

**FCSHU 500 RADIO-COMPUTER-SIGNAL-  
MASTER CLOCK  
CSHU 500 COMPUTER-SIGNAL-MASTER  
CLOCK  
FZDA3-S2-RADIO-TIME SERVICE UNIT  
ZDA3-S2 TIME SERVICE UNIT**

**User Handbook**



**FCSHU 500 Radio- Computer - Signal – Master Clock**

**CSHU 500 Computer - Signal – Master Clock**

**FZDA3-S2 Radio- Time Service Unit**

**ZDA3-S2 Time Service Unit**

**Operating Instructions**

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## 1. Generals

### 1.1 General Description

The FCSHC500 Radio-Computer-Signal-Master clock Signal Generator or FZDA3-S2 radio time distribution system is a software-controlled master clock signal generator with an automatic fast configuration facility. It can control up to 3 secondary time circuits at the same time without the need for any storage battery back-up, thanks to secondary timer auto-correction. In addition, the master clock signal generator is radio-controlled via the DCF77 German time code transmitter, i.e. time and date input is fully automatic. The secondary timer reset is triggered automatically following a malfunction or mains power failure (lasting up to one week). Each time circuit has its own separately adjustable ammeter arrangement or current monitor. An external 12V or 24V power supply can also be used. A chip card on which programmed switching times can be saved is provided for data protection purposes.

Note: Some illustrations and/or texts relate directly to the CSHU500 / FCSHU500, but do not necessarily also apply to the ZDA3-S2 / FZDA3-S2 !!

### 1.2 Operating Modes/ Inputs

The master clock signal generator has two remote control inputs for signal switching circuits such as panic circuits or signals triggered by a house or fire alarm.

### 1.3 Outputs

#### a) Time circuits

These are three simultaneously selectable secondary time circuits: MIN -circuit, SEC - circuit and ½ minute-circuit. Circuit pulse lengths are simultaneously and freely selectable between 0.5 and 7.5.

#### b) DCF77 – pulse diagram output

This pulse diagram output is matched to the signal from the German DCF77 time signal transmitter. The DCF signal can therefore be relayed to another timer without any aerial being required. The DCF-Signal is generated by the master clock signal generator and can be output randomly to time circuits 1 to 3.

#### c) Switch outputs

The master clock has two signal circuits and holiday, annual and weekly programs can be used to schedule on/off times or short-length pulses. Up to 325 switching times can be input. What is more, on/off or pulse switching accurate to one second can be achieved.

#### d) Alarm output

The alarm output is designed for failure telemetry, typically, for central group interrupt, for instance.

A few examples:

Time diff too great : The maximum permissible reset time has been exceeded.

L1 I-error (Circuit 1 current error): The current tolerance limit on the circuit has been exceeded.

L1-short-circuit (circuit 1 short circuit): the electrical connections must be checked. Other messages are mentioned in the relevant chapters.

#### e) RS 232 – data output

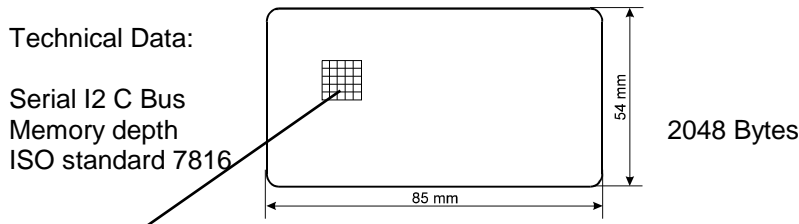
This data output can be used to relay the time of day and date via the (RS232) serial interface to a PC or DP facility.

## 1.4 Processor

An 80C32, used as the CPU, is the core element of the entire electronics system and is responsible for all input, output and monitoring functions.

## 1.5 Chip card

The switching times programmed into the MC can be stored on the chip card.



Contact zone

## 1.6 Technical data

|  |  |   |
|--|--|---|
| Model Number   | CSHU500<br>FCSHU500  | ZDA3-S2<br>FZDA3-S2   |
| Power pulse current (with integrated power supply appliance)       | 400 mA = 66 NU at 6 mA for all 3 circuits together,  |   |
| Impulse current (with external power supply (option))              | 500 mA = 80 NU at 6 mA per circuit, total 1500mA=240 slave clocks each with 6mA  |   |
| Impulse output type  | 1/1 or 1/ 2 minutes or 1/1 Second pulse or DCF77-telegram, pulse length adjustable from 0.5...7.5 sec.   |   |
| Connection of slave clocks or other time receivers                 | Via connection terminals (in the plug-in base)   |   |
| Supply voltage<br>power consumption,<br>current consumption        | 230V ±10% / max. 15VA  | 12V = 600 mA<br>24V = 600 mA<br>(at full load)  |
| Accumulator or data  | approx. 10 years   |   |
| Running accuracy without radio control                             | 0°C...+40°C ± 5 × 10 <sup>-6</sup> at +17°C...+23°C equivalent to approx. 0,4s / day   |   |
| operating temperature range  | 0°C...+50°C *<br>0°C...+40°C with integrated power supply<br>condensation not permissible  |   |
| Housing/ protection rating   | High impact –resistant polystyrene,<br>Colour: light grey/Connecting base<br>umber-grey / surface- or standard 35<br>mm rack-mounted, IP40 protection  | Aluminium plug-in rack for<br>19"-mounting rack / IP30 protection<br>(without mounting) |
| Dimensions of housing (W×H×D / mm)                                 | 75×158×120 (with socket)   | 121,5×129×170 (3 HE, 24 TE)   |
| Weight   | approx. 980 g  | approx. 1200 g  |
| Data output  | RS232 PC-interface: time of day, date, day of the week, baud rate: 4800  |   |
| Remote control for signal circuits                                 | Panic circuit, signal trip via house alarm or fire alarm   |   |
| Alarm output   | Open collector; 30V / 0,5A   |   |
| Switch outputs/<br>Signal outputs K1 and K2                        | Max. Make-/permanent-/Break current 4A/3A/2A; max. make-break capacity range: 60W (125VA) Switching voltage range: 0,1V - 250V; ON-OFF and pulse function, week-day, holiday, annual and block program; Up to 325 switching times, one-second switching time interval OPTION: Switching times can also be saved on the chip card |   |
| OPTION:<br>Radio receiver (projecting)<br>Weight of radio receiver | Housing: polycarbonate with 10 m connecting cable/IP65 / Dimensions :110x80x65 mm /180°swivel<br>approx. 500 g incl. swivel arm and 10 m of cable  |   |

\* In the case of 240 secondary timers = Full load and external supply

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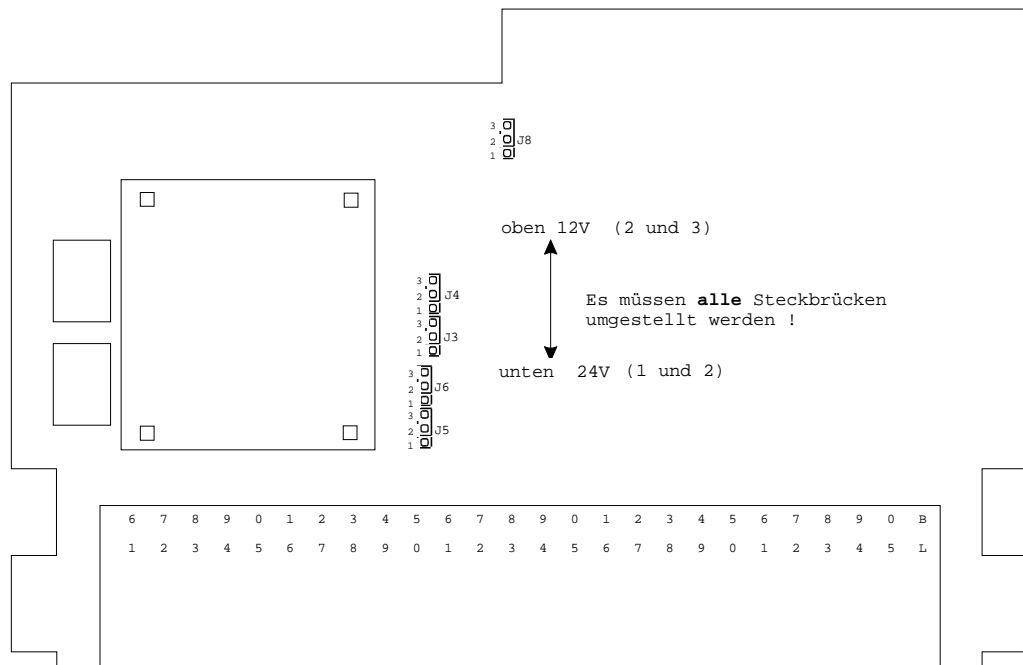


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**Note: Ensure spark suppression via contact assembly is provided by the customer!**

## 1.7 Component Drawing

Resting of plug-in jumpers for a 12V to 24V service voltage



## 2. Assembly and Operating instructions

The following points 2.1 (MC Assembly / Base) and 2.2 (Electrical connections / wiring diagram) refer to master clock signal generators CSHU500 and FCSHU500. The corresponding drawings for the 19,, plug-in cassettes ZDA3-S2 or FZDA3-S2 appear in point 4 (on page 55).

### 2.1 MC Assembly/Base

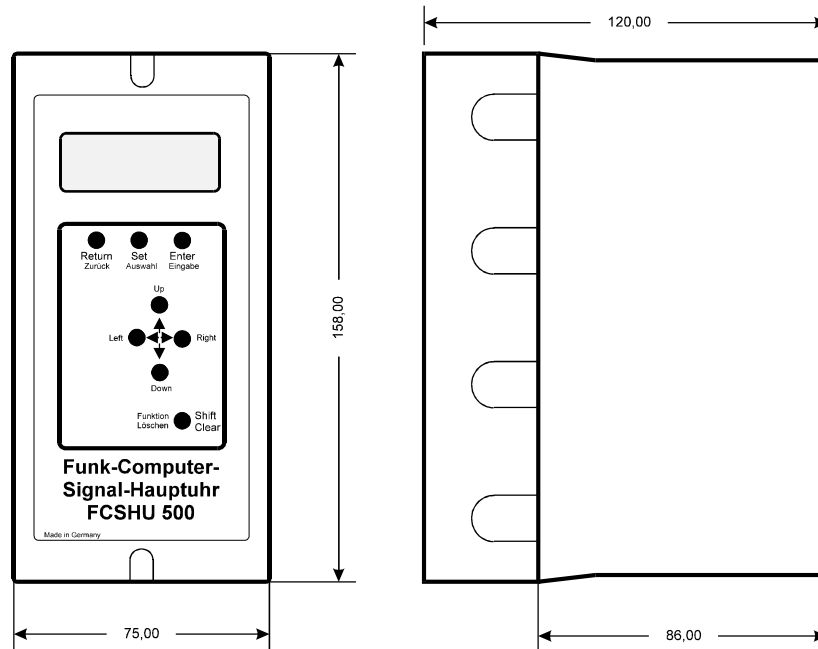
Remove the master clock signal generator from the connecting base. The master clock signal generator base is mounted with two screws, using any 230V mains connecting cable (or cable for external DC supply and taking account of any slave, DCF77- receivers, and so on, on the wall or on the standard rack so that the terminal strip is located on the RHS.

#### Advice on Installation

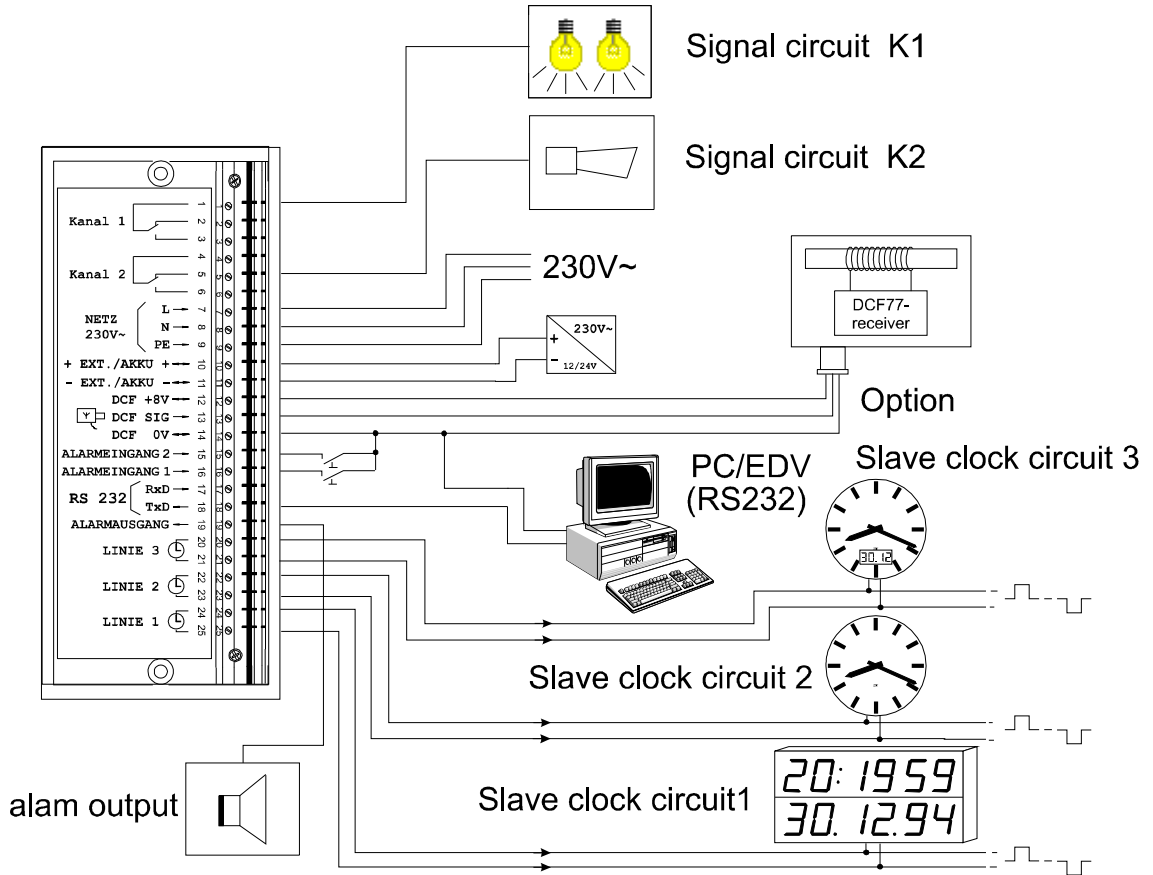
The highly integrated electronics are protected to the hilt against the effects of faults. However, in the event of exceptionally high interference, the possibility that the electronics may be affected cannot be ruled out. In order to minimise faults, avoid the following circumstances during installation:

1. Do not mount the master clock signal generator immediately next to interference transmitters such as power contractors, circuits carrying high current, solenoid valves, thyristor controls, etc.
2. Directly operated inductive consumers should be suppressed with suitable interference dissipaters such as varsities, RC-units, etc.
3. Inductive and capacitive consumers will impose an extremely heavy load on the channel output relay assemblies. Check whether isolating relays or contractors need to be installed.

