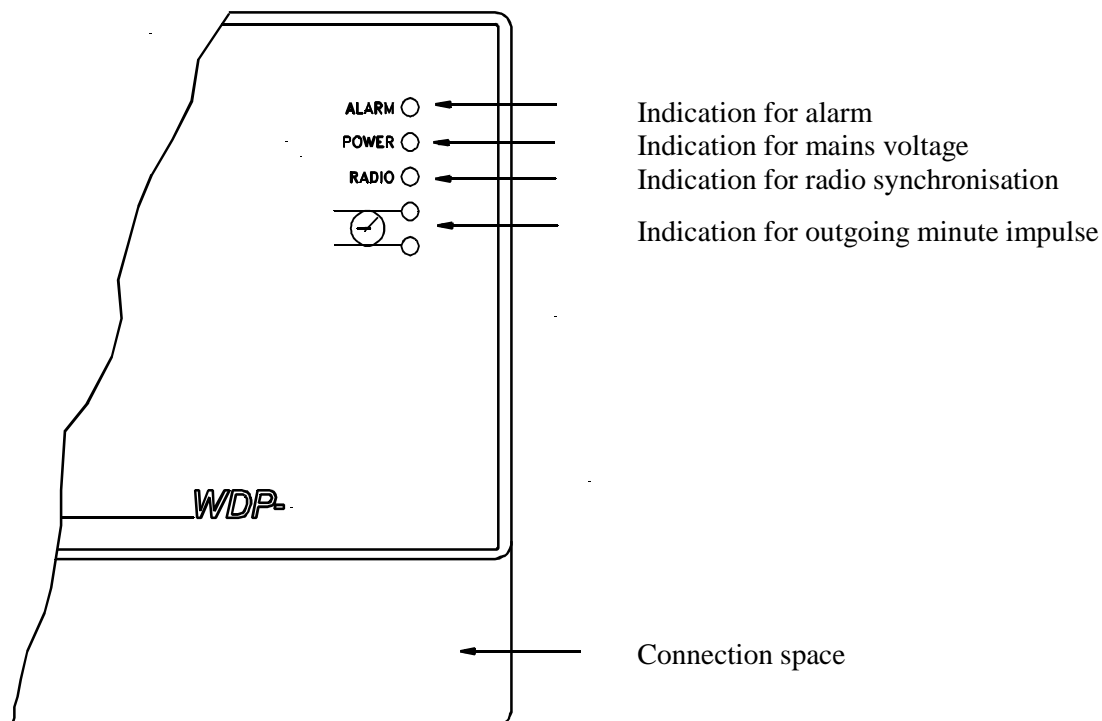
General description

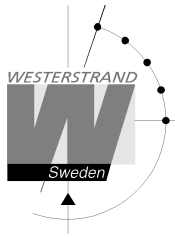
The Master Clock is an electronic quartz Master Clock for operating and control of analogue and digital Slave Clocks.

In case of power failure the built in Real Time Clock keeps the internal time updated.

Connected Slave Clocks are automatically corrected by rapid impulsing when power returns.

Summer/winter time correction (daylight saving) is pre-programmed and fully automatic.





QWTIME III MASTER CLOCK

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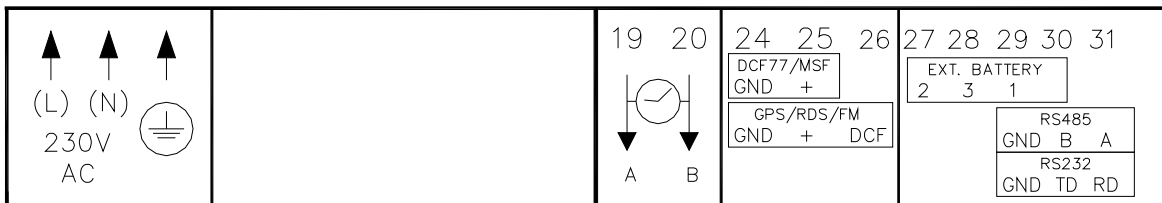
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Installation

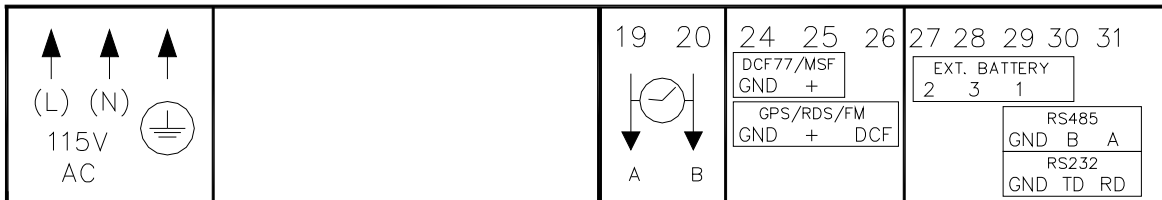
The Master Clock is intended for wall mounting.

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 the slave clock lines.
4. Connect, if included, other accessories/options such as radio synchronisation, RS232 etc.
5. Connect the supply voltage.

