masibus
A Sonepar Company

MTS300R

Redundant Master Time Sync Unit

High Performance. Accurate. Redundant.

RoHS

Masibus masTER Time-Sync MTS300R is capable for the time synchronization requirements in various industries like power, process, IT, telecommunications etc. It generates wide range of time code and pulse signals via different output ports like 1PPS, IRIG-B TTL/AM, NTP, serial (RS-232/RS-485), event/relay, PTP, pulse FO.

Masibus MTS300R is a GNSS (GPS+Glonass OR GPS+Glonass+Navic) based time server has redundant and non-redundant options for power supply and GNSS receiver functionality as per the customer requirement, MTS300R has a 20 x 4 LCD display for viewing of time parameters, status of GNSS receiver parameters, and output ports, discrete LEDs provide at-a-glance status and health information. The GNSS receiver has built-in RTC backed up with on board battery to maintain time during power loss and instant recovery on power resumption.

Network Time Protocol (NTP)
MTS300R is a stratum1 GNSS based full featured NTP server for synchronizing all types of NTP and SNTP clients in LAN. NTP v2/v3 and v4 with all modes (Unicast / Broadcast / Multicast) and NTP related all necessary MD5 authentication mechanisms are provided in this device. It is also capable to record and log internal CPU clock drift and accuracy statistics and displays it graphically on MTS300R webserver.

Networking Protocols
MTS300R supports a full suite of networking protocols for its own administration and configuration management. These are IPv4/v6, TCP, UDP, DHCP, HTTP, HTTPS, SNMP, SSH, SCP, SYSLOG, TELNET.

Security Features
MTS300R provides secured access for configuration and management through SSH, SCP, HTTPS. Full featured SNMP protocol with encryption DES/AES and authentication SHA/MD5 mechanisms. User accesses for console and web program are encrypted password supported. MTS300R is complying cybersecurity Guidlines.

User Friendly Setup and Administration
MTS300R is simple to install and easy to manage. Front panel controls allows network configuration and other set-up parameters. DHCP and IPv6 AUTOCONF feature capability makes MTS300R easy & ready to use on site network. Further, MTS300R can be completely configured remotely through webserver, SSH, SNMP, telnet & serial port. MTS300R can send notifications regarding various internal alarms to remote servers through SYSLOG and SNMP as well as logs it internally for future reference.

Features

- 22 Satellite parallel tracking
- <15 ns with GPS receiver (the receiver is locked on a fixed position)
- <±0.5 ppm (TCXO) accuracy while GPS Is Unlock
- <±0.0005 ppm (OCXO) accuracy while GPS is Unlock (Optional)
- Resynchronization Delay: - < 5 Min.
- Propagation delay compensation upto 99999 ns
- During the loss of the UTC source, Unit will shift to the internal RTC time & Software SNMP Trap as well as the hardware contact will be provided
- NTPv2/v3 and NTPv4 with MD5 authentication & symmetric and autokey management
- Secured web server
- FTP, networking protocols
- Remote alarm notifications via SNMP, SYSLOG
- Remote configuration using SSH, WEB SERVER, SNMP, TELNET
- Universal time-zone and DST settings
- Supports synchronization of IEC61850 compliant devices
- Universal (AC/DC) power supply
- Programmable pulse outputs
- Solid state relays for programmable events
- NTP client synchronization software
- Compact 19 " 3U rack mount enclosure
- USB port for Upgradation
- Diagnostic relay outputs
- IP bonding support on Ethernet ports
- Supporting Timing Protocols:
  - Serial NMEA [GPRMC, GPZDA, GPGGA], NGTS, T-FORMAT
  - IRIG-B (Modulated & Un Modulated/TTL/DCLS/PWM)
  - SNTP/NTP
  - PTPv2
  - Frequency Output (2.048 MHz (ITU-T G.703)/10 Mhz)

Applications: Time Synchronization of

- Sequence of Event Recorders, Disturbance Recorders, PMU
- Numerical Relays, Slave Clocks
- UNIX, Linux, Solaris & Windows Servers
- PLC/DCS/SCADA, ABT Metering
- Telecommunication, Synchrophasor Measurement
- EMS system, Fault Locator

