

SyncServer® SGC-1500

Smart Grid Clock for Substation Applications



Key Features

- PTP Grandmaster, Power Profile IEEE C37.238-2011
- Multiple gigabit Ethernet network ports
- Multiple time code and pulse outputs
- Internal GPS receiver accurate to <50 nanoseconds to UTC
- Time code generator supports IRIG-B, IEEE C37.118.1-2011
- Secure web based management
- Electromagnetic compatibility hardened to IEC 61850-3 and IEEE 1613-1
- NERC CIP compliant
- Dual DC power inputs
- Rubidium oscillator, option
- PTP Telecom Profile input, option
- Telecom T1/E1 sync outputs, option

Key Benefits

- Smart substation master clock: accurate, secure and reliable
- Synchronize IEDs, PMUs, merging units, meters
- Compatible with IEC 61850 station and process bus
- Support for existing substation timing allows migration to Smart Grid

Applications

- Power utility substation networks

Accurate, secure and reliable time synchronization is an operational necessity in the new world of smart substations. The Symmetricom® SyncServer® SGC-1500 Smart Grid Clock is designed specifically for the migration of power utility substations to the Smart Grid. It delivers the timing required by traditional substations as well as the new smart substations.

The SGC-1500 is ideally suited to synchronize automated operations that increase efficiency and respond instantly to conditions that threaten outages. The International Electrotechnical Commission (IEC) 61850 standard for electrical substation automation specifies microsecond timing accuracy for applications such as wide area measurement systems, traveling wave fault locators, and sample values. The SGC-1500 is an IEEE 1588 Precision Time Protocol (PTP) Grandmaster supporting the IEEE defined Power Profile that is optimized for time distribution over the substation local area network.

The SGC-1500 includes a highly accurate Coordinated Universal Time (UTC) clock that is synchronized to an internal time optimized GPS receiver. Its high performance network timing engine is

compliant with the new IEEE C37.238-2011 PTP Power Profile standard. On the output side, the SGC-1500 includes multiple gigabit Ethernet ports to interface to and synchronize station and process bus devices with PTP. Separate network ports are provided for remote and local management.

Oscillator upgrade to rubidium provides maximum clock holdover performance during dropouts of the time reference signals and helps mitigate GPS vulnerabilities. The timing reference can be further protected by distributing precise time to the substations over the wide area network using a centrally deployed PTP Grandmaster and the PTP Telecom Profile as an optional input to the SGC-1500.

The SGC-1500 also offers strong support for IRIG and other legacy timing interfaces required by IEDs and other substation devices. Multiple outputs are available to provide a wide variety of time code and pulse output signals, as well as optional T1/E1 outputs.

The SGC-1500 is the most powerful substation master clock available today. It is intuitive to use and securely provides all the timing inputs and outputs required within smart and traditional substations.

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Specifications

NETWORK PROTOCOLS

- HTTP/SSL/HTTPS (RFC2616)
- DHCP (RFC2131)
- IPv4
- IEEE 1588 PTP C37.238-2011
- SNMP v1 (RFC3584)

TIME ACCURACY

- Locked to GPS:
 - ±50 ns RMS, 150 ns peak to peak to UTC, ≥4 satellites tracked
- Holdover/Aging:
 - TCXO [standard]: 18 milliseconds/day <1E-06/month
 - Rubidium [optional]: <50 microseconds/day <3E-10/month

GPS RECEIVER

- 12 channel parallel receiver
- Connector to antenna: BNC
- Impedance: 50 ohms
- Gain at input: 20-36 db
- Voltage to antenna: 12 VDC

PTP SERVER

- IEEE 1588-2008 (PTP v2) Grandmaster
- IEEE C37.238-2011 Power Profile
 - Layer 2 Ethernet
 - Multicast
 - Peer to peer

ANTENNA

- Size: 3" Dia. x 3" H (7.62 cm x 7.62 cm)
- Connector: TNC
- Impedance: 50 ohms
- Gain: 41 db
- Voltage: 12 VDC
- Operating temperature: -55°C to +85°C

MECHANICAL/ENVIRONMENTAL

- Size: 1.75" x 17" x 13" (4.5 cm x 43.2 cm x 32.02 cm) 1U rack mount
- Power: 48 VDC, 40 watts
- Operating temperature: -20°C to +70°C
- Storage temperature: -40°C to +70°C
- Humidity: to 95%, noncondensing
- Server weight: 9 lbs (4.1 kgs)
- Shipping package: 16 lbs (7.3 kgs)

