



# SEL-2924/SEL-2925 Bluetooth Serial Adapters



## Features, Benefits, and Applications

### SEL-2924 Portable Bluetooth® Serial Adapter

Carry an SEL-2924 in your toolbox to connect to an EIA-232 port on a relay, controller, or other device. Use the built-in Bluetooth wireless capability of a laptop computer, smartphone, or other device to communicate as far as 10 meters (32 feet) away via a secure wireless link. Maintain settings and retrieve data from a convenient location in a plant or station, away from a switchboard or panel lineup.

- Connect to an EIA-232 port without a cable.
- Apply easily by using a security key and minimal settings.
- Set or retrieve information from device in substation or plant.
- Take advantage of Bluetooth connectivity with your Android™ or Blackberry® smartphone.

### SEL-2925 Bluetooth Serial Adapter

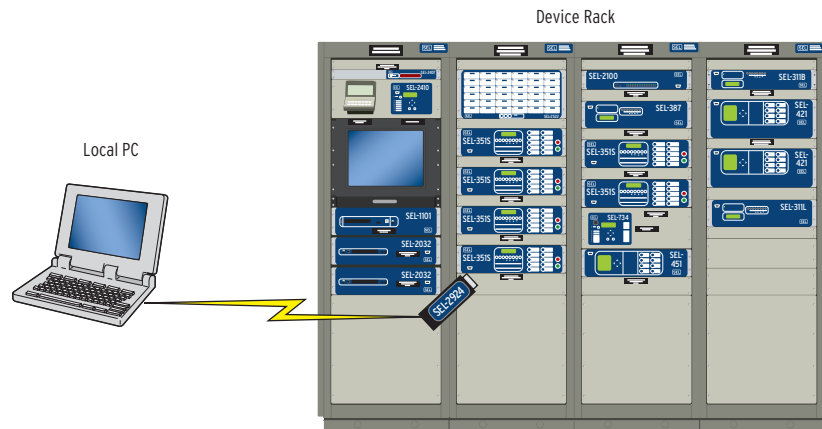
Permanently install an SEL-2925 on the serial port of a recloser control, protective relay, or other device. The SEL-2925 is a Bluetooth Class 1 device that can communicate with another Class 1 device as far as 100 meters (328 feet) away. For example, use one SEL-2925 on a protective relay and a second SEL-2925 on an SEL Real-Time Automation Controller (RTAC) as a cable replacement for SCADA and engineering access.

- Apply easily by using a security key and minimal settings.
- Install permanently by using the external antenna.
- Rely on this rugged device hardened for switchgear and recloser control cabinets.
- Protect equipment and personnel.
- Depend on security that always requires an 8- to 16-character key.
- Take advantage of Bluetooth connectivity with your Android or Blackberry smartphone.

# Introduction

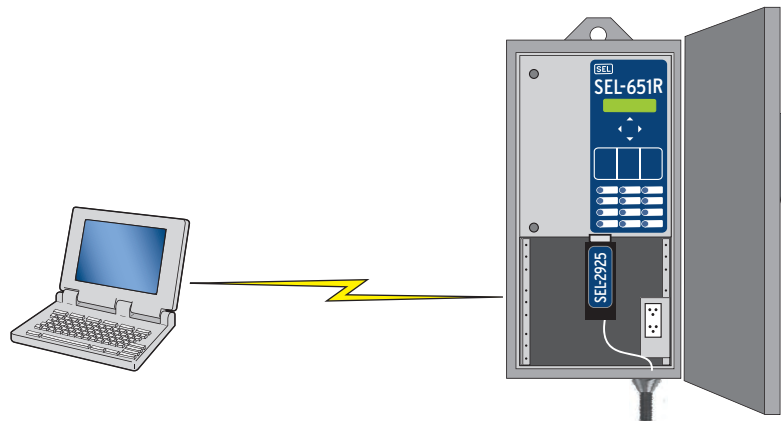
The SEL-2924/SEL-2925 is a 2.4-GHz, license-free, Bluetooth-to-serial adapter that allows reliable transport of serial data to any Bluetooth device supporting Bluetooth v2.1 or higher. The SEL-2924 is a Class 2 Bluetooth device with rechargeable batteries for quick connectivity to a serial device without using a cable. The SEL-2925 is a Class 1 Bluetooth device with an external antenna for permanent installations needing wireless communications as far as 100 meters (328 feet) away. To quickly set up the SEL-2924/SEL-2925, go to *Getting Started on page 3*.

*Figure 1* shows a simple method of gaining front-panel serial access by using the SEL-2924.



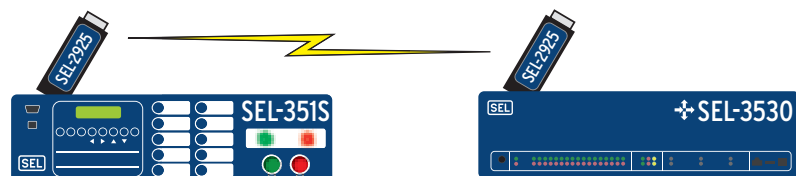
**Figure 1 SEL-2924 Local Communication**

*Figure 2* shows an application in which an SEL-2925 is installed on a device located in a hard-to-reach area (e.g., on top of a pole).



