



## LANTIME M1000

The Meinberg LANTIME M1000 has been designed to fulfill the synchronization requirements of modern power grid networks. The modular approach allows to configure it to offer a mix of required synchronization outputs for different devices like IEDs and SCADA systems. Selecting a combination of IRIG timecode outputs, pulses and frequencies required by some substation components and being able to add NTP/SNTP as well as PTP network synchronization interfaces makes the IMS platform (Intelligent Modular System) a perfect choice for substation automation and smart grid applications like synchrophasors and event recording. The 1U rackmount LANTIME M1000 can play different roles, depending on its configuration and module selection. By supporting Meinberg's IRSA (Intelligent Reference Switching Algorithm) technology, the M1000 can use GPS, GLONASS, 1PPS or IRIG time codes as its synchronization sources but can also accept PTP and even NTP in a user configurable priority.

The PTP implementation supports the PTP default profile (IEEE 1588-Annex J) as well as several power profile versions, including IEEE C37.238-2011 and its revised version, which is expected to be published soon. The Utility profile as standardized in IEC 62439-3 Annex B is also supported. If desired, a second TSU module can be used to synchronize the LANTIME M1000 with a remote Telecom Profile Grandmaster over a Wide Area Network link. The performance of the TSU module allows to synchronize hundreds of IEDs or other PTP slaves when operating as a Power Profile or Utility Profile Grandmaster Clock.

For (S)NTP-based synchronization, the CPU and the TSU module network interfaces of the LANTIME M1000 can be configured to act as a NTP server. The TSU Carrier Grade NTP mode offers a 10 ns time stamp accuracy, and serves up to 12000 NTP requests per second while the Software NTP service of the CPU module supports up to 10000 requests per second with sub-millisecond accuracy.

The described M1000 sample configuration provides various time code, pulse and frequency outputs on both electrical and optical interfaces.

The modular approach of the IMS platform allows field-replacement and hot-swap capability for IO modules and power supplies. This concept ensures future-proofness by allowing to add or replace modules when new technologies or interfaces are required and makes this product one of the most scalable and flexible synchronization solutions on the market.

### Key Features:

- GNSS (GPS and/or GLONASS) synchronized Network Time Server
- IEEE 1588 Grandmaster (multi-profile including IEEE 1588-2008, IEEE C37.238-2011, IEC 61588 and IEC 62439-3 Annex B)
- 10/100/1000 GBit PTP Interfaces (SFP/RJ45)
- (S)NTP Time server with HW time stamping
- IRIG and AFNOR Time Codes (DCLS and AM) In/Out
- 1PPS In/Out
- PTP and NTP Input
- DC and AC power supplies
- Electrical and Fiber Optic Interfaces for various pulses and frequencies
- Web GUI, CLI, SSH, SNMP, RADIUS, TACACS+



### Interfaces

- 2 Power Inputs: 100-240 V AC, 50-60 Hz; 100-240 V DC 20-72 V DC - 5pin DFK (option)
- 1 GNSS Input: BNC for Meinberg GPS antenna/converter SMA for GPS/GLONASS L1 (option)
- 1 Fast Ethernet: 10/100 BASE-T RJ45: Management and net-based alarms NTP Server (10.000 req/sec) NTP Input
- 4 GBit Ethernet: 10/100/1000 BASE-T RJ45: NTP Server and Management
- 1 GBit Ethernet: 100/1000 BASE-T (RJ45/SFP Combo Port) PTP/SyncE (Input or Output), Hardware NTP Server (12.000 req/sec)
- 4 Fixed Outputs: BNC 50 Ohm PPS, 10 MHz, TC DCLS, TC AM
- 4 Configurable Outputs: 850nm FO outputs, ST connectors Progr. Pulses, multi data formats timestrings software selectable
- 1 ToD Output: RS232 DS9 connector, serial time strings

