MEINBERG

Technical Information

Operating Instructions

GPS162

Incl. Windows Software
GPSMON32

Table of contents

Content of the USB stick

Besides this manual, the provided USB stick includes a setup program for the monitor software GPSMON32. This utility can be used to configure Meinberg GPS receivers via their serial ports and display status information of the module.

The software is executable under the following operating systems:

- Windows Server 2003
- Windows XP
- Windows 2000
- Windows NT
- Windows ME
- Windows 9x

If the USB stick is lost, the setup program can be downloaded for free at:
http://www.meinberg.de/english/sw/#gpsmon

General information

The satellite receiver clock GPS162 is designed to provide extremly precise time and frequency references. The compact size of the board GPS162 allows easy integration of GPS-controlled timing into synchronization tasks like:

o **Synchronization of Telecom networks**
o **Calibration and synchronization of laboratory equipment**
o **Synchronization of radio transmitters / base stations**
   (GSM / CDMA / UMTS / DAB / DVB / TETRA)

The clock has been developed for applications where conventional radio controlled clocks can´t meet the growing requirements in precision. High precision available 24 hours a day around the whole world is the main feature of the this system which receives its information from the satellites of the Global Positioning System.

The Global Positioning System (GPS) is a satellite-based radio-positioning, navigation, and time-transfer system. It was installed by the United States Departement of Defense and provides two levels of accuracy: The Standard Positioning Service (SPS) and the Precise Positioning Service (PPS). While PPS is encrypted and only available for authorized (military) users, SPS has been made available to the general public.

GPS is based on accurately measuring the propagation time of signals transmitted from satellites to the user´s receiver. A nominal constellation of 21 satellites together with 3 active spares in six orbital planes 20000 km over ground provides a minimum of four satellites to be in view 24 hours a day at every point of the globe. Four satellites need to be received simultaneously if both receiver position (x, y, z) and receiver clock offset from GPS system time must be computed. All the satellites are monitored by control stations which determine the exact orbit parameters as well as the clock offset of the satellites´ on-board atomic clocks. These parameters are uploaded to the satellites and become part of a navigation message which is retransmitted by the satellites in order to pass that information to the user´s receiver.

The high precision orbit parameters of a satellite are called ephemeris parameters whereas a reduced precision subset of the ephemeris parameters is called a satellite´s almanac. While ephemeris parameters must be evaluated to compute the receiver´s position and clock offset, almanac parameters are used to check which satellites are in view from a given receiver position at a given time. Each satellite transmits its own set of ephemeris parameters and almanac parameters of all existing satellites.

GPS162 features

The satellite receiver clock GPS162 is as a compact board with dimensions of 80 x 120 mm. The module contains four mounting holes (diameter 3 mm) for easy integration into the application of the user. The power supply and input/output signals are available via a 26-pole contact strip. The receiver is connected to the antenna/converter unit via a BNC-connector by using a 50 Ω-coaxial cable with a length of up to 300 m. It is possible to connect up to four receivers to one antenna by using an optional antenna diplexer.

The navigation message coming from the satellites is decoded by GPS162´s microprocessor. Depending on the oscillator option the GPS system time is tracked with an accuracy of better than ±250 nsec (TCXO HQ/OCXO LQ) or ±100 nsec (OCXO MQ/OCXO HQ). Compensation of the RF signal´s propagation delay is done by automatical determination of the receiver´s position on the globe. A correction value computed from the satellites´ navigation messages increases the accuracy of the board´s master oscillator and automatically compensates its aging. The last recent value is restored from the battery buffered memory at power-up.