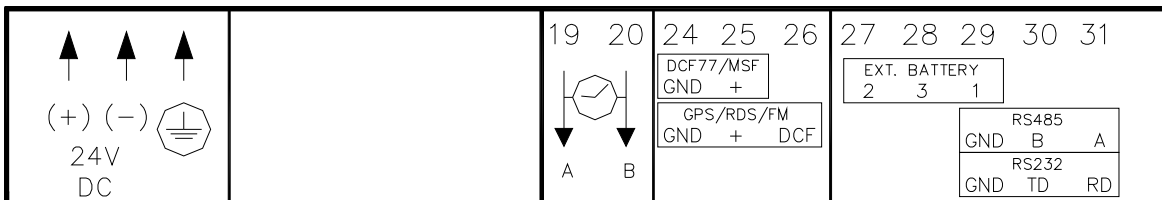
123312-00



123313-00



123310-00

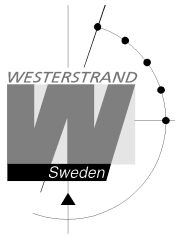


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Calculation of cable area in time systems

General

To make a time system with impulse operated analogue and digital slave clocks perform satisfactory, the cable from the Master Clock to the Slave Clocks need to be dimensioned correctly.

A 10% voltage drop is allowed in the cable.

The length and area of the cable and also the current (load) on the cable affect the voltage drop.

Formula

$$A = l \times I \times k$$

A = Area [mm²]

l = cable length [m]

I = current [A]

k = 0,015 [constant]

Power consumption

Impulse Slave Clocks

Analogue clocks minute \leq 400 mm: 7,5 mA

Analogue clocks minute \leq 900 mm: 15 mA

Analogue clocks minute + sweep seconds hand \leq 400 mm: 25 mA

Digital Clocks: 4 mA

Time-Code (TC) Slave Clocks

Analogue clocks minute \leq 400 mm: 14 mA

Analogue clocks minute \leq 900 mm: 20 mA

Analogue clocks minute + sweep seconds hand \leq 400 mm, indoor: 12 mA

Analogue clocks minute + sweep seconds hand \leq 400 mm, outdoor: 20 mA

Analogue clocks minute + sweep seconds hand \leq 900 mm: 27 mA

Example

A time system consists of 40 pcs. analogue clocks with diameter 300 mm.

The power consumption will then be $40 \times 7,5 = 300 \text{ mA} = 0,3\text{A}$.

Cable length is 100 metres.

$$A = 100 \times 0,3 \times 0,015 = 0,45 \text{ mm}^2$$

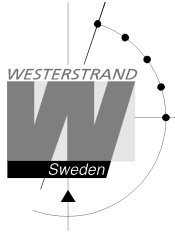
Choose a cable with an area of at least $0,45 \text{ mm}^2$.

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Connection of hourly correction (SR2/3) clocks

The impulse output can be configured to send out hourly correction pulses according to the SR2/3 standard. See *Special functions /Setup /impulse output* for more details.

The following hourly correction standards are supported:

- SR2-58 : (SR2, hourly correction 2-wired, with imp. correction on the 58th minute).
- SR2-59 : (SR2, hourly correction 2-wired, with imp. correction on the 59th minute).
- SR3-58 : (SR3, hourly correction 3-wired, with imp. correction on the 58th minute).
- SR3-59 : (SR3, hourly correction 3-wired, with imp. correction on the 59th minute).

Connection of 2-wired clocks:

Master Clock	Slave Clock
19 -----	PC
20 -----	AB

Connection of 3-wired clocks:

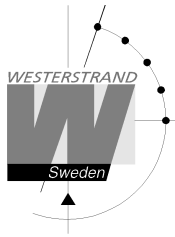
Master Clock	Slave Clock
19 -----	A
20 -----	B
24 -----	C

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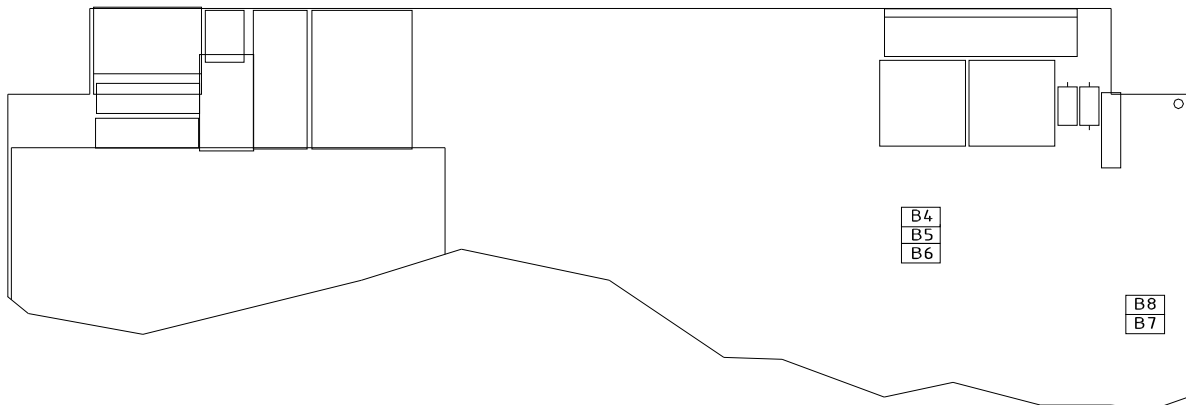
Synchronisation input

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	

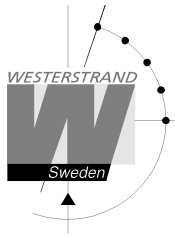
X = Closed

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Serial port RS232/RS485

General

The Master Clock has a serial port for connection to a PC or other similar equipment. The serial port is factory set to RS232. If RS485 connection is used the Master Clock has to be reconfigured according to the jumper instruction below.

