



PC Serial Security Kit (915900225)

Strong Cryptographic Security for Engineering Access

The PC Serial Security Kit (part 915900225) enables a PC to communicate securely over remote serial links protected by SEL encryption devices such as the SEL-3025 Serial Shield™. Installation of the kit is simple and requires no hardware modifications to the PC or its connections beyond plugging in a USB device. The kit consists of an SEL-3055 SEL Card Dock, an SEL-3045 Secure SCADA Card, and the SEL-5025 Secure Port Service Software. The PC Serial Security Kit enables secure engineering communication with meters, protective relays, programmable logic controllers (PLCs), and other remote devices. It also authenticates and encrypts serial data communications, offering a defense against eavesdropping, malicious attack, and unauthorized access.



The PC Serial Security Kit is the ideal solution for securing engineering access to dial-up connections for which an SEL-3025 protects the remote end by providing communications security and identity-based access control.

Major Features and Benefits

- **Simple Integration.** Easily upgrade remote access security with an SEL-3025 bump-in-the-wire encryption device at the remote site and the PC Serial Security Kit at the engineering workstation.
- **Individual User Accountability.** Secure all your dial-up modems with identity-based access controls and reports that you can manage centrally.
- **Proven Cryptographic Protocols.** SEL Encryption cards use proven NIST-approved algorithms for encryption and authentication.
- **SSCP for Message Authentication With Encryption.** Secure SCADA Communication Protocol (SSCP) is ideal for engineering access. SSCP authenticates every data packet on your serial link and can also use NIST-approved Advanced Encryption Standard (AES) encryption with strong 128- or 256-bit keys provide strong encryption.
- **Easy Configuration.** Use ACCELERATOR QuickSet® SEL-5030 Software to set up and manage configuration of both local and remote units.
- **Backup Configuration Data.** Quickly back up and restore configuration data with configuration files.
- **Simple Logging With Syslog.** Log events with Syslog for consistency, compatibility, and centralized collection.
- **Reliability.** The PC Serial Security Kit carries the standard SEL ten-year warranty.