TECHNICAL SPECIFICATIONS

GNSS Receiver	
Timing Accuracy	< 15 ns with GNSS (GPS + GLOANASS OR GPS + GLOANASS + IRNSS (NAVIC)) receiver (when receiver is locked on fixed position)
Positioning Accuracy	< 10m
Input Frequency	1575.42 MHz to 1602 MHz L1 C/A code, 1176.45 MHz + 1575.42 MHz to 1602 L1 + L5 C/A code
Tracking	22 Parallel channels
Acquisition Time	Hot start < 5 sec. Warm start < 38 sec. Cold start < 45 sec.
Antenna	
Type	Active L1 GNSS (GPS + GLOANASS) 40 dB gain Active L1 and L5. GNSS (GPS + GLOANASS + IRNSS (NAVIC), 40 dB gain
Antenna Cable Type	RG 6/RG 11
Operating Temperature	-40 to +85°C
Coverage	360 degree
Ingress Protection	IP67
Weight	150 g
Interface and Configuration	
Display	4 x 20 Character backlit LCD display
Displayed Data	Local / UTC time and date, Day of the week, Position latitude, longitude, Status of the GNSS receiver Configuration parameters.
Status LEDs	Power, 1PPS, Watchdog, Error, GPS Locked
Redundancy	Power supply redundancy GPS receiver clock module redundancy with individual GPS antenna connector Auto or Manual GPS Clock module seclection via switch Clock 1 / clock 2 switch to select preferable GPS clock module when MANUAL switch is selected Configurable ethernet port
Configuration Methods	Front keypad, Front console DB-9 port (Serial RS-232) Web server (HTTP/HTTPS), SSH, SNMP, TELNET (Ethernet RJ45 Port)
Keypad Configurable Parameters	Universal time zone correction, DST settings, Manual time setting Hour settings for display (12 or 24 format), UTC/LOCAL time display Data format selection (NGTS/T-FORMAT/GPGGA/GPZDA) Repetitive event generation output via potential free contact (PPS, PP5S, PPM, PPQH, PPHH, PPH,PPD) Propagation delay correction (compensation for antenna cable length) IPv4 Network parameters [IP, subnet, gateway] , DHCP Ethernet protocols (NTP, SNMP, Syslog, SSH, HTTP, HTTPS) service setting
Network Protocols	IPv4, IPv6, TCP, UDP, DHCP, AUTOCONF(IPv6) NTP v2[RFC 1119], v3[RFC 1305] and v4[RFC 5905] with unicast, broadcast / multicast modes SNMP v1[RFC 1157], v2[RFC 1901-1908] and v3[RFC 3411-3418] with enterprise MIB file SNMP v1, v2 and v3 compatible traps with two configurable SNMP trap managers SYSLOG for internal and remote alarm logging SSH v1, v2, telnet for remote configuration PTPv2 master - DEFAULT, IEEE C37.238-2011, IEEE C37.238-2017, IEC 61850-9-3, Profile Webserver through HTTP and HTTPS – browser based configuration & monitoring
Network Security Features	Configurable MD5 based encrypted password user access to SSH, telnet and webserver access NTP v3,v4 MD5 authentication with symmetric and autokey management SNMP v3 - AES/DES encryption and SHA/MD5 authentication SNMP v3 with no-auth / auth / priv security feature Configurable SSH v1, v2 with configurable 768 / 1024 / 2048 bits size security keys Configurable HTTPS SSL certificate
Logging & Alarms	Alarms and system messages logging using SYSLOG 100Kbytes of internal log memory Remote logging feature two configurable SYSLOG servers Remote alarm notification through SNMP traps and SYSLOG
NTP / SNTP Client Software	Platform support: Windows 10 & above, Windows server 2016 & above, Unix, Linux, Solaris server for time synchronization Using Net T Sync Software
USB Port	1 x USB Port on front panel Download/ upload of configuration files, Install firmware upgrades
Firmware Upgrade	Via webserver, TFTP, USB (All binaries + configuration)

