TECHNICAL REFERENCE

LANTIME M600 GPS

NTP Time Server with GPS Receiver

5th April 2018

Meinberg Radio Clocks GmbH & Co. KG

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1 Imprint

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Date: 2014-10-10

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 50°C (40 °C by using Rubidium).
- 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		2012/19/EU 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.*

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

3 Global Information LANTIME M600/GPS

The **LANTIME** (Local Area Network Time Server) provides a high precision time base to a TCP/IP network (Stratum-1-Server). The NTP (Network Time Protocol) is used to synchronize all NTP clients with the reference. The several LANTIME variants differ from each other by the time reference and output configuration. A GPS or GNSS (GPS, GLONASS, Galileo, BeiDou) receiver, GNS-UC (only GPS and Galileo) , a long wave receiver (like DCF77, MSF or WWVB) or an IRIG time code receiver can be integrated as an internal reference as well as a combination of these references (hybrid system). External references are also possible.

The LANTIME system is a set of equipment composed of an integrated GPS receiver, a single-board computer and a power supply, all installed in a metal 19 inch modular chassis and ready to operate. A simplified LINUX operating system is installed on the single-board computers flash disk. Eight push buttons and a display can be used to configure and monitor the time server.

After the network connection has been established the time server can also be configured and monitored remotely from a workstation via TELNET or FTP. An integrated web server enables access to the LANTIME by using an ordinary web browser.

4 Technical Specifications LANTIME Chassis

Protection Rating: IP20

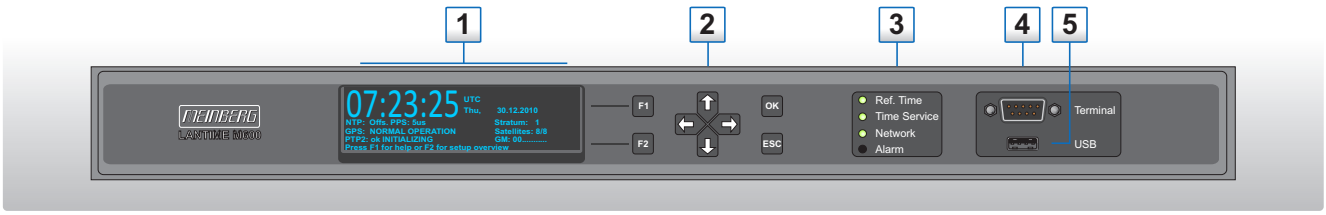
Power Consumption: Base configuration: 30 W
(max. 50 W - depending on the integrated module options)