**Figure 2 SEL-2925 Accessing Remote Device**

*Figure 3* shows how the SEL-2924/SEL-2925 can be used as a cable replacement to provide secure wireless connectivity.



**Figure 3 Cable Replacement Example**

# Getting Started

**NOTE:** When using a PC device for Bluetooth connections, the driver must support Bluetooth v2.1. Microsoft® Windows® 7 supports Bluetooth v2.1. Previous Windows platforms do not support this version. You must install or update the Bluetooth driver from the manufacturer before pairing with the SEL-2924/SEL-2925.

## Pairing

### ⚠ WARNING

Only use rechargeable AAA NiMH batteries in the SEL-2924. Use of incorrect batteries could result in battery damage or explosion.

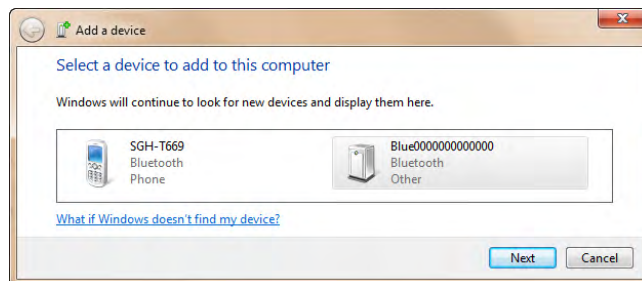
The SEL-2924/SEL-2925 allows you to wirelessly and securely connect to any EIA-232 serial port instead of using a serial cable. The SEL-2924/SEL-2925 communicates to any Bluetooth device that supports Bluetooth v2.1 or higher. The SEL-2924/SEL-2925 will not connect to a Bluetooth device with a lower version of Bluetooth technology. The SEL-2924/SEL-2925 supports the serial port profile (SPP) stack. The Bluetooth process has two actions that you must perform to properly connect to the device.

- Step 1. Connect the Bluetooth adapter to a computer or power supply USB Standard-A jack by using the supplied USB cable. Wait until the BLUETOOTH (⌘) LED is flashing.

On the SEL-2924, you can switch **PWR** to ON without connecting external power. The **PWR** switch must be set to ON to charge the batteries.

- Step 2. Enable Bluetooth on your PC and initiate a search for the Bluetooth device.

For Windows 7, look under **Devices and Printers** and click **Add a device**.



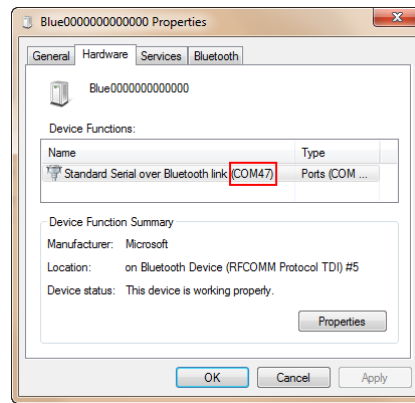
**Figure 4 Pairing a Bluetooth Device**

- Step 3. The PC should find the device with the name **BLUE(serial number)**, which should match the serial number found on the back of the Bluetooth device (see *Figure 4*).
- Step 4. Once you select the device, enter the device pairing code (PIN). The default PIN is **2924** for the SEL-2924 and **2925** for the SEL-2925.

## Connecting to the SEL-2924/SEL-2925

- Step 1. After successfully pairing with the device, the PC creates a virtual COM port for the device (see *Figure 5*).

Under **Devices and Printers**, double-click the newly paired device labeled **BLUE(serial number)** to get the COM port number highlighted in *Figure 5*.



**Figure 5 Bluetooth COM Properties**

- Step 2. Open a terminal program and connect to the designated COM port shown in *Figure 5*.

The default settings of the SEL-2924/SEL-2925 are 9600 bps, 8 data bits, no parity, and 1 stop bit. The terminal program and end device settings must all match for communication to work.

- Step 3. The SEL-2924/SEL-2925 BLUETOOTH LED should be illuminated to show that the link is connected.

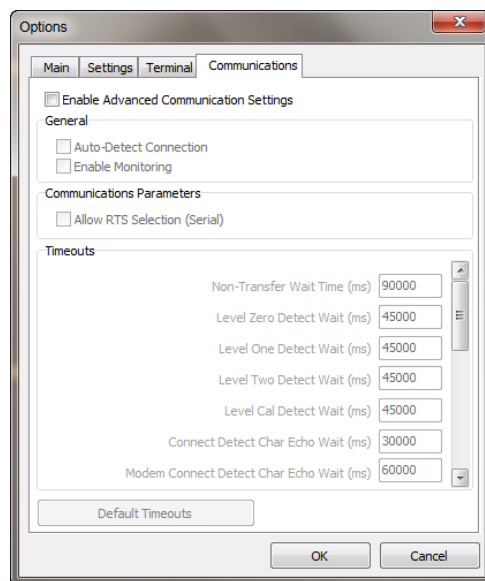
At this point, the SEL-2924 process is complete. For the SEL-2925, you *must* change the default PIN to enable the serial port. Go to *Securing the Wireless Channel* for instructions on changing the PIN.

