

# INSTRUCTION MANUAL

Economy LED digital clock

ECO DC series



## **Certification of the Producer**

### **STANDARDS**

The digital clock DC has been developed and produced in accordance with the EU Standards 2004/108/EG and 2006/95/EG:

Applied Standards:

mod IEC 60950-1:2005 + IEC-1:2005/Cor.1:2006-08

EN 55022:1998,+A1:2000,+A2:2003,+Cor.2:2003, class B

EN 61000-3-2:2000

EN 61000-3-3:1995, Cor. 1:1997, A1:2001



EN 61000-6-2:2001

EN 50121-4:2000

### **References to the instruction manual**

1. The information in this instruction manual can be changed at any time without notice. The current version is available for download on [www.mobatime.com](http://www.mobatime.com).
2. This instruction manual has been composed with the utmost care, in order to explain all details in respect of the operation of the product. Should you, nevertheless, have questions or discover errors in this manual, please contact us.
3. We do not answer for direct or indirect damages which could occur when using this manual.
4. Please read the instructions carefully and only start setting-up the product after you have correctly understood all the information for the installation and operation.
5. The installation must only be carried out by skilled staff.
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# 1 Description

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The Economy series covers low cost elegant and very slim digital clocks in 7 segment LED technique for displaying time and date • The Economy series can be operated in 3 freely selectable modes • Autonomous operation with internal quartz powered from mains • NTP multicast or unicast synchronization powered over PoE (compatible IEEE 802.3af) or mains powered • Slave clock operation controlled by self-setting MOBALine code or by IRIG-B (optionally), mains powered • LED display in red or green • Single- or double-sided clock • Plastic case in black color • Wall mounting for single sided clock • Ceiling suspension or wall bracket mounting for double sided clock • Intended for indoor use

## Display features

- Time display in four digits (HH:MM) either 12 or 24 hours format
- Date display in four digits (DD.MM.)
- 7 segment LED with 57 mm digit height for a viewing distance up to 25 m
- Alternating display of time and date with adjustable time period
- Display available in the red or green
- Sensor controlled automatic or manual adjustment of the display brightness

## Mechanic

- Anti-reflection front cover made of plexiglass including a filter layer for best readability over a wide viewing angle
- Elegant and slim clock frame, made of plastic in black color
- Single- or double-sided version for wall mounting, ceiling suspension or wall bracket mounting
- Double sided version consist of two pieces single sided clock and suspender
- Easy installation and time-saving maintenance, hanging holes for wall mounting,
- Supporting element for distance from wall (can be removed to tilt the clock down)
- All connectors and state LED are accessible on the back side in the recess
- Push-buttons placed on the top side of the frame
- Protection degree IP 30
- Equipment protection class II (no PE connection, plastic case)
- Working temperature -5 to +55°C

## Synchronization

- Autonomous operation with internal quartz time base with programmable, automatic seasonal time change
- NTP multicast or unicast synchronization powered over PoE or mains
- Slave clock operation with synchronization by self-setting MOBALine code or by IRIG-B (optionally), mains powered
- Precision 0.3 s/day at constant temperature – software trimming

## **Configuration**

- Setting of the clock parameters and time – date setting by means of push buttons

For PoE and NTP version only:

- DHCP / manual configuration of the clock parameters or setting over the telnet
- Private options of DHCP string to easy configuration of clock parameters when connected to LAN
- Configuration / supervision by means of MOBA-NMS software or SNMP protocol
- Firmware update remotely through the network using the TFTP protocol

## 2 Assembly

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The connection to the 110/230 V AC power network can be done only by authorized personnel with appropriate qualification and training.



The connection to the 110/230 VAC power network must be done in accord with the requirements of the connection of the class II equipment.



Danger of electric shock after dismounting the back cover.

### 2.1 Single-sided clock

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- Drill two anchoring holes into the wall, of a diameter adequate to accommodate supplied wood-type screws with dowels. See the assembly diagram (chapter 2.3) for appropriate hole spacing.
- Mount the hanging screws with the dowels to drilled holes in a way that the heads of the screws are ca 3-5mm from the wall.
- Shorten all the incoming cables appropriately.
- Mount the wide 2-pin connector to the incoming powering cable.
- Mount the 2-pin connector to the synchronization signal cable or crimp the RJ45 modular connector to the incoming Ethernet cable.
- Connect all the interconnecting cables into the corresponding connectors in the clock's back side recess.
- Hang the clock to the hanging screws.
- If the clock has to be tilted down, cut the supporting element on the bottom of the back side accordingly.

