



## MC-1-DE/ MC-1-DH

GPS Time Sync Unit  
Accurate. Reliable. Compact.



Masibus MC-1-DE & MC-1-DH GPS Time Synchronization Units are the most compact and accurate time synchronization units developed for various industries like the power and process industry. It has the options of various output types, required for interface with various systems and devices. MC-1-DH model has 7-segment LED display (date/time configuration). The unit is constructed in a form factor suitable for DIN-Rail, Wall mount or panel mount option. GPS time sync unit is designed for reliability and provides base time accuracy of 150nsec.

GPS time sync unit supports time code and pulse signals complying with standards like RS232/485 serial, PPS, IRIG-B, NTP, 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. It also has very low ppm crystal to maintain accurate time when GPS signal is lost.

GPS time sync unit has discrete LEDs that provide at-glance status and health information. Parameters like IP, gateway and subnet mask are programmable through ethernet port. MC-1-DE is also programmable via hyper terminal on the serial port.

In case of more than one ethernet port, each port is individually programmable only for network related parameters.

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

### Features

- Cost effective solution
- Compact DIN-Rail /Panel/Wall mount enclosure
- 6 digits, 0.56" 7-segment LED Display for time/date in MC-1-DH model
- 12 Satellite parallel tracking
- Universal (AC/DC) Power supply input
- Supports synchronization of IEC61850 compliant devices via NTP/SNTP protocol
- All weather water proof antenna
- Synchronization software for server & client
- Optional diagnostic relay outputs (Watch dog, GPS Lock) in MC-1-DE model
- Supporting Protocols:
  - IRIG-B Modulated
  - IRIG-B TTL
  - SNTP/NTP
  - NMEA/ T-Format/ NGTS

### 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

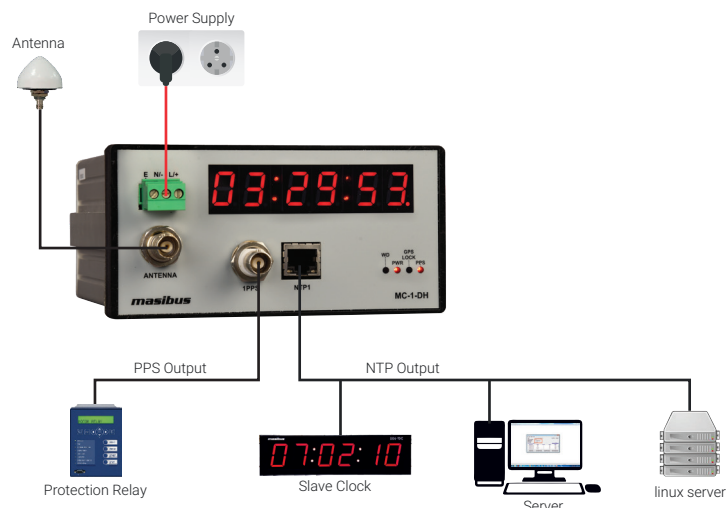
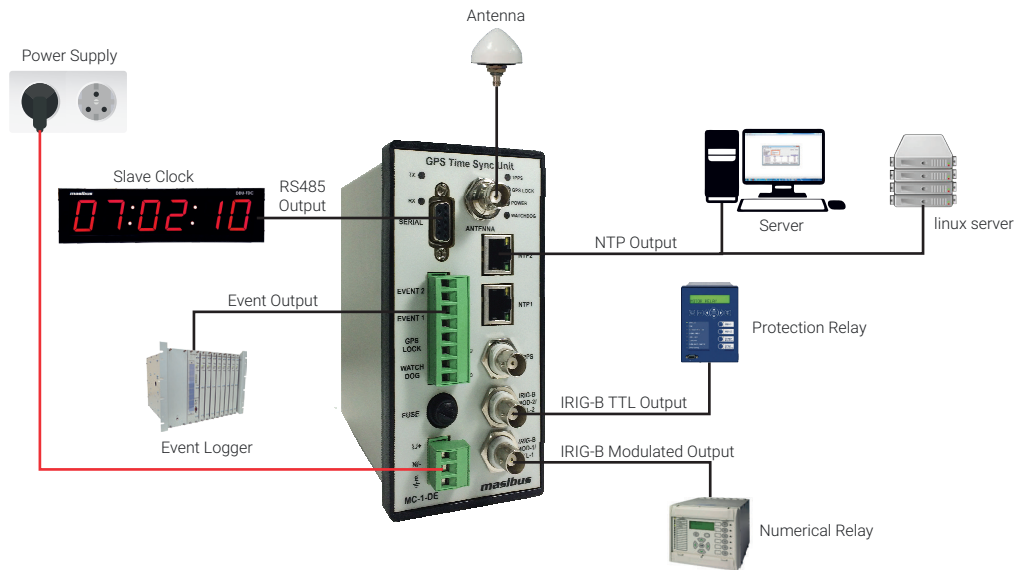
Timing Accuracy	< 15 ns with GPS receiver (Receiver is locked on fixed position)
Positioning Accuracy	< 10 m
Input Frequency	1575.42 MHz L1 C/A code
Tracking	12 Parallel channels
Acquisition Time	Hot start < 5 sec.
	Warm start < 38 sec.
	Cold start < 45 sec.

