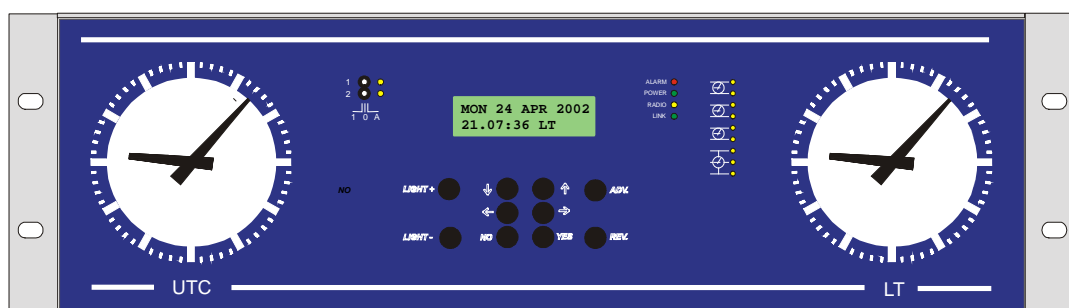


# User Manual

## Marine Master Clock



### Scandinavian Marine Time

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## Technical specifications

### General

Crystal Frequency:	4,915200 MHz.
Accuracy:	0,1 sec./24 hours (at +20°C).
Microprocessor:	HD6412394.
Connection voltage:	90 - 264V 50 Hz and. 24 V DC -5% +20 %.
Max ripple (24V DC):	0,7V RMS.
Power consumption:	100 VA depending on model.
Ambient temperature:	Between 0° C and +50°C.
Relative humidity:	Max. 85% non-condensing.
IP rating:	IP20
Weight:	5.6 kg.
CE-Approval, EMC:	Emission acc. to EN61000-6-3, Immunity acc. to. EN61000-6-2.

### Slave Clock output

#### *Output 1, 2 and 3:*

Impulse system:	1/1 minute, 1/2 minute, second, Time Code (TC)
Type of time:	LT, UTC
Impulse length:	Minute 0.1-9.9 sec. Second 0.1-1 sec.

#### *Output 4:*

Impulse system:	2-wire: 1/1 minute, 1/2 minute, second, Time Code (TC). 3-wire for Forward/Reverse movement: 1/1-minute alt. 1/2-minut.
Type of time:	LT, UTC
Impulse duration:	Minute 0.1-9.9 sec. Second 0.1-1 sec.
Maximum load / output:	2A (The output is equipped with short circuit protection that resets automatically.
Total load all outputs:	3A

### Relay output

Relay outputs:	2 closing potential-free contacts.
Max. load/relay output:	230 V 6A.
Total load relay outputs:	12A
Program memory:	100 years (EEPROM)
Number of control functions:	800.

## General description

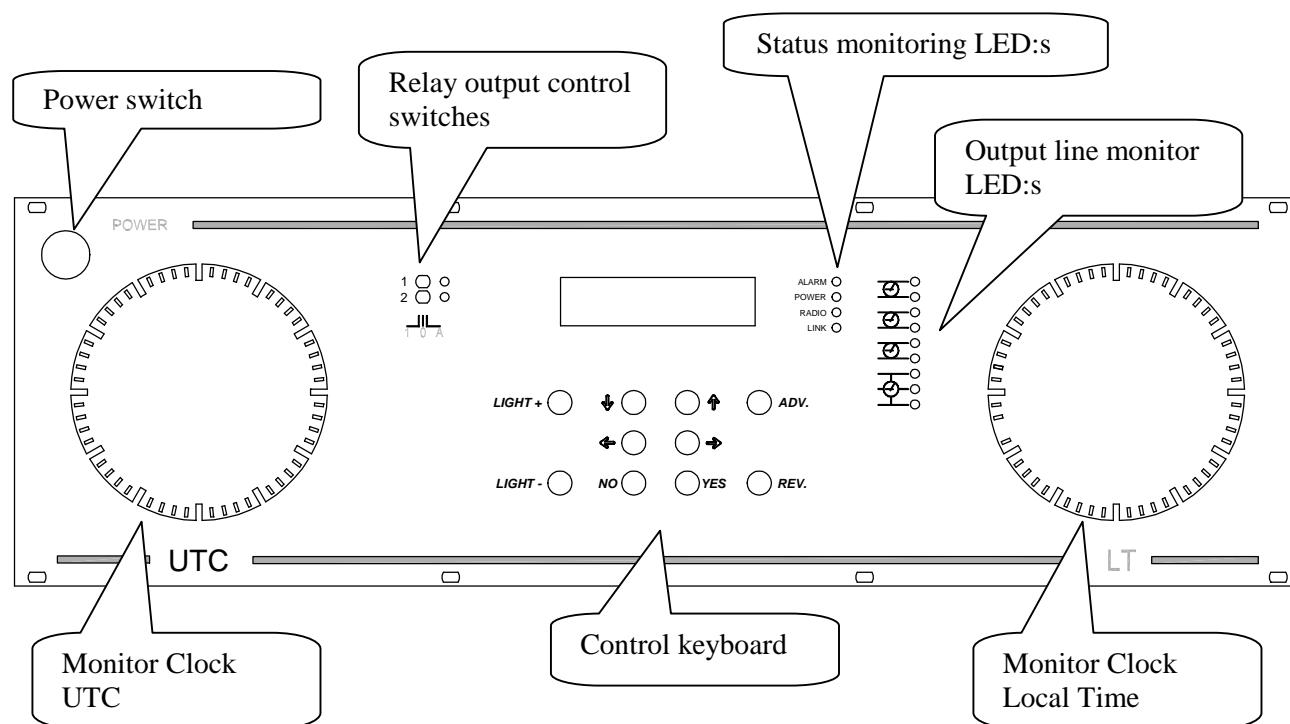
Westerstrand Marine Master Clock is the ideal solution for distribution of both Local and UTC time on board ships.

