MEINBERG
FUNKUHREN

Technical Information

Operating Instructions

DU35S

Impressum

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Features of the DU35S

The large display DU35S is a 300mm x 300mm LED matrix display that shows the time and date. It can be run either as a free running stand alone clock or as a serial driven slave clock.

Fig.1: Front View

In case of supply voltage failure the on board RTC keeps the time based on XTAL for at least 10 years. The language displayed can be choosen. The wall mounted housing of the DU35S is made of plastic coated steel sheet.

The power connector, the (optional) antenna input and the RS232/20mA interfaces provided by DU35S are accessible via connectors in the rear panel of the case.

Installation

Power Supply

The requested supply voltage is applied via the power cord receptacle in the rear panel. After connecting the power cord the system is ready to operate and the time/date is displayed immediately.

DU35S as Stand Alone Clock

After connecting the mains power the shown time can be set by the two buttons in the rear panel of the case. The accuracy of the time depends on the precision of the internal quartz base.

An automatic changeover of daylight saving can be programmed as described in section "Daylight Saving".

DU35S as Slave Clock

The DU35S can be synchronized by a preconnected radio clock that sends time strings periodically. When the radio clock stops sending time strings the DU35S continues by running on XTAL.

The data transmission occurs either:

  - via RS232 or
  - via 20mA current loop.

It is possible to connect several DU35S' or other similar displays via series connection to one radio clock.

Usage of the Buttons MENU and SET

The time and date, the language, the brightness, the serial parameters and the automatic changeover of daylight saving can be edited by using the buttons MENU and SET.

The button MENU is used to change over from the normal operation mode into the 'set parameters' mode and to select the different menus. The button SET is used to modify the selected parameter. When leaving the menu by pushing MENU the modification is acknowledged. When no button is pushed for more than 30 seconds the DU35S goes back into normal operation mode with loosing the last modification that was not acknowledged. The menus in detail are described below.

The Menus in Detail

Time

When pressing SET in this menu the actual valid time of the DU35S appears in the display with a blinking digit of the hours. Pressing and keeping pushed the SET button for at leasr half a second before releasing lets the blinking digit increment by one. This can be repeated until the value has reached the target. One more brief pressure of SET lets the next digit begin to blink that can be incremented in the same way. Pressing MENU acknowledges the modification and changes over to the next menu.

Date

The date can be modified in the same manner that is described above.

Language

When pressing SET in this menu the actual valid language of the DU35S' menu texts appears in the display. Renewed pressing SET causes another language appearing. When the wanted (and available) language is displayed, the menu is to leave by pressing MENU.

Mode

DU35S is able to show the time and/or date in different formats. One of these different display modes can be selected in this menu by pressing SET. Press the MENU button to acknowledge and to leave this menu.

Brightness

The brightness of the display can be set in three steps. Press SET in this menu to increment an integer between 1 and 3 where 1 means the most dimmed step and 3 means the fully brightness. Press MENU to acknowledge and to leave this menu.

Serial

Baudrate and framing of the serial interface can be set using this menu. Available baudrates are: 2400, 4800, 9600 and 19200. The framing can be choosen between 7E2 and 8N1. Setting this parameters occurs similar to the procedures described before. A short brief push to the SET button changes to the next parameter to be set, a longer push of SET lets the blinking value increment by one. Press MENU to acknowledge and to leave this menu.

Time Zone

This menu lets the user enter a value for the time offset to UTC each for winter time (daylight saving off) and for summer time (daylight saving on). This setting as well as the following described *Daylight Saving* settings come into affect only when the clock is used as a free running clock. Otherwise the changeover in daylight saving occurs according to the reference source (e.g. DCF77). Pressing MENU acknowledges the changings and switches to the next menu.

Daylight Saving

W/S D:
In this menu the automatic changeover from daylight saving **off** to daylight saving **on** can be edited. Pressing SET lets the user edit the date of the changeover as described before but there is one peculiarity:

Beginning of daylight saving may either be defined by exact dates for a single year or using an algorithm which allows the DU35S to recompute the effective dates year by year.

