SEL-3031
Serial Radio Transceiver
For Water and Wastewater Communications

Dual Operation Radio—Instrumentation and Control

Features and Benefits

Dual Radio Operating Modes Provide Flexibility
Gathers SCADA information from remote locations with point-to-multipoint radio operation, or rapidly transfers critical control and protection commands with low-latency point-to-point radio operation.

Point-to-Multipoint Operation Supports Many Remote Radios
Enables communication with remote radios up to 32 km (20 miles) in any direction from the master radio location. Gather data and send control signals to tanks, booster stations, wells, reservoirs, lift stations, and within treatment facilities without running wire.

No Wiring or Leased Lines Improves Return On Investment
Reduces the amount of capital required and shortens the payback time on any project with economical radio installation.

Strong Security Thwarts Attackers
Protects critical data with the optional encryption card, helping to implement requirements of the Homeland Security Act. Strong 256-bit Advanced Encryption Standard (AES) technology meets historical Federal Information Processing Standards (FIPS).

No Licensing Reduces Delays and Expenses
Operates on the license-free, 915 MHz ISM band for on-time, on-budget projects.

Low Latency Enables Fast Control
Transfers control commands with typical 5.5-millisecond latency with SEL MIRRORED BITS® communications.

Tough Radio Operates in Extreme Conditions
Designed, built, and tested for trouble-free operation in extreme temperature, electromagnetic interference, shock, and vibration conditions.

Add monitoring and control capability without additional wiring from equipment or water quality monitoring devices.

Water and Wastewater Applications

Communication for Control

- Support serial PLCs and PACs
- EIA-232, EIA-485, and fiber-optic options
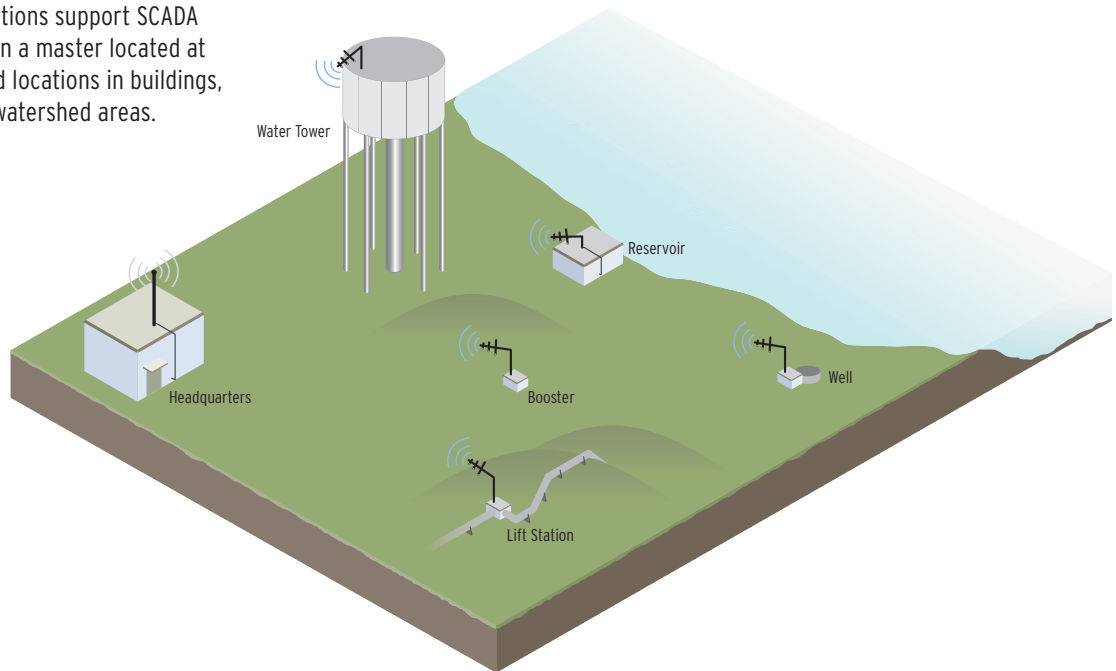- Non-line-of-sight with repeater configurations