Please see section *SPECIALFUNKTION/SETUP/SERIAL PORT* for details about type of interface, protocol, baudrate etc.

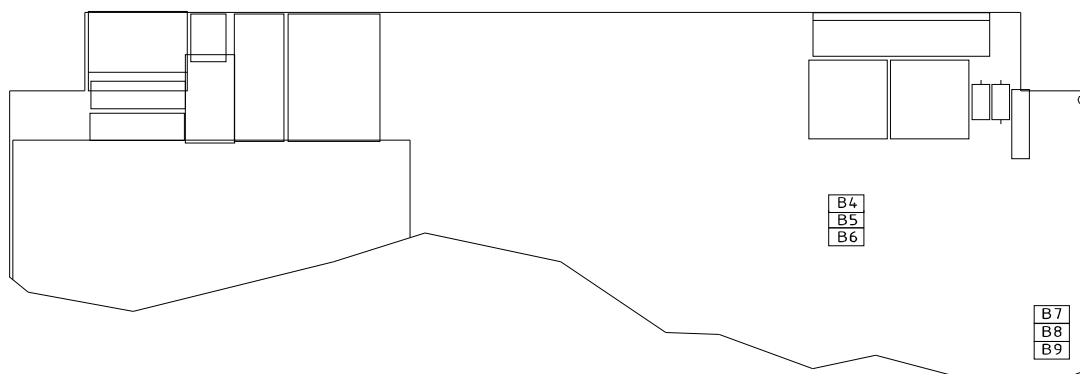
Connection via RS232

Example:

Master Clock	External equipment DTE (9-polig D-sub)	(25-polig D-sub)
GND (29) -----	5 -----	7
TD (30) -----	2 -----	3
RD (31) -----	3 -----	2
	┌ 1	┌ 7
	┌ 4	┌ 8
	┌ 6	┌ 20
	┌ 7	┌ 4
	┌ 8	┌ 5

Connection via RS485

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 B7-B9 according to the instruction below.
3. Remount the front panel and turn on the power again.
4. Enter the special function setup/serial port and change the setting to RS485.
5. Connect the RS485 signal to screw terminal 29, 30 and 31.



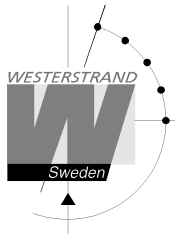
	B7	B8	B9	
PREPARED FOR RS232	X		X	FACTORY DEFAULT
PREPARED FOR RS485		X		

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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.

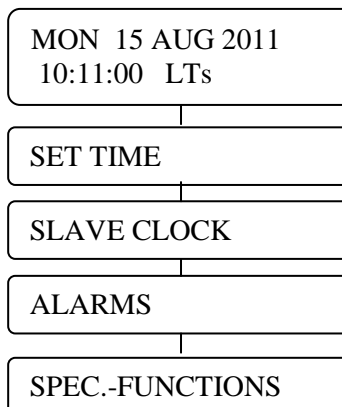
This is called *running mode* in this documentation.

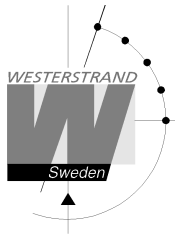
LTs = Local Time summer.

LTw = Local Time winter.

MON 15 AUG 2011
10:11:00 LTs

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





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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
DEU ?

Press **NO** until correct country code occurs.
For Germany, select DEU. Accept with **YES**.

SET TIME
060313 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**.

SLAVE CLOCK
= 12:00 OFF

Now the question: SLAVE CLOCK 12.00?
If the Slave Clocks show 12.00, answer **YES**, if not set the time shown by the slave clocks. Accept using **YES**.

SLAVE CLOCK
= 12:00 ON?

Accept using **YES**.

MON 13 MAR 2006
09:07:00 LTW

The Master Clock is now in running mode.

NOTE! If a slave clock runs out by a minute, its cabling must be pole changed and the slave clock to be corrected manually.

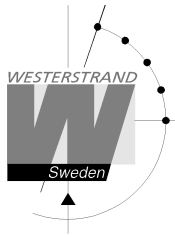
NOTE! If the time of the slave clocks is ahead of correct/present time the Master Clock Programmer will wait until correct time corresponds with the slave clocks.

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Set time when in operation

MON 13 MAR 2006 09:07:00 LT _w	Select function using ↓.
SET TIME	Enter the programming mode with YES.
SET TIME 060313 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 13 MAR 2006 10:13:00 LT _w	The master clock is now back in running mode.

Summer to winter (Day light saving)

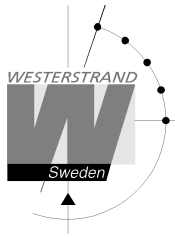
Resetting between summer and wintertime is fully automatic and does not need programming.

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Slave Clock

This function is used to enter the time that the slave clocks are showing.

This is useful if, by some reason, the master clock and the slave clocks should show different times.

When the slave clock time has been entered, the master clock will automatically adjust the slave clocks to correct time.