Dimensions of casing :



**2.2 Electrical connections / connection wiring**



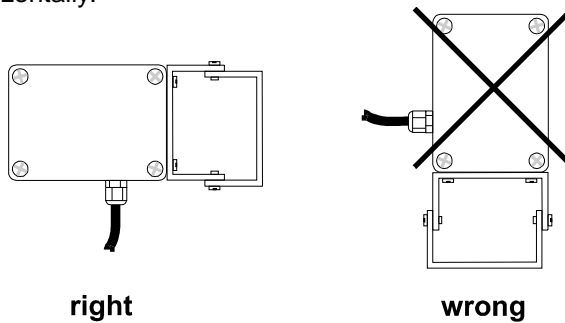
**2.3 Mounting / Aerial Location**

A suitable location must be found for the aerial (plus receiver). Install the aerial possibly close to the window or out-of-doors.

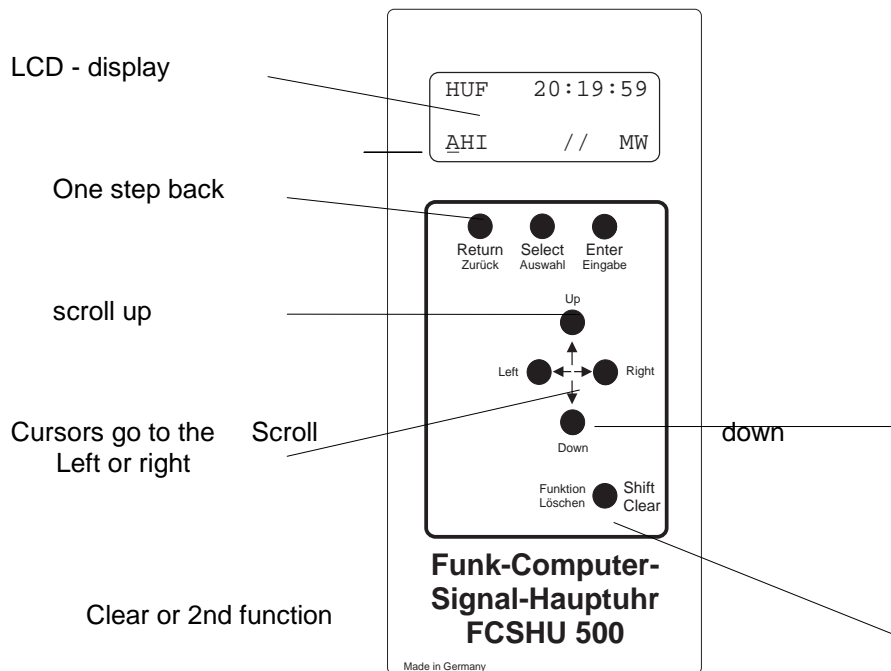
In order to establish the optimal direction for reception, first of all open the aerial cover to disclose the red LED (optical monitoring receiver) on the printed circuit board. This LED can now be used for checking reception. The aerial is rotated slowly until the LED flashes at precisely 1-sec. intervals (There should be no flickering of the LED; illumination time: 0.1 or 0.2 seconds, except for Sec. No. 59).

After approx. 4.....5 minutes of good reception, the display shows the official time of day (and the date) for Germany. If this is not the case, possibly an alternative aerial location should be sought. Do not move or turn the aerial during the read-in phase!

Fit the aerial casing horizontally:



**2.4 Operation and display units**



Radio-Computer-Signal Master Clock FCSHU 500

## 2.5 Commissioning/ Setting the Mode of Operation

**Note: On delivery, the master clock signal generator is in basic initialisation status (See page 13)!**

### 2.5.1 Start-up Phase/ Display after starting

The master clock signal generator becomes operational on connection to the 230V mains. It then enters the start-up phase and the following LCD display appears on the start-up phase window.  
MCW 20:19:59

Start-up Phase Window:

|                                |
|--------------------------------|
| MCW 20:19:59<br>Start-up phase |
|--------------------------------|

At start-up, the aerial should be checked to see whether it is or is not connected and DCF operation or quartz operation selected accordingly. This window can be by-passed by activating the , SELECT' key. The Main Menu then appears.

**Note: During the start-up phase, the aerial may not be moved otherwise interference-free radio reception cannot be guaranteed!**

### 2.5.2 Mode of Operation

#### a) DCF-Operation

If a good DCF signal is being received, after approx. 3 to 5 minutes the master clock switches to the Main Menu. The MCSGR-code ((MCSGR in German) stands for master clock signal generator-radio). If radio reception is poor, the read-in procedure is interrupted and the master clock signal generator is started by means of the emergency clock incorporated. The MCSGQ (MCSGQ in German) code then appears in the Main Menu (MCSGQ stands for master clock signal generator-quartz). In this case, the position of the aerial should be checked and may need to be changed.

#### b) Quartz-Operation

If no DCF signal is received, then 30 seconds later the master clock signal generator automatically switches to quartz operation. The MCSGQ (MCSGQ) code appears in the Main Menu (MCSGQ stands for master clock signal generator-quartz).

#### c) Satellite-Operation

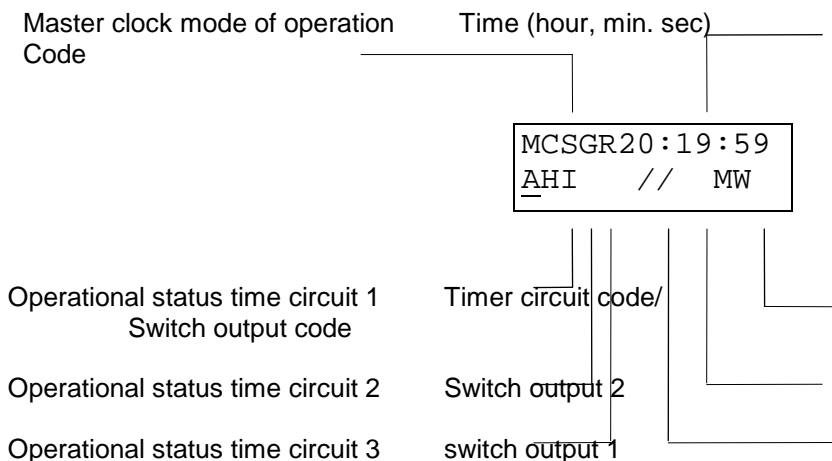
The master clock signal generator is also designed for satellite reception via GPS (Global-Position-System). There is therefore scope for receiving a signal from different satellites via an optional GPS converter; the signal is then output as a DCF signal. This feature is intended particularly for those countries located out of the range of the DCF signal.

## 2.6 Main menu - A Brief Description

Once the start-up menu has been completed, the master clock signal generator automatically returns to the Main Menu which contains information about master clock mode of operation, time of day, date, operational status of time circuits 1 – 3 and switch outputs 1 – 2. From this point onwards, the ,SELECT' key is accessed from the SELECT Menu.

From here, configurations, switching time programs, correction programs and data security can be called up and/or programmed.

**Main mane window :**



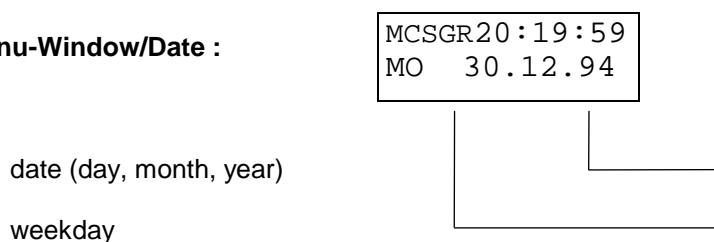
**2.6.1 Master clock signal generator – mode of operation**

There are two possible codes for MC mode of operation, namely:

- a) MCSGR (MCSGR in German) (Master clock signal generator-radio) signifies radio synchronically to the DCF signal
- b) MCSGQ (MCSGQ in German)(Master clock signal generator-Quartz) denotes quartz synchronically to an internal time datum

To display the date, keep the ‚RETURN‘ key depressed.  
 The date will now be displayed in the second row of the Main Menu:

**Main Menu-Window/Date :**



If the ‚RETURN‘ key is released once more, the system automatically returns to the Main Menu.

**2.6.2 MC Operational status (radio reception)**

DCF-reception is monitored constantly and can be interrogated from the Main Menu via the ‚SHIFT‘ and ‚LEFT‘ keys.

The following symbols appear in the Main Menu window:

- F+ denotes : Radio, good DCF-Signal
- F- denotes : Radio, poor DCF-Signal
- - denotes : no radio, no serviceable DCF-Signal received (Quartz clock operation)

The 'SHIFT' and 'RIGHT' keys can be used to Return to the Main Menu.

## 2.6.3 Examples (Radio monitoring)

**Main Menu Window:**

|                    |
|--------------------|
| MCSGR20:19:59      |
| <u>A</u> HI /   MW |

MC- mode of operation : F = Funk (Radio), DCF-operation

MC –time of day: 20 hrs., 19 min., 59 Sec.

time circuit 1 : A = Automatic time comparison mode (time circuit /  
Master clock signal  
Generator)

time circuit 2 : H = Halt (disconnected)

time circuit 3 : ( = Inactive

Switching output K1 : / = Switching output K1 off

Switching output K2 : I = Switching output K2 on

time circuit code 1 : MW = Minute circuit with summertime reset

After 'SHIFT' and 'LEFT' key actuation, the following window appears:

**Main menu Window:**

|                   |
|-------------------|
| MCSGR 20:19:59    |
| <u>A</u> HI // F+ |

MC-mode of operation : F = Funk (Radio), DCF-operation

Time of day : 20 hrs, 19 min, 59 Sec

time circuit 1 : A = Automatic time comparison mode (time circuit /  
Master clock signal  
Generator)

time circuit 2 : H = Halt (Off)

time circuit 3 : I = Inactive

Switching output K1 : / = Switching output K1 off

Switching output K2 : / = Switching output K2 off

Radio monitoring : F+ = Radio reception, good DCF-Signal

After 'SHIFT' and 'RIGHT' key actuation, return to Main Menu.

## 2.7 Code number

The configurations and switching time programs for the master clock signal generator can be protected against unauthorised access by means of a code number. In the standard configuration, this code is not activated, i.e. changes can be made.

### 2.7.1 Code activation

If the code has been activated and an input or change is attempted, the: 'Invalid Code Number' message appears. With the active code, reading of switching times or circuit interrogation is feasible.

Example: Activate Code (access protection active) :

| Step | Key                  | LCD display         | Note                              |
|------|----------------------|---------------------|-----------------------------------|
| 1    | 'SHIFT' and 'SELECT' | Code-Window         | Code-number reset ?               |
| 2    | 'ENTER'              | Code activated      | Code-number invalid               |
| 3    | 'CLEAR'              | Return to Main Menu | MCSGR20:19:59<br><u>AAA</u> // MW |

The code number must be input into the Main Menu before the next input or attempt at change otherwise 'Code number invalid' will be displayed.

### 2.7.2 Code number Input

If the Code number is activated and data are then input or amended, these actions must be preceded by entry of a code number!

