

# LANTIME M320



## Product Highlights

- | A powerful Stratum 1 NTP server capable of processing up to 25,000 requests per second
- | Compact 1U chassis, specially constructed for installation in a 19" rack
- | Engineered to order with a selection of reference receiver module options (e.g., GNSS, DCF77) and specified signal outputs for your application needs

## High-Performance Time Server for Time & Frequency Synchronization

The LANTIME M320 is designed by Meinberg to offer superior NTP server performance and high-accuracy time code output. Constructed to order with an integrated receiver clock specially engineered for optimum synchronization performance, this model features an "TCXO" type oscillator as standard. For superior holdover performance during GPS signal loss you can choose an "OCXO" type oscillator (OCXO-SQ, -HQ or -DHQ).

Meinberg's custom Linux-based LANTIME Operating System (LTOS), a slim & secure OS developed specially for the needs of a time server, powers the LANTIME M320 under the hood, providing access to all the security, network, and monitoring features that you could ever need from an enterprise-grade synchronization appliance.

The powerful Web UI enables you to quickly and easily configure and monitor your LANTIME device, while the CLI provides power users with unparalleled flexibility and efficiency. The comprehensive LTOS REST API provides a complete toolset for your network orchestration and automation needs, and SNMP support allows you to integrate your Meinberg systems into your existing network management system.

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## Basic System Specifications

<b>Processor</b>	Intel Atom E3805 dual-core SoM (1.33 GHz, 1 MB L2 cache, 3 W TDP)
<b>Operating System</b>	Custom LANTIME Operating System Firmware (LTOS) based on Linux 4.x LTS kernel
<b>Main Memory</b>	2 GB DDR3L onboard
<b>Flash Disk</b>	4 GB eMMC Flash

## Monitoring & Alarms

<b>Supported Protocols</b>	SNMP v1, SNMP v2, SNMP v3
<b>Notification Channels</b>	Email (SMTP), syslog
<b>Log Access</b>	Logs can be viewed and downloaded in the Web Interface, downloaded via the FTP service, or accessed via the command line interface

## NTP Support

<b>NTP Protocols</b>	NTP v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4 (RFC 5905), SNTP v3 (RFC 1769), SNTP v4 (RFC 2030)
<b>Security Features</b>	Symmetric key-based authentication using MD5, SHA-1, or AES-128-CMAC hashes NTP v4 Autokey (private/public key pairs) NTS encryption (RFC 8915) for NTP v4 in unicast client mode
<b>Performance</b>	Up to 25,000 NTP requests per second

## Management Interfaces

<b>Network</b>	Web Interface (HTTP/HTTPS TLS v1.3) SSH v2 (command line interface) Telnet (command line interface) REST API (HTTP/HTTPS TLS v1.3)
<b>Serial Console</b>	9-pin D-Sub RS-232 connector for serial terminal access
<b>Local</b>	Front display & function keys

## Operating Specifications

<b>Acoustic Noise Emissions</b>	0 dB(A)
<b>Operating Temperature</b>	0 °C to 50 °C (32 °F to 122 °F)
<b>Storage Temperature</b>	-20 °C to 70 °C (-4 °F to 158 °F)
<b>Relative Humidity</b>	Max. 95 % at 40 °C (104 °F), non- condensing
<b>Operating Altitude</b>	Max 4,000 m / 13,123 ft (above sea level)

## Accessories Included

- | Two-part power cable (5-pin MSTB to IEC 60320 C14 cable, IEC 60320 C13 cable to local mains plug) for connection to AC power source or 5-pin MSTB connector for assembly of a suitable power cable for DC power sources.
  - | Printed setup guide explaining the basic setup process and antenna installation.
  - | Models with a GPS or GNS-UC clock receiver include a Meinberg GPSANTv2 antenna for outdoor installation, a mounting kit containing all the accessories required to mount the antenna on a pole or wall, and a 20 m (65.6 ft) RG58 coaxial cable with pre-fitted connectors as standard\*.
  - | Models with a GNS or GNM clock receiver include a Meinberg GNMANTv2 antenna for outdoor installation, a mounting kit containing all the accessories required to mount the antenna on a pole or wall, and a 20 m (65.6 ft) Speedfoam 240HFJ coaxial cable with pre-fitted connectors as standard\*.
  - | Models with a PZF clock receiver include a Meinberg AW02 long-wave antenna, a mounting kit for outdoor installation, and a 10 m (32.8 ft) RG58 coaxial cable with pre-fitted connectors as standard\*.
  - | A rackmount kit for installation in a standard 19" rack.
- \* Meinberg also offers customized antenna cables to accommodate your specific installation requirements. Please reach out to your Meinberg Sales Representative for more information.