### 2.2 Double-sided clock

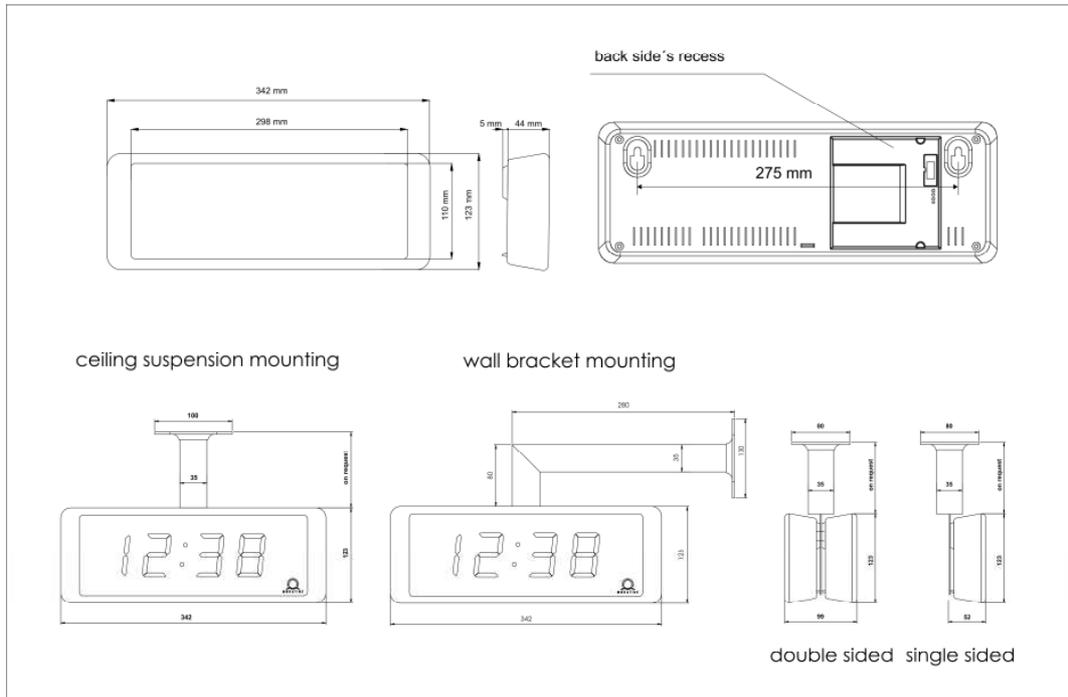
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- The double-sided clock consists of two parts, one serving as the control module (this one encompasses the terminals to connect powering voltage and synchronization source), and the other serving as the display module (with the terminal for the connection of interconnecting cable). Both clock parts are interconnected via a 10-core flat cable. The clock suspension part is delivered separately.
- Drill four anchoring holes into the ceiling (or wall), of a diameter adequate to accommodate supplied wood-type screws with dowels.
- Interlace the incoming cables through the suspension pipe. Fasten the ceiling suspension (or the side console) to the ceiling (or the wall), using 4 wood screws of 5 mm dia.
- Interlace the incoming cables through the pipe insert on the anchoring plate Slip-on the plate onto the suspension in a way that the screws fit into the upper groove on the pipe insert. Fix the connection by tightening the screw using an Allen key.
- Hang the display part of the clock to one side of the anchoring plate.
- Shorten all the incoming cables appropriately.
- Mount the wide 2-pin connector to the incoming powering cable.
- Mount the 2-pin connector to the synchronization signal cable or crimp the RJ45 modular connector to the incoming Ethernet cable.
- Connect all the interconnecting cables into the corresponding connectors in the clock's back side recess.
- Hang the clock to the hanging screws.
- If the clock has to be tilted down, cut the supporting element on the bottom of the back side accordingly.

- Loosen the screws on the suspension using the Allen key, and lift the clock into the suspension in a way that the screws fit into the lower groove on the pipe insert. Secure the attachment by tightening the screw using the Allen key.

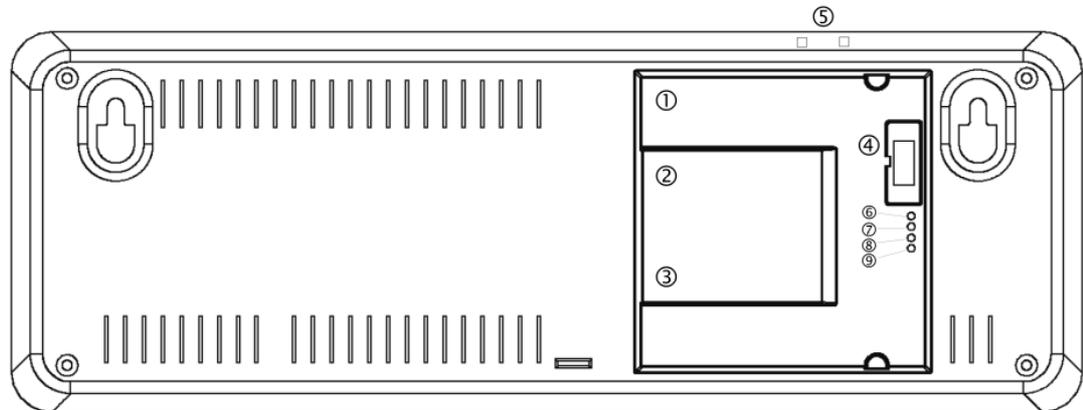
Note: during the disassembly first withdraw the clock, and suspend the suspension on the upper groove at the pipe insert.

