

# MOUNTING AND INSTRUCTION MANUAL

## GU 192(t) V2

Autonomous GPS radio controlled movement



## **Certification of the producer**

### STANDARDS

The GU 192(t) V2 was developed and produced in accordance with the EU guideline 2014 / 30 / EU



This product belongs to Class A in accordance with EN 55022.  
This equipment can lead to radio interference. In this case, actions must be taken by the user.

## **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.
6. It is prohibited to reproduce, to store in a computer system or to transfer this publication in a way or another, even part of it. The copyright remains with all the rights with BÜRK MOBATIME GmbH, D-78026 VS-Schwenningen and MOSER-BAER AG – CH 3454 Sumiswald / SWITZERLAND.

# Table of contents

---

1	Safety .....	4	6.3	Checking of the hand position.....	9
1.1	Safety instructions .....	4	6.4	Time zone selection .....	9
1.2	Symbols and signal words .....	4	6.5	Positioning of the magnet antenna .....	10
1.2.1	Warnings .....	4	6.6	Mounting of the power supply .....	11
1.2.2	Indications .....	4	6.7	Reception check .....	11
1.3	Intended Use .....	4	7	Synchronization / Accuracy .....	12
1.4	Observe operating safety! .....	5	8	Operation key .....	13
1.5	Observe the installation site! .....	5	8.1	Functions.....	13
1.6	Observe the electromagnetic compatibility! .....	5	8.2	Remote control.....	13
2	Maintenance.....	6	9	Configuration switches .....	14
2.1	Troubleshooting - repairs .....	6	10	Monitor LED.....	14
2.2	Cleaning .....	6	11	User defined time zone entry.....	15
2.3	Disposal.....	6	11.1	Download procedure .....	15
3	General Information - Introduction.....	7	11.2	Edit a time zone entry on PC .....	16
3.1	Scope of delivery.....	7	11.3	Definition of the transmission format .....	17
3.2	Technical data .....	7	11.4	Connections IF 494.....	18
3.3	Device description in this manual.....	7	12	Cascade with a basic movement.....	18
3.4	Introduction.....	7	12.1	Serial telegram for the synchronization of cascaded movements .....	19
3.5	Device types.....	7	13	Time zone table .....	20
4	Measurements.....	8	14	Technical data .....	22
5	Movement mounting.....	8	15	Accessories .....	22
6	Mounting and start-up .....	9			
6.1	Recommended procedure.....	9			
6.2	Mounting of the hands.....	9			

# 1 Safety

---

## 1.1 Safety instructions

---



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.

## 1.2 Symbols and signal words

---

### 1.2.1 Warnings



#### **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!

### 1.2.2 Indications



#### **Attention!**

Please observe this safety message to avoid unwanted effects on the device!



#### **Notice!**

Additional information for the use of the device.

## 1.3 Intended Use

---

The **GU 192(t) V2** is a movement for use in self-setting indoor and outdoor clocks for dial diameters up to 80cm. Without illumination: series 192; with illumination: series 192t. Cascading of up to three slave movements is possible (see chapter 12).

## 1.4 Observe operating safety!

---



**Caution!**

Never open the housing of the device! This could cause an electric short or even a fire, which would damage your device. Do not modify your device!



**Caution!**

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.



**Warning!**

Keep packaging such as plastic films away from children. There is the risk of suffocation if misused.

## 1.5 Observe the installation site!

---



**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.



**Danger!**

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.

## 1.6 Observe the electromagnetic compability!

---

This product belongs to Class A in accordance with EN 55022. This equipment can lead to radio interference. In this case, measures must be taken by the user.

## 2 Maintenance

---

### 2.1 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.

### 2.2 Cleaning

---

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

### 2.3 Disposal

---



#### **Device**

At the end of its lifecycle, do not dispose of your device in the regular household rubbish. 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.

## 3 General Information - Introduction

---

### 3.1 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:

- GU 192(t) V2
- GPS receiver
- Magnet antenna



#### **Attention!**

The movement GU 192(t) V2 and the GPS receiver are not compatible with the old components GU 192 V1 (art. no. 201415), GU 192t V1 (art. no. 201418) and the GPS receiver V1 (art. no. 201416)!

### 3.2 Technical data

---

See chapter „14 Technical data“.

### 3.3 Device description in this manual

---

This instruction manual is for the GPS radio movements **GU 192 V2** and **GU 192t V2**. Below, both models will be referred to as **GU 192** for better readability. With the exception of the shaft length, this term always refers to both models within the manual (GU 192 V2 and GU 192t V2).

### 3.4 Introduction

---

The GU 192 V2 is a GPS radio movement for use in self-setting indoor and outdoor clocks for dial diameter up to 80 cm. Cascading of up to three slave movements is possible.

For clocks without illumination, GU 192 V2 is used, for illuminated clocks the GU 192t V2 (t = long shaft).