The example beside shows how to enter the first case:
The day-of-week does not need to be specified and therefore is displayed as wildcard (*). The date of next years changeover has to be entered as well (year by year).

30 / 03
03   *

In the second case the day-of-week must be specified. Then, starting from the configured date, daylight saving starts the first day whitch matches the configured day-of-week.

The example shows what has to be entered when daylight saving has to start the last sunday in march every year:
The year (**) does not need to be specified because the changeover algorithm is valid for all further years, too.

25 / 03
**   7

W/S T:
In this menu the time of the changeover from daylight saving **off** to daylight saving **on** can be edited. Pressing SET lets the user edit the time of the changeover as described before. Press MENU to acknowledge and to leave this menu.

S/W D:

This menu lets the user enter the date of the automatic changeover from daylight saving **on** to daylight saving **off** in the same manner described in the prvious section:

Ending of daylight saving may either be defined by exact dates for a single year or using an algorithm which allows the DU35S to recompute the effective dates year by year.

The example beside shows how to enter a fixed time/date for a singe years daylight saving end:
The time/date of next years changeover has to be entered as well (year by year).

26 / 10

03   *

When daylight saving has to end the last sunday in october every year the following has to be entered: (day-of-week: 1 = monday, 7 = sunday).

25 / 10

****   7**

S/W T:

In this menu the time of the changeover from daylight saving **on** to daylight saving **off** can be edited. Pressing SET lets the user edit the time of the changeover as already described. Press MENU to acknowledge and to leave this menu.

Exit

Pressing SET in this menu lets the DU35S switch over from the 'set parameters' mode into the normal operation mode. All changes of the settings are valid now.
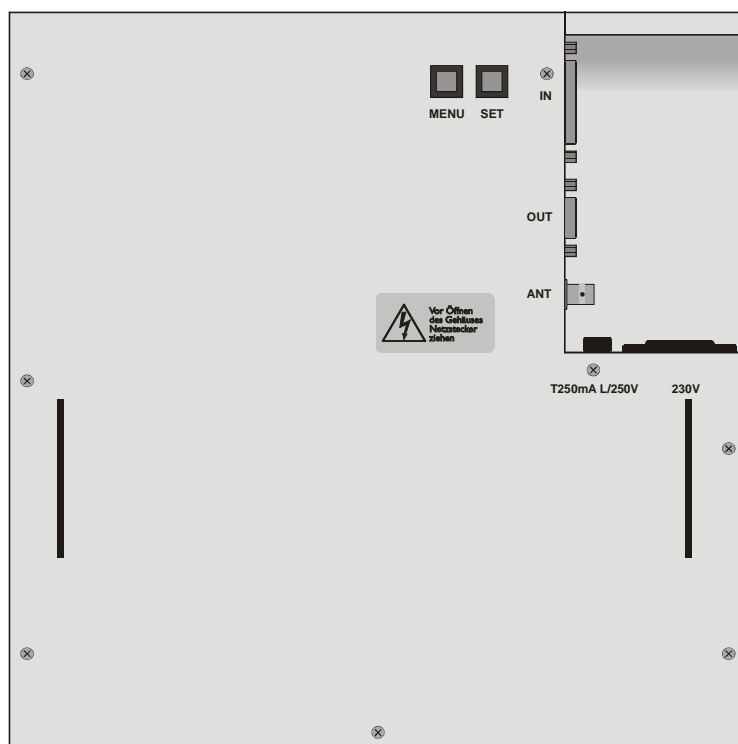
Rear View DU35S

Fig.2: `Rear Panel View`

IN	serial input for preconnected master clock (time strings)
OUT	serial output (time strings) for further DU35S' or other equivalent Displays.
ANT	not connected
Power	Power supply cord (85-264VAC / 120-375VDC)
FUSE	Fuse (250mA SB)
MENU/SET	Buttons to configure the DU35S

Because it is possible to preconnect clocks in different ways it is necessary to set the jumpers on the main board correctly (see examples Fig.3-6). The factory default setting of the jumpers is: syncronisation by RS232 time strings.

