



QWTIME III MASTER CLOCK  
**User Manual**

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Author: PM/MLE  
Date: 2026-03-20  
Page: 1 of 40

# User Manual

## Master Clock WDP-Q



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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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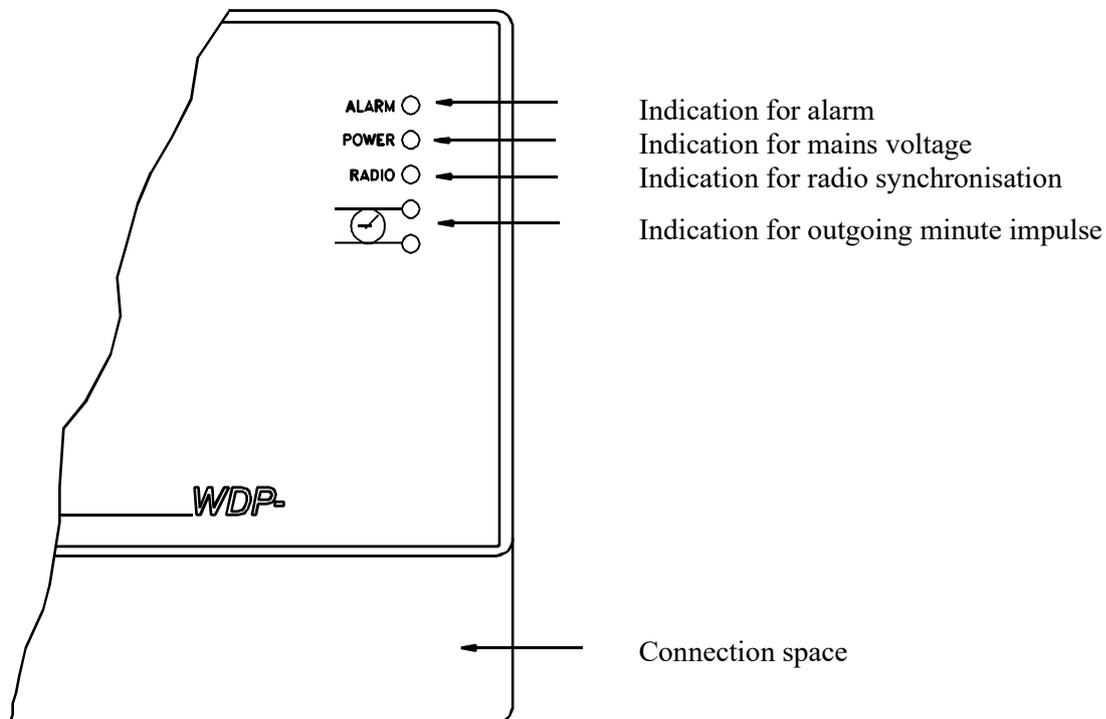
## General description

The Master Clock is a 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.

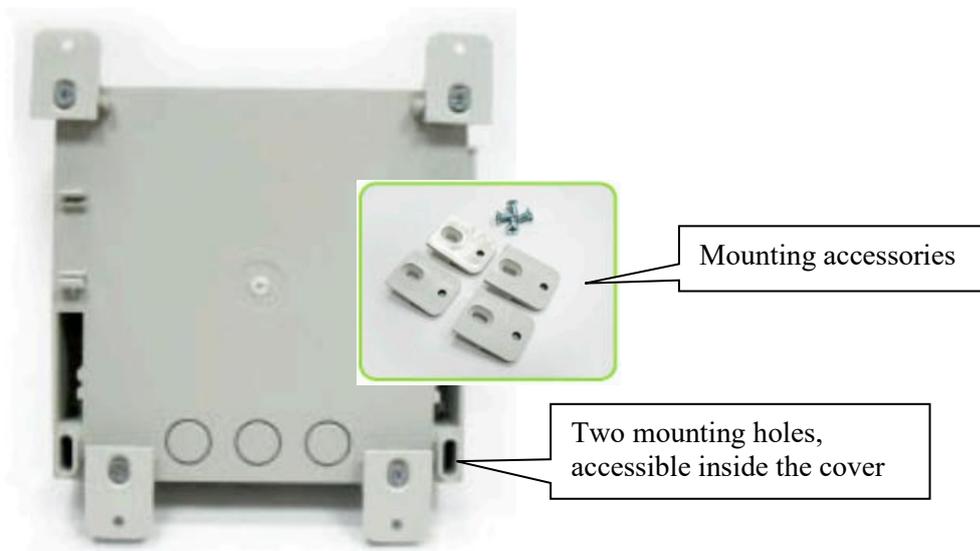
Connected Slave Clocks are automatically corrected by rapid impulsing when power returns.