The Master Clock is equipped with several outputs and inputs for control of Slave Clocks as well as distribution of time to computers and other equipment needing correct time. The four Slave Clock outputs can be individually programmed for different types of clocks. External radio receivers / time synchronisation sources can be connected when higher accuracy is needed.

For control and regulation of various energy consumers such as electrical striking plates, buzzers for pause signalling etc, the master Clock has a built in yearly programmer with two relay outputs.

The Master Clock is equipped with 10 buttons and a 2 x 16 character LCD. To facilitate the change of time zone two of the buttons are dedicated for this purpose. A light dimmer makes it possible to adjust the background illumination to the surrounding light level.

## Front panel description



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### Keyboard

<b>LIGHT+</b>	Increase LED backlight level
<b>LIGHT-</b>	Decrease LED backlight level
<b>↑↓</b>	Select function / Change and scroll
<b>←</b>	Move left / Cancel / Leave programming mode
<b>→</b>	Move right
<b>NO</b>	Decline
<b>YES</b>	Accept / Enter programming mode
<b>ADV.</b>	Advance Local Time
<b>REV.</b>	Reverse Local Time

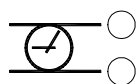
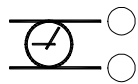
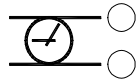
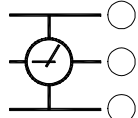
### Relay output control switches

<b>1</b>	Always ON
<b>0</b>	Always OFF
<b>A</b>	Automatic position, ON/OFF according to program.

### Status monitoring LED:s

<b>Alarm</b>	An alarm has occurred, for instance short circuit on one of the output lines.
<b>Power</b>	Power is ON.
<b>Radio</b>	Indicating signal coming from an external radio receiver.
<b>Link</b>	Indicating Ethernet LAN connection. (option)

### Output line monitoring LED:s

	Output line no. 1
	Output line no. 2
	Output line no. 3
	Output line no. 4

---

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## Installation

The Marine Master Clock is intended for stand, cabinet, wall or desk mounting.

1. Mount the Master Clock.
2. Make sure that all analogue slave clocks shows the same time, for instance 12.00.
4. Before connecting the slave clock lines, check the wires for short circuit, faulty connections etc.
5. Connect the slave clock lines.
6. Connect the signal line/lines (to relay contacts).
7. NOTE! For connection of signals etc., mixed voltages must not be used.  
Therefore, choose either 230VAC or, for example 24VAC for connection to the relays.
8. Connect, if included, other accessories/options such as radio synchronisation, RS232 etc.
9. Connect the supply voltage.
10. Proceed to "Start up procedure" page 9.

## 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 Time Base module is in operation it shows date and time in the display.  
This is called *running mode* in this documentation.

MON 23 SEP 2004  
U10:11:35 L12:11

MON 23 SEP 2004  
U10:11:35 L12:11

SET UTC

SET LT

SLAVE CLOCK

ALARMS

WEEK PROGRAM

DATE PROGRAM

DISPLAY PROGRAM

TEMPORARY PROGR.

GROUP → PERIODE

DISPLAY HOLIDAYS

SPEC.-FUNCTIONS

- |                              |     |
|------------------------------|-----|
| 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 procedure

1. Start up questions (this page)
2. Output configuration / Setup (page 10)
3. Enter time of Slave Clocks (page 12)

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.

SET UTC  
040514 09:07:00

Set, by using the arrows, the right UTC.  
Time format: Year, month, date, hour, minute, second.  
Set the time a minute in advance.  
Wait for the right time and synchronise using YES.

SET LT  
040514 10:07:00

Set, by using the arrows, the right Local Time.  
Time format: Year, month, date, hour, minute, second.  
Set the time a minute in advance.  
Wait for the right time and synchronise using YES.

FRI 14 MAY 2004  
U09:07:00 L10:07

The Master Clock is now in running mode.