## Antenna

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

## Interface and Configuration

Display (available in MC-1-DH model only)	6 Digits, 0.56"(14mm) seven segment LED display (Red)
Displayed Data (Available in MC-1-DH model only)	Local/UTC time and date Lock/Unlock indication
Status LEDs	Power, 1PPS, Watchdog, GPS locked
Configuration Programming	<ul style="list-style-type: none"> <li>In MC-1-DH: Ethernet parameters and display parameters using TELNET (Ethernet RJ45 port)</li> <li>In MC-1-DE: Ethernet parameters using TELNET (Ethernet RJ45 Port) Hyper-terminal (Serial RS-232)</li> </ul>
Programmable Parameters (via TELNET / Hyper-terminal*)	<ul style="list-style-type: none"> <li>Network parameters (IP, Gateway, Subnet Mask) - via TELNET only</li> <li>Global time zone correction</li> <li>Manual time setting</li> <li>Propagation delay correction (Compensate for antenna cable length)</li> <li>Date/time selection [MC-1-DH model only]</li> <li>Data format selection (NMEA-GPRMC, NGTS or T-FORMAT) - [MC-1-DH model only]</li> <li>Additional event configuration (Total &amp; On time of Events) - [MC-1-DE model only]</li> </ul>
*Via Hyper-terminal is possible in MC-1-DE only	
NTP / SNTP Client Software	<ul style="list-style-type: none"> <li>Platform support: Windows 10 &amp; above, Windows server 2016 &amp; above, Unix, Linux, Solaris server for time synchronization</li> </ul>



# TECHNICAL SPECIFICATIONS

## Time Signal Output

Output Type	Description	Connector*	Accuracy (to UTC)	Available No. of Standard	Output Option	Available No. of Standard	Output Option
PPS	<ul style="list-style-type: none"> <li>1 Pulse per second</li> <li>TTL into 250Ω</li> <li>200 ms Pulse width</li> </ul>	BNC Female	±150nSec.	1	-	1	-
IRIG-B Modulated	<ul style="list-style-type: none"> <li>IRIG-B (127) or IEEE 1344/C37.118-2005</li> <li>1 KHz AM Signal</li> <li>Modulation ratio - 3:1</li> <li>3 Vp-p into 100 Ω ±10%</li> </ul>	BNC Female	±10μSec.	-	2 (Either IRIG B Mod or IRIG TTL)	-	1 (Either IRIG B Mod or IRIG TTL)
IRIG-B TTL	<ul style="list-style-type: none"> <li>IRIG-B (007) or IEEE 1344/C37.118-2005</li> <li>TTL into 50Ω</li> </ul>	BNC Female	±1.5μSec.	-	-	-	-
NTP (LAN Interface)	<ul style="list-style-type: none"> <li>Protocol support: NTP V3, SNTP, SNMP V2</li> <li>Network protocol: TCP, Telnet, UDP, IPv4</li> <li>Mode: Server</li> <li>Network interface: RJ45, 10/100Mbps</li> </ul>	RJ45	±1mSec.	-	2	1	1
COM-1	<ul style="list-style-type: none"> <li>Selectable between NMEA-GPRMC, NGTS or T-Format</li> <li>Isolated serial RS-232 or RS-485 (Factory set)</li> <li>Programmable baud rate, stop bit, parity bit and message format</li> </ul>	DB9 Female	-	-	1	NA	NA
Event	<ul style="list-style-type: none"> <li>PMOS relay</li> <li>Rating: 350VDC/120mA</li> <li>On time programmable</li> </ul>	Plug in screw terminals (2.5mm <sup>2</sup> cable size)	-	-	2 (Selectable PPS to PPD)	NA	NA
Alarm Output	<ul style="list-style-type: none"> <li>Rating: AC: 230 V @ 2A</li> <li>DC: 30V @ 2A, 110V @ 0.3A, 220 V @ 0.12 A (max)</li> <li>a) GPS Sync. Lost b) watchdog</li> </ul>	Plug in screw terminals (2.5mm <sup>2</sup> cable size)	-	-	2 Numbers of PFC	NA	NA

