masibus

MC-1-M
GPS Master Clock

Accurate. Reliable. Modular.

Masibus MC-1-M GPS Master Clock has been developed for the power and process industry time synchronization requirements. It is the most featured, Modular and cost-effective GPS time synchronization solution available in 2U size Modular construction. MC-1-M is Reliable, Flexible and provides time accuracy of 150nsec at basic level.

MC-1-M has modular hardware architecture by way of option plug-in cards, offering wide range of time code and pulse signals via different output ports like RS232 serial, PPS, IRIG-B, Ethernet and PFC relay. These outputs have ample drive capability to drive multiple loads in parallel and its parameters are fully configurable. The GPS receiver has built-in RTC backed up with on board battery to maintain time during power loss and instant recovery on power resumption. MC-1-M has an optional ITU-T G.703 Standard, 2.048 MHz frequency output which Confirms to ITU-T G.811, the latest in Ethernet protocol for time Sync IEEE 1588 (PTP) is also available.

MC-1-M has a front panel display and keypad for configuration and viewing of time parameters and output ports, discrete LEDs provide at-a-glance status and health information. MC-1-M is also programmable via hyper terminal on the serial port, Ethernet parameters like IP gateway and subnet mask are programmable via the Ethernet port using Telnet, for more than one Ethernet port each port is individually programmable for IP and subnet.

Masibus has four decades of design experience and have supplied hundreds of GPS clocks for the most demanding applications in the power and process industry, Masibus clocks have been successfully interfaced with all types of devices like DFR, SOE, Relays, PLC, DCS, IEDs, servers and many more.

Features

- Reliable and cost effective
- Modular Design Concept with numerous plug-in cards
- Maximum outputs in single GPS (up to 18)
- 12 Satellite parallel tracking
- Universal (AC/DC) Power Supply
- Highly accurate TCXO Type crystal (OCXO Optional)
- 4x20 character backlit LCD display
- Remote configuration using TELNET
- Supports synchronization of IEC61850 compliant devices via NTP/SNTP protocol
- Programmable Pulse Output
- Solid State relays for programmable events
- All weather water proof antenna
- Synchronization software for Server & Client
- Diagnostic Relay outputs
- Supporting Protocols:
  - NMEA-0183 (RMC)
  - NGTS & T-FORMAT
  - IRIG-B Modulated
  - IRIG-B TTL
  - SNTP/NTP (RJ45 ports)
  - ITU-T G.703 Standard, 2.048 MHz frequency output (Confirms to ITU-T G.811)
  - PTP/IEEE-1588-2008

Applications: Time synchronization of

- Sequence of event recorders
- Disturbance recorders
- Numerical relays
- UNIX, Linux & Windows servers
- Slave clocks
- PLC/DCS/SCADA
- ABT metering
- EMS system
- Telecommunication
- Synchrophasor measurement

Technical Specifications

GPS Receiver

|	
Timing Accuracy	< 15 ns with GPS Receiver (Receiver is locked on fixed position)
Positioning Accuracy	< 10 m
Input Frequency	1575.42 MHz L1 C/A code
Tracking	12 parallel channels
Acquisition time	Hot Start < 5 sec Warm Start < 38 sec Cold Start < 45 sec

Antenna

Type	Active L1. GPS, 30 dB gain
Antenna Cable	RG 6(Std) / RG 8 (Optional coaxial cable)
Operating Temperature	-40 to +85 °C
Coverage	360 °C
Ingress Protection	IP67
Weight	150 g

Interface and Configuration

Display	4x20 Character backlit LCD
Displayed data	Local / UTC time and date Day of the week Position latitude, longitude Status of the GPS receiver Current data format of COM2
Status LEDs	Power, 1PPS, Watchdog, RTC ON / Event, GPS Locked
Configuration Programming	Parameters programmable by • Keypad • Hyper Terminal (Serial COM Port) • Ethernet Parameters using TELNET (Ethernet RJ45 Port)
Programmable Parameters	• Global time zone correction • Hour settings for Display (12 or 24 Hrs) • Data format selection (NGTS or T-FORMAT) • Repetitive event generation output via Potential free Contact (Per Minute or Hour) • Additional Event Configuration (Total & On time of Events) • Manual Time setting • Propagation delay correction (compensate for antenna cable length)
Configurable Parameters via TELNET	IP, Gateway and Subnet
NTP / SNTP Client Software	• Platform Support: Windows 98/NT/2000/XP/7 server synchronization • NTP Client Software is for easy distribution of time across the network