**For example:** Code number Input (Access protection removed) :

| Step | Key                  | LCD display     | Note                            |
|------|----------------------|-----------------|---------------------------------|
| 1    | 'SHIFT' and 'SELECT' | Code input      | Code-number select <u>0</u> 000 |
| 2    | 'UP' or 'DOWN'       | Select number   | Code-number select <u>9</u> 000 |
| 3    | 'LEFT' or 'RIGHT'    | Select location | Code-number select 907 <u>1</u> |

(Repeat Steps 2 and 3 until the correct Code 9071 has been input)

4        'ENTER' Code-input and        

|                  |
|------------------|
| MCSGR20:19:59    |
| AAA        // MW |

        reversion to Main menu

### 2.7.3 Error message - Code -

If the 'Code number invalid' message appears, then the code is activated and inputs are barred or the wrong number has been selected during code input.

Tip: 'CLEAR' can be used to erase the message. Now the code can either be input correctly or deactivated.

## 3. Operating Instructions/ Setting up the master clock signal generator

The master clock signal generator is programmed exclusively via the key field. The 'SELECT' is used to access the Selection Menu where the 'UP' or 'DOWN' keys are used to browse the sub-menus.

### 3.0 Basic Initialisation of the Master Clock Signal Generator

Or ,How to initialise the MC' i.e., how to Return to Basic Operational Status. The following configuration is then set up.

- \* DCF – Minimum read-in time: 3 Minutes
- \* Displayed text: German
- \* The time of the master clock signal generator is reset to 00:00:00 time and the date to 01.01.94.
- \* Circuit outputs 1 – 3 are in halt status.
  - \* All time circuits are set as minute circuits of 2 second pulse duration and for changeover from CET to CEST. Circuit current monitoring is deactivated, i.e., the reference current (V) and the current tolerance (D) register 0 % of
  - \* CET / CEST – times are cancelled
  - \* All switching times are cancelled
- \* All switching outputs are disconnected
- \* RZ-analysis Menu – Counter readings cancelled.

**WARNING !! WARNING !! WARNING !! WARNING !! WARNING !!**  
**!!**

Initialisation puts the MC in the configuration described above. Any times stored or programmed will be lost and will have to be input. A security interrogation precedes initialisation and provides an opportunity, via use of the 'RETURN' key, to return to the selection menu without initialisation.

Example: MC Initialisation :

| Step | Key         | LCD display                  | Note                          |                     |
|------|-------------|------------------------------|-------------------------------|---------------------|
| 1    | 1x 'SELECT' | Selection Menu               | MCSGR20:19:59<br>Annual Pr.   |                     |
| 2    | 2x 'DOWN'   | Initialisation window        | MCSGR20:19:59<br>Initial.     |                     |
| 3    | 1x 'ENTER'  | Security interrering. window | Yes =Enter<br>No =Return      |                     |
| 4    | 1x 'ENTER'  | Master clock signal          | MCSGR20:19:59<br>Init running | gen. is initialised |
| 5    | Return to   | Init-Window                  | MCSGR00:00:00<br>Initial.     |                     |
| 6    | 'RETURN'    | Return to Main               | MCSGR00:00:00<br>HHH // MW    | Menu                |

### 3.1 Master clock signal generator time/ -date input and display (to DCF operation)

In quartz operation, both time and date can be input manually. In DCF operation, on the other hand, manual setting of time and date is impossible because the reading in of time and date is done via the DCF signal. In this case the following message appears on the display:

DCF-clock  
No setting

To cancel this message, the 'CLEAR' key is activated. To set the time and date of the master clock signal generator the three time circuits must first of all be disconnected!

The master clock signal generator time is displayed in the upper row of the window. To arrange for the date to be displayed in the second row, the 'RETURN' key must be kept depressed.

**For example:** Setting the time and date.

| Step | Key | LCD display | Note |
|------|-----|-------------|------|
|------|-----|-------------|------|

1 Switch off time circuits 1-3 (see 3.3.2 - Page 25)

2 1x 'SELECT' Selection Menu MCSGQ19:19:59  
Annual Pr.

3 5x 'DOWN' Clock regulation MCSGQ19:19:59  
Set Clock

4 1x 'ENTER' Time /Date MCSGQ19:19:59  
MON 30.12.94

5 1x 'ENTER' Input mode MCSGQ19:19:59  
MON 30.12.94

6 'UP' or 'DOWN' Change number MCSGQ20:19:59  
MON 30.12.94

7 'LEFT' or 'RIGHT' Shift cursor to hr, MCSGQ20:19:59  
MON 30.12.94 min, sec, month, year

Repeat Steps 6 and 7, until the desired time and date have been input. (The day of the week is calculated by the master clock signal generator ).

Start MC 1x 'ENTER' MCSGQ20:19:00  
MON 30.12.94

9 2x 'RETURN' Return to the Main MCSGQ20:19:00  
HHH // MW Menu

10 Reconnect time circuits 1-3 (See 3.3 - Page 26)

**Advice re: Step 8 :**

If the second display is showing between 0 and 29, the time has still not been readjusted manually. Once the 'ENTER' key has been activated, the master clock signal generator starts registering the seconds from 0. The minute reading remains unaffected. However if the time is between 30 and 59 and the MC is already going, the minute reading is raised by one minute.

## 3.1.1 Error messages

If the following message appears at Step 4 then at least 1 timer is in auto time comparison mode

Circuit still  
in auto

**Tip:** Using the 'CLEAR' key, cancel the error message.  
Return to the Main Menu using the 'RETURN' key .  
Switch off time circuits with the 'SHIFT' and 'DOWN' keys (See 3.3.2 - Page 25)  
Start all over again with the time/date (Step 2)

If the time circuits or switching outputs are receiving no pulses and/or the slave clickers are not calibrating, then the time circuits have failed to come on again.

**Tip:** In the Main Menu, using the 'SHIFT' and 'UP' keys, reconnect the time circuits.  
If the message 'Code number invalid' appears, then unauthorised access counter-code has been activated.

**Tip :** The message can be cancelled using 'CLEAR'. The code can now be input (See 2.7.2 - Pages 12-13).

## 3.2 Master clock Signal Generator Configuration

### 3.2.1 Display Text Conversion

The master clock signal generator display can operate in two languages (German and English).

**Example :** German to English display text conversion:

| Step | Key | LCD display | Note |
|------|-----|-------------|------|
|------|-----|-------------|------|

|   |  |  |  |
|---|--|--|--|
| 1 |  | Disconnect time circuits 1-3 (See 3.3.2 - Page 25) |  |
|---|--|--|--|

|   |              |                 |  |
|---|--------------|-----------------|--|
| 2 | 1 x 'SELECT' | Selection menus |  |
|---|--------------|-----------------|--|

MCSGQ20:19:59  
Annual pro.

- |   |                                    |  |                       |
|---|------------------------------------|--|-----------------------|
| 3 | 7x 'UP' or 6 x 'DOWN' Time         | MCSGQ20:19:59<br>Clock Conf.           | configurations        |
| 4 | 1x 'ENTER' Text-Window             | MCSGQ20:19:59<br><u>T</u> ext     deut |                       |
| 5 | 1x 'ENTER' Input mode              | MCSGQ20:19:59<br>Text <u>d</u> eut     |                       |
| 6 | 'UP' or 'DOWN' Language selections | MCSGQ20:19:59<br>Text <u>e</u> ngl     |                       |
| 7 | 1x 'ENTER' Input Close             | MCSGQ20:19:59<br><u>T</u> ext     engl |                       |
| 8 | 2x 'RETURN' Return to Main Menu    | MCSGQ20:19:59<br><u>H</u> HH     //    |                       |
| 9 | Connect time circuits 1-3          |  | (See 3.3.3 - Page 26) |

### 3.2.2 Entry of Minimum DCF-Signal Read-in Time (In DCF-operation only)

In this instance, the master clock signal generator specifies the minimum time for DCF signal read-in. The read-in time is adjustable to either 3 or 5 minutes. If the DCF signal has not been read successfully by this time, the master clock signal generator automatically makes a fresh attempt.

Example: DCF – Signal Minimum Read-in Time :

| Step | Key | LCD display | Note |
|------|-----|-------------|------|
|------|-----|-------------|------|

|   |  |  |  |
|---|--|--|--|
| 1 | Disconnect time circuits 1-3 (See 3.3.2 - Page 25) |  |  |
|---|--|--|--|

|   |              |                 |  |
|---|--------------|-----------------|--|
| 2 | 1 x 'SELECT' | selection menus |  |
|---|--------------|-----------------|--|

|                             |
|-----------------------------|
| MCSGR19:19:59<br>Annual Pr. |
|-----------------------------|

|   |                                |                               |                    |
|---|--------------------------------|-------------------------------|--------------------|
| 3 | 7x 'UP' or 6x 'DOWN' Time      | MCSGR19:19:59<br>Time-config. | Configuration Menu |
| 4 | 1x 'ENTER' Text Window         | MCSGR19:19:59<br>Text German  |                    |
| 5 | 1x 'UP' or 4x 'DOWN' Min. read | MCSGR20:19:59<br>DCFoK 3 min  | time window        |
| 6 | 1x 'ENTER' Readiness for input | MCSGR19:19:59<br>DCFoK 3 min  |                    |
| 7 | 'UP' or 'DOWN' 3 or 5 minute   | MCSGR20:19:59<br>DCFoK 5 min  | selection          |
| 8 | 1x 'ENTER' Store input         | MCSGR19:19:59<br>DCFoK 5 min  |                    |
| 9 | 2x 'RETURN' Return to Main     | MCSGR20:19:59<br>HHH //       | Menu               |

10 Connect time circuits 1-3 (See 3.3.3 - Page 26)

### 3.2.3 Summer time (CEST = Central European Summer Time) / Normal time (CET = Central European Time)

CET to CEST conversion and vice-versa is adjusted automatically by the MC in DCF operation. At the changeover point from (CET) to (CEST), the master clock signal generator display, immediately after receiving the new valid time, automatically moves the time forward by an hour. The slave clickers receive additional pulses in the abbreviated switching rhythm. Conversely, during the CEST to CET changeover, the slave clickers are delayed by an hour. The time changes for the slave clickers even occur despite reception problems, for example, (variously according to whether Sept. or Oct.-configured). CET is also known as normal time (winter time).

Manual configuration is possible with the following Input:

- a) Sept : Changeover from CET to CEST during the last weekend in March

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Changeover from CEST to CET during the last weekend in September

- b) Oct : Changeover from CET to CEST during the last weekend in March  
 Changeover from CEST to CET during the last weekend in October

The conversion takes place on the Sunday of the last weekend.

- c) Date : Changeover from CET to CEST and from CEST to CET is effected via separate date inputs (CET / CEST)

DCF operation needs no date input as the changeover is radio-prompted.

- d) Aerial: CET / CEST changeover via the aerial signal is conditional upon clear reception of the new date, i.e., provided radio reception is interference-free at the moment of conversion.  
 (true of both DCF signal and GPS signal)

The MC also has facilities that also allow manual CET / CEST time conversion in quartz operation. This is carried out with the 3 time circuits off (See 3.3.2 - Page 25). The procedure is as follows:

**Example:** Change summer time end from September to October:

| Step | Key                  | LCD display    | Note   |
|------|----------------------|----------------|--|
| 1    |                      |                | Disconnect time circuits 1-3 (See 3.3.2 - Page 25) |
| 2    | 1x 'SELECT'          | Selection Menu | MCSGQ20:19:59<br>Annual Pro.                       |
| 3    | 7x 'UP' or 6x 'DOWN' | Time config.   | MCSGQ20:19:59<br>Clock conf. Menu                  |

| Step | Key                  | LCD display    | Note                              |
|------|----------------------|----------------|-----------------------------------|
| 4    | 1x 'ENTER'           | Time Config. - | MCSGQ20:19:59<br>Text deut Window |
| 5    | 2x 'UP' or 3x 'DOWN' | ST / WT-       | MCSGQ20:19:59<br>SZ/WZ SEP Window |

- |   |                |             |  |                       |
|---|----------------|-------------|--|-----------------------|
| 6 | 1x 'ENTER'     | Input-Mode  | MMSGQ20:19:59<br>SZ/WZ <u>S</u> EP       |                       |
| 7 | 'UP' or 'DOWN' |             | MMSGQ20:19:59<br>SZ/WZ <u>O</u> ct       | ST / WT-Configuration |
| 8 | 1x 'ENTER'     | Store Input | MMSGQ20:19:59<br><u>S</u> Z/WZ    Oct    |                       |
| 9 | 2x 'RETURN'    |             | MMSGQ20:19:59<br><u>H</u> HH    //    MW | Return to Main Menu   |
- 10 Connect time circuits 1-3 (See 3.3.3 - Page 26)

Date selection involves the following steps:

**Example:** The changeover from CET to CEST takes place on 30.03., and changeover from CEST to CET on 01.11. :

- | Step | Key                  | LCD display  | Note                         |      |
|------|----------------------|--|------------------------------|------|
| 1    |                      | Disconnect time circuits 1-3 (See 3.3.2 - Page 25) |                              |      |
| 2    | 1 x 'SELECT'         | Selection menus                                    | MMSGQ20:19:59<br>Annual Pro. |      |
| 3    | 7x 'UP' or 6x 'DOWN' | Time config. -                                     | MMSGQ20:19:59<br>Clock conf. | Menu |