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### Output configuration / Setup

Each output can be individually configured regarding different parameters. The setup is done from the special function *Setup*. If the default setup is used no configuration is needed.

Default setup:

Slave Clock output no. 1	Impulse system:	1/1 minute
	Type of time: UTC	
	Impulse length:	2 sec.
Slave Clock output no. 2	Impulse system:	-----
	Type of time:	
	Impulse length:	
Slave Clock output no. 3	Impulse system:	-----
	Type of time:	
	Impulse length:	
Slave Clock output no. 4	Impulse system:	3-wire for Forward/Reverse, 1/1-minute.
	Type of time: Local Time	
	Impulse length:	2 sec.

RS232 output  
NMEA 0183ZDA Time string,

RS485/422 input  
NMEA 0183ZDA Time string,

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### Set UTC when in operation

FRI 14 MAY 2004  
U09:07:00 L10:07

Select function using ↓.

SET UTC

Enter the programming mode with YES.

SET UTC  
040514 09:07:00

Set, by using the arrows, the right UTC.  
Time format: Year, month, date, hour, minute, second.  
Set the time a minute in advance.  
Wait for the right time and synchronise using YES.

SET UTC

Leave programming mode by pressing ← several times.

FRI 14 MAY 2004  
U09:07:00 L10:07

The master clock is now back in running mode.

### Set Local Time when in operation

Remark: To do normal Time Zone adjustments use the buttons, **ADV** and **REV**.

FRI 14 MAY 2004  
U09:07:00 L10:07

Select function using ↓.

SET LT

Enter the programming mode with YES.

SET LT  
040514 10:07:00

Set, by using the arrows, the right Local Time.  
Time format: Year, month, date, hour, minute, second.  
Set the time a minute in advance.  
Wait for the right time and synchronise using YES.

SET LT

Leave programming mode by pressing ← several times.

FRI 14 MAY 2004  
U09:07:00 L10:07

The master clock is now back in running mode.

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### Slave Clock

FRI 14 MAY 2004 U09:07:00 L10:07	Select function using ↓.
SLAVE CLOCK	Enter the programming mode with YES.
IMPULSE OUTPUT 1	Select output using ↑↓. Accept with YES.
IMPULSE OUTPUT 1 = 09:07 OFF	IMPULSE OUTPUT 1 = 09.07? (Example) If the slave clocks connected to impulse output 1 shows 09:07 answer YES, if not, set the time shown by the slave clocks.
IMPULSE OUTPUT 1 = 09:07 OFF	Turn ON impulse output 1 by using ↑↓.
IMPULSE OUTPUT 1 = 09:07 ON	Accept with YES
SLAVE CLOCK	Leave programming mode by pressing ← several times.
FRI 14 MAY 2004 U09:07:00 L10:07	The master clock is now back 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 will wait until correct time corresponds with the slave clocks.

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### Time zone adjustment

To change Local Time zone two buttons are used. The buttons are named ADV and REV.  
To advance the Local Time slave clocks to a new time zone press button ADV.

Example:

FRI 14 MAY 2004 U09:07:00 L10:07	Press button ADV.
LOCAL TIME ADJ. 60m ?	Use the default value or change by pressing ADV. Accept with YES.
LOCAL TIME ADJ. !	The Local Time slave clocks will now advance 60 minutes.
FRI 14 MAY 2004 U09:07:00 L11:07	When the correction is finished the display is automatically returned to running mode.

To reverse the Local Time slave clocks to a new time zone press button REV.

Example:

FRI 14 MAY 2004 U09:07:00 L10:07	Press button REV.
LOCAL TIME ADJ. - 60m ?	Use the default value or change by pressing REV. Accept with YES.
LOCAL TIME ADJ. !	The Local Time slave clocks will now be adjusted as below: 1 Min forward clock's stop 60 min 0,5 Min F/B clock's: Reverse 60 Min TC Clock's: Moves 11 hours forward
FRI 14 MAY 2004 U09:07:00 L09:07	When the correction is finished the display is automatically returned to running mode.

Remark: To interrupt a time zone adjustment in progress press button ← and YES.

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### Alarms

This function is used to display and erase the different alarms in the master clock.

ALARMS- DISPLAY

To show the alarms

ALARMS- ERASE

To erase the alarms

### Example 1, display alarms

FRI 14 MAY 2004  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

ALARMS

Accept with YES.

ALARMS- DISPLAY

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

09DEC 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

$\leftarrow$ .

FRI 14 MAY 2004  
U09:07:00 L10:07

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### Example 1, erase alarms

FRI 14 MAY 2004  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

ALARMS

Accept with YES.

ALARMS- ERASE

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

09DEC 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  $\leftarrow$ .

ALARMS

$\leftarrow$ .

FRI 14 MAY 2004  
U09:07:00 L10:07

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### Week Program & Date Program

Using these two functions, programming of the outputs is made.

