



## MC-1 GPS Master Clock

Accurate. Reliable. Flexible.

Masibus MC-1 GPS Master Clock has been developed to address key power and process industry time synchronization requirements. It is the most featured and cost-effective time synchronization solution for versatile applications like monitoring, control or analysis of the power system. MC-1 provides time synchronization accuracy better than 1 microsecond between distant locations.

MC-1 generates wide range of timing signals via seven programmable different output ports. It has range of Timing Outputs like RS232 serial ports, PPS Port, IRIG-B ports, RJ45 ports and relay outputs. These outputs have ample drive capability to easily drive multiple loads in parallel and its parameter configurable options. The GPS Backup battery improves acquisition time to as little as 15 seconds after a brief power loss by supplying constant power to the real-time clock.

MC-1 has a front panel display and keypad providing comfort for installation and usage. LEDs provide at-a-glance status information. MC-1 has facility to program the parameters by local PC connection via serial or Ethernet. Configuration of Time zone correction, hour setting, and serial data format selection are password protected to avoid unauthorized access.

MC-1 has Rack mount enclosure with 2U height.

### Features

- Reliable and cost effective
- 8 time-formats over 7 output ports
- 4 Event Outputs for monitoring function
- 12 Satellite parallel tracking
- No data loss under GPS unlock condition
- Universal (AC/DC) Power Supply
- Highly accurate TCXO/OCXO crystal (optional)
- 2x16 character backlit LCD display
- Remote configuration using TELNET
- Multiple time-code formats
- Supports synchronization of IEC61850 compliant devices via NTP/SNTP protocol
- Configuration Security
- Programmable Pulse Output
- Solid State relays for fast pulse response
- All weather water proof antenna
- Synchronization software for Server & Client
- Supporting Protocols:
  - NMEA GPRMC
  - NGTS & T-FORMAT
  - IRIG-B Modulated
  - IRIG-B TTL
  - SNTP/NTP ( RJ45 port )

### Applications

- Electrical utilities:
  - Generation
  - Transmission
  - Energy and Demand monitoring
- Distribution Interface with SCADA/RTU

## Technical Specifications:

### GPS Receiver

Timing Accuracy	< 20 ns (with respect to UTC / USNO) with Selective availability and tracking 12 satellites
Positioning Accuracy	< 25m
Input Frequency	1575.42 MHZ L1 C/A code
Tracking	12 parallel channels
Acquisition time	Hot Start < 15 sec Warm Start < 40sec Cold Start < 150sec