## 2.3 Assembly diagram



## 2.4 Control elements

---



- |   |  |  |
|---|--|--|
| ① | <b>Ethernet</b> connector (PoE, NTP only)  | RJ45 10BaseT/100TX (IEEE 802.3)<br>auto-negotiation<br>PoE version compatible with<br>IEEE 802.3af |
| ② | <b>Line-IN</b> connector (MBL, IRIG only)  | time signal input: MOBALine or IRIG-B  |
| ③ | <b>Power supply</b> connector (not in PoE) | powering 100 - 240 VAC voltage   |
| ④ | <b>DISP2</b> connector                     | connection of the second side (for<br>double sided clock)  |
| ⑤ | <b>PB1, PB2</b>                            | control pushbuttons  |
| ⑥ | <b>LINK</b> LED (PoE, NTP only)            | Ethernet link connected  |
| ⑦ | <b>ACTIVITY</b> LED (PoE, NTP only)        | Ethernet connection activity   |
| ⑧ | <b>STATE</b> LED                           | state indication   |
| ⑨ | <b>POWER</b> LED                           | indication of power applied  |

## 3 MOBALine and IRIG clock type operation

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### 3.1 MOBALine type

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- Connect the MOBALine signal to the two-pin input signal connector and the mains voltage to the two-pin power connector
- Set the menu items according to following **P3:A, P4:A, P6:A**
- After the connection, the time and date are adjusted automatically following the receipt of valid time information. The synchronization takes 6-15 seconds.
- It is possible to use the MOBALine time zone function, the zone is selected by menu item P5.

The colon permanently lit during the time display signalizes the synchronized clock. See the chapter 6 for further description of parameter setting.

### 3.2 IRIG type

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- Connect the IRIG signal to the two-pin input signal connector and the mains voltage to the two-pin power connector
- DCF-FSK, IRIG-B Standard, IRIG-B 123, IRIG-B DIEM, AFNOR A, AFNOR C variants of time signal are supported
- Set the menu items according to following **P3:A, P4:A, P6:A**
- After the connection, the time and date are adjusted automatically following the receipt of valid time information. The synchronization takes 6-15 seconds.

The colon permanently lit during the time display signalizes the synchronized clock. See the chapter 6 for further description of parameter setting.

## 4 NTP and PoE clock operation

### 4.1 Unicast mode

The clock is synchronized to UTC (Universal Time Coordinated) from a NTP server (up to four NTP server IP addresses configurable) and must have assigned its own IP address. The clock requests in defined intervals the actual time from the NTP server. If the server is not available, the clock tries to contact the other defined servers in cyclic way until the valid response from the NTP server is received.

This operating mode supports the monitoring and configuration of the movement via the network connection by means of the Telnet, SNMP or the MOBA-NMS software tool. For supervision and configuration with MOBA-NMS the clock's IP address can be used or the multicast group address having last octet cleared to zero (presuming the multicast is not disabled).

It is necessary to set appropriate time-zone for correct displaying of local time and date – see the chapter 5 for details.

#### Default network parameters:

IP address	0.0.0.0
subnet mask	0.0.0.0
default gateway	0.0.0.0
NTP server address 1	0.0.0.0
NTP server address 2	0.0.0.0
NTP server address 3	0.0.0.0
NTP server address 4	0.0.0.0
NTP request time [s]	10
DNS server	0.0.0.0
SNMP manager 1	0.0.0.0
SNMP manager 2	0.0.0.0
multicast config address	239.192.54.0
alive notification interval [min]	30
configuration port number	65532
time zone client port number	65534
DHCP	enabled
SNMP	enabled
Multicast support	enabled
Telnet	enabled

#### 4.1.1 Network parameters assignation by DHCP

The menu item **P7** must be set to value **3** (default). Network parameters are automatically obtained from a DHCP server.

The following DHCP options will be evaluated automatically:

[50] IP address

[3] Gateway address

[1] Subnet mask

[42] List with up to four NTP server addresses

[42] Time zone server address (usually same as NTP server address)

[234] SNMP manager address

[43] or [224] Additional options (refer to document BE-800793)

The network administrator must configure the DHCP options accordingly.

Assigned parameters can be checked in the submenu of items **P8** to **P10**.

### 4.1.2 Manual setting through setup menu

The menu item **P7** must be set to value **2**.

- See chapter 6.2.3 for setting the clock's IP address in the item **P8** submenu
- See chapter 6.2.4 for setting the subnet mask in the item **P9** submenu
- See chapter 6.2.5 for setting the gateway in the item **P10** submenu
- See chapter 6.2.6 for setting the multicast group address in the item **P11** submenu
- See chapter 6.2.7 for setting the unicast NTP server address in the item **P12** submenu.

### 4.1.3 Manual setting through telnet

The menu item **P7** must be set to value **1** or **2**. To establish the first connection through telnet, the following procedure is needed because the initial IP address of the clock is 0.0.0.0:

- assign a new IP address to the clock's MAC address (marked on the product label) by windows command **arp -s <IP address> <MAC address>**  
example: arp -s 192.168.0.190 00-16-91-FE-90-00
- reset the clock or power-cycle it and do the following within 2 minutes
- the IP address is temporarily matched to the clock (only valid when the current IP address is 0.0.0.0) by windows command **ping <IP address>** , the clock should answer the two last ECHO requests at least  
example: ping 192.168.0.190
- do the following within 30 seconds after the ping  
connect to the clock and make the needed settings (see lower) by windows command **telnet <IP address>** or use the HyperTerminal application

### 4.1.4 Setting parameters over telnet:

- request for entering the password appears after connection (default password is 718084)
- the information about software and hardware version followed by the MAC address is displayed after entering the correct password
- inserted commands must be confirmed by pushing the Enter key, use the Backspace key for correcting typing errors
- command help or ? displays help with a command list
- command reset resets the clock (changes are written to Flash)
- command conf -p displays current parameters from setup menu
- command conf -n displays current network parameters
- command conf -? displays help for command conf parameters  
example: conf -i 192.168.0.190 sets the clock's IP address to 192.168.0.190
- it is necessary to end telnet connection by command exit

Windows 7 note: The telnet is not activated in Windows 7 by default. For activating it go to the "Control Panel" in "Start menu", click on "Programs and Features", click on "Turn Windows features on or off" and find the "Telnet Client" check box in the window "Windows Features". Allow the system to install the appropriate files – this should take only a few seconds. The administrator rights are necessary for this operation.