- | Step | Key        | LCD display        | Note                                  |
|------|------------|--------------------|---------------------------------------|
| 4    | 1x 'ENTER' | Tim config. Window | MMSGQ20:19:59<br><u>T</u> ext    deut |

|    |                               |                                       |        |
|----|-------------------------------|---------------------------------------|--------|
| 5  | 2x 'UP' or 3x 'DOWN' ST / WT- | MCSGQ20:19:59<br><u>SZ</u> /WZ SEP    | Window |
| 6  | 1x 'ENTER' Input-Modus        | MCSGQ20:19:59<br>SZ/WZ <u>SEP</u>     |        |
| 7  | 1x 'UP' Date Window           | MCSGQ20:19:59<br>SZ/WZ <u>Date</u>    |        |
| 8  | 1x 'UP' CEST-window           | MCSGQ20:19:59<br><u>MESZ</u> 01.01.   |        |
| 9  | 1x 'ENTER' Input mode         | MCSGQ20:19:59<br>MESZ 0 <u>1</u> .01. |        |
| 10 | 'UP' or 'DOWN' Date select    | MCSGQ20:19:59<br>MESZ 30.0 <u>3</u> . |        |
| 11 | 1x 'ENTER' Store              | MCSGQ20:19:59<br><u>MESZ</u> 30.03.   |        |
| 12 | 1x 'UP' CET-Window            | MCSGQ20:19:59<br><u>MEZ</u> 01.01.    |        |
| 13 | 1x 'ENTER' Input mode         | MCSGQ20:19:59<br>MEZ 0 <u>1</u> .01.  |        |
| 14 | 'LEFT' or 'RIGHT' Move cursor | MCSGQ20:19:59<br>MEZ 01.0 <u>1</u> .  |        |

| Step0 | Key   | LCD-Display         | Note   |
|-------|---|---------------------|--|
| 15    | 'UP' or 'DOWN'                                  | Select date         | <div style="border: 1px solid black; padding: 2px;">MCSGQ20:19:59<br/>MEZ 01.11.</div> |
| 16    | 1x 'ENTER'                                      | input store         | <div style="border: 1px solid black; padding: 2px;">MCSGQ20:19:59<br/>MEZ 01.11.</div> |
| 17    | 2x 'RETURN'                                     | Return to main menu | <div style="border: 1px solid black; padding: 2px;">MCSGQ20:19:59<br/>HHH // MW</div>  |
| 18    | Connect time circuits 1-3 (see 3.3.3 - page 26) |                     |  |

Date configuration has top priority, i.e., in DCF operation or GPS operation, the MC automatically switches over to quartz operation! If CEST and CET are dated for the same day, date selection will be deactivated automatically and the MC will operate in CET! Also note that at least one month must elapse between the CET and CEST changeover date. Possible entry: e.g 31.03 (CEST) and 01.04 (CET).

### 3.2.4 Error Message

If the display shows 'S/W date wrong', this means that the requisite one month gap has not been left between the CET and CEST date.

**Tip** : Activate 'CLEAR' key (cancel Error message) and change date.

**Tip** : If the display shows 'Circuit still in Auto', this means that at least one timer is still in service. Activate 'CLEAR' key (cancel Error message) and return to the Main Menu. Once there, set all time circuits to OFF using the 'SHIFT' and 'DOWN' keys.  
(See 3.3.2 - Page 25) !  
This done, S/W dates can then be reprogrammed in the Time Configuration Menu.

After programming and return to the Main Menu, the time circuits are reconnected:

Using the 'CLEAR' key (cancel Error message)  
Using the 'RETURN' key, return to the Main Menu.  
Connect the time circuits using the 'SHIFT' and 'UP' keys (See 3.3.3 - Page 26)

### 3.3 time circuit Configuration

In the standard version, the output modes of the three MC time circuits take the form of minute circuits with CET to CEST conversion. In time circuit configuration, pulse type, pulse length and automatic CET to CEST conversion can be set.

time circuit Operational Status:

Each of the three time circuits is defined by an operational status and can be selected by cursor using the 'LEFT' or 'RIGHT' key.

- A - Auto: the slave clocks circuit is on
- H - Halt : the slave clocks circuit is off
- I - Inactive: the slave clocks circuit is inactive

Each of the three time circuits has its own time circuit code that is displayed whenever a time circuit is selected.

| Explanation of the Abbreviations in the Main Menu and in the programming | Main Menu Code | Program code |
|--|----------------|--------------|
| Minute circuit with CET to CEST conversion                               | MW             | Min W        |
| Half-minute circuit with CET to CEST conversion                          | mW             | Hmin W       |
| Second circuit with CET to CEST conversion                               | SW             | Seklin       |
| Second circuit without CET to CEST conversion                            | SN             | Sekuhr N     |
| Seconds clock without CET to CEST conversion                             | S              | Sekuhr       |
| DCF signal circuit   | D              | DCF          |
| Minute circuit without CET to CEST conversion                            | MN             | Min N        |
| Half minute circuit without CET to CEST conversion                       | mN             | Hmin N       |

In order to establish the operational mode of a time circuit, these must first of all be switched off. If all three time circuits are being redefined, all three timers must be disconnected

#### 3.3.1 Circuit time/date display and Circuit current

**Example:** Circuit 1 time/date and current display:

Step    Key        LCD display    Note

1 'LEFT' or 'RIGHT' Select time circuits

|    |          |
|----|----------|
| HU | 19:19:59 |
| L1 | 21:43:56 |

2 1x 'ENTER' MC-time Circuit time

|       |          |
|-------|----------|
| MCSGR | 19:19:59 |
| AHH   | //       |

L1 = (Circuit 1)

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| Step             | Key         | LCD display   | Note              |
|------------------|-------------|---|-------------------|
| 3<br>(circuit 1) | 1x 'UP'     | MC-date   |                   |
|                  |             | <div style="border: 1px solid black; padding: 2px;">                     HU 30.12.94<br/>                     L1 20.09.94                 </div>  | circuit date L1 = |
| 4<br>(circuit 1) | 1x 'UP'     | circuit current   |                   |
|                  |             | <div style="border: 1px solid black; padding: 2px;">                     IMP 21:43:56<br/>                     L1 20.09.94                 </div> | circuit date L =  |
| 5                | 1x 'UP'     | circuit current   |                   |
|                  |             | <div style="border: 1px solid black; padding: 2px;">                     I N00% D00%<br/>                     L1 s A I00%                 </div>  | L1 = (circuit 1)  |
| 6                | 1x 'RETURN' | Return to Main Menu   |                   |
|                  |             | <div style="border: 1px solid black; padding: 2px;">                     MCSGR20:19:59<br/>                     AHH //                 </div>     |                   |

The dates of the other circuits can be inspected at any time using the 'LEFT' or 'RIGHT' keys. In second clock pulse mode, the hrs. and min. information is indicated with an x as only ,seconds'information is presented here.

**Example:** time circuits (Time) Display :

HU 20:19:59  
 L1+ 21:43:56

top row : Master clock signal generator time

bottom row : circuit 1 Timer time

+ : time circuit halt mode:

In terms of date, time of day or both, the time circuit is ahead of Master clock signal generator time, i.e., the time circuit is stopped.

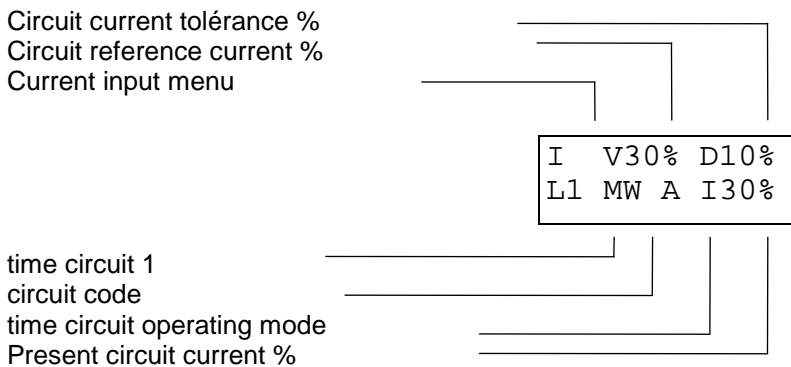
- : time circuit reset:

In terms of date, time of day or both, the time circuit lags behind the Master clock signal generator time, i.e. the time circuit has to be reset.

(blank) :time circuit and master clock signal generator are running synchronously.

**Example : circuit current display:**

Row 1 shows the reference current and the selected tolerance while circuit 2 gives the code and the actual time circuit current.



If the present circuit current (I%) pendulums between 2 values, the current tolerance must be set at ( a D%) of 10 % (or more). The reference current (V%) always has roughly the same value as the present circuit current (I%).

The percentages refer to the maximum circuit current of a circuit.

Circuit currents can be divided up, for example, in the following way:

1 circuit 100%, or 3x30%\_ circuits respectively or 2x50% circuits respectively

Maximum circuit current with the external supply: 500mA

Maximum circuit current when powered by an internal supply unit: 400mA

The reference current and time circuit current tolerance are adjustable (See 3.4.3 - monitor circuit current - Page 31 - 32).

**3.3.2 Disconnect time circuits**

**Example : Disconnect time circuits:**

| Step | Key                | LCD display               | Note |
|------|--------------------|---------------------------|------|
| 1    | 'LEFT' or 'RIGHT'  | select circuit 1          |      |
|      |                    | MCSGR20:19:59<br>AAA // D |      |
| 2    | 'SHIFT' and 'DOWN' | time circuit 1            |      |
|      |                    | MCSGR20:19:59<br>HAA //   | off  |

To disconnect the other time circuits, repeat Steps 1 and 2

|                             |                         |
|-----------------------------|-------------------------|
| All 3 time circuits are off | MCSGR20:19:59<br>HHH // |
|-----------------------------|-------------------------|

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<sup>1</sup>3 x 30%=90%, = 10% remain!

### 3.3.3 Connect time circuits

time circuit connection starts with automatic time reference mode, i.e. the time circuit is corrected to present master clock signal generator time.

**Example** : time circuit connection:

Step    Key        LCD display    Note

1    '*LEFT*' or '*RIGHT*' Select desired    

|                  |
|------------------|
| MCSGR20:19:59    |
| <u>HHH</u> // MW |

    circuit

2    '*SHIFT*' and '*UP*' time circuit 1 on    

|                  |
|------------------|
| MCSGR20:19:59    |
| <u>AHH</u> // MW |

Steps 1 and 2 are repeated in order to connect the other time circuits

All 3 time circuits are on    

|                  |
|------------------|
| MCSGR20:19:59    |
| <u>AAA</u> // MW |

### 3.3.4 Time circuit operating modes : A Brief Description

**Operating mode overview:**

|   | Pulse type | Pulse length      | Summer time changeover | time circuits Code in the Main Menu |
|---|------------|-------------------|------------------------|-------------------------------------|
| * | Sekuhr N   | 0.5 sec - 1 sec   | No                     | SN                                  |
|   | Hmin N     | 0.5 sec - 7.5 sec | No                     | mN                                  |
|   | Min N      | 0.5 sec - 7.5 sec | No                     | MN                                  |
| * | Sekuhr W   | 0.5 sec - 1 sec   | Yes                    | SW                                  |
|   | Hmin W     | 0.5 sec - 7.5 sec | Yes                    | mW                                  |
|   | Min W      | 0.5 sec - 7.5 sec | Yes                    | MW                                  |
|   | DCF        | 100ms / 200ms     | Yes                    | D                                   |
| * | Seklin     | 0.5 sec - 1 sec   | No                     | s                                   |
|   | Inakt      | -                 | -                      | I                                   |

\* Pulse length can be adjusted to 4,5 sec but is limited internally to a maximum of 1 sec.

## Brief Description of Pulse Types:

Sekuhr : Second pulse output carrying Hours-, Minutes- and date information

Hmin : Half minute cycle at 30 and 60 Seconds

Min: Minute pulse at 60 Seconds

DCF : DCF-Telegram simulation

Seklin: Second pulse output carrying no hours-, minutes- and date information

Inakt: time circuits inactive / cancelled

W : Summer time change ON

N : Summer time change off (Normal time)

### 3.3.5 Time circuit operating mode entry

Before setting a time circuit for the first time, define the operating mode of the timer (See 3.4.1. - Page 29-30 – setting time circuits). In this case, the time circuit to be altered must be OFF in the Main Menu.

Example : Switching circuit 1 operating mode from 1 minute operation to second operation.

| Step | Key | LCD display | Note |
|------|-----|-------------|------|
|------|-----|-------------|------|

|   |  |  |  |
|---|--|--|--|
| 1 |  | Disconnect time circuit 1 (See 3.3.2- Page 25) |  |
|---|--|--|--|

|   |          |                |  |
|---|----------|----------------|--|
| 2 | 'SELECT' | Selection menu | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     MCSGR19:19:59<br/>Annual Pro.                 </div> |
|---|----------|----------------|--|

|   |           |         |   |
|---|-----------|---------|---|
| 3 | 4x 'DOWN' | circuit | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     HU 19:19:59<br/>Lin - Config                 </div> configuration |
|---|-----------|---------|---|

|   |            |                   |   |
|---|------------|-------------------|---|
| 4 | 1x 'ENTER' | circuit 1 present | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     L1            Min W<br/>Puls 3.0s                 </div> operating mode |
|---|------------|-------------------|---|

|   |            |            |  |
|---|------------|------------|--|
| 5 | 1x 'ENTER' | input Mode | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     L1            Min W<br/>Puls 3.0s                 </div> (mode type) |
|---|------------|------------|--|

Step Key LCD display Note

- |    |  |                          |                |
|----|--|--------------------------|----------------|
| 6  | ‘UP’ or ‘DOWN’ Sekuhr Selection              | L1 Sekuhr W<br>Puls 3.0s |                |
| 7  | ‘LEFT’ or ‘RIGHT’ input mode                 | L1 Sekuhr W<br>Puls 3.0s | (pulse length) |
| 8  | ‘UP’ or ‘DOWN’ Pulse length                  | L1 Sekuhr W<br>Puls 1.0s | selection      |
| 9  | 1x ‘ENTER’ Terminate input                   | L1 Sekuhr W<br>Puls 1.0s |                |
| 10 | 2x ‘RETURN’ Return to Main Menu              | HU 30.12.94<br>HAA // SW |                |
| 11 | Connect time circuit 1 (see 3.3.3 - Page 26) |                          |                |

Time circuits 2 and 3 are converted in a similar way.