Remote Monitoring and Control

- Wells
- Water towers
- Lift stations
- Booster stations
- Water quality monitors
- Reservoirs

SCADA Master

PLC

High-Speed Control and Monitoring

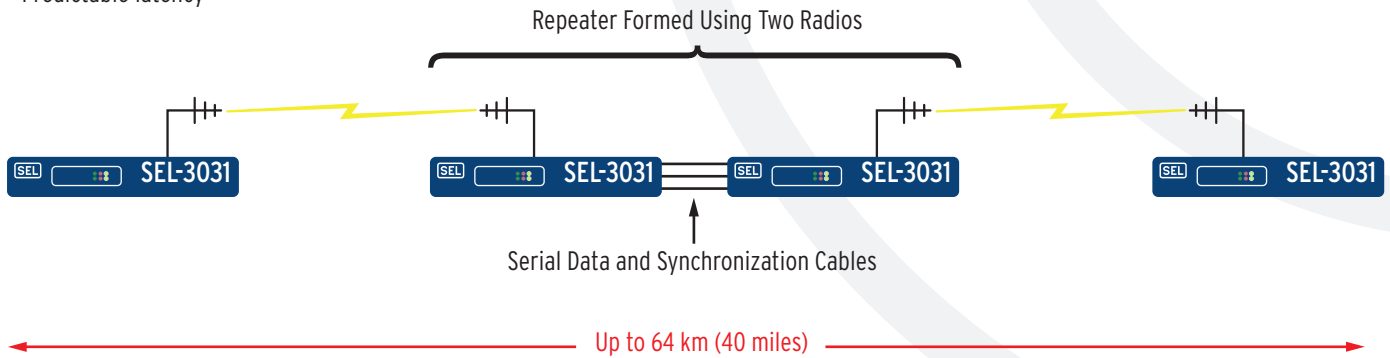## Multipoint Wireless Communication

Point-to-multipoint radio operations support SCADA monitoring and control between a master located at headquarters and multiple field locations in buildings, vaults, structures, rivers, and watershed areas.

Water Tower

Reservoir

Headquarters

Booster

Well

Lift Station

Water and Wastewater Applications

Radio Links With Repeaters

- Non-line-of-sight radio path
- Longer distance applications
- Full-bandwidth repeater
- Predictable latency

Repeater Formed Using Two Radios

| SEL | SEL-3031 |

Serial Data and Synchronization Cables

Up to 64 km (40 miles)

SEL-3031 Radios may be connected "back-to-back" to create a repeater. The repeater configuration can be used to extend the length of a link or to maintain radio contact when there is an obstacle between two sites.

Collocated Radios

A back-to-back repeater configuration is one example of collocated radios. There are several other important collocated radio configurations, and these can be difficult to design and install. The SEL-3031 has a special feature called SEL Hop-Sync™ technology to help mitigate installation difficulties.

Extended Features

The SEL-3031 contains a range of options and settings to match the radio to different operating requirements. Features include automatic repeat request (ARQ) and graphical representation of data on the configuration interface. ARQ is provided as an option to support radio links with low or variable availability. Graphical representation makes variable data easier to absorb during configuration and installation in the field.
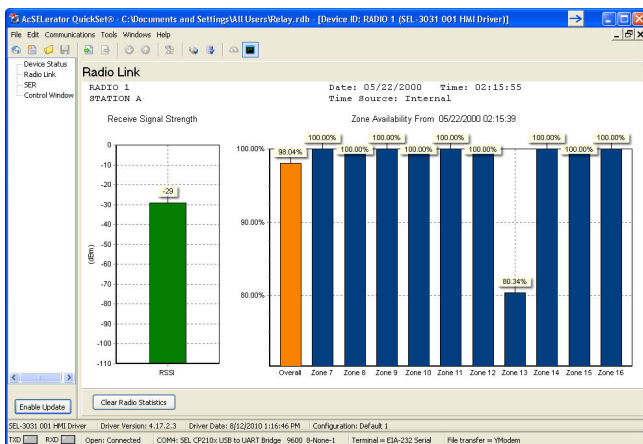
Outdoor Enclosures

