

# VCL-2156-PTP-NTP

## GPS PRC PTP & NTP CLOCK SERVER



**PTP**  
Grand-Master

**NTP**  
V2/v3/v4

**GPS PRC**  
G.811

**OCXO**  
G.812 holdover

**1U COMPACT**  
Cost effective

## Introduction

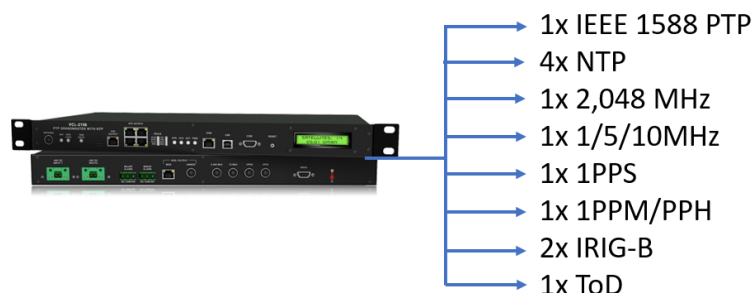
The VCL-2156 NTP SERVER is designed to provide NTP and ITU-T G.811 Primary Reference Clock that is locked to a GPS / GNSS reference to provide time synchronization to private networks such as Railways and Metro (ticketing and platform) networks, Airports and Air-Traffic Control facilities, Electric Sub-Station, 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.



**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.

# 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:  $\pm 30$ 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)

## 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:  $\geq 37$  years @ 24C
- Per Telcordia SSR 332, Issue 1:  $\geq 42$  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	GPS PRC synchronization with PTP and NTP protocols, no power supply
VCL-2156-NTP	GPS PRC synchronization with NTP protocol, no power supply
VCL-2156-AC220	110-230 Vac power supply module
VCL-2156-DC048	48 Vdc power supply module
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)



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