SEL-2488

Satellite-Synchronized Network Clock

Dependable time and frequency for emergency communications systems

- Enhance your timing resilience through multisource synchronization with GPS and the Precision Time Protocol (PTP).
- Synchronize your system with precise-time and frequency outputs, including 1 pulse per second (PPS), 10 MHz frequency, IRIG-B, Network Time Protocol (NTP), and PTP.
- Maximize your system reliability with rugged devices that operate dependably for decades while weathering extremes from −40° to +85°C (−40° to +185°F).
- Withstand satellite disruptions by using an integrated high-stability oscillator providing synchronization accuracy of 2.5 µs after 24 hours.
- Made in the United States with a ten-year warranty and complimentary technical support for the lifetime of your device.

Precise Time, Purpose-Engineered for Critical Infrastructure

Reliable Synchronization for Demanding Applications

Precise and reliable synchronization is a cornerstone of radio performance. With the SEL-2488 Satellite-Synchronized Network Clock, you can get the same accuracy, dependability, and innovation used in the electric power grid.

The SEL-2488 receives time signals from GPS or PTP, enabling multisource synchronization for enhanced time resilience. It distributes precise time and frequency via multiple outputs, including PPS, 10 MHz frequency, IRIG-B, NTP, and PTP (IEEE 1588-2008). If the primary source becomes unavailable, the clock seamlessly fails over to the secondary time source or to the internal reference oscillator, maintaining continuous synchronization.

These capabilities improve network reliability and make the SEL-2488 ideal for emergency communications applications, such as land mobile radio (LMR), simulcast systems, and public service answering points.

Optimal Radio System Performance

Precise synchronization is critical to the operation of your radio system. The SEL-2488 maximizes audio clarity by keeping every radio site in sync, and thanks to rugged hardware and network redundancy features, it minimizes or outright eliminates downtime for planned maintenance—or unplanned field calls at midnight.

Plug-and-Play Installation

The SEL-2488 requires no settings or configuration to begin keeping time. Within 5 minutes of connecting the power and system cables, the clock is designed to lock to GPS and start delivering accurate PPS and 10 MHz frequency outputs. Additional features make the SEL-2488 easy to use and manage, including an HTTPS web interface, a backlit LCD screen, the Lightweight Directory Access Protocol (LDAP), syslog, and the Simple Network Management Protocol (SNMP).

For a complete precise-time solution, you can include accessories like the SEL-9524 GNSS Antenna, LMR-400 coaxial cables, and gas tube coaxial surge protector.

Strengthen Time Resilience With Zero-Trust Principles

The SEL-2488 applies zero-trust principles to provide secure and precise-time synchronization across critical infrastructure. Even in the event of Global Navigation Satellite System (GNSS) disruption, it can synchronize to alternate high-accuracy sources, such as the PTP Telecom Profile (ITU-T G.8275.1), providing redundancy and reducing dependence on any single point of failure.