#### Concept description

<b>Program</b>	<p>A "program" refers to programming an output to a certain time. The word program represents a single time event and several programs are defined as a <i>group</i> of programs.</p> <p>For example: output 2 switches on every working day (Monday-Friday) at 8.00.</p>
<b>Week program</b>	<p>A week program is a program, which is repeated every week. You can for each program choose for which days of the week it shall be valid: Individual or block programming.</p> <p>M = Monday T = Tuesday W = Wednesday T = Thursday F = Friday S = Saturday S = Sunday</p>
<b>Date program</b>	<p>A date program is a program, which is valid for a specific date.</p>
<b>Group</b>	<p>A group of programs, signal events.</p>
<b>Type of signals</b>	<p>There are some different kinds of signals, depending on how the relay output is to be used.</p>
<b>ON/OFF</b>	<p>Is used when a longer lasting switching ON is required, e.g. for controlling fans, door locks, lighting etc.</p>
<b>01s</b>	<p>Is used when a short pulse is required, e.g. for bells/buzzers. Pulse duration selectable from 1-99 seconds.</p>
<b>Astr.</b>	<p>Astr. (Twilight) is a function which closes/opens a predestined relay at sunrise resp. sunset. Which day and month of the year it is, and where the Time Central programmer is located geographically, define the time of the sunrise resp. sunset. The sunrise resp. sunset are calculated in the software of the Y8 module. The geographic position of the Time Central is entered at starting up. A map indicating latitude (Enorth) and longitude (Eeast) is enclosed.</p>
<b>Mask</b>	<p>A program that is repeated f. ex every hour is easily entered by the use of mask program.</p> <p>XX.15.00 ; the program is repeated every hour att minute 15.</p> <p>08.XX.00 ; the program is repeated every minute between 08.00 and 09.00.</p> <p>XX.XX.00 ; The program is repeated every minute.</p>

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To simplify programming 3 sub menus are used:

WEEK PROGRAM <b>NEW</b> GROUP A
------------------------------------

To enter new programs.

WEEK PROGRAM <b>ERASE</b> GROUP A
--------------------------------------

To erase a separate existing program.

WEEK PROGRAM <b>CHANGE</b> GROUP A
---------------------------------------

To change existing programs.

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### Week Program, example 1 (New program)

Example: Outputs No. 2 shall switch on Monday – Friday at 09.00 and off at 17.00.

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using ↑↓.

WEEK PROGRAM

Enter programming mode using YES.

WEEK PROGRAM  
**NEW** GROUP A

Select new program using YES.

WEEK PROGRAM  
NEW GROUP **A**

Select group of programs using ↑↓, accept using YES.

**OUTPUT 2** ON  
----- 08:00:00

Select output using ↑↓. Move to the right using →.

OUTPUT 2 **ON**  
----- 08:00:00

State type of signal using ↑↓.

OUTPUT 2 ON  
**MTWTF--** 08:00:00

State the days the program shall function using ↑↓.  
Move to the right using →.

OUTPUT 2 ON  
MTWTF-- **09:00:00**

State the time of the program using ↑↓.  
Move to the right using →.  
Accept using YES.  
If the program is approved the text “Program saved” is displayed quickly.

OUTPUT 2 OFF  
MTWTF-- 17:00:00

Continue with programming OFF for the same output or leave programming by pressing ← several times.

WEEK PROGRAM

MON 14 OCT 2002  
U09:07:00 L10:07

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### Week Program, example 2 (Change program)

Example: A signal on output 1, Monday – Friday at 08.00, shall be changed to 08.15. Signal length is 5 seconds.

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

WEEK PROGRAM

Enter programming mode using YES.

WEEK PROGRAM  
**CHANGE** GROUP A

Select change program using YES.

WEEK PROGRAM  
CHANGE **GROUP A**

Select group of programs using  $\uparrow\downarrow$ , accept using YES.

**OUTPUT 2** 05S  
MTWTF-- 08:00:00

Select output using  $\uparrow\downarrow$ . Move to the right using  $\rightarrow$ .

OUTPUT 2 05S  
MTWTF-- 08:00:00

Step forward to the program, which is to be changed using NO and YES.

OUTPUT 2 05S  
MTWTF-- 08:**15**:00

Change the time to 09.15 using the arrows.  
Accept using YES.

WEEK PROGRAM

Leave the programming by pressing  $\leftarrow$  several times.

MON 14 OCT 2002  
U09:07:00 L10:07

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### Week Program, example 3 (Erase program)

Example: A signal on output 1, Fridays at 16.30 shall be deleted. Signal length is 5 seconds.

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

WEEK PROGRAM

Enter programming mode using YES.

WEEK PROGRAM  
**ERASE** GROUP A

Select erase program using YES.

WEEK PROGRAM  
ERASE **GROUP A**

Select group of programs using  $\uparrow\downarrow$ , accept using YES.

**OUTPUT 1** ON  
MTWTF-- 09:00:00

Select output using  $\uparrow\downarrow$ . Move to the right using  $\rightarrow$ .

OUTPUT 1 05S  
----F-- 16:30:00

Step forward to the program that is to be erased using NO and YES.  
Accept using YES.

WEEK PROGRAM

Leave the programming by pressing " several times.

MON 14 OCT 2002  
U09:07:00 L10:07

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### Week Program, example 4 (Astronomical function)

Example: Output No. 1 shall switch ON all sunset All days and switch OFF at sunrise.

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

WEEK PROGRAM

Enter programming mode using YES.

WEEK PROGRAM  
**NEW** GROUP A

Select new program using YES.

WEEK PROGRAM  
NEW **GROUP A**

Select group of programs using  $\uparrow\downarrow$ , accept using YES.

**OUTPUT 2** ON  
MTWTF-- 08:00:00

Select output using  $\uparrow\downarrow$ . Move to the right using  $\rightarrow$ .

OUTPUT 2 **ASTR**  
MTWTF--

State type of signal using  $\uparrow\downarrow$ .

OUTPUT 2 ASTR  
**MTWTF--**

State the days the program shall function using  $\uparrow\downarrow$ .  
Accept using YES.  
If the program is approved the text "Program saved" is displayed quickly.

WEEK PROGRAM

Leave the programming by pressing  $\leftarrow$  several times.

MON 14 OCT 2002  
U09:07:00 L10:07

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### Week Program, example 5 (Block program)

Example: Outputs No. 2 shall switch on Monday, Wednesday and Friday at 09.00.

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

WEEK PROGRAM

Enter programming mode using YES.

WEEK PROGRAM  
**NEW** GROUP A

Select new program using YES.

WEEK PROGRAM  
NEW **GROUP A**

Select group of programs using  $\uparrow\downarrow$ , accept using YES.

**OUTPUT 2 ON**  
----- 08:00:00

Select output using  $\uparrow\downarrow$ . Move to the right using  $\rightarrow$ .

OUTPUT 2 **ON**  
----- 08:00:00

State type of signal using  $\uparrow\downarrow$ .

OUTPUT 2 ON  
**M-W-F--** 08:00:00

State the days the program shall function using  $\uparrow\downarrow$ .  
Move to the right using  $\rightarrow$ .

OUTPUT 2 ON  
M-W-F-- **09:00:00**

State the time of the program using  $\uparrow\downarrow$ .  
Move to the right using  $\rightarrow$ .  
Accept using YES.  
If the program is approved the text "Program saved" is displayed quickly.

OUTPUT 2 OFF  
M-W-F-- 09:00:00

Continue with programming OFF for the same output or leave programming by pressing  $\leftarrow$  several times

WEEK PROGRAM

MON 14 OCT 2002  
U09:07:00 L10:07

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### Week Program, example 6 (Mask program)

Example: Outputs No. 2 shall switch on for 5 seconds every hour at minute 15, all days in the week.

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

WEEK PROGRAM

Enter programming mode using YES.

WEEK PROGRAM  
**NEW** GROUP A

Select new program using YES.

WEEK PROGRAM  
NEW **GROUP A**

Select group of programs using  $\uparrow\downarrow$ , accept using YES.

**OUTPUT 2** ON  
----- 08:00:00

Select output using  $\uparrow\downarrow$ . Move to the right using  $\rightarrow$ .

OUTPUT 2 **05S**  
----- 08:00:00

State type of signal using  $\uparrow\downarrow$ .  
05S = Pulse with 5 seconds length.

OUTPUT 2 05S  
**MTWTFSS** 08:00:00

State the days the program shall function using  $\uparrow\downarrow$ .  
Move to the right using  $\rightarrow$ .

OUTPUT 2 05S  
MTWTFSS **\*\* :15:00**

State the time of the program using  $\uparrow\downarrow$ . \*\* = every hour.  
Move to the right using  $\rightarrow$ .  
Accept using YES.  
If the program is approved the text "Program saved" is displayed quickly.

WEEK PROGRAM

Leave programming by pressing  $\leftarrow$  several times.

MON 14 OCT 2002  
U09:07:00 L10:07

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### Date Program, example (New program)

Example: Outputs No. 1 shall switch on the 1st of August at 12.00.

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

DATE PROGRAM

Enter programming mode using YES.

DATE PROGRAM  
**NEW**

Select new program using YES.

**OUTPUT 1 ON**  
AUG 01 08:00:00

Select output using  $\uparrow\downarrow$ . Move to the right using  $\rightarrow$ .

OUTPUT 1 **ON**  
AUG 01 08:00:00

State type of signal using  $\uparrow\downarrow$ .

OUTPUT 1 ON  
**AUG 01** 08:00:00

State the date the program shall function using  $\uparrow\downarrow$ .  
Move to the right using  $\rightarrow$ .