Application
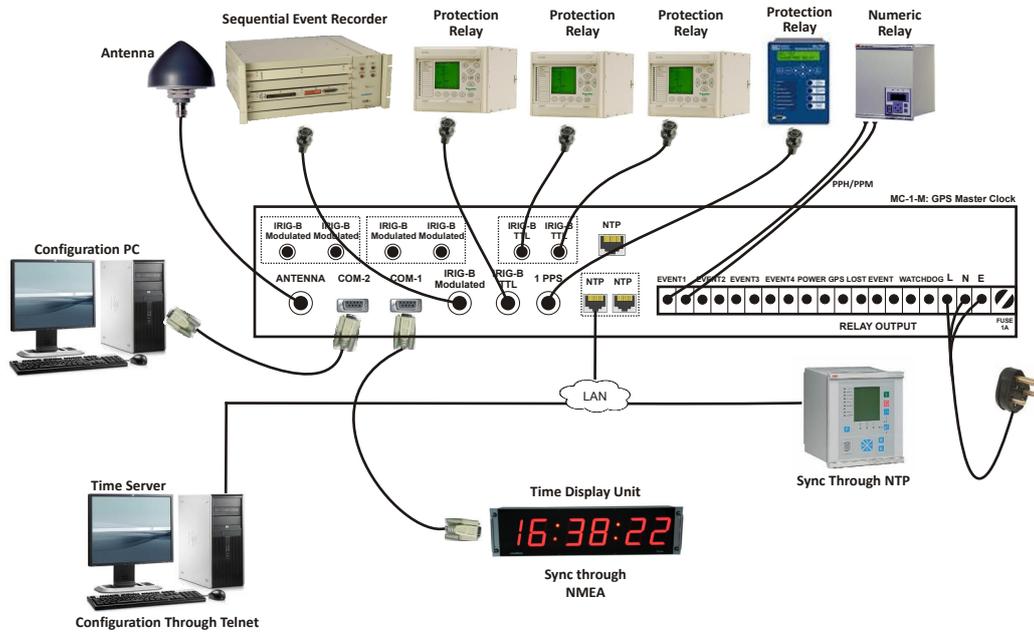
Technical Specifications

Time Signal Output

Output Type	Description	Connector*	Accuracy (to UTC)	Available Output		
				Standard	Options	
					Main Board	Plug-in Card (Max 4 cards)
PPS	• 1 Pulse per second • TTL into 250Ω • 200 ms Pulse Width	BNC Female	±150nSec	1	-	2
IRIG-B Modulated	• IRIG-B(127) or IEEE 1344/C37.118-2005 (Field Selectable) • 1 KHz AM Signal • 3:1 Modulation Ratio • 3V p-p into 100Ω ±10%	BNC Female	±10µSec	-	1	2
IRIG-B TTL	• IRIG-B (007) or IEEE 1344/C37.118-2005 (Field Selectable) • TTL into 50Ω	BNC Female	±1.5µSec	1	-	2
NTP	• Protocol Support: NTP V3, SNTP, SNMP V2 • Network Protocol: TCP, Telnet, UDP, IPv4 • Mode: Server • Network Interface: RJ45, 10/100Mbps	RJ45	±1mSec	-	2	2
COM-1	• NMEA-GPRMC • Isolated Serial RS232 /485** • Configuration: 9600-8-N-1	DB9 Female	-	1	-	1
COM-2	• Selectable between NGTS & T-Format • Isolated Serial RS232/485** • Programmable baud rate, stop bit, parity bit and message format	DB9 Female	-	1	-	-
Event	• PMOS relay • Rating: 350VDC/120mA • On time programmable	Plug in screw terminals 2.5mm²	-	1 Selectable PPM or PPH (fix 1sec On time)	4 Selectable PPS to PPD	-
PTP	• IEEE-1588-2008 V2 • Network Protocol: UDP, IPV4,Telnet • Mode: Master • Network Interface: RJ45, 10/100 Mbps	RJ45	±100nSec	-	-	1
Frequency out (2.048 MHz)	• ITU-T G.703 (E1), Unbalanced, BNC into 75 ohms	BNC Female	As per ITU-T G.703	-	1	-

*For BNC, RJ45 and DB9; 2 meter cable with mating connector supplied as standard
**RS232/485 is site selectable default setting from Factory is RS232

Alarm Output

3 Numbers of PFC	Rating: AC: 230 V @ 2A; DC: 30V @ 2A /110V @ 0.3A/ 220 V @ 0.12 A (max) a) GPS Sync. Lost, b) Watchdog, c) Power Fail

Technical Specifications

Power Supply

Power Supply (Std)	AC: 90-264V, 47 to 63 Hz DC: 125-300V
Power Supply (Optional)	DC: 18-72V (Optional)
Power Consumption	< 40 W Max