Please note that before using this function make sure that all connected slave clocks are showing the same time. If any of the slave clocks are showing a divergent time this clock must be manually adjusted to the same time as the other clocks.

The impulses to the slave clocks are temporarily stopped when entering this function.

MON 13 MAR 2006
09:07:00 LT_w

Select function using ↓.

SLAVE CLOCK

Enter the programming mode with **YES**.

SLAVE CLOCK
= 09:07 OFF

SLAVE CLOCK = 09.07? (Example)
If the slave clocks shows 09.07 answer YES,
if not, set the time shown by the slave clocks.

SLAVE CLOCK
= 09:07 OFF

YES.

SLAVE CLOCK
= 09:07 **ON?**

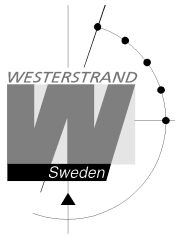
YES.

SLAVE CLOCK

Leave programming mode by pressing ← several times.

MON 13 MAR 2006
09:07:00 LT_w

The master clock is now back in running mode.



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.
- Alarm relay* is activated.
- 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
NO RADIO	Red alarm LED lit. Alarm relay activated.	The radio receiver is not working.	Check the radio receiver. If OK, clear the alarm.
UF LOW	Red alarm LED lit. Alarm relay activated	Impulse voltage below alarm limit.	Check the load on the impulse output. If OK, clear the alarm.
SHORT CIRCUIT	Red alarm LED lit. Alarm relay activated	Short circuit on impulse output	Remove the short circuit. If OK, clear the alarm.
CURRENT LOW	Red alarm LED lit. Alarm relay activated	Impulse current below alarm limit.	Check the load on the impulse output. If OK, check that the alarm limit is correctly configured. If OK, clear the alarm.
CURRENT HIGH	Red alarm LED lit. Alarm relay activated	Impulse current above alarm limit.	Check the load on the impulse output. If OK, check that the alarm limit is correctly configured. If OK, clear the alarm.
POWER DOWN	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.

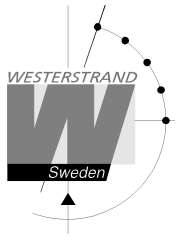
* One of the relay output can be used as an alarm relay. This function is as default disabled but can be enabled via SPECIAL FUNCTION/ SETUP/ ALARM RELAY/YES. See page 45 for more details.

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ALARMS- DISPLAY

To show the alarms

ALARMS- ERASE

To erase the alarms

Example 1, display alarms

MON 13 MAR 2006
09:07:00 LT_w

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 .

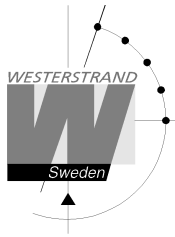
MON 13 MAR 2006
09:07:00 LT_w

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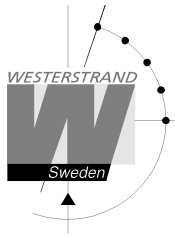
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Example 2, erase (clear) alarms

MON 13 MAR 2006 09:07:00 LT _w	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 13 MAR 2006 09:07:00 LT _w	



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.

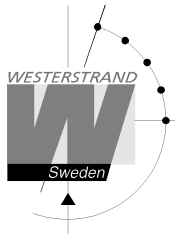
MON 14 MAR 2005 09:07:00 LT _w	Select function using ↓.
SPEC.-FUNCTIONS	Accept with YES.
SPEC.-FUNCTIONS STATUS	Press NO until wished function is shown. Accept with YES.
STATUS	Show status information of the different output/ input in the Master Clock.
KEYLOCK	Keylock and password function.
LANGUAGE	Language selection.
COUNTRY	Country selection.
POSITION	Selection of position for astronomical function.
SETUP	Setup / configuration of the different impulse system, type of synchronisation etc.
HOLIDAYS	Change holidays
DISPLAY FORMAT	Display format in running mode.
SOFTWARE VERSION	Present software version.
SPEC.-FUNCTIONS STATUS	Return to running mode press ←.
MON 14 MAR 2005 09:07:00 LT _w	

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Status

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

Example:

Check the status of the radio receiver.

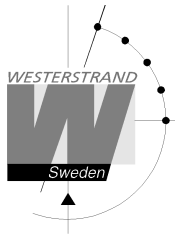
MON 14 MAR 2005 09:07:00 LT _w	Select function using ↓.
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS STATUS	Accept with YES.
STATUS SYNC.SOURCE	Press NO until wished input/output is shown. Accept with YES.
DCF77 60% 13MAR 19:59:00	The radio receiver has accepted 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 2005 09:07:00 LT _w	

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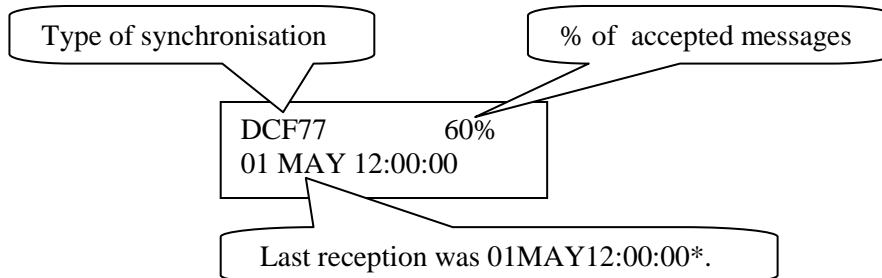
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Fax. +46 506 48051

