MANUAL

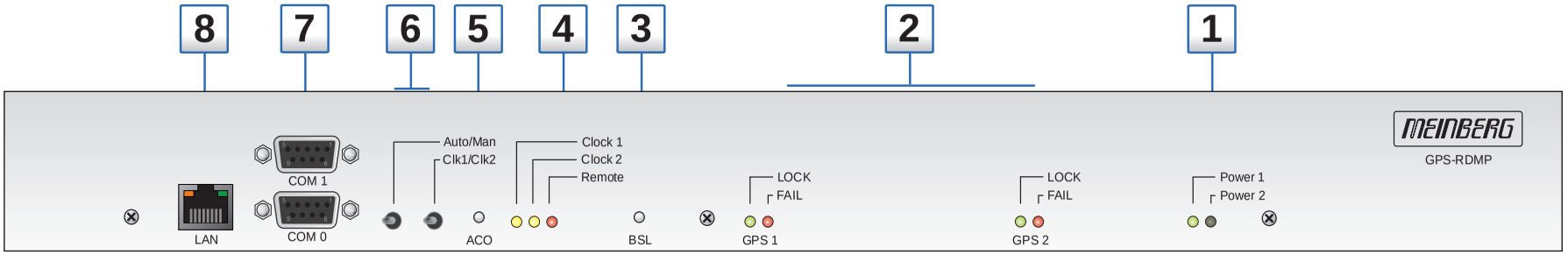
GPS-RDMP

Redundant GPS Receiver System

23rd October 2014

Meinberg Radio Clocks GmbH & Co. KG

Front view (Frontansicht) GPS-RDMP



ENGLISH

1. Power supply Status-LEDs (Power 1 / Power 2)
2. GPS 1 / 2 Status-LEDs (FAIL / LOCK)
3. BSL (Boot Strap Loader)
4. Status-LEDs Clock 1 / Clock 2 / Remote
5. ACO Button (Access Control Override)
6. Changeover switch “Clk 1 / Clk 2” , “Auto / Man”
7. Serial port COM 0, COM 1 - 9pin. D-SUB
8. Network connector “Remote Control”, RJ45

DEUTSCH

1. Netzteil Status-LEDs (Power 1 / Power 2)
2. GPS 1 / 2 Status-LEDs (FAIL / LOCK)
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4. Status-LEDs Clock 1 / Clock 2 / Remote
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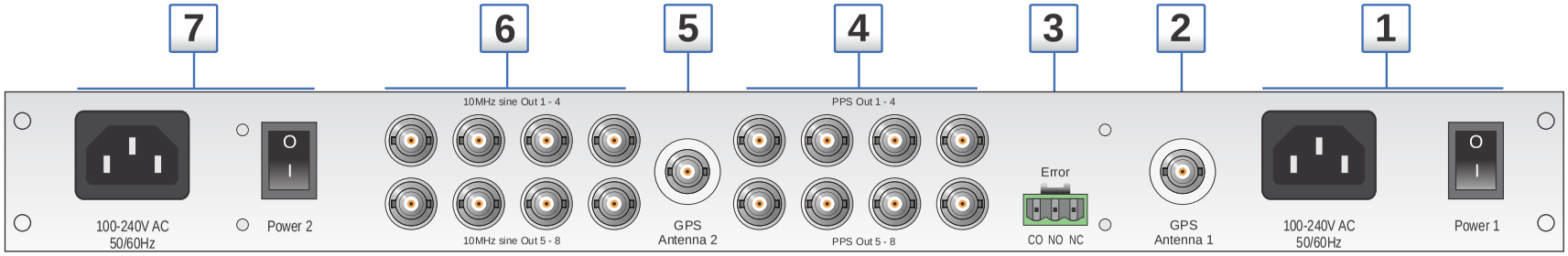
6. Umschalter “Clk 1 / Clk 2” , “Auto / Man”
7. Serielle Schnittstelle COM 0, COM 1 - 9pol. D-SUB
8. Netzwerk Anschluss “Remote Control”, RJ45

Rear view (Rückansicht) GPS-RDMP



ENGLISH

1. Power supply connector **Power 1**
2. GPS Antenna 1, BNC
3. Error relay output, 3pin. DFK
4. PPS outputs, BNC
5. GPS Antenna 2, BNC
6. 10MHz sine wave outputs, BNC
7. Power supply connector **Power 2**

DEUTSCH

1. Spannungsversorgung **Power 1**
2. GPS Antenne 1, BNC
3. Störmelderelaisausgang, 3pol. DFK
4. PPS Ausgänge, BNC
5. GPS Antenne 2, BNC
6. 10MHz Sinus Ausgänge, BNC
7. Spannungsversorgung **Power 2**

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1 Impressum

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Date: 2014-10-23

2 Safety instructions for building-in equipment

This building-in equipment has been designed and tested in accordance with the requirements of Standard IEC60950-1 "Safety of Information Technology Equipment, including Electrical Business Equipment".

During installation of the building-in equipment in an end application (i.e. rack) additional requirements in accordance with Standard IEC60950-1 have to be taken into account.

- The building-in equipment is a class 1 - equipment and must be connected to an earthed outlet (TN Power System).
- The building-in equipment has been evaluated for use in office environment (pollution degree 2) and may be only used in this environment. For use in rooms with a higher pollution degree more stringent requirements are applicable.
- The building-in equipment may not be opened.
- Protection against fire must be assured in the end application.
- The ventilation opening may not be covered.
- The equipment/building-in equipment was evaluated for use in a maximum ambient temperature of 40°C.
- For safe operation the building-in equipment must be protected by max 16 A fuse in the power installation system.
- Disconnection of the equipment from mains is done by pulling the mains plug.

2.1 Used Symbols

Nr.	Symbol	Beschreibung / *Description*
1		IEC 60417-5031 Gleichstrom / *Direct current*
2		IEC 60417-5032 Wechselstrom / *Alternating current*
3		IEC 60417-5017 Erdungsanschluss / *Earth (ground) Terminal*
4		IEC 60417-5019 Schutzleiterklemme / *Protective Conductor Terminal*
5		Vorsicht, Risiko eines elektrischen Schlages / *Caution, possibility of electric shock*
6		ISO 7000-0434 Vorsicht, Risiko einer Gefahr / *Caution, Danger*
7		2002/96/EC Dieses Produkt fällt unter die B2B Kategorie. Zur Entsorgung muss es an den Hersteller übergeben werden. *This product is handled as a B2B category product. In order to secure a WEEE compliant waste disposal it has to be returned to the manufacturer.*

3 General Information GPS

The satellite receiver clock GPS180 has been designed to provide extremly precise time to its user. 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 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 24 satellites together with several 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.

4 The Modular System GPS-RDMP

GPS-RDMP is a set of equipment composed of two GPS satellite controlled clocks and two power supply units, all installed in a metal desktop case (MULTIPAC) and ready to operate. The interface and input/output signals provided by GPS-RDMP are accessible via connectors in the rear and the front panel of the case. Details of the components are described below.

4.1 GPS180 Features

The hardware of GPS180 is a 100 mm x 160 mm microprocessor board. The front panel integrates 4 LED indicators and 4 push buttons. The receiver is connected to the antenna/converter unit by a 50 ohm coaxial cable (refer to "Mounting the Antenna"). Feeding the antenna/converter occurs DC insulated via the antenna cable. Optional an antenna splitter for up to four receivers connected to one antenna is available.

The navigation message coming in from the satellites is decoded by the microprocessor of the GPS180 in order to track the GPS system time. Compensation of the RF signals propagation delay is done by automatical determination of the receivers position on the globe. A correction value computed from the satellites navigation messages increases the accuracy of the boards oven controlled master oscillator (OCXO) and automatically compensates the aging of the OCXO. The last recent value is restored from the battery buffered memory at power-up.

The GPS-RDMP has several different optional outputs, progammable pulses, modulated / unmodulated timecode and RS232 COM ports, depending on the hardware configuation. You can get the GPS-RDMP with OCXO-HQ or OCXO-DHQ oszillator option to cover all levels of accuracy requirements.

You can review and change the hard- and software configuration options of the clock with the GPSMON32 application (see corresponding section in this manual - 13).

4.2 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 since GPS was initiated in 1980. The current number of leap seconds is part of the navigation message supplied by the satellites, so the internal real time of the GPS180 is based on UTC time scale. Conversion to local time and annual daylight saving time can be done by the receiver's microprocessor if the corresponding parameters are set up by the user.