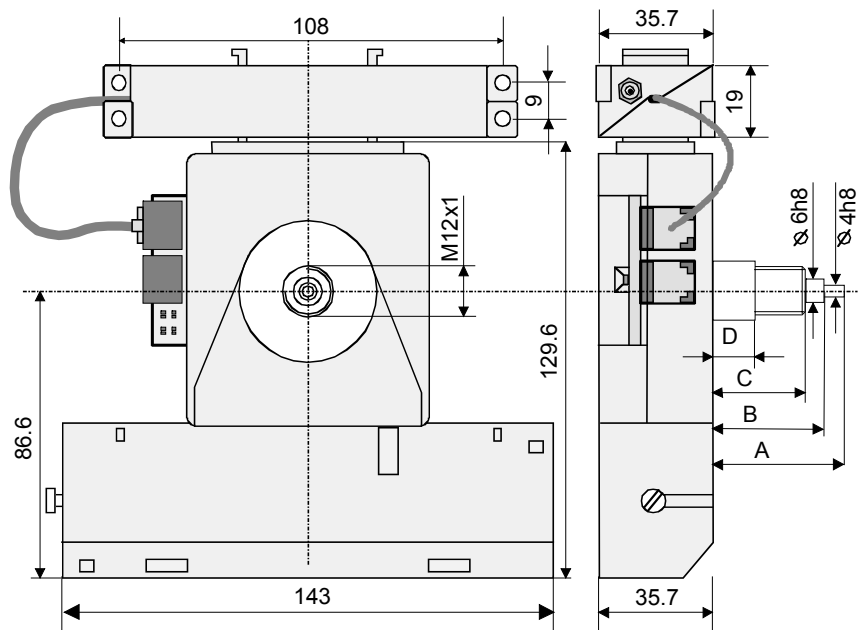
### 3.5 Device types

---

<b>Model:</b>	<b>Features:</b>	<b>Product no.:</b>
<b>GU 192 V2</b>	According to description above	<b>120719</b>
<b>GU 192t V2</b>	like GU 192 V2, long shaft version	<b>120720</b>

## 4 Measurements

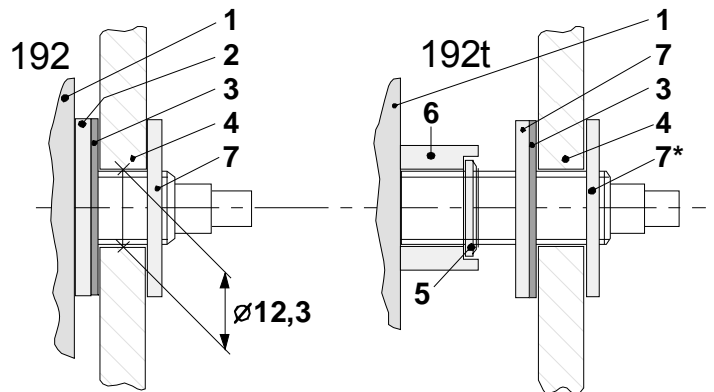
	192 V2	192t V2
A	18.9	34.0
B	11.9	27.0
C	8.4	23.5
D	---	8.0
E	5.0	8.0



## 5 Movement mounting

The dial must be sufficiently stable. The fixing hole must have a diameter of 12,3 mm. The movement must be fixed in vertical position.

See the picture to the right for the position of mounting parts. The disc nut (7\*) M12 x 1 has to be tightened with a special wrench tool (Art. No. 36761) and a torque wrench with a torque of 4.5 Nm +/- 0.2 Nm.



1 Movement  
2 Synthetic ring  
3 Rubber washer  
4 Dial

5 Ring nut  
6 Distance ring  
7 Disc nut



### Caution!

Using the movement 192t, the ring nut (5) and distance ring (6) must not be removed.



### Caution!

With the movement with short shaft (192) the rubber washer (3) must in no case touch the clock case. In case of damage of the clock case the movement can be blocked.



## 6 Mounting and start-up

---

### 6.1 Recommended procedure

---

The following procedure is recommended at the starting-up:

1. Mounting of the hands (chapter 6.2)
2. Selection of time zone (chapter 6.4)
3. Positioning of the magnet antenna (chapter 6.5)
4. Mounting of the power supply (chapter 6.6)
5. Checking of the reception (chapter 6.7)

### 6.2 Mounting of the hands

---

The shafts of the hour and minute hands are positioned ex-work on the reference position (12 o'clock). The hands shall be carefully fixed and tightened on the shafts. Enough space must be available between the hands.

**Advice:**

The position 12 o'clock must in any case be checked after the mounting (chapter 6.3).

