

# MOUNTING AND INSTRUCTION MANUAL

## NCC – Network Clock Controller

Please study these instructions carefully before installing the device.



## **Certification of the Producer**

### STANDARDS

The Network Clock Controller (NCC) was developed and produced in accordance with the EU Guidelines:

2014 / 30 / EU EMC  
2014 / 35 / EU LVD  
2008 / 57 / EU Railway



## **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.
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# 1 Safety

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Read this chapter and the entire instruction manual carefully and follow all instructions listed. This is your assurance for dependable operations and a long life of the device. Keep this instruction manual in a safe place to have it handy every time you need it.

## 1.1 Symbols and Signal Words used in this Instruction Manual

---



**Danger!**

Please observe this safety message to avoid electrical shock!

**There is danger to life!**



**Warning!**

Please observe this safety message to avoid bodily harm and injuries!



**Caution!**

Please observe this safety message to avoid damages to property and devices!



**Notice!**

Additional information for the use of the device.

## 1.2 Intended Use

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The **Network Clock Controller** is a device acting as an interface between NTP (Ethernet) and the MOBALine movement SEM100t/SAM100t. The interface receives the current time information via NTP and makes it available to the end devices via MOBALine.

Under consideration of this installation manual, the installation can be carried out by the end user.

## 1.3 Operating safety

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**Warning!**

- Do not modify your device!
- The device is not intended for use by persons (including children) with limited physical, sensory, or mental capacities or a lack of experience and/or knowledge.
- Keep packaging such as plastic films away from children. There is the risk of suffocation if misused.

## 1.4 Installation site

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**Caution!**

- To avoid any operating problems, keep the device away from moisture and avoid dust, heat, and direct sunlight. Do not use the device outdoors.
- Through operation, the device can warm up. Make sure to provide enough air circulation to divert the warmth.



**Danger!**

Make sure to wait before using the device after any transport until the device has reached the ambient air temperature. Great fluctuations in temperature or humidity may lead to moisture within the device caused by condensation, which can cause a short.

## 2 General Information: Introduction

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### 2.1 Scope of Delivery

---

Please check your delivery for completeness and notify your supplier within 14 days upon receipt of the shipment, if it is incomplete.

The package you received contains:

- 1 x NCC – Network Clock Controller
- 1 x spring terminal 8-pole

### 2.2 Device Description in this Manual

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This instruction manual is for the **Network Clock Controller**. In the following chapters, the designation **NCC** is used for better readability.

### 2.3 Function description

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The NCC is an interface between NTP (Ethernet) and the SEM100t/SAM100t movements (MOBALine movements). Furthermore, the NCC can control the clock illumination.

The NCC features configuration switches, which can however be overwritten by MOBA-NMS settings in some cases. Only the monitoring configuration must be set using the configuration switches. Furthermore, the illumination level can also be set via the configuration switches. Other than that, the configuration is done exclusively via MOBA-NMS (not included) or alternatively via SNMP or partially via DHCP parameters.


It is powered by PoE (Power over Ethernet) or via 230VAC. The NCC registers as a class 3 or 4 device at the Switch, depending on the load of the illumination output.

### 2.4 Mounting instructions

---



**Caution!**

- The **NCC** must be mounted on an even mounting plate inside the clock housing. For measurements, see chap. 12.
- The 2 mounting holes with copper lamination for the functional earth  must be electrically connected to the mounting plate (clock housing) using metal bolts. See chap. 3.
- The **NCC** must be mounted in a way to be protected against damage, dirt and water. The clock housing must be built for IP 54 or higher.
- If the **NCC** cannot be placed inside the clock housing, in exceptional cases it may be mounted in the immediate vicinity of the clock. In this case, the cable length for the movement and illumination must not exceed 1m. Moreover, the **NCC** must be protected against touch, dirt and water. Because of operational warming, sufficient air circulation must be provided.



**Danger!**

Make sure to wait before using the device after any transport until the device has reached the ambient air temperature. Great fluctuations in temperature or humidity may lead to moisture within the device caused by condensation, which can cause a short.

## 2.5 Electric connections



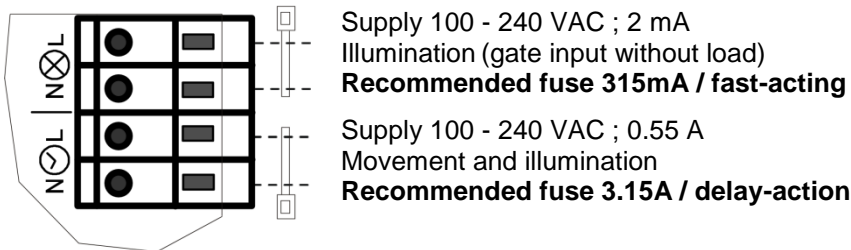
### Danger!

The power supply connection to the clock must be installed by a state-licensed electrician. The national installation regulations must be followed.

A bright grey push terminal serving as cut-off point is used for mains connection. In the supply line provided by the customer, a fuse must be provided for both the movement and the illumination according to the power data. The power data is right next to the terminal.

The same phase (nom. 230 VAC) is to be used for the movement and the illumination power supply. A supply wire with a cross section of max. 2.5mm<sup>2</sup> is to be used. The phase and neutral conductor for the illumination and movement are to be affixed near the plug terminal using a cable strap for each. The connecting wires must be stripped by 9-10mm.

### Mains power supply connection:



The clock housing and the mounting plate for the NCC must be connected to the protective earth of the mains supply (PE).

## 3 Configuration, displays and connections

---

### 3.1 Configuration

---

The NCC is configured via a DIP switch and using MOBA-NMS. In case of the latter, the operation takes place entirely via MOBA-NMS. Additionally, parameters can be given via DHCP or SNMP.

For detailed information about the configuration with MOBA-NMS, DHCP and SNMP, see the document BE-800793 „Description MOBATIME Network Clocks“.