4.3 Pulse and Frequency Outputs

The pulse generator of GPS-RDMP generates pulses once per second (P_SEC). Additionally, master frequencies of 10 MHz are derived from the OCXO. All the pulses are available with TTL level via rear panel connectors.

In the default mode of operation, pulse outputs and the synthesizer output are disabled until the receiver has synchronized after power-up. However, the system can be configured to enable those outputs immediately after power-up.

4.4 Asynchronous Serial Ports

A asynchronous serial RS232 interface are available to the user. In the default mode of operation, the serial output are disabled until the receiver has synchronized after power-up. However, the system can be configured to enable those outputs immediately after power-up. Transmission speeds, framings and mode of operation can be configured separately using GPSMON32.

COM 1 is compatible with other radio remote clocks manufactured by Meinberg. It sends the time string

either once per second, once per minute or on request (after receiving a "?" character). The format of the output strings is ASCII, see the technical specifications at the end of this document for details. You can update the firmware of GPS180 via the serial port COM 0. This port doesn't provide a serial time string.

5 Installation

5.1 Mounting the GPS 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 antenna/converter unit can be mounted on a pole with a diameter up to 60 mm or at a wall. A 45 cm plastic tube, two holders for wall-mounting and clamps for pole-mounting are added to every GPS180. A standard coaxial cable with 50 ohm impedance should be used to connect the antenna/converter unit to the receiver. The maximum lenght of cable between antenna and receiver depends on the attenuation factor of the used coaxial cable.

Up to four GPS180 receivers can be run with one antenna/converter unit by using the optional antenna diplexer. The total length of one antenna line between antenna, diplexer and receiver must not be longer than the max. lenght shown in the table above. The position of the diplexer in the antenna line does not matter.

High voltage protectors must be installed directly after reaching the indoors. The optional delivered protection kit is not for outdoor usage.

Note:
If the antenna cable was assembled 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 GPS180.

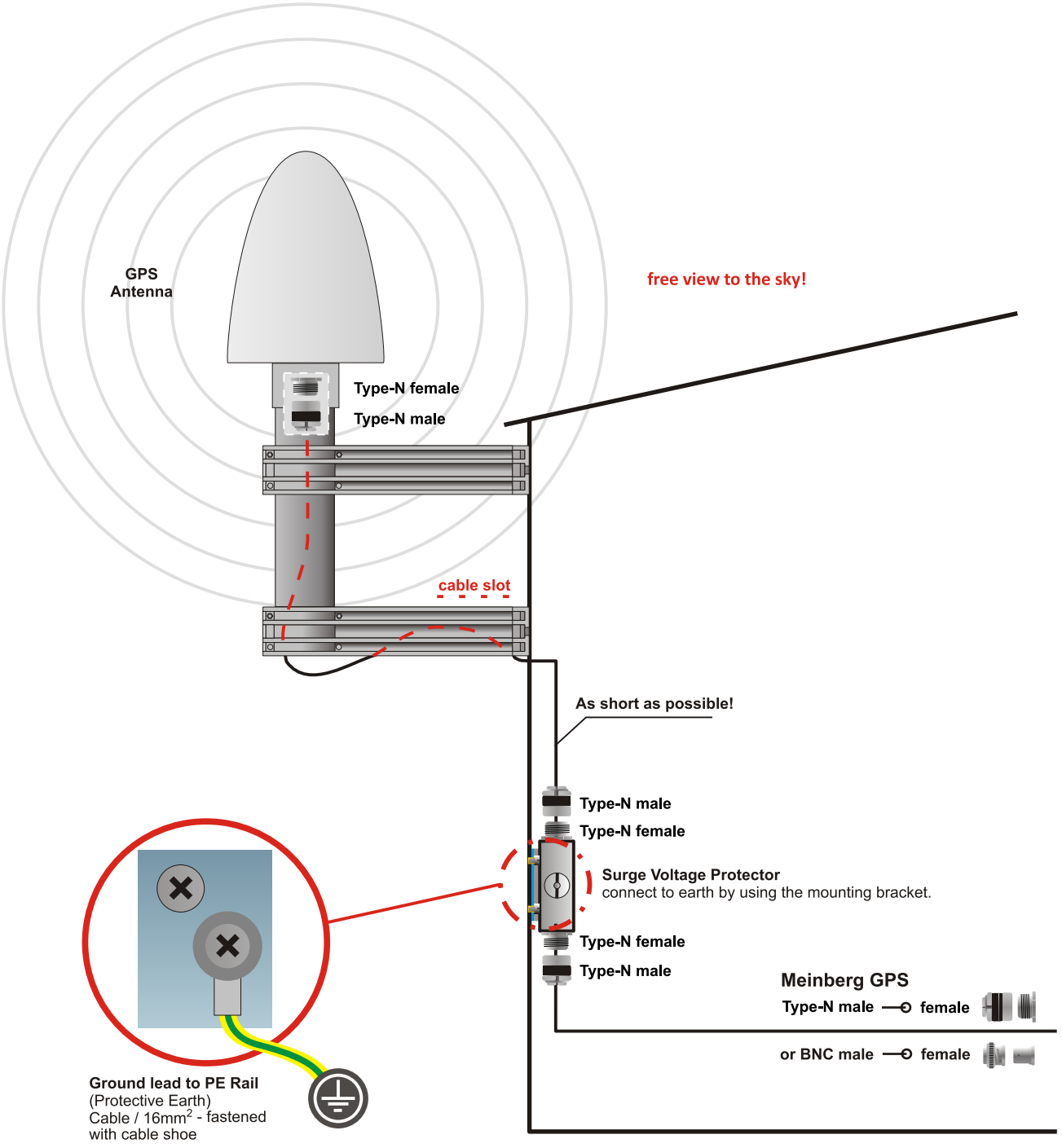
5.1.1 Example:

Type of cable	diameter Ø [mm]	Attenuation at 100MHz [dB]/100m	max lenght. [m]
RG58/CU	5mm	17	300 (1)
RG213	10.5mm	7	700 (1)

(1)This specifications are made for antenna/converter units produced after January, 2005
The values are typically ones; the exact ones are to find out from the data sheet of the used cable

5.1.2 Antenna Assembly with Surge Voltage Protection

Optional a surge voltage protector for coaxial lines is available. The shield has to be connected to earth as short as possible by using the included mounting bracket. Normally you connect the antenna converter directly with the antenna cable to the system.


GPS
Antenna
free view to the sky!
Type-N female
Type-N male
cable slot
As short as possible!
Type-N male
Type-N female
Surge Voltage Protector
connect to earth by using the mounting bracket.
Type-N female
Type-N male
Meinberg GPS
Type-N male female
or BNC male female
Ground lead to PE Rail
(Protective Earth)
Cable / 16mm2 - fastened
with cable shoe

5.2 Powering Up the System

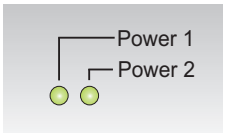
If both the antenna and the power supply have been connected the system is ready to operate. About 3 minutes the oscillator (OCXO-HQ) has warmed up and operates with the required accuracy. If the receiver finds valid almanac and ephemeris data in its battery buffered memory and the receiver´s position 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 10 minutes after power-up (OCXO-HQ). After 20 minutes of operation the OCXO is full adjusted and the generated frequencies are within the spezified tolerances.

If the receiver position has changed by some hundred kilometers since last operation, 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.

In the default mode of operation, neither pulse and synthesizer outputs nor the serial ports will be enabled after power-up until synchronization has been achieved. However, it is possible to configure some or all of those outputs to be enabled immediately after power-up. If the system starts up in a new environment (e. g. receiver position has changed or new power supply) it can take some minutes until the OCXO´s output frequency has been adjusted. Up to that time accuracy of frequency drops to 10-8 reducing the accuracy of pulses to +-5μs.

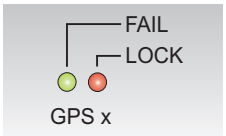
6 The Front Panel Layout

6.1 Power LED



The Power LEDs Power 1 and Power 2 are turned on when the power switch on the rear panel is "on". The two power supplies can be used independently of each other.

