EndRun
TECHNOLOGIES
"Smarter Timing Solutions"

Ninja *Time Server*

GPS-Synchronized, Portable

Ninja is a compact network time server optimized for size, weight, and power (SWaP). It provides an accurate and reliable source of network time inside your firewall and can support thousands of NTP or SNTP clients. Optionally, it can be configured as a PTP/IEEE-1588 Grandmaster. Ninja is DC powered, consumes less than 8 watts and is easily integrated into portable, battery-powered systems. An external AC/DC supply is available for stand alone applications.

Secure Network Interface
To synchronize network clients, Ninja provides a robust Network Time Protocol (NTP) server and optional IEEE-1588 Precision Time Protocol (PTP) Grandmaster. The IPv4/IPv6 management interface supports SSH, SNMPv3 and HTTPs. It's also security-hardened to meet the highest Information Assurance (IA) requirements.

Measurement Statistics and Charting
Real-time charting of NTP, GPS, Oscillator and CPU statistics are available via the Web Interface. Measurements are continuously computed and displayed in real-time with daily charts going back 10 years. The oscillator statistics verify that the unit was locked at a certain time. NTP statistics plots show the NTP packet rate and the accuracy of the NTP and System Time relative to UTC. The CPU statistics show the free memory, processor load and operating temperature.

Management - Status & Control
Ninja provides a secure Web Interface (HTTPS) for status monitoring using your Internet browser. To easily manage Ninja, you can use the network port or the RS-232 serial port. A handful of simple commands and interactive question/answer utilities are all that is needed to configure and control this product. There is no need to be proficient at Linux. Online help for all of the Ninja-specific commands is available. However, many Linux experts desire more control, and with the Ninja you have a very high level of control over the entire product and can customize virtually all aspects of operation.

PTP/IEEE-1588 Grandmaster Clock Option
Ninja can be configured as a Precision Time Protocol (PTP) Grandmaster Clock with high capacity and hardware-based packet processing. You can easily configure all PTP parameters via the network port or serial port. Once the PTP Grandmaster configuration is saved, it is broadcast to all PTP slaves who then configure themselves accordingly. If more than one Ninja is installed on your network, the PTP Best Master Clock (BMC) algorithm automatically decides which one becomes the Grandmaster.

Reference Oscillators
The basic Ninja ships with the standard TCXO. A Premium OCXO is available as an optional upgrade. The reference oscillator determines how fast the timing drifts in case of GPS signal loss. The better the oscillator, the slower the drift and the longer Ninja can maintain "perfect time". This is called the holdover period. The table on the next page shows oscillator specifications. For NTP applications, the most important specification is the Stratum 1 Holdever Period. For PTP applications, the most important specification is the Accumulated Time Error.

High Reliability and Two-Year Warranty
Ninja uses EndRun's power-efficient, fanless design and thermal packaging with an estimated MTBF of over 20 years. It's made in America, backed by a two-year warranty, includes a 60-day money-back guarantee and free technical support for life.

FEATURES

- GPS-Synchronized.
- Network Time Protocol (NTP).
- PTP/IEEE-1588 Grandmaster (optional).
- SNMP, SSH, HTTPS and more.
- IPv6 and IPv4 compliant.
- Secure Web Interface to monitor status via your Internet browser.
- Daily and weekly data plots: CPU, NTP, GPS and Oscillator Statistics.
- Serves NTP Stratum 1 time for 24 hours if GPS signal is lost. Up to 35 days with Oscillator Upgrade Option.
- Up to five optional outputs: 1PPS, PPO, time code (AM and DC) and alarm.
- Two-Year Warranty.
- Free technical support and software upgrades.
- 60-day money-back guarantee.

BENEFITS

- Accurate and secure source of network time inside your firewall.
- Thousands of of NTP clients can be reliably synchronized to within ½ - 2 milliseconds of each other.
- Easy to operate and maintain.
- Optimized SWaP solution easily integrated into a 1U host system.

Ninja Time Server
Specifications

GPS RECEIVER
– L1 Band - 1575.42 MHz. 12 Channels, C/A Code.
– 15 dB minimum gain at receiver input.
– Static and dynamic (shipboard) operating modes.
– Timing Receiver Autonomous Integrity Monitoring (TRAIM).
– SMA connector (female), $Zin = 50\Omega$. 5 VDC to antenna.

TIME TO LOCK
– <5 minutes, typical (TCXO).
– <10 minutes, typical (OCXO).

SYNCHRONIZATION ACCURACY
– GPS Receiver Accuracy: < 25 nanoseconds RMS to UTC(USNO) when locked*.
– NTP Timestamp Accuracy to reference clock: < 10 microseconds @ 2,500 requests/second.
– NTP Client Synchronization Accuracy: Network factors can often limit LAN synchronization accuracy to ½ - 2 milliseconds, typical.
– Optional PTP Timestamp Accuracy to reference clock: 8 nanoseconds.
   * See GPS-UTC Timing Specifications for details.

NETWORK PROTOCOLS
– NTP v3, v4, SNTP, MD5/SHA/autokey authentication, broadcast/multicast mode.
– SSH client/server with "secure copy" utility, SCP.
– SNMP v1, v2c, v3 with Enterprise MIB.
– HTTPS (Web Interface).
– TELNET client/server.
– FTP and DHCP clients.
– SYSLOG.
– IPv4/IPv6.
– PTP/IEEE-1588-2008 (v2) Grandmaster Option.

IEEE-1588/PTP GRANDMASTER OPTION
– IEEE-1588–2008 (v2) with 8-ns timestamp resolution.
– Default or IEEE-802.1AS Profile.
– Transport: IPv4. Layer-2 (L2) or Layer-3 (L3).
– Delay Mechanism: E2E or P2P.
– Transmission Mode: Multicast or Hybrid.
– Sync Interval: 1, 2, 4, 8, 16, 32, 64 or 128 packets/second.
– Announce Interval: 1, 2, 4, 8 or 16 seconds.

NETWORK I/O
– 10/100Base-T Ethernet. RJ-45 jack.

OPERATING SYSTEM
– Linux Kernel 4.14.88.

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

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

DC POWER
– 9-18 VDC, 1 amp / 8 watts maximum.
– Connector: Molex Micro-Fit 3.0 2-pin jack.
   (Mate: Molex 43025-0200/20-24 AWG Terminal: Molex 43030-0008.)

SIZE
– Chassis: 1.5"H x 5.3"W x 4.4"D.
– Weight: < 1 pounds (0.45 kg).

ENVIRONMENTAL
– Operating Temperature/Humidity: 0° to +50° C / 5% to 90% RH, non-condensing.
– Storage Temperature/Humidity: -40° to +85° C / 5% to 95% RH, non-condensing.

ANTENNA KIT OPTION
– 40 dB gain LNA with band–pass filter for out-of-band interference rejection.
– Rugged, all-weather housing capable of operation over -40° to +85°C.
– 50' low-loss RG-59 cable. Optional lengths up to 1000' with preamplifiers.
– Mounting kit: 18" long, 3⁄4" aluminum pipe with clamps.
– TNC connector (female), $Zout = 50\Omega$. 5 VDC input.
– Size: 3.25"H x 3"diameter.

OPTIONS
– Premium OCXO for extended holdover.
– IEEE-1588/PTP Grandmaster.
– Pulse Rate Outputs (1, 10, 100, 1k, 10k, 100k, 1M, 5M, 10M PPS; 1PP2S, 1PPM, Trigger).
– Time Code AM/DC Output (IRIG-B, NASA-36, 2137).
– 1PPS Output.
– Open-Collector Alarm Output.
– External AC/DC Power Supply.
– GPS Antenna Kit.

NTP CLIENT AND PTP SLAVE SOFTWARE
– NTP client software is freely available. Refer to:
   endruntechnologies.com/products/ntp-time-servers/ntp-client-software
– For information about PTP slave software see:
   endruntechnologies.com/products/grandmaster-clocks/ptp-slaves

Oscillator Options - Summary Performance Data

	TCXO (standard)	Premium OCXO (option)
Stratum 1 Holdover Period	Ninja serves Stratum 1 time for 24 hours after signal loss.	Ninja serves Stratum 1 time for 35 days after signal loss.
Accumulated Time Error for 1st Day	In case of signal loss, drift rate is 10 millisecs for 1st day.	In case of signal loss, drift rate is 80 microsecs for 1st day.