SEL-2488

Satellite-Synchronized Network Clock

Dependable time and frequency for emergency communications systems

- Synchronize your system with high-accuracy timing outputs, including 1 pulse per second (PPS), 10 MHz frequency, IRIG-B, Network Time Protocol (NTP), and Precision Time Protocol (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 with high-stability internal timekeeping accuracy of 2.5 µs after 24 hours.
- Made in the United States with ten-day lead times, a ten-year warranty, and free 24/7 technical support for the lifetime of your device.

Precise Time, Purpose-Engineered for Critical Infrastructure

Reliable Synchronization for Demanding Applications

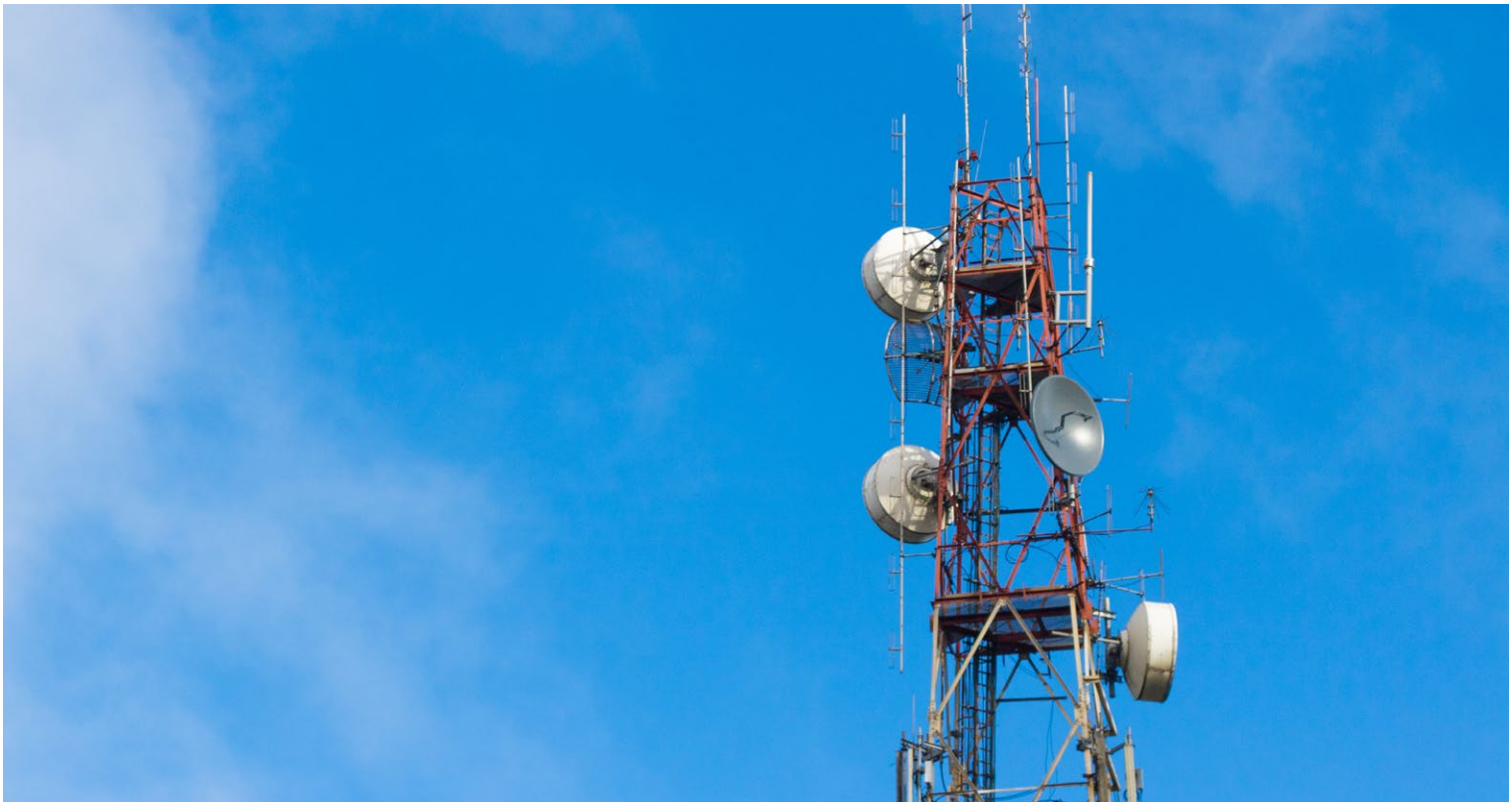
Precise and reliable synchronization is a cornerstone of radio performance. With the SEL-2488 Satellite-Synchronized Network Clock, you can get the same accuracy, dependability, and innovation used in the electric power grid.