## Support & Compliance

<b>Technical Support</b>	Free lifetime support via telephone and email, including firmware updates.
<b>Warranty</b>	Three-year warranty, extendable upon request
<b>Firmware Updates</b>	Firmware is field-upgradable; updates can be installed from a connected USB storage medium, via the Web Interface (upload via a web browser), or via the CLI (download from a server). The LANTIME Operating System Firmware LTOS allows you to install multiple firmware versions onto the device concurrently and select which one should be used when the system starts.
<b>Conformity Declarations</b>	CE, UKCA
<b>RoHS Compliance</b>	The product is fully RoHS-compliant.
<b>WEEE Status</b>	The purchase of this product is considered to be a “B2B” transaction (non-household product) for the purposes of the European Union Waste of Electrical and Electronic Equipment Directive; the product falls under Category 6, “Small IT and Telecommunications Equipment”. For disposal, it must be returned to the manufacturer to ensure WEEE compliance. Any transportation expenses for returning this product (at end-of-life) must be covered by the end user, while Meinberg will cover the costs for the waste disposal itself.

## Available Receiver Types

	Description	Recommended Cable	Input Specifications
<b>GPS</b>	12-channel L1 C/A code receiver for reception of signals from the GPS satellite constellation. Requires a Meinberg GPSANTv2 antenna (included with system as standard).	RG58 (max. length 300 m) RG213 (max. length 700 m) H2010 Ultraflex (max. length 1100 m)	Connector Type: BNC or Type-N Termination Impedance: 50 $\Omega$ Power Output: 15 V, 100 mA (for powering antenna) Input Signal: 35.4 MHz intermediate frequency
<b>GNS-UC</b>	72-channel receiver for reception of signals from the GPS (L1 C/A code) and Galileo (E1 B/C) satellite constellations. Requires a Meinberg GPSANTv2 antenna (included with system as standard).	RG58 (max. length 300 m) RG213 (max. length 700 m) H2010 Ultraflex (max. length 1100 m)	Connector Type: BNC or Type-N Termination Impedance: 50 $\Omega$ Power Output: 15 V, 100 mA (for powering antenna) Input Signal: 35.4 MHz intermediate frequency
<b>GNS</b>	72-channel receiver for reception of signals from the GPS (L1), Galileo (E1 B/C), BeiDou (B1I), and GLONASS (L1OF) satellite constellations. Meinberg GNMANTv2 antenna recommended (included with system as standard).	Speedfoam 240HFJ (max. length per segment 70 m, antenna line extendable with Meinberg INA-20 and INA-30 inline amplifiers)	Connector Type: SMA Termination Impedance: 50 $\Omega$ Power Output: 5 V, 120 mA (for powering antenna) Input Signal: Native GNSS signal
<b>GNM</b>	184-channel multi-band, multi-GNSS receiver for reception of signals from the GPS (L1 C/A and L2 bands), Galileo (E1-B/C and E5b bands), BeiDou (B1I and B2I bands), and GLONASS (L1OF and L2OF bands) constellations. Requires a Meinberg GNMANTv2 antenna (included with system as standard).	Speedfoam 240HFJ (max. length per segment 70 m, antenna line extendable with Meinberg INA-20 and INA-30 inline amplifiers)	Connector Type: SMA Termination Impedance: 50 $\Omega$ Power Output: 5 V, 120 mA (for powering antenna) Input Signal: Native GNSS signal
<b>TCR</b>	Timecode receiver for reception of DC level shift (pulse-width modulated) or AM (amplitude-modulated) timecode signals in a wide variety of standardized formats.	RG58 (max. length dependent on operating conditions such as termination impedance and signal voltage)	Connector Type : BNC Typical Input Voltage (DC Level Shift): 5 V DC Input Voltage Range (AM): 800 mV <sub>pp</sub> – 8 V <sub>pp</sub>
<b>PZF</b>	Long-wave receiver with quadrature demodulator for reception of signals from the DCF77 long-wave transmitter in Mainflingen, Germany. Requires a Meinberg AW02 or AI01 antenna.	RG58 (max. length 300 m)	Reception frequency: 77.5 kHz Termination Impedance: 50 $\Omega$ Power Output: 5 V (for powering antenna) Input Signal: 77.5 kHz signal with DCF77 encoding

