GMR6000

Multi-Functional Master Clock

The **GMR6000** master clock is a modern and versatile time server and frequency generator. The device can reference and synchronize to a variety of input sources and provides a local physical realization of time for systems to utilize. With built in power redundancy and intelligent switching and monitoring, the GMR6000 meets or exceeds contemporary system requirements for ensuring availability, accuracy, and traceability of time and frequency signals for mission-critical applications.

STANDARD INPUTS

- 13-digit display (Date/Time or Day of year/Time)
- Fully configurable offsets for time zone and DST
- NTP - Network Time Protocol Client
- RS232 (DB-9) / RS422 (5 Pos TB) and/or IP packet serial messages - NMEA 0183, NENA Format 0,1, or 8, Truetime-Kinemetrics
- 2-Independently addressable RJ45 Ports
- 1-Independently addressable SFP, supporting fiber or copper modules
- Configuration via USB or Ethernet (Port 1 only)

STANDARD OUTPUTS

- NTP - Network Time Protocol Server
- 10 MHz Sinewave (BNC, 50 Ω, low phase noise and phase locked to PPS out)
- 1 PPS (BNC, 50 Ω)
- RS232 (DB-9) /RS422 (5 Pos TB) and/or IP packet serial messages - NMEA 0183, NENA Format 0,1, or 8, Truetime-Kinemetrics
- Programmable relay closure - NO/NC dry contact relay
- Relay/ACO (Automatic Change Over) output

INPUT OPTIONS

CONFIGURABLE REFERENCE PRIORITY INPUTS:

The following input reference sources can be used to synchronize the system and/or discipline the internal high stability oscillator.

- GNSS Receiver, Single or Multiconstellation selectable
  Single L1 or Multiband L1, L2/L5 supporting:
  GPS/GLONASS/GALILEO/BeiDou
  (or M-Code GPS Receiver)
- PTP/IEEE1588 - Precision Time Protocol
- Timecodes - IRIG (DCLS/AM) /SMPTE
- PPS - Pulse Per Second (Sync In)
- 10 MHz - 10MHz reference frequency

The priority of all input signals can be freely configured.

Notes: NTP as a reference to discipline the oscillator is disabled. The unit is shipped with the NTP client disabled.

NMEA serial input may be used in conjunction with the Sync-In feature.

OUTPUT OPTIONS

CONFIGURABLE (MASTERPORT) OUTPUTS:

Four configurable Masterport BNC outputs supporting:

- Time codes: IRIG (DCLS and AM) /SMPTE
- Audio/Video Sync: Genlock Black-Burst, Tri-Level Sync, Wordclock
- 1, 5, or 10 MHz Square Wave (Phase locked with PPS)
- Additonal PPS
- User-defined Square Wave (Hz or kHz)
- Custom Period Square Wave (User-defined period/frequency)
- Programmable Pulse (Feature currently in development)
- Programmable Reference Frequency
- HaveQuick II (Non-NATO) (Feature currently in development)
  Masterport outputs are on BNC connectors and are software switchable between 50 Ω and 75 Ω

- PTP/IEEE1588v2 - Precision Time Protocol (Network ports only)

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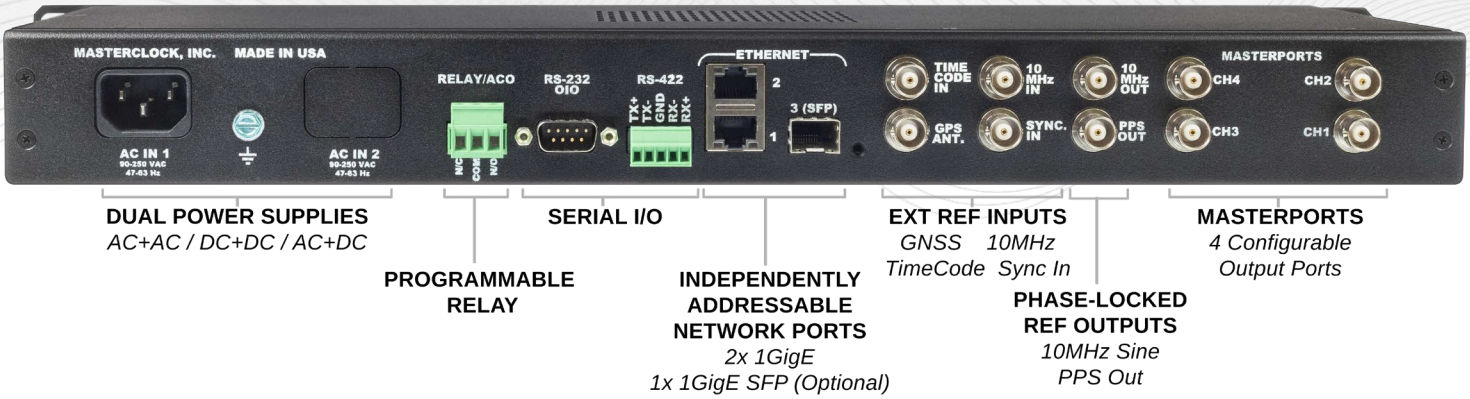