**NOTE:** If you are using ACSELERATOR QuickSet® SEL-5030 Software, you need to check **SEL Bluetooth Device** in the ACSELERATOR QuickSet **Communication Parameters** Serial tab and set the SEL-2924/SEL-2925 Control Switch 1 to ON.

## Securing the Wireless Channel

**NOTE:** If you are using ACSELERATOR QuickSet to set or change the PIN, you must clear the boxes shown in Figure 6, found under **Tools > Options > Communications**.

- Step 1. After successfully pairing, set Control Switch 1 on the SEL-2924/SEL-2925 to ON to access the command mode.
- Step 2. Open a terminal window on your PC and connect to the COM port designated for the SEL-2924/SEL-2925.



**Figure 6 Clearing Options**

- Step 3. On the terminal window, type **\$\$\$**. You will see a reply of CMD to tell you that you entered the command mode.

**NOTE:** You must issue \$\$\$ within 10 seconds of connecting to the port. If unsuccessful, disconnect/connect the terminal window to reset the 10-second timer.

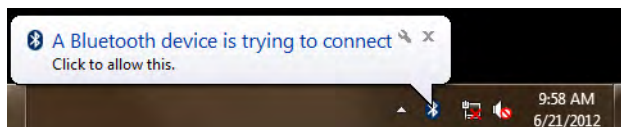
**NOTE:** If you are using ACSELERATOR QuickSet, you must exit the program, restart, then reconnect to make Step 5-Step 6 work properly.

Step 4. Change the default PIN by entering **ATPIN,*NewPIN* <Enter>**, replacing *NewPIN* with the PIN of your choice. The new PIN must be 8–16 characters.

If the PIN is accepted, the device will reply with **OK, please reconnect**. Otherwise it will return with **ERROR**.

Step 5. After changing the PIN, the SEL-2924/SEL-2925 will reboot. You must disconnect, then reconnect the terminal window to gain access.

Step 6. When you try to reconnect, the PC will prompt you to allow the connection, as shown in *Figure 7*. Enter the PIN you set in *Step 4*.



**Figure 7 Changing PIN Prompt**

Step 7. Once the SEL-2924/SEL-2925 PIN is set, all other PCs can use the new PIN to pair with the device.

## Accessories

Each SEL-2924 is shipped with batteries and a USB cable. Each SEL-2925 is shipped with one antenna and a USB cable. These items are also listed in *Table 1*.

**Table 1 Accessories**

SEL Part Number	Description
915900287	AC power supply with USB Micro-B connector
C658	USB Standard-A to Micro-B cable 1.82 m (6 ft)
915900290	AC power supply with plugs for U.S., Europe, UK, and Australia
C580	USB Micro-B power cable with plain wires 2 m (6.56 ft)
240-4060	USB Bluetooth Adapter for laptop PC
235-0301	Indoor antenna 0 dBi right-angle SMA (SEL-2925 only)
235-0300	Outdoor antenna (2.14 dBi with 0.91 m [3 ft] cable, SMA connector) (SEL-2925 only)
C970	Extension cable for outdoor antenna (SMA connectors) (SEL-2925 only)
C780	EIA-232 extension ribbon cable
C641P	EIA-232 extension cable to mount on plate or shelf (SEL-2925 only)
240-1550	EIA-232 adapter: converts to female serial connector
915900266	Rechargeable AAA NiMH batteries (SEL-2924 only)