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



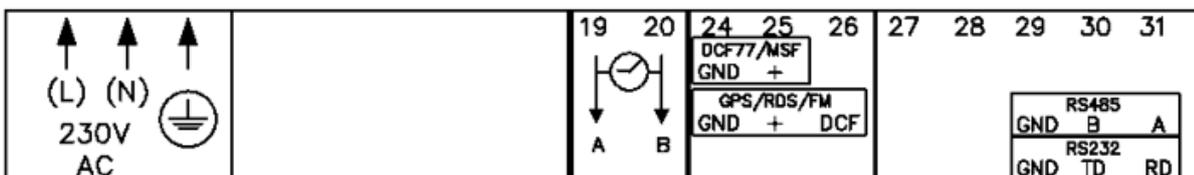
## Installation

The Master Clock is intended for wall mounting. Mounting is done either by using the two mounting holes, accessible inside the cover, or by using the enclosed mounting accessories.

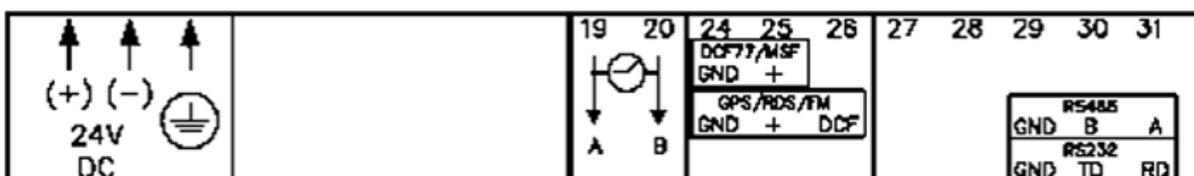


1. Connect the slave clock lines.
2. Connect, if included, other accessories/options such as radio synchronisation, Ethernet etc.
3. Connect the supply voltage.

123312-00 (230VAC)



123313-00 (115VAC)



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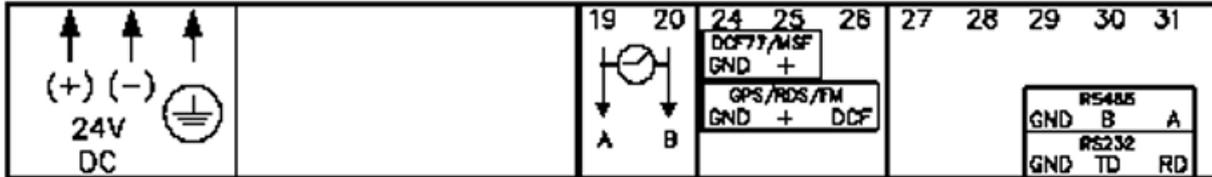
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123310-00 (24VDC)



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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 satisfactorily, 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 the current (load) on the cable affect the voltage drop.

### Formula

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

A = Area [mm<sup>2</sup>]

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: 15 mA (Version with movement 113160-00)

Analogue clocks minute  $\leq$  400 mm: 10 mA (Version with movement 22742-00)

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 mm<sup>2</sup>.

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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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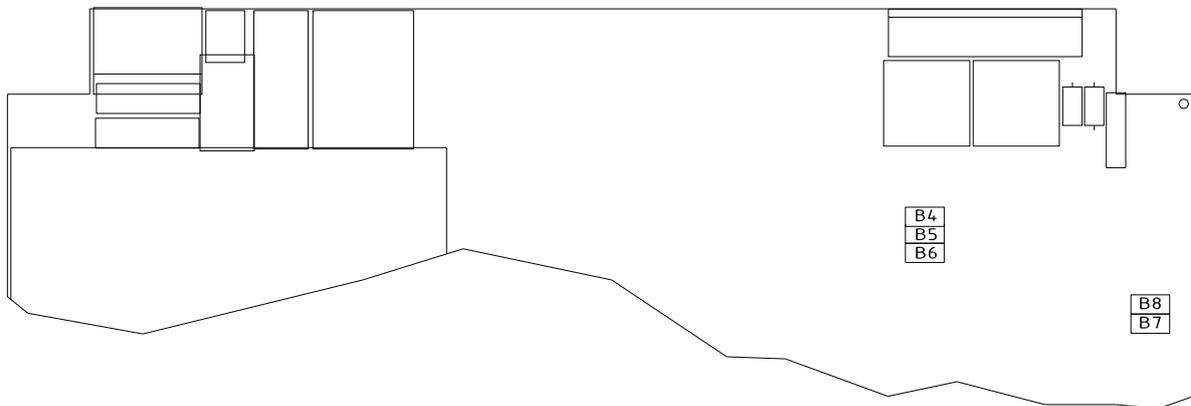
## Synchronisation input