TECHNICAL SPECIFICATIONS

CPU Card

Output	Description	Connector	Accuracy (to UTC)	Output per card
ETH x (LAN) Without PTP (CPU C1, C2)	Mode: Server IPv4, IPv6, DHCP, NTP, SNMP, WEB SERVER, SSH, TELNET Network interface: RJ45 with auto-negotiation	RJ45	±1mSec. [NTP server]	1 x 10/100 Mbps + 1 x 10/100/1000 Mbps
ETH x (LAN) With PTP (CPU C3)	Mode: Server IPv4, IPv6, DHCP, NTP, PTP, SNMP, WEB SERVER, SSH, TELNET Network interface: RJ45, auto-negotiation	RJ45	±1mSec. [NTP server] <1uSec. [PTP server]	1 x 10/100/1000 Mbps+ 1 x 10/100/1000 Mbps
NMEA	NMEA frame – GPRMC, Isolated output, RS232 /RS485** Fix configuration: 9600-8-N-1	Plug in screw terminals		1 no

**RS-232/RS-485 in CPU Card is site selectable, default setting RS-232

Time Signal Output

Output Type	Description	Connector	Accuracy (to UTC)
PPS Output	1 Pulse per second Over 250 Ω with 200 ms Pulse width	BNC Female	±100nSec.
IRIG-B Modulated Output	IRIG-B(127),1 KHz AM signal With Modulation ratio: 3:1 IRIG-B Output as per IEEE Standard C37.118 or IEEE 1344 standard Configurable 3 Vp-p, into 100Ω ±10%	BNC Female	±10µSec.
IRIG-B TTL Output	Format: IRIG-B (007) 100 Hz PWM signal IRIG-B Output as per IEEE Standard C37.118 or IEEE 1344 standard Configurable 5.5 Vp-p TTL signal into 50Ω IRIG-B PWM Differential RS485 Output (Optional/ On Request)	BNC Female	±1.5µSec.
Additional NTP Output	Mode: Server Protocol support: NTP V3, SNTP, TCP, TELNET, UDP, IPv4	RJ45	±1mSec. [NTP server]
Serial Output	Configurable serial frames (NMEA / NGTS / T-format) NMEA frames - GPRMC / GPZDA / GPGGA Isolated outputs with status LED RS-232 or RS-485 (Site Configurable), Fix configuration: 9600-8-N-1	DB9 Female	-
Event/ Pulse Output	Configurable event period (PPS, PP5S, PPM, PPQH, PPHH, PPH,PPD) with on time from 50 milliseconds to 50% of total period PMOS Relay output with status LED, Rating: 350V DC/120mA	Plug in screw terminals AWG max. 2.5 mm2	-
Relay Output	GPS Lock, Redundancy, Watchdog, Error Relay Rating: 230V AC/ 30V DC @ 2A; 110V DC@ 0.3A; 220V DC@ 0.12 A (max.)	Plug in screw terminals AWG max. 2.5 mm2	-
FDM Output	**Input Signal:** Mains frequency, 90 - 270VAC, 50Hz or 60Hz **Output Frame:** Serial frame (RS232, RS485) per second Baud rate: 9600/19200/38400/57600/115200-7/8-N/E/O-1/2 (Configurable) **Frame parameters**: Power line frequency, Frequency deviation, Reference time, Power line time, Time deviation **Alarm Outputs:** 2 PMOS relay alarm [Overflow, watchdog/Fail] Contact capacity: 350V DC, 120mA maximum	Input: 2-Way terminal strip DB-9 (RS-232) 2 pin plug (RS-485) 4 pin plug (Alarm)	Frequency: Accuracy of reference (Clock freq) ±1Hz Time deviation: Accuracy of reference (PPS) ±1ms
Fiber Optic Output	Signal type: IRIG-B TTL (007)/PPS/PPM/PPH/PPD - Configurable Transmission: Simplex, Fiber size: 62.5/125 µm, Wavelength: 820 nm Distance: 1750 meters	Multimode ST connector	As per signal type
PTP Output	Protocol: IEEE 1588v2, Default profile Power profile-IEEE C37.238-2011, IEEE C37.238-2017, Power utility profile-IEC-61850-9-3 Multicast, Unicast - layer 2, layer 3 ethernet (L2) or UDP IPv4 (L3) Delay Mechanism - E2E / P2P Sync Messages - Upto 128 messages/second per client PTP Modes - 1 Step / 2 Step	RJ45	±1uSec. [PTP server]
Frequency Output	2.048 Mhz Over BNC (75 Ohms) 2.048 Mhz Over Ethernet (120 Ohms) 10 Mhz Over BNC	BNC Female/RJ45	-