Block diagram GPS162
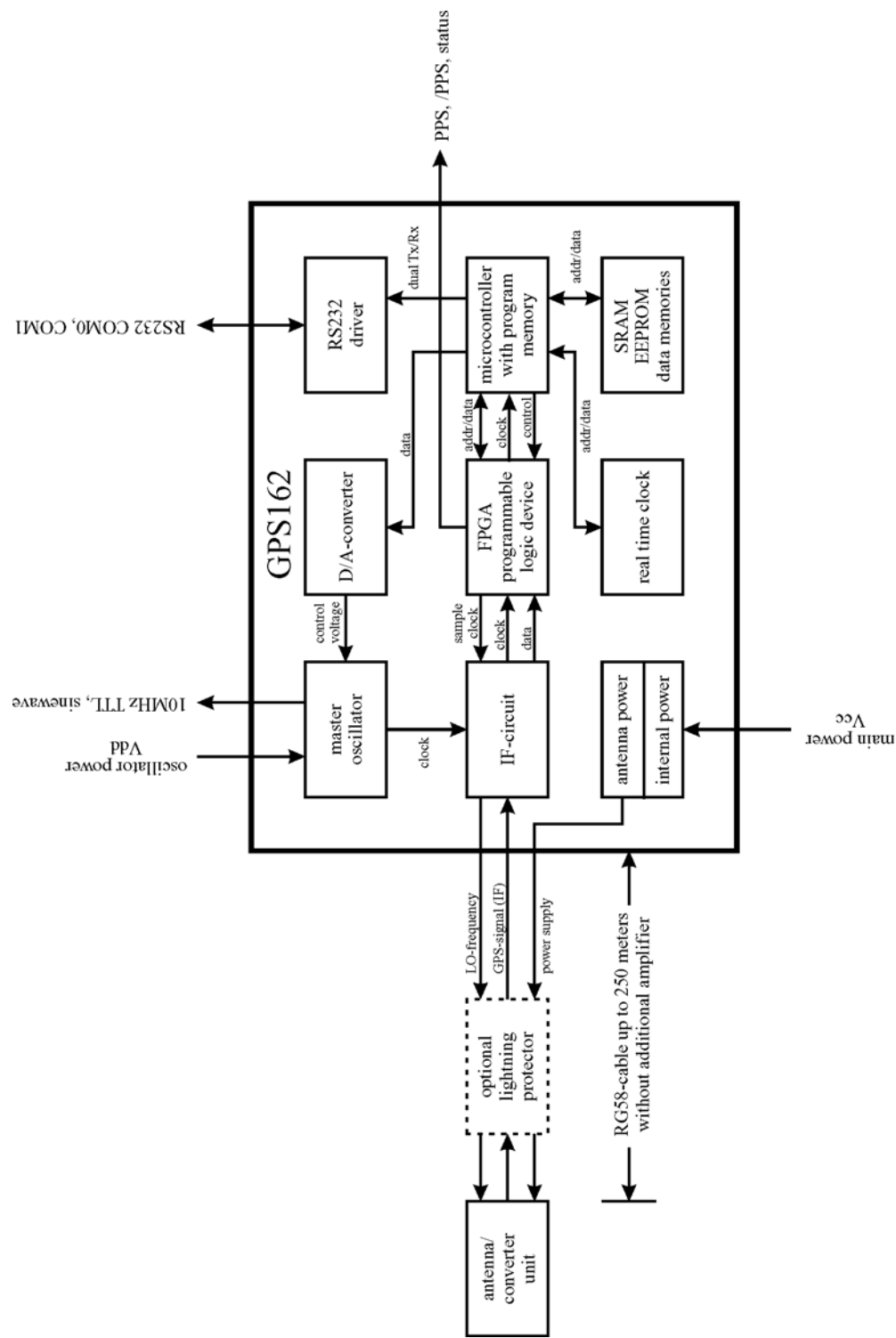
Oscillator options

To realize various requirements concerning the accurracy of the frequency outputs, the module GPS162 may be equipped with different master oscillators. They are disciplined by the GPS-system for compensation of long term effects like aging and temperature dependant drift. However, phase locking of the standard frequency to the pulse per second (PPS) is only available with the oscillator option 'OCXO MQ' or 'OCXO HQ'. The specifications for the different oscillators can be found in chapter 'Technical specifications GPS162'. **A label on the board shows the oscillator option of the present GPS162.**

Time zone and daylight saving

GPS system time differs from the universal time scale (UTC) by the number of leap seconds which have been inserted into the UTC time scale after GPS has been initiated in 1980. The current number of leap seconds is part of the navigation message supplied by the satellites, so GPS162´s internal real time is based on UTC.

Conversion to local time including handling of daylight saving year by year can be done by the receiver´s microprocessor if the corresponding parameters are set up with the help of the software GPSMON32 (included Windows software).

Pulse outputs

The pulse generator of the satellite controlled clock GPS162 generates a high- and a low-active pulse per second (PPS) with a pulse duration of 200msec, which are available at the contact strip. The turn-on slope of these pulses is phase aligned to UTC-second.

Standard frequencies

The module GPS162 provides two frequency outputs of 10 MHz which are derived from the master oscillator of the board. If oscillator option 'OCXO MQ' or 'OCXO HQ' was equipped, these standard frequencies are phase locked to the pulse per second. A TTL- and a sinewave output are available at the contact strip.

Asynchronous serial ports

Two asynchronous serial interfaces (RS-232) called COM0 and COM1 are available to the user. Transmission speeds, framings and the kind of the time string can be configured separately. The serial ports are sending a time string either once per second, once per minute or on request with ASCII '?' only. Possible time strings are 'Meinberg Standard', 'SAT', 'UNI Erlangen (NTP)', 'Computime', 'ABB-SPA', 'Racal' or 'NMEA (RMC)', see the technical specifications for details. Furthermore, the serial interface COM0 is used for communication with the monitor program. A possible firmware update is also done via this serial channel.

Enabling of outputs

In the default mode of operation the pulse outputs and the serial interfaces are disabled until the receiver has synchronized after power-up. However, with the help of GPSMON32 the system can be configured to enable those outputs immediately after power-up. This option can be set for each group of signals (pulses and serial interfaces) seperately.

Status outputs

The satellite receiver clock GPS162 provides two TTL-outputs (/FAIL and LOCK) for handing-over the status of synchronization of timing and calculation of position to post-connected systems. These outputs can be used for driving LEDs via an external resistor (R_{min} = 470 Ω).

/FAIL output

The '/FAIL' output switches to TTL high level whenever the internal timing of the receiver is synchronous to the GPS-system.