Rear Panel Connectors

| Name	Type	Signal	Cable
IN	25 pin SUB-D	RS232	shielded data line
OUT	9 pin SUB-D	RS232	shielded data line
Power	power cord receptacle	85-264VAC / 120-375VDC	power supply cord

CE Label

This device conforms to the directive 89/336/EWG on the approximation of the laws of the Member States of the European Community relating to electromagnetc compatibility.

Connection Exaples

Hauptuhr (DCF / GPS)
oder
DU35K* (D Sub 9 OUT)

DU35K
D Sub25 IN

2*   2

7*   7
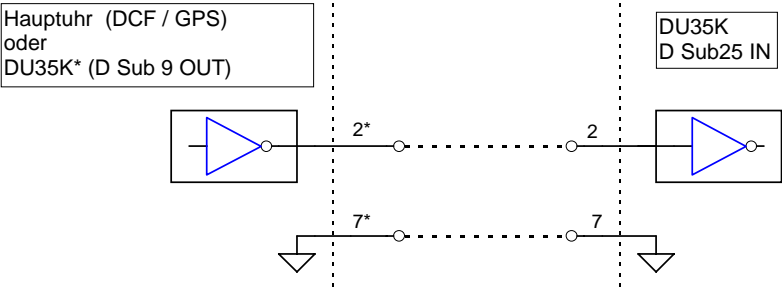
JMP1	JMP2	JMP5	JMP6	JMP7
X	X	X	X	RS232

Fig.3: Jumper settings for operating mode: 'Synchronisation by RS232'

Hauptuhr (DCF / GPS)
oder
DU35K* (D Sub 9 OUT)

DU35K
D Sub25 IN

4 *   25

1 *   23

+V
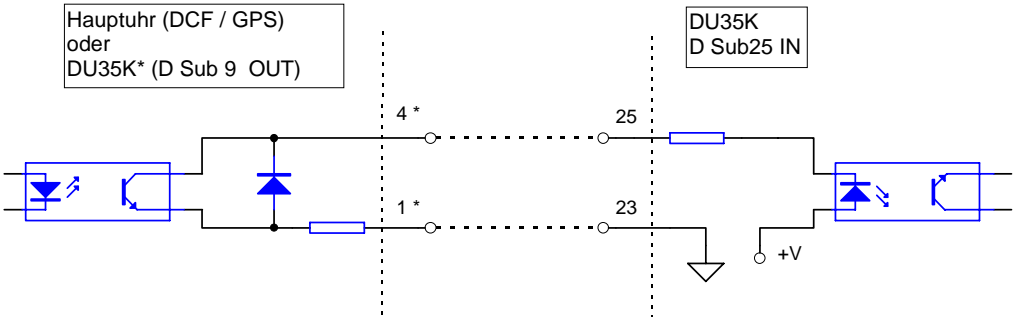
JMP1	JMP2	JMP5	JMP6	JMP7
passive	passive	active	active	20mA

Fig.4: Jumper settings for operating mode: 'Synchronisation by 20mA Current Loop'
with passive output onto active input

Hauptuhr (DCF / GPS)
oder
DU35K* (D Sub 9 OUT)