OUTPUT 1 ON  
AUG 01 **12:00:00**

State the time of the program using  $\uparrow\downarrow$ .  
Move to the right using  $\rightarrow$ .  
Accept using YES.  
If the program is approved the text "Program saved" is displayed quickly.

OUTPUT 1 OFF  
AUG 01 12:00:00

Continue with programming OFF for the same output or leave programming by pressing  $\leftarrow$  several times.

DATE PROGRAM

MON 14 OCT 2002  
U09:07:00 L10:07



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### Display Program

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

DISPLAY PROGRAM

Enter display program using YES.

DISPLAY PROGRAM  
GROUP **A**

Select program group using  $\uparrow\downarrow$ , accept with YES.

GROUP A  
OUTPUT **ALL**

Select output to be displayed using  $\uparrow\downarrow$ , accept with YES.

OUTPUT 2 ON  
MTWTF-- 08:00:00

Step forwards alt. Backwards using  $\uparrow\downarrow$ .

DISPLAY PROGRAM

Leave the function display program by pressing  $\leftarrow$  several times.

MON 14 OCT 2002  
U09:07:00 L10:07

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### Temporary Program, example

Example: Outputs No. 2 shall switch on immediately 15.35.00 and turn off according to normal week program. The temporary program will automatically be erased when the event has been effected.

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using ↑↓.

TEMPORARY PROGR.

Enter programming mode using YES.

**OUTPUT 2 ON**  
15:35:00

Select output using ↑↓. Move to the right using →.

OUTPUT 2 **ON**  
15:35:00

State type of signal using ↑↓.  
Accept using YES

OUTPUT 2 ON  
**15:35:00**

Accept using YES or change the time of the program using ↑↓.

TEMPORARY PROGR.

Leave the programming by pressing " several times.

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U09:07:00 L10:07

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### Group => Period

Each program group can be associated to one or several *time periods*. A time period can consist of one or several dates. Maximum 99 time periods can be used. Program group **A** is as default associated to a time period covering the complete year, 1/1-31/12.

Example:

A school has one group of programs that are used during the school season and another used during school holidays. School season = Group **A**, School holidays = Group **B**.

The school holidays are at the following dates: 1/5, 10/6-15/8, 23/9 and so on...

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using  $\uparrow\downarrow$ .

GROUP => PERIOD

Enter programming mode using YES.

GROUP **B**  
1: \_\_\_\_\_ - \_\_\_\_\_

Select group of programs using  $\uparrow\downarrow$ , accept using YES.

GROUP B  
1: **MAY01** - \_\_\_\_\_

State the date when the period shall begin.  
Move to the right using  $\rightarrow$ .

GROUP B  
1: MAY01 - **MAY01**

State the date when the period shall end.  
Accept with Yes.

GROUP B  
2: \_\_\_\_\_ - \_\_\_\_\_

Continue with next time period.

GROUP B  
2: **JUN07** - \_\_\_\_\_

GROUP B  
2: JUN07 - **AUG15**

Accept with YES.

GROUP => PERIOD

Continue with next time period or leave programming by pressing  $\leftarrow$  several times.

MON 14 OCT 2002  
U09:07:00 L10:07

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### Display Holidays

This function is used to display the public holidays that are stored.

Example:

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using ↑↓.

DISPLAY HOLIDAYS

Enter display program using YES.

DISPLAY HOLIDAYS  
01: 01Jan

Scroll using ↑↓.

DISPLAY HOLIDAYS

Leave the programming by pressing ← several times.

MON 14 OCT 2002  
U09:07:00 L10:07

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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 OCT 2002 U09:07:00 L10:07	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.
SETUP	Setup / configuration of the different impulse system, type of synchronisation etc.
DISPLAY FORMAT	Display format in running mode.
SOFTWARE VERSION	Present software version.
DEFAULT LT ADJ.	Default value used when pressing button ADV or REV.
SPEC.-FUNCTIONS STATUS	Return to running mode press ←.
MON 14 OCT 2002 U09:07:00 L10:07	

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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 OCT 2002  
U09:07:00 L10:07

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.

GPS 60%  
14OCT 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 OCT 2002  
U09:07:00 L10:07

