LANTIME M1000
Intelligent Modular Synchronization

The Ultra-Versatile Platform for Your Time and Frequency Synchronization Applications

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All IMS Modules will report their status to the M1000 CPU and are easily field-replaceable. The management CPU can automatically apply the configuration of a replaced card to a newly inserted replacement module. New or removed CLK and I/O modules will be recognized automatically.

### Power Supply Options

**IMS-PWR AD10:** 100-240 V AC/DC, 50 W
**IMS-PWR DC20:** 20-72 V DC, 50 W

- Power supply modules indicate operational status to CPU.
- Redundant configuration possible.
- All power supplies are operating in load sharing mode.

### Clock and Central Timing Modules

**IMS-GPS:** GPS C/A-code receiver (12 channels)
Antenna/Converter System (IF 35.4 MHz)
Max. Cable lengths: 300m (RG58), 700m (RG213)

**IMS-GLN:** Combined GPS/GLONASS receiver (32 channels)
Antenna: GPS/GLONASS L1
Max. Cable length: 100m (H155 low loss)

Accuracy of pulse outputs for IMS-GPS and IMS-GLN:
- ≤±100 ns to UTC (TCXO, OCXO LQ)
- ≤±50 ns to UTC (OCXO-SQ, -MQ, -HQ, -DHQ)

**IMS-PZF:** DCF77 Correlation Receiver
Accuracy of pulse outputs:
- ≤±50 µs to UTC

Redundant clock configuration possible (requires an additional integrated RSC switch unit)

### Signal Changeover Unit (internal)

**IMS-RSC:** Redundant Switching of Sync signals coming from the IMS-CLK modules. High availability of basic timing signals used for all I/O modules (1-PPS, 10 MHz, TOD).
Seamless switching of 2048kHz signals for telecom applications.

**IMS-SPT:** Signal Path Through (passive card used in non-redundant systems forwarding all signals from the clock).

### NTP and Management Module

**IMS-C051F:** 500 MHz, 1 x 10/100BASE-T Fast Ethernet Port
NTP Server: 10.000 NTP req/s
Protocols: SNMP, SSH, Telnet, DHCP, IPv4, IPv6, 802.1q, RADIUS, TACACS+
Management user interface via web interface or CLI

### Multiple Reference Input

**IMS-MRI:** Basic reference input signals (BNC)
- 1PPS
- 10 MHz
- IRIG-AM (B, AFNOR, IEEE1344 / C37.118)
- IRIG-DCLS (B, AFNOR, IEEE1344 / C37.118)

### Extended Synchronization Interface

**IMS-ESI:** Extended reference input signals
- 1PPS, BNC
- var. frequencies (1kHz-10MHz) unframed, BNC
- var. frequencies (1kHz-10MHz) unframed, RJ45
- BITS E1/T1 framed, RJ45

### Network Expansion Card

**TSU**
**LNE**
**ESI**
**CPU**
**MRI**

- 2MHz, 2MBit/s Reference variable frequency Input
- Management & NTP Module
- PTP / SyncE / Hardware NTP Interface
- Reference Input (IRIG, 1PPS, 10MHz)
LNE – LAN Network Expansion
IMS-LNE: Additional network ports for NTP and management
LNE-GbE: 4x 10/100/1000BASE-T Gigabit RJ45 Ports

TSU – PTP / SyncE / Hardware NTP Interface
IMS-TSU-GbE: Gigabit Ethernet (RJ45 / SFP Combo Port)
10 ns time stamp resolution
1-Step/2-step clock
IEEE 1588v2 multi profile support:
- Default 1588v2 profile
- ITU-T G.8265 and G.8275 Telecom profiles
- IEEE C.37.238-2011 Power Profile
- SMPTE ST 2059-2 Broadcast Profile
Layer 2 / Layer 3 / IPv4 / IPv6
E2E/P2P
Synchronous Ethernet In/Out
(ITU-T G.8261, G.8262, G.8264 ESME)
Carrier Grade NTP (10 ns time stamp resolution)

REL – Relay
Error relay contact module for error indication of clock faults.
IMS-REL: 3x DFK Connectors (3-pin CO/NO/NC) for error indication of CLK-1, CLK-2 and RSC (redundant system) or 1x DFK Connector (3-pin CO/NO/NC) for error indication of CLK-1

SCG – Studio Clock Generator
Word Clock frequencies for professional Audio Equipment
IMS-SCG:
- programmable word clock rates: 24Hz – 24,576MHz
- default rates: 44.1kHz, 48 kHz, 88.2 kHz, 96 kHz
- 4x BNC (2.5V TTL into 50Ω)

VSG – Video-Sync Generator
The VSG180 is a video signal reference for studio equipment. The board is synchronized by an external 10MHz signal. It generates configurable video signals in different formats to synchronize studio equipment:
- Bi-Level Sync (black burst)
- Tri-Level Sync

LIU – Line Interface Unit
IMS-LIU: E1/T1-generator available with 4 or 8 outputs.
Clock Outputs:
2.048 MHz (E1-mode) or 1.544 MHz (T1-mode), G.703, 75 Ohm, unbalanced or 2.048 MHz (E1-mode) or 1.544 MHz (T1-mode), G.703, 120 Ohm, balanced.
BITS - framed outputs with SSM/BOC support:
2.048 Mbps (E1-mode) or 1.544 Mbps (T1-mode), 75 Ohm, unbalanced or 2.048 Mbps (E1-mode) or 1.544 Mbps (T1-mode), 120 Ohm, balanced.