LOCK output

The 'LOCK' output switches to TTL high level if the receiver has acquired at least four satellites and has computed its position after power-up. In normal operation the receiver position is updated continuously as long as at least four satellites can be received. When the receivers position is known and steady only, a single satellite needs to be received for synchronization and generatation of output pulses.

BSL inputs

Whenever the on-board software must be upgraded or modified, the new firmware can be downloaded to the internal flash memory using the serial port COM0. There is no need to insert a new EPROM.

The contacts of a key must be connected to the BSL inputs of GPS162. If this key is pressed while the power supply of the module is switched on, a bootstrap-loader is activated and waits for instructions from the serial port COM0. The new firmware can be sent to GPS162 from any standard PC with serial interface. A loader program will be shipped together with the file containing the image of the new firmware.

The contents of the program memory will not be modified until the loader program has sent the command to erase the flash memory. So, if the BSL key is pressed unintentionally, the firmware will not be changed accidentially. After the next power-up, the system will be ready to operate again.

Installation

Power supply

The module GPS162 has two independent paths for connecting the power supply. The main supply of +5 V must be connected to the contacts 'VCC' of the contact strip (see pin assignments in 'Technical specifications GPS162'). The supply for the master oscillator ('VDD', +5V) is seperated from these contacts, because disturbing voltages on the power lead could decrease the short term stability of the oscillator.

It is possible to use only one +5 V-output of a power supply for connecting the receiver module and the oscillator. The 'VCC' and 'VDD' inputs should have seperate leads from the power supply in this case. The contacts for the reference potential are connected internaly. To achieve a good EMC-behaviour of GPS162 as much 'GND' pins of the contact strip as possible should be connected to the ground potential of the power supply directly.

Mounting the antenna

The GPS satellites are not stationary but circle round the globe in a period of about 12 hours. They can only be received if no building is in the line-of-sight from the antenna to the satellite, so the antenna/converter unit must be installed in a location from which as much of the sky as possible can be seen. The best reception is given when the antenna has a free view of 8° angular elevation above horizon. If this is not possible the antenna should be installed with a mostly free view to the equator because of the satellite courses which are located between latitudes of 55° North and 55° South. If even this is not possible problems occure especially when at least four sattelites for positioning have to be found.

The unit can be mounted using a pole with a diameter up to 60 mm. A standard coaxial cable with 50 Ω impedance (e.g. RG58C) should be used to connect the antenna/converter unit to the receiver. Cable thinner than RG58 should be avoided due to its higher DC resistance and RF attenuation. When using the optional antenna diplexer the total length of one antenna line between antenna, diplexer and receiver must not be longer than 300 m. If a cable with less attenuation is used its length may be increased accordingly (e.g. 600 m with RG213).

If the antenna cable was canned by the user: before powering up the system, make sure that there is no short-circuit between the inner and outer conductor of the antenna cable, because this could cause a fault of GPS162.

Powering up the system

If both, the antenna and the power supply have been connected, the system is ready to operate. About 10 seconds (OCXO MQ: 1 minute, OCXO HQ: 3 minutes) after power-up the receiver´s master oscillator has warmed up and operates with the required accuracy. If the receiver finds valid almanac and ephemeris data in its battery buffered memory and the receiver´s position has not changed significantly since its last operation the receiver can find out which satellites are in view now. Only a single satellite needs to be received to synchronize and generate output pulses, so synchronization can be achieved maximally one minute after power-up.

If the receiver position has changed by some hundred kilometers since last operati-on, the satellites´ real elevation and doppler might not match those values expected by the receiver thus forcing the receiver to start scanning for satellites. This mode is called **Warm Boot** because the receiver can obtain ID numbers of existing satellites from the valid almanac. When the receiver has found four satellites in view it can update its new position and switch to **Normal Operation**. If the almanac has been lost because the battery had been disconnected the receiver has to scan for a satellite and read in the current almanacs. This mode is called **Cold Boot**. It takes 12 minutes until the new almanac is complete and the system switches to Warm Boot mode scanning for other satellites.

Replacing the lithium battery

The life time of the lithium battery on the board is at least 10 years. If the need arises to replace the battery, the following should be noted:

ATTENTION!

Danger of explosion in case of inadequate replacement of the lithium battery. Only identical batteries or batteries recommended by the manufacturer must be used for replacement. The waste battery must be disposed as proposed by the manufacturer of the battery.

Technical specifications GPS162

RECEIVER:	6 channel C/A code receiver with external antenna/converter unit
ANTENNA:	Antenna/converter unit with remote power supply refer to chapter 'Technical specifications of antenna'
ANTENNA INPUT:	Antenna circuit dc-insulated; dielectric strength: 1000V⎓ Length of cable: refer to chapter 'Mounting the antenna'
TIME TO SYNCHRO-NIZATION:	one minute with known receiver position and valid almanac 12 minutes if invalid battery buffered memory
BATTERY BACKUP:	storage of important GPS-system data in the internal RAM, backed-up by lithium battery lifetime of battery 10 years min.
PULSE OUTPUTS:	pulses per second (PPS) high- and low-active pulses TTL into 50 Ω pulse duration 200 msec turn-on slope phase aligned to UTC-second mode of operation 'if sync'
ACCURACY OF PULSES:	after synchronization and 20 minutes of operation TCXO HQ/OCXO LQ : better than ±250 nsec OCXO MQ/OCXO HQ : better than ±100 nsec better than ±2 μsec during the first 20 minutes of operation
FREQUENCY OUTPUTS:	one 10 MHz output at a time with: TTL into 50 Ω sinewave, 0.5 V_{rms} into 50 Ω

