

## Product Overview

The **VCL-2156, GigE NTP Server** is designed to provide PTP, NTP Clock that is locked to a GPS / GNSS reference to provide time synchronization to private networks such as Railways and Metro networks, Airports and Air-Traffic Control facilities, Power Utilities, Oil and Gas Utilities, ISPs and Cable TV networks as well as to Campus networks that are required to maintain a complete isolation from public networks for security reasons.

VCL-2156 locks to a GPS / GNSS reference to provide an NTP time reference on up to 4 x 10/100/1000BaseT Ethernet Ports which can be segregated to serve separate classes of assets in the network.



### Features and Highlights:

- IEEE 1588 v2 Precision Time Protocol Grandmaster
- PTP Profiles supported: Telecom profile, Power profile
- Support up to 128 PTP Clients
- Gigabit Ethernet Interfaces for NTP and PTP ports
- High bandwidth NTP performance
- Upto 7,500 NTP requests per second
  - 40,000 NTP Slaves supported
  - 250,000 SNTP Slaves supported
- Multiple NTP Ports - 4 Independent 10/100/1000 Mbit/s, RJ-45 Ethernet interfaces
- ITU-T G.811 / Stratum 1 compliant (PR) Primary Reference when locked to GPS
- ITU-T G.812 compliant holdover
- Synchronization of NTP and SNTP clients
- Leap Second Correction Support
- MD5 authentication for NTP clients
- Meets and comply with Power Contact and Lightning Protection as per EN61000-4-5 Level 3 specification
- Alert notifications via SNMP Traps, SNMPv2, SNMPv3
- Concurrent IPv6 and IPv4 operation
- Networking protocols: IPv4, IPv6, SSH, TELNET, FTP, SYSLOG, SCP, TFTP, SCP, SFTP
- Supports Anti Jamming
- Supports Anti-Spoofing
- Secure network management: enable or disable options
- Double Oven Quartz Oscillator (OCXO) hold-over
- DC, or AC, or 1+1 Redundant AC+DC Power Supply options.

The **VCL-2156** is equipped with a highly accurate, low-noise OCXO to provide a high stability, ITU-T G.812, Type II, III compliant holdover clock with better than 12µs accuracy over a 24 hour (5 milliseconds per year) period in the event of unavailability of the GPS signal or antenna failure, or a temporary loss of reception in a totally isolated network without any external reference.

**VCL-2156** establishes a highly accurate phase-synchronized frequency and time base by synchronizing to the GPS satellites' atomic clocks to distribute synchronized time over packet based networks including Ethernet, Carrier Ethernet, IP and IP/MPLS Networks.

The **VCL-2156** provides NTPv4 time reference. Features such as maintaining a distinctly separate IP address for system management and control, password based access, SSH as well as Md5 authentication ensures operational reliability and security. Additional features include remote login and remote firmware upgrade (file transfer) capabilities. VCL-2156 includes complete SNMP monitoring as well as support for enterprise directory services for user authentication, internal and external logging and monitoring of alarm and error messages through Syslog ensures a high level of system manageability. Other features include DHCP for installation convenience and support concurrent IPv4/IPv6 support for future network up gradation.

### Display:

- LCD-display with back-light

### MTBF:

- Per MIL-HDBK-217F: ≥ 37 years @ 24C
- Per Telcordia SSR 332, Issue 1: ≥ 42 years @ 24C

### Performance:

VCL-2156 has 4x10/100/1000BaseT Industrial Ethernet Ports that meet and comply with "Power Contact and Lightning Protection" as per EN61000-4-5 Level 3 specifications making it suitable for the equipment to be installed in harsh industrial environments which include Electric Sub-Stations, Railway and Metro Networks.

VCL-2156 is powered by a high performance microprocessor and a highly precise GPS based time receiver that provides a better than 30 nanosecond accuracy to assure high bandwidth NTP Performance of better than 7,500 NTP requests per second / 128 packets per seconds (40,000 NTP Slaves supported ).

### Monitoring and Management:

The configuration can be managed by Graphical User Management Interface. A text based and menu driven setup utility is also available via Telnet or SSH. An optional Graphical User Network Management Interface (NMS) allows multiple systems installed on a networks to be monitored and configured from a single or multiple management locations.

### Synchronization Inputs:

- 1+1 x GPS / GNSS (TNC)

### PTP Time Output:

- 1 x Gigabit IEEE-1588 v2 PTP Grandmaster

### NTP Outputs:

- 4 x 10/100/1000 Mbps NTP Interfaces
- 1 x 10/100Mbps user configurable NTP / OAM interface.

### Security and Protection:

- Password Protection with password strength monitor
- SSH

**Technical Specifications:****GPS/GNSS Receiver Specifications:**

- 50 Channel GPS Receiver
- 72 Channel GNSS Receiver
- GPS L1 frequency, C/A Code Receiver
- Tracks up to 12 satellites in GPS only mode (GPS only version)
- Tracks up to 24 satellites in GNSS mode (GNSS version)
- Synchronizing Time:
  - Acquisition time - Hot Start: 1 sec.
  - Acquisition time - Warm Start: 28 sec.
  - Acquisition time - Cold Start: 28 sec.
- GPS/GNSS Signal
  - Tracking and Navigation: -162 dBm
  - Reacquisition -160 dBm
  - Cold Start -148 dBm
- Antenna Connector: TNC
- Accuracy Of Time-Pulse Signal referenced to GPS:  $\pm 30$ ns (raw)
- Accuracy Of Time-Pulse Signal referenced to GNSS:  $\pm 20$ ns (raw)
- Accuracy Of Time-Pulse Signal referenced to GPS/GNSS:  $\pm 15$ ns (compensated)  
(Note: with all satellites in view at -130db)