BPE – Basic Port Expansion
Back-End uses unmodified standard signals provided by backplane.

LNO – Low Noise Option
IMS-LNO: 10 MHz sine wave outputs (low phase noise).
Integrated PLL and low phase noise oscillator (OCXO-MQ/HQ).

CPE – Configurable Port Expansion
This module consists of a half-size standard controller card (Back-End) and a dockable port expander card (Front-End), allowing a large variety of available and programmable output signals and physical connectors, including various electrical and optical interfaces.
IMS-CPE available Signals:
- 1PPS, 10MHz
- Time Codes: IRIG A/B/E/G/AFNOR/IEEE1344/C37.118/NASA36/AFNOR
- AM and DCLS
- Frequency Synthesizer (sine-wave + TTL)
- Programmable Pulses: 1PPS, 1PPM, 1PPH, Timer, Single Shot, Cyclic Pulses, DCF77 Mark, Sync Status
- Serial Timestrings (RS232 or RS422 / 485)

ACM – Active Cooling Module
The Active Cooling Module allows the operative use of the M1000 in high temperature environments. A hot-plug replacement, without the need to power down the system, is possible at any time.
**KEY FEATURES**

- IMS - Intelligent Modular Synchronization platform
- Hot swappable, field-replaceable modules
- Endless combinations of modules
- Optimized space usage
- Redundant power and reference sources
- Web based management for all modules
- Up to 16 additional LAN ports
- Up to 4 PTP (IEEE 1588-2008) modules
- Various types of I/O modules

**INPUT SIGNAL OPTIONS**

- GNSS: GPS, GLONASS
- Radio Signal: DCF77 - PZF correlation receiver
- Time Codes: IRIG AM, IRIG DCLS
- Serial String: RS232 TOD+PPS
- Pulses: 1PPS
- Frequencies: variable frequencies (1kHz - 10MHz)
- BITS/Clock: E1|T1 (framed) / 2.048|1.544 MHz (unframed)
- Network: NTP, IEEE1588v2, Synchronous Ethernet

All available input signals can be configured to be used within the Meinberg MRS (Multi-Reference Sources) concept. The inputs are integrated into the Meinberg IRSA (Intelligent Reference Selection Algorithm) technology which allows user-defined prioritization of inputs and automatic reference fail-over control.

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**PWR**

Two PWR slots are available for high power requirements and optional redundant configurations. Different models are available supporting wide range AC and/or various DC voltage range.

**CLK**

Reference clock module slot which holds either a GPS, GLONASS or PZF receiver including the main oscillator. The clock module provides standard backplane signals like 1PPS, 10 MHz and a serial time string. Up to two CLK slots can operate per backplane.

Usable Modules:
- IMS-GPS: GPS Receiver
- IMS-GLN: GPS/GLONASS Receiver
- IMS-PZF: DCF77 Correlation Receiver

**ESI**

Usable Modules:
- IMS-ESI: Extended reference input signals (1PPS, var. frequencies, E1/T1)
- IMS-TSU: IEEE1588v2 Input/Output, Synchronous Ethernet (Input/Output, NTP (Output))

Slot ESI1: Input signals are directly connected to CLK1
Slot ESI2: Input signals are directly connected to CLK2 (redundant)
Output signals are available from both clocks (switched)

All IO modules can operate in ESI slots.

**MRI**

Usable Modules:
- IMS-MRI: Standard reference input signals (1PPS, 10 MHz, IRIG-AM, IRIG-DCLS)
- IMS-ESI: Extended reference input signals (1PPS, var. frequencies, E1/T1)
- IMS-TSU: IEEE1588v2 Input/Output, Synchronous Ethernet (Input/Output, NTP (Output))

Slot MRI1: Input signals are directly connected to CLK1
Slot MRI2: Input signals are directly connected to CLK2 (redundant)
Output signals are available from both clocks (switched)

All ESI and IO modules can operate in MRI slots.

**CPU**

Holds a CPU module which operates as the main chassis controller and provides web interface and other management services as well as NTP. The IMS platform supports one CPU slot per backplane.

**SCU**

Switch Module (internal), required when using a redundant receiver solution. Automatic or remote controlled changeover of signal sources, seamless changeover of 2.048 MHz reference signals for redundant telecom applications.

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