#### Configuration of the DIP switches:

Selecting whether the NCC is used for a single- or a double-sided clock:

| Double-sided/Single-sided | 1   |
|---------------------------|-----|
| Monitor two movements     | ON  |
| Monitor one movement      | OFF |

Selecting whether the movements are to be monitored by the NCC:

| Monitoring     | 2   |
|----------------|-----|
| Monitoring on  | ON  |
| Monitoring off | OFF |

Adjusting the illumination level:

| Current[mA] | 3   | 4   | 5   |
|-------------|-----|-----|-----|
| 240         | OFF | OFF | OFF |
| 350         | OFF | OFF | ON  |
| 390         | OFF | ON  | OFF |
| 440         | OFF | ON  | ON  |
| 500         | ON  | OFF | OFF |
| 550         | ON  | OFF | ON  |
| 590         | ON  | ON  | OFF |
| 700         | ON  | ON  | ON  |

Currently, DIP switch 6 does not have any function.

### 3.2 Reset push-button

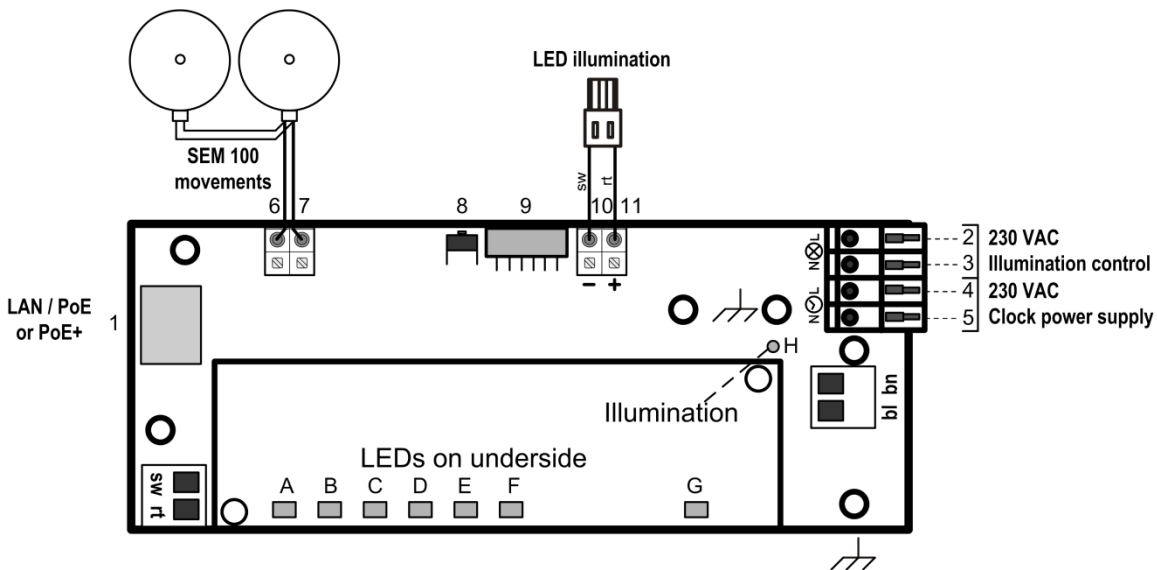
---

The NCC features a reset push-button next to the DIP switch. To carry out a software reset on the NCC, the push-button must be held down for min. 2 seconds.

If the push-button is held down for more than 10 seconds, the factory settings are loaded ( see chapter 9 Factory settings).

### 3.3 Connections and displays

The NCC features the following connections and displays:



| No. | Group                                | Meaning and function                                                                                            |
|-----|--------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| 1   | LAN connector (RJ45)                 | Connection Ethernet with or without PoE                                                                         |
| 2   | Power input for illumination control | Phase (100 – 240 VAC / 0.1 A, 50/60 Hz)                                                                         |
| 3   |                                      | Neutral conductor                                                                                               |
| 4   | Power input                          | Phase (100 – 240 VAC / 0.55 A, 50/60 Hz)                                                                        |
| 5   |                                      | Neutral conductor                                                                                               |
| 6   | MOBALine out                         | MOBALine output signal, connection b                                                                            |
| 7   |                                      | MOBALine output signal, connection a                                                                            |
| 8   | Reset push-button                    | hold for > 4 seconds, device reboots<br>hold for > 20 seconds, device resets to factory settings                |
| 9   | DIP switch                           | Single-sided resp. double-sided (1)<br>Monitoring (2)<br>Illumination level (3-5) see chapter 3.1 Configuration |
| 10  | Illumination output                  | + LED illumination                                                                                              |
| 11  |                                      | - LED illumination                                                                                              |
| A   | PoE+ LED (orange)                    | ON if PoE+ was detected                                                                                         |
| B   | LAN activity LED (yellow)            | Blinks: active network traffic                                                                                  |
| C   | LAN link LED (green)                 | ON: Ethernet link OK                                                                                            |
| D   | LED (yellow)                         | Currently unused                                                                                                |
| E   | Synch. LED (green)                   | ON: NTP synchronization OK                                                                                      |
| F   | Alarm LED (red)                      | ON: min. 1 alarm active                                                                                         |
| G   | Power LED (green)                    | ON: power supply OK                                                                                             |
| H   | Power supply LED illumination (red)  | ON if illumination control input is connected to mains voltage (pins 2 and 3)                                   |



## 3.4 Operation modes / synchronization

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For time synchronization, two operation modes are available, unicast or multicast.

### 3.4.1 Unicast

---

The NCC is synchronized from an NTP server to UTC (coordinated world time).

This operation mode supports the monitoring and configuration of the NCC via the network connection. The configuration can take place automatically through a DHCP server or manually using the software MOBA-NMS.

For monitoring and configuration with MOBA-NMS, one of the group addresses (multicast IP) 239.192.54.0 or 239.251.34.0 for IPv4 resp. FF38::EFC0:3600 or FF38::EFFB:2200 for IPv6 or the IP address is used.

In this operation mode, the NCC will try to obtain the following network parameters from a DHCP server (see also chapter 6.2):

- IP address
- gateway address
- subnet mask
- NTP server address(es) / time zone server address
- SNMP manager address

In this operating mode, the NCC will try to obtain the following network parameters in an IPv6 network from a DHCPv6 server (see also chapter 7.4):

- IP address
- NTP server address(es) / time zone server address
- SNMP manager address

The NTP server addresses must be configured as a DHCP option by the network administrator. If an address is sent to the NCC, the latter will request NTP and time zone packages from the former. The request interval can be configured using the software MOBA-NMS.

### 3.4.2 Multicast

---

The NCC is synchronized to UTC (coordinated world time) by an NTP server. The configuration can only be carried out using the software MOBA-NMS.