Hyperterminal note: The Hyperterminal application can be used as an alternative to telnet. It is necessary to activate the "Send line ends with line feeds" and "Echo typed characters locally" in the Properties -> Settings -> ASCII setup window.

### 4.1.5 SNMP

The ECO-DC clock supports SNMP version 2c notifications and parameter reading and setting by means of SNMP GET and SET commands. This allows to integrate the clock to a network management system. The ECO-DC (SNMP agent) can send alarm notifications and alive notifications to a SNMP manager. The IP address of the SNMP manager can be provided to the clock by DHCP, Telnet, SNMP or the MOBA-NMS. The structure of supported parameters is defined in a MIB file (refer to document TE-800728 or BE-800793 for details). In addition the clock supports the “system” node parameters defined by MIB-2 (RFC-1213)

Alarm notifications are asynchronous messages and are used to inform the manager about the appearance / disappearance of alarms.

Alive notifications are sent out periodically to report availability and state of the clock. The interval time can be configured.

#### SNMP community strings:

read community	romobatime
read / write community	rwmobatime
notification (trap) community	trapmobatime

## 4.2 Multicast mode

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The clock is synchronized to UTC (Universal Time Coordinated) from a NTP server. The clock receives NTP multicast packets transmitted by the NTP server in a specified time cycle. This type of synchronization requires no clock's own IP address and is therefore suitable for an easy commissioning of the large systems of slave clocks. Further this mode supports monitoring and parameter configuration by means of MOBA-NMS software.

For supervision and configuration with MOBA-NMS the multicast group address can be used or the multicast group address having last octet cleared to zero.

The Multicast operating mode signifies only a minimum amount of configuration work for a network administrator.

It is necessary to set appropriate time-zone for correct displaying of local time and date – see the chapter 5 for details.

#### Default network parameters:

multicast group address	239.192.54.1
multicast config address	239.192.54.0
configuration port number	65532
time zone client port number	65534

The menu item **P7** must be set to value **1**. See chapter 6.2.6 for setting the multicast group address in the item **P11** submenu.

## 5 Local time calculation

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### 5.1 Basic setting – control according to source of synchronization

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P4	A	Time zone is carried over from the source of synchronization
P5	0	Neither MOBALine time zone nor time zone server are used
P6	A	Display time and date according to source of synchronization incl. daylight saving time

This setting is suitable for digital clocks controlled by a master clock as slave clocks in a time distribution system using the MOBALine or IRIG time signal. An internal time zone table is not used.

### 5.2 Calculation using MOBALine time zones

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P4	A	Time zone is carried over from the source of synchronization. The UTC time calculation is based on the MOBALine information.
P5	1 - 20	Selection of the MOBALine time zone
P6	A	Display time and date according to chosen MOBALine time zone, incl. daylight saving time

This setting is suitable for digital clocks controlled by a master clock as MOBALine slave clocks in a time distribution system with the possibility to display different MOBALine time zones.

### 5.3 Calculation using Time-zone server MOBATIME

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P4	A	NTP protocol uses UTC time zone
P5	1 - 15	Selection of the time zone server time zone
P6	A	Display time and date according to chosen time zone server time zone, incl. daylight saving time

This setting is suitable for NTP and PoE digital clocks controlled by MOBATIME NTP servers, which support the time zone server functionality.

### 5.4 Calculation using time zone entries preconfigured by MOBA-NMS software

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P4	A	NTP protocol uses UTC time zone
P5	0	No time zone server is used
P6	U1-U7	Display time and date according to chosen preconfigured time zone entry, incl. daylight saving time

This setting is suitable for NTP and PoE digital clocks, where several user defined time zone entries should be used. The time zone entries are preconfigured by means of the MOBA-NMS software.

## 5.5 Calculation according to internal time zone table

P4	0 – 64	According to time zone in which source of synchronization works
P5	0	Neither MOBALine time zone nor time zone server are used
P6	0 – 64, U	Display time and date by calculation from the UTC time according to chosen time zone, incl. daylight saving time

This setting is suitable for autonomous digital clocks or in cases when the displayed time is needed from another time zone than provided by the synchronization source. Displayed time and date calculation is based on the internal time zone table or on the user-specific time zone parameters. This setting is useful also for the NTP synchronization, when no time zone server is available.