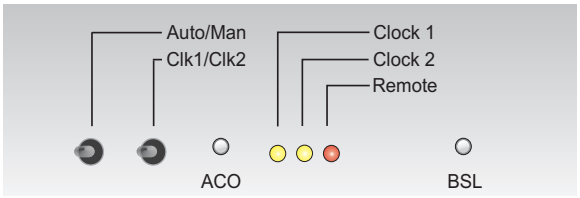
6.2 FAIL - LOCK LED



The LOCK LED is turned on when after power-up the receiver has acquired at least four satellites and has computed its position. In normal operation the receiver position is updated continuously as long as at least four satellites can be received. In case of known and unchanged position of the receiver only one satellite is necessary to keep the internal time base synchronous to the GPS time. The LOCK LED is turned off when the accuracy of the output frequencies is reached.

The red LED (FAIL) is turned on after power-up until the receiver has synchronized or if a severe error occurs during operation.

6.3 STATUS LEDs



This is an automatic multiplexer board for redundant clock systems composed of two Meinberg radio-clocks. It is used to perform changeovers on pulse and frequency signals as well as the serial ports of the connected radio clocks based on the status of the time-sync signals of both clocks. To avoid unnecessary changeovers in case of repeatedly occuring freewheeling operations of one system, the master/backup order is changed on each changeover. For example, suppose the current master system to loose synchronization. Now a changeover is performed to the synchronous slave system and the previous slave system becomes the new Master. No changeover is done if both systems are asynchronuos. In this case the current state is retained. All essential functions of the board, such as actual switching state, alarms and mode of operation can be monitored via SNMP/ETHERNET connection. Also changeover can be triggered remotely via SNMP command. Network access to the board is password protected. The board is capable of handling 10 MBit as well as 100 MBit ethernet connection over a front panel RJ45 connector. Two front panel switches allow override of the internal selection logic. Current State of the board is indicated by three front panel LEDs.

Front Panel Switch Automatic/Manual

This switch selects between automatic and manual mode. In manual mode the boards internal selection logic is overidden and the current system for signal generation can only be selected manually by the switch CLK1/CLK2. This switch also takes precedence over the Ethernet remote functions. In manual mode the outputs are always

enabled, regardless of the synchronization state of the clocks.

Front Panel Switch CLK1/CLK2

Selects the active system in Manual Mode, has no effect in automatic mode.

LED CLK1 / CLK2

These Leds show the current switching state of the board. Both LEDs are turned off if the boards outputs are deactived.

LED REMOTE

Indicates remote controlled operation over SNMP/ETHERNET. In remote mode the user can select the master via SNMP command. The last state selected over SNMP is retained when the system returns to local/automatic mode if this state is not inconsistent with the selection that would be made by the control logic. For example, if the user selects CLK2 as master system via SNMP, then this state is only retained on return to local mode, if either CLK 2 is synchronous or both clocks are asynchronous.

ACO-Button (Access Control Override)

The button labelled ACO can be used if the access password has been forgotten. The button is usable only when no network connection is active (e.g. with a GPSMON32 client). Pressing this button for at least 4 seconds puts the unit in ACO mode, clearing the access password temporarily for about 30 seconds. During this time, a GPSMON32 client or a TELNET client can log in to the unit without a password (just press ENTER when you are asked or leave the field empty). After the 30 seconds passed, the previous password is restored (if it has not been altered during the ACO period). If a client connects to the unit during this time (and does not change the password), the previously used password will be restored right after the connection has been closed.

This ACO mode should only be used to enter a new password when the old one has been lost.

BSL - Boot Strap Loader

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

If the BSL key behind the front panel is pressed while the system is powered up, a bootstrap-loader is activated and waits for instructions from the serial port COM0. The new firmware can be sent to GPS-RDMP 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 while the system is powered up, the firmware will not be changed accidentially. After the next power-up, the system will be ready to operate again.

7 LAN-XPT

The LAN-XPT expansion module transfers the first serial port (COM0) of a Meinberg GPS based radio clock into a 10baseT/100baseT Ethernet interface, adding functionality that allows a user to query status informations by using the TCP/IP Protocol and the Meinberg application GPSMON32 or a third-party SNMP management software. It is also possible to connect to the radio clock via network, reading the time and date telegrams generated by the clock. If configured, the module automatically queries the clock periodically and generates alarm messages (SNMP traps), which are sent to the SNMP management software. Additionally a configured syslog server can receive those alarm messages and record them for later reference.

8 Configuration

8.1 Initial configuration of the network parameters

In order to be able to connect to the module over the network, three parameters have to be set up correctly. It is recommended to contact your local network administrator before installing the unit in order to inform her/him about the new network device and eventually ask for the necessary parameters. This may avoid severe network problems, e.g. caused by double IP addresses.

In order to simplify installation, the XPT modules are pre-configured with the IP address 192.168.58.140, netmask 255.255.255.0 and the default gateway 192.168.58.1 - please make sure that this does not collide with anything before connecting the module to your network.

DCHP mode can be configured by setting an IP address of 0.0.0.0. The module will send a DHCP request to an existing DHCP server in your network. If such a server is available in the network and if it has been configured correctly, the XPT module will receive its network parameters from the DHCP server. GPSMON32 will find the module (using the Settings/Connection/Find mechanism) and can connect to it using the automatically assigned address. Please note: GPSMON32 will only find LANXPT and SCU-XPT modules which are connected to the subnet(s) that the PC/Laptop running GPSMON32 is connected. The "Find" function will not work over subnet boundaries, i.e. via a router. The communication itself works, but if your XPT module is not in the same subnet as the GPSMON32 host, you will have to enter the IP address manually instead of using the "Find" button.

If you need to setup a static IP address, e.g. because no DHCP server is available, you can do this using GPSMON32 or basic operating system commands. Both ways require that you know the MAC address of the XPT module you want to configure. This address is printed on a small label which is located near the network port, either on the front panel module handle (in a 3U chassis) or on the rear panel (if the network port is accessible on the rear panel).

To assign a temporary IP address using OS commands, please open a command shell and run the following commands:

8.2 On Windows Systems

8.2.1 1. Create an ARP table entry

arp -s [IP Address] [AA-BB-CC-DD-EE-FF] [SRCADDR]

where [AA-BB-CC-DD-EE-FF] is the MAC Address of the XPT module, [IP Address] is the temporary IP address you want to use and the optional [SRCADDR] parameter represents the IP address of the network interface you want to use on your PC/Laptop. This is only applicable if your PC/Laptop has more than one Ethernet interfaces, on systems with only one network port you do not need to specify this parameter.

Example:
arp -s 192.168.0.12 00-20-4a-80-fb-c8

8.2.2 2. Try to open a TELNET connection to port 1

telnet [IP Address] 1

The Telnet connection will fail becaise this step is just needed to tell the XPT module to be reachable under the temporary IP address unril it is restarted/rebooted.

Example:
telnet 192.168.0.12 1

8.2.3 3. Connect to the XPT module using TELNET port 9999

telnet [IP Address] 9999

You should now be able to login to the Telnet setup interface of the XPT module where you can set a permanent IP address and configure other parameters. Please refer to the corresponding sections below (especially the "Extended Configuration with Telnet" chapter). Alternatively you can reach the module now with GPSMON32 using the temporary IP address.

Example:
telnet 192.168.0.12 9999

8.3 On Linus/Solaris/Unix Systems

The only difference between Linux and Windows commands is that you need to use a colon as a separator for the MAC address in Step 1 (ARP Table entry).

Example:
arp -s 192.168.0.12 00:20:4a:80:fb:c8

8.3.1 IP Address

The unique IP address of your XPT module. It must be selected from within a range which is valid for the local network. Such an IP address normally has to be defined by the network administrator.

If the IP address is set to "000.000.000.000", then the module will try to request an IP address from a DHCP server. If no DHCP server is reachable, it will try to assign itself an address from the so-called AutoIP-range (169.254.0.1 - 169.254.255.254). This can be avoided by assigning an IP address "000.000.001.000", representing the "DHCP but no AutoIP" choice. AutoIP is also not used if a DHCP server is reachable but denies to assign an IP address to the module. In this case, the unit continuously sends DHCP requests until it gets an address. If AutoIP is disabled (by using "0.0.1.0" as the IP address), your XPT module will continuously try to find a DHCP server accepting its request, too. After the unit received a valid DHCP assigned IP address, it will restart using this address.