**Holdover (G.812) Synchronization:**

- OCXO (Double Oven-Controlled Crystal Oscillator)
- Accuracy
  - 0.5 ppb per day
  - 50 ppb per year

**Network Time Protocol:**

- NTP v2, (RFC 1119), NTP v3 (RFC 1305), NTP v4, (RFC 5905), SNTP v3 (RFC 1769), SNTP v4 (RFC 2030), MD5 Authentication
- Upto 7,500 NTP requests per second
- 40,000 NTP Slaves supported
- 250,000 SNTP Slaves supported
- Internet Protocol: IPV4 - DHCP (RFC 2131), IPV6 - DHCPv6 (RFC 3315)
- NTP Version 4.2.8p7
- Time Protocol: TIME (RFC 868)
- Daytime Protocol: DAYTIME (RFC 867)

**PTP Profiles:**

- Default Profile
- Power Profile - C37.238-2011
- Power Profile - C37.238-2017
- Power Profile - IEC/IEEE 61850-9-3
- Power Profile - IEC 61850-9-3
- Telecom Profile G.8275.1-2008
- Ethernet Default Profile (Layer 2 multicast)
- Communication: Unicast, Multicast, Mixed
- Best Master Clock Algorithm (BMCA)

**PTP IEEE 1588 v2 Grandmaster**

- Communication: Unicast, Multicast, Broadcast
- Synchronization of IEC-61850 Compliant
- <100ns Accuracy when locked with GPS
- PTP Slave/Client capacity: 8, 16, 32, 64 or 128
- User Configurable
  - 1-step and 2-step Clock
  - End-to-End and Peer-to-Peer
- Layer 2 (Ethernet) or Layer 3 (UDP)
- Configuration message rate 8 pkts/sec, 16 pkts/sec, 32 pkts/sec, 64 pkts/sec, 128 pkts/sec
- Up to 128 message per second
- 1x 10/100/1000Base-T (RJ45)

**Local / Remote Management:**

- RS-232C, USB
- 10/100BaseT Ethernet RJ45
- 2 x External Alarm Relay Contacts
- Telnet / SSH v2 (option to disable clear text communication to comply with NERC security requirements)
- CLI Control Interface (HyperTerminal or VT100)
- SNMPv2, SNMPv3 Traps (MIB provided)
- Syslog, HTTP/HTTPS
- TCP, UDP, FTP, SCP, SFTP.

**Configuration and Monitoring Software:**

- Telnet, SSH, CLI
- NMS - GUI (Graphical User Interface) - Runs on any PC operating on Windows 7, Windows 8 or Windows 10 OS.

**Standards & Compliance:**

- IEC - EMC – Certified to EN 55022: 2005 / CISPR 32A / EN55022, EN 55024:2005, IEC 61000-4-2, IEC 60255 / 61000-4-6, 8, 9, IEC 60255-22-6, IEC 60255-5:2000, IEC 61000-4-8, IEC 61000-4-9, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-18, IEC 60068-2-6, IEC 60068-2-1Ad, IEC 60068-2-14Ad, IEC 60068-2-2Bd, IEC 60068-2-30, IEC 61850-3
- RoHS, CE – 2001/95/EC, 2006/95/EC, EN60950-1, EN61000-6-2, EN61000-6-4
- FCC – FCC Part 15 B Class A: Conducted Emission test on Power Line
- FCC Part 15 B Class A: Radiated Emission >1 GHz FCC, 6 GHz, on Power Line

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**Mechanical Specifications:**

- H x W x D: 44 mm x 480 mm x 225 mm
- Weight: 2.3 Kg
- 19", 21", 23" Rack mounting options - 1U High
- IP Rating: IP20

**Environmental (Equipment):**

Operational	-20C to +65C (Typical: +25C)
Cold start	-10C
Storage	-40C to +85C
Humidity	95% non-condensing
Cooling	Convention Cooled. No cooling fans are required.

**Power Supply:**

- Dual Redundant
- 1+1 AC power (100 to 240V AC, 50/60 Hz, IEC C14 Inlet Connector)
- 1+1 DC 24V, 1+1 DC 48V
- 1+1 DC 110~220V
- AC or DC
- Reverse Polarity Protection

**Power Consumption:**

- <15W at ambient (steady state 24°C)

**Antenna Specifications:**

- Antenna Type: Active, Wall Mounting
- Antenna Connector: TNC
- Polarization: Right hand circular
- Frequency Band: 1575.42 MHz  $\pm$  10 MHz
- Amplifier Gain: 40dB  $\pm$  4dB
- VSWR: <2.0 Max, 1.0 Typical
- Operating temperature: -40C to +85C
- Out of Band Rejection:  $\geq$  -60dB @  $\pm$  50MHz off center (1575.42 MHz) frequency
- Lightning Protection: According to EN61000-4-5 Level 3.
- LMR400 (or equivalent) Cable Length - 30, 50, 60, 90 and 100 meters

**Ordering Information:**

Part Number	Description
VCL-2156-NTP-PTP-yy	NTP Server and IEEE-1588v2 PTP Grandmaster yy: AC or ACR or DC or DCR or ACDC (1+0, 1+1, AC+DC)

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