Internet: <http://www.westerstrand.se>
E-mail: info@westerstrand.se

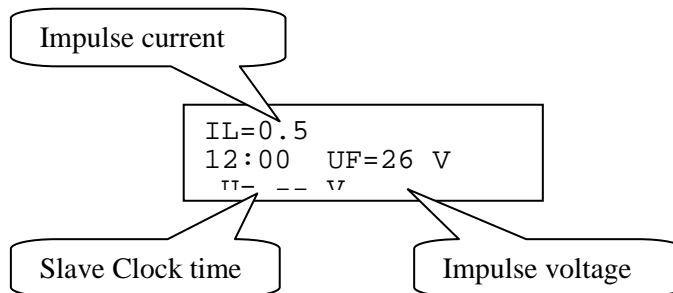


Status sync. source

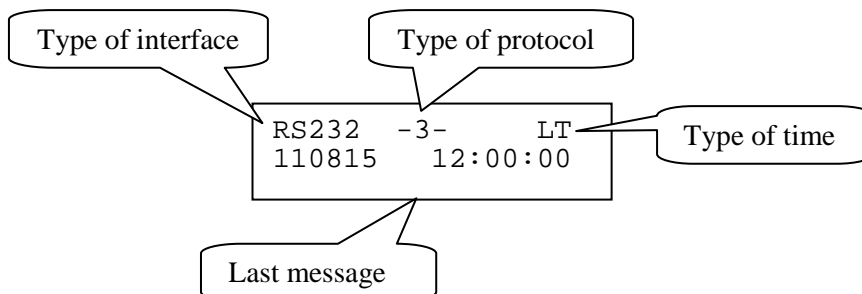


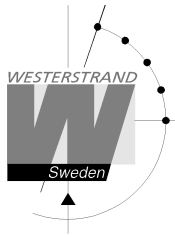
*Remark: The marked position always shows the actual second. This information is updated every other second.

Status impulse output



Status serial port

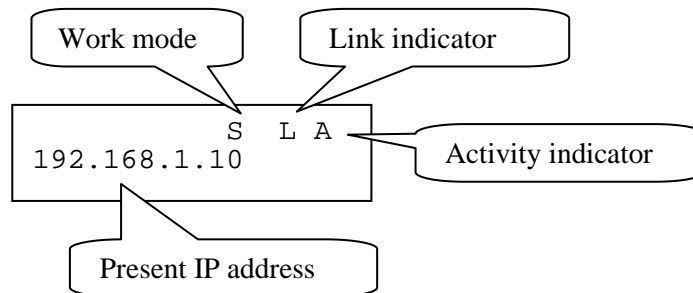




Status Alarm relay

This function is not used for Master Clock WDP-Q

Status IP



Work mode S = Server. The Master Clock is configured to work as an NTP Time Server.
C = Client. The Master Clock is configured to work as an NTP Time Client.

Link indicator L = Link activated. The Master Clock is connected to a network.
= No link. The Master Clock is not connected to a network.

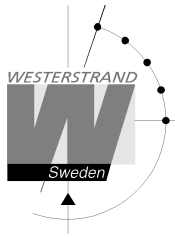
Activity indicator A = The Master Clock is accessed via the network.

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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

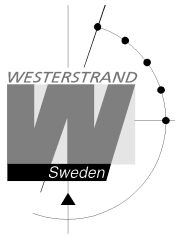
MON 14 MAR 2005 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS KEYLOCK	Accept with YES.
KEYLOCK OFF PASSWORD --	Change to keylock ON.
KEYLOCK ON PASSWORD --	Accept with YES.
KEYLOCK ON PASSWORD --	Accept with YES.
SPEC.-FUNCTIONS KEYLOCK	Return to running mode press ←.
MON 14 MAR 2005 09:07:00 LT	

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Example 2:
Activate keylock with password

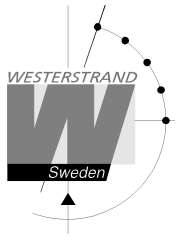
MON 14 MAR 2005 09:07:00 LT	Select function using ↓.
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS KEYLOCK	Accept with YES.
KEYLOCK OFF PASSWORD --	Change to keylock ON.
KEYLOCK ON PASSWORD --	Accept with YES.
KEYLOCK ON PASSWORD 99	Enter, by using the arrows, a 2-digit password. Accept with YES.
SPEC.-FUNCTIONS KEYLOCK	Return to running mode press ←.
MON 14 MAR 2005 09:07:00 LT	

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Language

With this function the language be selected.

Example:

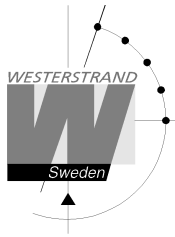
MON 14 MAR 2005 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS LANGUAGE	Accept with YES.
LANGUAGE ENGLISH?	Select, by using the arrows, the wished language. Accept with YES.
SPEC.-FUNCTIONS LANGUAGE	Return to running mode press ←.
MON 14 MAR 2005 09:07:00 LT	

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Country

With this function the Country can be selected.