Isolation (Withstanding voltage)
Between primary terminals* and secondary terminals**: **At least 1500 V AC for 1 minute**
Between primary terminals* and grounding terminal: **At least 1500 V AC for 1 minute**
Between grounding terminal and secondary terminals**: **At least 1500 V AC for 1 minute**
Between secondary terminals**: **At least 500 V AC for 1 minute**
* Primary terminals indicate power terminals and relay output terminals.
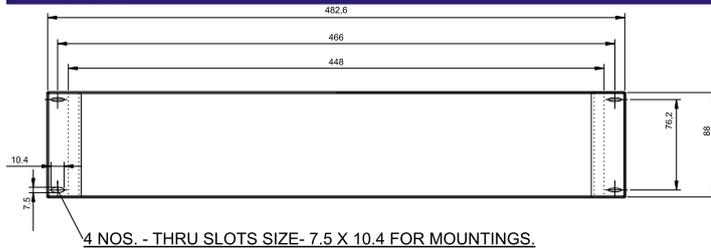** Secondary terminals indicate Output Ports.
Insulation resistance: 50MΩ or more @ 500 V DC between power terminals and grounding terminal.
Note: No Isolation between IRIGB-TTL and PPS Output.

Physical

Mounting	2U, 19" Rack Mount
Depth (mm)	305
Ingress protection	IP20 enclosure
Weight	4 Kg (approx)

Dimensions

4 NOS. - THRU SLOTS SIZE- 7.5 X 10.4 FOR MOUNTINGS.

FRONT VIEW

Standard Accessories

m-AN-01: Antenna	1 no
m-MK-AMC-40-1: Antenna Clamp for mounting	1 no

Environmental

Operating temperature	0 to +55 °C
Storage temperature	-20 to +80 °C
Humidity	20-90% Non Condensing

Type test

Electrostatic Discharge (ESD)	IEC 61000-4-2
Radiated Susceptibility	IEC 61000-4-3
EFT Test	IEC 61000-4-4
Surge Test	IEC 61000-4-5
Conducted Susceptibility (Conducted RF)	IEC 61000-4-6
Power Frequency Magnetic Field	IEC 61000-4-8
High Frequency Disturbance	IEC 61000-4-10
Voltage interruption/voltage dips	IEC 61000-4-11
Damped Oscillator Magnetic Field	IEC 61000-4-12
Radiated Emission Conducted Emission	As per CISPR-22
Vibration	IEC 68-2-6
Bump Test	IS 9002 Part-7
Dry Heat Test	IEC 60068-2-2
Damp Heat Steady State test	IEC 60068-2-30
Shock Test	IEC 60255-21-2
Dielectric Test	
Cold Test	IEC 60068-2-1: 2007

Accessories (Optional-On Request)

m-LA-01: Lighting Arrestor (Surge Suppressor)
m-AR-01-01: Antenna Rod (1 meter)
m-SR-01: RS485 Repeater
TDR-4: Time Distribution Rack
TSR-4: Time Signal Repeater
Netser (NGTS-NTP) Converter
TDU-64: Time / Date / Day / Frequency Display

Ordering Code

Model	LAN Output		IRIG B Mod o/p		Event Output		Power Supply		Antenna Cable Length		Extra O/P Modules							
											O/P Module-1		O/P Module-2		O/P Module-3		O/P Module-4	
MC-1-M	X		X		X		X		X		X		X		X		X	
	0	None	0	None	0	None	U1	90-264VAC/ 125-300VDC	0	None	0	None	0	None	0	None	0	None
	1	1 No. Ethernet	1	1 No. IRIG-Modulated	1	4 Event O/P	U2	18-72V DC	1	15 Meter	1	2 Nos. PPS	1	2 Nos. PPS	1	2 Nos. PPS	1	2 Nos. PPS
	2	2 Nos. Ethernet	2	2.048 MHz (E1)					2	30 Meter	2	2 Nos. IRIG-TTL	2	2 Nos. IRIG-TTL	2	2 Nos. IRIG-TTL	2	2 Nos. IRIG-TTL
									3	50 Meter	3	2 Nos. IRIG -Modulated	3	2 Nos. IRIG -Modulated	3	2 Nos. IRIG -Modulated	3	2 Nos. IRIG -Modulated
									4	100 Meter	4	1 No RS232 (NMEA)	4	1 No RS232 (NMEA)	4	1 No RS232 (NMEA)	4	1 No RS232 (NMEA)
									S	Special	5	2 Nos. Ethernet	S	Special	S	Special	S	Special
											6	PTP/IEEE-1588						

X - Specify from table

Masibus Representative: