masibus
A Sonepar Company

MC-1-U
GPS Master Clock

Accurate. Reliable. Compact.

RoHS

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

MC-1-U generates wide range of time code and pulse signals via different output ports like RS-232 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-U has a front panel display and keypad for configuration and viewing of time parameters and output ports, discrete LEDs provide at-aglance status and health information. MC-1-U 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
- 8 time-formats over 7 output ports
- 12 Satellite parallel tracking
- Universal (AC/DC) power supply
- Highly accurate TCXO type crystal (OCXO Optional)
- 2x20 Character backlit LCD display
- 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)

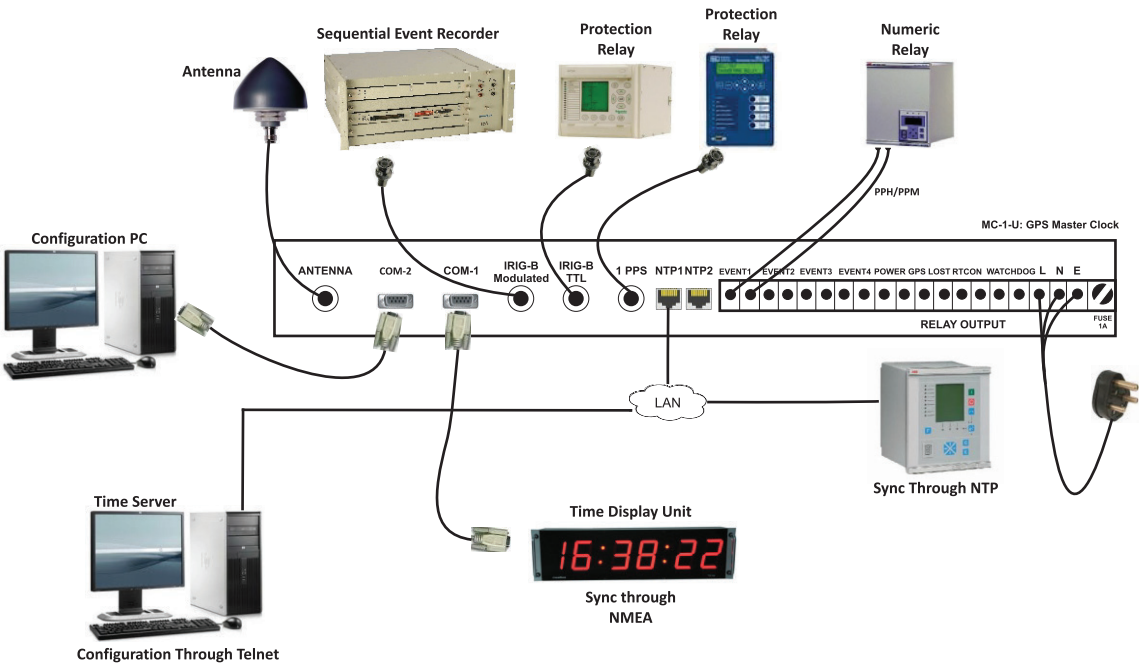
Applications: Time synchronization of

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

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, 40 dB gain
Antenna Cable	RG6 Coaxial cable
Operating Temperature	-40 to +85 °C
Coverage	360 °C
Ingress Protection	IP67
Weight	150 g
Interface and Configuration	
Display	2x20 Character backlit LCD display
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, Event, GPS locked
Configuration Programming	Parameters programmable by Keypad Hyper terminal (Serial RS-232) 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) t Propagation delay correction(Compensate for antenna cable length)
Configurable Parameters via TELNET	IP, Gateway and subnet
NTP / SNTP Client Software	Platform support: Windows 10 & above, Windows server 2016 & above, Unix, Linux, Solaris server for time synchronization

APPLICATION



Technical Specifications

Time Signal Output

Output Type	Description	Connector*	Accuracy (to UTC)	Available Output Standard	Available Output Options
PPS	• 1 Pulse per second • TTL into 250Ω • 200 ms Pulse Width	BNC Female	±150nSec.	1	-
IRIG-B Modulated	• IRIG-B(127) or IEEE 1344/C37.118-2005 (Field Selectable) • 1 KHz AM Signal • 3:1 Modulation ratio • 3Vp-p into 100Ω ±10%	BNC Female	±10µSec.	-	1
IRIG-B TTL	• IRIG-B (007) or IEEE 1344/C37.118-2005 (Field Selectable) • TTL into 50Ω	BNC Female	±1.5µSec.	1	-
NTP (LAN Interface)	• Protocol support: NTP V3, SNTP, SNMP V2 • Network Protocol: TCP, Telnet, UDP, IPv4 • Mode: Server • Network interface: RJ45, 10/100Mbps	RJ45	±1mSec.	-	2
COM-1	• NMEA-GPRMC • Isolated serial RS232 /485** • Configuration: 9600-8-N-1	DB9 Female	-	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 2.5mm^2	-	1 Selectable PPM or PPH (fix 1 sec On time)	4 (Selectable PPS to PPD)

*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

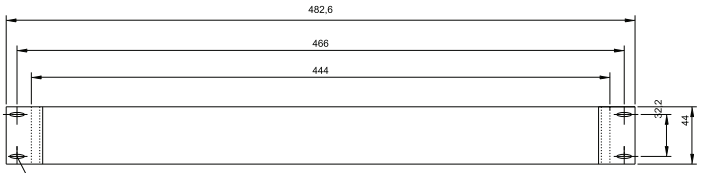
Power Supply (Std)	AC: 90-264V, 47 to 63 Hz DC: 90-300V
Power Supply (Optional)	DC: 18-72V
Power Consumption	< 15 W

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	1U, 19" Rack Mount
Depth (mm)	324
Ingress Protection	IP20 enclosure
Weight	3 Kg (Approx.)

Panel Cut-out



4 NOS. - THRU SLOTS SIZE- 7.5(W) X 10.4(L) FOR MOUNTINGS.

FRONT VIEW

Standard Accessories

m-AN-01: Antenna	1 no
m-AR-01-01: Antenna Rod (0.5 Meter)	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-SR-01: RS-485 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	
MC-1-U	X		X		X		X		X	
	0	None	0	None	0	None	U1	90-264VAC /90-300VDC	0	None
	1	One	1	One	1	4 Event O/P	U2	18-72V DC	1	15 Meter
	2	Two							2	30 Meter
									3	50 Meter
									4	100 Meter
									5	Special

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