**Figure 8** C658, USB Standard-A to Micro-B Cable

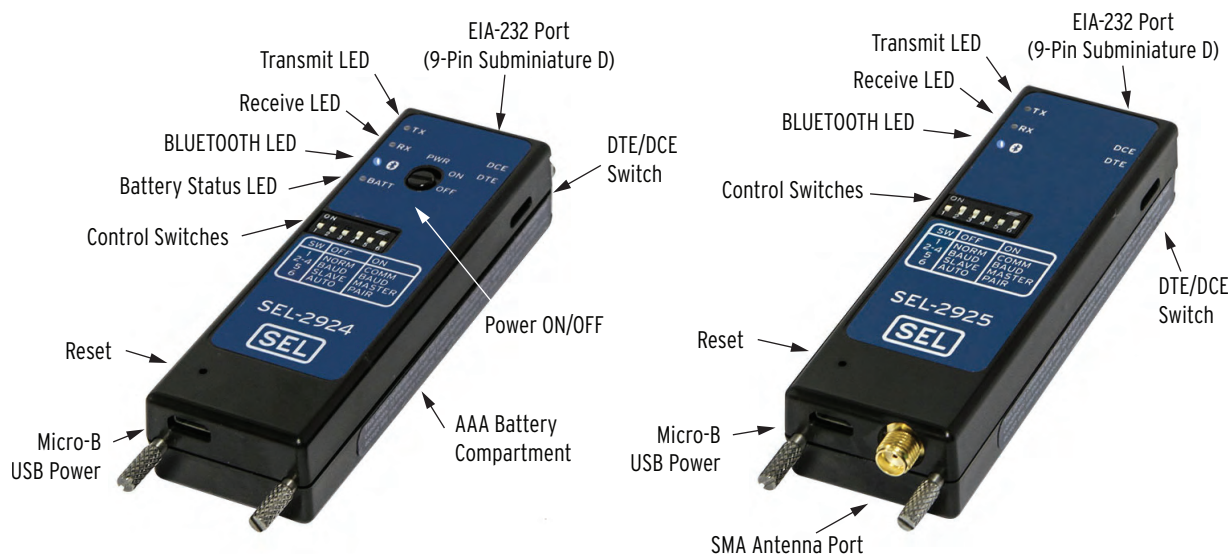


**Figure 9** 235-0301, Indoor Antenna 0 dBi, SMA Connector



**Figure 10** 235-0300, Outdoor Antenna 2.14 dBi With Three-Foot Cable, SMA Connector

## Product Locations and Connections




**Figure 11** SEL-2924 and SEL-2925 Locations

The SEL-2924 and SEL-2925 share many of the same features.

**Table 2** Features of the SEL-2924 and SEL-2925 (Sheet 1 of 2)

	Label	Color	Status	Description
Transmit	TX	Green	ON	Data are being received from the serial port and transmitted to the wireless side.
		Green	Blinks two times in one second	Both TX and RX blink after pressing the reset button or after successful cable replacement connection.
Receive	RX	Red	ON	Data are being received from the wireless side and transmitted out of the serial port.
		Red	Blinks two times in one second	Both TX and RX blink after pressing the reset button or after successful cable replacement connection.

**Table 2 Features of the SEL-2924 and SEL-2925 (Sheet 2 of 2)**

	Label	Color	Status	Description
BLUETOOTH		Blue	ON	Bluetooth is connected with device and communicating.
		Blue	Blinks once per second	Device is ready and not connected.
		Blue	Blinks ten times per second	Device is booting up.
Battery Status	BATT (SEL-2924 only)	Red	Blinks once per second	The battery is low and needs to be recharged.
		Green	Blinks once per second	Batteries are being charged.
		Green	ON	Batteries are fully charged and external power is being applied.

## Control Switch Settings

**Table 3 Control Switch Settings**

Switch	OFF 0 = OFF	On 1 = ON	Function
1	NORM	CMD	<p><b>OFF = NORM</b></p> <p>This is the normal operating mode for the device. In this position the device shall only allow the control (DIP) switch settings to set the device. In this mode, the device will not allow access to command mode.</p> <p><b>ON = CMD</b></p> <p>In command mode, all baud rate switch settings will be ignored. The device shall allow entry into command mode by using the \$\$\$ string for a given time set by the ATCMD setting. See <i>Settings and Commands on page 10</i> for more information on AT commands.</p>
2–4	BAUD		Control switches 2–4 apply if Control Switch 1 is in the OFF position. See <i>Table 4</i> for a list of all the supported baud rates. In this mode, the device will change the serial baud rate shown in <i>Table 4</i> five seconds after the last switch has changed position.
5	SLAVE	MASTER	<p>Control Switch 5 will only be read at the time of the startup. Switch 5 is ignored after the device is turned on.</p> <p><b>OFF = SLAVE</b></p> <p>In the Slave mode the device will be discoverable to connect with a master device. This is the default setting for the device and should be set to this for most applications.</p> <p><b>ON = MASTER</b></p> <p>The Master mode shall support a cable replacement mode allowing pairing of two devices with one set to master and the other set to slave. See the section below on cable replacement pairing for information on how to do this.</p>
6	AUTO	PAIR	<p>Control Switch 6 will only be read at the time of the power-up. Switch 6 shall be ignored during run time or after the cable replacement pairing/connection process is complete.</p> <p><b>OFF = AUTO</b></p> <p>This is the normal operating mode of the device to automatically pair with a master device. This is the default setting for the device and should only be changed when initiating a cable replacement pairing process.</p> <p><b>ON = PAIR</b></p> <p>The Pair mode is for pairing two Bluetooth devices, cable replacement mode, where one is set as master and the other is set as slave. This mode only works with SEL-2924/SEL-2925 devices. See <i>Pairing Two SEL-2924/SEL-2925 Devices Back-to-Back on page 8</i> for more information.</p>

## Baud Rate

The baud rate of the device is set either by the control switches or through settings commands in command mode. Control Switch 1 must be set to OFF (NORM mode) to change the baud rate with the control switches. Once Control Switch 1 is set to OFF (NORM mode), Control Switches 2–4 can be set to the desired baud rate shown in *Table 4*.