Example:

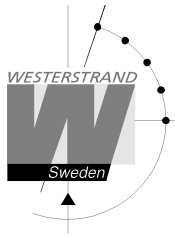
MON 14 MAR 2005 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS COUNTRY	Accept with YES.
COUNTRY DEU ?	Select, by using the arrows, the wished country. Accept with YES.
SPEC.-FUNCTIONS COUNTRY	Return to running mode press ←.
MON 14 MAR 2005 09:07:00 LT	

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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.)

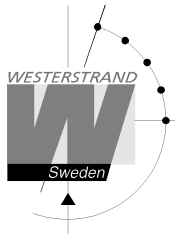
MON 14 MAR 2005 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS SETUP	Accept with YES.
SETUP SYNC SOURCE	Press NO until wished input/output is shown. Accept with YES.
DCF77 AL.LIMIT --h -- m	Set, by using the arrows, the 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 2005 09:07:00 LT	

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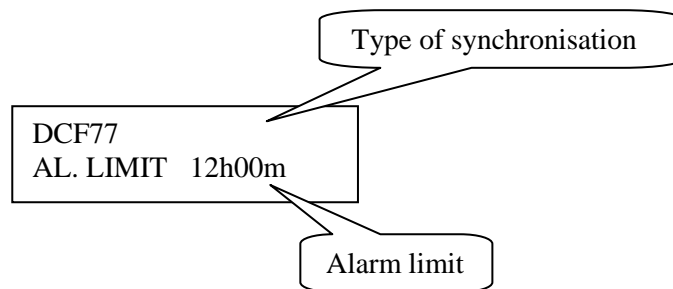
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Setup sync. source

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	Polar reversing time code type hard wired DCF.
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

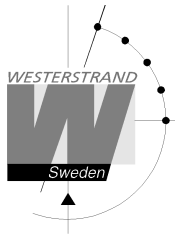
The configuration parameter *Alarm limit* specifies the time delay before the radio alarm is activated. Default setting is that the radio alarm is inactivated, AL.LIMIT --h--m.

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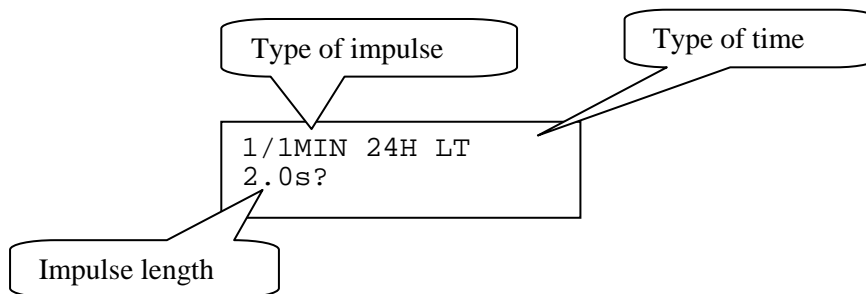
Internet: <http://www.westerstrand.se>
E-mail: info@westerstrand.se



Setup impulse output

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

Impulse type



Type of impulse

Selection of impulse type. The following types are available.

- 1/1M-24H : Polarised 1/1-minute impulse with 24 hours resetting (default).
- 1/1M-12H : Polarised 1/1-minute impulse with 12 hours resetting.
- 1/2M-24H : Polarised 1/2-minute impulse with 24 hours resetting.
- 1/2M-12H : Polarised 1/2-minute impulse with 12 hours resetting.
- SEC-12H : Polarised Second impulses with 12 hours resetting.
- SEC-60S : Polarised Second impulses with 60 seconds resetting.
- TC : Hard wired DCF Time Code.
- TC-POL : Polarised hard wired DCF Time Code.
- 1/1M-UP : Non polarised (Uni-Polar) PPM synchronisation pulse. Pulse length 1 second.
- SR2-58 : (SR2, hourly correction 2-wired, with imp. correction on the 58th minute).
- SR2-59 : (SR2, hourly correction 2-wired, with imp. correction on the 59th minute).
- SR3-58 : (SR3, hourly correction 3-wired, with imp. correction on the 58th minute).
- SR3-59 : (SR3, hourly correction 3-wired, with imp. correction on the 59th minute).
- IRIGB123 : Time code according to IRIG Document 200-98, Format B123.
- AFNOR : Time code according to AFNOR NFS-87500.
- : No impulse system.

Type of time

LT = Local Time.

NT = Normal Time (winter time).

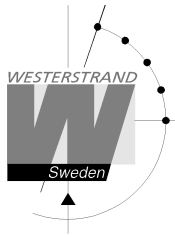
UTC = Universal Time Coordinated.

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Impulse length

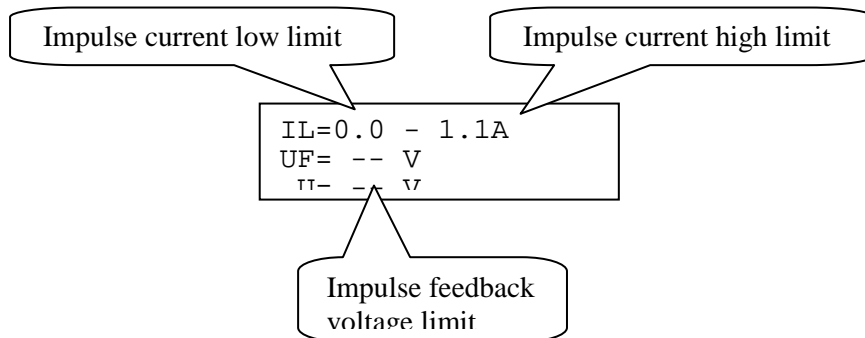
Configuration of impulse length.