### Antenna

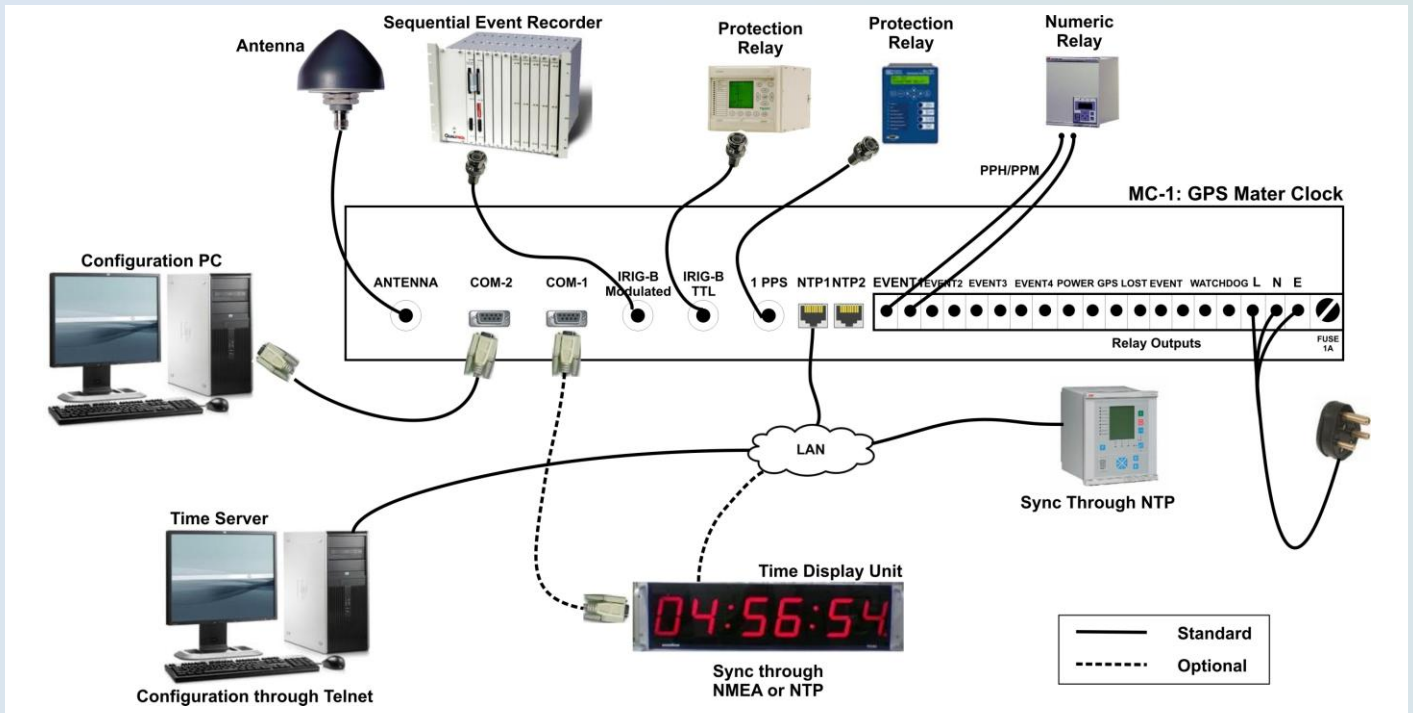
Type	Active L1. GPS, 25 dB gain
Antenna Cable	RG 6 / RG 8 (Optional coaxial cable)
Max length	150 meters

### Interface and Configuration

Display	2x16 Character backlit LCD Display
Displayed data	Local / UTC time and date Day of the year, days of the week Position latitude, longitude Status of the GPS receiver, Current data format of COM2
Status LEDs	Power, 1PPS, Watchdog, Event, GPS Locked
Configuration Programming	Parameters programmable by <ul style="list-style-type: none"><li>Keypad</li><li>Hyper Terminal (Serial COM Port)</li><li>TELNET (Ethernet RJ45 Port)</li></ul>
Programmable Parameters	<ul style="list-style-type: none"><li>Global time zone correction</li><li>Hour settings for Display (12 or 24 Hrs),</li><li>Data format selection (NGTS or T-FORMAT)</li><li>Repetitive event generation output via Potential free Contact (Per Minute or Hour)</li><li>Additional Event Configuration (Total &amp; On time of Events)</li></ul>
Configurable Parameters via TELNET	IP, Gateway and Subnet
NTP / SNTP Client Software	<ul style="list-style-type: none"><li>Platform Support: Windows 98/NT/2000/XP/7 server synchronization</li><li>NTP Client Software is for easy distribution, management and monitoring of time across the network</li><li>Drivers for UNIX &amp; LINUX are also available on request</li></ul>