### 3.3.6 Error Messages

If the ‘circuit still in auto’ message appears after Step 5, this signifies that the time circuit selected is still in automatic time reference mode.

**Tip :**

Using the ‘CLEAR’ key, cancel the error message  
 Using the ‘RETURN’ key, return to the Main Menu  
 Disconnect time circuits using the ‘SHIFT’ and ‘DOWN’ keys. (See 3.3.2 - Page 25)  
 Recommence conversion.

If the time circuits or switching outputs are not receiving any pulses and/or the slave clocks timer fails to come on, this means that the time circuits have not been reconnected or the time input is in advance of the master clock signal generator time.

**Tip :** Connect time circuits using the ‘SHIFT’ and ‘UP’ keys.

(See 3.3.3 - Page 26)

### 3.4 time circuits

The master clock signal generator has three time circuit outputs which, in the standard version are defined as being minute circuits with CET to CEST conversion.

Slave clickers must be synchronised according to time circuit configuration! Setting or resetting to master clock signal generator time is done automatically.

Setting time circuits / synchronisation with slave clickers

If the time circuit has been configured, it must now be synchronised with the slave clickers. The time for the time circuit is therefore set to the time of the slave clickers. For actuation, the time circuit to be changed must be ,off' on the Main Menu.

**Example** : time circuit 1 setting (Min-circuit) :

| Step | Key | LCD display | Note |
|------|-----|-------------|------|
|------|-----|-------------|------|

|   |  |  |   |
|---|--|--|---|
| 1 |  |  | Disconnect time circuit 1 using the 'SHIFT' and 'DOWN' keys.<br>(See 3.3.2 - Page 25) |
|---|--|--|---|

|   |          |                |                              |
|---|----------|----------------|------------------------------|
| 2 | 'SELECT' | Selection Menu | MCSGR19:19:59<br>Annual Pro. |
|---|----------|----------------|------------------------------|

|   |           |                        |                            |
|---|-----------|------------------------|----------------------------|
| 3 | 3x 'DOWN' | circuit setting window | HU 19:19:59<br>Lin Setting |
|---|-----------|------------------------|----------------------------|

Instead of Steps 2 and 3, SHIFT and ENTER can be used direct from the Main Menu to change circuit setting.

|   |            |                        |                            |
|---|------------|------------------------|----------------------------|
| 4 | 1x 'ENTER' | circuit 1 timer window | L1 20:19:59<br>MW 30.12.94 |
|---|------------|------------------------|----------------------------|

|   |            |            |                            |
|---|------------|------------|----------------------------|
| 5 | 1x 'ENTER' | input mode | L1 20:19:59<br>MW 30.12.94 |
|---|------------|------------|----------------------------|

|   |                   |                     |                            |     |              |
|---|-------------------|---------------------|----------------------------|-----|--------------|
| 6 | 'LEFT' or 'RIGHT' | Select hours, Min., | L1 20:19:59<br>MW 30.12.94 | day | Month , year |
|---|-------------------|---------------------|----------------------------|-----|--------------|

|   |                |               |                            |
|---|----------------|---------------|----------------------------|
| 7 | 'UP' or 'DOWN' | input numbers | L1 20:19:59<br>MW 30.12.94 |
|---|----------------|---------------|----------------------------|

Repeat steps 6 and 7 until the circuit time and circuit date have been input

Step    Key    LCD display    Note

8        1x 'ENTER'    Terminate input

|            |          |
|------------|----------|
| <u>L</u> 1 | 20:19:59 |
| MW         | 30.12.94 |

9        2x 'RETURN'    Return to Main Menu

|              |          |
|--------------|----------|
| HU           | 30.12.94 |
| <u>H</u> A A | // MW    |

10    Connect time circuit 1 using the 'SHIFT' and 'UP' keys  
 (see 3.3.3 - Page 26)

time circuits 2 and 3 are actuated similarly.

If a time circuit is being operated as a DCF circuit, no actuation is required.

If the time circuit is being operated as a seconds circuit, then only seconds setting is feasible.

If the timer circuit is functioning as a seconds timer, the time circuit needs to be set in terms of hours, minutes, seconds and date to the time registered by the slave clocks timer.

If the time circuit is being operated as a minutes circuit, then the time circuit has to be synchronised in terms of hours, minutes and date with the time of the slave clickers (See 3.3.4 - Page 26 - 27 – Time Circuit Operating Modes).

If the time circuit is synchronised with the master clock signal generator via the slave clickers and the time circuit is reconnected, then the time circuit will be readjusted automatically to the master clock signal generator time.

Clearly, adjustment is possible only up to a (certain) ,maximum time difference (between MC time and time circuit time). This time difference depends on time circuit configuration:

| Pulse type configuration | max. permissible time difference |
|--------------------------|----------------------------------|
| Seklin                   | -                                |
| Sekuhr                   | 3 hours                          |
| Hmin N, Hmin W           | ½ week (3.5 days)                |
| Min N, Min W             | 1 week (7 days)                  |
| DCF-circuit              | -                                |

## 3.4.2 Error messages – set time circuits

If, after Step 8, the display registers the message 'Time diff too great', this means that the maximum permissible time correction has been exceeded.

**Tip** :Using the 'CLEAR' key, cancel the message and then reset the timer.

If, after step 5, the message 'circuit still in Auto' appears, then the chosen time circuit is still in automatic time comparison mode.

**Tip** : Use the 'CLEAR' key to cancel the message.  
Using the 'RETURN' key, return to the Main Menu.  
Disconnect the time circuits using the 'SHIFT' and 'DOWN' keys.  
(See 3.3.2 - Page 25)  
Repeat the regulation routine again.

If the time circuits or switching outputs are not receiving any pulse or the slave clickers does not cut in, then the time circuits have not come on again or the time input is in advance of the master clock signal generator time.

**Tip** :Connect time circuits with the 'SHIFT' and 'UP' keys in the Main Menu.  
(See 3.3.3 - Page 26)

## 3.4.3 Monitor circuit current

In circuit current monitoring, if the permissible tolerance value has been exceeded, then an error message is displayed.

Accordingly, the reference current and current tolerance must be set in the circuit data window. If a figure of 0 % is set for the reference current (default value), this means that current monitoring is inactive. Setting can be done in halt mode or in automatic time comparison mode from the Main Menu. To make input easier, the circuit current measured with the last pulse is displayed as the present actual current value. An input for the reference current is possible in 10 % steps only and should correspond approximately to the present circuit current. Likewise, a tolerance value (Delta) is to be input so that, amongst other things, unavoidable measurement differences can be offset and a malfunction alarm prevented.

**The following procedure is recommended:**

- |   |  |                                 |
|---|--|---------------------------------|
| 1 | 'LEFT' or 'RIGHT' Select time circuits         | MCSGR20:19:59<br>AAA // MW<br>_ |
| 2 | 1x 'ENTER' MC-time circuit time<br>(circuit 1) | HU 20:19:59<br>L1 21:43:56      |

Step    Key    LCD display    Note

3    The true current figure (e.g. 28%) is found to be approximately 140mA (remeasured with every pulse)

4    3x 'UP' or 1x 'DOWN' time circuit

|    |      |        |
|----|------|--------|
| I  | V00% | D00%   |
| L1 | MW   | A I28% |

current window

(V)    5    1x 'ENTER' input mode for

|    |      |        |
|----|------|--------|
| I  | V00% | D00%   |
| L1 | MW   | A I28% |

reference current

6    1x 'UP' or 'DOWN' Select

|    |      |        |
|----|------|--------|
| I  | V30% | D00%   |
| L1 | MW   | A I28% |

percent                  parameter

(30%)

7    'LEFT' or 'RIGHT' input mode

|    |      |        |
|----|------|--------|
| I  | V30% | D10%   |
| L1 | MW   | A I28% |

Current tolerance

The 'UP' or 'DOWN' keys can be used to raise the percentage figure in 10% steps

8    1x 'ENTER' Terminate input

|    |      |        |
|----|------|--------|
| I  | V30% | D10%   |
| L1 | MW   | A I28% |

9    1x 'RETURN' Return to Main

|                      |
|----------------------|
| MCSGR20:19:59        |
| AAA            // MW |

Menu

**WARNING :** The 100% definition is dependent on the respective current supply :

(When drawing supply from the integral power supply unit the peak of around 400 mA is equivalent to 100 % (but only 400 mA for all circuits cumulatively)  
 (with an external supply, the max. is 500 mA / circuit)

### 3.4.4 Error Messages

If, after Step 7, the message 'L1 I-error' (circuit 1 – current error) appears on the display, there are two possible solutions:

**Tip :** Use of the 'CLEAR' key to cancel the message and re-establish the circuit current or Selection of a tolerance value of greater than 0 % for the corresponding circuit.

If the slave clickers included in the circuit are some distance away or additional slave clickers have been connected in the system, then the reference current and tolerance needed to be predetermined. Watch out for the maximum permissible current!

Once the faults have been eliminated and the parameters predetermined, remember to reconnect the time circuits!

If the message 'L1 short circuit' (circuit 1 – short-circuit) appears in the Main Menu, the time circuit connections need to be checked for a possible short-circuit.

### 3.4.5 Give a single (manual) pulse /reset

The time circuits can be reset/corrected manually by means of one-off pulses. To achieve this, the time circuits to be reset must be off in the Main Menu.

Example : Give a single pulse to circuit 1:

Step    Key        LCD display    Note

1    Disconnect time circuits 1 (see 3.3.2 - page 25)

2    'LEFT' or 'RIGHT' Select time circuits

|                             |
|-----------------------------|
| MCSGR20:19:59               |
| <u>H</u> AA        //    MW |

3        1x 'ENTER' MC-time  
 (circuit 1)

|                |
|----------------|
| HU    20:19:59 |
| L1    21:43:56 |

circuit time

4        2x 'UP' or 2x 'DOWN' Single pulse

|                 |
|-----------------|
| IMP    21:43:56 |
| L1    06.04.94  |

window

5        1x 'SELECT' Give isolated minute-

|                 |
|-----------------|
| IMP    21:43:56 |
| L1    06.04.94  |

pulse

6                    1x 'RETURN'

|                             |
|-----------------------------|
| MCSGR20:19:59               |
| <u>A</u> HA        //    MW |

Return to Main Menu

7    Connect time circuit 2 (see 3.3.3 - page 26)  
 Possibly reset circuit time

**Note : Manual pulsing is impossible with the DCF-circuit!**

### 3.4.6 Error Messages

If, after Step 4, the display registers 'Aut' (Auto) instead of 'IMP' (pulse), the time circuit is in automatic time comparison mode.

**Tip** : Disconnect time circuit in the Main Menu and recommence at step 1.

#### Operating Instructions/ Programming the Clock timer

The master clock signal generator has two switching outputs K1 and K2, by means of which various systems such as lighting, signalling equipment, etc. can be controlled. Control over these switching outputs can be exercised by programming the switching times or by manual on/off procedures. The manual pulse interval is one second. Once the start-up phase has been completed, the switching outputs are reset to the circuit status currently applying.

### 3.5.1 Operational status of the Switching Outputs

Switching outputs are permanently defined by an operational status.

/ : Switching output off

I : Switching output on

Each of the two switching outputs has its own code that is displayed when the switching output is selected:

K1: Switching output 1

K2 : Switching output 2

Each switching output can be on or off per switching time fixture or emit an ON or OFF pulse lasting a maximum of 99 seconds.

E (ON): Connect

A (OFF): Disconnect

P60 : 60 sec. pulse length, for example.

### 3.5.2 Switching output manual on/off

Switching outputs can be switched on or off at any time. Switching is done in synchrony with the next second change in the display.

**Example** : Connect switching channel K1:

| Step | Key               | LCD display  | Note       |
|------|-------------------|--|------------|
| 1    | 'LEFT' or 'RIGHT' | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     MCSGR<br/>                     20:19:59<br/>                     AAA / / K1                 </div> | channel K1 |
| 2    | 'SHIFT' and 'UP'  | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     HU 20:19:59<br/>                     AAA   / K1                 </div>                             | on         |

**Example : Disconnect switching channel K1 :**

| Step | Key                           | LCD display   | Note                |
|------|-------------------------------|---|---------------------|
| 1    | 'LEFT' or 'RIGHT' Select      | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     MCSGR20:19:59<br/>                     AAA      / K1                 </div> | switching output K1 |
| 2    | 'SHIFT' and 'DOWN' Disconnect | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     MCSGR20:19:59<br/>                     AAA    / / K1                 </div> | switching output K1 |

**3.5.3 Brief Program Description**

Four programs are stored in the MC each of which discharges a particular type of circuit timing function. Up to 325 timed switching functions can be input. Timed on and off functions must be input separately.