### 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.

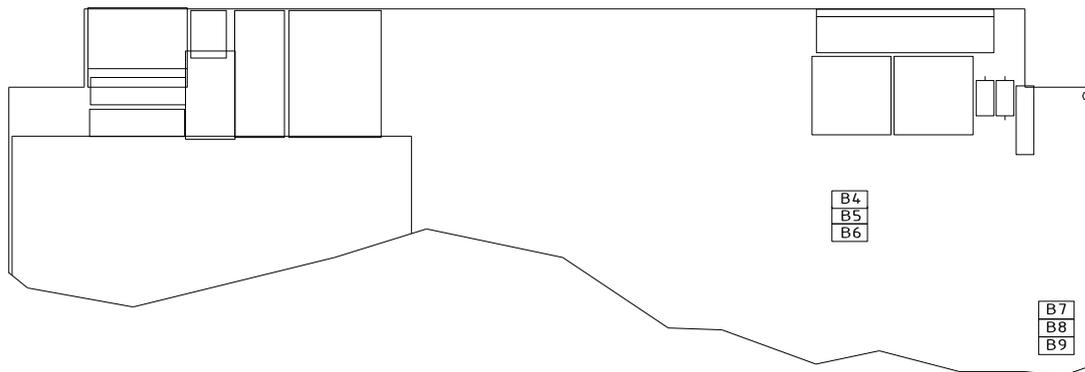
### Connection via RS232

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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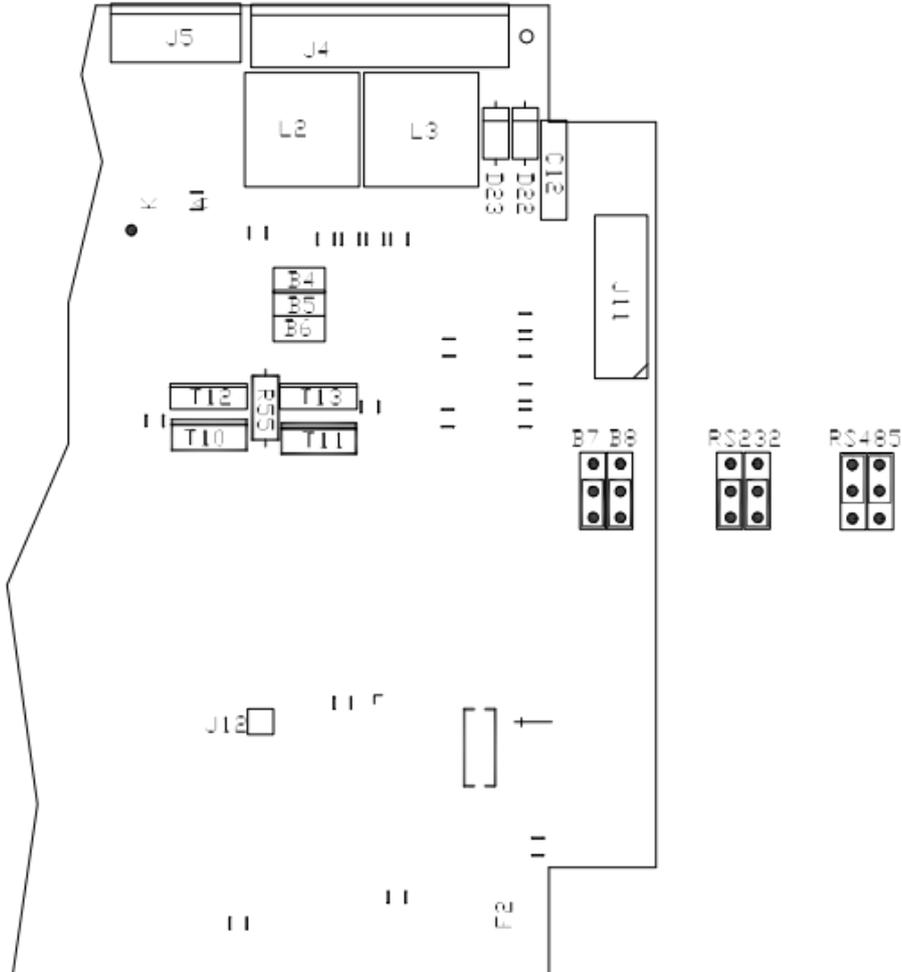
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## For K40713-xx



