LANTIME IMS M3000 - Video/Audio/Broadcasting Sample Configuration
Redundant Power Supplies, redundant Receiver Configuration (GPS and combined GPS/GLONASS Module), CPU Network Management Modul, IEEE 1588 & NTP Hardware Time Stamp Unit (SMPTE, AES67 profile, GRANDMASTER and SLAVE Mode), VSG Video Sync Module, SCG-U Studio Clock Generator and LNO 10MHz Low Noise Outputs

LANTIME M3000

Synchronization Solutions 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 M3000 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 satellites 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 M3000 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, NTSC
  Video Signals: HD/SD Video Syncs (Tri-Level/Bi-Level Sync) H-Sync and V-Sync
- Studio Sync: Programmable word clock rates between 24Hz – 12.288 MHz
- Web GUI, CLI, SNMP, RADIUS, TACACS+
- Redundant DC and AC power supplies

RAVENNA   SMPTE

SCG-U / SCG-B	VSG	LNO
Studio Clock Generator	Video Sync Generator	Low Noise 10MHz Sine Output Module

Interfaces

2	Power Inputs:	100-240 V AC / 100-200 V DC, 5pin DFK
2	GNSS Input:	BNC for Meinberg GPS antenna/converter SMA for GNSS L1
1	Fast Ethernet:	10/100 BASE-T RJ45: Management and net-based alarms NTP Server NTP Input
4	Fast Ethernet:	10/100/1000 BASE-T RJ45 (LNE-GbE)
3	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
8	Audio Signals:	Word clock rates 24Hz - 12.288MHz
8	Video Signals:	Tri-Level/Bi-Level Sync, HD/SD Syncs unbalanced, 300mV$_{PP}$ @ 75Ω, BNC female unbalanced, 2.5V TTL @ 75Ω, BNC female
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 2,048 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[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 Option

The Active Cooling Module allows the installation of the M3000 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, 3U/84 HP (483 mm wide x 132 mm high x 270 mm deep)
Ambient Temperature:	0 ... 50°C / 32 ... 122°F
Humidity:	Max. 85%