## 6 Control and configuration of the clock using pushbuttons

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The clock is controlled and configured using two pushbuttons located in the back side recess

### Abbreviations used for the key strokes

**PB1L, PB2L** pushing of the pushbutton for a period of more than 1 second  
**PB1S, PB2S** short-time pushing of the pushbutton

### Functioning of the pushbuttons in the “Clock“ mode (time or date displayed)

**PB1S** time correction to the whole minute ( $\pm 30$  sec)  
**PB2S** switch between the time and date display  
**PB1L** entry into the time and date setting mode  
**PB2L** entry into the setup menu

### 6.1 Setting of time and date

---

The setting of time and calendar date takes place in the following steps: year – days – months – hours – minutes. The entry into the time and date setting mode occurs by pushing the **PB1L** pushbutton.

The display shows the following:



The item to be adjusted is now blinking.

Push the **PB1S** pushbutton to move to another item. After having adjusted the minutes and by pushing the **PB1S**, the entered values are stored (the seconds are set to zero) and the clock returns back to “Clock” mode.

Note: When the time zone for local time and date calculation (menu item P6) is set to the values U1 – U7 or U, the entered time and date is taken as UTC.

### Function of the pushbuttons in the “Time and date setting“ mode.

**PB1S** advancement to another item to be set up  
**PB2S** increase of the item to be set up by 1  
**PB2L** continuous increase of the current item

### 6.2 Setup menu for the setting of the clock parameters

---

The entry into the parameter setup menu is done by the pushing of the **PB2L** button.

The display shows the following:



The item to be adjusted is now blinking

The options for the parameter setup are shown in the clock menu table.

## Function of the pushbuttons in the setup menu mode

<b>PB1S</b>	storage of the current item and move to another menu item
<b>PB1L</b>	storage of values and return into normal display mode, or entry into the submenu, where it is permitted by the program
<b>PB2S</b>	increase of the current item by 1
<b>PB2L</b>	continuous increase of the current item

Program item	Function	Scope of the values (default values are printed in bold)		
P0	Display brightness	1-30, <b>A</b> (automatic adjustment)		
P1	Time display format	<b>24</b> h, 12 h		
P2	Display mode	<b>1-3</b>		
		<b>1</b>	continuous display of time	
		<b>2</b>	continuous display of date	
		<b>3</b>	display sequence: time 6 sec, date 3 sec.	
P3	Type of synchronization source	A (automatic setting)		
P4	Time zone of synchronization source	0 - 64, <b>A</b> (automatically)		
P5	Time zone for MOBALine or Time-zone server MOBATIME	1-20, <b>0</b> (off) – for MOBALine synchronization or 1-15, <b>0</b> (off) – for NTP synchronization		
P6	Time zone for local time and date calculation	0 to 64, <b>A</b> (automatically), U* (user time zone), U1-U7 (preconfigured time zone entry by MOBA-NMS)		
P7	Clock operation mode	<b>1</b>	multicast (without IP address)	
		<b>2*</b>	unicast – network param. defined manually	
		<b>3*</b>	unicast – network param. assigned by DHCP	
P8	IP address	IP*	edit network parameters in manual setting mode or display parameters assigned by DHCP	
P9	Subnet mask	Su*		
P10	Gateway	Gg*		
P11	Multicast addr.	Mc*		setting of multicast group address
P12	Unicast NTP addr	Uc*		setting of NTP unicast server address
SW version		r_._ (e.g.: r1.10)		

\* possibility to enter the submenu  
Items P7 to P12 available in NTP and PoE variants only

 The maximum brightness setting in manual mode can reduce the life cycle of the LED displays in the long run. We recommend leaving the brightness control to "auto" mode (default value).

### 6.2.1 Submenu for setting the user-specific time zone

Choose the value **U** in the item **P6** (time zone of displayed time and date) in the clock menu, then enter the submenu by pushing the **PB1L** pushbutton for setting the parameters of the user-specific time zone. The item to be set is blinking.

By pushing the **PB2S** button, the adjusted value is increased in steps of 1; by pushing the **PB2L** button, the value will be continuously increased.

The display shows the following (example: -12 hours):



Enter the offset of the required time zone compared to UTC time within -12 to +12 hours. Decimal point means 0,5 hour.

Switch over to setting the way of switching to daylight saving time (DST) by pushing **PB1S**.

The display shows the following:



Option:  
**n** – no DST is used  
**F** – DST defined by fixed date  
**C** – DST defined by calculated date

If the value **F** is set in item **dt:**, enter the submenu for entering fixed date and time by pushing **PB1L**.

#### DST defined by fixed date and time

The item to be set is blinking. By pushing the **PB2S** button, the adjusted value is increased in steps of 1; by pushing the **PB2L** button, the value will be continuously increased.

#### Symbols on the display:

**Fh** change to summer time; entry of the hour at daylight saving begins  
**bh** shift back; entry of the hour at daylight saving ends

The display shows the following:



Enter the hour at which the daylight saving time begins.

Push **PB1S**.

The display shows the following:



Enter the day and the month. Push **PB1S**. Enter the month in which the daylight saving time begins.

Push **PB1S**.

The display shows the following:



Adjust the hour at which the daylight saving time ends.

Push **PB1S**.

The display shows the following:



Enter the day of the month. Push **PB1S**.  
Enter the month when the daylight saving time ends.

The daylight saving time has been set to start on April 28<sup>th</sup> at 2 o'clock and end on October 10<sup>th</sup> at 3 o'clock in the example described above.

Save the setting and return to item **dt:** by pushing **PB1L**. Another push of the **PB1L** button leads back to the clock menu item **P6**.