For monitoring and configuration with MOBA-NMS, one of the multicast group addresses (multicast IP) is used. The group address is an IP address in the multicast range (224.0.0.0 to 239.255.255.255), addresses selected by Moser-Baer AG from a freely available range:

-IPv4: 239.192.54.x and 239.251.34.x, whereat x = 1..15

With IPv6, the ranges mentioned above are implemented as follows:

-IPv6: FF3y::EFC0:360x and FF3y::EFFB:220x, whereat x = 0x1..0xF and y=scope

E.g.: 239.192.54.5 → FF38::EFC0:3605 or 239.251.34.10 → FF38::EFFB:220A

For scope, the following values are possible: ~~2 = Link Local Scope~~

~~5 = Site Local Scope~~

8 = Organization Local Scope

~~14 = Global Scope~~

Contrary to unicast mode, the NCC receives multicast addressed NTP and time zone packages from an NTP server on a fixed group address (multicast IP). The standard port numbers are 123 (NTP) and 65534 (time zone). The operation mode multicast poses the smallest configuration effort for a network administrator.

## 3.5 Time signal outputs

---

The NCC is equipped with one MOBALine time signal output.

### 3.5.1 MOBALine

---



- frequency modulated MOBALine time signal for self-setting slave clocks.  
(TREND, SEM40/SAM40, SAM 00, SEM100t, SAM100t)
- output format: local time
- electrical properties: 20V / 50Hz

## 3.6 Week program

---

### 3.6.1 Description

---

An additional function of the NCC is autonomous illumination control as defined in a week program. This week program can be created/edited using a text editor or the software Switch Editor Basic. The week program can then be loaded onto the NCC using the software MOBA-NMS.

A week program can contain up to 50 entries (switch commands: ON, OFF, signal) and 50 exceptions (vacation and holiday phases).

### 3.6.2 Structure

---

#### Instruction set

|        |                                                |
|--------|------------------------------------------------|
| <ST>   | Start of the area saved in the NCC             |
| </ST>  | End of the area saved in the NCC               |
| <ID>   | Start of the identification number of the file |
| </ID>  | End of the identification number               |
| <WP1>  | Start of the week program part                 |
| </WP1> | End of the week program part                   |
| <EX1>  | Start of the exception part                    |
| </EX1> | End of the exception part                      |

#### Identification

<ID>xxxxxxx</ID> The file identification consists of up to 8 ASCII characters.

#### Week program entry

A week program always consists of at least two entries.

An entry is constructed as follows:

<w>DDDDDDHMMZZ</w>

D: week day, HH: hours, MM: minutes, ZZ: state/signal>

Week days are defined: Sunday, Monday, Tuesday..., Saturday  
1 = activated on this day, 0 = deactivated  
Example: 0111110 (program runs Monday-Friday)

The hours are defined: 00 – 23, 99 every hour

The minutes are defined: 00 – 59

The state is defined: 00 = switch off and 99 = switch on, 01-90 signal length in seconds (switch on for 1-90 sec., then switch off again)

A switch on command must always be followed by a switch off command.

A signal command does not require a switch off command.

## Exception entry

Unlike a week program entry, an exception entry always requires a starting point and an end point.

Thus, an exception entry looks as follows:

```
<e>DDMMYYYY-DDMMYYYY</e>  
(DD: day, MM: month, YYYY: year)
```

Everything in front of the “-“ belongs to the starting point, everything after it to the end point.

The days are defined: 1-31  
The months are defined: 1-12  
The years are defined: 2000-3000 or \*\*\*\* (every year)

## Template / Example

```
<?xml version="1.0" encoding="ASCII"?>  
<ST>  
  <ID>Bei_prog</ID>          Identification  
  <WP1>  
    <w>0111110093005</w> Mo-Fr at 09:30, switch on for 05 sec.  
    <w>0111110153005</w> Mo-Fr at 15:30, switch on for 05 sec.  
    <w>0111110073010</w> Mo-Fr at 07:30, switch on for 10 sec.  
    <w>0111110170010</w> Mo-Fr at 17:00, switch on for 10 sec.  
  </WP1>  
  <EX1>  
    <e>22122015-02012015</e> Exception from 22.12.2015 - 02.01.2015  
  </EX1>  
</ST>
```



Notice!: The two commands **<EX1>** and **</EX1>** are mandatory in the file, even if no exception is defined.

## 3.6.3 Switch Editor Basic

Switch Editor Basic is a Java-based software for creating and editing week programs. In connection with relays, it can be used for the automation of building processes (e.g. illumination, electronic locks).



### Caution!

The NCC allows for up to 50 week program entries and 50 exceptions. Bigger programs can be created with the Switch Editor, but not saved on the NCC

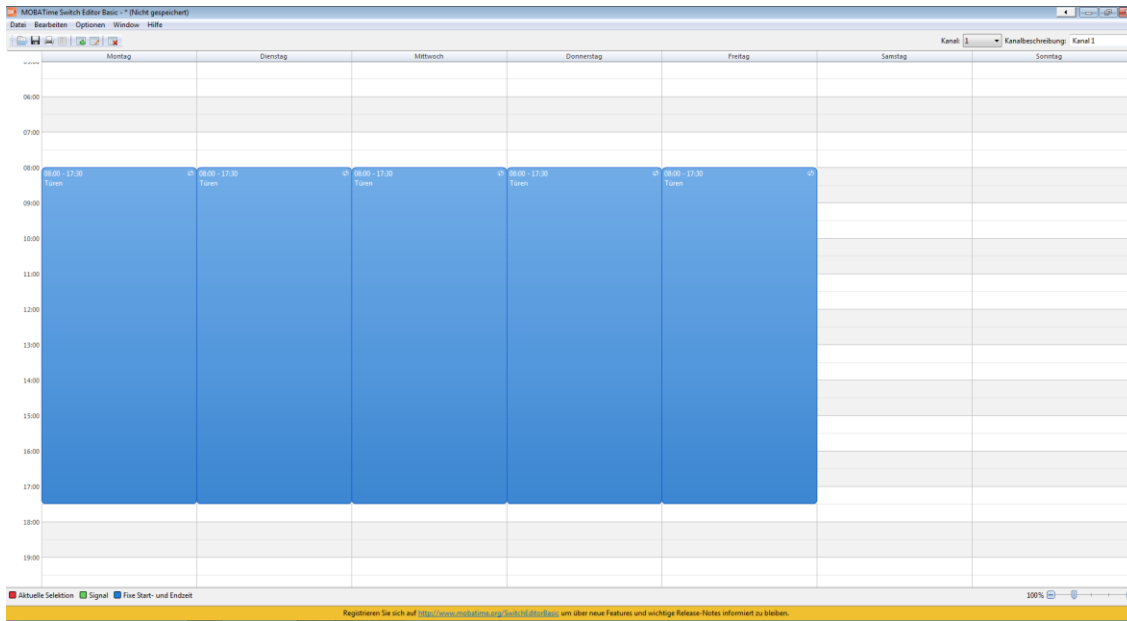
The NCC possesses only one channel and ignores entries on other channels.

