

VCL-2156-PTP-NTP / VCL-2156-NTP

GPS PRC PTP & NTP CLOCK SERVER



PTP

Grand-Master
IEEE-1588v2

NTP

V2/v3/v4

GPS PRC

G.811

OCXO

G.812 holdover

1U COMPACT

Cost effective

Introduction

The VCL-2156-PTP-NTP IEEE-1588v2 Grandmaster is designed to provide PTP Telecom and Power profiles

VCL-2156-PTP-NTP & VCL-2156-NTP SERVER are designed to provide 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.

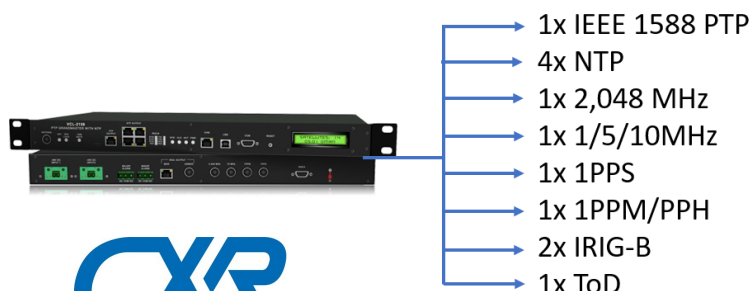
The VCL-2156 is equipped with a highly accurate, low-noise OCXO to provide a high stability, ITU-T G.812, Type II, III compliant holdover clock with better than 12µs accuracy over a 24 hour (5 milliseconds per year) period in the event of unavailability of the GPS / GNSS signal, or GPS / GNSS antenna 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 / GNSS satellites' atomic clocks to distribute synchronized time over packet-based networks including Ethernet, Carrier Ethernet, IP and IP/MPLS Networks.

In addition to functioning as a primary NTP server, the VCL-2156 may also be used as an intermediate NPT server in the event of the loss or the absence of the GPS input. This feature increases the reliability and resilience of the VCL-2156 NTP server, which in the event of losing its GPS signal, automatically becomes a secondary NTP server by synchronizing to another primary NTP time server located in the same network to acquire and to continue to dispense an accurate NTP time reference.

PTP 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



Display:

LCD-display with back-light (HH:MM:SS) - 12/24 Hour Mode

NTP Peering:

NTP peering is a method to allow multiple NTP servers to share time. Having more than one reference server configured increases reliability of the NTP server.

In peering mode, in addition to its GPS reference, VCL-2156 can be configured to receive and monitor time from an additional Stratum 1 NTP Server available on the network. This allows the unit to fall back to its peer source in the event its primary reference becomes unavailable.

Performance:

The VCL-2156 has 4+1, 10/100 BaseT 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 provides a better than 30 nanosecond accuracy to assure high bandwidth NTP Performance of better than 7,500 NTP requests per second (40,000 NTP Slaves supported).

Monitoring and Management:

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

Features and Highlights:

- GPS / GNSS Input
- NTP Input
- Functions as a Primary NTP Server
- Automatic failover to function as a secondary NTP Server, in the absence of GPS Signal
- High bandwidth NTP performance
- Up to 7,500 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/GNSS
- ITU-T G.812 compliant holdover
- Synchronization of NTP / SNTP clients
- Supports Unicast, Multicast, Broadcast
- NTP Peering
- Leap Second correction Support
- MD5 authentication for NTP clients
- 1 x IRIG-B Un-Modulated (BNC)
- 1 x IRIG-B Modulated (RJ45)
- Meets and comply with Power Contact and Lightning Protection as per EN61000-4-5 Level 3 specifications.
- Alert notifications via SNMP Traps, SNMPv2, SNMPv3, SMTP (Email)
- Concurrent IPv6 and IPv4 operation
- Supported network protocols: IPv4, IPv6, SSH, TELNET, FTP, SYSLOG, SCP, SFTP
- DHCP Support
- Secure network management: enable or disable options
- Double Oven Quartz Oscillators (OCXO) hold-over
- Stratum 1 when synchronized to GPS/GNSS, or Stratum 2 hold-over
- DC, or AC, or 1+1 Redundant AC+DC Power Supply options.