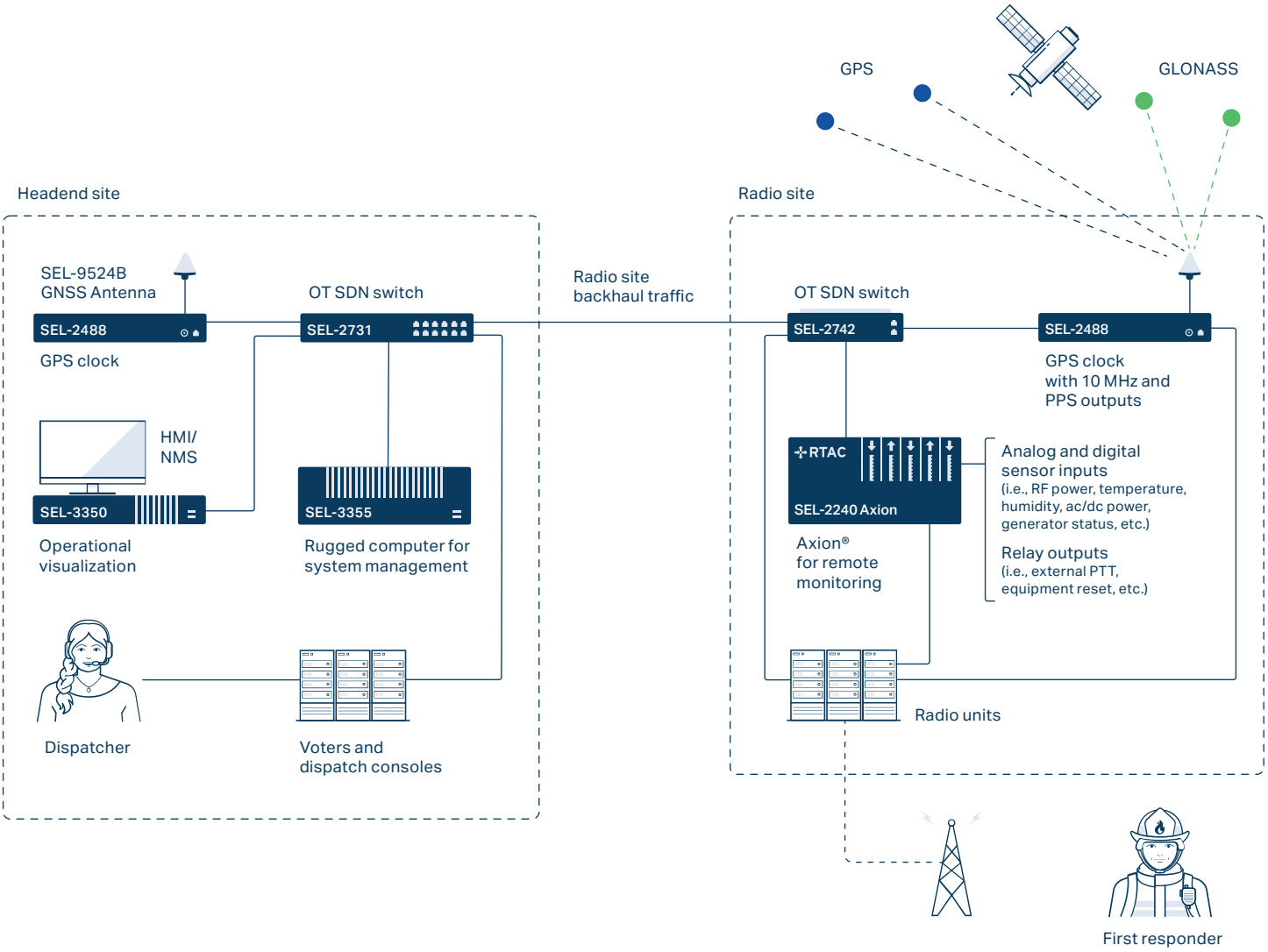
For further security, the SEL-2488 incorporates satellite signal verification to detect and mitigate GNSS spoofing or jamming, validating the satellite time signals before accepting them. Additionally, its PTP acceptable master table restricts synchronization to explicitly approved PTP timeTransmitters, ensuring that only known and trusted sources can influence system time.

Industry-Leading Reliability and Support

Every SEL product comes with a no-cost ten-year worldwide product warranty and complimentary technical support for the lifetime of your device.