### 6.3 Checking of the hand position

---

- Switch on switch 8 (chapter 9).
- Install the power supply (chapter 6.6).
  - ➔ The clock runs to 12 o'clock position
  - ➔ Position of hands OK?
- If the hand position is wrong, carefully loosen the hands, adjust and tighten.
  - ➔ Check the 12 o'clock position again (initiating by a short interruption of the power supply).
- Switch off switch 8 (chapter 9).
  - ➔ The radio reception will thus be activated. With sufficient reception the clock runs from the 12 o'clock position to the correct time after max. 25 minutes.



**Advice:**

After the correct setting the hands must not be turned by hand any more!

### 6.4 Time zone selection

---

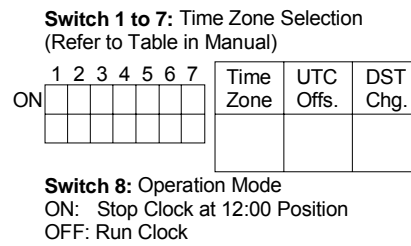
In the program memory of the GU 192 V2, a total of 59 different time zone entries are programmed permanently (chapter 13). With the switches 1 to 6 on the rear side of the movement the time zone entries can be selected (chapter 9). The program entries contain in addition to the UTC related local offset partly also information on the season time change-over and will thus be able to take into consideration the most common change-over times.



**Advice:**

Should an invalid entry be coded (>59), the clock runs on UTC. A change of the switch position will only be effective at the next minute step.

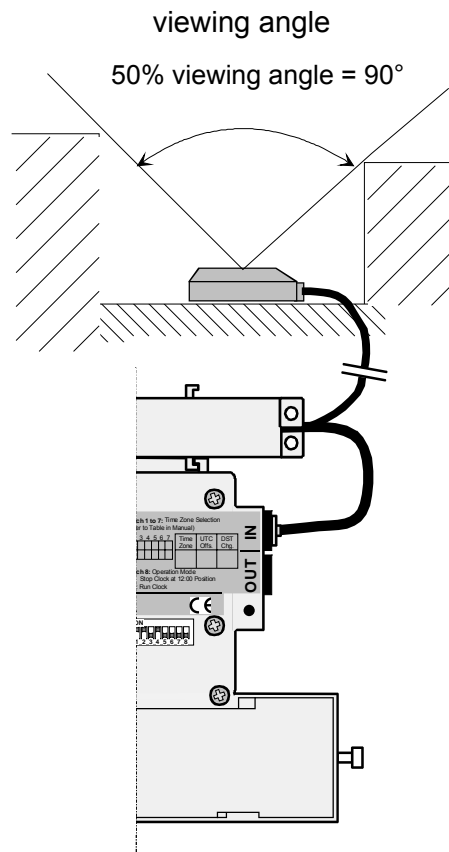
On the type plate of the GU 192 V2 the configuration for the corresponding installation site of the clock can be indicated:



If none of the 59 predefined time zone entries corresponds to the requirements, an entry as per the user's requirements can be charged on the GU 192(t) V2 (chapter 11). This entry will be selected with switch 7 and will blot out the adjustments of the switches 1 to 6. If no entry has been stored on the clock up to now, the switch 7 is of no importance and the coding of the switches 1 to 6 remains valid.

## 6.5 Positioning of the magnet antenna

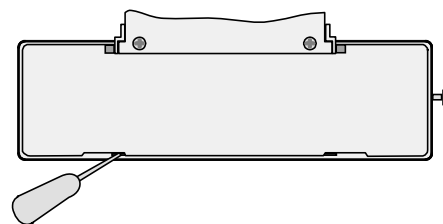
The magnet antenna must be connected to the GPS receiver and installed outdoors (shading from buildings should be avoided). The GPS receiver shall be connected to the input of the GU 192(t) V2 before the installation of the battery.



## 6.6 Mounting of the power supply

---

To open the battery box lift the cover with a screwdriver, which is placed in the foreseen space, and press lightly downwards (see picture). Possible power supplies:



Var.1: 1 Lithium battery 3.6V 35 Ah (Art. 106895)

Var.2: Ext. power supply 230VAC (Art. 116964)



### Attention:

Please pay attention to the polarity of the power supply! As soon as the movement is under power, the hands will start moving.



### Advice:

The electric contact can be improved through a slight tightening of the synthetic screw. The lithium battery and the mains part shall be connected by using the corresponding connection wires.

## 6.7 Reception check

---

During the reception procedure a side-positioned LED will emit a flash pattern, which indicates the state (chapter 10).

The initial synchronization can last up to 25 minutes. This is the maximal time required, in order to receive the necessary information from the GPS satellite under sufficient reception conditions. After the initialization this time will be reduced to 2 minutes.

Should the clock not be synchronized even after 25 minutes, the reception procedure will be interrupted (LED does not flash any more, the hands will remain on 12 o'clock position). The following possibilities to reactivate the reception procedure exist:

- Interrupt the power supply
- A short pressure on the operation button (chapter 8)
- Switch on, followed by a switch off, of the switch 8 (chapter 9)
- After 23 hours the movement will activate the reception automatically.