K40713-00, -02, -03, -04

	B4	B5	B6	B7	B8				
PREP. FOR RADIO REC	X	X							FACTORY DEFAULT
PREP. FOR SYNC. PULSE			X						
PREP. FOR RS232	SEE ABOVE								FACTORY DEFAULT
PREP. FOR RS485	SEE ABOVE								

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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 16 AUG 2021  
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 | ←   |

MON 16 AUG 2021  
10:11:00 LTs

SET TIME

SLAVE CLOCK

ALARMS

SPEC.-FUNCTIONS



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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 16 AUG 2021  
09:07:00 LTs

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 16 AUG 2021 09:07:00 LTs	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 16 AUG 2021 10:13:00 LTs	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.



## 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 16 AUG 2021  
09:07:00 LTs

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 16 AUG 2021  
09:07:00 LTs

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
<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>UF LOW</b>	Red alarm LED lit. Alarm relay activated	Impulse voltage below alarm limit.	Check the load on the impulse output. If OK, clear the alarm.
<b>SHORT CIRCUIT</b>	Red alarm LED lit. Alarm relay activated	Short circuit on impulse output	Remove the short circuit. If OK, clear the alarm.
<b>CURRENT LOW</b>	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.
<b>CURRENT HIGH</b>	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.
<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.

\* 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 16 AUG 2021  
09:07:00 LTs

Select function using  $\uparrow\downarrow$ .

ALARMS

Accept with YES.

ALARMS- DISPLAY

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

09AUG 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 16 AUG 2021  
09:07:00 LTs

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## Example 2, erase (clear) alarms

MON 16 AUG 2021 09:07:00 LTs	Select function using ↑↓ .
ALARMS	Accept with YES.
ALARMS- ERASE	Press NO until the wished function is shown. Accept with YES.
09AUG 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 16 AUG 2021 09:07:00 LTs	



## 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 16 AUG 2021 09:07:00 LTs	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 16 AUG 2021 09:07:00 LTs	

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## Status

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

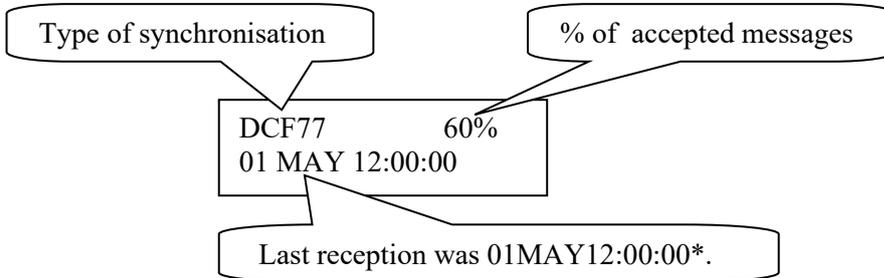
Example:

Check the status of the radio receiver.

MON 16 AUG 2021 09:07:00 LTs	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 16 AUG 2021 09:07:00 LTs	