**a) Annual program**

The annual program handles timed functions that recur annually.

**b) holiday program**

The holiday program manages timing functions that recur annually and need to be activated only on certain days.

**c) Block program / Block date**

The block program manages timed operations that recur weekly during block activation. A maximum of 8 block programs can be input. Each block program is limited by a start and end program.

**d) Weekday program**

The weekday program manages time functions that recur throughout the whole year on a weekly basis.

**3.5.4 Program Prioritisation**

Since only one of the above programs can be active (at any given time), the programs have to be prioritised.

Top priority is assigned to the holiday program that takes precedence over all other programs. The annual program ranks number 2; the block program comes next while the weekday program has the lowest priority rating.

If several programs are being used simultaneously, then the timed functions are dealt with in the order of priority specified above, i.e. lower priority switching times are suppressed.

## 3.5.5 Reading of Switching times

In each Program, the switching times input can be called up individually.

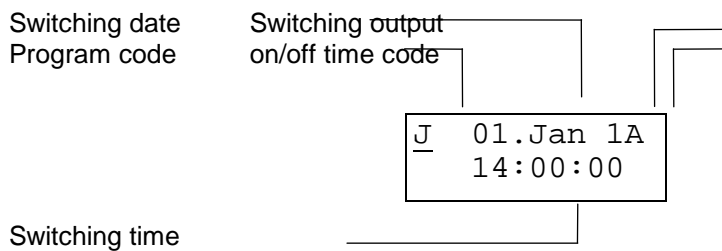
Example : Calling up switching times in the holiday program:

| Step | Key                  | LCD display            | Note   |
|------|----------------------|------------------------|--|
| 1    | 1x 'SELECT'          | Selection Menu         | MCSGQ20:19:59<br>Annual Pro.                     |
| 2    | 1x 'UP'              | Choose between         | MCSGQ20:19:59<br>Holiday Pr. individual programs |
| 3    | 1x 'ENTER'           | switching time display | F 01.Jan 1A<br>10:18:20                          |
| 4    | 1x 'UP' or 1x 'DOWN' | other                  | F 30.Feb 1A<br>22:19:59 switching times          |
| 5    | 2x 'RETURN'          | Return to Main Menu    | MCSGQ20:19:59<br>AAA //                          |

Switching data for the block program can be called up by selecting the block program in Step 2 and continuing with Step 3. Block programs 1-7 are to be selected per Step 2 using a combination of the 'SHIFT' and 'UP' keys.

### Abbreviations used in the switching time display :

#### a) Annual program - Switching time display



The annual program disconnects switching channel K1 on 1st January at 1400 hours.

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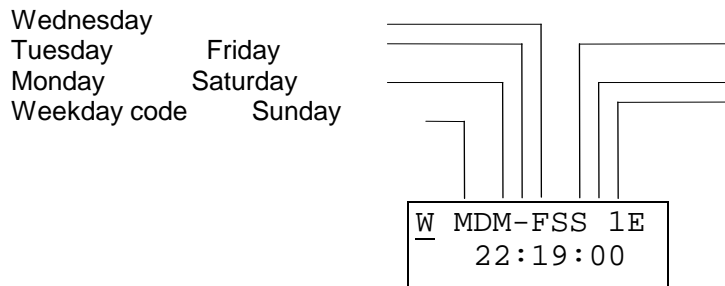
**Program code :**

J : Annual program  
 F : Holiday program  
 B : Block program (Block 0 -7)  
 W : Weekday program

Code :

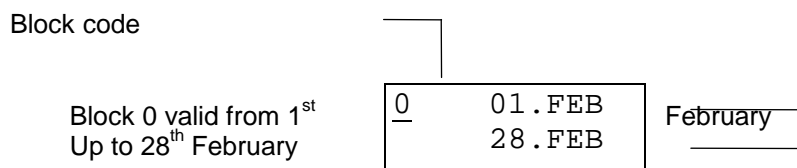
A : Disconnect  
 E : Connect  
 P60 : ON pulse length of e.g. 60 Seconds

**b) display Weekday program - Switching time**



Switching output K1 will come on at 2219 hours every day of the week apart from Thursdays.

**c) Block date display- Switching time**



Block 1 - 7 are selected with the UP key

## 3.5.6 Inputting of Switching times

### a) Annual program or Holiday program

**Example :** Input 24th March, 8:30 hours as the switching time  
 connect switching output K2

Step    Key    LCD display    Note

1        1x 'SELECT' Selection Menu

|                              |
|------------------------------|
| MCSGR20:19:59<br>Annual Pro. |
|------------------------------|

2        1x 'UP'    Select annual or holiday

|                              |
|------------------------------|
| MCSGR20:19:59<br>Annual Pro. |
|------------------------------|

program

3        1x 'ENTER' Holiday program

|                               |
|-------------------------------|
| J    No time<br>f i x t u r e |
|-------------------------------|

window

No appointed time denotes that as yet no switching times have been input into the program

4        1x 'SELECT' Request standard

|                            |
|----------------------------|
| J    01.Jan 1A<br>00:00:00 |
|----------------------------|

time

5        1x 'ENTER' input mode

|                            |
|----------------------------|
| J    01.Jan 1A<br>00:00:00 |
|----------------------------|

6        'LEFT' or 'RIGHT' the cursor to select

|                            |
|----------------------------|
| J    24.Jan 1A<br>00:00:00 |
|----------------------------|

day and month

7        'UP' or 'DOWN' Set date

|                            |
|----------------------------|
| J    24.Mar 1A<br>00:00:00 |
|----------------------------|

8        'LEFT' or 'RIGHT' Use the cursor to  
 output

|                            |
|----------------------------|
| J    24.Mar 1A<br>00:00:00 |
|----------------------------|

jump        to Switching

9        1x 'UP'    Select switching

|                            |
|----------------------------|
| J    24.Mar 2A<br>00:00:00 |
|----------------------------|

output2

| Step | Key               | LCD display             | Note                 |
|------|-------------------|-------------------------|----------------------|
| 10   | 'LEFT' or 'RIGHT' | J 24.Mar 2A<br>00:00:00 | to the outputs code  |
| 11   | 1x 'UP'           | J 24.Mar 2E<br>00:00:00 | On mode              |
| 12   | 'LEFT' or 'RIGHT' | J 24.Mar 2E<br>00:00:00 | go to the second row |
| 13   | 'UP' or 'DOWN'    | J 24.Mar 2E<br>00:00:00 | Set time             |
| 14   | 'ENTER'           | J 24.Mar 2E<br>08:30:00 | Terminate input      |

For multiple input, use the 'SELECT' key, for single input, use the 'ENTER' key

|    |             |                           |                     |
|----|-------------|---------------------------|---------------------|
| 15 | 2x 'RETURN' | MCSGR20:19:59<br>AA // MW | Return to Main Menu |
|----|-------------|---------------------------|---------------------|

If several switching times are to be entered, there is an opportunity to terminate input using the 'SELECT' key and at the same time request a new standard time. This, too, then appears on the display. Switching times are then input as described under steps 5 to 13. Only after the last switching time fixture (has been entered) is input terminated using the 'ENTER' key.

## b) Weekday program

**Example :** Switching Time Entries for Monday, Tuesday and Friday at 920 hours respectively  
 Switching channel 1 Switching pulse : Pulse length 60 Seconds

| Step | Key         | LCD display                  | Note           |
|------|-------------|------------------------------|----------------|
| 1    | 1x 'SELECT' | MCSGR20:19:59<br>Annual Pro. | Selection Menu |

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| Step       | Key               | LCD- Display                    | Note  |
|------------|-------------------|---------------------------------|---|
| 2          | 2x 'UP'           | Select weekday                  | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     MCSGR20:19:59<br/>                     Weekday pro.                 </div> program  |
| 3          | 1x 'ENTER'        | weekday program                 | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     WNo appointed<br/>                     time                 </div> window<br><br>'no appointed time' denotes that no switching times have as yet been entered in the program. |
| 4          | 1x 'SELECT'       | Request standard                | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W M-----1A<br/>                     00:00:00                 </div> time  |
| 5          | 1x 'ENTER'        | input mode                      | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W M-----1A<br/>                     00:00:00                 </div>   |
| 6 of the   | 1x 'RIGHT'        | use the cursor to week- Tuesday | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W M-----1A<br/>                     00:00:00                 </div> jump to the 2 <sup>nd</sup> day   |
| 7          | 1x 'UP'           | Select Tuesday                  | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W MD-----1A<br/>                     00:00:00                 </div>  |
| 8 week     | 3x 'RIGHT'        | Use cursor to move -- Fri.      | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W MD-----1A<br/>                     00:00:00                 </div> to the 5 <sup>th</sup> day of the  |
| 9          | 1x 'UP'           | Select Friday                   | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W MD--F--1A<br/>                     00:00:00                 </div>  |
| 10 outputs | 'LEFT' or 'RIGHT' | Use Cursor to jump code         | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W MD--F--1A<br/>                     00:00:00                 </div> to the switching   |
| 11         | 1x 'UP'           | select switching                | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W MD--F--1A<br/>                     00:00:00                 </div> channel  |
| 12 outputs | 'LEFT' or 'RIGHT' | Use the cursor to code          | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     W MD--F--1A<br/>                     00:00:00                 </div> jump to switching  |

| Step | Key               | LCD- Display        | Note   |
|------|-------------------|---------------------|--|
| 13   | 1x 'UP' or 'DOWN' | Select 60 sec       | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     W MD--F--1P<br/>                     00:00:00 60                 </div> plus <i>length</i> |
| 14   | 'LEFT' or 'RIGHT' | Use cursor to jump  | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     W MD--F--1P<br/> <u>0</u>0:00:00 60                 </div> to the 2 <sup>nd</sup> row      |
| 15   | 1x 'UP' or 'DOWN' | Set time            | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     W MD--F--1P<br/>                     09:<u>2</u>0:00 60                 </div>             |
| 16   | 'ENTER'           | Terminate input     | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     W MD--F--1P<br/>                     09:20:<u>0</u>0 60                 </div>             |
| 17   | 2x 'RETURN'       | Return to main menu | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     MCSGR20:19:59<br/> <u>AAA</u> // MW                 </div>                                 |

To select every day, activate the 'SHIFT' and 'UP' keys. If several switching times need to be input, an opportunity is given to close input using the 'SELECT' key and simultaneously to request a new standard time. This then also appears in the display. The switching times are then input as described under steps 5 to 15. Only when the last switching time (has been entered) is input closed using the 'ENTER' key. Input can be interrupted at any time using the 'RETURN' key.

### c) Block program

For a block program, the start and end date of the block must be entered in the block date window provided for the purpose. The start and end date must be separated by an interval of at least one day so that the block can be activated. Otherwise, the message 'Block inaccessible' appears !

For a block program to work in conjunction with the block date, code numbers are allocated. Identical code numbers work together, e.g. block program 0 with block date 0. Block programs are selected by means of the 'SHIFT' and 'UP' keys.

**Example :** Block program 3 should start on 7th January and finish on 28th March.

| Step | Key                                 | LCD display                  | Note   |
|------|-------------------------------------|------------------------------|--------|
| 1    | 1x 'SELECT' Menu selection          | MCSGR20:19:59<br>Annual Pro. |        |
| 2    | 4x 'UP' select block date           | MCSGR20:19:59<br>Block date  | window |
| 3    | 1x 'ENTER' input mode-<br>(Block 0) | 0 Block<br>inaccessible      |        |
| 4    | 'UP' or 'DOWN' select Block 3       | 3 Block<br>inaccessible      |        |
| 5    | 1x 'ENTER' select start date        | 3 01 Jan<br>02 Jan           |        |
| 6    | 'UP' or 'DOWN' set start date       | 3 02 Jan<br>28 Mar           |        |
| 7    | 'LEFT' or 'RIGHT' select end date   | 3 02 Jan<br>28 Mar           |        |
| 8    | 'UP' or 'DOWN' set end date         | 3 07 Jan<br>28 Mar           |        |
| 9    | 1x 'ENTER' Terminate input          | 3 07 Jan<br>28 Mar           |        |
| 10   | 2x 'RETURN' return to Main Menu     | MCSGR20:19:59<br>AAA // MW   |        |

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**Example** : input : switching times Mon., Tues., Fir; connect switching output 2 :  
 Time 8:15 hours; in Block 3

| Step | Key               | LCD display                   | Note  |
|------|-------------------|-------------------------------|---|
| 1    | 1x 'SELECT'       | selection Menu                | MCSGR20:19:59<br>Annual Pro.                            |
| 2    | 3x 'UP'           | select block program          | MCSGR20:19:59<br>Block prog.                            |
| 3    | 1x 'ENTER'        | Block program window          | 0 Noappointed<br>time                                   |
| 4    | 'SHIFT' and 'UP'  | select block 3                | 3 Noappointed<br>time                                   |
| 5    | 'SELECT'          | request standard              | 3 M----- 1A<br>00:00:00 time                            |
| 6    | 'LEFT' or 'RIGHT' | Move cursor to the            | 3 M----- 1A<br>00:00:00 1st day of the week             |
| 7    | 'UP' or 'DOWN'    | Select Monday                 | 3 M----- 1A<br>00:00:00                                 |
| 8    | 1x 'RIGHT'        | Use cursor to<br>of the week  | 3 M----- 1A<br>00:00:00 move to the 2 <sup>nd</sup> day |
| 9    | 'UP' or 'DOWN'    | select Tuesday.               | 3 MD----- 1A<br>00:00:00                                |
| 10   | 3x 'RIGHT'        | Use the cursor to<br>the week | 3 MD----- 1A<br>00:00:00 move to 5 <sup>th</sup> day of |

