LANTIME M1000

Intelligent Modular Synchronization

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

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MEINBERG

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.

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 (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)

SCU – 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).

CPU – 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

MRI – 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)

ESI – 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

PWR
AC / DC
Power Supplies
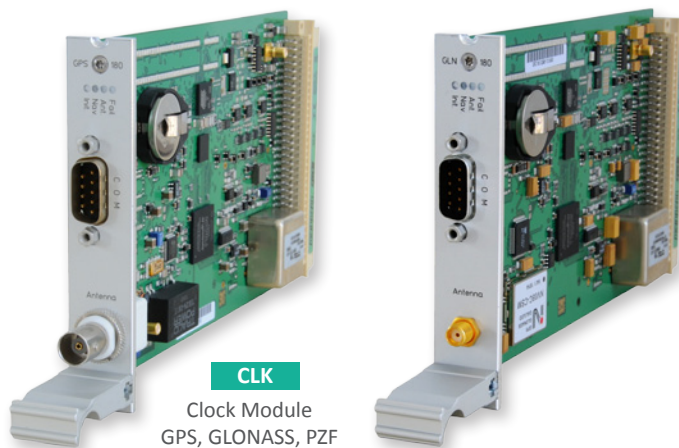
CLK
Clock Module
GPS, GLONASS, PZF

MRI
Reference Input
IRIG, 1PPS, 10MHz

ESI
2MHz, 2MBit/s Reference
variable frequency Input

CPU
Management &
NTP Module

TSU
PTP / SyncE /
Hardware NTP Interface

LNE
Network
Expansion Card

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 ESMC)

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:
• programmble 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
E1/T1
Generator

BPE
Basic Port
Expansion

LNO – Low Noise Option

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

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.

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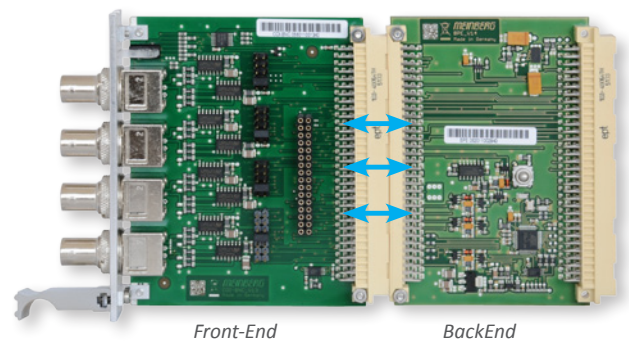
IMS-BPE available signals:
• 1PPS, 10 MHz square-wave
• 2.048 MHz square-wave
• IRIG DCLS+AM (B, AFNOR, IEEE1344 / C37.118)
• Programmable Pulses provided by clock module

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)

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.

| ACM | I/O | CLK 2 | ESI-, MRI-CLK 2 or I/O | PWR-1 |
| --- | CPU | CLK 1 | ESI-, MRI-CLK 1 or I/O | PWR-2 |

Redundant Receiver-Slot Assignment with internal RSC Switch Logic

| ACM | I/O | I/O | ESI-CLK 1 or I/O | PWR-1 |
| --- | CPU | CLK 1 | ESI-, MRI-CLK 1 or I/O | PWR-2 |

Single Receiver-Slot Assignment

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.

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

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.

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.

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.

ESI (Extended Synchronization Interface)

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

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