**Table 4 Baud Rate Selection**

Switch Number			Baud
2	3	4	
ON	ON	ON	1200
OFF	ON	ON	2400
ON	OFF	ON	4800
OFF	OFF	ON	9600
ON	ON	OFF	19200
OFF	ON	OFF	38400
ON	OFF	OFF	57600
OFF	OFF	OFF	115200

See *Settings and Commands* on page 10 for more information on setting the baud rate with the serial commands.

## Pairing Two SEL-2924/SEL-2925 Devices Back-to-Back

The SEL-2924/SEL-2925 supports a cable replacement mode to pair two devices with only the use of the control switches. This mode provides a secure wireless link between two devices, replacing a serial cable.

Follow these steps to pair two SEL Bluetooth devices.

- Step 1. Remove power from both devices.
- Step 2. Set control switches 2–4 to the required baud rate. Baud rates must be the same on both devices.
- Step 3. Set Control Switch 5 to OFF on the device designated as a slave device.
- Step 4. Set Control Switch 5 to ON on the device designated as a master device.
- Step 5. Set Control Switch 6 on both devices to ON.
- Step 6. Apply power to both units, making sure that they are within a few feet of each other.
- Step 7. Wait for units to automatically pair with each other using an internally generated random character encryption PIN.  
Both devices will flash the TX and RX LEDs three times in one-second intervals when the devices are connected and set.
- Step 8. The devices are now permanently paired with each other.

Once two devices are paired for a cable replacement sequence, they can only be pulled out of this mode by resetting both devices. After the devices are paired, changing control switches 1, 5, and 6 will have no effect on the device.

## Reset Button

The reset button is located on the top of the device near the back of the unit (see *Figure 11*). If you are unable to pair or connect to the device or have forgotten the PIN number, it may be necessary to reset the device. Use a paper clip to press and hold the button for five seconds to reset all of the settings to the factory default. The TX and RX LEDs will blink four times to confirm the settings have been reset to the factory default.

## USB Micro-B Power Connector

The USB Micro-B plug is located on the back of the unit. The plug is used for powering or charging the device. The plug does *not* have data lines for communication. The SEL-2924/SEL-2925 can be powered through the provided USB Micro-B cable with a local PC, an external +5 Vdc power



supply, or through a USB Micro-B to wall plug cable. The USB cable allows easy configuration and setup of the device with a local PC.

## EIA-232 Serial Port

The EIA-232 is a male DB-9 connector designed to plug directly into a female DB-9 connector. A gender changer may be used if the device port uses a male DB-9 connector. The device can use Pin 1 to power or charge the device by using +5 Vdc. You can download the SEL-5801 Cable Selector program from [www.selinc.com](http://www.selinc.com) to find compatible cables to connect and power the device.

**Table 5 EIA-232 Pinout**

Pin Number	Function
1	+5 Vdc power
2	RXD
3	TXD
4	N/C
5	GND
6	N/C
7	RTS
8	CTS
9	N/C

## Hardware Flow Control

The EIA-232 standard defines hardware flow control lines for a variety of uses. The device supports CTS and RTS control lines that may be used for hardware flow control, keying a transmitter, or providing device status. See *Settings and Commands on page 10* for more information on turning on hardware flow control.

## DTE/DCE Selector Switch

The serial port connection is made through a DB-9 connector. The signals follow the ANSI/TIA/EIA-232 Standard (EIA-232) and the 9-pin definition of EIA/TIA-574. The standards define two types of equipment: data terminal equipment (DTE) and data communication or circuit equipment (DCE). Serial ports on personal computers (e.g., COM1), PLCs, meters, protective relays, and most devices that do something other than providing a communications link are DTE. Most modems, radios, fiber-optic transceivers, Bluetooth adapters and multiplexer serial ports are DCE.

Typical connections are between one DTE port and one DCE port. Every signal that is an output of a DTE port is an input to the DCE port, and all DTE inputs are DCE outputs. To directly connect the SEL-2924/SEL-2925 to most end equipment (DTE) the DTE/DCE switch should be left in the default DCE position. You can connect two DTE ports or two DCE ports to each other by using a null modem cable to cross-connect the inputs to the outputs. You can also directly connect the SEL-2925 to a DCE port without a null modem cable by moving the DTE/DCE switch to the DTE position.

## SEL-2924 ON/OFF Switch and Batteries

The SEL-2924 is designed for temporary connections to serial devices. The SEL-2924 comes with rechargeable AAA NiMH batteries and an ON/OFF switch. The switch must be set to ON to use the device and set to OFF after use. If the device is left on, it will discharge the batteries. To charge the batteries, either connect the provided USB Micro-B cable to a PC or apply +5 Vdc power to Pin 1 of the DB-9 connector. The SEL-2924 will only charge the batteries when the ON/OFF switch is set to ON.

