VCL-2156, PTP IEEE-1588v2 Grandmaster with NTP SERVER

Product Overview

The VCL-2156, PTP IEEE-1588v2 Grandmaster with NTP SERVER is designed to provide PTP, NTP and ITU-T G.811 Primary Reference Clock that is locked to a GPS / GNSS Reference to provide time synchronization to private networks such as Railways and Metro (ticketing and platform) networks, Airports and Air-Traffic Control facilities, Electric Sub-Stations, Power Distribution and Transmission companies, 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. It may be also used by 2G, 3G and LTE service providers which provide a time of day reference to their customers over their wireless networks.

VCL-2156 locks to a GPS / GNSS reference to provide an NTP time reference on up to 4+1, 10/100BaseT 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
- 2048MHz, 10MHz, PPS and TOD Output
- High bandwidth NTP performance
- Upto 5000 NTP requests per second
- Multiple NTP Ports - 4+1 x Independent
- 10/100 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
- MDS authentication for NTP clients
- 1 x IRIG-B Un-Modulated (BNC)
- 1 x IRIG-B Modulated (RI4S)
- Meets and comply with Power Contact and Lightening Protection as per Telcordia GR-1089-CORE and EN61000-4-5 Level 3 specifications.
- Alert notifications via SNMP Traps, SNMPv2, SNMPv3
- Concurrent IPv6 and IPv4 operation
- Networking protocols: IPv4, IPv6, SSH, TELNET, FTP, SYSLOG, SCP, TFTP, SCP, SFTP
- Secure network management: enable or disable options
- Double Oven Quartz Oscillators (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 / GLONASS 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 / GLONASS satellites’ atomic clocks to distribute synchronized time over packet based networks including Ethernet, Carrier Ethernet, IP and IP/MPLS Networks.

The VCL-2156 provides a wide range of GPS / GLONASS referenced frequency and time sources that include 2.048MHz, 10MHz, 1PPS frequency as well as an NMEA and NTPv4 time reference. Features such as maintaining a distinctly separate IP address for system management and control, password based access, SSH as well as MDS 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 upgrade.

Performance:

VCL-2156 has 4+1, 10/100 BaseT Industrial Ethernet Ports that meet and comply with “Power Contact and Lightening Protection” as per Telcordia GR-1089-CORE and 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 / GLONASS based time receiver that provides a better than 30 nanosecond accuracy to assure high bandwidth NTP Performance of better than 5000 NTP requests per second / 128 packets per seconds.

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.

Standards & Compliance:

- IEC - EMC – Certified to EN 55022: 2005 / CISPR 22A / 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 60068-4-18, IEC 60068-2-6, IEC 60068-2-14Ad, IEC 60068-2-1Ad, IEC 60068-2-2Bd, IEC 60068-2-30, IEC 61850-3
- CE – 2001/95/EC, 2006/95/EC, EN60950-1, EN61000-6-2, EN61000-6-4
- FCC Part 15 B Class A: Radiated Emission >1 GHz FCC, 6 GHz, on Power Line
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 Signal
  - Tracking and Navigation: -162 dBm
  - Reacquisition -160 dBm
  - Cold Start -148 dBm
- Antenna Connector: TNC
- Accuracy Of Time-Pulse Signal referenced to /c33
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- Synchronizing Time:
  - GPS/L1 frequency, C/A Code Receiver
- 72 Channel GNSS Receiver
- GPS/GNSS Receiver Specifications:
  - Accuracy Of Time-Pulse Signal referenced to /c33

**PTP IEEE 1588 v2 Grandmaster:**
- <100ns Accuracy when locked with GNSS (GPS/GLONASS)
- 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
- 1 x 10/100/1000Base-T (RJ45)

**Network Time Protocol:**
- NTP v2, (RFC 1119), NTP v3 (RFC 1305), NTP v4, (RFC 5905), SNTP v3 (RFC 1769), SNTP v4 (RFP 2030), MDS Authentication
- 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)
- Communication: Unicast, Multicast, Broadcast
- Synchronization of IEC-61850 Compliant

**Local / Remote Management and Monitoring Ports:**
- RS-232C, USB
- 10/100BaseT Ethernet RJ45
- 2 x External Alarm Relay Contacts.

**Display:**
- LCD-display with back-light

**Ordering Information:**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCL-2156-NTP-yy</td>
<td>NTP Server</td>
<td>yy: AC or ACR or DC or DCR or ACDC (1+0, 1+1, AC+DC)</td>
</tr>
<tr>
<td>VCL-2156-NTP-PTP-yy</td>
<td>NTP Server and IEEE-1588v2 PTP Grandmaster</td>
<td>yy: AC or ACR or DC or DCR or ACDC (1+0, 1+1, AC+DC)</td>
</tr>
</tbody>
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Technical specifications are subject to changes without notice.

**Security and Protection:**
- Password Protection with password strength monitor
- SSH

**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.

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

**Mechanical Specifications:**
- Height 44 mm
- Width 480 mm
- Depth 225 mm
- Weight 2.3 Kg
- Rack Mount Options 19", 21", 23" Rack mounting options

**Power Supply:**
- Dual Redundant
- 1+1 AC power (100 to 240V AC, 50/60Hz)
- 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
- Polarization: Right hand circular
- Frequency Band: 1575.42 MHz ± 10 MHz
- Amplifier Gain: 40dB ± 4dB
- VSWR: <2.0 Max, 1.0 Typical
- Operating temperature: -40C to +85C
- Out of Band Rejection: > -60dB @ ±50MHz
- Frequency: According to EN61000-4-5 Level 3.
- LMR400 (or equivalent) Cable Length - 30, 50, 60 and 90 meters

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