8.3.2 Netmask

The netmask defines whether a destination IP address belongs to the local network and is needed for routing purposes. Detailed information about this topic can be found in TCP/IP protocol literature. You may also ask your network administrator or search information on the internet.

8.3.3 Default Gateway

All IP addresses the XPT module communicates with will be classified as local or remote partners, depending on the unit's own IP address and the netmask. If a destination address is found to be remote ("not reachable directly"), all communication traffic will be routed over the default gateway, that is the host configured as the"gateway" in the module configuration.

These three network parameters can be entered by using the radio clocks display and front panel buttons (if supported by the clock's firmware). You will find a "SETUP IP CFG SETTINGS" menu in the setup of these models shortly after theclock detected the XPT module. With external XPT modules this happens a few seconds after the XPT module has been connected to the clock's COM0 respectively directly after the radio clock has been powered up (with integrated XPT modules).

For all models without a display and/or front panel buttons and all of the GPS radio clocks with a firmware version not supporting the XPT module, the configurationmust be done with the GPSMON32 application or by using the OS dependan procedure outlined above. A detailed description for the setup procedures can be found in the documentation of the GPSMON32 software. Please note that you must use version
2.x or later of GPSMON32, earlier versions do not include network support.

8.4 Extended configuration with telnet setup

Once the network parameters of the XPT module are set up correctly, you can configure the unit by using a telnet program. You have to know the IP address of your module and then connect to port 9999 at this address with your telnet client application. On most systems this is done by running a command "telnet ip.of.your.xptmodule 9999", see the documentation of your telnet software on how to initiate a connection if this does not work. After the connection has been established, you are asked for the LANXPT password (default is "meinberg").

Please be aware of the fact that a telnet connection always is unencrypted (even the password is sent as plain text during the login sequence), so you should make sure that no sniffing is possible when you are accessing your XPT module by telnet. This can be archieved by using a crosslink-cable and a direct connection between the module and, for example, a laptop.

The changes to the setup you are applying during the telnet session will not be effective until you leave the setup dialogue by choosing option 9 (save and exit). Only then the changed parameters are stored permanently, afterwards the module will be rebooted (takes about 10 to 30 seconds) to activate the changes.

When you see the welcome message of the module after entering the correct password, please press Enter to go into the setup menu:
*** Meinberg LAN-XPT Setup 1.75 X5 ***
MAC address 00204AAF5B40
Software version V0175 (080715) CPK6101_XPTEX
041710003280 XPT Password:********
OK

Press Enter for Setup Mode:
After pressing Enter, the important parameters are displayed and the menu appears:
*** basic parameters
Hardware: Ethernet TPI
IP addr 172.16.3.202, no gateway set,netmask 255.255.255.000
****
Clock port (1)
Baudrate 19200, I/F Mode 4C, Flow 00
Source Port (10001)
****
SNMP Configuration:
SNMP community name for read: public
SNMP community name for write: private
Trap IP addresses:
1: " not set "
2: " not set "
3: " not set "
****
SYSLOG Configuration:
SYSLOG is enabled
SYSLOG server : 172.016.003.002
Change Setup:
1 Network configuration
2 Clock port configuration
3 SNMP configuration
4 SYSLOG configuration
7 factory defaults
8 exit without save (no reboot)
9 save and exit
90 Change password
Your choice ?
You may now choose a menu option by entering the corresponding number (1,2,3,7,8,9 or 90) and confirm your choice by pressing ENTER. The available menu options are described below.

8.4.1 Menu option 1 Network configuration

The setup of the network parameters can be changed by using this menu option:

IP Address : (172) .(016) .(003) .(202)
Set Gateway IP Address (Y) Y
Gateway IP Address : (172) .(016) .(003) .(002)
Netmask: Number of Bits for Host Part (0=default) (8)

Note: In the telnet setup, IP addresses are entered as four single decimal digits (0-255). The setup always shows the actual value in brackets and waits for an input:

IP Address : (172) _

"_" represents the cursor. Enter a new value and press Enter. If you press Enter without entering a new value, the old value will be used. After pressing Enter, the next part of the IP address appears:

IP Address : (172) 192 .(016) _

Now you can enter the second part of the IP address and confirm with Enter. Then enter the third and fourth part the same way. The line could look like this afterwards:

IP Address : (172) 192 .(016) 168 .(003) 100 .(202) 11

So in this example you changed the IP address from 172.16.3.202 to 192.168.100.11 !

When the setup asks for the netmask, you have to enter the number of set bits forming your desired netmask. If you want to use a netmask like 255.255.255.0, this is represented by 8 bits for the host part (the last 8 bits are zero).

8.4.2 Menu option 2 Clock port configuration (LAN-XPT / SCU-XPT)

These parameters are defining the way the XPT module communicates with the radio clock it is attached to (SCU-XPT and LAN-XPT models). If you change anything here, it is very likely that the communication with the clock will be broken. Additionally there may arise problems for GPSMON32 to talk to the module in a proper way. Therefore we recommend not to alter the default settings in any way:

Baudrate (19200)
I/F Mode (4C) ?
Flow (00) ?
Source Port (10001)

If you changed something here accidentally, just re-enter the above shown default values (in brackets) manually or choose the menu option 7 (factory defaults) in order to reset the whole configuration (this changes almost everything, so it is safer to reenter the shown settings manually).

8.4.3 Menu option 3 SNMP Configuration

The parameters configurable with menu option 3 are related to SNMP:

SNMP community name for read (public):

The SNMP community is some kind of rudimentary access control mechanism. Each SNMP request is provided with a community string, which is checked by the modules SNMP subsystem. If the string corresponds to this "SNMP community for read" parameter, read-only access will be granted. Attention: Because the community string is not a very secure protection (it is transferred in plain text over the network), the LANXPT module additionally checks if the sender of the SNMP request is defined as a SNMP trap receiver (see below). If not, the access is denied.

SNMP community name for write (private):

If an incoming SNMP request provides this community string, the LANXPT SNMP subsystem grants read-write access. Because there is no SNMP write-supported variable available at the moment, this parameter can be used to define a second SNMP community allowed to query the unit.

SNMP community name for traps (pubtrap):

This community is used for sending the SNMP traps to the trap receivers.

Enter IP addresses for SNMP traps:
1: (172) .(016) .(003) .(002)
2: (172) .(016) .(003) .(045)
3: (000) .(000) .(000) .(000)

Here you may define up to three SNMP trap receivers. These IP addresses are also used as a security option, because your LANXPT only replies to SNMP requests coming from one of these three IP addresses. The input of IP addresses is described in detail above, please refer to menu option 1 !

The description of all supported and provided SNMP variables can be found in the "SNMP reference" section in this manual.

8.4.4 Menu option 4 Syslog Configuration

This menu option allows you to specify a syslog server to which the XPT module sends alarm and status messages by using UDP and port 514. The syslog server then handles those messages according to its own configuration. It may just record them in its own system log or invokes other actions. Please note that you will have to alter the configuration of your syslog server software to tell it that it is allowed to receive these messages from the XPT module and how to handle them. Please check the documentation of your syslog server software to find out how to do this in a proper way.

The dialogue for changing the syslog server entry looks like this:

********* SYSLOG Configuration **********
Use SYSLOG logging? (Y) Y
Enter IP address for SYSLOG server:(172) .(016) .(003) .(002)

8.4.5 Menu option 7 Factory Defaults

With this option you can reset your module configuration to the default settings. Please note that the network parameters are NOT changed. If you ever set up your unit the wrong way, you may restore the original settings by using this option.

8.4.6 Menu option 8 Exit without save

If you leave the setup by choosing this menu option, all changes you applied to the setup during the actual telnet session will not be stored permanently. The setup remains in the state until you reboot/power cycle it.

8.4.7 Menu option 9 Save and exit

All settings will be stored in the non-volatile memory of the module, afterwards it will reboot in order to activate the changes. Only the LANXPT module will reboot, the radio clock is not affected by this in any way! The boot process takes up to 30 seconds, afterwards the unit is running with the new settings and may be contacted again over the network.

8.4.8 Menu option 90 Change password

The XPT password that is used for authentication (telnet/GPSMON32) and for encryption can be changed by choosing this menu option. Please note that any currently active GPSMON32 connection will be interrupted due to the changing encryption keys.