DU35 K
D Sub25 IN

+V   -V

4 *   25

1 *   23
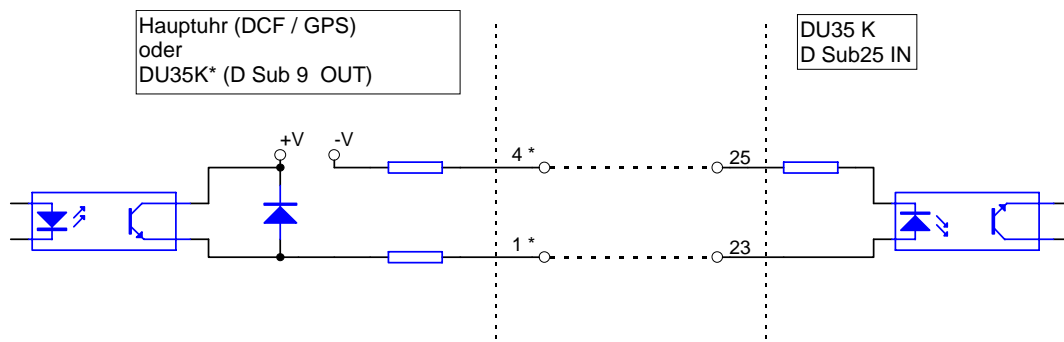
JMP1	JMP2	JMP5	JMP6	JMP7
active	active	passive	passive	20mA

Fig.5: Jumper settings for operating mode: 'Synchronisation by 20mA Current Loop'
with active output onto passive input

Pin Assignments of SUB-D Connector IN

2   Input Time Strings - RS232
3   Output RX_INF - RS232
7   Ground
17   Output RX_INF - 20mA -
23   Input Time Strings - 20mA +
24   Output RX_ INF - 20mA +
25   Input Time Strings - 20mA -

Pin Assignments of SUB-D Connector OUT

1   Output Time Strings - 20mA -
2   Output Time Strings - RS232
3   Input RX_INF - RS232
4   Output Time Strings - 20mA +
5   Ground
6   Input RX_INF - 20mA +
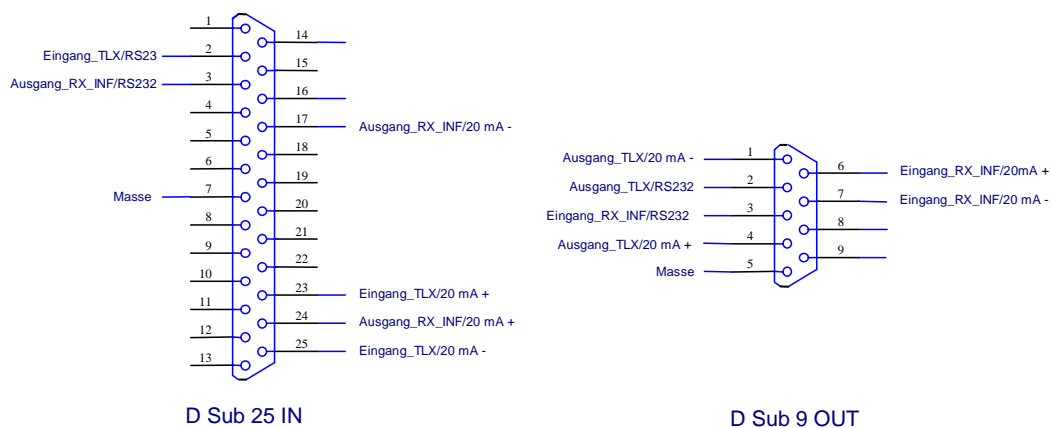7   Input RX_INF - 20mA -

D Sub 25 IN

D Sub 9 OUT

Fig.7: Pin Assignments of SUB-D Connectors IN and OUT
(DCF77 variant: The DSub connector (IN) at the rear panel has no effect!)

Technical Specifications:

OPERATION MODE:	- as free running quartz clock with internal RTC - as slave clock synchronized by radio clock or master clock with serial time strings
DISPLAY:	LED dot matrix display 5x7 dots, 2 lines (50mm character height), LED circle for indication of seconds
INPUTS:	serial interface, RS232 or 20mA current loop (passive/active) DSUB25 connector
OUTPUTS:	serial interface, RS232 or 20mA current loop (passive/active) DSUB9 connector
BAUDRATE:	2400, 4800, 9600 or 19200 baud
FRAMING:	7E2 or 8N1
TIME STRING:	see "Format of the Meinberg Standard Time String"
BUFFERING:	In case of supply voltage failure the on-board RTC keeps the time based on XTAL for more than 10 years.
POWER REQUIREMENTS:	85-264VAC, 50/60Hz / 120-375VDC, approx. 22VA
FUSE:	250mA T (slow blowing)
PHYSICAL DIMENSION:	323mm x 323mm x 57mm
WEIGHT:	4,7kg