OSCILLATOR-
SPECIFICATIONS:

	TCXO	OCXO LQ	OCXO MQ	OCXO HQ
short term stability $\tau = 1$ sec	2 * 10 E-9	1 * 10 E-9	2 * 10 E-10	1 * 10 E-11
accurracy free run one day	+/- 1 * 10 E-7 +/- 1 Hz (Note 1)	+/- 2 * 10 E-8 +/- 0.2 Hz (Note 1)	+/- 1,5 * 10 E-9 +/- 15 mHz (Note 1)	+/- 5 * 10 E-10 +/- 5 mHz (Note 1)
accurracy free run one year	+/- 1 * 10 E-6 +/- 10 Hz (Note 1)	+/- 4 * 10 E-7 +/- 4 Hz (Note 1)	+/- 1 * 10 E-7 +/- 1 Hz (Note 1)	+/- 5 * 10 E-8 +/- 0.5 Hz (Note 1)
accurracy GPS-synchronous averaged 24 h	+/- 1 * 10 E-11	+/- 1 * 10 E-11	+/- 5 * 10 E-12	+/- 1 * 10 E-12
phase noise	1 Hz -60 dBc/Hz 10 Hz -90 dBc/Hz 100 Hz -120 dBc/Hz 1 kHz -130 dBc/Hz	1 Hz -60 dBc/Hz 10 Hz -90 dBc/Hz 100 Hz -120 dBc/Hz 1 kHz -130 dBc/Hz	1 Hz -75 dBc/Hz 10 Hz -110 dBc/Hz 100 Hz -130 dBc/Hz 1 kHz -140 dBc/Hz	1 Hz -85 dBc/Hz 10 Hz -115 dBc/Hz 100 Hz -130 dBc/Hz 1 kHz -140 dBc/Hz
power supply at 25°C steady state warm up	+5V / 20 mA N/A	+5V / 160 mA +5V / 380 mA	+5V / 300 mA +5V / 700 mA	+5V / 300 mA +5V / 700 mA
temperature dependant drift free run	+/- 1 * 10 E-6 (-20...70°C)	+/- 2 * 10 E-7 (0...60°C)	+/- 5 * 10 E-8 (-20...70°C)	+/- 1 * 10 E-8 (5...70°C)

Note 1:
The accurracy in Hertz is based on the standard frequency of 10 MHz. For example:
Accurracy of TCXO (free run one day) is +/- 1 * 10 E-7 * 10 MHz = +/- 1 Hz

SERIAL PORTS: 2 independant asynchronous serial ports (RS-232)
COM0 and COM1 can be configured seperately
Baud Rate: 300 up to 19200
Framing: 7N2, 7E1, 7E2, 8N1, 8N2, 8E1

time string selectable for COM0 and COM1
'Standard Meinberg', 'SAT'', 'Racal', 'NMEA (RMC)',
'ABB-SPA', 'Uni Erlangen (NTP)', 'Computime'

default settings: COM0:   19200, 8N1
COM1:   9600, 8N1
'Standard Meinberg' for COM0 and COM1
time string per second
mode of operation 'if sync'

STATUS
INDICATION: receiver status for a TTL-high output:
Lock: the reciever was able to compute its position
after power-up
/Fail: the internal timing of the receiver is synchronous
to the GPS-system

POWER
REQUIREMENTS: VCC: +5V, e.g. 650mA
                VDD: +5V, current consumption see
                                                table 'Oscillator specifications'

BOARD
DIMENSION: 80 mm x 120 mm x 17.5 mm (width x length x height)

CONNECTORS: coaxial BNC connector for antenna/converter unit
                     26-pole (2 x 13) contact strip

AMBIENT
TEMPERATURE: 0 ... 50°C

HUMIDITY: 85% max.

Pin assignments of the contact strip

The contact strip of GPS162 is assigned as shown below (top view, orientation as shown in chapter 'Board dimensions'):