Enter new XPT Password :********
Confirm new XPT Password:********

Password changed. The new password is used immediatly, but you
have to save your settings in order to use it permanently. However,
every active session (if any) has been interrupted due to the password
change.
Press any key to return to main menu:

As noted above, because the entered new password (you have to enter it twice to avoid a typo as it is not shown during input) is activated immediately, an open GPSMON32 connection is interrupted due to the password change and the corresponding crypto key change. After you changed the password, you therefore have to reconnect.

9 Skilled/Service-Personnel only: 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!

There is a Danger of explosion if the lithium battery is replaced incorrectly. Only identical batteries or batteries recommended by the manufacturer must be used for replacement.

The waste battery has to be disposed as proposed by the manufacturer of the battery.

CE marking
This device follows the provisions
of the directives 93/68/EEC

CE

10 Firmware Updates

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

Set the Auto/Manual switch to the position Manual, and select with the CLK1/CLK2 the GPS System which should be updated. Press the BSL Button on the front panel during the system is powered up. The bootstrap-loader is activated and waits for instructions from the serial port COM0.

The new firmware can be sent to the GPS180 from any standard PC with serial interface. The loader program (MBG Flash) 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 programm has sent the commant to erase the flash memory. After the next power-up, the system will be ready to operate again.

To upload the Firmware to both systems, the procedure of the update has to repeat.

11 Technical Specifications GPS receiver

RECEIVER:	12 - channel C/A code receiver with external antenna/converter unit
ANTENNA:	Antenna/converter unit with remote power supply refer to chapter "Technical Specifications GPS Antenna"
ANTENNA INPUT:	Antenna circuit dc-insulated; dielectric strength: 1000 V Length of cable: refer to chapter "Mounting the Antenna"
TIME TO SYNCHRONIZATION:	One minute with known receiver position and valid almanac 12 minutes if invalid battery buffered memory
PULSE OUTPUTS:	Change of second (P_SEC, TTL level)
ACCURACY OF PULSES:	adter synchronization and 20 minutes of operation OCXO HQ: better than +-100 nsec OCXO DHQ: better than +-100 nsec
FREQUENCY OUTPUTS:	10 MHz sine 1 V_{pp} into 50 Ohm
ACCURACY OF FREQUENCY:	see Oscillator specification
SERIAL PORTS:	two asynchronous serial ports (RS-232)

Baud Rate:	300 up to 19200	
Framing:	7E1, 7E2, 7N2, 7O1, 7O2, 8E1, 8N1, 8N2, 8O1	
default setting:	COM0:	19200, 8N1 (Firmware Updates only)
	COM1:	9600, 8N1

Annotation: Even if one of the setup functions "INIT USER PARMS" or "Resetting Factory Defaults" is executed, the serial port parameters are reset to default value only if invalid parameters have been configured.

11.1 Oscillator specifications

Oscillators available for Meinberg GPS Receivers/Time Servers:
OCXO, TCXO, Rubidium

	TCXO	OCXO LQ	OCXO MQ	OCXO HQ	OCXO DHQ	Rubidium (only available for 3U models)
short term stability (= 1 sec)	$2 \cdot 10^{-9}$	$1 \cdot 10^{-9}$	$2 \cdot 10^{-10}$	$5 \cdot 10^{-12}$	$2 \cdot 10^{-12}$	$2 \cdot 10^{-11}$
accuracy of PPS (pulse per sec)	< ±250 ns	< ±250 ns	< ±100 ns	< ±100 ns	< ±100 ns	< ±100 ns
phase noise	1Hz -60dBc/Hz 10Hz -90dBc/Hz 100Hz -120dBc/Hz 1kHz -130dBc/Hz	1Hz -60dBc/Hz 10Hz -90dBc/Hz 100Hz -120dBc/Hz 1kHz -130dBc/Hz	1Hz -75dBc/Hz 10Hz -110dBc/Hz 100Hz -130dBc/Hz 1kHz -140dBc/Hz	1Hz < -85dBc/Hz 10Hz < -115dBc/Hz 100Hz < -130dBc/Hz 1kHz < -140dBc/Hz	1Hz < -80dBc/Hz 10Hz < -110dBc/Hz 100Hz < -125dBc/Hz 1kHz < -135dBc/Hz	1Hz -75dBc/Hz 10Hz -89dBc/Hz 100Hz -128dBc/Hz 1kHz -140dBc/Hz
accuracy free run, one day	$\pm 1 \cdot 10^{-7}$ ±1Hz (Note1)	$\pm 2 \cdot 10^{-8}$ ±0.2Hz (Note1)	$\pm 1.5 \cdot 10^{-9}$ ±15mHz (Note1)	$\pm 5 \cdot 10^{-10}$ ±5mHz (Note1)	$\pm 1 \cdot 10^{-10}$ ±1mHz (Note1)	$\pm 2 \cdot 10^{-11}$ ±0.2mHz (Note1)
accuracy, free run, 1 year	$\pm 1 \cdot 10^{-6}$ ±10Hz (Note1)	$\pm 4 \cdot 10^{-7}$ ±4Hz (Note1)	$\pm 1 \cdot 10^{-7}$ ±1Hz (Note1)	$\pm 5 \cdot 10^{-8}$ ±0.5Hz (Note1)	$\pm 1 \cdot 10^{-8}$ ±0.1Hz (Note1)	$\pm 5 \cdot 10^{-10}$ ±5mHz (Note1)
accuracy GPS-synchronous, average 24h	$\pm 1 \cdot 10^{-11}$	$\pm 1 \cdot 10^{-11}$	$\pm 5 \cdot 10^{-12}$	$\pm 1 \cdot 10^{-12}$	$\pm 1 \cdot 10^{-12}$	$\pm 1 \cdot 10^{-12}$
accuracy of time free run, 1 day	± 4.3 ms	± 865 µs	± 65 µs	± 22 µs	± 4.5 µs	± 1.1 µs
accuracy of time free run, 1 year	± 16 s	± 6.3 s	± 1.6 s	± 788 ms	± 158 ms	± 8 ms
temperature depandant drift free run	$\pm 1 \cdot 10^{-6}$ (-20...70°C)	$\pm 2 \cdot 10^{-7}$ (0...60°C)	$\pm 5 \cdot 10^{-8}$ (-20...70°C)	$\pm 1 \cdot 10^{-8}$ (5...70°C)	$\pm 2 \cdot 10^{-10}$ (5...70°C)	$\pm 6 \cdot 10^{-10}$ (-25...70°C)

Note 1: The accuracy in Hertz is based on the standard frequency of 10 MHz.

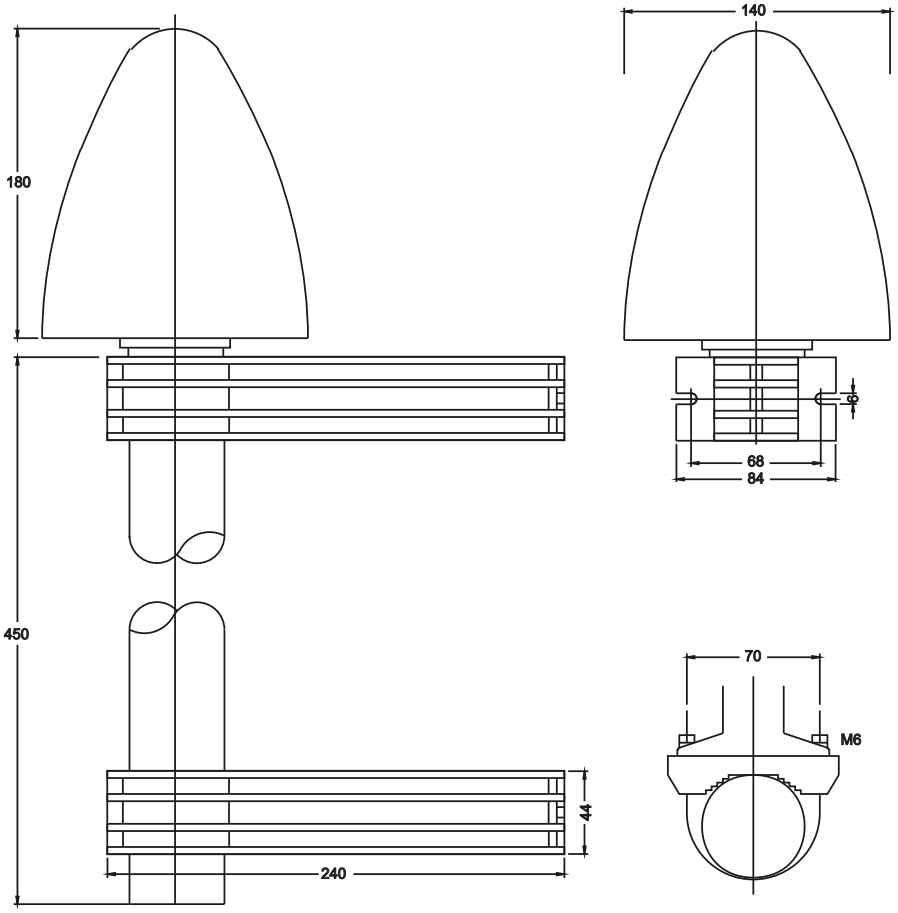
For example: Accuracy of TCXO (free run one day) is $\pm 1 \cdot 10^{-7} \cdot 10\text{MHz} = \pm 1$ HZ

The given values for the accuracy of frequency and time (not short term accuracy) are only valid for a constant ambient temperature! A minimum time of 24 hours of GPS-syncronicity is required before free run starts.