# Oscillator Specifications

## “TCXO” Type Oscillator

The LANTIME M320 is shipped as standard with a “TCXO” (temperature-controlled crystal oscillator), which provides excellent holdover performance if your server loses synchronization with its upstream reference for any reason:

PPS Accuracy	< ±100 ns
Short-Term Frequency Stability at 10 MHz	$\pm 2 \times 10^{-9}$ Hz where t = 1 second
10 MHz Frequency Accuracy (GNSS-Synchronized, 24 Hours)	$\pm 1 \times 10^{-11}$ Hz ( $\pm 0.1$ mHz)
10 MHz Frequency Accuracy (after 24 Hours in Holdover)	$\pm 1 \times 10^{-7}$ Hz ( $\pm 1$ Hz)
10 MHz Frequency Accuracy (after 1 Year in Holdover)	$\pm 1 \times 10^{-6}$ Hz ( $\pm 10$ Hz)
Phase Drift (after 24 Hours in Holdover)*	± 4.3 ms
Phase Drift (after 7 Days in Holdover)*	± 128 ms
Phase Drift (after 30 Days in Holdover)*	± 1.1 s
Phase Drift (after 1 Year in Holdover)*	± 16 s
Phase Noise	- 1 Hz: < -60 dBc/Hz - 10 Hz: < -90 dBc/Hz - 100 Hz: < -120 dBc/Hz - 1 kHz: < -130 dBc/Hz
Temperature-Dependent Drift	$\pm 1 \times 10^{-6}$ (-20 °C to 70 °C, -4 °F to 158 °F)

\* Full holdover performance requires the oscillator to have been in operation for at least 30 days and the system GNSS-synchronized for 24 hours previously. One-year values are based on mathematical extrapolation and not on physical measurements.