Ambient Temperature: 0 ... 50 °C

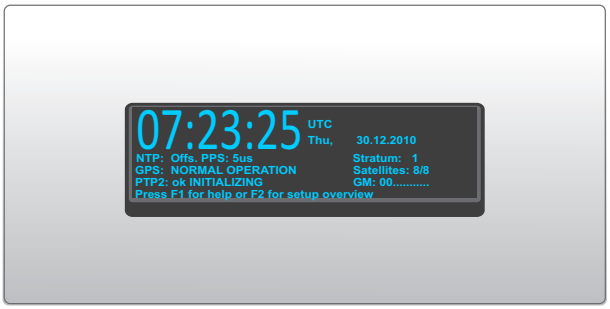
Storage Temperature: -20 ... 70 ° C

Humidity: max. 85% (non-condensing) @ 30 °C

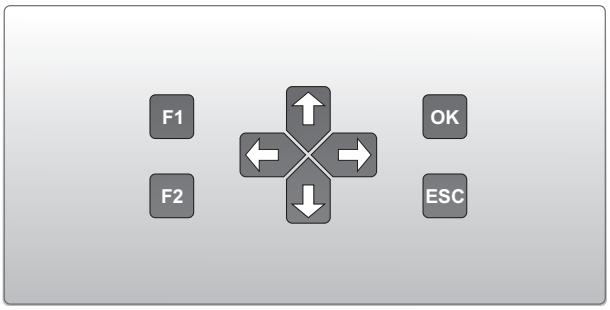
5 LANTIME M600 - Front connectors



1. The main menu is displayed after switching on the device and having completed the initialization phase. In the main menu the most important status information are displayed. In the top line of the display the operating mode of the reference clock / reference time is shown. Instead of "GPS: NORMAL OPERATION" the messages, "GPS: COLD BOOT", "GPS: WARM BOOT" or "GPS: UPDATE ALMANAC" can appear (as GPS reference Time). In case the antenna connection is interrupted, the following message is shown: "GPS: ANTENNA FAULTY".



2. By using the 4 arrows and the "ESC", "F1" and "F2" buttons of the keypad you can navigate through each menu in the display. You can always return to the main menu by pressing the "ESC" button several times.



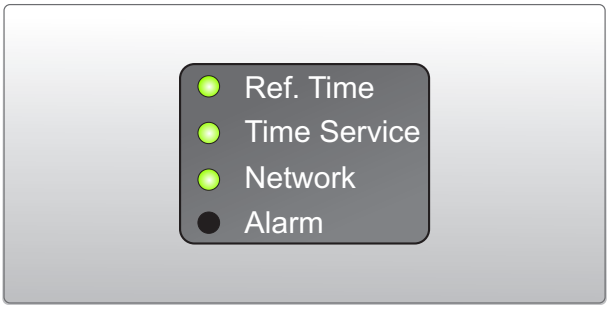
3.

"Ref. Time"
green: the reference clock (e.g. build-in GPS) provides a valid time
red: the reference clock does not provide a valid time

"Time Service"
green: NTP is synchronized to the reference clock, e.g. GPS
red: NTP is not synchronized or switched to the "local clock"

"Network"
green: all monitored network interfaces are connected ("Link up")
red: at least one of the monitored network interfaces is faulty

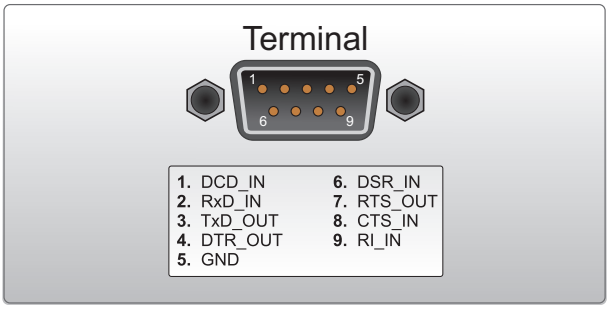
"Alarm"
off: no error
red: general error



4.

To connect a serial terminal use the 9 pin SUBD RS232 connector in the front panel. Via the serial terminal connection it is possible to configure the parameters with a terminal program. To establish a connection between the LANTIME and a PC, use a NULL-MODEM cable. Configure your terminal program with 38400 Baud, 8 Databits, no parity and one Stopbit ((8N1). The terminal emulation has to be set to VT100. After connecting to the time server the login message will be displayed. Enter user name and password:

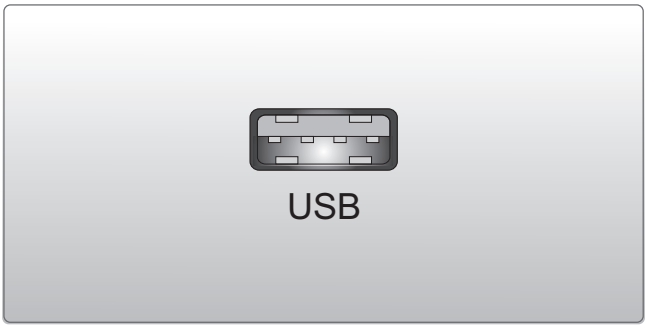
Default User: *root*; Password: *timeserver*