#### **DST defined by calculated date**

The item to be set is blinking. By pushing **PB2S**, the adjusted value is increased in steps of 1; by pushing the **PB2L** button, the value will be continuously increased.

#### **Symbols in the display:**

**F** change to summer time  
**b** setting the time back

#### **Scope of the setting:**

Week 1. – 4., L (the last one), P (last but one) and H (first after 15<sup>th</sup> day in the month)  
Day of the week 1. – 7. (Mo – Su)  
Month 1. – 12.

#### **The display shows the following:**



Enter the week in which the daylight saving time begins. Push **PB1S**. Enter the day of the week at which the daylight saving time begins.

Push **PB1S**.

#### **The display shows the following:**



Enter the month in which the daylight saving time begins. Push **PB1S**. Enter the hour at which the daylight saving time begins.

Push **PB1S**.

#### **The display shows the following:**



Enter the week in which the daylight saving time ends. Push **PB1S**. Enter the day of the week at which the daylight saving time ends.

Push **PB1S**.

#### **The display shows the following:**



Enter the month in which the daylight saving time ends. Push **PB1S**. Enter the hour at which the daylight saving time ends.

**The daylight saving time has been set to start on the last Sunday in March at 2 o'clock and end on the last Sunday in October at 3 o'clock in the example described above.**

By pushing **PB1L** save the setting and return to item **dt:**. Another push of the **PB1L** button leads back to the clock menu item **P6**.

### **6.2.2 Submenu for network services configuration**

Choose the value **2** or **3** in the item **P7** (network work mode selection) in the clock menu, then enter the submenu by pushing the **PB1L** pushbutton for configuring the network services (Multicast support in unicast work mode, SNMP service, Telnet service). The item to be set is blinking.

In der Anzeige erscheint:



Set value 1 for enabling the multicast support in the unicast work mode or value 0 for disabling it by pushing the **PB2S**.

Switch to the next parameter – SNMP communication support by pushing the **PB1S**. The display shows the **Sn: 1**. Set value 1 for enabling the SNMP support or value 0 for disabling it by pushing the **PB2S**.

Switch to the next parameter – Telnet support by pushing the **PB1S**. The display shows the **tn: 1**. Set value 1 for enabling the telnet support or value 0 for disabling it by pushing the **PB2S**.

By pushing **PB1L** save the setting and return to item **P7**.

### 6.2.3 Manual setting of the IP address of the clock

Choose the item **P8** in the main menu and push the **PB1L** button to enter the submenu for setting the IP address. The item to be set is blinking.

By pushing **PB2S**, the adjusted digit value is increased in steps of 1; by pushing the **PB2L** button, the value will be continuously increased.

The display shows the following:



Enter the four octets of the IP address step by step. Switch to the next digit or octet respectively by pushing the **PB1S**. Octets are marked by letters **A**, **b**, **C** and **d**.

By pushing the **PB1L** button, the entered values are stored and the clock returns to the menu item **P8**.

### 6.2.4 Manual setting of the subnet mask

Choose item **9** in the main menu and push the **PB1L** button to enter the submenu for setting the subnet mask. The item to be set is blinking.

By pushing **PB2S**, the adjusted value is increased in steps of 1; by pushing the **PB2L** button, the value will be continuously increased.

The display shows the following:



Enter the four octets of the subnet mask step by step. Switch to the next octet by pushing the **PB1S** button. The octets are marked by the letters **A**, **b**, **C** and **d**.

By pushing the **PB1L** button, the entered values are stored and the clock returns to the menu item **P9**.

### 6.2.5 Manual setting of the default gateway IP address

Choose the item **P10** in the main menu and push the **PB1L** button to enter the submenu for setting the default gateway IP address. The item to be set is blinking. By pushing **PB2S**, the adjusted digit value is increased in steps of 1; by pushing the **PB2L** button, the value will be continuously increased.

In der Anzeige erscheint:



Enter the four octets of the gateway IP address step by step. Switch to the next digit or octet respectively by pushing the **PB1S** button. The octets are marked by the letters **A**, **b**, **C** and **d**.

By pushing the **PB1L** button, the entered values are stored and the clock returns to the menu item **P10**.

### 6.2.6 Submenu for setting the multicast group address

Choose the menu item **P11** and then enter the submenu by pushing the **PB1L** pushbutton for setting the multicast group address. The item to be set is blinking. By pushing the **PB2S** button, the adjusted digit value is increased in steps of 1; by pushing the **PB2L** button, a continuous increase of the value takes place.

The display shows the following:



Enter the four octets of the IP address step by step. Switch to the next digit or octet respectively by pushing the **PB1S** button. Octets are marked by the letters **A**, **b**, **C** and **d**.

By pushing the **PB1L** button, the entered values are stored and the clock returns to the menu item **P11**.

### 6.2.7 Submenu for setting of the NTP unicast synchronization

Choose the menu item **P12** then enter the submenu by pushing the **PB1L** pushbutton for setting the parameters of the NTP unicast synchronization. The item to be set is blinking.

By pushing the **PB2S** button, the adjusted digit value is increased in steps of 1; by pushing the **PB2L** button, the value will be continuously increased.

The display shows the following:



Set the four octets of the NTP server's IP address step by step. Switch to the next digit or octet respectively by pushing the **PB1S** button. Octets are marked by letters **A**, **b**, **C** and **d**.