1/1 and 1/2 -minute impulse: 0.1 s – 9.9 s.
Second impulses: 0.1 – 1.0 s.

Remark:

When selecting second impulses with pulse length > 0.5 seconds, the pulse length for rapid impulses is automatically adjusted to 0.5 seconds.

Alarm limits



Impulse current low limit

Alarm limit for low current (minimum load). The minimum load can be set from 0A up to 1.1A.

Impulse current high limit

Alarm limit for high current (maximum load). The maximum load can be set from 0A up to 1.1A.

Impulse feedback voltage limit

Alarm limit for feedback impulse voltage.

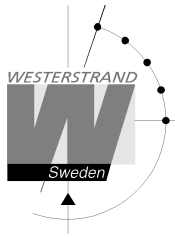
-- : No limit (default).
01 - 99 : Limit in volts, V.

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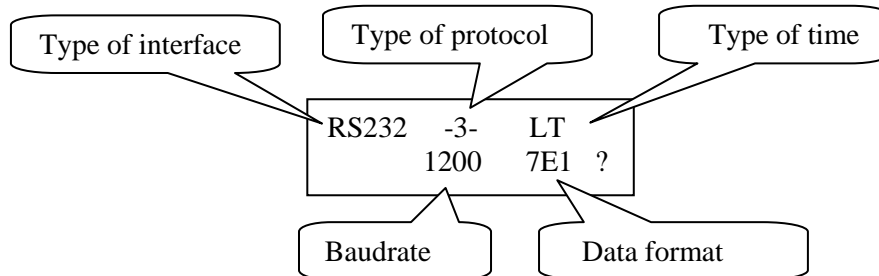
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Setup serial port



Type of interface

Here is type of interface selected. Please note that there are also hardware jumpers that have to be changed on the circuit board when the interface is switched. See section Serial port RS232/485 in this manual.

Type of protocol

Name of the transmission / reception protocol used in the module. The following protocols are available.

- 1 : General 2-way-communication protocol.
- 2, 3, 5 and 7 : Automatic time message protocols.
- NMMI :NMEA 0183, ZDA Time string, transmitted each minute.
- NMSE :NMEA 0183, ZDA Time string, transmitted each second.

Type of time

Type of time received or transmitted.

LT = Local Time.

NT = Normal Time (winter time).

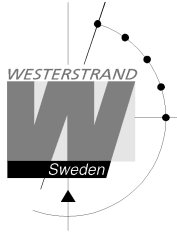
UTC = Universal Time Coordinated.

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Baudrate

Available speeds:

300, 600, 1200, 2400, 4800, 9600, 19200, 38400 baud.

Data format

Data format of message received or transmitted.

No. of data bits, 7 or 8.

Type of parity, non, odd or even.

No. of stop bits, 1 or 2.

Available formats:

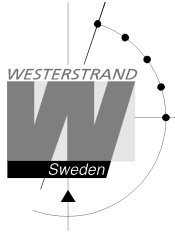
7N1, 7N2, 7O1, 7O2, 7E1, 7E2, 8N1, 8N2, 8O1, 8O2, 8E1, 8E2,

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Protocol description

Protocol 2

The message has length 20 bytes according to:

STX F G W 20 YY MM DD HH MM SS ETX BCC

F - Flag bits

7 =0
6 =1
5 =0
4 =0 Winter time, =1 summer time
3 =1 Synched from Radio source, e.g. DCF77
2 =1 Synched from timeserver

1 0 Type of time
OFF OFF UTC
OFF ON LOC
ON OFF NOR

Example:

Assume wintertime time, synched from radio source, synchronized from timeserver, local time:
Bits 6, 3, 2 and 0 are set: 0100 1101 = 4Dh = 'M'

G - UTC offset during wintertime from letter 'P' in 1/2 hour steps.

Example:

Germany 2 x 1/2 = 1 hour, so 'P'+2 = 'R'

W	Weekday	'1' Monday .. '7' Sunday
YY	Year	'00'..'99'
MM	Month	'01'..'12'
DD	Day of month	'01'..'31'
HH	Hour	'00'..'23'
MM	Minute	'00'..'59'
SS	Second	'00'..'59'
ETX	03h	
BCC	Exclusive or of bytes F..ETX	

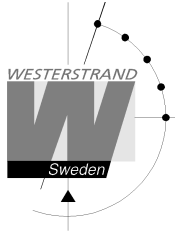
The message is transmitted each second

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Protocol 3

At second 56 this message will be transmitted:

HH:MM:00 SP DD/MN/YY SP NNN SP W CR LF (25 bytes)

HH = Hour '00' - '23'.
: = 3AH
MM = Minute '00' - '59'.
SP = Blank 20H.
DD = Date '01' - '31'.
/ = 2FH
MN = Month '01' - '12'.
YY = Year '00' - '99'.
NNN = Daynumber '001' - '365' (3 bytes).
W = Weekday '1' - '7'.
CR = 0DH.
LF = 0AH.