11.2 Technical Specifications GPS Antenna

ANTENNA:	dielectrical patch antenna, receive frequency:	25 x 25 mm 1575.42 MHz
BANDWITH:	9 MHz	
CONVERTER:	local oscillator to converter frequency: first IF frequency:	 10 MHz 35.4 MHz
POWER REQUIREMENTS:	12V ... 18V, @ 100mA (provided via antenna cable)	
CONNECTOR:	N-Type, female	
AMBIENT TEMPERATURE:	-40 ... +65°C	
HOUSING:	ABS plastic case for outdoor installation (IP66)	

Physical Dimension:



11.3 Time Strings

11.3.1 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		
	sending with one bit accuracy at change of second		
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 (depending on clock type):

u:	'#'	GPS: clock is running free (without exact synchr.)
		PZF: time frame not synchronized
		DCF77: clock has not synchronized after reset
	' '	(space, 20h)
		GPS: clock is synchronous (base accuracy is reached)
		PZF: time frame is synchronized
		DCF77: clock has synchronized after reset
v:	'*'	GPS: receiver has not checked its position
		PZF/DCF77: clock currently runs on XTAL
	' '	(space, 20h)
		GPS: receiver has determined its position
		PZF/DCF77: clock is syncronized with transmitter

x time zone indicator:

'U'	UTC	Universal Time Coordinated, formerly GMT
' '	CET	European Standard Time, daylight saving disabled
	'S'	(CEST) 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

11.3.2 Format of the Meinberg GPS Time String

The Meinberg Standard Time String is a sequence of 36 ASCII characters starting with the STX (start-of-text) character and ending with the ETX (end-of-text) character. Contrary to the Meinberg Standard Telegram the Meinberg GPS Timestring carries no local timezone or UTC but the direct GPS time without conversion into UTC. The format is:

<STX>D:*tt.mm.jj*;T:*w*;U:*hh.mm.ss*;*uv*G*y*;*lll*<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)		
tt.mm.jj	the current date:		
	tt	day of month	(01..31)
	mm	month	(01..12)
	jj	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 is running free (without exact synchr.)
		' '	(space, 20h) clock is synchronous (base accuracy is reached)
	v:	'*'	receiver has not checked its position
		' '	(space, 20h) receiver has determined its position
G	time zone indicator 'GPS-Time'		
y	anouncement of discontinuity of time, enabled during last hour before discontinuity comes in effect:		
	'A'	announcement of leap second insertion	
	' '	(space, 20h) nothing announced	
lll	number of leap seconds between UTC and GPS-Time (UTC = GPS-Time + number of leap seconds)		
<ETX>	End-Of-Text, (ASCII Code 03h)		

11.3.3 Format of the Meinberg Capture String

The Meinberg Capture String is a sequence of 31 ASCII characters terminated by a CR/LF (Carriage Return/Line Feed) combination. The format is:

CH*x*_*tt.mm.jj*_*hh:mm:ss.fffffff*<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:

x	0 or 1 corresponding on the number of the capture input
_	ASCII space 20h

dd.mm.yy the capture date:

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

hh:mm:ss.fffffff the capture time:

hh	hours	(00..23)
mm	minutes	(00..59)
ss	seconds	(00..59, or 60 while leap second)
fffffff	fractions of second, 7 digits	

<CR> Carriage Return, ASCII Code 0Dh

<LF> Line Feed, ASCII Code 0Ah

11.3.4 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>*dd.mm.yy/w/hh:mm:ssxxxxuv*<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
sending with one bit accuracy at change of second

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)

xxxx time zone indicator:

'UTC'	Universal Time Coordinated, formerly GMT
'CET'	European Standard Time, daylight saving disabled
'CEST'	European Summertime, daylight saving enabled

u clock status characters:

'#'	clock has not synchronized after reset
' '	(space, 20h) clock has synchronized after reset

v 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

11.3.5 Format of the Uni Erlangen String (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.llle hhhhm*<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
sending with one bit occuracy at change of second

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'	CEST	European Summertime, daylight saving enabled
' '	CET	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 d. 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 WGS84 ellipsoid in meters leading signs are replaced by a space character (20h)	
<ETX>	End-Of-Text, ASCII Code 03h	

11.3.6 Format of the NMEA 0183 String (RMC)

The NMEA String is a sequence of 65 ASCII characters starting with the '$GPRMC' 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 where as the other characters are part of the time string. The groups of characters as defined below:

$	Start character, ASCII Code 24h sending with one bit accuracy at change of second		
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		

11.3.7 Format of the NMEA 0183 String (GGA)

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

$GPGGA,*hhmmss.ss,bbbb.bbbbb,n,lllll.ll,e,A,vv,hhh.h,aaa.a,M,ggg.g,M,,0*cs*<CR><LF>

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

$	Start character, ASCII Code 24h sending with one bit accuracy at change of second		
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.bbbbb	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.lllll	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	
A	Position fix (1 = yes, 0 = no)		
vv	Satellites used (0..12)		
hhh.h	HDOP (Horizontal Dilution of Precision)		
aaa.h	Mean Sea Level altitude (MSL = altitude of WGS84 - Geoid Separation)		
M	Units, meters (fixed value)		
ggg.g	Geoid Separation (altitude of WGS84 - MSL)		
M	Units, meters (fixed value)		
cs	checksum (EXOR over all characters except '$' and '*')		
<CR>	Carriage Return, ASCII Code 0Dh		
<LF>	Line Feed, ASCII Code 0Ah		

11.3.8 Format of the NMEA 0183 String (ZDA)

The NMEA String is a sequence of 38 ASCII characters starting with the **'$GPZDA'** character and ending with the characters **CR** (carriage return) and LF (line-feed). The format is:

$GPZDA,*hhmmss.ss,dd,mm,yyyy,HH,ll*cs<CR><LF>**
ZDA - Time and Date: UTC, day, month, year and local timezone.

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

$	Start character, ASCII Code 24h sending with one bit accuracy at change of second		
hhmmss.ss	the current UTC time:		
	hh	hours	(00..23)
	mm	minutes	(00..59)
	ss	seconds	(00..59 or 60 while leap second)
HH,ll	the local timezone (offset to UTC):		
	HH	hours	(00..+-13)
	ll	minutes	(00..59)
dd,mm,yy	the current date:		
	dd	day of month	(01..31)
	mm	month	(01..12)
	yyyy	year	(0000..9999)
cs	checksum (EXOR over all characters except '$' and '*')		
<CR>	Carriage Return, ASCII Code 0Dh		
<LF>	Line Feed, ASCII Code 0Ah		

11.3.9 Format of the ABB SPA Time String

The ABB SPA Time String 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

11.3.10 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 sending with one bit accuracy at change of second		
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		

11.3.11 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 sending with one bit accuracy at change of second		code 58h
<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		
Interface parameters:	7 Databits, 1 Stopbit, odd. Parity, 9600 Bd		

11.3.12 Format of the SYSPLEX-1 Time String

The SYSPLEX1 time string is a sequence of 16 ASCII characters starting with the SOH (Start of Header) ASCII controll character and ending with the LF (line feed, ASCII Code 0Ah) character. The format is:

<SOH>ddd:hh:mm:ssq<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:

<SOH>	Start of Header (ASCII control character) sending with one bit accuracy at change of second		
ddd	day of year		(001..366)
hh:mm:ss	the current time:		
	hh	hours	(00..23)
	mm	minutes	(00..59)
	ss	seconds	(00..59, or 60 while leap second)
	q	Quality indicator	(space) Time Sync (GPS lock) (?) no Time Sync (GPS fail)
<CR>	Carriage-return (ASCII code 0Dh)		
<LF>	Line-Feed (ASCII code 0Ah)		

11.3.13 Format of the ION Time String

The ION time string is a sequence of 16 ASCII characters starting with the SOH (Start of Header) ASCII controll character and ending with the LF (line feed, ASCII Code 0Ah) character. The format is:

<SOH>ddd:hh:mm:ssq<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:

<SOH>	Start of Header (ASCII control character) sending with one bit accuracy at change of second		
ddd	day of year		(001..366)
hh:mm:ss	the current time:		
	hh	hours	(00..23)
	mm	minutes	(00..59)
	ss	seconds	(00..59, or 60 while leap second)
	q	Quality indicator	(space) Time Sync (GPS lock) (?) no Time Sync (GPS fail)
<CR>	Carriage-return (ASCII code 0Dh)		
<LF>	Line-Feed (ASCII code 0Ah)		

12 Technical Specifications GPS-RDMP

HOUSING:	19 Inch Metal desktop case, MULTIPAC Schroff Front panel: 1U/84HP (43,6 mm high / 426,4 mm wide)
PROTECTION RATING:	IP20
PHYSICAL DIMENSIONS:	483 mm wide x 43,7 mm high x 285 mm deep
POWER CONSUMPTION:	2 x 30W
INPUT VOLTAGE-RANGE:	100 - 240 VAC, 50 - 60Hz

12.1 CE-Label

Low voltage directive:	**2006/95/EC EN 60950-1** Safety of Information Technology Equipment, including Electrical Business Equipment Electromagnetic compatibility.
EMV-directive:	**89/336EEC EN50081-1** Electromagnetic compatibility (EMC). Generic emission standard. Part 1: Residential, commercial and light industry **EN50082-2** Electromagnetic compatibility (EMC). Generic immunity standard. Part 2: Industrial environment

CE

12.2 Front and rear panel connectors

Name	Type	Signal	Cable / connection
Front panel			
Network ETH	RJ-45	Ethernet	shielded data line
COM 0 / COM 1 (COM 0 for firmware updates only)	9pin. D-SUB female	RS-232	shielded data line
Rear panel			
Power supply	IEC (power) connector	100-240VAC	power cord
GPS Antenna	BNC	10MHz / 35.4MHz	shielded coaxial line
Error	3pin. DFK male	relay	3pin. MSTB clamp
PPS Out	BNC	TTL 2.5 Vpp into 50 Ohm	shielded coaxial line
10MHz sine Out	BNC	1.0 Vpp into 50 Ohm	shielded coaxial line

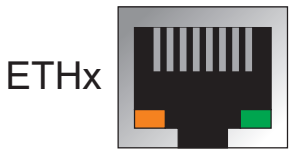
12.3 10/100base-T Ethernet (IEEE 803.2)

Link speed: 10/100 MBit

Connector Type: 8P8C (RJ45)

Cable: CAT 5.0

Duplex Modes: Half/Full/Autonegotiaton



12.4 RS232 COMx Timestring

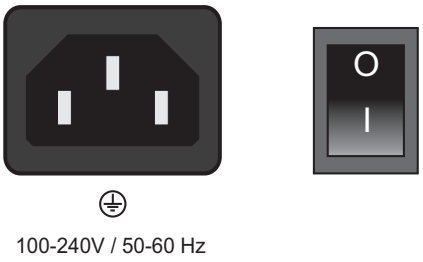
Connector: D-SUB Male-Female 9pol.

Cabel: shielded data line
PC connector (serial port) 1:1

Assignment:
Pin 2: TxD (transmit)
Pin 3: RxD (receive)
Pin 5: GND (ground)

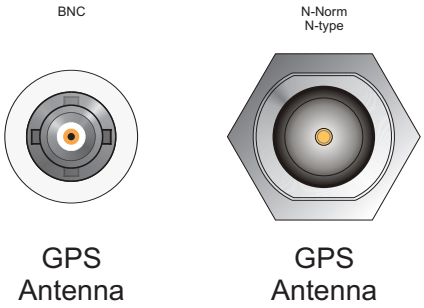
12.5 Power connect

INPUTVOLTAGE RANGE:	100-240V AC, 50...60Hz
INPUT FUSE:	UL/IEC127, 250V AC S 3.15A
OUTPUT POWER:	25W max.
CONNECTORS:	input IEC320 AC inlet



12.6 GPS Antenna

Cable:	shielded coax
Cablelength:	max. 300m to RG58, max. 700m to RG213
Connector:	BNC female or N-type female
Input GPS:	Antenna circuit 1000 V DC insulated
Local Oscillator to Converter Frequency:	10 MHz [1]
First IF Frequency:	35.4 MHz [1]

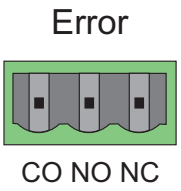


1) these frequencys are transfered via the antenna cable.

Power Requirements: 12V ... 18V, 100mA (via antenna cable)

12.7 Error Relay

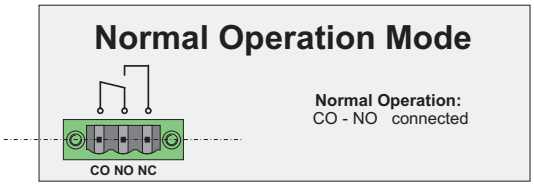
On the back panel of the device you can find a DFK connector labeled "Error". This relay output is connected to the TTL TIME_SYNC output of the reference clock (GPS, PZF, TCR, ...). If the internal reference clock has been synchronized by its source (GPS, DCF77 or IRIG) the relay will switch to mode "NO". In case of bad antenna signal or the device has been switched off the relay falls back to mode "NC".

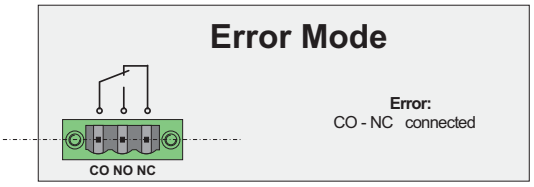


Additionally the relay can be switched by one of the notification conditions.

Technical Specification

SWITCHING VOLTAGE max.:	125 VDC 150 VAC	
SWITCHING CURRENT max.:	1 A	
SWITCHING LOAD max.:	DC AC	30 W 60 VA
SWITCHING-CURRENT UL/CSA:	0.46 A 0.46 A 1 A	150 VAC 65 VDC 30 VDC
RESPONSE TIME:	ca.2 ms	





12.8 Pulse Per Second Output

Level: TTL 2,5V to 50 Ohm

Connector: BNC, female

Cable: shielded coax line

Pulselength: 200 ms

12.9 10MHz sine Output

Input: 10MHz TTL or sine wave

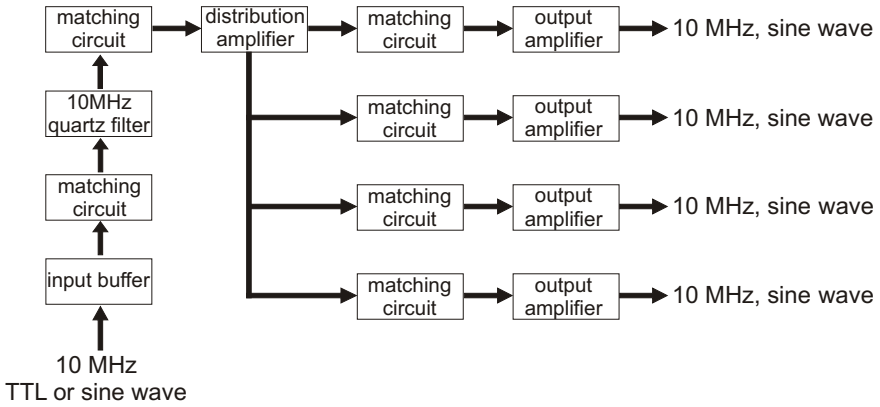
Outputs: 4 sine wave outputs
Output level: 1,2Vpp (5,9dBm) into 50 Ohm
Harmonics: -60 dBc

Quarz filter: Bandwidth 3 kHz

Connector: BNC, female

Cable: shielded coax line

The module SD04 uses a narrowband quartz filter to form a sine wave signal from a 10MHz TTL or sine wave input signal. Four output signals are provided via distribution amplifiers.



