



Cern C-2000

Stratum 1 PTP 1588v2 Grand Master Clock

NTP server

PRS/PRC

Features

- » Hardware-based timestamps, 100 Mbps wirespeed NTP processing
- » Variety of antenna voltage outputs
- » Integrated web server
- » Telnet, SNMP and MIB support
- » 10/100Base-T Ethernet interfaces
- » OCXO or Rubidium oscillator option

Benefits

- » Ease of use
- » Lower OpEx
- » Reuse of existing antenna
- » Nanosecond timestamp accuracy
- » Storage backup and scheduling
- » Impervious to Denial of Service attacks

Industry firsts

- » ITU Stratum over IP
- » IP-based redundancy

The Cern C-2000 from Brilliant Telecommunications, Inc., is a 19-inch rack-mountable Primary Reference Source (PRS) and Primary Reference Clock (PRC) that provides superior hardware-based timestamping accuracy and redundant configurability.

The C-2000 accepts a GPS signal from a variety of manufacturers' antennas and provides antenna power via an attached RF cable. The server is also capable of accepting a signal from timing sources such as GLONASS systems, or via Network Time Protocol (NTP) from a network peer.

The C-2000 uses highly accurate NTP and Precision Timing Protocol (PTP) technology. With timestamping performed in the hardware, the C-2000 provides wirespeed NTP/PTP with unparalleled accuracy while decreasing vulnerability to Denial of Service (DoS) attacks. In the event that a direct connection with the GPS is interrupted the C-2000 maintains Stratum 2 synchronization with the use of a local Rubidium oscillator.

Because of its integrated platform, the C-2000 replaces previous generations' equipment at a lower total cost of ownership. The network timing distribution capabilities of the C-2000 reduce the need for expensive Cesium timing elements in the network. A Rubidium internal oscillator option is available for standalone or central office deployments.



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Specifications

General

Specifications

GR-2830
ITU G.811
ANSI T1.101
NEBS Level 3

Internal oscillator

Rubidium upgrade

Sync inputs

GPS standard
GLONASS
2x T1/E1

Communications

RS-232 (RJ-45)
Ethernet (RJ-45) 10/100Base-T, IEEE 802.3

Receiver options

- » GPS (L1) or GLONASS

System outputs

Number of system outputs 14

T1/E1

Number of T1 or E1 outputs 8

T1 port format

Transmit/receive bit rate—1.544 Mbps
Line encoding—B8ZS
Framing—Extended Superframe (ESF) with or without SSM support
Connector—RJ-48, 110 ohm

E1 port format

Transmit/receive bit rate—2.048 Mbps
Line encoding—HDB3
Framing—G.704 without CRC4, G.704 with CRC4 with or without SSM support
Connector—RJ-48, 120 ohm

Frequency output

Number of 10 MHz outputs 1
Number of 5/1 MHz outputs 1
(software selectable)
Connector BNC, 50 ohm

Composite Clock

Number of Composite Clock outputs 2

Frequency accuracy

Locked to GPS or Stratum 1 BITS— 1×10^{-11}
Holdover
Rubidium— 2.5×10^{-11} 24 hour stability
OCXO— 7.0×10^{-10} 24 hour stability

PPS output

Number of PPS outputs 1
Signal type TTL, pulse
Connector BNC

IRIG-B

Number of IRIG-B outputs 1
Signal type Modulated or unmodulated TTL
(100 pps)
Time code format BCD, CF, SBS
Connector BNC

Timing accuracy

Locked to GPS— ± 100 ns to GPS
Holdover
Rubidium— $< 3 \mu\text{s}$ to GPS for 24 hours 32° to $+122^\circ\text{F}$ $\pm 41^\circ\text{F}$ (0° to $+50^\circ\text{C}$ $\pm 5^\circ$)
OCXO— $< 60 \mu\text{s}$ to GPS output for 24 hours

Physical

Dimensions 1.75" high x 17.5" wide x 12" deep
(4.45 x 44.45 x 30.48 cm)
Power 48 VDC nominal (30 to 60 VDC);
90-264 VAC, 50 to 60 Hz
Operating temperature 32° to $+122^\circ\text{F}$
(0° to $+50^\circ\text{C}$)
Power consumption 20 W
Humidity 5% to 95% noncondensing

EMC FCC Part 15

Safety TÜV, North America and Europe

RoHS Level 6

Management

- » Local or remote
- » Embedded web server GUI
- » Telnet/SSH/Craft CLI (Cisco-like)
- » Network management can be performed through the Ethernet port
- » SNMP v1/v2/v3

Protocols and standards

ANSI T1.101
Daytime (RFC 867)
DiffServ/DSCP (RFC 2474)
GR-378-CORE, GR-1244, GR-2830
HTTP/HTTPS (RFC 2616)
IEEE 1588 v2 (PTP)
IRIG-B (IRIG Standard 200-98)
IPv4
ITU G.811, G.812, G.823, G.824, G.703, G.704
MD5 authentication (RFC 1321) release 2
NTPv2 (RFC 1119), v3 (RFC 1305), v4 enhancements
NTP broadcast mode, multicast, manycast
SMTP forwarding
PTPV2 IEEE 1588
SNMP v1 (RFC 1157), v2 (RFC 1448), v3 (RFC 2271), MIB II (RFC 1213)
SNTP (RFC 2030)
SSH (RFC 4250-4254)
SSL v1, v2, v3
Telnet (RFC 854)
TFTP (RFC 1350)
Time (RFC 868)
802.3



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