	1	2	
10MHz sinewave	●	●	GND
10MHz TTL	●	●	GND
Power supply oscillator,VDD (+5V)	●	●	Power supply oscillator,VDD
GND	●	●	GND
Power supply,VCC (+5V)	●	●	Power supply,VCC (+5V)
RS232, TxD0	●	●	RS232, RxD0
RS232, TxD1	●	●	RS232, RxD1
GND	●	●	GND
BSL1	●	●	BSL2
GND	●	●	GND
/PPS, TTL, low active	●	●	PPS, TTL, high active
/Fail	●	●	Lock
GND	●	●	GND
	25	26	
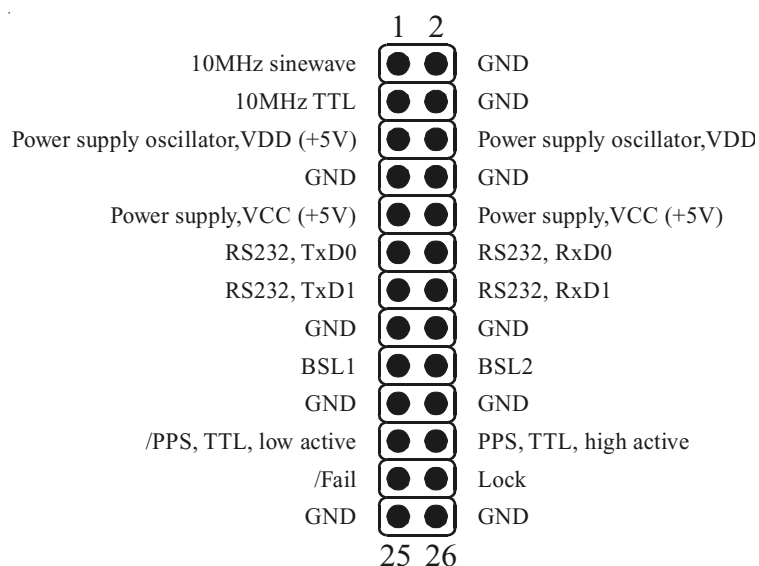
Board dimensions
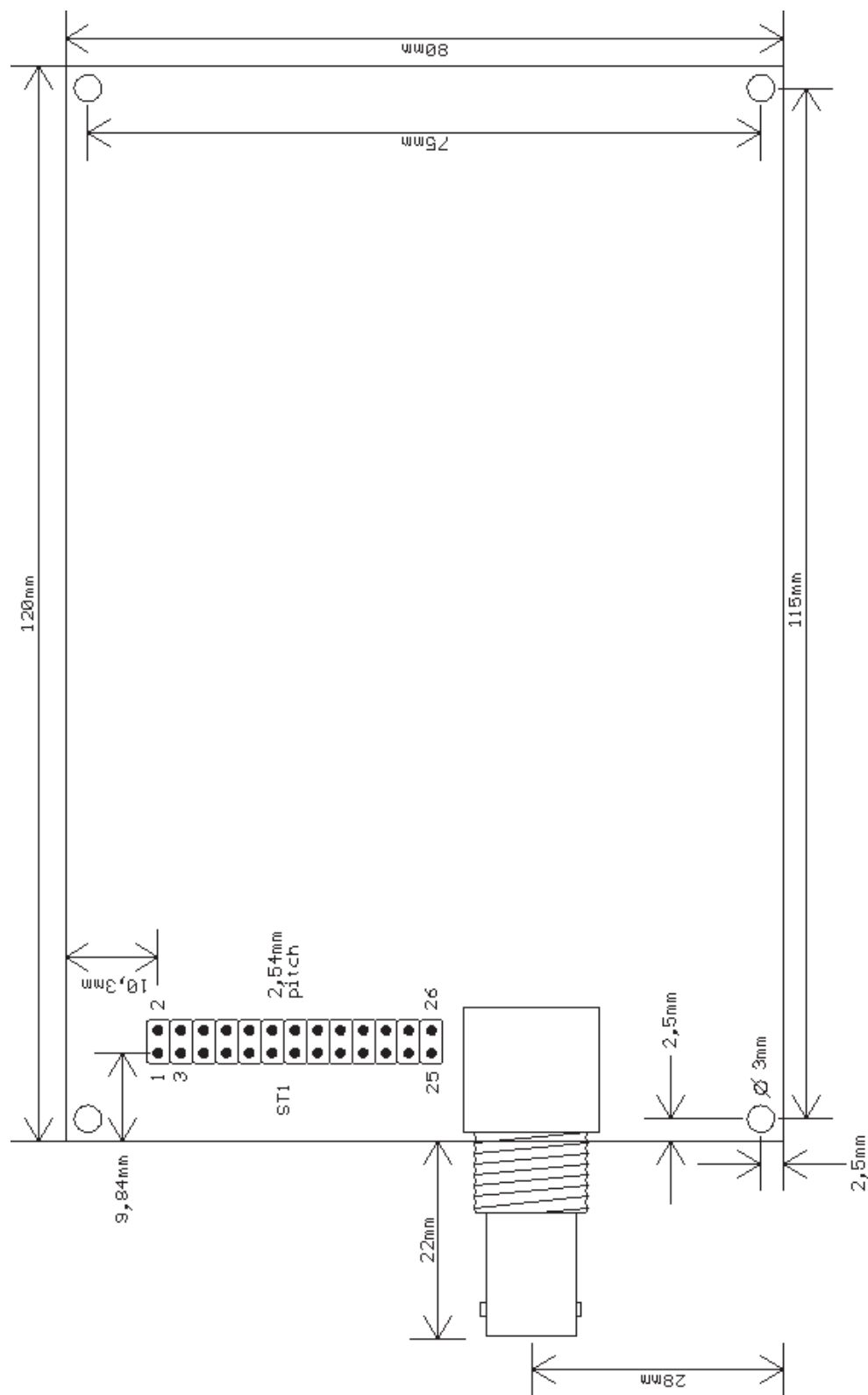
Format of the Meinberg standard time string

