

# Tempus LX CDMA Network Time Server

*A Stratum 1 Time Server to Easily Synchronize Your Network*

**While installing an antenna on the roof is a typical requirement for most other time servers, with the Tempus LX you can easily mount the antenna on top of your equipment rack, or anywhere else inside your building.** The Tempus LX can serve accurate time to any system running an NTP or SNTP client and can support 200,000 network clients (workstations, servers, routers, etc.) with an NTP timestamp accuracy of <10 microseconds. The highly-integrated solid-state design is extremely reliable, and you can easily manage it by using the network port, a local console on the RS-232 serial port, or via the display and keypad. A Web Interface (HTTPS) is also provided for status monitoring using your Internet browser.



## CDMA Cellular/PCS

### Timing and Frequency Control

The Tempus LX includes a proprietary CDMA receiver for synchronization to Universal Coordinate Time (UTC). It receives its timing information from the Global Positioning System (GPS) via the CDMA mobile telecommunications network used by many cellular telephones. This means the antenna can be conveniently located inside buildings, anywhere a cell phone signal is available.

### Easy and Safe Installation

Since CDMA signals can be received inside buildings, Tempus LX saves installation, labor and leasing costs inherent in traditional

GPS timing systems. The rackmount unit is easily installed wherever it is needed and the 10/100Base-T ethernet interface smoothly integrates with existing network equipment. The unit is up and running in just a few minutes on networks supporting DHCP. In addition, by installing the small cellular antenna safely within the confines of your building, the Tempus LX virtually eliminates any risk of damage to your equipment rack caused by lightning strikes.

### Network Security Hardened

Extra care has been taken with the Tempus LX to "harden" it against network attacks. There are only a small handful of settings that need to be made and they typically need to be set only once in the lifetime of the product. Since this is a set-it-and-forget-it box we have eliminated all extraneous protocols/services in order to minimize exposure to security holes. You can change settings via SSH or Telnet and monitor the alarm/status information by using HTTPS, SNMP, SSH or Telnet. Security-conscious users can disable any or all of the risky protocols such as HTTPS, Telnet, Time and Daytime or restrict HTTPS, SNMP, SSH and Telnet access to specific hosts.

### Superior Reliability

The superior reliability of the Tempus LX is the result of a very highly-integrated, solid-state design in which all components undergo a selection process for reliability. This is combined with a production process which integrates stringent quality assurance inspections and rigorous performance verification. These processes yield a Mean Time Between Failure (MTBF) for the Tempus LX of 25 years based on demonstrated field data.

### Risk-Free Guarantee

If you are not satisfied with the Tempus LX for ANY reason, simply return it within 60 days for a full refund less shipping fees. See [www.endruntechnologies.com/guarantee.htm](http://www.endruntechnologies.com/guarantee.htm) for details.

## FEATURES

- CDMA Cellular/PCS synchronization. (No subscriber fees.)
- NTP v4, SNMP v3, SSH and more.
- IPv6 and IPv4 compliant.
- Optional PTP/IEEE-1588.
- User-friendly display & keypad with built-in help menus.
- Web Interface lets you monitor status via your Internet browser.
- Three-Year Warranty.
- 60-Day Money-Back Guarantee.
- Free technical support and software upgrades for life.

## KEY BENEFITS

- Indoor Antenna.
- Accurate and secure source of network time inside your firewall.
- Up to 200,000 network clients can be reliably synchronized within 1/2 to 2 milliseconds of each other.
- Easy to install and maintain.
- No costly antenna installation fees.
- No risk of lightning strike damage to your equipment rack.



*No GPS Rooftop Antenna.  
This antenna easily mounts anywhere inside your building.*

# Tempus LX CDMA Network Time Server

## Specifications



### CDMA RECEIVER:

- Digital Cellular Mobile Receive Band - 869-894 MHz.
- PCS Mobile Receive Band - 1930-1990 MHz.
- TIA/EIA IS-95 CDMA Pilot and Sync Channels.

### ANTENNA:

- TNC jack on rear panel,  $Z_{in} = 50\Omega$ .
- Dual Band, 824-896 MHz/1850-1990 MHz, magnetic-base with integral 12 ft. RG-58/U cable and TNC plug. Extension cables and preamplifiers are available as options.

### TIME TO LOCK:

- < 5 minutes, typical (TCXO).
- < 10 minutes, typical (OCXO/Rb).

### HOLDOVER ACCURACY:

- TCXO (standard): 10 milliseconds/day. Serves Stratum 1 time for 24 hours after signal loss.
- OCXO: 100 microseconds/day. Serves Stratum 1 time for 35 days after signal loss.
- Rubidium: 8 microseconds/day. Serves Stratum 1 time for 140 days after signal loss.