When a week program created in Switch Editor is saved, the software creates three files:

**.swprog** Raw data for further editing in Switch Editor Basic  
**.prg** File for MOBATIME master clocks, supports multiple channels  
**.sprg** File for NCC, supports one channel.

Switch Editor doesn't allow for entering an ID. Thus, the first 8 digits of the week program name are saved in the file. The name must not contain any spaces. The ID can be edited via a text editor.

The special command "each hour" is not supported by the Switch Editor either and can only be set manually in the week program.



### 3.6.4 Data transfer from/to NCC

#### MOBA-NMS

Using the command **Week program transfer**, a week program can be transferred to or from the NCC. The command can be found as follows:

Right click on NCC entry → Commands → Weekprogram transfer

#### Manually via IPv4

The week program data can be transferred via command line.

To transfer the week program from the NCC to the PC, use a "**get**" command:

```
tftp <IP address> get <file name>
```

Example:

```
tftp 10.241.0.90 get W_prog01.txt
```

With the above command, the week program is written into the file W\_prog01.txt and saved in the Windows user directory.

To transfer a week program from the PC to the NCC, use a "**put**" command:

```
tftp <IP address> put <file name>
```

Example:

```
tftp 10.241.0.90 put W_prog01.txt
```

For this command, the document W\_prog01.txt must be saved in the Windows user directory.

#### Manually via IPv6

Transferring data via IPv6 functions almost identically to IPv4, but the IPv6 address "**link local**" is used in place of the IP address:

```
tftp <IPv6 link local> <get/put> <file name>
```

Example:

```
tftp fe80::216:91ff:fe12:3456 put W_prog01.txt
```



**Caution!**

The data transfer to/from the NCC cannot be accessed via "Auto conf", DHCP or "fix address".

## **4 Monitoring SEM100t/SAM100t clocks**

---

Using an NCC and MOBA-NMS, single-sided resp. double-sided clocks can be monitored (movement SEM100t or SAM100t).

## **5 Mounting and commissioning**

---

In order to mount the NCC and to launch it for the first time, the following process can be used:

1. Mount NCC to desired spot
2. Configure using MOBA-NMS and set the DIP switches as desired
3. Connect MOBALine slave clocks to line output
4. Connect illumination to illumination output
5. Plug in Ethernet cable with PoE power supply; if no PoE is available, power the NCC with 230VAC
6. After a short period of time, the alarm LED (red) should go out and the sync LED (green) should light up

## 6 Operating behavior

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### 6.1 Power supply

---

The NCC can be supplied by PoE(+) (Power over Ethernet (Plus)) from a switch. The PoE performance class is class 3 or 4 (depending on illumination).

As an alternative to the PoE switch, a PoE injector or midspan can be used.

The two PoE supply variants, phantom power and spare-pair power, are supported.

Furthermore, the NCC can be powered via 230VAC.

### 6.2 DHCP

---

In the operation mode unicast, the NCC tries to obtain the network configuration from a DHCP server in the IPv4 network. The DHCP options are automatically evaluated.

The precise description can be found in the manual BE-800793 Description MOBATIME network clocks.

It is the task of the network administrator to configure the DHCP options accordingly.

### 6.3 IPv6

---

IPv6 allows for up to 4 parallel IP addresses, prioritized in decreasing order:

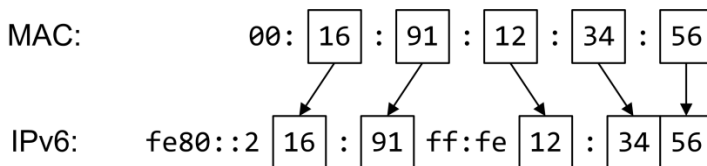
- address given by DHCPv6
- fix address
- address calculated with auto-config (SLAAC / RA)
- link local address

It is possible to deactivate DHCPv6 and / or auto-configuration.

Calculation of the link local address from the MAC address:

fe80::2[2nd part MAC]:[3rd part MAC]ff:fe[4th part MAC]:[5th part MAC][6th part MAC]

**Example:**



### 6.4 DHCPv6

---

In the unicast operating mode, the NCC tries to get the network configuration from a DHCPv6 server in the IPv6 network. The DHCP options are automatically evaluated.

A detailed description can be found in the manual BE-800793 Description MOBATIME network clocks.

The network administrator is responsible for configuring the DHCP options accordingly.

### 6.5 Auto-configuration / SLAAC

---

In the unicast operating mode, the NCC tries to calculate the network configuration from the information of a router (RA) in the IPv6 network: IPv6 address.

A detailed description can be found in the manual BE-800793 Description MOBATIME network clocks.

## 6.6 SNMP

---

For the integration into a monitoring system, the NCC supports SNMP notifications (traps) (SNMP version 2c). As an SNMP agent, the NCC can send alarm and alive traps to an SNMP manager in the network (e.g. network management tool HP OpenView or similar). For this purpose, the IP address of the SNMP manager must be configured (with DHCP or PC tool MOBA-NMS). The trap structures are defined in an MIB file (for details, see document BE-800793). Alarm traps are used to inform the SNMP manager about errors. Alive traps are sent periodically and signal the availability and the status of the device to the SNMP managers. The interval of the alive traps can be set with the PC tool MOBA-NMS.

## 6.7 Local time calculation

---

The NCC is synchronized to UTC (coordinated world time). In order to calculate and display the local time, the NCC requires additional information in the shape of a time zone entry. The NCC can save 1 time zone entry which can be edited over the network using the PC tool MOBA-NMS.