**⚠ WARNING**

Only use rechargeable AAA NiMH batteries in the SEL-2924. Use of wrong batteries could result in battery damage or explosion.

The **BATT** LED will flash red when the batteries are low, indicating that they need to be recharged. Once power is applied to the unit, the **BATT** LED will flash green to indicate that the batteries are charging. Once the batteries are fully charged, the **BATT** LED will turn solid green. The SEL-2924 must be turned on in order for the device to charge.

## Settings and Commands

The SEL-2924/SEL-2925 has additional commands to set the device and extend the capabilities. For these commands to work properly, Control Switch 1 must be set to ON (CMD mode). To enter the command mode, the user must type **\$\$\$** within 10 seconds of connecting to the device. If successful, the device will respond with **CMD**. This response lets the user know that the device is in command mode. In this mode, all the commands listed in *Table 6* can be used. To exit command mode, either type **ATO** or cycle power. If the **\$\$\$** command is not entered in 10 seconds, you can disconnect and then reconnect to re-initialize the 10 seconds. This 10-second delay can be changed to a user-set time by using the **ATCMD** setting.

**Table 6 AT Commands and Descriptions (Sheet 1 of 2)**

Command	Description
<b>ATB,(1200,2400,9600,19200,38400,57600,115200)</b>	Sets the baud rate on the serial side of the device. The baud rate only accepts baud rates listed from 1200 to 115200 bps. The default baud rate is 9600 bps. If Control Switch 1 is set to OFF, then the baud rate is overridden by the baud rate set from Control Switches 2–4.
<b>ATPIN,&lt;string&gt;</b>	Set or change the PIN code. (The SEL-2925 default PIN must be changed to enable the serial interface.) The PIN code consist of any printable ASCII characters from 8–16 characters long. All printable characters in the ASCII character set are valid. The default PIN for the SEL-2924 is <b>2924</b> , and the default PIN for the SEL-2925 is <b>2925</b> . The user must change the default PIN on the SEL-2925 to an 8–16 character PIN in order for the serial port to function.
<b>ATG</b>	Make Bluetooth connectible but not discoverable.
<b>ATH</b>	Make Bluetooth connectible and discoverable. This is the default mode in the device. If the operating mode is set to master, then it cannot be made discoverable.
<b>ATM,(Master,Slave)</b>	Sets the operating mode of the device. A master device has the ability to pair to a slave with a supplied Bluetooth MAC address. The Bluetooth MAC address can be found on the back of every device. In Master mode, the device only accepts commands from the serial port. A slave device allows any Bluetooth master to pair. In Slave mode, the device only accepts commands through the Bluetooth interface. The default setting is Slave.
<b>ATFN,&lt;string&gt;</b>	Sets the Bluetooth-friendly name. The device shall accept a string consisting of any printable ASCII characters from 1–18 characters long. By default, the device shall have the following friendly name: Blue(serial number), e.g., Blue1112345678.
<b>ATC,&lt;string&gt;</b>	Connect to the specified remote Bluetooth MAC address. This command can only be used when the device is set as a master. The remote Bluetooth MAC address is a 12-digit hex character located on the back of each device.
<b>ATI1</b>	Display firmware version with the FID, e.g., SEL-2924-R100-V0-Z000000-D20120613.

**Table 6 AT Commands and Descriptions (Sheet 2 of 2)**

Command	Description
ATSTA	<p>Display current settings and status of the device.</p> <p>Upon receiving the command, the device will display the following information:</p> <hr/> <pre> S/N=1112345678 FID=SEL-2924-R100-V0-Z000000-D20120613 Name=Blue1112345678 Address= 00A053112233  SETTINGS SW1 SW2 SW3 SW4 SW5 SW6 OFF ON OFF OFF ON OFF Baud=9600 HW Flow Ctrl=Deasserted Battery Level=Normal Battery Charging=No Mode=Slave CMD=10  SELF TEST RESULTS RAM FLASH OK OK</pre> <hr/>
ATD	<p>Displays the diagnostic information for the device.</p> <p>RAM = OK/FAIL</p> <p>FLASH = OK/FAIL</p> <p>Battery Level = Low/Normal/Fully Charged</p> <p>Battery Charging = Yes/No</p> <p>Diagnostic Records = As long as 10 records</p> <p>Example:</p> <hr/> <pre> SELF TEST RESULTS RAM FLASH OK OK Battery Level: Low Battery Charging: Yes  DIAGNOSTIC RECORDS ----- 1. &lt;diag record&gt; 2. &lt;diag record&gt;</pre> <hr/>
ATDC	Clears the diagnostic records.
ATK	Terminates current connection. This setting will only work if the device is set as a Master.
ATCTS,(Asserted, Deasserted,Enabled)	<p>Asserts control lines, deasserts control lines, or enables hardware flow control. The default mode is Deasserted.</p> <p>When set as a DCE device, the CTS line can be set to Asserted or Deasserted to allow the end device to send data. In most cases, this setting should be set to Deasserted.</p> <p>Setting ATCTS to Enabled will cause the CTS line to automatically switch high or low to support hardware (HW) flow control. After enabling HW flow control, the SEL Bluetooth Serial Adapter must be plugged into a device that supports hardware flow control to pass data.</p> <p>Do <i>not</i> set ATCTS to Enabled when using DNP3 protocol.</p>
\$\$\$	Enter command mode. This command only works when the device is connected and the command mode timer ATCMD has not expired.
ATO	Exit command mode. After ATO is entered, the device responds with <code>Exit</code> CMD.
ATCMD,(5–60,ON)	Command mode delay timer. The default timer is 10 seconds. The time delay setting is the length of time in which a user can type \$\$\$ to enter command mode. This timer starts when the device is connected.

