LANTIME M1000

The Meinberg LANTIME M1000 has been designed to fulfill the synchronization requirements of modern 4G/LTE networks. It is capable to act as a Primary Reference Time Clock (PRTC) and, because of its unmatched flexibility, can be deployed in different scenarios. The modularity of the IMS platform (Intelligent Modular System) allows the M1000 to be configured for all areas of a mobile backhaul network: in the core, metro or access levels.

Depending on the installed modules and the selected synchronization sources, the 1U rackmount LANTIME M1000 can play different roles. By supporting multiple input sources utilizing Meinberg's IRSA (Intelligent Reference Switching Algorithm) technology, the M1000 accepts GPS, GLONASS, PTP, NTP, SyncE, 1PPS or E1/T1 as possible synchronization inputs to be able to act as an Edge Grandmaster Clock. IRSA is useful to bridge potential GNSS outages or, if desired, completely avoid depending on GPS/GLONASS availability. A highly stable oscillator ensures a holdover period of several hours or days depending on the target application even if no synchronzation source is available anymore. Using an external PRC allows to extend the holdover capabilities to whatever level is required at a certain point in the network.

The PTP implementation support both ITU-T profiles, ITU-T G.8265.1 for frequency and ITU-T G.8275.1 for frequency and phase. This allows to provide accurate frequency and phase synchronization over packet networks to all network elements requiring synchronization, including 2G/3G/4G base stations as well as LTE advanced networks. The M1000 can act as a Telecom Grandmaster for hundreds of clients.

For NTP-based synchronization, each of the TSU module network interfaces of the LANTIME M1000 can be configured to act as a carrier grade NTP server with 10 ns time stamp accuracy, serving up to 12000 NTP requests per second on each port.

This M1000 sample configuration supports additionally up to 8 pulse and frequency outputs like PPS, 10 MHz as well as software selectable T1 or E1 outputs to synchronize Telecom equipment or measurement devices.

The modular approach of the IMS platform allows field-replacement and hot-swap capabilities for IO modules and power supplies. This concept ensures future-proofness and expandability 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 PRTC (compliant to ITU-T G.8272)
- IEEE 1588 Grandmaster (multi-profile, incl. ITU-T G.8275.1 and G.8265.1)
- Synchronous Ethernet In/Out
- GBit PTP Interfaces (SFP/RJ45)
- Carrier Grade NTP Time server with HW time stamping
- E1/T1 BITS and Clock In/Out (ITU-T G.703)
- 1PPS In/Out
- 10 MHz In/Out
- PTP and NTP Input
- IEEE 802.1Q VLAN Tagging
- DSCP and IEEE 802.3p QoS
- Web GUI, CLI, SNMP, RADIUS, TACACS+
- Redundant DC and AC power supplies

Interfaces

2	Power Inputs:	20-72 V DC 5pin DFK 100-240 V AC/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
1	GBit Ethernet:	100/1000 BASE-T (RJ45/SFP Combo Port) PTP/SyncE (Input or Output), Hardware NTP Server (12.000 req/sec)
1	GBit Ethernet:	100/1000 BASE-T (RJ45/SFP Combo Port) PTP/SyncE (Output) Hardware NTP Server (12.000 req/sec)
1	PPS Input:	BNC 50 Ohm
2	Frequency Inputs:	BNC and RJ45 (20 Hz ... 10 MHz)
1	E1/T1 Input:	RJ45 BITS (framed), software selectable
4	GPIO Outputs:	BNC 50 Ohm (PPS, 10 MHz, 2048 kHz), software selectable
4	E1/T1 Outputs:	2 BNC (Clock) and 2 RJ45 (BITS/framed) E1 or T1, 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-DC20 - Power Supply

Nominal Voltage:	20-72 V DC
Output Power:	50 W (max.)
Fuse:	6 A (T) / 250 V
Protective Class:	Class 1
Power Connector:	5pin DFK
LEDs:	green, diameter 5mm, on if output OK
Hotplug:	yes

ESI - Telecom Synchronisation Reference Inputs

Reference Inputs:	PPS, E1 / T1 framed/unframed, variable frequencies

LIU-A2002 - Line Interface Unit

Clock:	T1 - 1.544 MHz, E1 - 2.048 MHz, G.703
BITS:	T1 - 1.544 MBit/s, E1 - 2.048 MBit/s, G.703

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 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:	Compliant to 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) < ±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[1]
First IF Frequency:	35.4 MHz[1] 1) these frequencys are transfered 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%