The local time setting can only be configured using MOBA-NMS.

Alternatively, the calculation of the local time based on the time zone entry of a time zone server is supported. In the unicast mode, it requests the entry from the configured NTP server. In the multicast mode, it receives the corresponding entry on the config-ured group address.

## 6.8 Accuracy / Loss of synchronization

---

The deviation in the synchronized state is usually smaller +/-50 ms.

The NCC signals a loss of synchronization after 24 hours through putting out the 12 o'clock command. The deviation after 24 h without synchronization is typically smaller +/-2 s (quartz accuracy: 20 ppm at room temperature).



### Notice!

The mentioned deviations depend on the accuracy and performance of the time source (NTP server). The NTP reception can be influenced by the network load and devices (hub, switch, router, firewall, etc.).

## 6.9 Redundant time source

---

The availability of NTP servers as time source can be improved through a redundant operation in the network. Depending on the operation mode of the NCC, the following strategy is provided (also works for time zone servers):

### 6.9.1 NTP client unicast

---

As a DHCP option or through manual configuration (MOBA-NMS), up to four different NTP server addresses can be announced to the NCC. If three time requests in a row are not answered by the current server, the interface switches to the next server (if available). The duration until the change is dictated by the set request interval (default: 3 x 10 seconds). After a restart of the interface, the request begins at the first server.

### 6.9.2 NTP client multicast

---

Two servers which send NTP packages from the same group address (multicast IP) are to be installed. The sending intervals of the two servers have to be set so that the primary server is the synchronization source in normal operation. The synchronization from the secondary server only occurs if the primary server shows an error. The ratio of the number of sent packages between primary and secondary server should be at least 4:1:

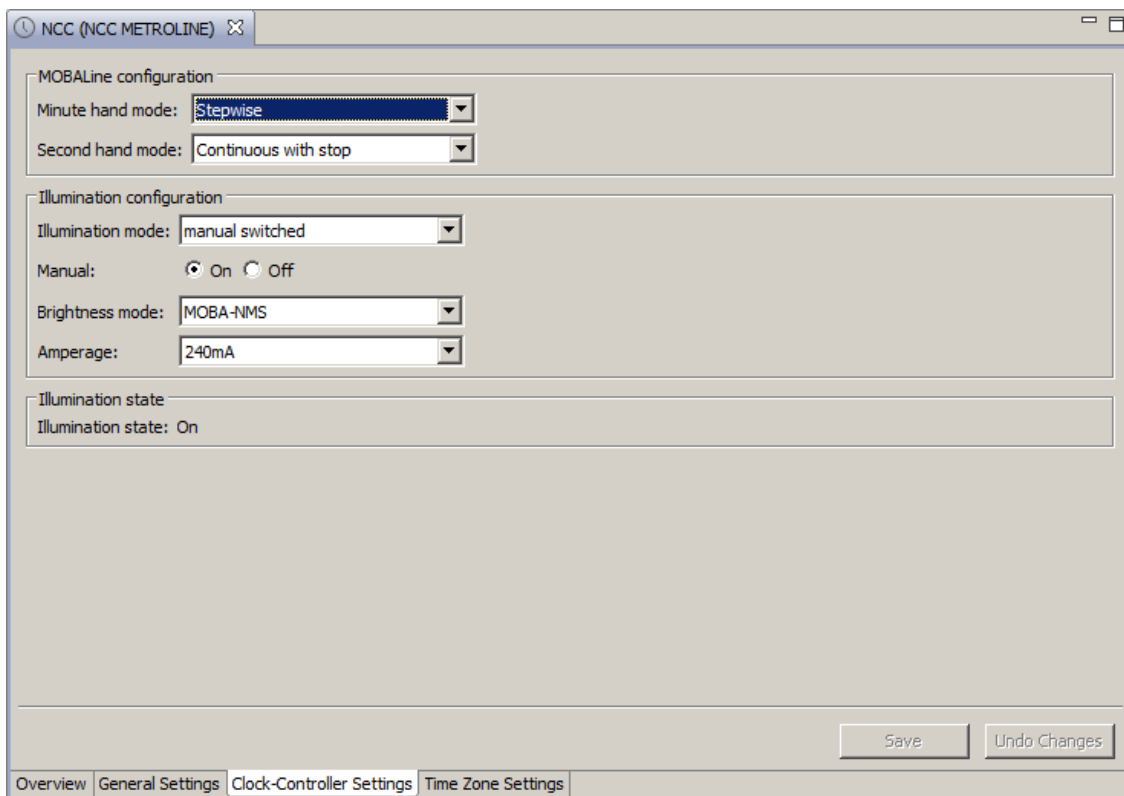
- sending interval primary server: 1 package / 1 minute
- sending interval secondary server: 1 package / 4 minutes

The choice of server thus depends on the dominance of the server which sends out more NTP packages per time unit. Consequently, if the primary server falls out, the secondary server dominates.

## 6.10 MOBA-NMS (MOBATIME Network Management System)

MOBA-NMS is a Java-based PC program used for configuration and status requests of NTP clocks. This software allows for all configurations for one or several devices to be carried out centrally.

Further information, manuals and the software itself can be found on our website <http://www.mobatime.com>. If desired, it can also be sent out on a USB stick (must be ordered separately).



In the register card "NCC Settings", the various NCC parameters can be edited.



## 7 Update

The firmware resp. the bootloader of a clock can be updated using MOBA-NMS. However, depending on the reason for change the settings on the clock are lost. The protocol TFTP UDP Port 69 is used.

In the multicast operating mode, an update is carried out sequentially on multiple clocks. In the unicast operating mode, this is done parallel.



For the update, a DHCP server in the network is required.

### Caution!

The update window is opened by right-clicking on the device → Commands → Firmware Update...:

Firmware update

Bootloader update



### Notice!

The newest versions of the firmware and bootloader are available at [www.mobatime.com](http://www.mobatime.com) → Support → Product Resources in the respective product folder. If the delivered device contains newer software than displayed in this manual, please check the settings.