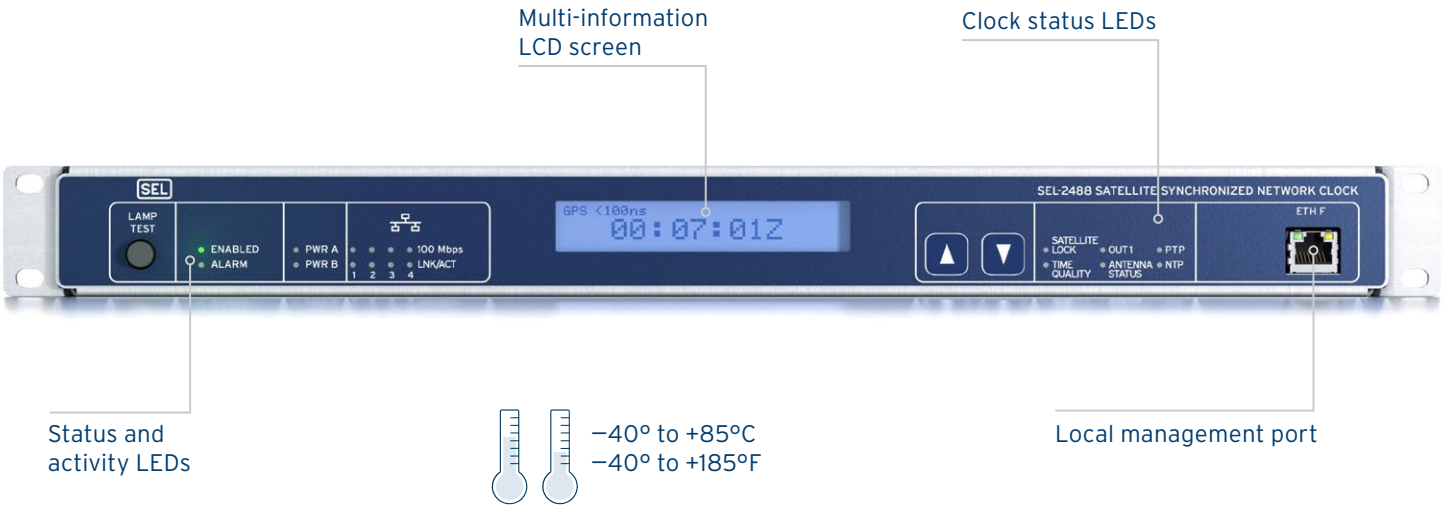
We manufacture the SEL-2488 in U.S. factories that we own and operate, giving us direct control over quality and supporting industry-leading reliability. Across thousands of deployments worldwide, the SEL-2488 has achieved a mean time between failures of over 1,800 years.