## Application:



## Technical Specifications:

### Time Signal Output

Output	Description	Isolation	Accuracy (GPS Locked)	Available Output	Transmission Distance
1PPS	<ul style="list-style-type: none"> <li>One pulse per second</li> <li>BNC Female connector</li> </ul>	<ul style="list-style-type: none"> <li>10 MΩ at 500 VDC from all ports</li> <li>Input to Output: 2500 Vrms</li> </ul>	±500nSec	1	5m
IRIG-B Modulated	<ul style="list-style-type: none"> <li>Format: IRIG-B122.</li> <li>Carrier Freq: 1KHz</li> <li>Modulation Ratio: 3:1</li> <li>0-10V (p-p) unloaded</li> <li>0-3V (p-p) 50Ω load</li> </ul>	<ul style="list-style-type: none"> <li>0.1 MΩ at 500 VDC from all ports</li> <li>Input to Output: 2500 Vrms</li> </ul>	±60μSec	1	3Km
IRIG-B TTL	<ul style="list-style-type: none"> <li>Format: IRIG-B122</li> <li>Rise time&lt;15ns</li> <li>BNC Female connector</li> </ul>	<ul style="list-style-type: none"> <li>10 MΩ at 500 VDC from all ports</li> <li>Input to Output: 2500 Vrms</li> </ul>	±60μSec	1	5m
NTP (LAN Interface)	<ul style="list-style-type: none"> <li>Time sync protocol: NTP V3, SNTP</li> <li>Network Protocol: TCP, Telnet, UDP, IPV4</li> <li>RJ45, 10 Mbps</li> </ul>	2000 VDC from all ports	±1mSec	Standard: 1 Optional: 1	N.A.
COM-1 (NMEA-GPRMC)	<ul style="list-style-type: none"> <li>Isolated Serial RS232</li> <li>Programmable baud rate, stop bit, parity bit and message format</li> <li>UTC Time Frame, 9600 baud rate</li> <li>RS232, DB-9 Female connector</li> </ul>	<ul style="list-style-type: none"> <li>0.1 MΩ at 500 VDC from all ports</li> <li>Input to Output: 2500 Vrms</li> </ul>	±1μSec	1	15m
COM-2 (NGTS & T-Format)	<ul style="list-style-type: none"> <li>Isolated Serial RS232</li> <li>Programmable baud rate, stop bit, parity bit and message format</li> <li>Selectable between NGTS &amp; T-Format</li> <li>RS232, DB-9 Female connector</li> </ul>	<ul style="list-style-type: none"> <li>0.1 MΩ at 500 VDC from all ports</li> <li>Input to Output: 2500 Vrms</li> </ul>	±1μSec	1	15m

### Event and Alarm Output

Output	Description
Standard Event Output (1 Nos.)	<ul style="list-style-type: none"> <li>Selectable between 1PPS/1PPM/1PPH</li> </ul>
Optional Event Output (4 Nos.)	<ul style="list-style-type: none"> <li>Configurable time period 1Sec to 24Hrs.</li> <li>Voltage rating: 350 VDC level, 150mA</li> </ul>
Alarms (3 Nos.)	All isolated Potential free contacts: 230 VAC / 24 VDC, 10A (max) a) GPS Sync. Lost, b) Watchdog, c) Power Fail

## Technical Specifications:

### Power Supply

Power supply	AC: 85-260V, 47 to 55 Hz, 1ph DC: 90-370V
Power consumption	< 15W
Complying Standards	FCC-B, CISPR-B, EN55022-B, VCCI-B

### Physical

Mounting	2U, 19" Rack Mount
Dimensions	483(W) x 90(H) x 300(D) mm
Ingress protection	IP 20 enclosure
Weight	4Kg (approx)

### Environmental

Operating temperature	-5 to +55°C
Storage temperature	-40 to +85°C
Humidity	30 to 90% Rh

### Type test

Electrostatic Discharge (ESD)	IEC 6100-4-2
Radiated Susceptibility	IEC 6100-4-3
EFT Test	IEC 6100-4-4
Surge Test	IEC 6100-4-5
Conducted Susceptibility (Conducted RF)	IEC 6100-4-6
Power Frequency Magnetic Field	IEC 6100-4-8
High Frequency Disturbance	IEC 6100-4-10
Voltage interruption/voltage dips	IEC 6100-4-11
Damped Oscillator Magnetic Field	IEC 6100-4-12
Radiated Emission Conducted Emission	As per CISPR-22
Vibration	IEC 68-2-6
Bump Test	
Dry Heat Test	IEC 60068-2-2
Damp Heat Steady State test	IEC 60068-2-30

### Accessories (Optional-On request)

Antenna mounting clamp
Surge Suppressor
Signal Amplifier
RS232/485 Repeater
TDR-4 (Time distribution rack)
TSR-4 (Time Signal Repeater)
Netser (NGTS-NTP)
TDU-64 (Time / Date / Frequency Display Unit)

### Ordering Code

Model	LAN Output		Event Output		Antenna Cable Length	
MC-1	0	None	0	None	1	15 Meter
	1	One	1	4 Event O/P	2	30 Meter
	2	Two			3	50 Meter
					4	100 Meter
					5	150 Meter

Head Office:

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