### Advice!

After inserting a suitable lithium battery or connecting a mains part (chapter 6.6), the clock runs in any case on the 12 o'clock position, in order to initiate the hand position and switches on the reception for the initial synchronization.



### Advice!

If synchronization is not working, even after more than 30 minutes, than disconnect mini magnetic antenna from receiver and restart movement again be removing the power supply. After some minutes, if the clock hands reached the 12.00 position, reconnect the antenna and reception should work correctly.

## 7 Synchronization / Accuracy

---

After a successful initialization the GU 192(t) V2 switches on the reception once a week and will then be synchronized from the GPS again. Should the synchronization not be successful the procedure will be repeated after 23 hours. After max. 53 days without a correct synchronization the clock will change over to disturbance mode.

The clock runs to the 12 o'clock position and remains there in power saving mode. The movement can be released from the disturbance mode through a switch on and a following switch off of the configuration switch 8 (chapter 9). The reception procedure for an initial synchronization will then be started anew.

Further information concerning the reception activating can be found in chapter 6.7.

As standard for the accuracy of the GU 192(t) V2 the emission by minute of the serial time telegram (chapter 12) immediately after the synchronization from GPS can be rated. The telegram reaches its validity with the last emitted sign. The deviation in relation to the GPS second impulse (+/- 95 ns to UTC) will amount to +/- 20 ms after the synchronization. The quartz drift amounts to typical +/- 2 ppm (T=0..40°C), which can cause a deviation of +/- 172.8 ms in 24 h.

(At temperatures under 0°C, resp. over 40°C, the quartz drift amounts to +/- 7.5 ppm).

## 8 Operation key

### 8.1 Functions

The following functions can be released through the operation key (see picture):

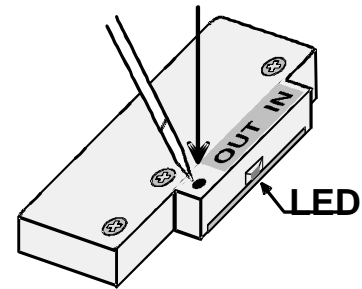
<b>A</b>	Key pressed for < 5 s
<b>B</b>	Key pressed for > 5 s

**A:**

If the key < 5 s will remain pressed, the clock switches on the time reception after the next minute step for further 2 minutes.

**B:**

If the key > 5 s will remain pressed, the clock runs to the 12 o'clock position and will remain there for 10 minutes. During this time it is possible to charge a time offset on the movement as per the user's requirements (see chapter 11). After the end of the 10 minutes or after that the key has been briefly pressed, the clock runs to the correct time again (under condition that the clock is synchronized).



**Advice!**

Should the clock has to be dismantled or the hands adjusted again, it is recommended to remove the power supply, after that the hands have stopped on 12 o'clock. It will thus be avoided, that the hands suddenly will start running again after 10 minutes.



**Advice!**

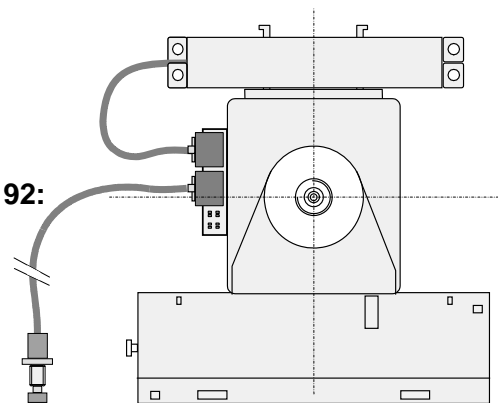
When the operation key is pressed, the side-positioned LED must flash. Should this not be the case, the key has been released too early and the function A not executed. If the key is pressed longer than 5 s (Function B), the LED will extinguish.

### 8.2 Remote control

The operation key can also be operated by means of a remot external key. This will be connected on the plug position **OUT** (see picture).

Accessories (optional): KEY 192  
External key incl. 5 m cable

**KEY 192:**  
5m



**External Key**

## 9 Configuration switches

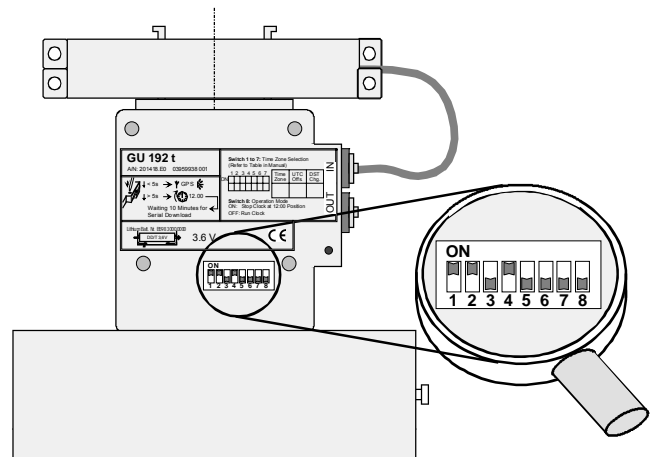
With the switches 1 to 6 (see picture) one of the 59 predefined time zone entries can be selected (chapter 13). The sum of the valence of the switched on switches gives the number of the selected time zone entry.

