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-Station, 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
- 40,000 NTP Slaves supported
- 250,000 SNTP Slaves supported
- 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 (Rj45)
- 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.

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 (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

Standards & Compliance:
- IEC - EMC – Certified to EN 55022: 2005 / CISPR 22A / EN50522, 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 60255 / 61000-4-6, 8, 9, IEC 6068-2-6, IEC 6068-2-1Aad, IEC 6068-2-14Ad, IEC 60068-2-2Bd, IEC 6068-2-3O, 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 GPS: +/-30ns (raw)
- Accuracy Of Time-Pulse Signal referenced to GNSS: +/-20ns (raw)
- Accuracy Of Time-Pulse Signal referenced to GPS/GNSS: +/-15ns (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

Synchronization Inputs:
- 1 x GPS [TNC]

NTP Outputs:
- 4 x 10/100 Mbps NTP interfaces
- 1 x 10/100 Mbps user configurable NTP interface

PTP, Frequency and Time Outputs:
- 1 x IEEE-1588 v2 PTP Grandmaster
- 1 x 2.048 MHz, 50 Ohms, phase-locked to GPS (BNC), ITU-T G.811 compliant.
- 1 x 10 MHz, 50 Ohms, phase-locked to GPS (BNC), ITU-T G.811 compliant.
- 1 x 1 PPS, phase-locked to UTC (BNC)
- 1 x ToD (Time-Of-Day) output compliant to IEC-61850 Compliant
- 1 x 1 PPS, phase-locked to UTC (BNC)
- 1 x 10 MHz, 50 Ohms, phase-locked to GPS (BNC), ITU-T G.811 compliant.
- 1 x 1 PPS, phase-locked to UTC (BNC)
- 1 x 1 PPS / 1 PPH

Network Time Protocol:
- NTP v2, (RFC 1119), NTP v3 (RFC 1305), NTP v4, (RFC 5905), SNTP v3 (RFC 1769), SNTP v4 (RFC 2030), MDS Authentication
- Upto 5000 NTP requests per second
- 40,000 SNTP Slaves supported
- 250,000 SRTP 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 IEEE 1588 v2 Grandmaster
- Communication: Unicast, Multicast, Broadcast
- Synchronization of IEC-61850 Compliant
- <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)

PTP Profiles:
- Default Profile
- Power Profile C37.238-2011
- Power Profile C37.238-2017
- Power Profile IEC/IEEE 61850-9-3
- Telecom Profile G.8265.1
- Telecom Profile G.8275.1-2008
- Ethernet Default Profile (Layer 2 multicast)
- Communication: Unicast, Multicast, Mixed
- Best Master Clock Algorithm (BMCA)

Display:
- LCD-display with back-light

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

Local / Remote Communication Options:
- Telnet / SSH (option to disable clear text communication to comply with NERC security requirements)
- CLI Control Interface (HyperTerminal or V.100)
- SNMPv2, SNMPv3 Traps (MIB provided)
- Syslog, HTTP/HTTPS
- TCP, UDP, FTP, SCP, SFTP.

Ordering Information:

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>VCL-2156-NTP-yv</td>
<td>NTP Server</td>
<td>yv: AC or ACR or DC or DCR or ACDC (1+0, 1+1, AC+DC)</td>
</tr>
<tr>
<td>VCL-2156-NTP-PTP-yv</td>
<td>NTP Server and IEEE-1588v2 PTP Grandmaster</td>
<td>yv: AC or ACR or DC or DCR or ACDC (1+0, 1+1, AC+DC)</td>
</tr>
</tbody>
</table>

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, 50/60 Hz)
- 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
- Amplier Gain: 40dB + 4dB
- VSWR: ≤ 2.0 Max, 1.0 Typical
- Operating temperature: -40C to +85C
- Out of Band Rejection: ≥ -60dB @ ±50MHz off center (1575.42 MHz) frequency
- Lightening Protection: 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

Technical specifications are subjects to changes without notice.

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