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: different for DCF77 or GPS receivers:

          '*' DCF77 clock currently runs on XTAL
            GPS receiver has not checked its position

          ' ' (space, 20h) DCF77 clock is sync'd with transmitter
            GPS receiver has determined its position

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)

Format of the SAT time string

The SAT time string is a sequence of 29 ASCII characters starting with the STX (start-of-text) character and ending with the ETX (end-of-text) character. The format is:

<STX>*tt.mm.jj/w/hh:mm:ss*MEzz*xy*<CR><LF><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)

zz   time zone indicator:
      'Z ' MEZ   European Standard Time, daylight saving disabled
      'SZ' MESZ European Summertime, daylight saving enabled

x   clock status characters:
      '*'   DCF77 clock currently runs on XTAL
                GPS receiver has not checked its position

      ' '   (space, 20h) DCF77 clock is sync'd with transmitter
                GPS receiver has determined its position

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

<CR>   Carriage return (ASCII code 0Dh)

<LF>   Line feed (ASCII code 0Ah)

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

Format of the RACAL standard Time String

The RACAL standard Time String is a sequence of 16 ASCII characters terminated by a X (58h) character and ending with the CR (Carriage Return, ASCII Code 0Dh) character. The format is:

<X><G><U>*yymmddhhmmss*<CR>

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:

<X>   Control character   code 58h
sending with one bit accuracy at change of second

<G>   Control character   code 47h

<U>   Control character   code 55h

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

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

<CR>   Carriage Return, ASCII code 0Dh

Format of the NMEA (RMC) string

The NMEA String is a sequence of 65 ASCII characters starting with the '$' character and ending with the characters CR (carriage return) and LF (line-feed). The format is:

$GPRMC,*hhmmss.ss*,A,*bbbb.bb*,n,*lllll.ll*,e,0.0,0.0,*ddmmyy*,0.0,a*hh<CR><LF>

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

$	start character (ASCII-Code 24h)

hhmmss.ss   the current time:

hh	hours	(00..23)
mm	minutes	(00..59)
ss	seconds	(00..59, or 60 while leap second)
ss	fractions of seconds	(1/10 ; 1/100)

A   Status   (A = time data valid)
(V = time data not valid)

bbbb.bb   latitude of receiver position in degrees
leading signs are replaced by a space character (20h)

n   latitude, the following characters are possible:
'N' north of equator
'S' south d. equator

lllll.ll   longitude of receiver position in degrees
leading signs are replaced by a space character (20h)

e   longitude, the following characters are possible:
'E' east of Greenwich
'W' west of Greenwich

ddmmyy   the current date:

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

a   magnetic variation

hh   checksum (EXOR over all characters except '$' and '*')

<CR>   carriage-return; ASCII-Code 0Dh

<LF>   line-feed; ASCII-Code 0Ah

Format of the ABB-SPA timestring

The ABB SPA timestring is a sequence of 32 ASCII characters starting with the characters ">900WD" and ending with the <CR> (Carriage Return) character. The format is:

>900WD:*yy-mm-tt_hh.mm;ss.fff*:*cc*<CR>

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:

yy-mm-tt	the current date:	
	yy year of the century	(00..99)
	mm month	(01..12)
	dd day of month	(01..31)
_	Space (ASCII code 20h)	
hh.mm;ss.fff	the current time:	
	hh hours	(00..23)
	mm minutes	(00..59)
	ss seconds	(00..59, or 60 while leap second)
	fff milliseconds	(000..999)
cc	Check sum. EXCLUSIVE-OR result of the previous characters, displayed as a HEX byte (2 ASCII characters 0..9 or A..F)	
<CR>	Carriage Return (ASCII code 0Dh)	

Format of the time string Uni Erlangen (NTP)

The time string Uni Erlangen (NTP) of a **GPS-clock** is a sequence of 66 ASCII characters starting with the STX (start-of-text) character and ending with the ETX (end-of-text) character. The format is:

*<STX>tt.mm.jj; w; hh:mm:ss; voo:oo; acdfg i;bbb.bbbbn lll.lllle hhhh*m*<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)

v   sign of the offset of local timezone related to UTC

oo:oo   offset of local timezone related to UTC in hours and minutes

ac   clock status characters:
        a: '#' clock has not synchronized after reset
             ' ' (space, 20h) clock has synchronized after reset

        c: '*' GPS receiver has not checked its position
             ' ' (space, 20h) GPS receiver has determined its position

d   time zone indicator:
        'S' MESZ European Summertime, daylight saving enabled
        ' '   MEZ   European Standard Time, daylight saving disabled