PTP, Frequency and Time Outputs:

- 1x Gigabit IEEE-1588 v2 PTP Grandmaster
- 1 x 2.048 MHz, 75 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.
- 1x1 PPS, phase-locked to UTC (BNC)
- 1 x ToD (Time-Of-Day) output compliant to NMEA 0183 (DB9)
- 1 x IRIG-B Un-Modulated (BNC-50 Ohms) (B000, B002, B003, B004)
- 1 x IRIG-B Modulated (RJ45) (B120, B122, B123, B124)
- 1x1 PPM / 1 PPH

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)

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 simultaneously
 - 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: ± 30 ns (raw)
 - Accuracy Of Time-Pulse Signal referenced to GNSS: ± 20 ns (raw)
 - Accuracy Of Time-Pulse Signal referenced to GPS/GNSS: ± 15 ns (compensated)
- (Note: with all satellites in view at -130db)

Synchronization Inputs:

- 1 x GPS / GNSS (TNC)
- NTP Time Source

Holdover (G.812) Synchronization:

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

NTP Outputs:

- 4 x 10/100Mbps NTP / SNTP Interfaces
- 1 x 10/100Mbps user configurable NTP / SNTP interface

Frequency and Time Outputs:

- 1 x 2.048 MHz, 75 Ohms, phase-locked to GPS / GNSS (BNC). ITU-T G.811 compliant.
- 1 x 10MHz, 50 Ohms, phase-locked to GPS / GNSS (BNC). ITU-T G.811 compliant.
- 1 x 1PPS, phase-locked to UTC (BNC)
- 1 x ToD (Time-Of-Day) output compliant to NMEA 0183 - RS232C (DB9)
- 1 x IRIG-B Un-Modulated (BNC-50 Ohms) (B000, B002, B003, B004)
- 1 x IRIG-B Modulated (RJ45) (B120, B122, B123, B124)
- 1 x 1 PPM / 1 PPH - Programmable
- 1 x Potential Free Contact

IRIG-G format :

- IRIG-B formats compliant : **B120, B122, B123 and B124**

MTBF:

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

Specifications

Network Time Protocol:

- NTP v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4, (RFC 5905), SNTP v3 (RFC 1769), SNTP v4 (RFP 2030), MD5 Authentication
- Up to 7,500 NTP requests per second
40,000 NTP Slaves supported
250,000 SNTP Slaves supported
- Internet Protocol: IPv4/IPv6
- NTP version 4.2.8p7
- Time Protocol: TIME (RFC 868)
- Daytime Protocol: DAYTIME (RFC 867)
- Supports Unicast, Multicast and Broadcast
- NTP Peering

Security and Protection:

- Password Protection with password strength monitor
- SSH

Local / Remote Management:

- RS-232C
- USB
- 10/100BaseT Ethernet RJ45
- 1 x External Alarm Relay Contact.
- Telnet / SSH (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.

Standards & Compliance:

- IEC - EMC – Certified to EN 55022: CISPR 32, EN 55024:2005, IEC 61000-4-2, IEC 60255 / IEC 61000-4-6, IEC 61000-4-8, 61000-4-9, IEC 60255-22-6, IEC 60255-5:2000, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-18, IEC 61000-4-17, IEC 60950, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-14, IEC 60068-2-30, IEC 61850-3, IEC 60068-2-40, IEC 60068-2-6, IEC 60068-2-27
- 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

Configuration and Monitoring Software:

- Telnet,
- SSH,
- CLI
- NMS - GUI (Graphical User Interface) - Runs on any PC operating on Windows 11 or Windows 10 OS.

Specifications

Mechanical Specifications:

- H x W x D: 44mm x 480 mm x 225 mm
- Weight: 2.3 Kg
- 19", 21", 23" Rack mounting options

Environmental (Equipment):

Operational	-20°C to +65°C
Cold start	-10°C
Storage	-40°C to +85°C
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
- 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: > -60dB @ \pm 50MHz off center (1575.42 MHz) frequency
- Lightning Protection: According to EN61000-4-5 Level 3 (Optional).
- LMR400 (or equivalent) Cable Length - 30, 50, 60 and 90 meters