*For example time zone entry 27:*

*Switch 5, 4, 2, 1 on position ON:  $16 + 8 + 2 + 1 = 27$*

Should none of the predefined time zone entries be applicable, an entry as per the user's requirements can be charged from a computer into the movement by means of an interface (chapter 11). This entry will be selected with switch 7.

Should the clock be transported, stored or maintained without removing the power supply (battery or mains part), the switch 8 can be switched on. The movement runs now on the 12 o'clock position and will then be put in the power saving mode, so that the power supply will not be unnecessarily charged. In this condition the clock will not synchronize itself!



## 10 Monitor LED

On the side of the movement a LED is situated, which displays the operation conditions of the 192(t) V2 as flash pattern:

**1x flashing:** *Battery voltage for the reception too low*

In case of too low battery voltage, caused by very low ambient temperatures or through a discharge of the battery caused by age, the GPS receiver of the GU 192 V2 must not be switched on any more. (→ Exchange of battery or waiting for higher temperature).

**2x flashing:** *GPS receiver switched on*

The processor tries to build up the communication with the GPS receiver. If the clock does not leave this condition during the whole reception duration (max. 2, resp. 25 minutes), it is possible that the connection with the GPS receiver or to the magnet antenna is disturbed. (→ Check connection to the receiver).

**3x flashing:** *Query receiver state*

The processor requires from the GPS receiver a state telegram and evaluates the same. If the clock does not leave this condition during the remaining reception duration (max. 2, resp. 25 minutes), missing or disturbed satellite reception could be the reason. (→ Put the antenna into a better position or activate the reception again manually later on).

**4x flashing:** *Query receiver time*

There are enough satellites available for the synchronization. The processor requires now time telegrams from the GPS receiver and evaluates the same. If the clock in spite of this does not synchronize during the remaining reception duration (max. 2, resp. 25 minutes), then no valid time could be received or the reception duration was not sufficient. (→ Activate the reception manually again).

The LED monitor will also light, when the operation key is pressed (chapter 8).

## 11 User defined time zone entry

---

The GU 192 (t) V2 is equipped with a non-volatile memory (EEPROM), where the user defined time zone entries can be stored. The download is effected by means of a serial data transmission. For this purpose a PC or a PALM together with an interface IF 494 for the level adaptation RS 232 to TTL 3V can be used.

### 11.1 Download procedure

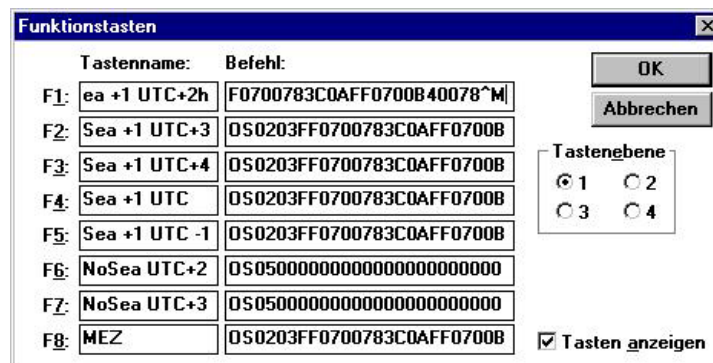
---

- Switch off all configuration switches. The clock will run on UTC time (will later be used for checking the downloads).
- Press operation key > 5 s (The movement will immediately run to the 12 o'clock position and will remain there during 10 minutes).
- Remove the GPS receiver from the IN-plug of the movement.
- Connect the IF 494 to the IN-plug of the movement.
- Connect the IF 494 with the computer or PALM.
- Transmit the time zone entry with the download program from PC or PALM (LED on IF 494 must flash).
- Wait until the remaining time of the 10 minutes has passed or end the download through a brief push on the operation key on the GU 192(t) V2. The clock runs again on UTC time.
- For activating the user defined time zone entry switch on switch 7.
- Check of the entry: If the clock does not run on the required time or if it does not leave the 12 o'clock position, the download has gone wrong and must be repeated. For this the movement must first be released from the disturbance mode: Switch on and then immediately switch off the switch 8 (chapter 9).

## 11.2 Edit a time zone entry on PC

The disk 'Timeset Utilities for QU192 with IF494' (Art.Nr.: 201 420) contains the program **Terminal.exe** and the file **QU192Sea.trm**. With a double click on **Terminal.exe** the terminal program will start and with 'Open file' the configuration file **QU192Sea.trm** can be loaded (see picture).