The SEL-2488 receives time signals from GPS and distributes precise time and frequency via multiple outputs, including 1 PPS, 10 MHz frequency, IRIG-B, NTP, and PTP (IEEE 1588-2008). In the event of GPS disruption, the SEL-2488 seamlessly fails over to internal timekeeping.

These capabilities make the SEL-2488 ideal for synchronizing 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 construction and redundant timekeeping features, it minimizes or outright eliminates downtime for planned maintenance—or unplanned field calls at midnight.



Plug-and-Play Installation

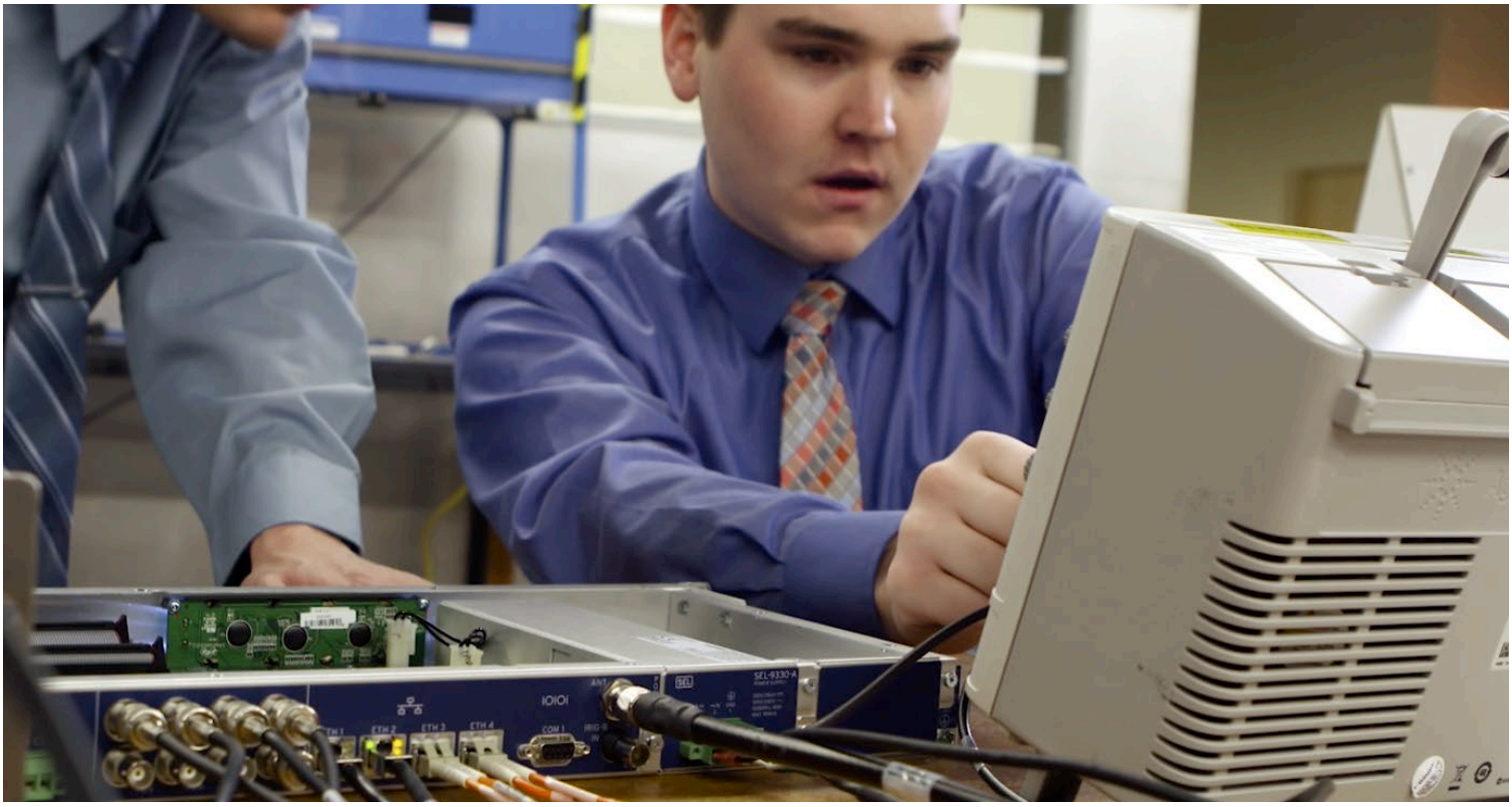
The SEL-2488 requires no settings or configuration to begin keeping time. Within 5 minutes of connecting the power and system cables, the clock is designed to lock to GPS and start delivering accurate 1 PPS and 10 MHz frequency outputs. Additional features make the SEL-2488 easy to use and manage, including 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.