After the last octet setting, set the constant  $x$  which determines the interval of synchronization in seconds.

By pushing the **PB1L** button, the entered values are stored and the clock returns to the menu item **P12**.

Note: Through the setup menu, it is possible to set only one NTP server IP address. If more than one NTP server addresses were previously configured (using telnet or MOBA-NMS tool), after opening the P12 submenu the IP address of currently active NTP server is displayed. When the IP address was modified and the configuration is saved using the setup menu, the IP address is stored to the definition of the first NTP server, the other NTP server addresses are cleared including those defined by the NTP server domain names.

### 6.3 Parameter reset

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If necessary, the clock parameters can be set to factory defaults by the following procedure:

- Enter the clock menu, move to the software version item by several pushes of the **PB1S**.
- Keep pushing both buttons on the clock frame simultaneously until the display shows **C0:00**
- Use the **PB2** button to set the value behind the colon to **04**
- Keep pushing both buttons simultaneously until the display shows **FAC1** and the clock resets

## 7 Update firmware of NTP and PoE version using TFTP32 tool

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- create a folder on the computer hard drive and copy the files "tftpd32.ini", "tftpd32.chm" and "tftpd32.exe" into it, then run "tftpd32.exe"
- copy the new firmware file "dc3app.bin" as well
- run "tftpd32.exe", leave only the TFTP Server in the window Settings -> Global Settings checkbox active, don't change other settings
- open the active folder setting window with the Browse button and browse for the folder containing the firmware file
- connect to the clock by the windows command **telnet <IP address>**  
example: telnet 192.168.0.190
- the request for the telnet password will appear; after entering the valid password, the information about the software and hardware version followed by the MAC address appears
- enter the command **fu** in the telnet window for starting the automatic update of the clock's firmware from the "dc3app.bin" file
- after the command is entered, information about the sent file and its progress is displayed in the tftpd32 window; the telnet connection is then terminated automatically
- wait approx. 1 minute after the file sending is finished, connect again to the clock through telnet
- after successfully entering the password, check if the indicated firmware version is correct, otherwise it is necessary to repeat the whole procedure
- enter the **exit** command to close the telnet connection, close the tftpd32 window

## 8 Time zone table

Standard time zone table (Version 10.0).

Time zone	City / State	UTC Offset	DST Change	Standard → DST	DST → Standard
00	UTC (GMT), Monrovia, Casablanca	0	No		
01	London, Dublin, Edinburgh, Lisbon	0	Yes	Last Sun. Mar. (01:00)	Last Sun. Oct. (02:00)
02	Brussels, Amsterdam, Berlin, Bern, Copenhagen, Madrid, Oslo, Paris, Rome, Stockholm, Vienna, Belgrade, Bratislava, Budapest, Ljubljana, Prague, Sarajevo, Warsaw, Zagreb	+1	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
03	Athens, Istanbul, Helsinki, Riga, Tallinn, Sofia, Vilnius	+2	Yes	Last Sun. Mar. (03:00)	Last Sun. Oct. (04:00)
04	Bucharest, Romania	+2	Yes	Last Sun. Mar. (03:00)	Last Sun. Oct. (04:00)
05	Cairo, Pretoria, Harare	+2	No		
06	Amman	+2	Yes	Last Thu. Mar. (23:59)	Last Fri. Oct. (01:00)
07	UTC (GMT)	0	No		
08	Kuwait City, Minsk, Kaliningrad	+3	No		
09	Praia, Cape Verde	-1	No		
10	UTC (GMT)	0	No		
11	Abu Dhabi, Muscat, Tbilisi, Moscow, St. Petersburg, Volgograd, Samara	+4	No		
12	Kabul	+4.5	No		
13	Adamstown (Pitcairn Is.)	-8	No		
14	Tashkent, Islamabad, Karachi	+5	No		
15	Mumbai, Calcutta, Madras, New Delhi, Colombo	+5.5	No		
16	Astana, Thimphu, Dhaka, Yekaterinburg	+6	No		
17	Bangkok, Hanoi, Jakarta, Novosibirsk	+7	No		
18	Beijing, Chongqing, Hong Kong, Singapore, Taipei, Urumqi, Krasnoyarsk	+8	No		
19	Tokyo, Osaka, Sapporo, Seoul, Irkutsk	+9	No		
20	Gambier Island	-9	No		
21	South Australia: Adelaide	+9.5	Yes	1 <sup>st</sup> Sun. Oct (02:00)	1 <sup>st</sup> Sun. Apr. (03:00)
22	Northern Territory: Darwin	+9.5	No		
23	Brisbane, Guam, Port Moresby, Yakutsk	+10	No		
24	Sydney, Canberra, Melbourne, Tasmania: Hobart	+10	Yes	1 <sup>st</sup> Sun. Oct. (02:00)	1 <sup>st</sup> Sun. Apr. (03:00)
25	UTC (GMT)	0	No		
26	UTC (GMT)	0	No		