To select every day, activate the „SHIFT“ and „UP“ keys.

| Step | Key                    | LCD display   | Note                    |
|------|------------------------|---|-------------------------|
| 11   | 'UP' or 'DOWN'         | Select Friday   |                         |
|      |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 MD--<u>F</u>-- 1A<br/>                     00:00:00                 </div>        |                         |
| 12   | 3x 'RIGHT'             | Use cursor to move  | to switching output     |
| K1   |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 MD--F-- <u>1</u>A<br/>                     00:00:00                 </div>        |                         |
| 13   | 1x 'UP' or 1x 'DOWN'   | select  | switching output        |
| K2   |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 MD--F-- <u>2</u>A<br/>                     00:00:00                 </div>        |                         |
| 14   | 'RIGHT'                | Use cursor to jump to   | switching channel       |
| cord |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 MD--F-- <u>2</u>A<br/>                     00:00:00                 </div>        |                         |
| 15   | 'UP' or 'DOWN'         | select ON   | code                    |
|      |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 MD--F-- <u>2</u>E<br/>                     00:00:00                 </div>        |                         |
| 16   | 'RIGHT'                | Use cursor to jump to   | the 2 <sup>nd</sup> row |
|      |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 MD--F-- <u>2</u>E<br/> <u>0</u>0:00:00                 </div>                     |                         |
| 17   | 'UP' or 'DOWN'         | set time  |                         |
|      |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     3 MD--F-- <u>2</u>E<br/>                     08:1<u>5</u>:00                 </div> |                         |
| 18   | 1x 'ENTER' or 'SELECT' | Close input   |                         |
|      |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <u>3</u> MD--F-- <u>2</u>E<br/>                     08:15:00                 </div>                     |                         |
| 19   | 2x 'RETURN'            | Return to Main Menu   |                         |
|      |                        | <div style="border: 1px solid black; padding: 5px; display: inline-block;">                     MCSGR20:19:59<br/> <u>A</u>AA // MW                 </div>                          |                         |

If several switching times need to be entered in a block, an opportunity is provided for closing input using the 'SELECT' key instead of the 'ENTER' key (Step 17) whilst simultaneously requesting a new standard time. This then also appears in the display. Switching times are then input as described under Steps 4 to 16. Only with the last switching time is input terminated by using the 'ENTER' key. Input can be interrupted at any time using the 'RETURN' key.

## 3.5.7 Error Messages

If, after input, the message 'Incorrect input' is displayed, then an impermissible date has been entered.

**Tip** :Cancel error message with the 'CLEAR' key, check the input and amend it, if necessary.

If the message 'No appointed time' appears in the Selection Menu, the block program still contains no switching time fixtures.

**Tip** :Using the 'SELECT' key, request a new switching time and input switching times.

If the 'Block inaccessible message appears in the Selection Menu, no block date has as yet been entered.

**Tip** : Using the 'ENTER' key, request a new time and input.

If, after input, the message 'Appointed time duplicated', this means that the latest switching time input is already available.

**Tip** :It is no longer necessary to input this switching time. The message is cancelled using the 'CLEAR' key.

If no switching process takes place at the switching times managed by the block program, then there has been a mismatch between the block numbers of the block program (switching times) and the block date (start/end date).

### **The block numbers must tally with the switching time dates! (e.g. Block date 0 and block program 0)**

**Tip** :Clear the wrong block and activate the correct block with the matching block number using the start and end date.

If after the block date input, the message 'Block overlap' appears, then there is overlap between two blocks. The date of the second block must be amended, so that no overlap is still evident.

**Tip** :Using the 'CLEAR' key, clear the error message and then amend the start / end date.

If, after input, the message 'Time incorrect' appears, then an invalid date has been programmed.

**Tip** :Using the 'CLEAR' key, cancel the error message and then amend the start/end date.

If the 'Block inaccessible message appears in the Selection Menu, no block has as yet been input.

**Tip** :Using the 'ENTER' key, request a new time appointment and enter the date.

If the Selection Menu displays the message 'No days, this means that no day has as yet been selected from the weekday program or that the ,every day' option has been chosen.

**Tip** :Using the 'CLEAR' key, cancel the error message and then input at least one weekday.

## 3.5.8 Changing the Switching Times

### a) Annual and Holiday programs

**Example** : Changing the switching times in the annual program from 24th March, 830 hours, K2 to the switching time of 7th August, 1000 hours, K1

| Step | Key            | LCD display              | Note                                  |
|------|----------------|--------------------------|---------------------------------------|
| 1    | 1x 'SELECT'    | selection Menu           | MCSGR20:19:59<br>Annual Pro.          |
| 2    | 1x 'ENTER'     | select time fixture with | J 24.Mar 1E<br>08:30:00 'UP' / 'DOWN' |
| 3    | 1x 'ENTER'     | Input mode               | J 24.Mar 1E<br>08:30:00               |
| 4    | 'UP' or 'DOWN' | Set desired dates        | J 07.Aug 1E<br>00:00:00               |
| 5    | 1x 'ENTER'     | Terminate input          | J 07.Aug 1E<br>10:00:00               |
| 6    | 2x 'RETURN'    | Return to Main           | MCSGR20:19:59<br>AAA // MW Menu       |

## b) Weekday program

**example :** Changing the switching times from Mon., Tues., Fri., 9:20 hours, pulse length 60 Seconds to the switching time of Wed., 14:12 hours, pulse length 10 seconds.

Step    Key    LCD display    Note

- |  |   |                               |          |
|--|---|-------------------------------|----------|
| 1  | 1x 'SELECT' Selection Menu                  | MCSGR20:19:59<br>Annual Pro.  |          |
| 2  | 2x 'UP' select weekday -                    | MCSGR20:19:59<br>Weekday pro. | window   |
| Using the 'UP' and 'DOWN' key, look for a switching time |   |                               |          |
| 3  | 1x 'ENTER' select switching time            | W MD--F-- 1P<br>09:20:00 60   |          |
| 4  | 1x 'ENTER' Change mode                      | W MD--F-- 1P<br>09:20:00 60   |          |
| 5  | 'LEFT' or 'RIGHT' Cursor to 1 <sup>st</sup> | W MD--F-- 1P<br>09:20:00 60   | weekday  |
| 6  | 'UP' or 'DOWN' Cancel Monday                | W -D--F-- 1P<br>09:20:00 60   |          |
| 7  | 1x 'RIGHT' Cursor to 2 <sup>nd</sup> day of | W -D--F-- 1P<br>09:20:00 60   | the week |
| 8  | 'UP' or 'DOWN' Cancel Tuesday               | W ---F-- 1P<br>09:20:00 60    |          |
| 9  | 1x 'RIGHT' Cursor to 3 <sup>rd</sup> day of | W ----F-- 1P<br>09:20:00 60   | the week |

Step    Key    LCD display    Note

10            'UP' or 'DOWN' Select            

|              |
|--------------|
| W --M-F-- 1P |
| 09:20:00 60  |

            Wednesday

By the same principle, Friday is also cleared.

11 'LEFT' or 'RIGHT' Using the cursor, go            

|             |
|-------------|
| W --M--- 1P |
| 09:20:00 60 |

            to            the 2<sup>nd</sup> row

12 'UP' or 'DOWN' set desired time &            

|             |
|-------------|
| W 07.Aug 1P |
| 14:12:00 10 |

            pulse            length

13            1x 'ENTER' Terminate input            

|              |
|--------------|
| W --M---- 1P |
| 14:12:00 10  |

14            2x 'RETURN' Return to Main            

|               |
|---------------|
| MCSGR20:19:59 |
| AAA // MW     |

            Menu

### c) Block program

**Example :** Changing the switching times from Mon., Tues., Fri., 9:20 hours, pulse length 60 seconds to a switching time of Wed., 14:12 hours, in Block 6

Step    Key    LCD display    Note

1            1x 'SELECT' selection Menu            

|               |
|---------------|
| MCSGR20:19:59 |
| Annual Pro.   |

2            3x 'UP' select program            

|               |
|---------------|
| MCSGR20:19:59 |
| Block Pro.    |

3            1x 'ENTER' Block program 0            

|               |
|---------------|
| 0No appointed |
| time          |

            window

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| Step  | Key                 | LCD display                          | Note                          |
|---|---------------------|--------------------------------------|-------------------------------|
| 4   | 6x 'SHIFT' and 'UP' | search for time                      | switching                     |
|   |                     | 6 No appointed time                  |                               |
| 5   | 'UP' or 'DOWN'      | Select block 6                       |                               |
|   |                     | 6 No appointed time                  |                               |
| 6   | 1x 'ENTER'          | Change mode automatically)           | (Window appears               |
|   |                     | 6 MD--F-- 1P<br>09:20:00 60          |                               |
| 7   | 'LEFT' or 'RIGHT'   | Cursor to 1 <sup>st</sup> day of     | the week                      |
|   |                     | 6 MD--F-- 1P<br>09:20:00 60          |                               |
| 8   | 'UP' or 'DOWN'      | Clear Monday                         |                               |
|   |                     | 6 -D--F-- 1P<br>09:20:00 60          |                               |
| 9   | 1x 'RIGHT'          | Cursor to 2 <sup>nd</sup> day of     | the week                      |
|   |                     | 6 -D--F-- 1P<br>09:20:00 60          |                               |
| 10  | 'UP' or 'DOWN'      | Clear Tuesday                        |                               |
|   |                     | 6 ---F-- 1P<br>09:20:00 60           |                               |
| 11  | 1x 'RIGHT'          | Cursor to 3 <sup>rd</sup> day of the | week                          |
|   |                     | 6 ---F-- 1P<br>09:20:00 60           |                               |
| 12  | 'UP' or 'DOWN'      | Select                               | Wednesday                     |
|   |                     | 6 --M-F-- 1P<br>09:20:00 60          |                               |
| Friday is also cancelled by the same principle. |                     |                                      |                               |
| 13  | 'LEFT' or 'RIGHT'   | Using the cursor to                  | go to the 2 <sup>nd</sup> row |
|   |                     | 6 --M--- 1P<br>09:20:00 60           |                               |

| Step | Key            | LCD display  | Note |
|------|----------------|--|------|
| 14   | 'UP' or 'DOWN' | Set desired time   |      |
|      |                | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     6 07.Aug 1P<br/>                     14:12:00                 </div>     |      |
| 15   | 1x 'ENTER'     | Terminate input  |      |
|      |                | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     6 --M---- 1P<br/>                     14:12:00 60                 </div> |      |
| 16   | 2x 'RETURN'    | Return to Main   | Mane |
|      |                | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     MCSGR20:19:59<br/>                     AAA // MW                 </div>  |      |

## 3.6 Cancel Switching Times

### a) Annual program, Holiday program and Weekday program

To cancel an appointed switching output, first of all go into Selection Menu and select the time fixture for cancellation from the annual program / holiday program. Then cancel the switching time with the 'SHIFT' and 'RETURN' keys. If all time fixtures are to be cancelled, this can be done using the 'SHIFT' and 'ENTER' keys. Return to Main Menu is achieved merely by activating the 'RETURN' key TWICE.

### b) Block program

A switching time can be cancelled by entering the Selection Menu and selecting the start/end times in the block date. The next step is to cancel the block date using the 'SHIFT' and 'RETURN' keys. The block is now inaccessible. The switching times can remain stored in the block program block. The block can be reactivated at a later point in time, by inputting the new start/end date into the block date. If individual switching times in the block program are to be cancelled, then these must first of all be selected then cancelled using the 'SHIFT' and 'RETURN' keys. All time fixtures can be cancelled by using the 'SHIFT' and 'ENTER' keys. Press the 'RETURN' key TWICE to return to the Main Menu.

**Example :** Deleting switching time fixtures from the annual program  
 (applies to all switching times)

| Step | Key         | LCD display   | Note |
|------|-------------|---|------|
| 1    | 1x 'SELECT' | Selection Menu  |      |
|      |             | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     MCSGR20:19:59<br/>                     Annual Pro.                 </div> |      |
| 2    | 'ENTER'     | Select appointed time   |      |
|      |             | <div style="border: 1px solid black; padding: 2px; display: inline-block;">                     J 07.Aug 1E<br/>                     10:00:00                 </div>      |      |

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Step    Key    LCD display    Note

Using the 'UP' and 'DOWN' keys, search for the switching time for cancellation

|   |  |                           |                |
|---|--|---------------------------|----------------|
| 3 | 'SHIFT' and 'RETURN' Cancel individually | MCSGR20:19:59<br>10:00:00 | switching time |
|---|--|---------------------------|----------------|

If all time fixtures are to be cancelled, the 'SHIFT' and 'ENTER' keys must be activated.

|   |                       |                            |           |
|---|-----------------------|----------------------------|-----------|
| 4 | 2x 'RETURN' Return to | MCSGR20:19:59<br>AAA // MW | Main Menu |
|---|-----------------------|----------------------------|-----------|

### 3.7 Program loading and/or reading the switching times from the chip card

Switching time programs are loaded by means of a chip card. Current switching time programs are stored in the master clock signal generator and are (also) cancelled by the loading process.