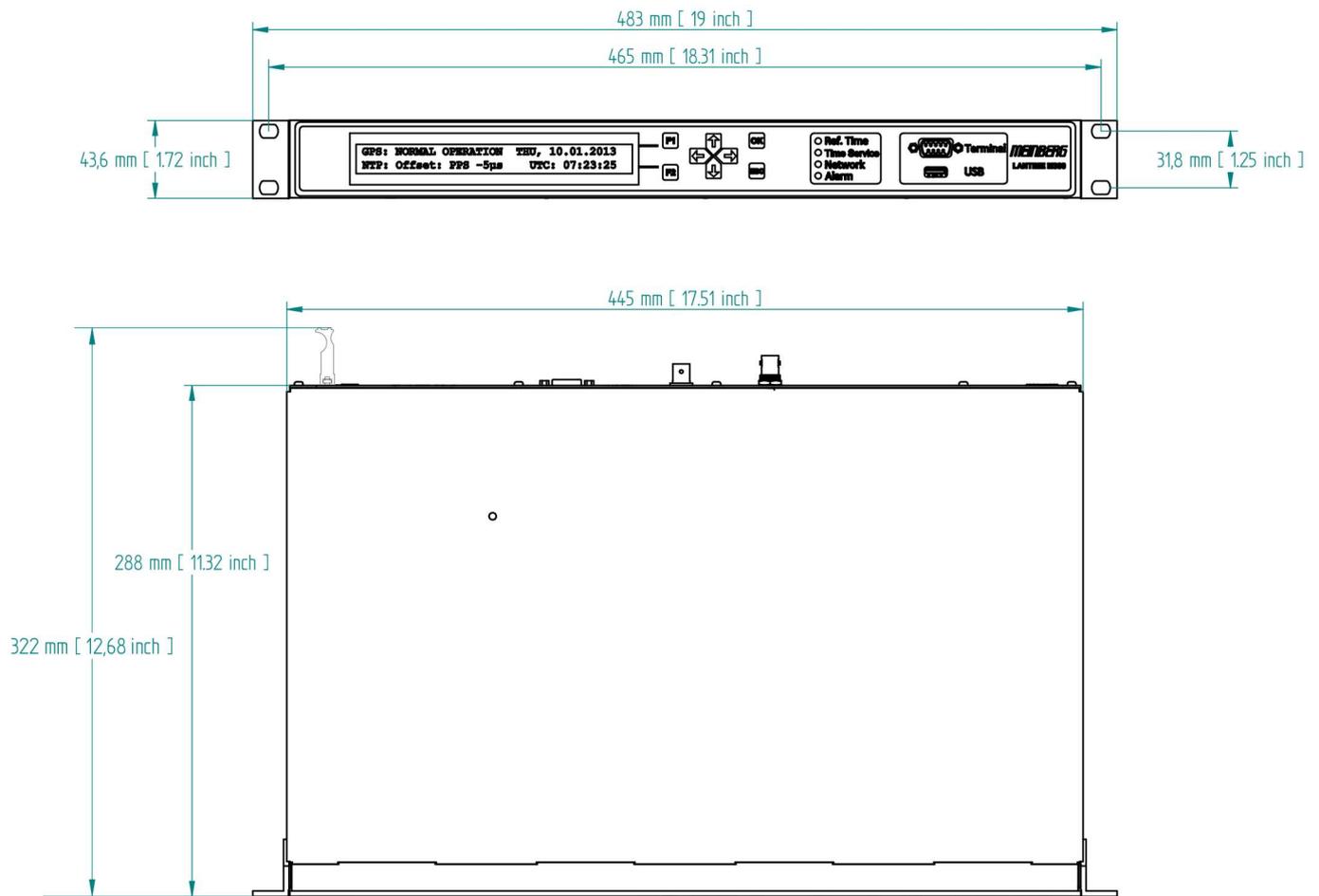
## Oscillator Options

The LANTIME M320 may also be shipped on request with a more powerful holdover solution; the options available and a comparison of their performance relative to the TCXO oscillator are listed below:

Type	Phase Drift after 24 Hours in Holdover*	Phase Drift after 1 Year in Holdover*
TCXO	± 4.3 ms	± 16 s
OCXO SQ	± 65 μs	± 4.7 s
OCXO HQ	± 10 μs	± 788 ms
OCXO DHQ	± 4.5 μs	± 158 ms

\* Full holdover performance requires the oscillator to have been in operation for at least 30 days and the system GNSS-synchronized for 24 hours previously. One-year values are based on mathematical extrapolation and not on physical measurements.

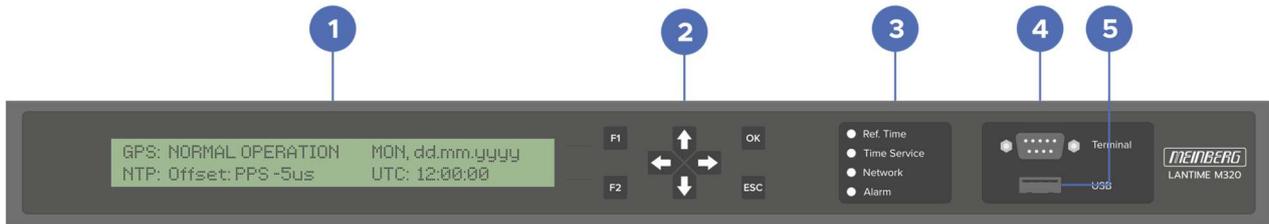
# LANTIME M320 Chassis



## Chassis Specifications

<b>Form Factor</b>	1U / 66 HP
<b>Dimensions (Only Chassis)</b> [W x H x D]	445 mm x 43.6 mm x 288 mm (17.53 in x 1.717 in x 11.34 in)
<b>Dimensions (including Connectors &amp; Handles)</b> [W x H x D]	445 mm x 43.6 mm x 322 mm (17.53 in x 1.717 in x 12.68 in)
<b>Material</b>	Sheet steel
<b>IP Rating</b>	IP30

# LANTIME M320 Display View



## 1 LCD Panel

- | 2 x 40 character backlit display for clarity even in low-light conditions.
- | Status display (as shown above) indicates the status of the receiver clock, the current date and time of the clock, and the current offset of the NTP server.
- | Provides status readouts and allows basic configuration processes to be performed using the front-panel function keys.
- | Shows alarms and alerts requiring user intervention.