At second 60 (0) a synchronisation sign SUB (1AH) is transmitted.

Remark: The message transmitted at second 56 is *next* minute.

Example:

At 09:07:56 is a message transmitted. The time included in this message will be 09:08:00.

Protocol 5

T:YY:MN:DD:WW:HH:MM:SS CR LF (24 bytes)

T = T
: = 3AH
YY = Year 00....99
MN = Month 01....12
DD = Day 01....31
WW = Day of week 01....07
HH = Hour 00....23
mm = Minutes 00....59
ss = Seconds 00....59
CR = Carriage return 0Dh.
LF = Line feed 0Ah.

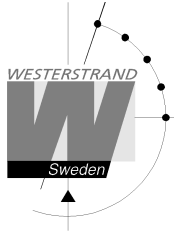
The time message is sent out each minute or each second.

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Protocol 7

STX WW VV YYYY MN DD HH MM SS F G BCC ETX (24 bytes)

STX = 02h (1 byte).
WW = Week number '01'-'53'
VV = Weekday '01'-'07'
YYYY = Year '2003-2099'
MN = Month '01'-'12'
DD = Day '01'-'31'
HH = Hour '00'-'23'
MM = Minute '00'-'59'
SS = Second '00'-'59'

F = '0' Winter-time.
= '1' Summer-time.

G = Offset to UTC for winter-time according to (1 byte):
' ,' (2Ch) -2 hours, '.' (2Eh) -1 hour, '0' (30h) 0 hour.

BCC = Checksum; Exclusive OR of bytes WW..F G in hexadecimal ascii
format (2 bytes). Byte STX is NOT included!.

ETX = 03h (1 byte).

This message is sent out each second.

NMEA

ZDA - Time & Date - UTC, Day, Month, Year and Local Time Zone

1	2	3	4	5	6	7

\$--ZDA, hhmmss, xx, xx, xxxx, xx, xx*hh<CR><LF>

Field Number:

- 1) Universal Time Coordinated (UTC)
- 2) Day, 01 to 31
- 3) Month, 01 to 12
- 4) Year
- 5) Local zone description, 00 to +- 13 hours
- 6) Local zone minutes description, same sign as local hours
- 7) Checksum

NMMI :NMEA 0183, ZDA Time string, sänds ut varje minut.
NMSE :NMEA 0183, ZDA Time string, sänds ut varje sekund.

Setup Alarm Relay

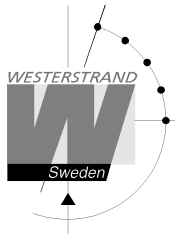
This function is not used for Master Clock WDP-Q

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Setup IP

This function can be used to give the Master Clock an IP address if it is equipped with option Ethernet. Please note that IP address as well as all other network parameters can be configured via an external PC using Telnet. See separate manual for this.

Example:

Give the Master Clock IP address 192.168.1.100.

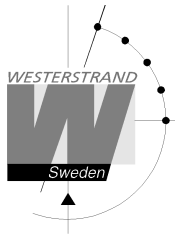
MON 13 MAR 2006 09:07:00 LT _w	Select function using ↓.
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS SETUP	Accept with YES.
SETUP IP	Press NO until the text IP is shown. Accept with YES.
IP 192.168.013.199	Set the first digit group of the IP address using ↑↓. Move to the right using →.
IP 192.168.013.199	Continue with the second digit group. Change digits using ↑↓. Move to the right using →.
IP 192.168.001.199	Continue with the third digit group. Change digits using ↑↓. Move to the right using →.
IP 192.168.001.100	Continue with the fourth digit group. Change digits using ↑↓. Accept with YES.
SETUP IP	Return to running mode press ←.
SPEC.-FUNCTIONS SETUP	←.
SPEC.-FUNCTIONS	←.
MON 13 MAR 2006 09:07:00 LT _w	

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Software version

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

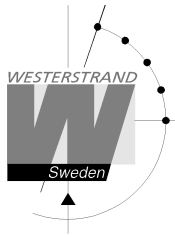
MON 14 MAR 2005 09:07:00 LT	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS SOFTWARE VERSION	Accept with YES.
QW3-A031 123342-00 11m	The software version is QW3-A031. 11m = Uptime for this Master Clock.
SPEC.-FUNCTIONS SOFTWARE VERSION	Return to running mode press ←.
SPEC.-FUNCTIONS	←
MON 14 MAR 2005 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 2005
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 12 DEC 2001
LTw

Format 2, used for test / fault finding.

Example:

MON 14 MAR 2005
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.

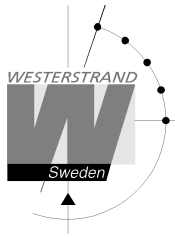
DISPLAY FORMAT
STANDARD

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

SPEC.-FUNCTIONS
DISPLAY FORMAT

Return to running mode press ←.

MON 14 MAR 2005
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.

After starting up the master clock, no impulses appear (to correct the slave clocks).

- B1. The master clock awaits the time shown by the slave clocks. Impulses will be distributed when correct time = the time shown by the slave clocks.

Alarm messages

- D1. "Short circuit"

Excessive load on the impulse output. Check the slave clock wiring. Impulses are stored (memorised) during the alarm. When the fault is fixed, all the stored impulses are distributed by rapid impulsing.

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 "Status/Sync. source" 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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