13 The program GPSMON32

The program GPSMON32 can be used to monitor and programm all essential functions of Meinberg GPS-Receivers. The Software is executable under Windows 7, Windows Vista, Win9X, Win2000, WinXP and WinNT. To install GPSMON32 just run **setup.exe** from the included USB flash drive and follow the instructions of the setup program.

Program and clock can communicate either via serial link or via TCP/IP connection if the clock is prepared for (LANXPT or SCU-XPT board). The mode to be used can be selected in menu *"Connection -> Settings"* by the checkboxes serial and network.

13.1 Serial Connection

To obtain a connection between you 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 apperaring window. Some firmware versions of the GPS receiver 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.

13.2 Network Connection

(only clocks with Ethernet access!)

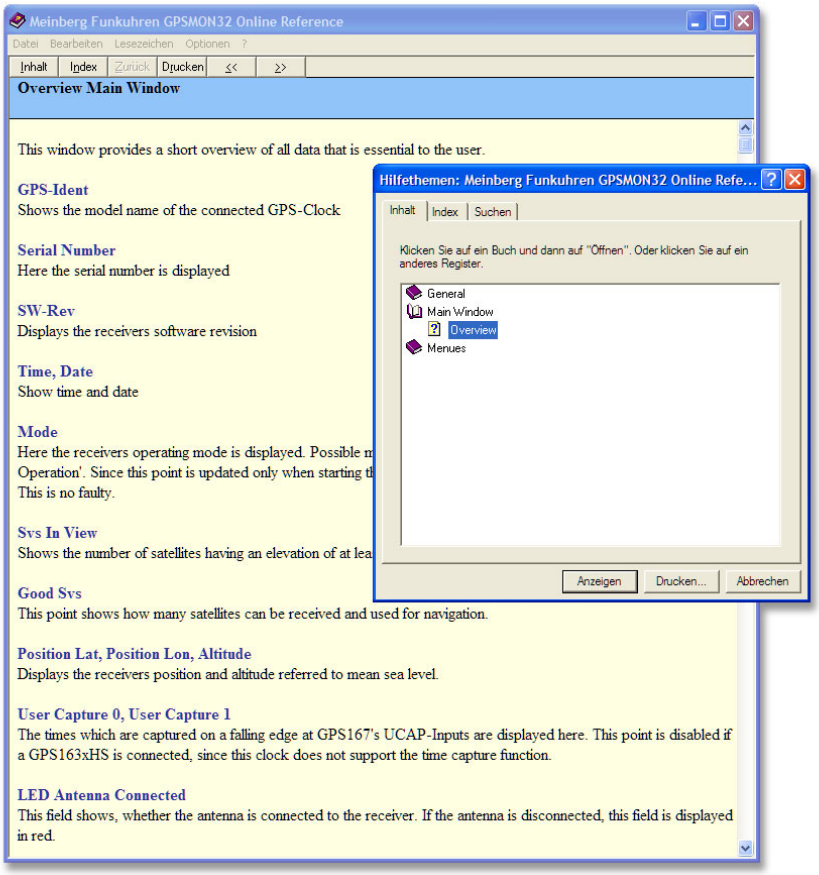
Settings needed for a network connection can be done in menu "Connection->Settings".
To set up a network connection from clock program GPSMON32, the mode "network" must be selected in the field "mode". Further the TCP/IP-Address must be entered in field "IP-Address". If the IP-Address is unknown, the user can let the program search for available clocks in the local network by clicking the "Find" button. A new connection can be set up by clicking to one of the displayed addresses.

Access to radioclocks by network is always protected by a Password.

The online help function of GPSMON32 provides detailed information on setting up a TCP/IP connection.

13.3 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 German/English in the Help Menu


Meinberg Funkuhren GPSMON32 Online Reference
Datei Bearbeiten Lesezeichen Optionen ?
Inhalt Index Zurück Drucken << >>
Overview Main Window
This window provides a short overview of all data that is essential to the user.
GPS-Ident
Shows the model name of the connected GPS-Clock
Serial Number
Here the serial number is displayed
SW-Rev
Displays the receivers software revision
Time, Date
Show time and date
Mode
Here the receivers operating mode is displayed. Possible n
Operation'. Since this point is updated only when starting t
This is no faulty.
Svs In View
Shows the number of satellites having an elevation of at lea
Good Svs
This point shows how many satellites can be received and used for navigation.
Position Lat, Position Lon, Altitude
Displays the receivers position and altitude referred to mean sea level.
User Capture 0, User Capture 1
The times which are captured on a falling edge at GPS167's UCAP-Inputs are displayed here. This point is disabled if a GPS163xHS is connected, since this clock does not support the time capture function.
LED Antenna Connected
This field shows, whether the antenna is connected to the receiver. If the antenna is disconnected, this field is displayed in red.
Hilfethemen: Meinberg Funkuhren GPSMON32 Online Refe...
Inhalt Index Suchen
Klicken Sie auf ein Buch und dann auf "Öffnen". Oder klicken Sie auf ein anderes Register.
General
Main Window
Overview
Menues
Anzeigen Drucken... Abbrechen

14 Used Symbols

Nr.	Symbol	Beschreibung / *Description*
1		IEC 60417-5031 Gleichstrom / *Direct current*
2		IEC 60417-5032 Wechselstrom / *Alternating current*
3		IEC 60417-5017 Erdungsanschluss / *Earth (ground) Terminal*
4		IEC 60417-5019 Schutzleiterklemme / *Protective Conductor Terminal*
5		Vorsicht, Risiko eines elektrischen Schlages / *Caution, possibility of electric shock*
6		ISO 7000-0434 Vorsicht, Risiko einer Gefahr / *Caution, Danger*
7		2002/96/EC Dieses Produkt fällt unter die B2B Kategorie. Zur Entsorgung muss es an den Hersteller übergeben werden. *This product is handled as a B2B category product. In order to secure a WEEE compliant waste disposal it has to be returned to the manufacturer.*

Konformitätserklärung

Declaration of Conformity

Hersteller Manufacturer	**Meinberg Funkuhren GmbH & Co. KG** **Lange Wand 9** **D-31812 Bad Pyrmont**

erklärt in alleiniger Verantwortung, daß das Produkt
declares under its sole responsibility, that the product

Produktbezeichnung Product Name	**Satellite Receiver**
Modell / Typ Model Designation	**GPS-RDMP**

auf das sich diese Erklärung bezieht, mit den folgenden Normen übereinstimmt
to which this declaration relates is in conformity with the following standards

EN55022:2008-05, Class B	Grenzwerte und Meßverfahren für Funkstörungen von informationstechnischen Einrichtungen Limits and methods of measurement of radio interference characteristics of information technology equipment
EN55024:2003-10	Grenzwerte und Meßverfahren für Störfestigkeit von informationstechnischen Einrichtungen Limits and methods of measurement of Immunity characteristics of information technology equipment
EN 61000-3-2:2006	Elektromagnetische Verträglichkeit (EMV) Grenzwerte für Oberschwingungsströme EMC limits for harmonic current emissions
EN 61000-3-3:1995 (+A1:2001 +A2:2005)	Elektromagnetische Verträglichkeit (EMV) Grenzwerte für Spannungsschwankungen und Flicker in Niederspannungsnetzen Limitation of voltage fluctuation and flicker in low-voltage supply systems
EN 60950-1:2006 (+A11:2009)	Sicherheit von Einrichtungen der Informationstechnik Safety of information technology equipment

gemäß den Richtlinien 2004/108/EG (Elektromagnetische Verträglichkeit), 2006/95/EG (Niederspannungsrichtlinie) und 93/68/EWG (CE Kennzeichnung) sowie deren Ergänzungen.
following the provisions of the directives 2004/108/EC (electromagnetic compatibility), 2006/95/EC (low voltage directive) and 93/68/EEC (CE marking) and its amendments.

Bad Pyrmont, den 16.01.2012

Günter Meinberg
Managing Director


GPS_RDMP_160112