Format of the Meinberg Standard Time String

The Meinberg Standard Time String is a sequence of 32 ASCII characters starting with the STX (start-of-text) character and ending with the ETX (end-of-text) character. The format is:

<STX>D:*dd.mm.yy*;T:*w*;U:*hh.mm.ss*;*uvxy*<ETX>

The letters printed in *italics* are replaced by ASCII numbers whereas the other characters are part of the time string. The groups of characters as defined below:

<STX>   Start-Of-Text (ASCII code 02h)

dd.mm.yy the current date:
     dd day of month (01..31)
     mm month   (01..12)
     yy year of the century (00..99)

w   the day of the week (1..7, 1 = Monday)

hh.mm.ss the current time:
     hh hours   (00..23)
     mm minutes   (00..59)
     ss seconds   (00..59, or 60 while leap second)

uv   clock status characters:
     u: '#' clock has not synchronized after reset
      ' ' (space, 20h) clock has synchronized after reset
     v: '*' DCF77 clock currently runs on XTAL
      ' ' (space, 20h) DCF77 clock is sync'd with transmitter

*x*   time zone indicator:
     'U' UTC Universal Time Coordinated, formerly GMT
     ' ' MEZ European Standard Time, daylight saving disabled
     'S' MESZ European Summertime, daylight saving enabled

y   anouncement of discontinuity of time, enabled during last hour before discontinuity comes in effect:
     '!' announcement of start or end of daylight saving time
     'A' announcement of leap second insertion
     ' ' (space, 20h) nothing announced

<ETX>   End-Of-Text (ASCII code 03h)

Jumper Arrangement
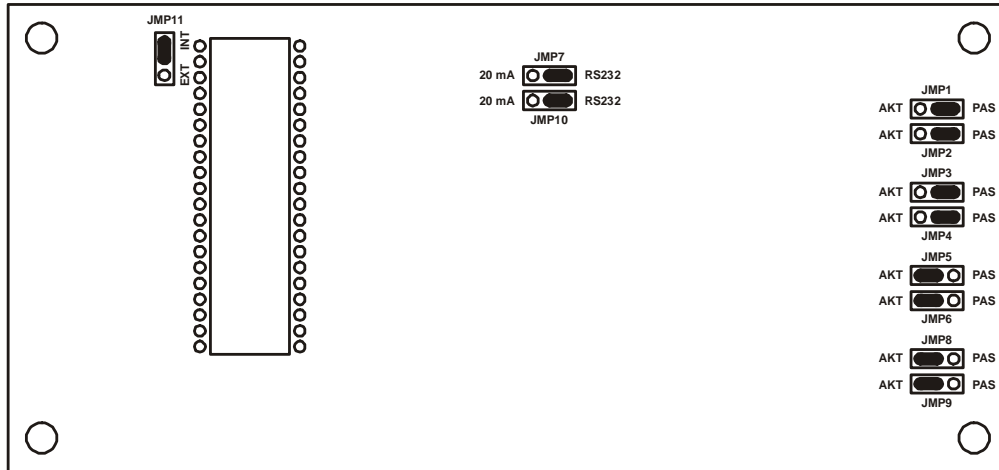
Jumper:		Default:
JMP1, JMP2	Output time string 20mA current loop; active / passive	passive
JMP3, JMP4	Output RX_INFO 20mA current loop; active / passive	passive
JMP5, JMP6	Input time string 20mA current loop; active / passive	active
JMP7	Input select timestring: RS232 / 20mA	RS232
JMP8, JMP9	Input RX_INFO 20mA current loop;	active
JMP10	Input select RX_INFO: RS232 / 20mA	RS232
JMP11	always INT - Do not change!	INT