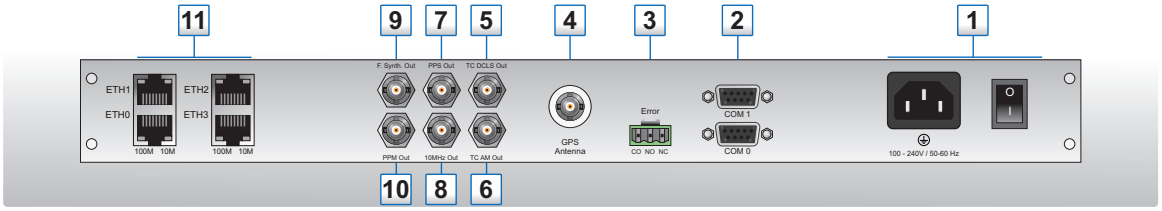
5.

All devices of the LANTIME M-Series dispose a USB interface, which can be used to plug in a USB Stick. The USB Stick can be deployed for the following tasks:

- to lock the keys on the LC-Display, to prevent unauthorized access
- to save the LANTIME configuration
- to transfer the configuration between several LANTIMES
- to save log files



6 M600 - Rear connectors



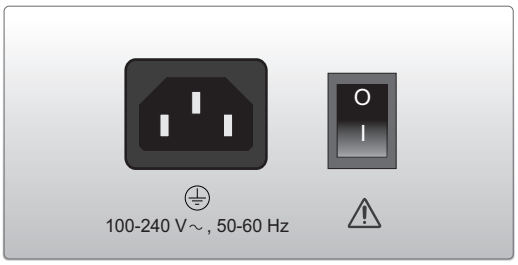
6.1 Power Connector

Input Voltage Range: 100-240 V AC, 50 - 60Hz

Input Current: 0.65 A_{max}

Input Fuse: UL/IEC127, 250 V AC S 3.15 A

Connector: input IEC320 AC inlet

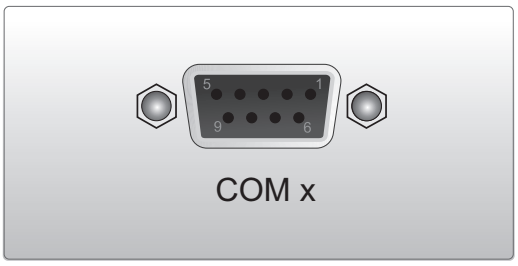


6.2 RS232 COMx Timestring

Connector: 9pin D-SUB female

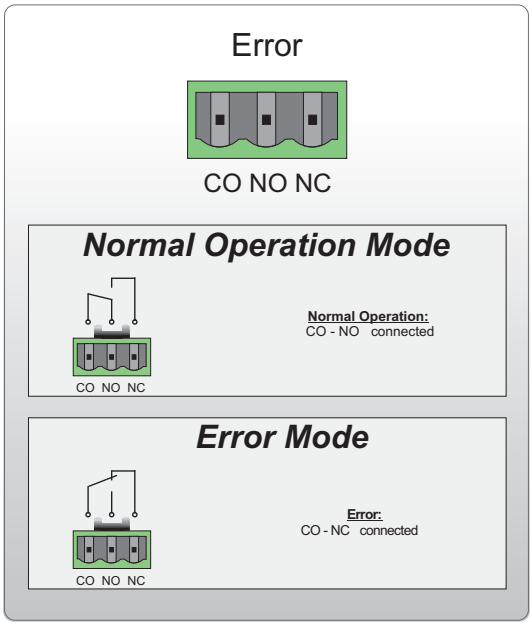
Cable: shielded data line

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



6.3 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".

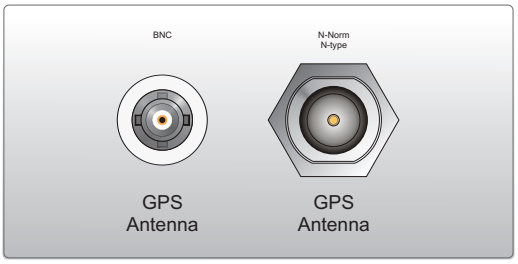


Techncal Specification

Switching Voltage max.:	125 V DC 140 V AC	
Switching Current max.:	1A	
Switching Load max.:	DC AC	30 W 60 VA
Switching Current UL/CSA:	0.46 A 0.46 A 1A	140 V AC 65 V DC 30 V DC
Response Time:	ca.2ms	

6.4 GPS Antenna

Cable:	shielded coax
Cable Length:	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 frequencies are transfered via the antenna cable.