In the configuration file some time zone entries are predefined as examples. They will be transmitted through a click on the corresponding key in the lower bar.



The examples can be modified or completed by opening the menu 'Settings – Function keys' (see picture). The telegram to be sent can be composed with the help of the description in chapter 11.3 and be entered in the field 'Command'.

### Advice:

In the field the complete telegram will not be displayed, however, the cursor can be moved further to the right. At the end of the telegram **^M** must always be entered!



### 11.3 Definition of the transmission format

**Definition:** 9600 bit/s, 7 data bit, even parity, 1 stop bit.

**Format:**

Byte no.	Designation	Sign	HEX code
1	Start sign	O	4F
2	Identification season telegram	S	53
3	1) Type of season entry – tens	0	30
4	Type of season entry – unit	2 oder 5	32 oder 35
5–14	2) Daylight saving time start date / time	0 .. 9, A .. F	30 .. 39, 41 .. 46
	Daylight saving time offset, value $\pm 120$ min:		
15	High Nibble	0 .. 9, A .. F	30 .. 39, 41 .. 46
16	Low Nibble	0 .. 9, A .. F	30 .. 39, 41 .. 46
17–26	Daylight saving time End date / time	0 .. 9, A .. F	30 .. 39, 41 .. 46
	Local Offset, value $\pm 780$ min:		
27	High Byte, High Nibble	0 .. 9, A .. F	30 .. 39, 41 .. 46
28	High Byte, Low Nibble	0 .. 9, A .. F	30 .. 39, 41 .. 46
29	Low Byte, High Nibble	0 .. 9, A .. F	30 .. 39, 41 .. 46
30	Low Byte, Low Nibble	0 .. 9, A .. F	30 .. 39, 41 .. 46
31	Telegram end	CR	0D

- 1) The following types of season entries are available (see below):  
 2: Season change-over at specific dates yearly  
 5: No season change-over, only offset to UTC

2) Definition of start and end of daylight saving time / date:

Type(1B)	SumTime begin Time/Date (5B)				SumOffset (min) (1B)	SumTime end Time/Date (5B)				LocalOffset to UTC (min) (2B)
2	month	WDM	WD	min of day	i.e. 60 (MET)	month	WDM	WD	min of day	i.e. 60 (MEZ)
5	not used				no sumtime	not used				i.e. 60 (MEZ)

**Legend:**

**WDM:** 1 .. 4 = first .. fourth WD of the month (e.g. first Saturday in April)

1...31 = 1st – 31st day of the month (e.g. 21st April)

-1 (FF) / -2 (FE) = last / second to last WD of the month (e.g. last Sonntag March)

**WD:** Weekday: Monday = 1 ... Sonntag = 7 or Tag = 0

**Example for CET:**

1	2	3/4	5/6	7/8	9/10	11..14	15/16	17/18	19/20	21/22	23..26	27..30	31
O	S	02	03	FF	07	0078	3C	0A	FF	07	00B4	003C	0D

**3/4:** Type 2

**5/6:** Month 03 -> March

**7/8:** Hex FF = -1 -> last weekday of the month

**9/10:** Weekday 7 -> Sunday

**11..14:** Hex 0078 = 120 -> 120th min. of day -> 02.00

**15/16:** Season offset 60 min.

**17/18:** Month 10 -> October

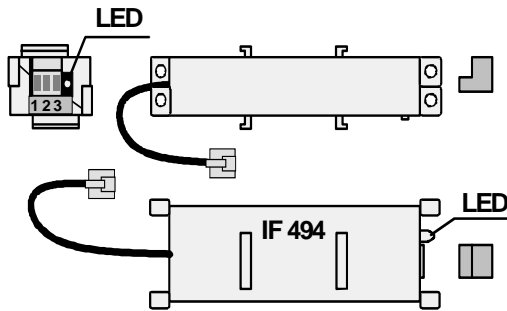
**19/20:** ditto 7/8

**21/22:** ditto 9/10

**23..26:** Hex 00B4 = 180 -> 03.00

**27..31:** Offset to UTC 60 min.

## 11.4 Connections IF 494

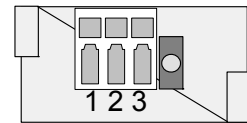


Optional accessories for the programming of the user defined time zone entries.

The LED confirms the data transmission with brief flashing.

Dimensions approx. 34 x 20 x 15mm.

