



## Meinberg Radio Clocks

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## LANTIME M600/MRS: NTP Time Server synchronized by GPS/1PPS/10MHz/IRIG/NTP

Meinberg LANTIME time servers are used around the world to provide accurate time to networks of any size. The LANTIME M600/MRS synchronizes all systems that are NTP- or SNTP-compatible and uses a built-in Meinberg GPS radio clock and supports a broad range of other reference time sources like 1PPS, 10MHz, IRIG time codes (both DCLS and AM) or upstream NTP servers. A highly stable and precise oscillator is capable of bridging interferences or a temporary loss of reception and can also be used as a stable independent time base when operated in free running mode.

### Key Features

- Accepts a large number of sync references: GPS, 1PPS, 10MHz, IRIG (DCLS and AM) and NTP
- Synchronization of NTP and SNTP compatible clients
- Web based status and configuration interface [1]([Demo](#)) and console based graphical configuration utility
- Supported net protocols: IPv4, IPv6, NTP, SNTP, DAYTIME, DHCP, HTTP, HTTPS, FTP, SAMBA, SFTP, SSH, SCP, SYSLOG, SNMP, TIME, TELNET, W32TIME
- Alert-Notification system of status change by Email, WinMail, SNMP or an external connected display
- Full SNMP v1,v2,v3 support with own SNMP-daemon for status and configuration and SNMP Trap messages
- USB port for performing updates, lock front panel, and backup/restore configuration and log files.
- Antenna connected with up to 300m of standard coaxial cable RG58
- Four independant RJ-45 ethernet interfaces 10/100 MBit

## Description

As an ultra stable NTP time provider, the LANTIME M600/MRS not only represents a highly accurate source of synchronization for all network devices supporting the Network Time Protocol (NTP) or the Simple Network Time Protocol (SNTP), it also offers a number of legacy time and frequency outputs for keeping non-networked devices in sync.

The Meinberg MRS technology (Multi Reference Sources) enables you to utilize one or more time and frequency references in prioritized order defined by your individual requirements. The Intelligent Reference Switching Algorithm (IRSA) developed by Meinberg engineers ensures that switching from a highly accurate reference source (e.g. GPS) to a less accurate one (e.g. IRIG or NTP) is delayed as long as the internal ultra stable oscillator is capable of maintaining an accuracy level that is better than the one of the next available reference source in the priority list.

In lab environments the MRS technology offers a flexible solution to changing availability of different synchronization sources and for highly critical operative systems. The possibility to use multiple independent sync references allows you to fulfill redundancy requirements of your network synchronization solution.

Another field of applications for MRS technology is the monitoring and measurement of synchronization sources, e.g. determining and logging the accuracy of an IRIG generator or a PPS source.

The GNU/Linux operating system of the LANTIMEs SBC (Single Board Computer) has been optimized to ensure a high level of security and reliability.

A large display shows the state of the internal GPS receiver and the NTP subsystem.

The configuration of the system can be done by using a standard web browser to access the extensive but straightforward HTML interface. Alternatively a text based and menu driven setup utility can be started from the shell prompt after logging into the unit via Telnet or SSH.

The security-related features of LANTIME time servers satisfy highest demands. The time synchronization data can be reliably signed and secured by symmetric keys (MD5) and the NTP autokey procedures. This protects the clients against manipulated time and man-in-the-middle attacks and allows them to verify that the NTP packets they received were sent by the LANTIME. Additionally the whole LANTIME configuration can be done by using encrypted channels (e.g. SSH, HTTPS or SNMPv3). Every unused/unneeded protocol can be disabled in order to reduce possible points of attack.

In order to support network management systems the LANTIME time servers offer an extensive SNMP interface, which can be accessed by SNMP V1, V2.c and V3. It allows the monitoring of all relevant system parameters (including operating system parameters, network interface statistics, detailed GPS and NTP status information as well as the complete system configuration) and can be used to alter the LANTIME configuration via SNMP set commands, too.

LANTIME time servers are designed to be deployed in IPv6 networks, the NTP time synchronization as well as the configuration interfaces (Web-based, SSH and SNMP) comes with IPv6 support. You can assign several IPv6 addresses and the system supports automatic configuration by IPv6 autoconf.

Because of its modular system architecture it is possible to equip a LANTIME time server with a number of different reference time sources. Optionally several additional frequency-, serial string- and pulse outputs are available and by combining two (even different) time sources and redundant power supplies, high-availability systems are no problem.

The LANTIME M600/MRS is equipped with high precision oscillator "OCXO HQ" (look at [\[2\]oscillator options](#) for details) as standard. The oscillator determines the holdover characteristics (e.g. when the GPS signal is disturbed or jammed). The oscillator option "OCXO DHQ" is available to fulfill higher requirements.

Please note that the GPS antenna is not included in the standard scope of delivery and has to be ordered separately, if you are planning to use GPS as a synchronization source.

## Characteristics

<b>Type of receiver</b>	6 channel GPS C/A-code receiver
<b>Display</b>	Vacuum fluorescent graphic display (VFD), 256 x 64 dots
<b>Control elements</b>	Eight push buttons to set up basic network parameters and to change receiver settings
<b>Status info</b>	Four bicolor LEDs showing status of: <ul style="list-style-type: none"> <li>- reference time</li> <li>- time service</li> <li>- network</li> <li>- alarm</li> </ul>
<b>Input signal</b>	1x GPS Antenna Input 1x PPS in 1x 10MHz in 1x IRIG DCLS in 1x IRIG AM in
<b>Pulse Synchronization Input Signals</b>	1 Pulse Per Second, TTL (BNC)
<b>Frequency inputs</b>	1x 10 MHz, TTL 50 Ohm (BNC)
<b>IRIG Time Code Input</b>	IRIG-B123, B122, B003, B002, B006, B007, B126, B127, IEEE 1344 and AFNOR NFS 87-500
<b>Frequency outputs</b>	10 MHz via female BNC connector, TTL into 50 Ohm Synthesizer 1/8 Hz up to 10 MHz via female BNC connector, TTL into 50 Ohm Accuracy depends on oscillator (standard: OCXO HQ), look at <a href="#">[2]oscillator options</a>
<b>Pulse outputs</b>	Pulse per second (PPS) and pulse per minute (PPM) via female BNC connectors, TTL into 50 Ohm, pulse width: 200msec, active high
<b>Accuracy of pulse outputs</b>	< ±100ns (OCXO HQ, OCXO DHQ)
<b>Interface</b>	Two independent serial RS232-interfaces, menu configurable
<b>Data format of interfaces</b>	Baudrate: 300, 600, 1200, 2400, 4800, 9600, 19200 Baud data format: 7N2, 7E1, 7E2, 8E1, 8N1, 8N2 Time telegram: <a href="#">[3]Meinberg Standard-Telegram</a> , SAT, Uni Erlangen (NTP), SPA, NMEA0183 (RMC), COMPUTIME or <a href="#">[4]capture-telegramm</a>
<b>Unmodulated time code output</b>	DCLS, TTL into 50 Ohm via female BNC connector, active high
<b>Modulated time code output</b>	IRIG AM sine wave signal via female BNC connector: 3Vpp (MARK), 1Vpp (SPACE) into 50 Ohm
<b>Generated time codes</b>	IRIG B002: 100pps, DCLS signal, no carrier, BCD time of year IRIG B122: 100pps, AM sine wave signal, 1 kHz carrier, BCD time of year IRIG B003: 100pps, DCLS signal, no carrier, BCD time of year, SBS time of day IRIG B123: 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, SBS time of day IEEE1344: Code according to IEEE1344-1995, 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, SBS time of day, IEEE1344 expansion for date, time zone, daylight saving and leap second in Control Funktionen Segment AFNOR: Code according to NFS-87500, 100pps, AM sine wave signal, 1kHz carrier, BCD time of year, complete date, SBS time of day

<b>Alarm output</b>	Synchronous state of the module, relay output (changeover contact)
<b>Network Interface</b>	4 x 10/100 MBit with RJ45
<b>Power supply</b>	85-264VAC (50/60Hz)
<b>Universal Serial Bus (USB) Ports</b>	1x USB Port in front panel: <ul style="list-style-type: none"> <li>- install firmware upgrades</li> <li>- backup and restore configuration files</li> <li>- copy security keys</li> <li>- lock/unlock front keys</li> </ul>
<b>Supported Time String Formats</b>	Meinberg Standard Timestring, Uni Erlangen Timestring, SYSPLEX Timer, NMEA, Computime, ABB-SPA, SAT, Arbiter
<b>Single-Board-Computer</b>	i386 compatible 500Mhz CPU, 256 MB RAM
<b>Operating System of the SBC</b>	Linux with nano kernel (incl. PPSkit)
<b>Network protocols OSI Layer 4 (transport layer)</b>	TCP, UDP
<b>Network protocols OSI Layer 7 (application layer)</b>	TELNET, FTP, SSH (incl. SFTP, SCP), HTTP, HTTPS, SYSLOG, SNMP
<b>Internet Protocol (IP)</b>	IP v4, IP v6
<b>Network Autoconfiguration Support</b>	IPv4: Dynamic Host Configuration Protocol - DHCP (RFC 2131) IPv6: Autoconfiguration Networking - AUTOCONF
<b>Network Time Protocol (NTP)</b>	NTP v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4 (no RFC) SNTP v3 (RFC 1769), SNTP v4 (RFC 2030) MD5 Authentication and Autokey Key Management
<b>Time Protocol (TIME)</b>	Time Protocol (RFC 868)
<b>Daytime Protocol (DAYTIME)</b>	Daytime Protocol (RFC 867)
<b>IEC 61850</b>	Synchronization of IEC 61850 compliant devices by using SNTP
<b>Hypertext Transfer Protocol (HTTP)</b>	HTTP/HTTPS (RC 2616)
<b>Secure Shell (SSH)</b>	SSH v1.3, SSH v1.5, SSH v2 (OpenSSH)
<b>Telnet</b>	Telnet (RFC 854-RFC 861)
<b>Simple Network Management Protocol (SNMP)</b>	SNMPv1 (RFC 1157), SNMPv2c (RFC 1901-1908), SNMP v3 (RFC 3411-3418)

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<b>Power consumption</b>	25W
<b>Form Factor</b>	Three different variants are available, standard version is: 19" module case, height: 44.5mm (1U), width: 483mm (84HP), depth: 350mm (Pic. middle) optional available: /TGP: 19" desktop case, height: 157mm (3U), width: 257mm (42HP), depth: 316mm (Pic. top) /BGT: 19" module case, height: 132mm (3U), width: 483mm (84HP), depth: 260mm (Pic. bottom)
<b>Ambient temperature</b>	0 ... 50°C / 32 ... 122°F
<b>Humidity</b>	Max. 85%
<b>Scope of supply</b>	Time Server, power cable, printed Quick-Start manual (detailed reference manual is stored as a PDF file inside the unit and can be downloaded, read and printed with a webbrowser)
<b>Technical Support</b>	Meinberg offers free lifetime technical support via telephone or e-mail.
<b>Warranty</b>	Three-Year Warranty
<b>Firmware Updates</b>	Firmware is field-upgradeable, updates can be installed directly at the unit or via a remote network connection. Software updates are provided free of charge, for the lifetime of your Meinberg product.
<b>RoHS-Status of the product</b>	This product is fully RoHS compliant
<b>WEEE status of the product</b>	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. 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.
<b>Options and Accessories</b>	Optional add-ons and accessories: [5] <a href="#">Product Options</a>
<b>Additional Information</b>	Additional information about the Meinberg LANTIME family of NTP time servers and other LANTIME models can be found on the [6] <a href="#">LANTIME NTP Time Server Family Page</a>

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#### Manual

The english manual is available as a PDF file: [7][Download \(PDF\)](#)

#### Links:

- [1] <http://www.meinberg.de/cgi-bin/main.cgi>
- [2] <http://www.meinberg.de/english/products/./specs/gpsopt.htm>
- [3] <http://www.meinberg.de/english/products/./specs/timestr.htm>
- [4] <http://www.meinberg.de/english/products/./specs/capstr.htm>
- [5] <http://www.meinberg.de/english/products/./lantime-m600-mrs-options.htm>
- [6] <http://www.meinberg.de/english/products/./ntp-time-server.htm>
- [7] [http://www.meinberg.de/download/docs/manuals/english/m600\\_mrs.pdf](http://www.meinberg.de/download/docs/manuals/english/m600_mrs.pdf)