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

6.5 Time Code AM Output

Carrier frequency: 1kHz (IRIG-B)

Signal outputs: Unbalanced sine wave-signal:
3 V_{pp} (MARK)
1 V_{pp} (SPACE) into 50 Ohm

Connector: BNC, female

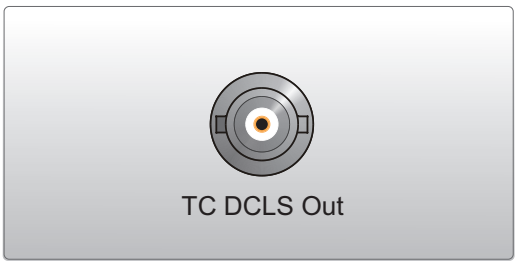
Cable: shielded coax line

6.6 Time Code DCLS Output

Signal outputs: DCLS: TTL, high or low active

Connector: BNC, female

Cable: shielded coax line



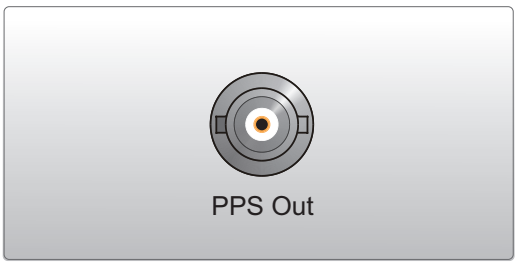
6.7 Pulse Per Second Output

Level: TTL 2.5 V into 50 Ohm

Connector: BNC, female

Cable: shielded coax line

Pulse length: 200 ms

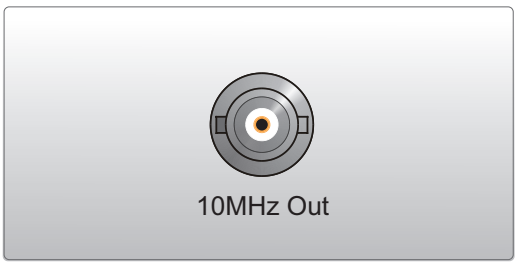


6.8 10MHz Output

Level: TTL 2.5 V into 50 Ohm

Connector: BNC, female

Cable: shielded coax line



6.9 Synthesizer for frequencies

Frequency (output): 0,1Hz - 10MHz

Connector: BNC, female

Cable: shielded coax line

Pulse: TTL

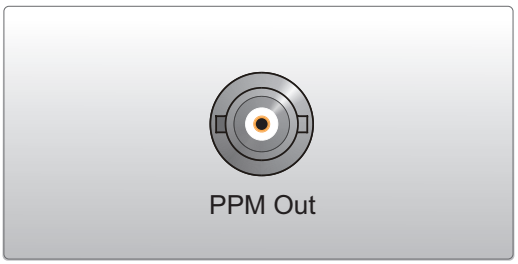
6.10 Pulse Per Minute Output

Level: TTL into 50 Ohm

Connector: BNC, female

Cable: shielded coax line

Pulse length: 200 ms



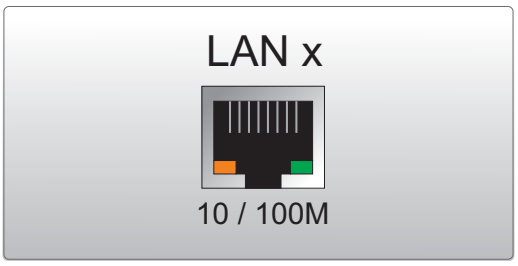
6.11 10/100base-T Ethernet (IEEE 803.2)

Link Speed: 10/100 MBit

Connector Type: 8P8C (RJ45)

Cable: CAT 5.0

Duplex Modes: Half/Full/Autonegotiaton



7 Mounting the GPS Antenna

The GPS satellites are not stationary, but circle round the globe with 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/downconverter unit must be installed in a location that has as clear a view of the sky as possible. The best reception is achieved when the antenna has a free view of 8° angular elevation above the horizon. If this is not possible, the antenna should be installed with the clearest free view to the equator, because the satellite orbits are located between latitudes 55° North and 55° South. If this is not possible, you may experience difficulty receiving the four satellites necessary to complete the receiver's position solution.

The antenna/converter unit can be mounted on a wall, or on a pole up to 60 mm in diameter. A 50 cm plastic tube, two wall-mount brackets, and clamps for pole mounting are included. A standard RG58 coaxial cable should be used to connect the antenna/downconverter unit to the receiver. The maximum length of cable between antenna and receiver depends on the attenuation factor of the coaxial cable.

Up to four GPS receivers can be run with one antenna/downconverter unit by using an optional antenna splitter. The total length of an antenna line from antenna to receiver must not be longer than the max. length shown in the table below. The position of the splitter in the antenna line does not matter.

The optional delivered MBG S-PRO protection kit can also be used for outdoor installation (degree of protection: IP55). However, we recommend an indoor installation, as close as possible to the wall where the antenna cable is entering, to minimize the risk of overvoltage damage, for example by lightning.

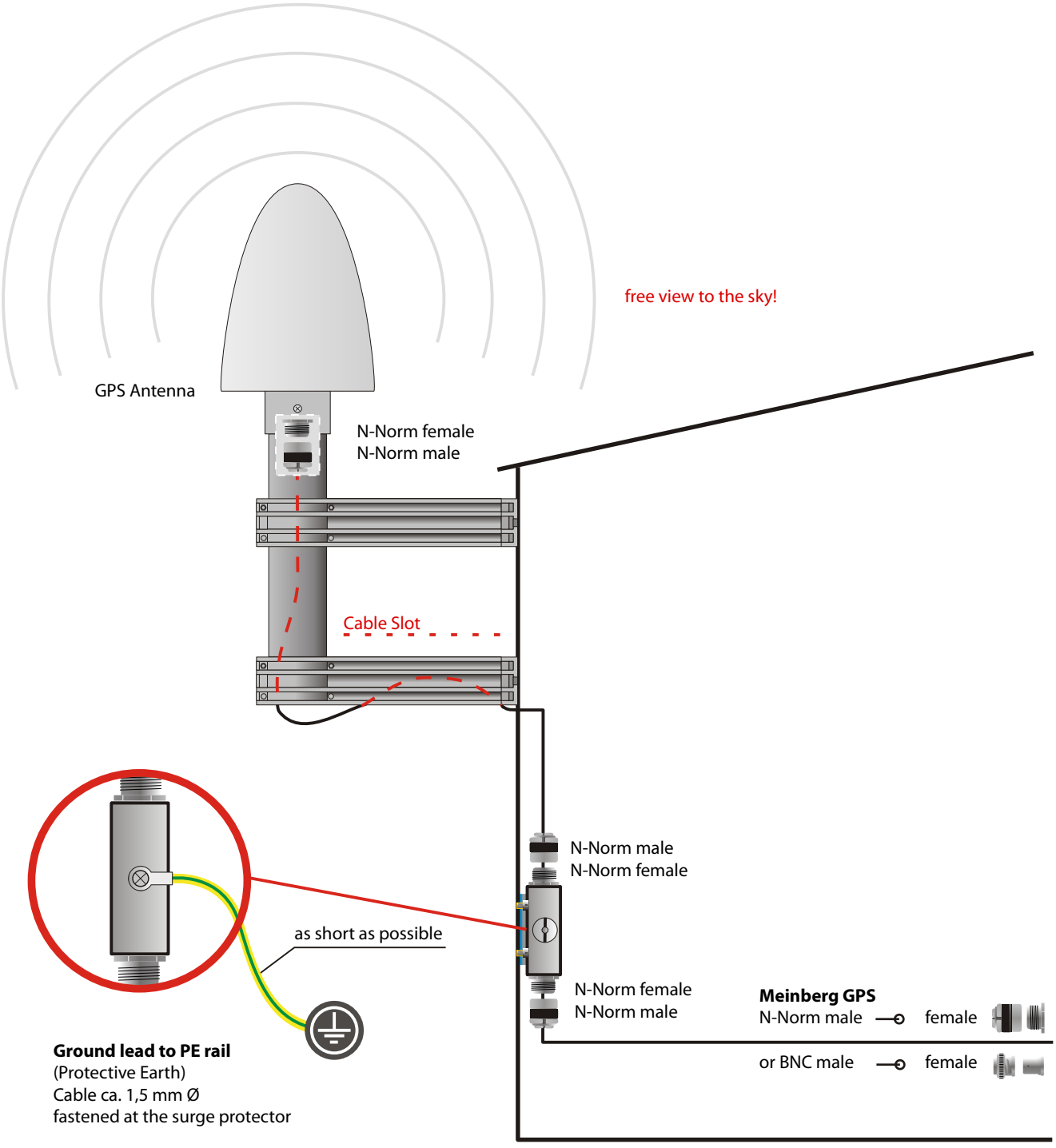
7.1 Example:

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

7.2 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.



7.3 Antenna Short-Circuit

(systems with front display only)
In case of an antenna line short-circuit the following message appears in the display:

If this message appears the clock has to be disconnected from the mains and the defect eliminated. After that the clock can be powered-up again. The antenna supply voltage must be 15V_{DC} .

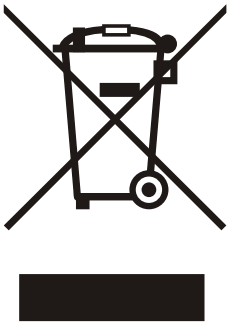
8 WEEE Compliance

Compliance with EU Directive 2011/65/EC (RoHS)

We hereby declare that this product is conform to the European Directive 2011/65/EC, "Restrictions of Hazardous Substances in Electrical and Electronic Equipment". We ensure that electrical and electronic products sold in the EU do not contain lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyls (PBBs), and polybrominated diphenyl ethers (PBDEs) above the legal threshold.

WEEE status of the product

This product is handled as a B2B (Business to Business) category product. In order to secure a WEEE compliant waste disposal it has to be returned to the manufacturer. Any transportation expenses for returning this product (at its end of life) have to be incurred by the end user, whereas Meinberg will bear the costs for the waste disposal itself.



9 Declaration of Conformity

Konformitätserklärung

Doc ID: LANTIME M600/GPS-2014-10-10

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

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

Produktbezeichnung **LANTIME M600/GPS**
Product Designation

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

EN55032:2012, Class B	Limits and methods of measurement of radio interference characteristics of information technology equipment
EN55024:2010	Limits and methods of measurement of Immunity characteristics of information technology equipment
EN 60950-1:2006 (A11:2009 + A1:2010 + A12:2011 + AC:2011 + A2:2013)	Safety of information technology equipment
EN 50581:2012	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

gemäß den Richtlinien 2014/30/EU (Elektromagnetische Verträglichkeit), 2014/35/EU (Niederspannungsrichtlinie), 2011/65/EU (Beschränkung der Verwendung bestimmter gefährlicher Stoffe) und 93/68/EWG (CE Kennzeichnung) sowie deren Ergänzungen.
following the provisions of the directives 2014/30/EU (electromagnetic compatibility), 2014/35/EU (low voltage directive), 2011/65/EU (restriction of the use of certain hazardous substances) and 93/68/EEC (CE marking) and its amendments.

Bad Pyrmont, 2014-10-10

Günter Meinberg
Managing Director