Data input plug IF 494:



### A RS232 without external power supply

Connection to serial interface:

1: TxD      2: GND

### B RS232 with external power supply

Connection to serial interface with external, galvanic separated power source (6V – 12VDC)

1: TxD      2: GND  
3: +6...12V      2: GND

### C RS422 without external power supply

Connection to serial interface

1: TD -      2: TD +

### D RS422 with external power supply

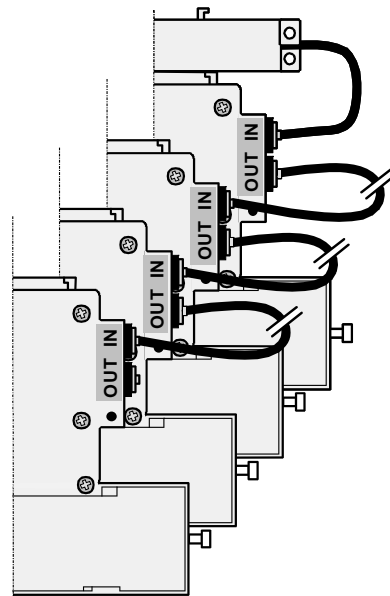
Connection to serial interface with external galvanic separated power source (6 – 12VDC)

1: TD -      2: TD +  
3: +6...12V      2: GND

## 12 Cascade with a basic movement

Cascading means that a number of movements can be connected in series. Up to three basic movements of the type BU 192(t) can be connected to a GU 192(t) (see picture).

The cascading is done by means of a cascade cable COM 192 (length 1m), enabling to synchronize 4 movements with only one reference signal. After the synchronization of the master movement the time synchronization for all the other movements will follow in a few seconds only. Should the time for the master movement change during the normal operation, the time take-over for each connected movement will take about 2 minutes, therefore totally about 6 minutes. This is also valid for the daylight saving time change.



## 12.1 Serial telegram for the synchronization of cascaded movements

---

For the synchronization of cascaded movements a standard serial telegram IF 482 will be used. The definitions will be executed as follows:

**Definition:** Time telegram (ASCII), terminating at the designed second in the telegram:  
9600 bit/s, 7 data bits, even parity, 1 stop bit. Jitter < 50ms.

**Format:**

Byte Nr.	Designation	Sign	HEX Code
1	Start sign	O	4F
2	Supervision 1)	A	41
3	Time season 3)	L	4C
4	Year tens	0 .. 9	30 .. 39
5	Year units	0 .. 9	30 .. 39
6	Month tens	0 or 1	31 or 31
7	Month units	0 .. 9	30 .. 39
8	Day tens	0 .. 3	30 .. 33
9	Day units	0 .. 9	30 .. 39
10	Monday .. Sunday 2)	F	46
11	Hours tens	0 .. 2	30 .. 32
12	Hours units	0 .. 9	30 .. 39
13	Minutes tens	0 .. 5	30 .. 35
14	Minutes units	0 .. 9	30 .. 39
15	Seconds tens	0 .. 5	30 .. 35
16	Seconds units	0 .. 9	30 .. 39
17	Telegram end	CR	0D

- 1) This character is always A: Will be checked but not evaluated.
- 2) Weekday not evaluated. This character is always L.
- 3) Local time (displayed by the clock): Will be checked but not evaluated.

## 13 Time zone table

Time zone entries in the standard season table (version 9.0).

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, Liubliana, Prague, Sarajevo, Sofia, Vilnius, Warsaw, Zagreb	+1	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
03	Athens, Istanbul, Minsk, Helsinki, Riga, Tallinn, Kaliningrad	+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	Dhaka	+6	Yes	Wed. 31. Mar. (22:59) (2010)	Sun. 31. Oct. (23:59) (2010)
07	Tel Aviv	+2	Yes	Last Fri. Mar. (02:00)	2 <sup>nd</sup> Sun. Oct. (02:00) (2010)
08	Kuwait City	+3	No		
09	Moscow, St. Petersburg, Volgograd	+3	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
10	Tehran	+3.5	Yes	Sun. 21. Mar. (00:00) (2010)	Tue. 21. Sep. (00:00) (2010)
11	Abu Dhabi, Muscat, Tbilisi	+4	No		
12	Kabul	+4.5	No		
13	Yekaterinburg, Russia	+5	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
14	Tashkent	+5	No		
15	Mumbai, Calcutta, Madras, New Delhi, Colombo	+5.5	No		
16	Astana, Thimphu	+6	No		
17	Bangkok, Hanoi, Jakarta	+7	No		
18	Beijing, Chongqing, Hong kong, Singapore, Taipei, Urumqi	+8	No		
19	Tokyo, Osaka, Sapporo, Seoul	+9	No		
20	Yakutsk, Russia	+9	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
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	Queensland: Brisbane, Guam, Port Moresby	+10	No		
24	NSW, Victoria: Sydney, Canberra, Melbourne	+10	Yes	1 <sup>st</sup> Sun. Oct. (02:00)	1 <sup>st</sup> Sun. Apr. (03:00)
25	Tasmania: Hobart	+10	Yes	1 <sup>st</sup> Sun. Oct. (02:00)	1 <sup>st</sup> Sun. Apr. (03:00)
26	Vladivostok	+10	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
27	Solomon Is. , New Caledonia	+11	No		