Network Features

STANDARD

- Three Independently Addressable isolated 1GigE Ethernet ports (Two RJ45 , one SFP)
- NTP Server: Synchronization of NTP and SNTP compatible clients
- NTP authentication: MD5, SHA-1, SHA-2

OPTIONAL

- PTP/IEEE 1588 **Ordinary Clock** or **Grandmaster** Synchronization of IEEE1588-2008 (PTPv2) compatible clients
  - Default E2E IEEE 1588-2008
  - Default P2P IEEE 1588-2008
  - SMPTE ST 2059-2 Professional Broadcast Environment
  - AES67 Profile for Audio/Video Bridging and Time Sensitive Networks
  - SMPTE 2110 for Audio/Video combined ST 2059-2 and AES67 Interoperability
  - Power IEC 61850-9-3
  - Power IEEE C37.238-2011
  - Power IEEE C37.238-2017
  - Telecom G.8275.1
- Other PTP profiles by adjusting PTP settings manually

Security Features

Advanced Anti-Jamming, Anti-Spoofing Detection and Mitigation, Authenication on Dedicated Management Port(s), Encrypted Protected Admin and User Passwords and Access Levels, Authenticated NTP (Feature currently in development)

Holdover Features

Features FAST Disciplining, and Low Phase Noise options for OCXO and Rubidium (RB) oscillators for extended holdover with low drift.

OCXO Oscillator: ± 1.5 usec/24 hours Rubidium Oscilator: ± 500 nSec/24 hours

Management Features

- Dedicated isolated management network port
- Additional USB management port (Feature currently in development)
- Local or network firmware updates and licensing of new features
- WinDiscovery UI network device discovery launches HTTPS webpage configuration and status monitoring.(Feature currently in development)
- SSH CLI (Command Line Interface)
  Additonal SNMP v1, v2, and v2c,v3 AES-256 configuration (Sets), monitoring (Traps), and logging with provided MIBs. Syslog client
- Easy to read 13-digit 7 segment LED display (Date/Time or Day of year/Time)
- Eight multicolor LEDs on the font panel showing status/alarm of:
  - Power supplies
  - Holdover status
  - Lock indication
  - Stability - System Ready Indicaton
  - Current Reference (GNSS, PTP, TimeCode, Internal Oscillator)
  - GNSS Satellite Status

Power Features

STANDARD SINGLE OR OPTIONAL REDUNDANT POWER:

Select between single or dual power supplies

- AC: 90-264VAC, 50/60Hz, IEC (Universal IEC C14 AC input connector)
- DC: 24VDC, 48VDC, or 125 VDC
- <20W Power Dissipation

SUPPORTED NETWORK PROTOCOLS

Protocol	Description
Transmission Control Protocol (TCP) and User Datagram Protocol (UDP)	Layer 4 - Transport Layer Network Protocol
Internet Protocol (IP)	IPv4, IPv6
Network Autoconfiguration	IPv4: Dynamic Host Configuration Protocol, DHCP (RFC 2131) IPv6: DHCPv6 (RFC 3315) Autoconfiguration Networking
Network Time Protocol (NTP) Simple Network Time Protocol (SNTP)	NTP v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4 (RFC 5905) SNTP v3 (RFC 1769), SNTP v4 (RFC 4330)
NTP Authentication	MD5, SHA-1 , SHA-2, Authentication and Autokey Key Management, NTP-Sec
Secure Shell (SSH)	SSH v1.3, SSH v1.5, SSH v2 (OpenSSH) - CLI (Command Line Interface)
Hypertext Transfer Protocol (HTTP)	HTTP/HTTPS (RC 2616) (Feature currently in development)
Simple Network Management Protocol (SNMP)	SNMPv1 (RFC 1157), SNMPv2c (RFC 1901-1908), SNMPv3 (RFC 3411-3418)
Precision Time Protocol (PTP)	IEEE1588-2008 v2, IEEE1588-2019 v2.1
Internet Group Management Protocol (IGMP)	IGMPv2 (RFC 2236), IGMPv3 (RFC 3376)
Syslog Protocol (SYSLOG)	SYSLOG (RFC 5424)