CERTIFICATIONS

- MET NRTL (USA and Canada)
- FCC
- CE
- CB Scheme
- VCCI

SAFETY COMPLIANCE

- UL 60950-1 (2nd Edition)

- CSA C22.2 No. 60950-1
- IEC 60950-1 CB (2nd Edition)
- EU 2006/95/EC Low Voltage Directive (LVD)
- EN60950-1 (2nd Edition)

EMC COMPLIANCE

- FCC Part 15 (Class A)
- CISPR 22 (Class A)
- EU 2004/108/EC Electromagnetic Compatibility Directive
- EN55022 (Class A)
- EN55024
- IEC 61850-3 (DC supply surge rated at 3kV differential, 1kV common)
- IEEE 1613-1

Test documentation available upon request.

FRONT PANEL

Display: Sharp, high-resolution 32x256 dot-matrix vacuum-fluorescent. 1,2 or 4 line.

Keypad: 0-9 numeric, up, down, left, right, ENTER, CLR, TIME, STATUS, MENU. Keypad lockout.

LEDs: (tri-color green/red/orange)

Lock: Time reference status

Network: Network connection status

PTP: PTP active

Alarm: Fault condition

Console: Reserved

LAN 0: Local management, 10/100 Base-T Ethernet

REAR PANEL

J1 GPS L1, 1575 MHz (BNC)

J2-3 Fiber optic timing outputs (optional)

Connector type: ST

Wavelength: 820 nm ~ 860 nm Multimode

Time code: DCF77, C37.118.1-2011 (IRIG-B)

Pulse outputs: 0.5PPS, 1 PPS, 1PP 30 minutes, 1PPM, 1PPH

J4-5 Digital timecode: IEEE C37.118.1-2011 (IRIG-B) or DCF77

Logic 0: <0.8 V, Logic 1: >4.5 V, Zout = 50 ohms

J6-7 Digital pulse: 1 PPS

Logic 0: <0.8 V, Logic 1: >4.5 V, Zout = 50 ohms

J8-9 Analog timecode: IEEE C37.118.1-2011 (IRIG-B)

Analog: 6 V p-p, ± 0.5 V, Zout = 50 ohms

J10-11 Reserved

J12 RS-422 100 ohm (RJ45)

J13 RS-232 100 ohm (RJ45)

P1 T1/E1 output (optional)

P2 T1/E1 output (optional)

LAN 1: SFP 100/1000 Base-X or RJ-45 100/1000 Base-T Ethernet, Remote Management

LAN 2: SFP 100/1000 Base-X or RJ-45 100/1000 Base-T Ethernet, PTP Telecom Profile input, option

LAN 3: RJ-45 100/1000 Base-T Ethernet, PTP Power Profile output

LAN 4: RJ-45 100/1000 Base-T Ethernet, PTP Power Profile output

OC 1, 2: Open Collector Outputs (optional)

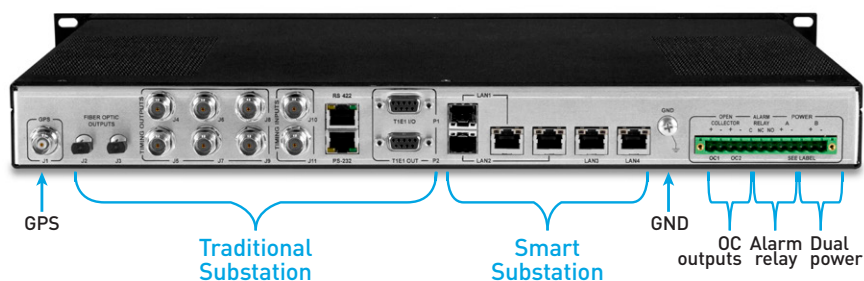
Alarm Relay: SPDT (Form C)

PRODUCT INCLUDES

- SGC-1500 Smart Grid Clock
- L1 GPS antenna
- 50' (15 meters) LMR240 coaxial cable
- 1 ft. antenna mounting mast (30 cm) with two clamps
- Category 5 patch cable
- Rack mount ears
- Manual CD

OPTIONS

- Rubidium oscillator upgrade for extended holdover
- T1/E1 Output
- PTP Telecom Profile, input
- Fiber optic timing output (time code, pulses)
- Open Collector outputs (pulses)
- GPS antenna in-line amplifier for cable runs to 300' (90 m)
- GPS antenna down/up converter for cable runs to 1500' (457 m)
- Lightning arrestor



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