\*For BNC, RJ45 and DB9 option; 2 meter cable with mating connector supplied as standard

## Power Supply

Power Supply (Std.)	90-264V AC, 47 to 63 Hz / 90-300V DC
Power Supply (Optional)	18-75V DC
Power Consumption	<10 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

## Physical

Mounting	DIN-Rail (35mm) / Panel Mount / Wall Mount
Dimensions (mm) H x W x D	144 X 72 X 140 (MC-1-DE) 72 X 144 X 140 (MC-1-DH)
Ingress Protection	IP20 enclosure
Weight	900 g (approx.) (MC-1-DE) 800 g (approx.) (MC-1-DH)

## Environmental

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

## Directive Conformity

Electromagnetic Compatibility Directive 2014/30/EU	*IEC 61000-6-2: 2016, IEC 61000-6-4: 2018
Low Voltage Directive 2014/68/EU	*IEC 62368-1: 2018

\*Applicable only for CE marked MC-1-DE Model.

# TECHNICAL SPECIFICATIONS

## Ordering Code

Model	Output 1		Output 2 #		Output 3 #		Output 4		Output 5 ^		Power Supply		Mounting		Antenna Cable Length	
	X		X		X		X		X		X		XX		X	
MC-1-DE	0	None	0	None	0	None	0	None	0	None	U1	90-264V AC / 90-300V DC	D0	DIN Rail Mount	1	15 Meter
	1	1 NTP	1	IRIG-B AM	1	IRIG-B AM	1	RS-232	1	2 Event o/p + Alarm	U2	18-75V DC	W0	Wall Mount	2	30 Meter
	2	2 NTP	2	IRIG-B TTL	2	IRIG-B TTL	2	RS-485					P0	Panel Mount	3	50 Meter
															4	100 Meter
															S	Special

X - Specify from table

# IRIG B IEEE1344 option will work along with NTP o/p or serial o/p only

▲ Event o/p option will work along with serial o/p only

## Ordering Code

Model	Output 1		Output 2 #		Power Supply		Mounting		Antenna Cable Length	
	X		X		X		XX		X	
MC-1-DH	1	1 NTP	0	None	U1	90-264V AC / 90-300V DC	D0	DIN-Rail Mount	1	15 Meter
	2	2 NTP	1	IRIG-B AM	U2	18-75V DC	W0	Wall Mount	2	30 Meter
			2	IRIG-B TTL			P0	Panel Mount	3	50 Meter
									4	100 Meter
									S	Special

X - Specify from table

# IRIG B IEEE1344 option will work along with NTP o/p

### Standard Accessories

m-AN-01: Antenna	1 no.
m-MK-AMC-40-1: Antenna clamp for mounting	1 no.
Mounting kit	1 set

### Optional Accessory (extra cost)

m-LA-01: Lighting Arrestor (Surge Suppressor)
m-AR-01-01: Antenna Rod (1 meter)
m-SR-01: RS-485 Repeater
TDR-4: Time Distribution Rack
TSR: Time Signal Repeater
Netser (NGTS-NTP) Converter