PTP PROFILES (PRE-CONFIGURED)

Default	Default E2E IEEE 1588-2008 Default P2P IEEE 1588-2008
Media, Audio/Video	SMPTE ST 2059-2 Professional Broadcast Environment AES67 Profile for Audio/Video Bridging and Time Sensitive Networks SMPTE 2110 for Audio/Video combined ST 2059-2 and AES67 Interoperability Power IEEE C37.238-2011 Power IEEE C37.238-2017 Telecom G.8275.1
Compliance (PENDING)	Safety: IEC 62368-1:2023 Audio/video, information and communication technology equipment - Part 1: Safety requirements EMC: EN IEC 55035 Electromagnetic compatibility of multimedia equipment FCC, CE Marked, ANSI , ROHS TAA Compiant Traceability to <1 microsecond (ref: tf.nist.gov/general/pdf/3167.pdf)
Temperature & Humidity	Operating: 0 to 60°C (32 to 140°F), Up to 90% (non-condensing) Storage: -20 to 70°C (-4 to 158°F), Up to 90% (non-condensing)
MTBF	>500,000 hours (Calculated using Fixed/Ground Mil HDBK 217F assumptions)
Size & Weight	Size: 16.90w x 1.750h x 9.75d in (42.92w x 4.445h x 24.76d cm) Weight: 2.6 lbs. (1.2 kg)

SUPPORTED TIME CODES

Time Code (LTC, Serial Formats)	Description
IRIG (DCLS, Amplitude Modulated)	Inter-Range Instrumentation Group - IRIG STANDARD 200-16 IRIG-A, IRIG-B
SMPTE	Society of Motion Picture and Television Engineers SMPTE 12M, 309M, 24/25/30 ND fps - 29.97 Drop Frame
HaveQuick II	HaveQuick Non-NATO version (Feature currently in development)
Serial ASCII Codes	
NMEA-0183	National Marine Electronics Association
NENA	National Emergency Number Association , Format 0,1,8 per NENA PSAP Master Clock Standard, NENA-STA-026.5-2022, February 28, 2022
Truetime/Kinemetrics	Legacy Truetime Kinemetrics DDD:HH:MM:SS format
IRIG	Inter-Range Instrumentation Group - IRIG STANDARD 212-00 IRIG-J

OPTIONAL CONFIGURATION ITEMS

Part #	Description	
GMR-AVSync	Blackburst (BB), Tri-Level Sync (TLS), Word Clock & SMPTE, BNC Cntr	Licensable
GMR-TCADV	IRIG-A, IRIG-E, IRIG-G, IRIG-H, BNC Cntr (IRIG-J Serial Cntr)	Licensable
GMR-PTP	PTP IEEE 1588 Server / Client, 1 GigE, all network ports	Licensable
GMR-PPO	Custom Waveform Output	Licensable
GMR-GNSS	GNSS Receiver, BNC Connector	Specify at order
GMR-M-Code	Encrypted GPS M-Code receiver - Contact sales for information	Contact Sales
GMR-HSO-3	Internal Rubidium Ultra High Stability Oscillator	Specify at order
GMR-SYNC-IN	PPS, PPM, PPH, Input, BNC Cntr	Licensable
GMR-TCG	Time Code Generator (IRIG-A, IRIG-B, SMPTE 12M, 309M, 24/25/30 ND fps - 29.97 Drop Frame)	Licensable
GMR-TCR	Time Code Reader (IRIG-A, IRIG-B, SMPTE 12M, 309M, 24/25/30 ND fps - 29.97 Drop Frame).	Specify at order
AC Power Cords Available:	IEC C13 to North American (NEMA 5-15, Type B), Euro Plug (CEE 7/7, Type F), U.K. Style (Type D), or Australia/New Zealand (Type I)	Specify at order