## 2 Function Keys

“F1”, “F2”, “OK”, “ESC”, and arrow keys allow for local navigation of configuration menus and status readouts to enable many configuration processes to be performed directly from the device during installation.

## 3 Status LEDs

<b>Ref. Time (R)</b>	Indicates whether the reference clock is providing a valid timebase.
<b>Time Service (T)</b>	If lit, the internal NTP service of the server is synchronized with the reference clock.
<b>Network (N)</b>	Shows whether there is a valid link-up on the network interface.
<b>Alarm (A)</b>	Advises of a general system fault that requires attention.

## 4 Serial Console Port (Terminal Access)

The serial console port is a standard RS-232 interface with a D-Sub 9 male connector that can be used to establish a direct serial connection (38400 baud, 8N1 framing) between the LANTIME M320 and any device running suitable terminal software (e.g., a laptop) for direct command line access. The connection can be established using any suitable RS-232 cable or adapter (e.g., USB to D-Sub 9, Yost wiring standard).

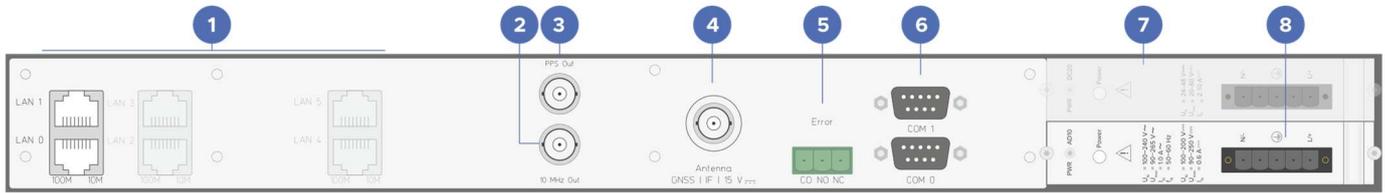
## 5 USB Interface

This USB interface can be used for:

- | saving a backup of the LTOS configuration to an external storage medium (such as a USB flash drive) and restoring this backup (or copying a standard configuration between multiple LANTIME servers)
- | creating a backup of logfiles (such as SyncMon logs)
- | loading and saving cryptographic certificates
- | creating a physical USB “security key” that can be used to enable and disable the local function keys on the device

# LANTIME M320 Connector View

The illustration below represents the configuration **LANTIME M320/GPS/AD10-DC20**. The actual appearance and functionality of different configurations may vary depending on the installed clock-receiver and specified I/O options.



## 1 Network Interfaces

<b>Network Interfaces</b>	2x RJ45 10/100-BASE-T interface (Fast Ethernet) with link status LEDs Additional Ethernet Interface configurations available as an option
<b>Network Protocols</b>	IPv4 (with DHCP support), IPv6 (with DHCPv6 and Autoconf support)
<b>Network Services</b>	HTTP(S) for web interface and REST API access FTP for access to log files and uploading firmware updates Telnet and SSH for command line access SNMP for monitoring
<b>Other Networking Features</b>	Full Parallel Redundancy Protocol (PRP) support as Doubly Attached Node Support for network link aggregation (“bonding”) with multiple modes for load balancing or link redundancy

## 2 10 MHz Output

<b>Connector Type</b>	BNC, female, for shielded coaxial cable
<b>Output Signal</b>	10 MHz frequency
<b>Signal Level</b>	TTL pulse, 2.5 V <sub>p</sub> with 50 Ω load

## 3 Pulse-per-Second Output

<b>Connector Type</b>	BNC, female (for shielded coaxial cable)
<b>Output Signal</b>	Pulse-per-second (PPS)
<b>Signal Level</b>	TTL pulse, active high, 2.5 V <sub>p</sub> with 50 Ω load
<b>Pulse Width</b>	200 ms

## 4 GPS Antenna Input

The specifications of the antenna and its connector are dependent on the selected clock receiver. This example features a GPS receiver.

<b>Antenna</b>	GPSANTv2*
<b>Connector Type</b>	Bayonet Neill-Concelman (BNC) connector for coaxial cable
<b>Input Impedance</b>	50 Ω
<b>Input Signal</b>	35.4 MHz intermediate frequency
<b>Power Supply</b>	15 V, 100 mA to antenna via antenna cable
<b>Supported Cable Length</b>	Max. 300 m (RG 58) Max. 700 m (RG 213) Max. 1100 m (H2010 Ultraflex)

\* For more detailed information on the GPSANTv2 antenna, request a copy of the Meinberg GPSANTv2 data sheet from your Meinberg Sales Representative, or download it directly from the Meinberg website:

<http://mbg.link/gpsant>

## 5 Error Relay

<b>Connector Type</b>	3-pin MSTB
<b>Max. Switching Voltage</b>	125 V DC 140 V AC
<b>Max. Switching Current</b>	1 A
<b>Max. Switching Power</b>	30 W DC 60 VA AC
<b>UL/CSA Switching Power</b>	0.46 A / 140 V AC 0.46 A / 65 V DC 1 A / 30 V DC
<b>Response Time</b>	Approx. 2 ms
<b>Relay States</b>	Normal Operation: CO & NO connected Error State: CO & NC connected

## 6 Time String Outputs (RS-232)

<b>Connector Type</b>	D-Sub 9-pin
<b>Data Transmission Method</b>	Serial
<b>Baud Rate</b>	19200 ( <i>Default</i> ), 9600, 4800, 2400, 1200, 600, 300
<b>Framing</b>	7N2, 7E1, 7E2, 8N1 ( <i>Default</i> ), 8N2, 8E1, 7O1, 7O2, 8O1, 8E2
<b>Output String Support</b>	Meinberg Standard ( <i>Default</i> ), Meinberg Capture, Meinberg GPS, SAT, NMEA RMC, NMEA GGA, NMEA ZDA, NMEA RMC GGA ( <i>RMC followed by GGA</i> ), NMEA GGA ZDA ( <i>GGA followed by ZDA</i> ), Uni Erlangen, Computime, Sysplex 1, SPA, RACAL, ION, ION Blanked, IRIG-J-1, 6021, Freelance
<b>Pin Assignment</b>	Pin 2: TxD Pin 3: RxD Pin 5: GND

## 7 AD10 Power Supply

<b>Connector Type</b>	5-pin MSTB female connector
<b>Nominal Voltage Range (<math>U_N</math>)</b>	100 V – 240 V AC / 100 V – 200 V DC
<b>Rated Voltage Range (<math>U_{max}</math>)</b>	90 V – 265 V AC / 90 V – 250 V DC
<b>Nominal Current (<math>I_N</math>)</b>	1.0 A (AC) / 0.6 A (DC)
<b>Nominal Frequencies (<math>f_N</math>)</b>	50 Hz – 60 Hz
<b>Rated Frequency Range (<math>f_{max}</math>)</b>	47 Hz – 63 Hz
<b>Maximum Power (<math>P_{max}</math>)</b>	50 W
<b>Max. Thermal Output (<math>E_{therm}</math>)</b>	180.00 kJ/h (170.61 BTU/h)

## 8 DC20 Power Supply

<b>Connector Type</b>	5-pin MSTB female connector
<b>Nominal Voltage Range (<math>U_N</math>)</b>	24 V – 48 V DC
<b>Rated Voltage Range (<math>U_{max}</math>)</b>	20 V – 60 V DC
<b>Nominal Current (<math>I_N</math>)</b>	2.1 A DC
<b>Maximum Power (<math>P_{max}</math>)</b>	50 W
<b>Max. Thermal Output (<math>E_{therm}</math>)</b>	180.00 kJ/h (170.61 BTU/h)