Expansion Chassis

- Up to 6 User selectable output modules (Add any 4 output cards, in any combination Please specify in order)
- Up to 16 x IRIG-B Un-Modulated outputs (RS422, RS485, RS232)
- Up to 16 x IRIG-B Un-Modulated outputs (BNC)
- Up to 8 x NMEA-0183 outputs (RJ45)
- Up to 16 x 1PPS outputs (BNC)
- Up to 4 x 1PPS outputs (ST)

Ordering information

Reference	Description
VCL-2156-PTP-NTP	<p>VCL-2156, GPS Primary Reference Clock (ITU-T G.811 Compliant), IEEE-1588v2 PTP Grandmaster with NTP , 19-inch, Rack Mount version</p> <p>Supports:</p> <p>Network Interface</p> <ul style="list-style-type: none"> - 4 x NTP (Ethernet) Ports [10/100Mbps, Electrical RJ45 (F)] - 1 x High Stability OCXO Holdover Clock <p>Inputs:</p> <ul style="list-style-type: none"> - 1 x GPS (TNC (F)) <p>Outputs:</p> <ul style="list-style-type: none"> - 1 x IEEE-1588v2 PTP Grandmaster - 4 x NTPv4 Ports - 1 x 2.048MHz (ITU-T G.811 Compliant) - 1 x 10MHz (ITU-T G.811 Compliant) - 1 x 1PPS (Phase synchronized with better than 100ns accuracy) - 1 x NMEA - 1 x IRIG-B (Unmodulated) - 1 x IRIG-B (Modulated) <p>Management: SNMP (Minitor), Telnet / SSH (RJ45 (F) Port), Serial Port (USB, DB-9 COM), EMS, Graphical User , Interface (GUI)</p> <p>Installation Kit: System Core Cables, Mounting Hardware, Documentation, User Manual</p> <p>#Add Antenna and cables</p> <p>#Add lightning protection kit VCL-GPS-PROTEC.</p> <p>[# Add Power Supply Option VCL-PS-xx] 1 or 2.</p>
VCL-2156-NTP	<p>Same as VCL-2156-PTP-NTP description, without PTP features.</p> <p>GPS PRC synchronization with NTP protocol, no power supply</p>
VCL-2156-EXT-2786	<p>VCL-2156 Extension Unit (NTP Client /NTP Slave), 19-Inch, Rack mountable, [supports up to 4 cards, ref VCL-2444-485, VCL-2447-232, VCL-2480, VCL-2482-M, VCL-2482-P, VCL-2485-I, VCL-2485-N, VCL-2488, VCL-2727-I, VCL-2727-P].</p>

Accessories	Description
VCL-GPS-ANT	GPS antenna, 30dB, N-Type (F) connector
VCL-GPS-COAX-TNC-N	N-Type (M) to TNC (M) GPS cable adapter, 3 meters
VCL-GPS-COAX-30M	N-Type (M) to N-Type (F) GPS cable, 30 meters
VCL-GPS-COAX-60M	N-Type (M) to N-Type (F) GPS cable, 60 meters
VCL-GPS-PROTEC	GPS lightning protection kit, 50 Ohms, N-Type (M) to N-Type (F)

POWER SUPPLY	Description
VCL-PS-AC220	110-230 Vac power supply module for VCL. 1 x 90~240V AC, 50/60 Hz, Power Supply Input Installation in our factory.
VCL-PS-DC048	48 Vdc power supply module for VCL. Installation in our factory
VCL-PS-DC220	1 x 110~250V DC Power Supply Input for VCL. Installation in our factory
VCL-PS-ACDC	1 x 90~240V AC, 50/60 Hz, Power Supply Input, 1 x 48V DC Power Supply Input. Installation in our factory
VCL-PS-DC048DC220	1 x 48V DC Power Supply Input 1 x 110~250V DC Power Supply Input Installation in our factory
VCL-PS-AC220R	2 x 110-230 Vac power supply module for VCL. 2 x 90~240V AC, 50/60 Hz, Redondunt Power Supply Input Installation in our factory.
VCL-PS-DC048R	2 x 48V DC Power Supply Input [Redundant] power supply module for VCL-TP. Installation in our factory
VCL-PS-DCR220	2 x 110~250V DC Power Supply Input [Redundant]. Installation in our factory



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