## 7.1 Bootloader update

A bootloader update is only necessary if the respective alarm is displayed:

The image shows two overlapping windows from a management interface. The left window, titled 'Properties', displays a gauge for 'NMI (PM)' with a red needle pointing to the 'Alarm' status. Below the gauge, it shows 'Status: Alarm' and 'Alarm(s): Bootloader'. A 'Device Information (last connection)' section lists details like Type (NMI), Location (PM), IP address (10.241.0.151), and MAC address (00:16:91:01:08:A0). A 'Refresh' button is visible. The right window, titled 'NMI (PM)', shows a detailed configuration page with a yellow warning icon in the top right. It contains sections for 'Device Information' (including Run Mode: NTP Client Unicast and Alarm(s): Bootloader), 'Device Information Network' (including IP Address: 10.241.0.151 and Subnet Mask: 255.240.0.0), and 'MOBALine clocks status' (listing 12 clock IDs, all marked as 'Not configured'). A 'Refresh' button and 'Next refresh: 2 min. 46 sec.' are at the bottom.

In case of a bootloader alarm, the selection field for the firmware (application) is deactivated and only made available after a successful bootloader update:

The image shows a dialog box titled 'Update NMI device(s)'. It has a header 'Update NMI device(s)' and a close button. The main content area says 'Please provide the file with the new device firmware:' followed by a text input field and a 'Browse...' button. Below this is a 'File information:' section with a dash '-' and a 'Bootloader:' section with another text input field and 'Browse...' button. At the bottom, there is a 'Warning' section with red text: 'For some device types, there has to be a DHCP server in your network to run the update! Refer to the device manual for details.' and 'OK' and 'Cancel' buttons.



**Notice!**

The bootloader file must be a .zip file.

## 8 Maintenance

---

### 8.1 Troubleshooting: Repairs

---

If you cannot rectify the problems, contact your supplier from whom you have purchased the device.

Any repairs must be carried out at the manufacturer's plant.

Disconnect the power supply immediately and contact your supplier, if ...

- liquid has entered your device
- the device does not properly work and you cannot rectify this problem yourself.

### 8.2 Cleaning

---

- Please make sure that the device remains clean especially in the area of the connections, the control elements, and the display elements.
- Do not use solvents, caustic, or gaseous cleaning substances.

### 8.3 Disposing

---



#### **Device**

At the end of its lifecycle, do not dispose of your device in the regular household rub-bish. Return your device to your supplier who will dispose of it correctly.



#### **Packaging**

Your device is packaged to protect it from damages during transport. Packaging is made of materials that can be disposed of in an environmentally friendly manner and properly recycled.

## 9 Factory settings

The NCC is delivered with the following standard configuration. This can be recreated on the device (see chapter 3.2).

Factory settings:

|                                            |                                                                                                                                                 |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Name (20 digits)                           | NCC                                                                                                                                             |
| IP mode                                    | IPv4 und IPv6 on                                                                                                                                |
| DHCP IPv4                                  | on                                                                                                                                              |
| IPv4 IP address                            | 1.255.255.253                                                                                                                                   |
| IPv4 subnet mask                           | 255.255.255.0                                                                                                                                   |
| IPv4 gateway address                       | 1.255.255.252                                                                                                                                   |
| IPv6 fix address/prefix                    | 0::0/64                                                                                                                                         |
| IPv6 link local address                    | see calculation in chapter 6.3                                                                                                                  |
| DHCPv6                                     | on                                                                                                                                              |
| IPv6 autoconfiguration (RA, SLAAC)         | on                                                                                                                                              |
| Host name                                  | MOBATIMExxxxxx, with the last 6 digits corresponding to the last 6 digits of the MAC address.<br>e.g. MAC 00:16:91:12:34:56<br>→ MOBATIME123456 |
| DNS Server (for NTP server only)           | 0.0.0.0 / 0::0                                                                                                                                  |
| NTP server address 1                       | 0.0.0.0 / 0::0                                                                                                                                  |
| NTP server address 2                       | 0.0.0.0 / 0::0                                                                                                                                  |
| NTP server address 3                       | 0.0.0.0 / 0::0                                                                                                                                  |
| NTP server address 4                       | 0.0.0.0 / 0::0                                                                                                                                  |
| Request interval NTP [s] (10...999s)       | 10                                                                                                                                              |
| Time zone entry 1                          | UTC                                                                                                                                             |
| Port number for configuration              | 65532                                                                                                                                           |
| Port number for time zone client           | 65534                                                                                                                                           |
| SNMP manager address 1                     | 0.0.0.0 / 0::0                                                                                                                                  |
| SNMP manager address 2                     | 0.0.0.0 / 0::0                                                                                                                                  |
| Interval SNMP alive traps [min] (1...1440) | 30                                                                                                                                              |
| MOBALine movement minute hand              | step                                                                                                                                            |
| MOBALine movement second hand              | continuous with step                                                                                                                            |
| Illumination mode                          | switched manually                                                                                                                               |
| Illumination                               | on                                                                                                                                              |
| Brightness mode                            | DIP switch                                                                                                                                      |

The interface can also be reset using MOBA-NMS.

## 10 Time zone table

Time zone entries standard season table (version 10.1).