---

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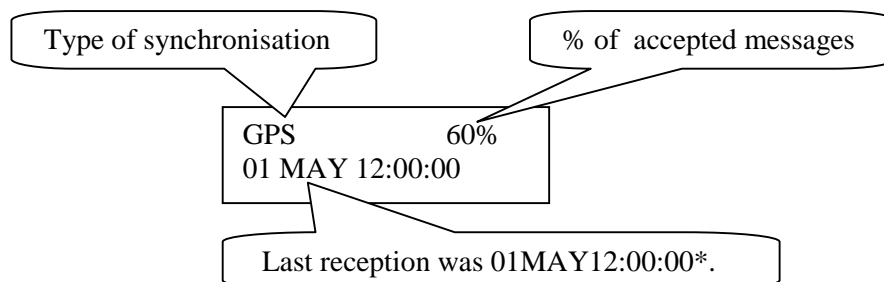
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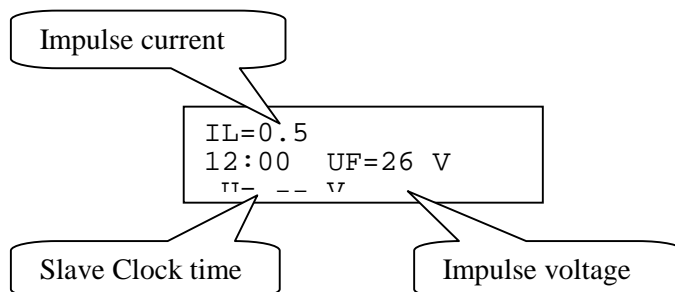
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### Status sync. source



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

### Status impulse output



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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 OCT 2002 U09:07:00 L10:07	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 OCT 2002 U09:07:00 L10:07	

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### Example 2:

Activate keylock with password

MON 14 OCT 2002  
U09:07:00 L10:07

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 OCT 2002  
U09:07:00 L10:07

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### Language

With this function the language be selected.

Example:

MON 14 OCT 2002  
U09:07:00 L10:07

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 ←.

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U09:07:00 L10:07

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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 OCT 2002 U09:07:00 L10:07	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.
GPS AL.LIMIT --h -- m	Set, by using the arrows, the alarm limit to 1 hour (01h).
GPS AL.LIMIT 01h 00 m	Accept with YES
SETUP SYNC SOURCE	Return to running mode press ←.
SPEC.-FUNCTIONS SETUP	←
SPEC.-FUNCTIONS	←
MON 14 OCT 2002 U09:07:00 L10:07	

---

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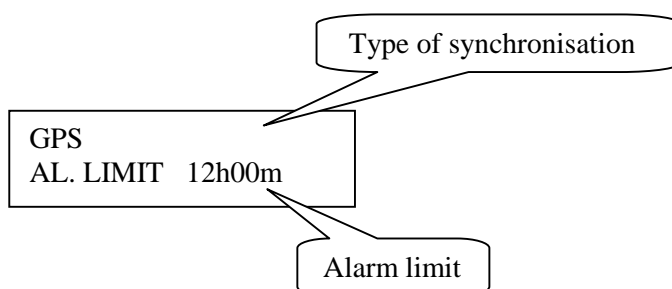
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### Setup sync. source

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 radio synchronisation.
DCF77	Radio synchronisation DCF77.
RDS	Radio synchronisation RDS.
GPS	Radio synchronisation GPS.

### 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.

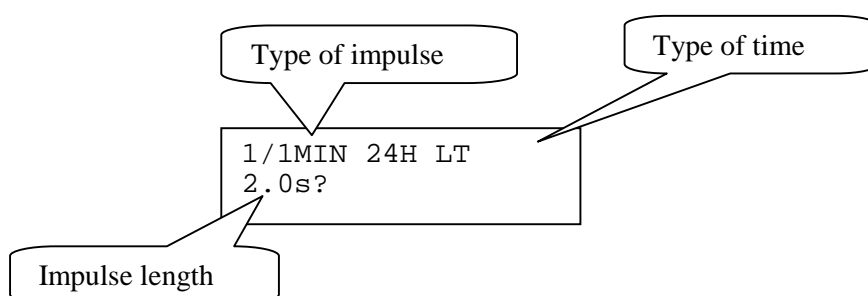
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### Setup impulse output

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
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.
1/2-SEC	: Polarised Second impulses with 60 seconds resetting.
TCmarine	: Time Code
FW/RW	: 3-wire for Forward/Reverse, 1/1-minute.
FW/RW1/2	: 3-wire for Forward/Reverse, 1/2-minute.
-----	: No impulse system.

#### **Type of time**

LT = Local Time.

UTC = Universal Time Coordinated.

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### Impulse length

Configuration of impulse length.

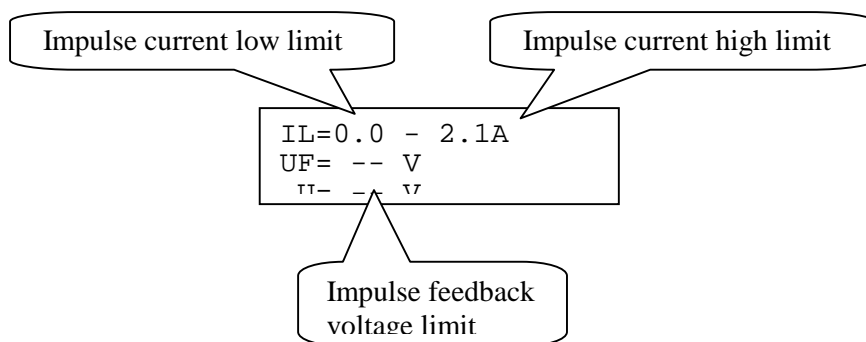
1/1 and 1/2 -minute impulse: 0.1s – 9.9 s.