Overview

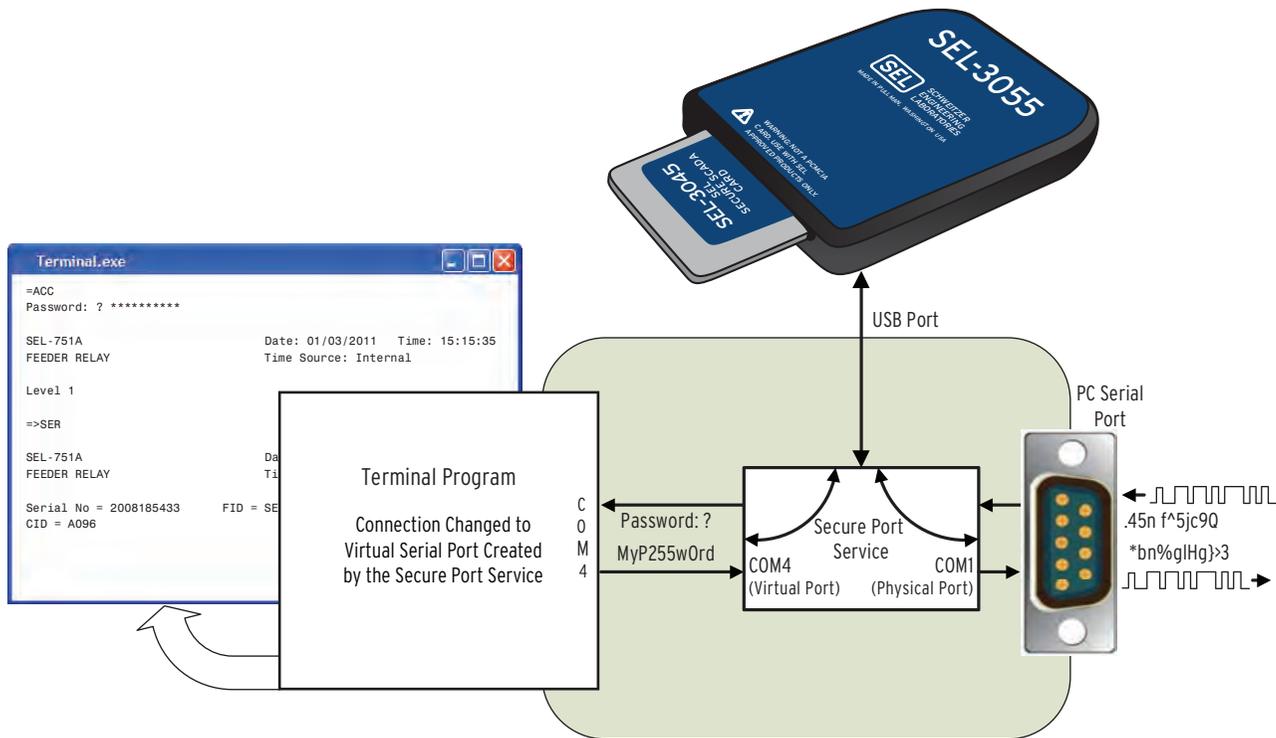


Figure 1 Serial Data Encryption Using the PC Serial Security Kit

The PC Serial Security Kit provides NIST-validated encryption for a serial communications port on a PC workstation. Through your use of the SEL-3045 card and the SEL-5025 Secure Port Service Software, you can enable cryptographic security for any serial communications port on the PC. The SEL-5025 routes communication between virtual serial ports and the hardware communications ports on a PC. It sends data through the inserted cryptographic processor card either before the information leaves the PC and needs to be encrypted or after it is received, decrypting the information before passing it on to the software application. Through use of a virtual serial port created by the Secure Port Service, existing PC software applications can access remote field devices for which the SEL-3025 provides security without requiring changes to typical device operation. Access controls and encryption occur independently of the end device or the PC software application.

In the sample application in *Figure 1*, a terminal and modem provide a user communication with a remote device. The SEL-3055 has been plugged into a serial port, and the SEL-5025 is running on the PC. The Secure Port Service has created a new virtual serial port on COM4, and the terminal program is simply reconfigured to use that port instead of the physical port it had used previously. The Secure Port Service is configured to map the new virtual port to COM1. The new port copies communications parameters from the physical port, so the communications parameters need no change. If you

configure the Secure Port Service to operate with a modem on the physical port, the system is modem aware. Traffic to the physical serial port remains in the clear until you have an established carrier, so that you can communicate with the modem and establish a connection before automatically switching to secure mode.

SEL-3045 Secure SCADA Card

The SEL-3045 Secure SCADA Card with Secure SCADA Communication Protocol (SSCP) provides strong protection, data integrity, and authenticity. SSCP protects against spoofed, altered, spliced, reordered, or replayed data with strong data authentication. It also provides optional AES-128 or AES-256 data encryption for protection from eavesdropping. The protocol prevents unauthorized device access by rejecting all communications session requests from sources that cannot pass cryptographic session authentication. *Figure 2* shows a typical engineering access connection where an engineering workstation retrieves data from a remote device over an untrusted communications channel. Publicly accessible channels, such as a leased phone circuit, a dial-up connection, or a radio link, are considered untrusted communications channels. An attacker could access the channel, connect to the remote modem, and inject malicious data or replay old data to cause such an unwanted action as an unauthorized breaker operation.