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

g   anouncement of discontinuity of time, enabled during last hour before discontinuity comes in effect:
        'A' announcement of leap second insertion
        ' '   (space, 20h) nothing announced

i	leap second insertion
	'L' leap second is actually inserted
	(active only in 60th sec.)
	' ' (space, 20h) no leap second is inserted
bbb.bbbb	latitude of receiver position in degrees
	leading signs are replaced by a space character (20h)
n	latitude, the following characters are possible:
	'N' north of equator
	'S' south of equator
lll.llll	longitude of receiver position in degrees
	leading signs are replaced by a space character (20h)
e	longitude, the following characters are possible:
	'E' east of Greenwich
	'W' west of Greenwich
hhhh	altitude above sea level in meters
	leading signs are replaced by a space character (20h)
\<ETX\>	End-Of-Text (ASCII-code 03h)

Format of the Computime Time String

The Computime time string is a sequence of 24 ASCII characters starting with the T character and ending with the LF (line feed, ASCII Code 0Ah) character. The format is:

T:*yy*:*mm*:*dd*:*ww*:*hh*:*mm*:*ss*<CR><LF>

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:

T   Start character

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

ww   the day of the week   (01..07, 01 = monday)

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

<CR>   Carriage-return (ASCII code 0Dh)

<LF>   Line-feed (ASCII code 0Ah)

Technical specifications of antenna

ANTENNA: dielectrical patch antenna, 25 x 25mm
                  receive frequency: 1575.42 MHz
                  bandwidth: 9 MHz

CONVERTER: local oscillator to converter frequency: 10 MHz
                  first IF frequency: 35.4 MHz

POWER
REQUIREMENTS: 12V ... 18V, @ 100mA (provided via antenna cable)
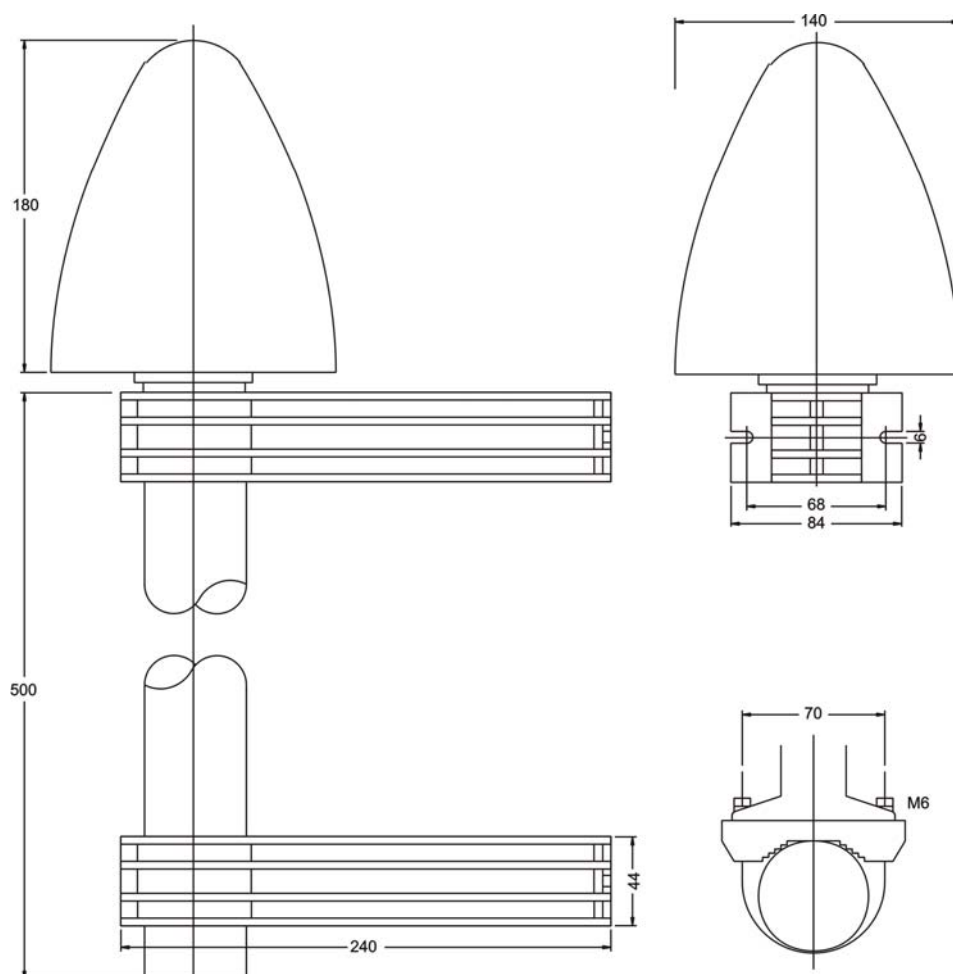
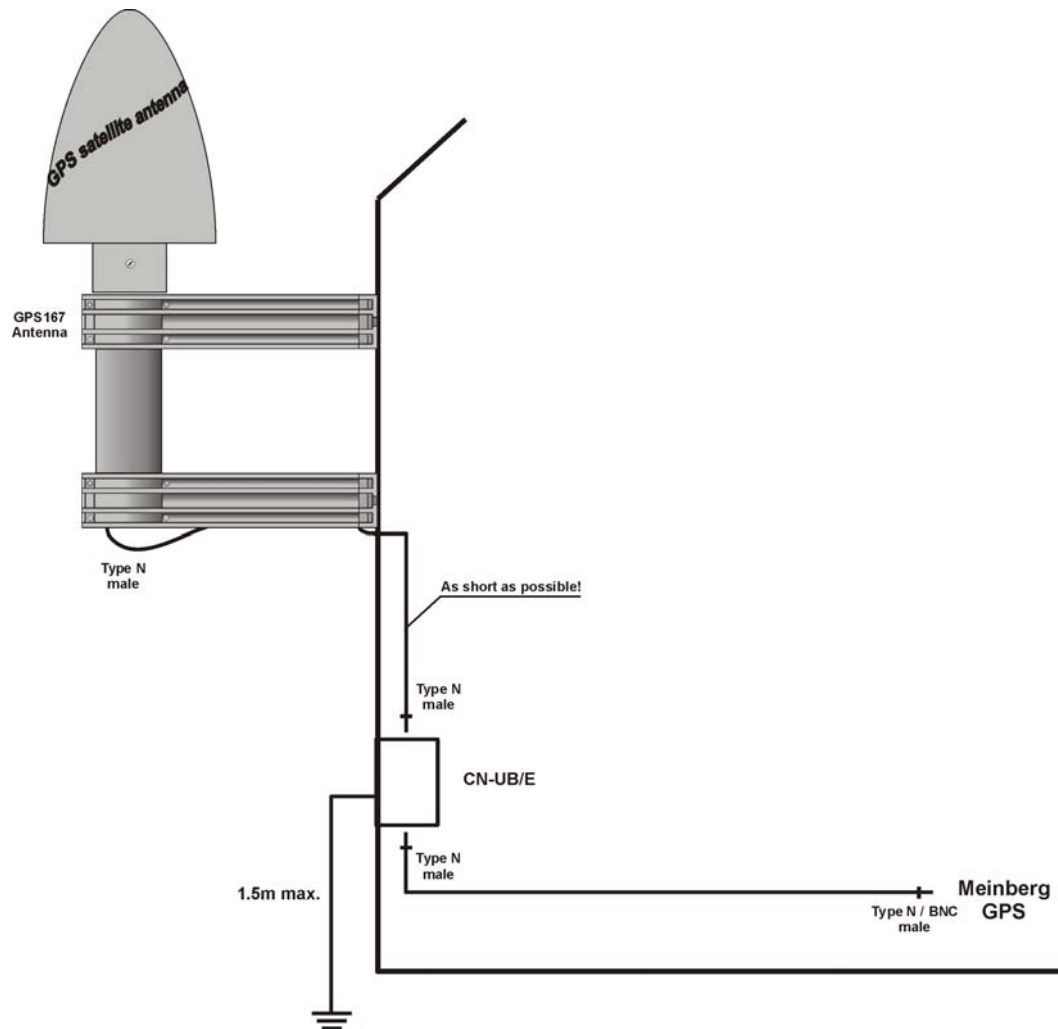CONNECTOR: coax type N, female