Note : Die Chip card is inserted into the slot provided for the purpose with the memory location on the bottom left hand side.

Example : Loading a program from a chip card:

Step    Key    LCD display    Note

|   |                            |                              |  |
|---|----------------------------|------------------------------|--|
| 1 | 1x 'SELECT' Selection Menu | MCSGR20:19:59<br>Annual Pro. |  |
|---|----------------------------|------------------------------|--|

|   |                              |                              |             |
|---|------------------------------|------------------------------|-------------|
| 2 | 5x 'UP' or 8x 'DOWN' Program | MCSGR20:19:59<br>Prog.-laden | load window |
|---|------------------------------|------------------------------|-------------|

|   |                              |             |  |
|---|------------------------------|-------------|--|
| 3 | 1x 'ENTER' Program is loaded | Load Progr. |  |
|---|------------------------------|-------------|--|

|   |                   |                              |             |
|---|-------------------|------------------------------|-------------|
| 4 | Return to program | MCSGR20:19:59<br>Prog.-laden | load window |
|---|-------------------|------------------------------|-------------|

Step    Key    LCD display    Note

|   |        |                     |                                  |
|---|--------|---------------------|----------------------------------|
| 5 | RETURN | Return to Main Menu | MCSGR20:19:59<br>AAA       // MW |
|---|--------|---------------------|----------------------------------|

### 3.7.1 Error Messages

If, after Step 3, the error message 'card missing' appears, then the chip card has not been inserted.

If the message 'card error' appears, then the chip card has not been inserted properly.

Tip : Cancel the message with the CLEAR key and insert the chip card correctly. Then continue with step 3.

If the 'card content invalid' message appears, this means that no data have been stored on the chip card.

Tip : Cancel the message with the 'CLEAR' key and insert chip card. Then continue with step 3.

### 3.8 Storing Programs/ Switching times on the chip card

The switching times programmed in the master clock signal generator can be stored on the chip card.

**Note** : When this is done, any programs already stored on the chip card will be overwritten!

The chip card is inserted with the memory location on the bottom left hand side in the slot provided for the purpose.

**Example** : Protection of all chip card programs:

Step    Key    LCD display    Note

|   |           |                |                              |
|---|-----------|----------------|------------------------------|
| 1 | 1x SELECT | Selection Menu | MCSGR20:19:59<br>Annual Pro. |
|---|-----------|----------------|------------------------------|

|   |                  |         |                             |      |        |
|---|------------------|---------|-----------------------------|------|--------|
| 2 | 6x UP or 7x DOWN | Program | MCSGR20:19:59<br>Prog. save | save | Window |
|---|------------------|---------|-----------------------------|------|--------|

Step    Key    LCD display    Note

|   |            |                  |               |
|---|------------|------------------|---------------|
| 3 | 1x 'ENTER' | Program is saved | Prog.<br>save |
|---|------------|------------------|---------------|

Program save can take up to 3 minutes (depending on the number of switching times)

|   |                   |                     |                                       |        |
|---|-------------------|---------------------|---------------------------------------|--------|
| 4 | Return to program | save                | MCSGR20:19:59<br>Prog.save            | window |
| 5 | 'RETURN'          | Return to Main Menu | MCSGR20:19:59<br><u>A</u> AA    // MW |        |

### 3.8.1 Fault Messages

If, after step 3, the error message 'card missing' or 'card error' appears, then the chip card has not been inserted.

**Tip** :Cancel with the 'CLEAR' key and insert the chip card. Then continue with Step 3.

### 3.9 RZ-Analysis Menu

The RZ-test analysis method was implemented in order to evaluate power failures and DCF reception characteristics. Power failures and voltage fluctuations prompting clock restart are summarised in the upper row of the display.

The bottom row shows the total number of radio synchronisation with a putatively good DCF time signal. With each radio synchronisation, one unit is added to the meter reading. If the meter reading increases in a relatively short time, the DCF time signal is being disrupted frequently and the aerial location is inappropriate. (See 2.3 - Page 8).

**Example** : Analysis Menu:

Step    Key    LCD display    Note

|   |             |                |                              |
|---|-------------|----------------|------------------------------|
| 1 | 1x 'SELECT' | selection Menu | MCSGR20:19:59<br>Annual Pro. |
|---|-------------|----------------|------------------------------|

|   |           |               |                          |
|---|-----------|---------------|--------------------------|
| 2 | 1x 'DOWN' | Analysis Menu | MCSGR20:19:59<br>RZ-Test |
|---|-----------|---------------|--------------------------|

3 1x 'ENTER' Voltage failure

|          |     |
|----------|-----|
| RESET    | 001 |
| DCF/QRTZ | 123 |

radio synchronisation

Both meter readings can be rezeroed (000) using the 'SHIFT' and 'RETURN' keys.

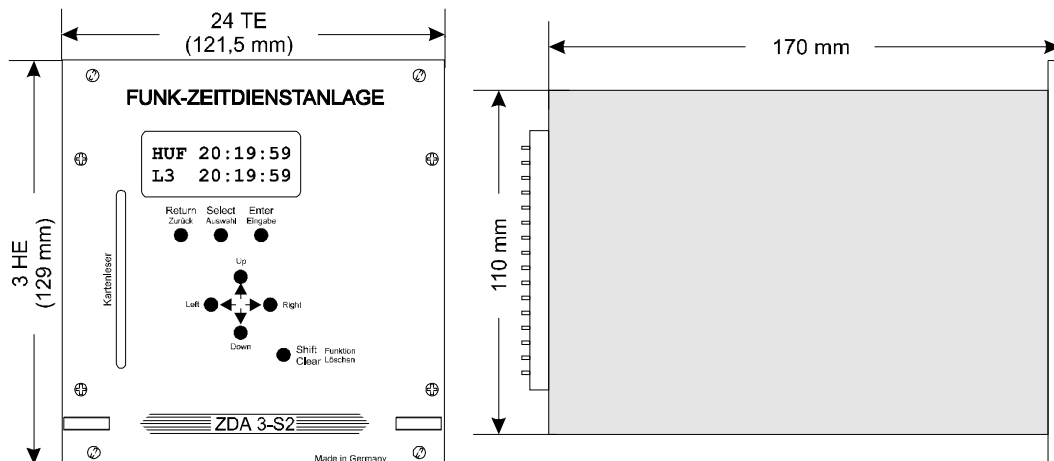
4 'RETURN' Return to Main Menu

|               |
|---------------|
| MCSGR20:19:59 |
| AAA // MW     |

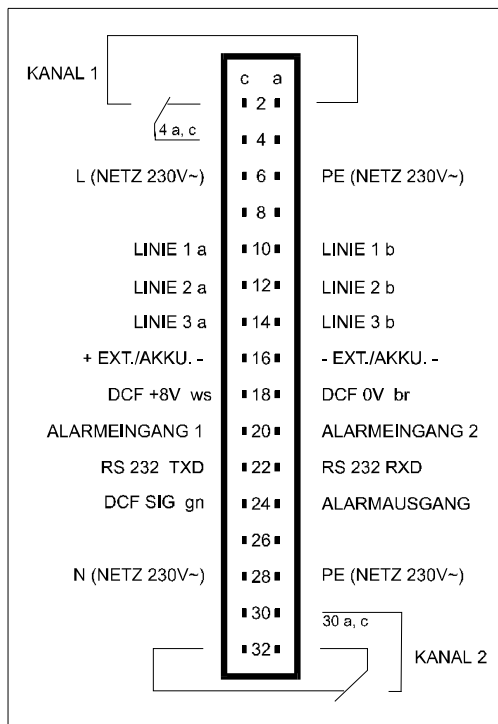
## 4. Supplements to the instruction for mounting and starting

### 4.1 Dimensional drawing 19"-plug-in Cassette

Radio time service unit



## 4.2 Electrical Connections / Wiring Diagram



Connecting Strip configuration  
 (Module D, 32-pin, to DIN 41612) on  
 the back of the insert

## 5. Data Protocol of the Serial RS232– Data Output

### 5.1 General

The technical data for this interface are as follows:

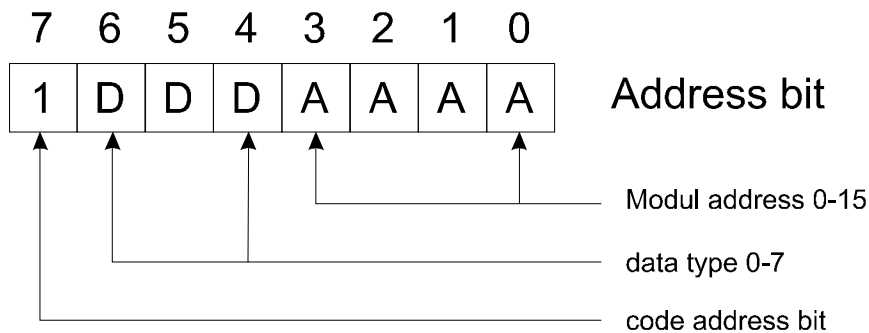
Baud rate : 4800 Baud  
 Data with : 8 Bit  
 Stop bits :2  
 Parity : none  
 Handshake :none

The data on this interface can be read by any PC. Time and date information can thus be read into and processed on a PC via the interface, only 8-bit data words being transferred via this interface. In the case of module addresses, the highest rated bit (MSB) is always 1, while with data the MSB is always 0. Data transfer is always a 3-stage process:

1.) Transmit addresses with the data type code.

Transmit data. The number of bytes depends on the type of data.  
 Transmit FF (hex) clearing signal.

Transfer starts after each second changeover. The time of day is relayed by the master clock signal generator first of all to minimise the ensuing delay. The data type is also transmitted at the same time as the address output. An address byte is defined as follows:



The master clock signal generator only sends its data to the 0 address. The address coding is as follows.

| Addresses | Data                                  |
|-----------|---------------------------------------|
| 0         | fixed : time / date / day of the week |
| 1-15      | unoccupied                            |

Data type code :

| Code | Data value | Number and type of data bytes     |
|------|------------|-----------------------------------|
| 0    | Time       | 8, hz, he, mz, me, sz, se, SN, FQ |
| 1    | Date       | 7, WT, tz, te, mz, me, jz, je     |

hz= hour tenth, he= hour one, mz= minute tenth, me= minute one, sz= second tenth, se= second one, SN= Summertime or Wintertime, FQ= Radio-controlled or quartz

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WT= weekday tz= date tenth, te= date one, mz= month tenth, me= month one, jz= year tenth, je= year one

## 5.2 Typical time transmission

In time output, the address byte plus the time data type is sent first of all, then this is followed by 6 data bytes plus time data. The data bytes are transferred as normal „0„ to „9„ figure ASCII codes. The FFh clearing signal comes at the end.

**Example :** At 0 address, the time transmitted should be 12:34:56. The following bytes are transferred: Transfer bytes:

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

- address byte (Bit 7) =1, (90h)
- data type (Bit 4-6) =0 for date and weekday
- address (Bit 0-3) =0 for address 0

1. data byte (Bit7) =0  
 weekday, digit is 7, 37h

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |

2. data byte (Bit 7)=0  
 date tenth, digit is 2, 32h

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

3. data byte (Bit 7)=0  
 date one, digit is 4, 34h

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |

4. data byte (Bit 7)=0  
 month tenth, digit is 1, 31

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |

5. data byte (Bit 7) =0  
 Month one, digit is 2, 32h

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

6. data byte (Bit 7) =0  
 year tenth, digit is 9, 39h

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |

7. data byte (Bit 7) =0  
 year one, digit is 3, 33h

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |

8. final signal (FFh)

| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

## 5.3 Typical Date Transmission

In date output, first of all the address byte is transmitted with the date data type. This is followed by 6 data bytes plus the date. The data bytes are transferred as normal „0,, up to „9,, figure ASCII codes. The clearing signal FFh comes at the end.

**Example** : At 0 address, the date transmitted should be Sunday 24.12.93. The following bytes are transmitted:

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

- address byte (Bit 7) =1, (80h)
- data type (Bit 4-6) =0 for time
- address (Bit 0-3) =0 for address 0

1. data byte (Bit7) =0  
 hour tenth, digit is 1, 31h

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

2. data byte (Bit 7)=0, hour one, digit is 2, 32h

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |

3. data byte (Bit 7)=0, minute tenth, digit is 3, 33h

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |

4. data byte (Bit 7)=0, minute one, digit is 4, 34h

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 |

5. data byte (Bit 7) =0, second tenth, digit is 5, 35h

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 1 |

6. data byte (Bit 7) =0, second one, digit is 6, 36h

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |

7. data byte (Bit 7) =0, ASCII „S“ 53h summertime, ASCII „N“ 4Eh Normal time

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |

8. data byte (Bit 7) =0, ASCII „F“ 46h radio-controlled, ASCII „Q“ 51h Quartz mode

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |

9. final signal (FFh)

|   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

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