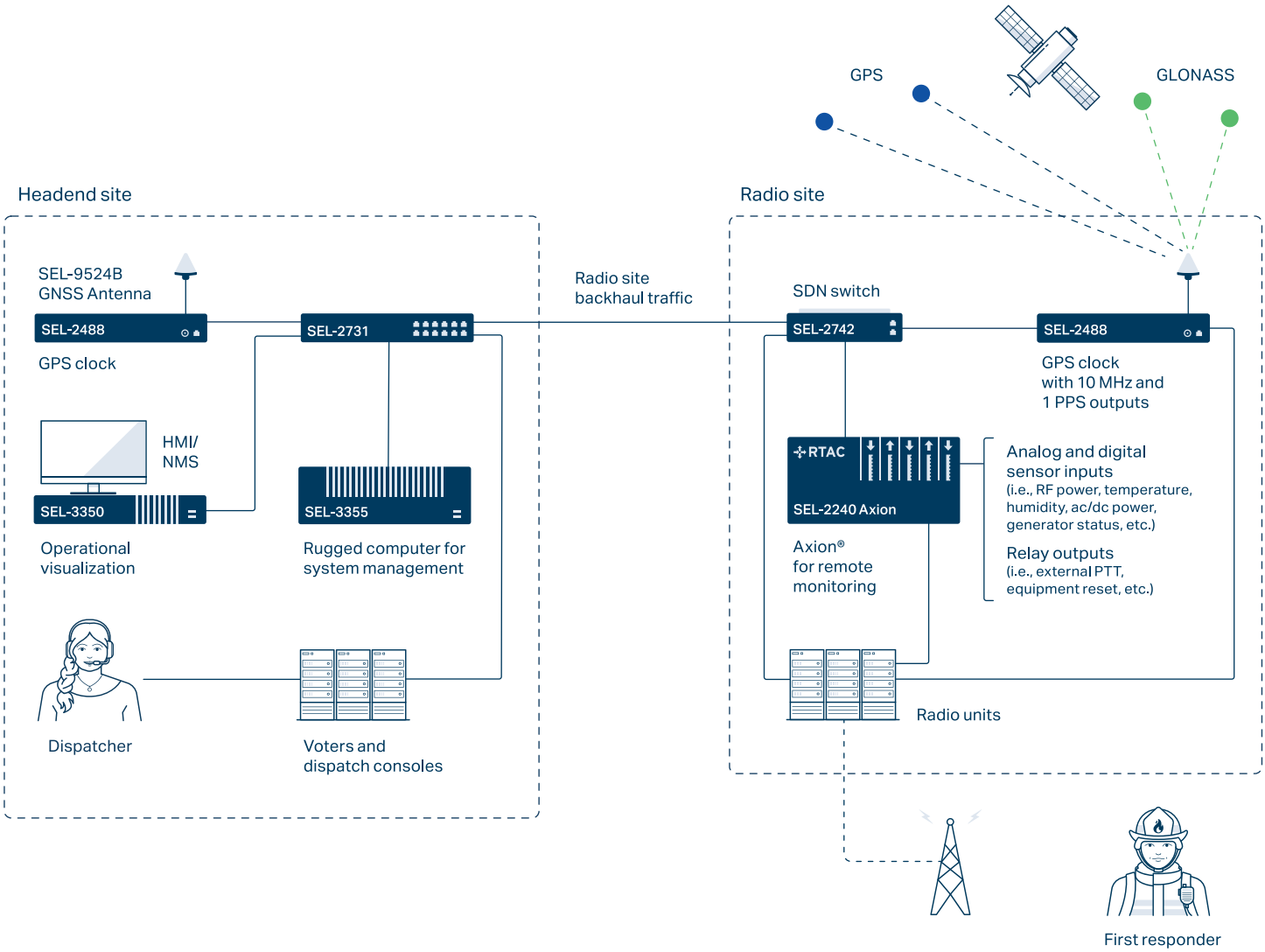
Industry-Leading Reliability, Lead Times, and Support