| Time zone | City / State                                                                                                                                                                                   | UTC Offset | DST Change | Standard → DST                    | DST → Standard                    |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|-----------------------------------|-----------------------------------|
| 00        | UTC (GMT),<br>Monrovia, Casablanca                                                                                                                                                             | 0          | No         |                                   |                                   |
| 01        | London, Dublin,<br>Edinburgh, Lisbon                                                                                                                                                           | 0          | Yes        | Last Sun. Mar. (01:00)            | Last Sun. Oct. (02:00)            |
| 02        | Brussels, Amsterdam,<br>Berlin, Bern, Copenhagen,<br>Madrid, Oslo, Paris, Rome,<br>Stockholm, Vienna, Bel-<br>grade, Bratislava, Buda-<br>pest, Ljubljana, Prague,<br>Sarajevo, Warsaw, Zagreb | +1         | Yes        | Last Sun. Mar. (02:00)            | Last Sun. Oct. (03:00)            |
| 03        | Athens, Istanbul, Helsinki,<br>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        | Pretoria, Harare,<br>Kaliningrad                                                                                                                                                               | +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,<br>Moscow, St. Petersburg,<br>Volgograd                                                                                                                                    | +3         | No         |                                   |                                   |
| 09        | Praia, Cape Verde                                                                                                                                                                              | -1         | No         |                                   |                                   |
| 10        | UTC (GMT)                                                                                                                                                                                      | 0          | No         |                                   |                                   |
| 11        | Abu Dhabi, Muscat, Tbilisi,<br>Samara                                                                                                                                                          | +4         | No         |                                   |                                   |
| 12        | Kabul                                                                                                                                                                                          | +4.5       | No         |                                   |                                   |
| 13        | Adamstown (Pitcairn Is.)                                                                                                                                                                       | -8         | No         |                                   |                                   |
| 14        | Tashkent, Islamabad,<br>Karachi, Yekaterinburg                                                                                                                                                 | +5         | No         |                                   |                                   |
| 15        | Mumbai, Calcutta, Madras,<br>New Delhi, Colombo                                                                                                                                                | +5.5       | No         |                                   |                                   |
| 16        | Astana, Thimphu, Dhaka,<br>Novosibirsk                                                                                                                                                         | +6         | No         |                                   |                                   |
| 17        | Bangkok, Hanoi, Jakarta,<br>Krasnoyarsk                                                                                                                                                        | +7         | No         |                                   |                                   |
| 18        | Beijing, Chongqing, Hong<br>kong, Singapore, Taipei,<br>Urumqi, Irkutsk                                                                                                                        | +8         | No         |                                   |                                   |
| 19        | Tokyo, Osaka, Sapporo,<br>Seoul, Yakutsk                                                                                                                                                       | +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,<br>Port Moresby, Magadan,<br>Vladivostok                                                                                                                                       | +10        | No         |                                   |                                   |
| 24        | Sydney, Canberra, Mel-<br>bourne, 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.),<br>Noumea (New Caledonia),                                                                                                                                              | +11        | No         |                                   |                                   |
| 28        | Auckland, Wellington                                                                                                                                                                           | +12        | Yes        | Last Sun. Sep. (02:00)            | 1 <sup>st</sup> Sun. Apr. (03:00) |
| 29        | Majuro (Marshall Is.), ,<br>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, Santiago                       | -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,<br>Easter Island, Chile | -5   | No  |                                   |                                   |
| 38 | New York, Eastern Time<br>(US & Canada)      | -5   | Yes | 2 <sup>nd</sup> Sun. Mar. (02:00) | 1 <sup>st</sup> Sun. Nov. (02:00) |
| 39 | Chicago, Central Time<br>(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, Qaanaaq, Greenland                     | -3   | Yes | Last Sat. Mar. (22:00)            | Last Sat. Oct. (23:00)            |
| 56 | Qaanaaq, Greenland (old)                     | -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 (old)                        | -4   | Yes | 2 <sup>nd</sup> Sun. Oct. (00:00) | 2 <sup>nd</sup> Sun. Mar. (00:00) |
| 61 | Chile, Easter Island (old)                   | -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 table (entries 80 – 99).

**Legend:**

UTC: Universal Time Coordinate, equivalent to GMT  
DST: Daylight Saving Time  
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.



**Notice:**

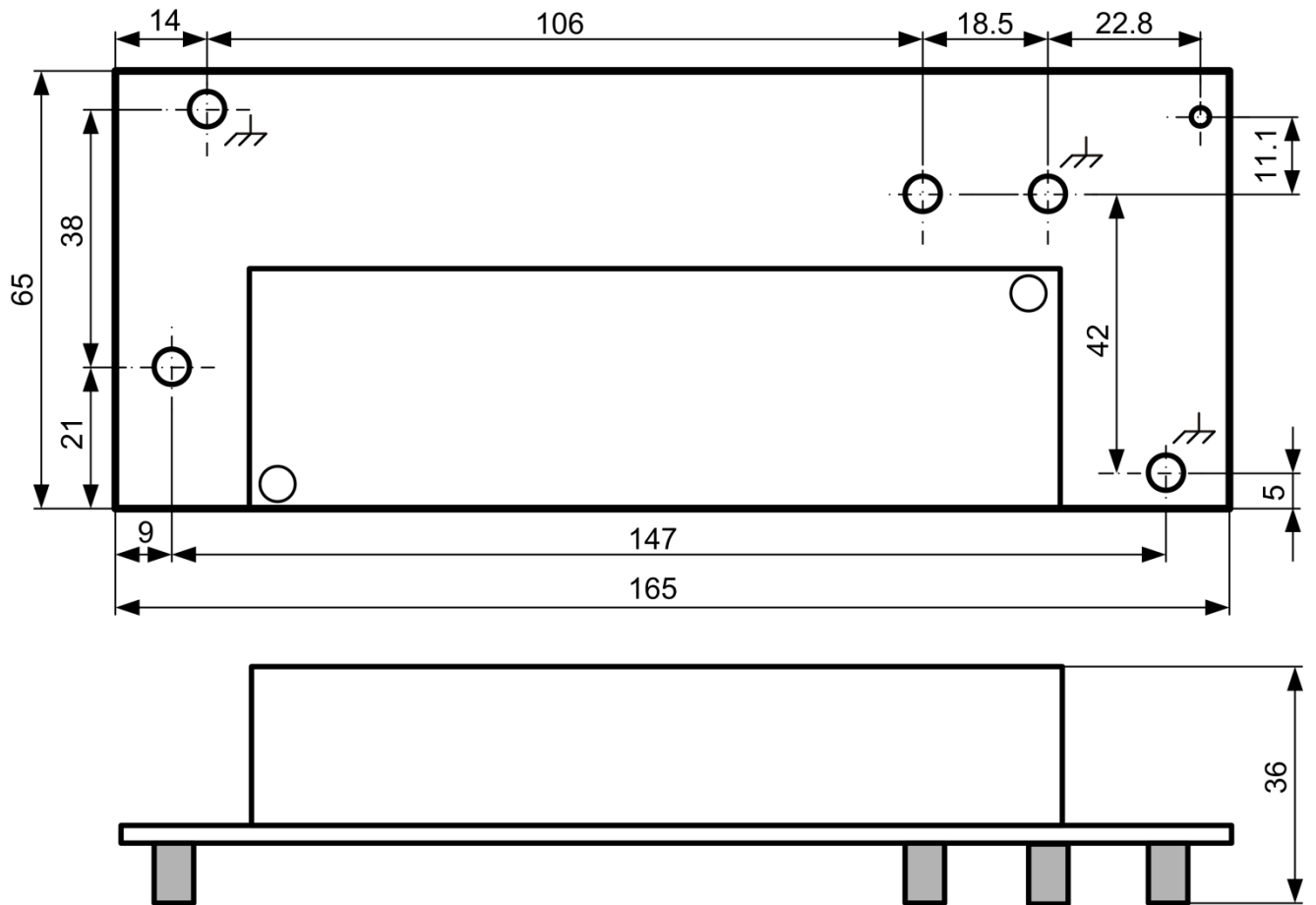
As usual, the time table is adapted each year. You can download the newest time table from our homepage: [www.mobatime.com](http://www.mobatime.com) → Downloads → Moba-Software → Time Zone Table. If the delivered device contains a newer version as showed in this manual, it's recommended to check the time zone entries.