28	Auckland, Wellington	+12	Yes	Last Sun. Sep. (02:00)	1 <sup>st</sup> Sun. Apr. (03:00)
29	Marshall Is.	+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) (2010)
33	Buenos Aires	-3	No		
34	Newfoundland, Labrador	-3.5	Yes	2 <sup>nd</sup> Sun. Mar. (00:01)	1 <sup>st</sup> Sun. Nov. (00:01)
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	Samara, Russia	+4	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
49	Novosibirsk, Russia	+6	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
50	Krasnoyarsk, Russia	+7	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
51	Irkutsk, Russia	+8	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
52	Magadan, Russia	+11	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
53	Anadyr, Russia	+12	Yes	Last Sun. Mar. (02:00)	Last Sun. Oct. (03:00)
54	Ittoqqortoormiit, 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	Islamabad, Karachi, Pakistan	+5	No	Thu. 15. Apr. (00:00) (2010)	Sun. 31. Oct. (00:00) (2010)
64	Apia, Samoa	-11	Yes	Last Sun. Sep. (00:00)	First Sun. Apr. (00:00) (2011)

**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:** You can download the current 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.

## 14 Technical data

Operation	1 motor for minute and second hand Normal operation mode: 1 step / min. Setting mode: 2 steps / sec.
Automatic time take over from GPS and adjustment of the movement on predefined local time	•
Automatic, pre-programmed change of daylight saving time	•
59 predefined time zone entries	Selection by means of DIP switch
Option: Time zone entry programmable on PC for download	•
Reading of the time information from GPS	Cold start: max. 25 minutes Warm start: max 2 minutes
Synchronization on GPS	1 x per week
Signalization of missing GPS reception	Stop on 12:00 position, after about 1.5 months without reception
Check of hand position	1 x per 12 hours
Dimensions of hands max.	As per DIN 41092/3 for dial-ø up to 80 cm
Weight of hands max.	Balanced min. hand 140g, hour hand 110g
Fixing	Central nut M12 x 1 mm
Dimensions	As per drawing
GPS receiver	L1 frequency 1575.42 MHz, C/A code, 12 channel
GPS magnet antenna	Active miniature antenna with 5 m coaxial cable, pluggable
Accuracy, deviations will be corrected at GPS synchronization	0.2 seconds / day at 0 °C to 40 °C
Operation and storage temperature at max. 95 % rel. humidity, not condensing	-30 °C to +70 °C
Power supply	3.6 V lithium battery / 35 Ah, Life-span > 6 years
Weight without batteries	GU 192 V2: 310 g, GU 192t V2: 350 g
CE conformity	EN 61000-6-3, emissions (household) EN 50121-4, industrial (increased requirements for railways)

## 15 Accessories

<b>CAB 192:</b> Extension cable with connectors and plugs (L= 4 m)	For indoor use only	104816 & 103674
<b>COM 192:</b> Cascade cable with connectors (L= 1 m)		116022
<b>KEY 192:</b> External key with 5 m cable and connectors		116025
<b>LIT:</b> Long-life Lithium battery, 3,6 V	Within a protected housing (IP 54)	106895
<b>NT 192:</b> External power supply unit for 230 V/50 Hz, 3.6 VDC	for in- and outdoor use	116964
<b>IF 494:</b> Interface pluggable, with connection to serial interface RS 232 or RS 422		117907
<b>TIMESET Kit:</b> Timeset Utilities for IF 494 for programming of the time and season tables with QU 192 V2 (BU 192).	PC Software: 'MobaSrc.exe'	108165



### HEADQUARTERS / PRODUCTION

MOSER-BAER AG  
Spitalstrasse 7, CH-3454 Sumiswald  
Tel. +41 34 432 46 46 / Fax +41 34 432 46 99  
moserbaer@mobatime.com / www.mobatime.com

### SALES WORLDWIDE

MOSER-BAER SA EXPORT DIVISION  
19 ch. du Champ-des-Filles, CH-1228 Plan-les-Ouates  
Tel. +41 22 884 96 11 / Fax + 41 22 884 96 90  
export@mobatime.com / www.mobatime.com

### SALES SWITZERLAND

MOBATIME AG  
Stettbachstrasse 5, CH-8600 Dübendorf  
Tel. +41 44 802 75 75 / Fax +41 44 802 75 65  
info-d@mobatime.ch / www.mobatime.ch

MOBATIME SA  
En Budron H 20, CH-1052 Le Mont-sur-Lausanne  
Tél. +41 21 654 33 50 / Fax +41 21 654 33 69  
info-f@mobatime.ch / www.mobatime.ch

### SALES GERMANY, AUSTRIA

BÜRK MOBATIME GmbH  
Postfach 3760, D-78026 VS-Schwenningen  
Steinkirchring 46, D-78056 VS-Schwenningen  
Tel. +49 7720 8535 0 / Fax +49 7720 8535 11  
buerk@buerk-mobatime.de / www.buerk-mobatime.de