AMBIENT
TEMPERATURE: -25 ... +65°C

HOUSING: ABS plastic case for outdoor installation (IP56)

PHYSICAL
DIMENSION:

Assembly with CN-UB/E (CN-UB-280DC)

The program GPSMON32

The program GPSMON32 can be used to monitor and program all essential functions of Meinberg GPS-Receivers. The Software is executable under Win9x/2k/ NT. To install GPSMON32 just run Setup.exe from the included USB stick and follow the instructions of the setup program.

To obtain a connection between your PC and the GPS-receiver, connect the receivers COM0 port to a free serial port of your PC. The PCs comport used by the program GPSMON32 can be selected in submenu **'PC-Comport'** in menu **'Connection'**.
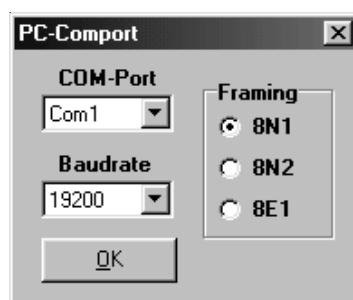
Also transfer rate and framing used by the program are selected in this menu. Communication between the clock and the PC comes about, only if the GPS serial port is configured in the same way as the PCs comport. You can enforce an access, if the GPS serial port is not configured with appropriate parameters for communication. Select the menu item **'Enforce Connection'** in menu **'Connection'** and click **'Start'** in the appearing window. Some firmware versions of GPS167 do not support this way of setting up a connection. If **'Enforce Connection'** doesn't succeed apparently, please change the serial port parameter of GPS COM0 manually to the PCs parameters.
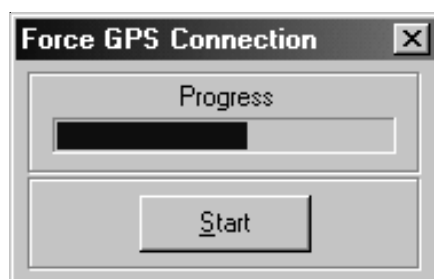
Online Help

The online help can be started by clicking the menu item 'Help' in menu Help. In every program window a direct access to a related help topic can be obtained by pressing F1. The help language can be selected by clicking the menu items Deutsch/ Englisch in the Help Menu.