Multiple Output Card

Multi-Port Output Card (M1)#	2 Nos. IRIG-B AM /TTL / PPS (Any one factory set) 2 Nos. Event output and 2 Nos. Alarm (GPS Lock and Watchdog)	BNC female, Plug in screw terminals	As defined above respectively
Multi-Port Output Card (M2)#	1 Nos. IRIG-B AM /TTL / PPS (Any one factory set) 2 Nos of Event and 2 Nos Alarm (GPS Lock and Watchdog) 2 Nos. FO over IRIG-B TTL/PPS/PPM/PPH/PPD	BNC female, Plug in screw terminals, Multimode ST connector	As defined above respectively

TECHNICAL SPECIFICATIONS

Power Supply

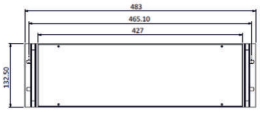
Standard	90 - 264 V AC / 90- 300 V DC, 65W
Option-1	18 - 75 V DC, 50W
Output Status	Power LED status, power fail relay output

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	3U, 19" Rack mount
Dimensions (mm)	133(H) x 483(W) x 240(D)
Ingress Protection	IP20 enclosure
Weight	5.2 Kg

Mounting Dimensions



Environmental

Operating Temperature	0 to +55°C
Storage Temperature	-20 to +80°C
Humidity	20-95 % RH non condensing

Type Test

EMI/EMC Tests	
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
Voltage Interruption/Voltage Dips	IEC 61000-4-11
Damped Oscillatory Wave Immunity Test	IEC 61000-4-18*
Conducted Emission	CISPR-16 or Equivalent
Radiated Emission	CISPR-16 or Equivalent
Environmental Tests	
Cold Test	IEC 60068-2-1
Dry Heat Test	IEC 60068-2-2
Damp Heat Test	IEC 60068-2-30
Vibration	IEC 60255-21-1
Shock Test	IEC 60255-21-2
Dielectric Test	IEC 60255-5-0*

Note: Tests marked with an asterisk (*) are currently in progress

Ordering Code

Model	Receiver Clock Module	Power Supply PS-1	Power Supply PS-2	CPU with Ethernet o/p	Output Card (Select Code for Card Type from Table1.1) Card-1	Card-2	Card-3	Card-4	Card-5	Card-6	Card-7	Card-8	Card-9	Antenna Cable Length
MTS300R	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Receiver Clock Module	
1	1 x Clock GPS+GLO
2	2 x Clock GPS+GLO
3	1 x Clock GPS+GLO+ IRNSS
4	2 x Clock GPS+GLO+ IRNSS

Power Supply PS-1	
1	90 - 264 V AC/ 90- 300 V DC
2	18-75 V DC

Power Supply PS-2	
N	None
1	90 - 264 V AC/ 90- 300 V DC
2	18-75 V DC

CPU with Ethernet o/p	
C1	1x10/100 Mbps
C2	1x10/100 Mbps +1x1 Gbps
C3	1x10/100 Mbps +1x1 Gbps with PTP

Antenna Cable Length	
0	None
1	15 Meters
2	30 Meters
3	50 Meters
4	100 Meters
S	Special

Output Card Table1.1

Card Type	None	IRIG-B AM		IRIG-B TTL		1PPS		Serial	Event		NTP/SNTP		Relay	FO		FDM	Multiport#		Special
Code-X	X	1B	1C	2B	2C	3B	3C	4B	5B	5C	6B	6C	7C	AB	AC	F	M1	M2	S
No. of Ports	-	2 No.	4 No.	2 No.	4 No.	2 No.	4 No.	2 No.	2 No.	4 No.	2 No.	4 No.	4 No.	2 No.	4 No.	4 No.	6 No.	7 No.	