## 11 Alarm list

| Number | Error message             | Description / Action                                                                                                                                                                | Chap. |
|--------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 0      | Synchronization           | Lost synchronization after 1h without time information over NTP                                                                                                                     |       |
| 1      | Power supply              | 1 or more power supply failed (detection often not possible)                                                                                                                        |       |
| 2      | Slave                     | Error on slave movements (cascade)                                                                                                                                                  |       |
| 3      | Illumination              | Supervision of clock illumination                                                                                                                                                   |       |
| 4      | Hands position (sec)      | Wrong hand position detected. E.g. hand blocked                                                                                                                                     |       |
| 5      | Hands position (m/h)      | Wrong hand position detected. E.g. hand blocked                                                                                                                                     |       |
| 6      | Restart                   | Restart alarm is set after restart (at least sent out once per notification)                                                                                                        |       |
| 7      | Comm. Error               | Set if an error occurred in communication, e.g. invalid packet, invalid parameter, ...<br>cleared after send of notification (id configured on) and CMD_ANS_STATE_V2 has been sent. |       |
| 8      | Time zone                 | No time zone information                                                                                                                                                            |       |
| 9      | Authentication error      | Device password wrong. (Used for CMD_SET_DATA only.)                                                                                                                                |       |
| 10     | Bootloader error          | Bootloader has old version -> Update                                                                                                                                                |       |
| 32     | Side clock state error    | Indicates that at least one supervised side clock has an error.                                                                                                                     |       |
| 33     | "No file" error           | No switch editor file on the clock controller                                                                                                                                       |       |
| 34     | Week program error        | Wrong week program state                                                                                                                                                            |       |
| 35     | Exception error           | Wrong exception state                                                                                                                                                               |       |
| 36     | File error                | Error occurred reading the switch editor file                                                                                                                                       |       |
| 37     | Power error               | PD can't give enough power                                                                                                                                                          |       |
| 38     | File too big              | The switch editor file is too big                                                                                                                                                   |       |
| 39     | Light error               | Light should be on, light sensor says off                                                                                                                                           |       |
| 40     | MOBALine error            | The line voltage is too low                                                                                                                                                         |       |
| 41     | Illumination over current | The configured illumination current is too high                                                                                                                                     |       |

## 12 Measurements

All dimensions in mm



The contact points must be electrically connected to the mounting plate using metal bolts!

### Mounting locations



Ø2.5mm hole for spacer



Mounting hole for M3 screw



## 13 Technical data

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|                                                                               |                                                                                                                                                                                              |
|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Synchronization</b>                                                        | NTP                                                                                                                                                                                          |
| <b>Power supply</b> <b>from mains</b>                                         | 100-240 VAC, 0.55 A, 50/60 Hz (20 W)                                                                                                                                                         |
| <b>from LAN</b>                                                               | Power over Ethernet, 802.3at, class 4, < 22 Watt<br>Phantom or spare-pair power                                                                                                              |
| <b>Start-up current</b>                                                       | Cold start: 70A ( $t_{width} = 200 \mu\text{S}$ measured at 50% $I_{peak}$ )                                                                                                                 |
| <b>Power reserve</b>                                                          | ext. UPS                                                                                                                                                                                     |
| <b>Time-keeping without synchronization</b><br>→ afterwards to 12:00 position | NTP. 1 day                                                                                                                                                                                   |
| <b>Accuracy</b> <b>synchronized</b>                                           | typically < +/- 50 ms                                                                                                                                                                        |
| <b>unsynchronized</b>                                                         | typically < +/- 2 seconds after 24h                                                                                                                                                          |
| <b>Outputs</b>                                                                | MOBALine: local time, max. 100mA                                                                                                                                                             |
| <b>Illumination</b>                                                           | 30V / max 700mA                                                                                                                                                                              |
| <b>Week program function</b>                                                  | no (future function)                                                                                                                                                                         |
| <b>Time zone setting</b>                                                      | yes (via MOBA-NMS)                                                                                                                                                                           |
| <b>Operating elements</b> <b>DIP switch</b>                                   | 1 single- or double-sided clock<br>2 network surveillance<br>3-5 illumination level (current)<br>6 not used                                                                                  |
| <b>Push-button</b>                                                            | Software reset<br>Reset to factory settings                                                                                                                                                  |
| <b>Displays (LEDs)</b>                                                        | Power (green)<br>LAN link (green)<br>LAN activity (yellow)<br>Alarm (red)<br>Synch. (green)<br>PoE(+) (orange)<br>External illumination control (red)                                        |
| <b>Operation</b>                                                              | MOBA-NMS, DIP switch, push-button                                                                                                                                                            |
| <b>Weight</b>                                                                 | 250 g                                                                                                                                                                                        |
| <b>Temperature range</b>                                                      | -30 °C ... +70 °C                                                                                                                                                                            |
| <b>Remote operation</b>                                                       | Via MOBA-NMS, SNMP or from DHCP-Server (network settings only):<br>Second and minute hand behavior, time zone, 12:00 position, illumination on/off, illumination control, illumination level |
| <b>Surveillance</b>                                                           | SNMP (Traps, SNMP V2a)<br>MOBA-NMS:<br>MOBALine voltage<br>Synchronization                                                                                                                   |
| <b>Protection class</b>                                                       | Protection class I                                                                                                                                                                           |

### Safeguard table

| Safeguard type (LS) | B10 | B16 | C10 | C16 |
|---------------------|-----|-----|-----|-----|
| Number of NCCs      | 4   | 7   | 7   | 11  |





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