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.

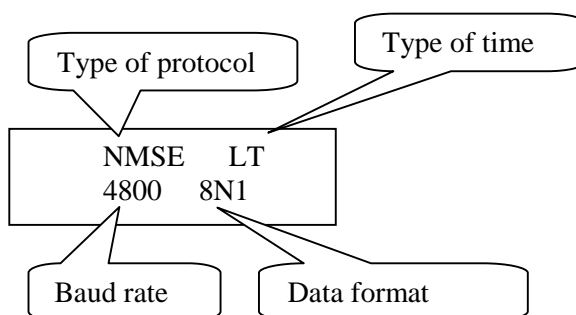
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### Setup RS232 and RS485/422 output / input

Below is a description of the different configuration parameters available in the setup menu for the **RS232 and RS485 input/ output**.

Please remark that if default settings are used no configuration is needed. The RS485/422 input protocol is always fixed to NMEA ZDA Time string and can not be changed.



#### Type of protocol

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

SEMC: Semco standard time string  
NMMI: NMEA 0183, ZDA Time string, minute update (output from Master Clock)  
NMSE: NMEA 0183, ZDA Time string, second update (output from Master Clock)  
NMin: NMEA 0183, ZDA Time string, (input to Master Clock)  
1: General 2-way-communication protocol.  
2, 3, 5 and 7: Automatic time message protocols.

#### Type of time

Type of time received or transmitted.

LT = Local Time.

UTC = Universal Time Coordinated.

#### Baudrate

Available speeds:

300, 600, 1200, 2400, 4800, 9600 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

#### 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

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### 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 Synced from Radio source, e.g. DCF77
2	=1 Synced 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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## MARINE MASTER CLOCK

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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.

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### Setup special pulse

Relay output no. 2 can be dedicated to send out a special pulse. When this function is enabled the relay is activated every day for 5 seconds at 02.00 UTC.

Use the procedure below to enable the special pulse.

MON 14 OCT 2002 U09:07:00 L10:07	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS SETUP	Accept with YES.
SETUP SPECIAL PULSE	Press NO until wished input/output is shown. Accept with YES.
SPECIAL PULSE NO ?	Change to using ↑↓.
SPECIAL PULSE YES ?	Accept with YES
SETUP SPECIAL PULSE	Return to running mode press ←.
SPEC.-FUNCTIONS SETUP	←
SPEC.-FUNCTIONS	←
MON 14 OCT 2002 U09:07:00 L10:07	

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### Software version

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

MON 14 OCT 2002 U09:07:00 L10:07	Select function using ↓ .
SPEC.-FUNCTIONS	Accept with YES. Press NO until wished function is shown.
SPEC.-FUNCTIONS SOFTWARE VERSION	Accept with YES.
MMC-A031 11m	The software version is MMC-A031. 11m = Uptime for this Master Clock.
SPEC.-FUNCTIONS SOFTWARE VERSION	Return to running mode press ←.
SPEC.-FUNCTIONS	←
MON 14 OCT 2002 U09:07:00 L10:07	

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### Display format

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

The following three formats can be selected:

MON 12 DEC 2001  
10:11:00 LT

Format 1  
LT = Local Time.  
UTC = Universal Time Coordinated.

MON 12 DEC 2001  
U09:11:00 L10:11

Format 2 (Default)  
L = Local Time  
U = UTC

MON 12 DEC 2001  
LTw

Format 3,  
Used for test / fault finding.

Example:

MON 14 OCT 2002  
U09:07:00 L10:07

Select function using ↓ .

SPEC.-FUNCTIONS

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

SPEC.-FUNCTIONS  
DISPLAY FORMAT

Accept with YES.

DISPLAY FORMAT  
-1- LT

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

SPEC.-FUNCTIONS  
DISPLAY FORMAT

Return to running mode press ←.

MON 14 OCT 2002  
10:07:00 LT

---

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## 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.

*Relay outputs are programmed but nothing happens.*

- C1. The switch on the front panel is in position **0**. Correct position is **A**.
- C2. Check that the output is working when the switch is in position **1**.
- C3. Different program types have different priority. E.g. a programmed holiday overrides a signal point in a week program.  
Priority order (1=highest, 4=lowest):  
1) Date program 2) Holiday 3) Group 4) Week program

*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.
- D2. "Memory full"  
  
The master clock is out of memory, probably due to incorrect programming. Use week program for repetitive signals or group for a certain period. See the programming instructions in this manual.
- D3. "Exists"

---

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The signal point is already programmed.

D4. “Not programmed”

When trying to change a non-existing signal point.

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## Connection diagram