# Specifications

## Compliance

Designed and manufactured under an ISO 9001 certified quality management system

### SEL-2924 Bluetooth Class 2 Device

Range:	10 m (32 ft)
Frequency:	2.4 GHz ISM band
Power:	2.5 mW; 4 dBm max

### SEL-2925 Bluetooth Class 1 Device

Range:	100 m (328 ft)
Frequency:	2.4 GHz ISM band
Power:	100 mW; 20 dBm max

## Data Rate

1.2 to 115.2 kbps

## Operating Temperature

SEL-2924 (Battery Rating):	0° to +40°C (32° to +104°F)
SEL-2925:	−40° to +85°C (−40° to +185°F)

## Power Requirements

5 Vdc 5% tolerance	
SEL-2924:	<2.5 W
SEL-2925:	<2 W

## LED Indicators

TX:	Data sent out of EIA-232 port
RX:	Data received in EIA-232 port
BLUETOOTH:	Wireless status
BATT:	Battery status

## Power Supply

5 Vdc via Pin 1 of serial port or USB Micro-B jack	
Charging USB cable included	
Rechargeable AAA NiMH Batteries (SEL-2924):	Batteries provide 8+ hours of operation

### SEL-2925 External Antenna

#### SMA Connector

Maximum Torque:	0.6 Nm (5 in-lb)
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#### Indoor and Outdoor Antenna Options

Indoor:	0 dBi right-angle SMA
Outdoor:	2.14 dBi with 0.91 m (3 ft) cable

## Security

Standard:	Bluetooth v2.1
Type:	Elliptical Curve Diffie Hellman Encryption
Key:	8–16 characters

## Dimensions

19.05 mm x 31.75 mm x 112.1 mm  
(0.75" H x 1.25" W x 4.41" D)

## Type Tests

### Electromagnetic Compatibility Emissions

General Emissions	CFR 47 Part 15 Severity Level: Class B
Product-Specific Emissions:	IEC 60255-25:2000 Severity Level: Class B

### Electromagnetic Compatibility Immunity (SEL-2925 Only)

Electrostatic Discharge Immunity:	IEC 60255-22-2:2008 Severity Level: 2 and 4 kV contact; 2 and 4 kV air IEC 61000-4-2:2008 Severity Level: 2 and 4 kV contact; 2 and 4 kV air IEEE C37.90.3:2001 Severity Level: 2 and 4 kV contact; 4, 8, and 15 kV air
Magnetic Field Immunity:	IEC 61000-4-8:2009 Severity Level: 1000 A/m for 3 seconds, 100 A/m for 1 minute IEC 61000-4-9:2001 Severity Level: 1000 A/m IEC 61000-4-10:2001 Severity Level: 1000 A/m
Radiated RF Immunity:	IEC 60255-22-3:2007 Severity Level: 10 V/m IEC 61000-4-3:2010 Severity Level: 10 V/m

### Environmental (SEL-2925 Only)

Cold:	IEC 60068-2-1:2007 Severity Level: 16 hours at −40°C IEEE 1613
Damp Heat, Cyclic:	IEC 60068-2-30:2005 Severity Level: 25°C to 55°C, 6 cycles, Relative Humidity: 95% IEEE 1613
Dry Heat:	IEC 60068-2-2:2007 Severity Level: 16 hours at +85°C IEEE 1613
Seismic:	IEC 60255-21-3:1993 Severity Level: Class 2 (Quake Response) IEEE 1613
Shock and Bump:	IEC 60255-21-2:1988 Severity Level: Class 1–Shock Withstand, Bump, and Class 2–Shock Response IEEE 1613
Vibration (Sinusoidal):	IEC 60255-21-1:1988 Severity Level: Class 1 Endurance, Class 2 Response IEEE 1613

## EMC Emissions

### Rated Emissions

FCC Part 15.247; ICES-001; RSS-210  
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:  
1. This device may not cause harmful interference, and  
2. This device must accept any interference received, including interference that may cause undesired operation.