### SYNCHRONIZATION ACCURACY:

- CDMA Receiver Accuracy: < 10 microseconds to UTC when locked, typical.
- NTP Timestamp Accuracy: < 10 microseconds while supporting up to 200,000 clients (typical).
- NTP Client Synchronization Accuracy: Network factors can often limit LAN synchronization accuracy to  $\frac{1}{2}$  to 2 milliseconds, typical.

### SUPPORTED PROTOCOLS:

- SNTP, NTP v2, v3, v4, MD5 authentication, and broadcast/multicast mode and autokey.
- SSH server with "secure copy" utility, SCP.
- SNMP v1, v2c, v3 with Enterprise MIB.
- HTTPS (Web Interface).
- TIME and DAYTIME server.
- TELNET client/server.
- FTP and DHCP clients.
- SYSLOG.
- IPv4 and IPv4/IPv6 Hybrid.
- Optional PTP/IEEE-1588.

### NTP CLIENT SOFTWARE:

- NTP client software is freely available. Refer to [www.endruntechnologies.com/ntp-client.htm](http://www.endruntechnologies.com/ntp-client.htm).

### NETWORK I/O:

- Rear panel RJ-45 jack.
- 10/100Base-T Ethernet.

### SERIAL PORT I/O:

- RS-232 serial I/O on rear panel DB9M jack for secure, local terminal access.
- Parameters fixed at 19200 baud, 8 data bits, no parity, 1 stop bit.

### SYSTEM STATUS INDICATORS:

- Sync LED: Green LED pulses to indicate lock status.
- Network LED: Amber LED indicates network activity.
- Alarm LED: Red LED indicates a serious fault condition.

### ALPHANUMERIC DISPLAY/KEYPAD:

- Display: Brilliant 16x280 dot-matrix vacuum-fluorescent.
- Keypad: Enter, Back, Edit, Right, Left, Up, Down, Help.

### FIRMWARE UPGRADES:

- Software is field-upgradeable and provided free-of-charge.

### POWER:

- 90-264 VAC, 47-63 Hz, 0.5A Max. @ 120 VAC, 0.25 A Max @ 240 VAC.
- 110-370 VDC, 0.5A Max. @ 120 VDC.
- 3-Pin IEC 320 on rear panel, 2-meter cord included.

### SIZE:

- Chassis: 1.75"H x 17"W x 10.75"D.
- Weight: < 5 pounds.
- Antenna: 14"H x 2" diameter at base.

### ENVIRONMENTAL:

- Temperature: 0° to +50° C.
- Humidity: 0 to 95%, non-condensing.

### COMPLIANCE:

- CE, FCC.

### OPTIONS:

- OCXO, Rubidium, IEEE-1588 (PTP), Timecode, 1 PPS, Alarm Output, Sysplex Timer Output, -48 Vdc Input, 10 MPPS, Programmable Pulse Rate Output. More options available - call us.

### PTP/IEEE-1588 (Grandmaster) - (option):

- IEEE-1588-2008 (V2) and IEEE-1588-2002 (V1).
- Version 2 Parameters: Default Profile. Multicast. Two-Step Clock. Delay Mechanism: E2E or P2P. Delay Interval: 2 seconds. Delay Request Interval: 1, 2, 4, 8 or 16 seconds. Sync Interval: 1 or 2 seconds. Transport: UDP/IPv4.
- PTP Slave Synchronization Accuracy to the Grandmaster: 10 microseconds, typical, network topology dependent.

### 1 PPS OUTPUT - (option):

- 1 PPS: Positive TTL pulse @ 50Ω or RS-422 levels.
- User-Selectable Width: 20 us, 1 ms, 100 ms, 500 ms.
- Accuracy: < 10 microseconds to UTC typical when locked.
- Stability: TDEV < 50 ns,  $\tau < 10^4$  seconds.

### TIMECODE OUTPUT - (option):

- Signal: 1 Vrms into 50Ω, 1 kHz carrier.
- User-Selectable Format: IRIG-B120 (IEEE-1344), IRIG-B122, IRIG-B123, NASA-36, or 2137.

### ALARM OUTPUT - (option):

- Open Collector, 40V Max, 100 mA Max Saturation Current.
- High impedance after signal loss or at major hardware fault.

### PROGRAMMABLE PULSE RATE OUTPUT - (option):

- Pulse: TTL squarewave into 50Ω.
- User-Selectable Rate: 1, 10, 100, 1K, 10K, 1M, 5M, 10M PPS and DC-Shift Timecode.
- Accuracy: <  $10^{-11}$  to UTC for 24-hour averaging times when locked.
- Stability:  $\sigma_y(\tau) < 10^{-9}$  for  $\tau < 10^3$  seconds,  
 $\sigma_y(\tau) < 10^{-6}/\tau$  for  $\tau > 10^3$  seconds.

### SERIAL ONCE-PER-SECOND TIME OUTPUT - (option):

- RS-232 output only port - transmits ASCII characters indicating current time.
- 9600 baud, 8 data bits, 1 stop bit, odd parity.
- IBM Sysplex Timer compatibility. Other formats available - call us.