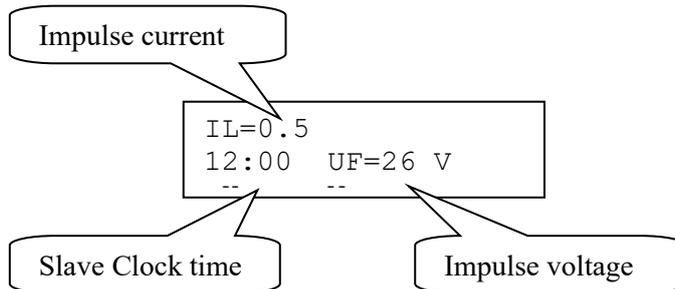


### Status sync. source

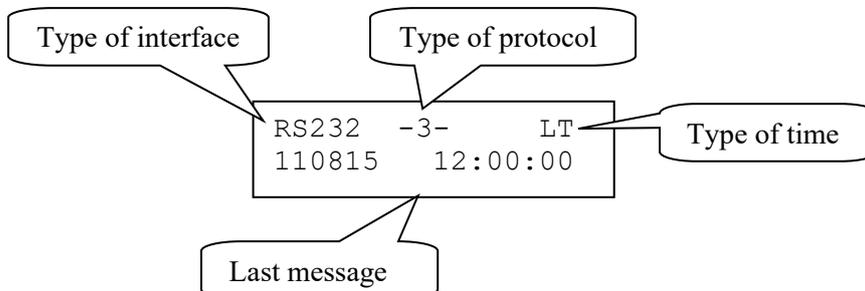


\*Remark: The marked position always shows the actual second. This information is updated every other second.

### Status impulse output



### Status serial port

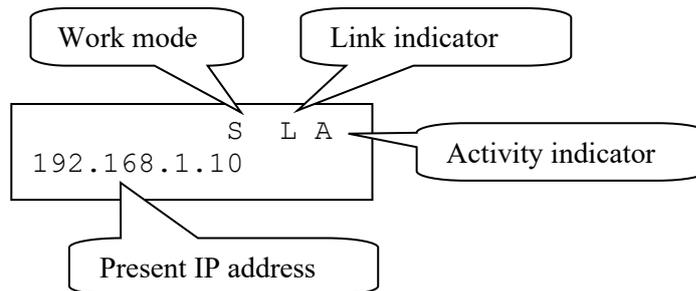




## Status Alarm relay

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 16 AUG 2021 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 16 AUG 2021 09:07:00 LT	

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# QWTIME III MASTER CLOCK

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Example 2:  
Activate keylock with password

MON 16 AUG 2021 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 16 AUG 2021 09:07:00 LT	

---

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## Language

With this function the language be selected.

Example:

MON 16 AUG 2021 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 16 AUG 2021 09:07:00 LT	



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### Country

With this function the Country can be selected.  
 The following country codes are available:

ALG = Algeria	ESP-W	NLD = Netherlands
Au-EST	EST = Estonia	NOR = Norway
AuCSTN	FIN = Finland	NZL = New Zealand
AuCSTS	FRA = France	PHL = Philippines
Au-WST	FRO = Faroe Islands	POL = Poland
Au-TAS	GBR = Great Britain	PRT = Portugal
AUT = Austria	GRC = Greece	QAT = Qatar
BEL-1	GRL = Greenland	OMN = Oman
BEL-2	HKG = Hongkong	ROU = Romania
BEL-3	HRV = Kroatia	RUS-M
BEL-4	HUN = Hungary	SAU = Saudi Arabia
BGR = Bulgaria	IND = India	SGP = Singapore
BRA = Brazil	IRL = Ireland	SWE = Sweden
CAN-P	ISL = Iceland	SYR = Syria
CAN-M	ISR = Israel	TUR = Turkey
CAN-C	ITA = Italy	UAE = United Arab Emirates
CAN-E	JOR = Jordan	US-HAW
CHE = Schweiz	KWT = Kuwait	US-ALA
CYP = Cyprus	LTU = Lithuania	US-P
DEN = Denmark	LUX = Luxembourg	USA-M
DEU = Germany	LVA = Latvia	USA-C
EGY = Egypt	MEX = Mexico	USA-E
ESP = Spain	MLT = Malta	US-ATL
	MUS = Mauritius	VEN = Venezuela
	MYS = Malaysia	ZAF = South Africa
		EUROPÉ = CET, without holidays
		GLOBAL = UTC, without holidays

Example:

MON 16 AUG 2021  
 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.

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COUNTRY  
DEU ?

Select, by using the arrows, the wished country.  
Accept with YES.

SPEC.-FUNCTIONS  
COUNTRY

Return to running mode press ←.