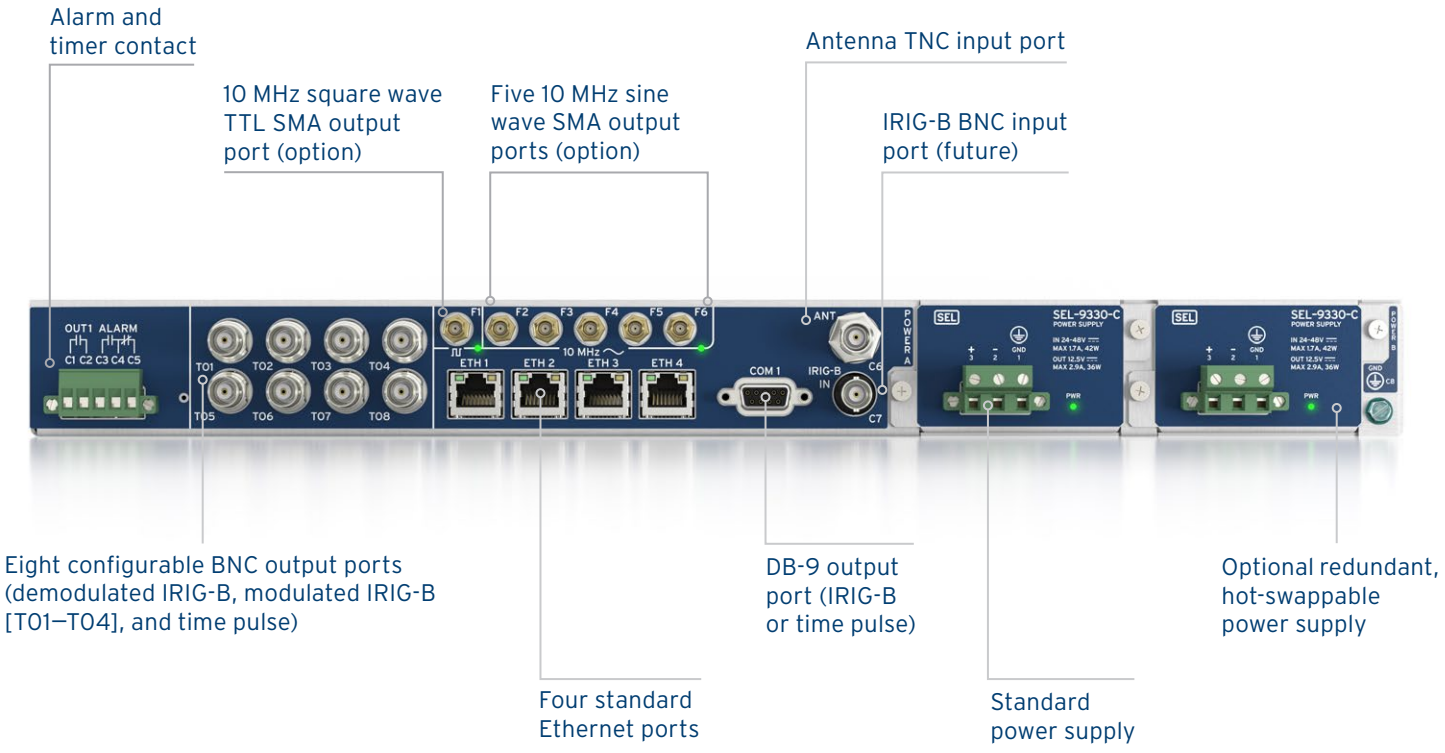
End-to-End LMR System Support



LMR system solutions from SEL incorporate devices that provide precise timing, resilient and cybersafe networking, remote monitoring, and rugged computing. Satellite clocks maximize audio quality; OT SDN switches and SEL ICON® multiplexers provide cybersecurity and flexible transport of voice services; and the SEL Axion® controller allows you to remotely monitor the entire system from one interface.

Overview


Multi-information LCD screen
Clock status LEDs
SEL-2488 SATELLITE SYNCHRONIZED NETWORK CLOCK
LAMP TEST
ENABLED
ALARM
PWR A
PWR B
100 Mbps
LNK/ACT
GPS <100ns
00:07:01Z
SATELLITE LOCK
OUT1
PTP
TIME QUALITY
ANTENNA STATUS
NTP
ETH F
Status and activity LEDs
−40° to +85°C
−40° to +185°F
Local management port


Alarm and timer contact
10 MHz square wave TTL SMA output port (option)
Five 10 MHz sine wave SMA output ports (option)
Antenna TNC input port
IRIG-B BNC input port (future)
OUT1 ALARM
C1 C2 C3 C4 C5
T01 T02 T03 T04
T05 T06 T07 T08
F1 F2 F3 F4 F5 F6
10 MHz
ETH 1 ETH 2 ETH 3 ETH 4
ANT
COM 1
IRIG-B IN
C6 C7
POWER A
SEL-9330-C POWER SUPPLY
POWER B
Eight configurable BNC output ports (demodulated IRIG-B, modulated IRIG-B [T01—T04], and time pulse)
Four standard Ethernet ports
DB-9 output port (IRIG-B or time pulse)
Standard power supply
Optional redundant, hot-swappable power supply

Specifications

General	
Timing Accuracy	Less than 40 ns average, 100 ns peak to UTC
Lock Time	Less than 5 minutes from power to accurate PPS and 10 MHz (typical)
Frequency Accuracy	<1E-12 averaged over 24 hours when synchronized to GPS
Accuracy After 24 Hours in Holdover (Typical)	OCXO option: 5 µs DOCXO option: 2.5 µs
Frequency Stability After 24 Hours in Holdover (Typical)	OCXO option: 1E-10 Hz/Hz DOCXO option: 5E-11 Hz/Hz
Time Sources and Timing Inputs	GPS (standard) PTP (IEEE 1588-2008) (optional) GLONASS (optional, for verification only)
Frequency Outputs	5 rear 10 MHz sine wave frequency outputs (SMA) 1 rear 10 MHz TTL square-wave frequency output (SMA)
Timing Outputs	8 rear BNC ports for (PPS or IRIG-B) 1 rear DB-9 port (PPS or IRIG-B)
Ethernet Ports	1 front RJ45 Ethernet management port 4 rear Ethernet ports in pairs of 10/100BASE-T, 100BASE-FX
Output Contacts	Alarm contact, Form C Timer contact, Form A, 1 µs accuracy to UTC
Power Supply	24—48 Vdc and 125—250 Vdc or Vac options available in dual-redundant configuration
Operating Temperature	—40° to +85°C (—40° to +185°F)
Warranty	No-charge ten-year worldwide product warranty
Mean Time Between Failures (MTBF)	Over 1,800 years as of November 2025

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Making Electric Power Safer, More Reliable, and More Economical
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