27	Honiara (Solomon Is.), Noumea (New Caledonia), Vladivostok	+11	No		
28	Auckland, Wellington	+12	Yes	Last Sun. Sep. (02:00)	1 <sup>st</sup> Sun. Apr. (03:00)
29	Majuro (Marshall Is.), Magadan, Anadyr	+12	No		
30	Azores	-1	Yes	Last Sun. Mar. (00:00)	Last Sun. Oct. (01:00)
31	Middle Atlantic	-2	No		
32	Brasilia	-3	Yes	3 <sup>rd</sup> Sun. Oct. (00:00)	3 <sup>rd</sup> Sun. Feb. (00:00)
33	Buenos Aires	-3	No		
34	Newfoundland, Labrador	-3.5	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
35	Atlantic Time (Canada)	-4	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
36	La Paz	-4	No		
37	Bogota, Lima, Quito	-5	No		
38	New York, Eastern Time (US & Canada)	-5	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
39	Chicago, Central Time (US & Canada)	-6	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
40	Tegucigalpa, Honduras	-6	No		
41	Phoenix, Arizona	-7	No		
42	Denver, Mountain Time	-7	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
43	Los Angeles, Pacific Time	-8	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
44	Anchorage, Alaska (US)	-9	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
45	Honolulu, Hawaii (US)	-10	No		
46	Midway Islands (US)	-11	No		
47	Mexico City, Mexico	-6	Yes	1 <sup>st</sup> Sun. Apr. (02:00)	Last Sun. Oct. (02:00)
48	Adak (Aleutian Is.)	-10	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
49	UTC (GMT)	0	No		
50	UTC (GMT)	0	No		
51	UTC (GMT)	0	No		
52	UTC (GMT)	0	No		
53	UTC (GMT)	0	No		
54	Scoresbysund, Greenland	-1	Yes	Last Sun. Mar. (00:00)	Last Sun. Oct. (01:00)
55	Nuuk, Greenland	-3	Yes	Last Sat. Mar. (22:00)	Last Sat. Oct. (23:00)
56	Qaanaaq, Greenland	-4	Yes	2 <sup>nd</sup> Sun. Mar. (02:00)	1 <sup>st</sup> Sun. Nov. (02:00)
57	Western Australia: Perth	+8	No		
58	Caracas	-4.5	No		
59	CET standard time	+1	No		
60	Santiago, Chile	-4	Yes	2 <sup>nd</sup> Sun. Oct. (00:00)	2 <sup>nd</sup> Sun. Mar. (00:00)
61	Chile, Easter Island	-6	Yes	2 <sup>nd</sup> Sat. Oct. (22:00)	2 <sup>nd</sup> Sat. Mar. (22:00)
62	Baku	+4	Yes	Last Sun. Mar. (04:00)	Last Sun. Oct. (05:00)
63	UTC (GMT)	0	No		
64	UTC (GMT)	0	No		

In countries where the DST switch date changes annually (e.g. Iran, Israel), the time zone has to be defined manually in the user time zone.

**Legend:**

UTC: Universal Time Coordinate, equivalent to GMT  
DST Change: Daylight Saving Time changeover  
Standard → DST: Time change from Standard time (Winter time) to Summer time  
DST → Standard: Time change from Summer time to Standard time (Winter time)

**Example:**

2<sup>nd</sup> last Sun. Mar. (02:00) Switch over on the penultimate Sunday in March at 02.00 hours local time



**Attention!**

The Time Zone Table is usually updated every year. The current table is available for download under the following address: [www.mobatime.com](http://www.mobatime.com) → Customer Area → Customer Support → Support Resources → Software Tools → Time Zone Table. In case your device is equipped with a newer version than shown in this manual, the current time zone settings should be checked.

## 9 Technical data

### 9.1 Standard design of the clock

Technical data		ECO-DC.57.4
Display	height of the digits	57
	number of digits	4
Time display format	HH : MM	√
Date display format	DD. MM	√
Automatic or manual display brightness		√
Viewing distance		25 m
Autonomous operation		Internal quartz base
Synchronization		MOBALine time code, mains powered
		IRIG-B, mains powered
		NTP protocol, mains powered
		NTP protocol, powered over PoE (compatible IEEE 802.3af)
Power supply		100 - 240 VAC / 50 - 60 Hz
Power consumption	single sided design	7 VA
	double sided design	12 VA
Quartz accuracy	without synchronization	±0,3 sec/day after at least 24 hours synchronization from the time source (measured over 24 h), at 20°C +/- 5°C
Operating temperature		-5 to + 55°C
Protection degree		IP 30 (IP40 on request)
Weight in kg	single sided design	0,75
	double sided design	2
Dimensions (WxHxD) mm	single sided design	342 x 123 x 44
	double sided design	342 x 123 x 105



Note for the IP40 modification (excluding PoE variant): The power connector can be considered as an IP40 only if it is connected to the clock. Otherwise it is considered as an IP30 accessory.

### 9.2 Voltage range and electric current consumption of the lines

Type of slave line	Voltage range	Electric current consumption
MOBALine	5 – 30 VAC	6 – 34 µA
IRIG B	20 mVpp – 2 Vpp	20 µA – 2 mA

## 10 Accessories and Maintenance

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### 10.1 Single sided clock

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- instruction manual 1 pc
- wood screws including dowels 2 pcs

### 10.2 Double sided clock

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- instruction manual 1 pc
- wood screws including dowels for fastening the console 4 pcs
- interconnecting cable for second side 1 pc
- Allen key for fastening the console 1pc

### 10.3 Cleaning

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Clean only the clock surface. Use soft rags and antistatic detergents. Don't use synthetics.



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