### IMS - Modules

#### CPU-C051F - NTP and Management Module

- Processor: AMD Geode™ LX 800 (500 MHz, 128 KB L2 cache, 3.6 W) 10000 req/s
- Main Memory: onboard 256 MByte
- Cache Memory: 16 KB 2nd Level Cache
- Flash Disk: 1 GB
- Configuration: Web GUI, CLI, SNMP,RADIUS,TACACS+

#### PWR-AD10 - Power Supply

- Nominal Voltage: 100-240 V AC, 50-60 Hz; 100-240 V DC
- Voltage:Range: AC: 90-265 V, 47-63 Hz; DC: 90-250 V
- Output Current: max. 10.0 A, min. 0.15 A
- Fuse: internal, T2.5 A / 250 V
- Protective Class: Class 1
- Power Connector: 5pin DFK
- LEDs: green, diameter 5mm, on if output OK
- Hotplug: yes

#### BPE-1000 - Backplane Port Expander (Frontend / Backend)

- Output Signals: fixed: 4 x female BNC connector PPS, 10 MHz, IRIG DCLS, IRIG AM

#### CPE-5000 - Configurable Port Expander (Frontend / Backend)

- Selectable Output Signals: Programable Pulses (Cyclic Pulse, Timer, PPS, PPM, PPH, DCF77 Marks, TimeSync, DCLS Time Code, Freq.Synth)
- Outputs: 850nm FO output, ST connectors (GI 50/125µm or GI 62,5/125µm gradient fibre)

### TSU-GbE

- IEEE1588 / SyncE / NTP Time Stamp Unit with Gigabit Ethernet
- CPU: 1 GHz Dual Core
- Connector Types: Combo Port SFP/RJ45
- Link Speed: 100/1000 Mbit (Copper), 1Gbit (SFP)
- Accuracy: 10 ns time stamp resolution
- Profiles: IEEE 1588v2 Default Profile IEEE C.37.238 Power Profile IEC 61588, IEC 62439-3 Annex B) ITU-T G.8265.1 Telecom Frequency Profile ITU-T G.8275.1 Telecom Phase/Time Profile SMPTE ST 2059-2 Broadcast Profile
- PTP Modes: Layer 2, Layer 3 End-To-End, Peer-To-Peer Delay Mechanisms
- NTP: Carrier Grade NTP Server mode with 10 ns time stamp accuracy
- SyncE: ITU-T G.8261, G.8262 and G.8264 (ESMC) Master and Slave
- Clock Modes: 1-Step and 2-Step in Master or Slave Mode
- Protocols: IPv4, IPv6, DSCP, VLAN (802.1q)

### GPS180 - 12 channel GPS C/A-code receiver

- Time/Phase Accuracy: compliant to ITU-T G.8272 Primary Reference Time Clock (PRTC) < ±100 ns (TCXO, OCXO LQ) < ±50 ns (OCXO-SQ, -MQ, -HQ, -DHQ)
- Frequency Accuracy: ITU-T G.811 (in GPS locked mode)
- Antenna Cable: shielded coax
- Cable length: max. 300 m to RG58, max. 700 m to RG213
- Antenna Connector: BNC female
- Input GPS: Antenna circuit, 1000 V DC insulated
- Local Oscillator to Converter Frequency: 10 MHz<sup>1</sup>
- First IF Frequency: 35.4 MHz<sup>1</sup>  
1) these frequencies are transferred via the antenna cable.
- Power Requirements: 15 V, 100 mA (via antenna cable)
- Holdover Performance:

	Phase + - 1.5 µs	Phase 5 µs	Phase 10 µs	Freq. 16 ppb
OCXO-HQ	6 h	10 h	16 h	45 days
OCXO-DHQ	14 h	25 h	36 h	6 months

### ACM - Active Cooling Module

The Active Cooling Module allows the installation of the M1000 safely within the temperature specification. The ACM is easily field-replaceable and allows for a hot-plug replacement without the need to power down the unit.

### System

- Form Factor: 19" metal chassis, 1 U/84 HP (483 mm wide x 43 mm high x 285 mm deep)
- Ambient Temperature: 0 ... 50°C / 32 ... 122°F
- Humidity: Max. 85%