LANTIME M3000
Intelligent Modular Synchronization

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

Meinberg Radio Clocks GmbH & Co. KG
Lange Wand 9
31812 Bad Pyrmont, Germany
Phone: +49 (0) 52 81 / 93 09 - 0
Fax: +49 (0) 52 81 / 93 09 - 30
Email: info@meinberg.de
Web: www.meinberg.de
www.meinbergglobal.com
All IMS Modules will report their status to the LAN-CPU and are easily replaceable in the field. 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.

**PWR** — 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.

**CLK** — 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 (H355 low loss)
- **IMS-PZF:** DCF77 Correlation Receiver
  - 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-ESI:** Extended reference input signals
  - 1PPS, BNC
  - var. frequencies (1kHz-10MHz) unframed, BNC
  - var. frequencies (1kHz-10MHz) unframed, RJ45
  - BITS E1/T1 framed, RJ45

Redundant clock configurations possible (requires switch card RSC).
**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
  - Carrier Grade NTP (10 ns time stamp resolution)

**LNO**  – Low Noise Option

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

**SCG**  – Studio Clock Generator

IMS-SCG: Word Clock frequencies for professional Audio Equipment.
- 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**  – Studio Clock Generator

- synchronized by an external 10MHz signal
- 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.

**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/XR3 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)

**BPE**  – Basic Port Expansion

Back-End uses unmodified standard signals provided by a backplane.

IMS-BPE available signals:
- 1PPS, 10 MHz square-wave
- 2.048 MHz square-wave
- IRIG DCLS+AM (B, AFNOR, IEEE1344 / C37.118)
- Programmable Pulses provided by clock module

**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).

**ACM**  – Active Cooling Module

The optional Active Cooling Module allows installation of the M3000 in non-A/C environments or in a rack setup in which the passive cooling concept cannot work reliably. All M3000 units can be equipped with an ACM cartridge in the field, if required. The ACM module allows a hot-plug replacement without the need to power down the system.
IMS - Slot Types

**KEY FEATURES**

- IMS - Intelligent Modular Synchronization platform
- Hot swapping, field-replaceable modules
- Arbitrary combinations of modules
- Optimized space usage
- Active cooling option
- Redundant power and reference sources (e.g. GPS)
- Web based management for all modules
- Up to 40 additional LAN ports
- Up to 10 PTP (IEEE 1588-2008) modules
- Various types of I/O modules
- Rubidium option via external chassis

**INPUT SIGNAL OPTIONS**

**GNSS:** GPS, GLONASS

**Radio Signal:** DCF77 - PZF correlation receiver

**Time Codes:** IRIG AM, IRIG DCLS

**Serial String:** RS232 TDD+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.

**PWR**

Four PWR slots are available for high power requirements and optional triple redundancy 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

**SCU**

Optional Switch Module, required when using redundant clocks. Automatic, remote controlled or manual changeover of signal sources, seamless changeover of 2.048 MHz reference signals for redundant telecom applications.

**CPU**

Holds a CPU module which acts 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.

**Usable Modules:**
- IMS-TSU: PTP / SyncE / Hardware NTP Interface
- IMS-BPE: Basic Port Expansion
- IMS-CPE: Configurable Port Expansion
- IMS-LIU: Line Interface Unit (E1/T1 Telecom Signals)
- IMS-LNO: 1MHz sine Low Noise Option
- IMS-LNE: LAN network expansion
- IMS-SCG: Studio Clock Generator (Audio)
- IMS-VSG: Video Sync. Generator
- IMS-REL: Relay contact module (Error Out)
- IMS-FDM: Frequency deviation monitor for power line networks

**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.**

**IO**

Usable Modules:
- IMS-TSU: PTP / SyncE / Hardware NTP Interface
- IMS-BPE: Basic Port Expansion
- IMS-CPE: Configurable Port Expansion
- IMS-LIU: Line Interface Unit (E1/T1 Telecom Signals)
- IMS-LNO: 1MHz sine Low Noise Option
- IMS-LNE: LAN network expansion
- IMS-SCG: Studio Clock Generator (Audio)
- IMS-VSG: Video Sync. Generator
- IMS-REL: Relay contact module (Error Out)
- IMS-FDM: Frequency deviation monitor for power line networks

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.**