## FCC Part 15, Class B; ICES-003

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help. Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

## FCC Section 15.21

Users manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## 注意！

依據 低功率電波輻射性電機管理辦法

第十二條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

## Industry Canada

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage ; (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Country	Authority	Reference	Part Number Starts With
Australia/ New Zealand	Ctick	N14953, Z1191	292401 or 292501
Brazil	Anatel	ID: 2908-13-7001	292404
Brazil	Anatel	ID: 2918-13-7001	292504
Canada	IC	6514A-RN42	292401
Canada	IC	7693A-RN41N	292501
Peru	MTC	TRSS29460	292501
Philippines	NTC	ESD-1307386C	292403
Philippines	NTC	ESD-1307387C	292503
Saudi Arabia	CITC	20130925007	292401
Saudi Arabia	CITC	20130925008	292501
South Africa	ICASA	TA-2012/1618	292402
South Africa	ICASA	TA-2012/1617	292502
Taiwan	NCC	CCA113LP3810T1	292401
Taiwan	NCC	CCA113LP3790T8	292501
Thailand	NBTC	20150422	292401 or 292501
USA	FCC	ID: T9J-RN42	292401
USA	FCC	ID: OA3-RN41N	292501

COFETEL Certification: Número de certificado: México RCPSESE12-1242  
 Marca: SEL  
 Modelo: SEL 2924  
 Número de certificado: México RCPSESE12-1243  
 Marca: SEL  
 Modelo: SEL 2925

# Firmware

To find the firmware revision number in your device, use the serial port **STATUS** command to view the status report.

The FID label will appear as follows, with the Part/Revision number in bold:

FID=SEL-292x-Rxxx-Vx-Z001001-Dxxxxxxxx

The firmware revision number is after the “R,” and the release date is after the “D.”

For example:

FID=SEL-2924-R100-V0-Z010001-D20120801

is firmware revision number 100, release date August 1, 2012.

Table 7 lists the firmware versions, a description of modifications, and the product manual date code that corresponds to firmware versions. The most recent firmware version is listed first.

**Table 7 SEL-2924 Firmware Revision History**

Firmware ID (FID) Number	Summary of Revisions	Manual Date Code
SEL-2924-R100-V0-Z001001-D20120801	► Initial version.	20120801

**Table 8 SEL-2925 Firmware Revision History**

Firmware ID (FID) Number	Summary of Revisions	Manual Date Code
SEL-2925-R100-V0-Z001001-D20120801	► Initial version.	20120801

# Instruction Manual

The date code at the bottom of each page of this manual reflects the creation or revision date.

Table 9 lists the manual release dates and a description of modifications. The most recent manual revisions are listed at the top.

**Table 9 Instruction Manual Revision History (Sheet 1 of 2)**

Revision Date	Summary of Revisions
20210324	► Updated <i>Specifications</i> to remove UL MX certification.
20200508	► Added UL MX certification.
20150805	► Updated <i>Specifications</i> .
20150527	► Updated <i>Table 6: AT Commands and Descriptions</i> . ► Updated <i>SEL-2925 External Antenna</i> in <i>Specifications</i> . ► Renamed <i>Certifications</i> to <i>Compliance</i> and moved to the beginning of <i>Specifications</i> . ► Added certification for Thailand.
20131209	► Added certifications for Brazil and Taiwan.
20131108	► Added certification for Peru.

**Table 9 Instruction Manual Revision History (Sheet 2 of 2)**

Revision Date	Summary of Revisions
20131025	<ul style="list-style-type: none"> <li>➤ Removed references to “+ EDR” in reference to BLUETOOTH versions.</li> <li>➤ Added connector type to antenna cables.</li> <li>➤ Updated part numbers in <i>Specifications</i>.</li> <li>➤ Added certifications for South Africa, Philippines, and Saudi Arabia.</li> <li>➤ Added Chinese subset of FCC warning.</li> </ul>
20130118	<ul style="list-style-type: none"> <li>➤ Added <i>Figure 6: Uncheck Options</i>.</li> <li>➤ Added text on using SEL-701PC® SEL-5030 Software to set or change the PIN.</li> <li>➤ Added COFETEL certification.</li> </ul>
20121031	<ul style="list-style-type: none"> <li>➤ Added certification for Australia/New Zealand.</li> </ul>
20120801	<ul style="list-style-type: none"> <li>➤ Initial version.</li> </ul>

## Technical Support

We appreciate your interest in SEL products and services. If you have questions or comments, please contact us at:

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 Internet: [selinc.com/support](http://selinc.com/support)  
 Email: [info@selinc.com](mailto:info@selinc.com)

# Notes

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## WARNING

Only use rechargeable AAA NiMH batteries in the SEL-2924. Use of wrong batteries could result in battery damage or explosion.

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The information in this document is provided for informational use only and is subject to change without notice. Schweitzer Engineering Laboratories, Inc. has approved only the English language document.

This product is covered by the standard SEL 10-year warranty. For warranty details, visit [selinc.com](http://selinc.com) or contact your customer service representative.

## AVERTISSEMENT

Seulement utiliser des piles rechargeables AAA NiMH dans le SEL-2924. L'utilisation de batteries mauvaises pourrait entraîner des dommages ou une explosion de la batterie.

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