SEL can provide one or more radios in enclosures with surge protectors, power supplies, and other devices. A standard enclosure is available as an ordering option. To meet other requirements, work with the SEL Custom Enclosures group to quote and supply complete custom packages.

Companion Power Supply

The SEL-9322 15 Vdc Power Supply is available to power the wall-mount version of the SEL-3031. Details can be found on the SEL website, www.selinc.com/SEL-9322.

SEL-3031 Serial Radio Transceiver

General Specifications

Wireless

ISM band 902–928 MHz frequency-hopping spread spectrum (FHSS)

Point-to-point or point-to-multipoint operation

Output power	1 W (30 dBm)
Adjustable power	20–30 dBm

Optional SEL Encryption Card

256-bit AES encryption
Session authentication
Validated to FIPS 140-2 Level 2 historical security requirements

Data

Send data via protocols, such as DNP3, Modbus®, SEL Mirrored Bits, IEEE C37.118 synchrophasors, and SEL ASCII

IRIG-B time code on Port 2

Built-In Clock

Manually set or time-synchronize using IRIG-B

Alarm Output

Integrate radio alarm contact with annunciators and alarm panels

Distance

Communicates up to 32 km (20 miles) line of sight; longer distances are possible with repeater configurations

USB Management Port

Access local diagnostics, determine signal strength, create and modify settings, and determine packet quality

Mounting and Power Supply Options

Wall-mount	9–30 Vdc at <5 W
Rack-mount	125/250 Vdc or Vac, 24–48 Vdc at <7 W
NEMA 3R cabinet	125/250 Vdc or Vac

Certifications

FCC Part 15.247; ICES-001; RSS-210
FCC Part 15, Class A; ICES-003 for USA and Canada
COFETEL for Mexico
ANATEL for Brazil (part number starts with SEL-30311)
UL, cUL: UL 508, CSA C22.2 No. 142

Substation- and Plant-Grade Equipment

The SEL-3031 is designed, built, and tested with the same practices, processes, and standards that we use for our protective relays, information processors, and other products. This includes compliance with IEEE and IEC standards for electrostatic discharge, fast transients, radiated emissions, surge-withstand capability, dielectric strength, pulsed magnetic fields, and disturbances. Specifications and tests are per the IEEE 1613 communications and IEEE C37.90-1989 and IEC 60255 protective relay standards.

Operation-Related Specifications

Point-to-Point Operation (protection and control)

Three Serial Data Ports

Standard interface	EIA-232 (DCE female 9-pin sub D)

Port 1 options

EIA-485	Female 9-pin sub D
Fiber-optic	SEL-2812 compatible (LC connectors)
Speed	9.6 or 19.2 kbps full duplex per port (unencrypted)
Optional	38.4 kbps full duplex on Port 1 (disables Port 2)

Point-to-Multipoint Operation (data gathering from multiple remote radios)

One Serial Data Port

EIA-232, EIA-485, or serial fiber-optic port option
Configurable port speeds: 9.6, 19.2, or 38.4 kbps; full duplex per port (unencrypted)

Encryption Protects Against Eavesdropping and Unauthorized Control

To cryptographically secure your valuable data, order the radio with an SEL-3044 SEL Encryption Card, featuring:

- 256-bit AES technology
- Easy configuration with minimal settings
- Verification of data encryption
- FIPS 140-2 Level 2 (historical) validated compliance
- Security against man-in-the-middle and replay cyber attacks
- Fixed 9.6 kbps full-duplex throughput per port, or 19.2 kbps on Port 1 (disables Port 2)