

# SEL-3405

## High-Accuracy IRIG-B Fiber-Optic Transceiver



Send 200 ns accurate IRIG-B to remote devices with complete dependability

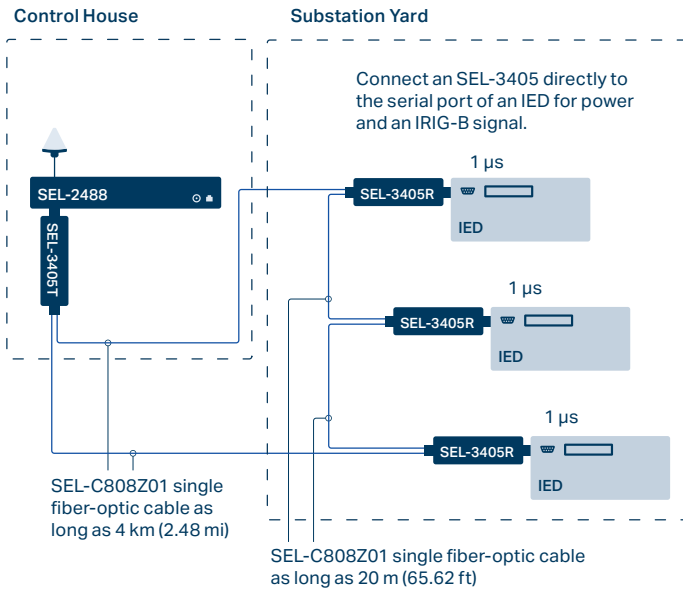
- Automatic cable delay compensation maintains nanosecond IRIG-B accuracy for distances up to 4 km (2.4855 mi).
- Zero settings simplifies integration into an existing system.
- Fiber-optic cables isolate time signals from electrical interference.



# Key Features

## Time-Synchronize Remote Devices

Use the SEL-3405 High-Accuracy IRIG-B Fiber-Optic Transceiver to send IRIG-B across distances where installing a GPS antenna is not feasible. Using a pair of SEL-3405 Transceivers (with one connected at the clock and another at the end device), the end device will receive delay-compensated IRIG-B without requiring user-configured settings. The SEL-3405 can receive time from any SEL clock and send it to any end device. The SEL-3405 automatically adjusts for the delay that occurs as the signal moves through the fiber. Send time between individual devices, or install the transceivers in a ring to provide  $<1 \mu\text{s}$  accurate IRIG-B signals to as many as three devices simultaneously.



## Benefits of Sending Time Over Fiber

Using the SEL-3405 to distribute IRIG-B time signals increases reliability because fiber-optic cables are far less susceptible to electromagnetic interference (EMI)/radio frequency interference (RFI) than copper links and provide improved isolation from ground potential rise and other electrical hazards.

## IRIG-B Where You Need It

GPS antennas require a clear view of the sky in all directions. This may not be possible for all installation locations. Whether the device that needs accurate time is at the bottom of the dam or in a hard-to-reach location, the SEL-3405 provides accurate IRIG-B time.

## Time-Synchronization Pass-Through

The SEL-3405 can pass any demodulated timing signal (e.g., IRIG-B or pulse per second [PPS]) over a single multimode fiber and maintain a timing accuracy of better than  $2 \mu\text{s}$ .





SEL-3405T back label with DB-9 pinout.



SEL-3405R back label with DB-9 pinout.



Use the SEL-3405 to bring time into the control house. Then distribute that time throughout the building using the SEL-3400 IRIG-B Distribution Module.



Use the C940 to power the SEL-3405 when using the SEL-3400 BNC power option. Distribute time from the second BNC connector of the C940.

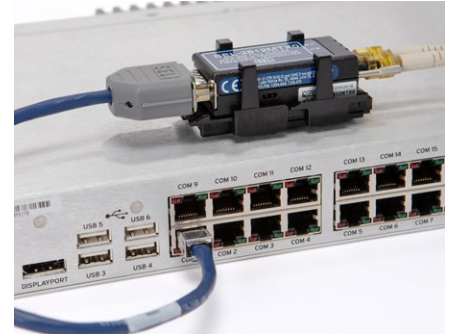


Use the C942 in conjunction with the SEL-9321 to provide external power using tinned wires when power is not available through the intelligent electronic device (IED) or clock serial port.

# Transceiver Mounting Options

Use an SEL Transceiver Mounting Kit and adapter cable when connecting the SEL-3405 to IEDs with an RJ-45 male serial connector or when the mounting depth is an issue (e.g., in switchgear applications). These kits provide a simple and secure way to remote-mount the transceiver away from the host connector:

- 915900573—Mounting Kit for SEL Transceiver; includes mount only
- 915900574—Mounting Kit for SEL Transceiver; includes mount and SEL-C478A cable (6 ft, DB-9 female to RJ-45 male)
- 915900575—Mounting Kit for SEL Transceiver; includes mount and SEL-C641 cable (6 ft, DB-9 female to DB-9 male)



## SEL-3405 Specifications

### General

<b>Timing Accuracy (Point-to-Point Link)</b>	<200 ns end-to-end accuracy using two SEL-3405 Transceivers
<b>Optical Source</b>	850 nm (infrared) VCSEL transmitter Typical transmit level: -13 dBm Maximum output level: -9 dBm Maximum link distance: 4 km (2.4855 mi) (point-to-point link)
<b>Fiber-Optic Cables and Connectors</b>	ST connectors Multimode fiber (50–200 μm) SEL provides compatible SEL-C805 Multimode 200 μm, SEL-C807 Multimode 62.5/200 μm and SEL-C808 Multimode 62.5/125 μm Core Fiber-Optic Cables.
<b>Power Requirements</b>	The SEL-3405 accepts power applied to Pin 1, 3, or 7. In instances where the device cannot be powered via these pins, SEL offers cable options for powering the device via tinned wires (C942) or power supply (C941) or through the BNC port of an SEL-3400 (C940).
<b>Accessory Cables</b>	SEL-C940: DB-9 (for SEL-3405) to dual BNC (for IRIG-B and power) SEL-C941: DB-9 (for SEL-3405) to BNC (for IRIG-B) to +5 Vdc power supply (for power) SEL-C942: DB-9 (for SEL-3405) to BNC (for IRIG-B) to tinned wires (for power) SEL-C654: monoplug to BNC (for IRIG-B via SEL-3405 side jack) SEL-C655: monoplug to DB-9 (for IRIG-B via SEL-3405 side jack) SEL-C656: monoplug to ring terminals (for IRIG-B via SEL-3405 side jack) SEL-C657: monoplug to tinned wires (for IRIG-B via SEL-3405 side jack)
<b>Operating Temperature</b>	-40° to +85°C (-40° to +185°F)
<b>Certifications</b>	CE, UKCA, RCM, FCC Laser Safety
<b>Warranty</b>	10 years

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+1.509.332.1890 | info@selinc.com | selinc.com

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