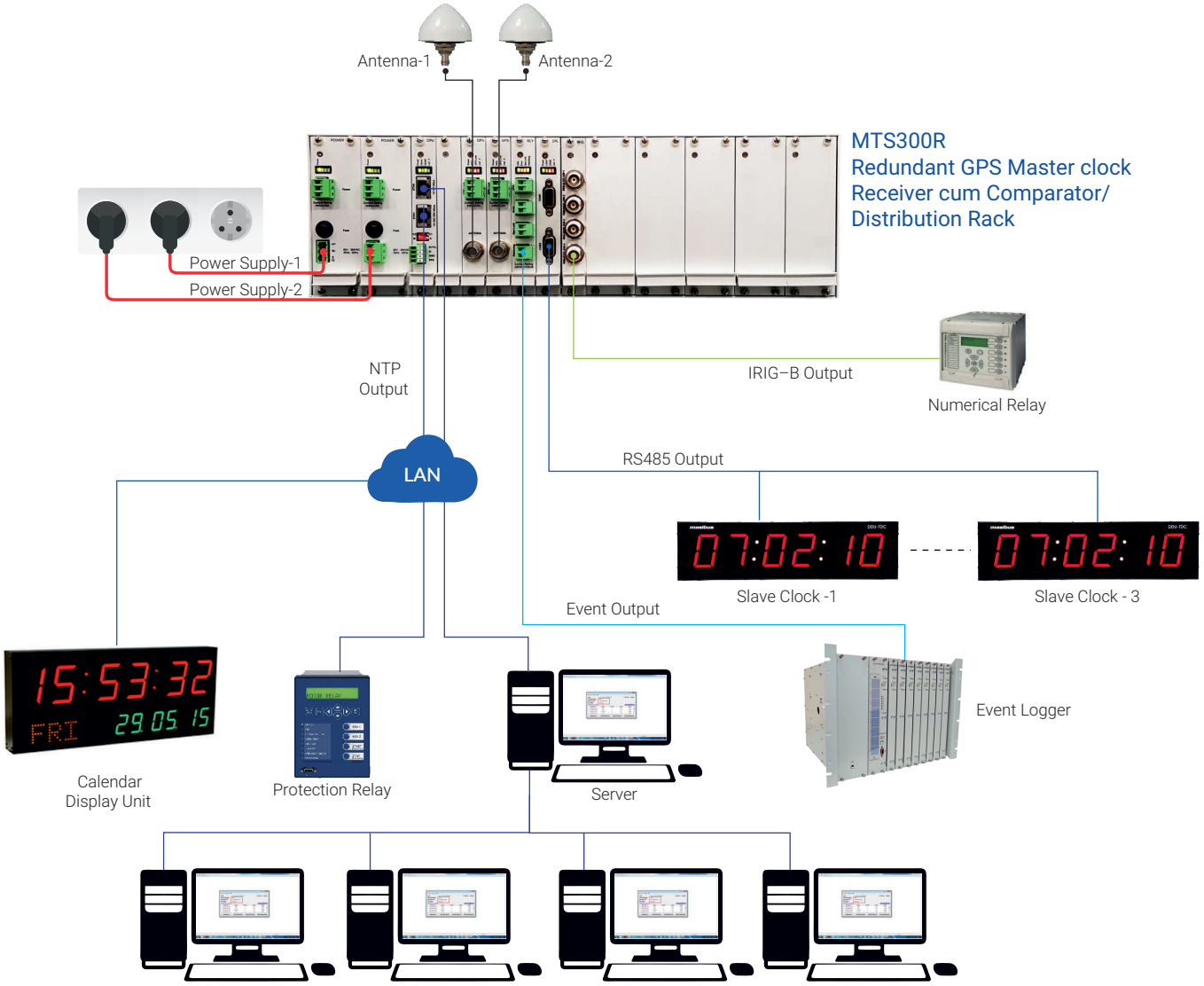
Standard Accessories
GPS Antenna and 0.5 Meter SS Antenna mounting rod integrated - 1 No.
2 Meter RJ45 Ethernet Cable - 1 No.
2 Meter RS-232 GPS Configuration Cable - 1 No.
Documents – User Manuals, Test Certificates - 1 Set
Windows based NTP Client Syncronization software - Download from Webstie

Optional Accessories (Extra Cost)
mLA01: Lighting Arrestor (Surge Suppressor) – 1 No.
S-lineamp: Line Amplifier - 1 No.

Note:

1. For unit with AC Power I/P: Max. upto 4 NTP cards are possible & with DC Power I/P: Max upto 3 NTP cards are possible.
2. #Customer to specify the required o/p type in Multiport Card while ordering.

GENERIC APPLICATION DIAGRAM



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