Every SEL product comes with a no-cost ten-year worldwide product warranty and complimentary 24/7 technical support for the lifetime of your device.

The SEL-2488 provides industry-leading reliability, proven in thousands of deployments worldwide to achieve a mean time between failures of over 1,900 years. And because we manufacture our devices in our own U.S. factories, we guarantee that most SEL products ship within ten days of ordering.

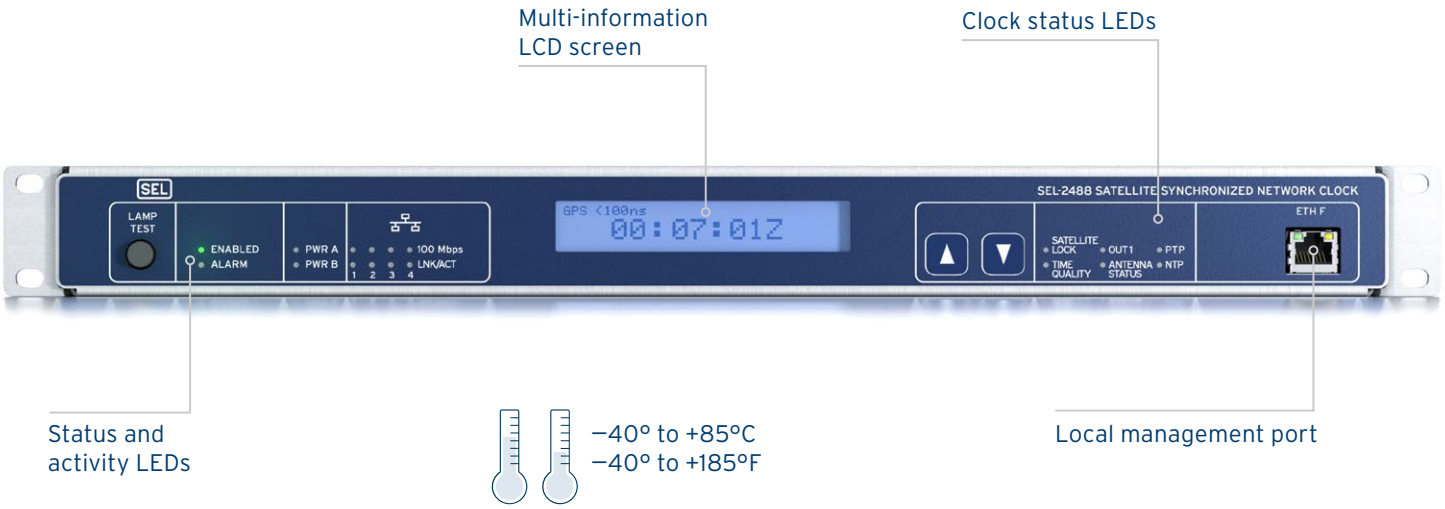


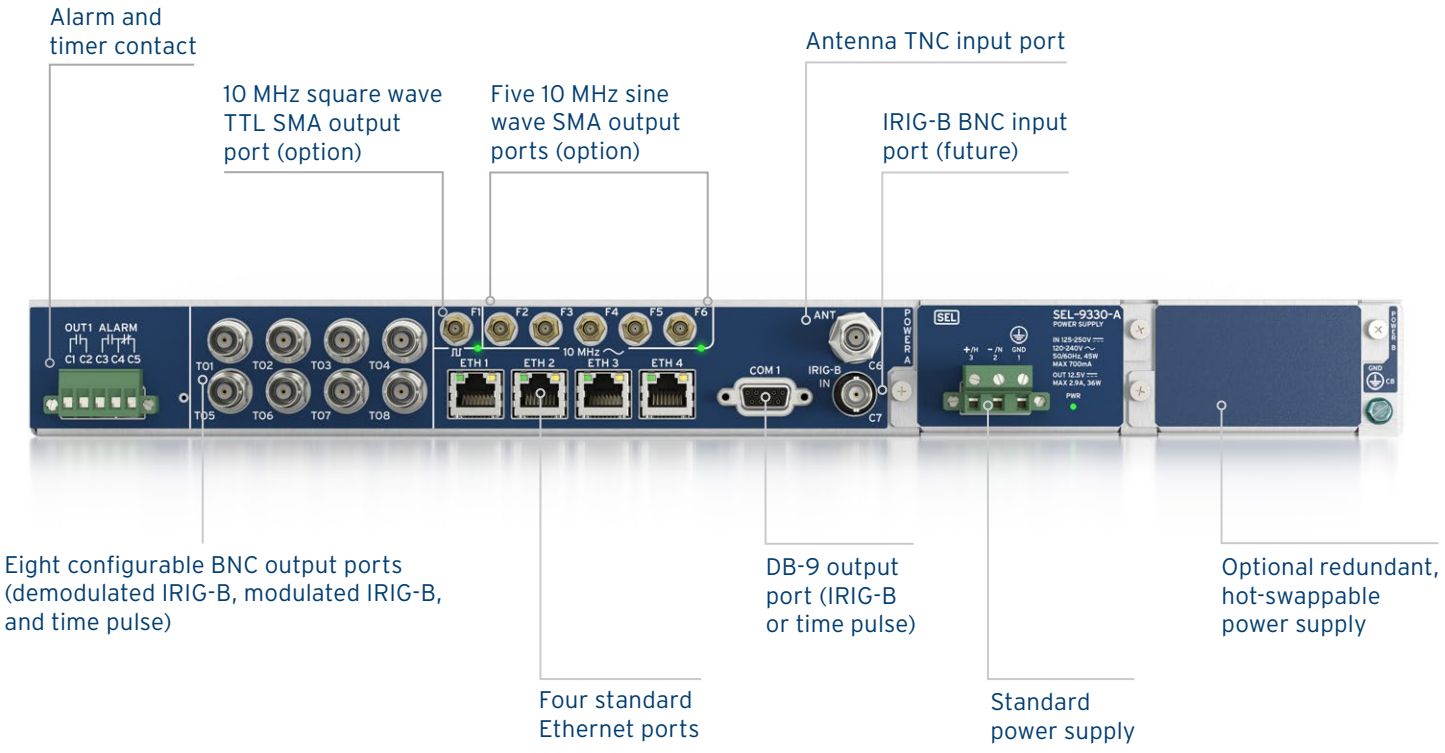
End-to-End LMR System Support



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 ICON multiplexers provide cybersecurity and flexible transport of voice services; and the 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
COM 1
ANT
IRIG-B IN
C6 C7
POWER A
SEL-9330-A
POWER SUPPLY
Eight configurable BNC output ports (demodulated IRIG-B, modulated IRIG-B, 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 1 PPS and 10 MHz (typical)
Frequency Accuracy	<1E-12 averaged over 24 hours when synchronized to GPS
Accuracy After 24 Hours in Holdover	OCXO option: 5 µs, 1E-10 DOCXO option: 2.5 µs, 5E-11
Time Sources and Timing Inputs	GNSS: GPS, GLONASS (optional, for verification only)
Frequency Outputs	5 rear 10 MHz sine wave frequency outputs (SMA) 1 rear 10 MHz TTL frequency output (SMA)
Timing Outputs	8 rear BNC ports for (1 PPS or IRIG-B) 1 rear DB-9 port (1 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
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 1,900 years as of August 2024

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Making Electric Power Safer, More Reliable, and More Economical
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