



# LANTIME M1000

Video, Audio and Live-IP Broadcasting Applications



## LANTIME M1000

Synchronization Solution for the Professional Audio/Video and Broadcasting Industry

The Professional Broadcasting Industry is currently evolving its studio infrastructures from traditional Video/Audio signal distribution like SDI for Video, AES for Audio and dedicated Genlock/Wordclock signals towards a full IP based production as described in the SMPTE suite of standards for Professional Media over IP Networks (SMPTE ST 2110). SMPTE ST 2110 is currently in final draft stage.

However, a live networked infrastructure environment with COTS switch equipment and live networked video devices has already been presented to the public in experimental case studies. Today it is already agreed that IEEE 1588 (PTP) will be the basis for synchronizing all clocks in a TV or radio studio. For the Audio-over-IP world, technologies like AES67 or RAVENNA already use PTP as their choice for time synchronization already.

The Meinberg LANTIME M1000 has been designed to enable coexistence and interoperability of traditional (Black-Burst, Tri-Level Sync, AES Word-Clock) and future (IEEE-1588 PTP) synchronization methods of professional Audio/Video equipment also in hybrid environments. It provides highly accurate time and frequency, derived from GNSS for legacy and IP-connected devices in parallel. The system offers redundancy, flexibility and the ability to swap cards, so that the user can have the desired configuration in one unit.

By supporting multiple input sources utilizing Meinberg's IRSA (Intelligent Reference Switching Algorithm) technology, the M1000 accepts GPS, GLONASS, Galileo, BeiDou, PTP, NTP, SyncE, 1PPS, IRIG Time Code or 10MHz as possible synchronization inputs.

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.

### IMS-SCG: Studio Clock Generator

The module generates various audio frequencies for studio applications.  
SCG-U: Four outputs with configurable word clock rates between 24Hz – 12.288MHz  
SCG-B: 25pin female connector, 4 x DARS, IEC 60958-4 format

### IMS-VSG: Video-Sync Generator

This module is a video signal reference for studio equipment. It generates configurable video signals in different formats to synchronize studio equipment (PAL with VITC Support / NTSC Blackburst, Tri-Level Sync, SD / HD V-, H-, Frame-Sync, DARS).

### IMS-LNO: Low Phase Noise 10MHz Generator

The IMS-LNO is a 10MHz generator card, which provides sine signals with low phase noise to 4 external outputs. The card has a microprocessor system, which monitors the output signals and generates status signals for the upper-level management system accordingly.

- High quality oscillator, locked to an external 10MHz signal.
- Four sine wave outputs with 7dBm or 12dBm output level
- Quartz Filter: Bandwidth 1 kHz

## Key Features:

- GNSS (GPS, GLONASS, Galileo, BeiDou) synchronized Master Clock
- IEEE 1588 Grandmaster (SMPTE ST 2059-2, AES67 Media Profile, ...)
- PTP and NTP Input
- GBit PTP Interfaces (SFP/RJ45)
- Synchronous Ethernet In/Out
- Carrier Grade NTP Time server with HW time stamping
- Video Formats: PAL (VITC Support), NTSC
- Video Signals: HD/SD Video Syncs (Tri-Level/Bi-Level Sync) H-Sync and V-Sync
- Audio Signals: Programmable word clock rates between 24Hz – 12.288MHz AES11-2003 (DARS)
- Web GUI, CLI, SNMP, RADIUS, TACACS+
- Redundant DC and AC power supplies



RAVENNA



SCG

Studio Clock Generator

VSG

Video Sync Generator

LNO

Low Noise 10MHz Sine Output Module



LANTIME IMS M1000 - Audio / Video - Configuration: CPU Network Management Module, LNO - Low Phase Noise 10MHz Generator, VSG Video-Sync Generator, GPS Receiver, SCG-U Studio Clock Generator, HPS-100 IEEE 1588 Time Stamp Unit (GRANDMASTER or SLAVE Mode), redundant AC Power Supplies



### Interfaces

- 2 Power Inputs: 100-240 V AC / 100-200 V DC, 5pin DFK
- 1 GNSS Input: BNC for Meinberg GPS antenna/converter
- 1 Fast Ethernet: 10/100 BASE-T RJ45:  
Management and net-based alarms  
NTP Server  
NTP Input
- 1 GBit Ethernet: 100/1000 BASE-T (RJ45/SFP Combo Port)  
PTP/SyncE (2 x Input or Output, 1 x Output),  
Hardware NTP Server (up to 400,000 req/sec)
- 4 Fixed Outputs: LNO - Low Noise 10MHz sine
- 4 Audio Signals: Word clock rates 24Hz - 12.288MHz
- 3 Video Signals: Tri-Level/Bi-Level Sync, HD/SD Syncs  
unbalanced, 300mV<sub>pp</sub> @ 75Ω, BNC female  
unbalanced, 2.5V TTL @ 75Ω, BNC female
- 1 Digital Audio Signal: DARS (AES3id via BNC 75Ω)
- 1 ToD Output: RS232 DS9 connector, serial time strings

### IMS - Modules

#### CPU-C05F1 - NTP and Management Module

- Processor: AMD Geode™ LX 800  
(500 MHz, 128 KB L2 cache, 3.6 W)  
6,000 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;  
100-200 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

#### VSG - Video Sync Generator

- SMPTE standards: PAL Blackburst with VITC Support (SMPTE12M-1/SMPTE ST309M)  
NTSC Blackburst  
720p/50Hz (SMPTE296M3)  
1080i/25Hz (SMPTE274M6)  
720p/59.94Hz (SMPTE296M1)  
1080i/29.97Hz (SMPTE274M7)  
V-, H-, Frame-Sync for HD and SD formats  
1x DARS (AES3id via BNC 75Ω)

#### SCG - Studio Clock Generator

- SCG-U: 4x BNC outputs with programmable word clock rates  
between 24Hz – 12.288MHz.
- SCG-B option: 25pin female connector, 4 x DARS, IEC 60958-4 format

#### LNO - 10MHz Low Noise Out Generator

- Sine wave outputs with 7dBm or 12dBm output level
- Quartz filter bandwidth 1 kHz

#### HPS-100 - 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: 8 ns time stamp resolution
- Profiles: IEEE 1588v2 Default Profile  
AES67 Media Profile  
SMPTE ST 2059-2 Broadcast Profile  
IEEE 1588v1 (Option for DANTE)  
Enterprise Profile  
IEEE C.37.238 Power Profile  
ITU-T G.8265.1 Telecom Frequency Profile  
ITU-T G.8275.1 Telecom Phase / Time Profile (full timing support)  
ITU-T G.8275.2 Telecom Phase / Time Profile (partial timing support)  
IEEE 802.1AS TSN/AVB Profile  
DOCSIS 3.1
- PTP Modes: Layer 2, Layer 3  
End-To-End, Peer-To-Peer Delay Mechanisms
- NTP: Carrier Grade NTP Server mode with  
8 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)
- Capacity: up to 2048 Unicast Clients  
more than 260,000 Delay Requests/sec

#### 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<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 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%