MON 16 AUG 2021  
09:07:00 LTs

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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 16 AUG 2021 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.
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 16 AUG 2021 09:07:00 LT	

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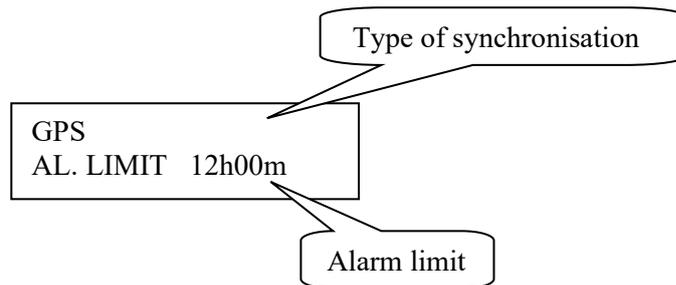
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## Setup sync. source

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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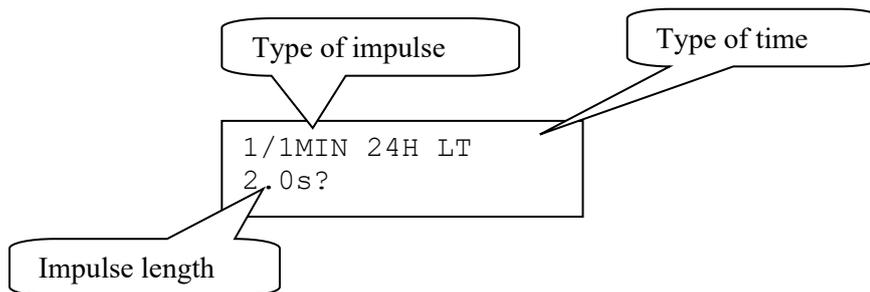
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## Setup impulse output

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 (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

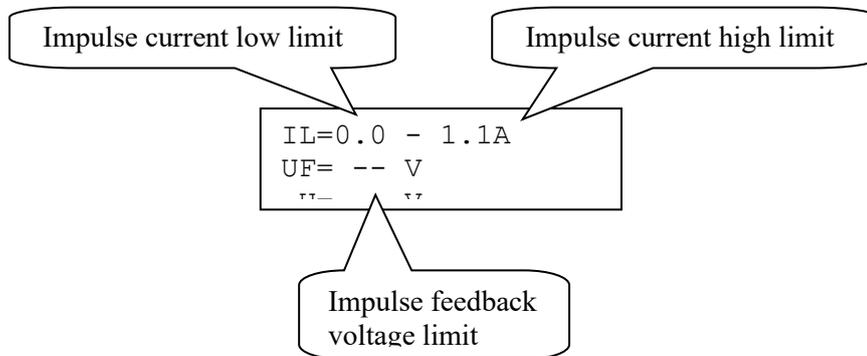
Configuration of impulse length.

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.

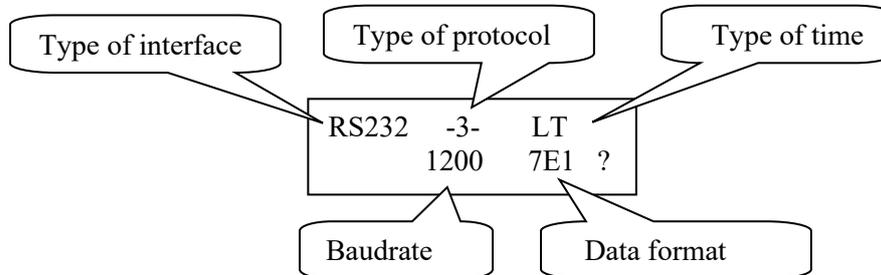
### Impulse feedback voltage limit

Alarm limit for feedback impulse voltage.

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



## 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 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 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 16 AUG 2021 09:07:00 LTs	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 16 AUG 2021 09:07:00 LTs	



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## Software version

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

MON 16 AUG 2021 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-A195 123342-00 11m	The software version is QW3-A195. 11m = Uptime for this Master Clock.
SPEC.-FUNCTIONS SOFTWARE VERSION	Return to running mode press ←.
SPEC.-FUNCTIONS	←
MON 16 AUG 2021 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 16 AUG 2021  
10:11:00 LTs

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

MON 16 AUG 2021  
LTs

Format 2, used for test / fault finding.

Example:

MON 16 AUG 2021  
09:07:00 LTs

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 16 AUG 2021  
09:07:00 LTs



## 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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