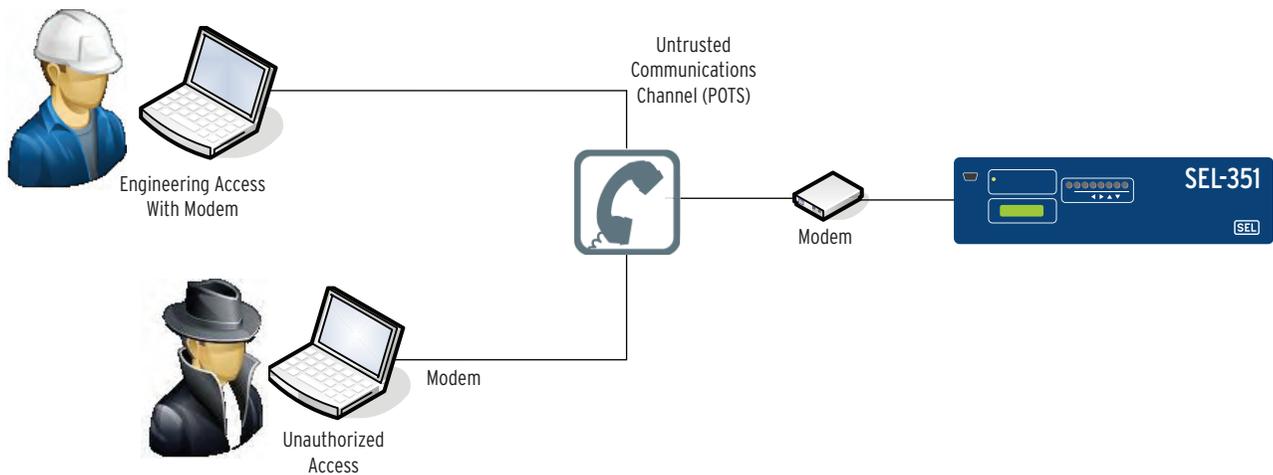


Figure 2 Typical Engineering Access Communications Channel

Figure 3 shows the engineering communications link secured by a PC Serial Security Kit at the engineering workstation and working with an SEL-3025 at the remote modem. Legitimate communication still flows seamlessly between the engineering workstation and the

remote device. The SEL-3025 serial shield blocks all unauthorized access to the protected master and remote IEDs. The SSCP protocol is a byte-oriented protocol that offers the strong encryption and message authentication features necessary for engineering access.

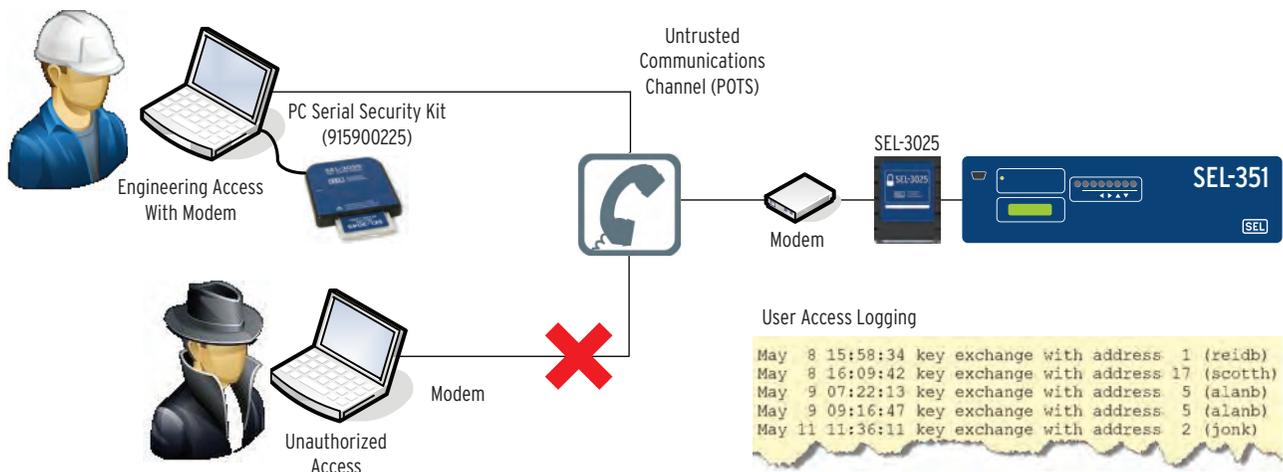


Figure 3 Secure SCADA Communications Channel

Using the PC Serial Security Kit With a Modem for Engineering Access

Set up of an engineering workstation that uses the PC Serial Security Kit for secure communication begins with the insertion of the SEL-3045 into the SEL-3055 and the connection of the card dock to a USB port on the workstation. The software on the CD accompanying the PC Serial Security Kit installs the SEL-5025 Secure Port Service application, as well as the necessary device drivers and ACSELERATOR QuickSet software.

Following Secure Port Service configuration, the serial port presently in use by your PC application maps to a new virtual serial port, and the PC application begins using the new port. You can then see among the

communications application configuration dialogs a new serial port called **SEL Secured Communications Port**. The new port adopts the configuration settings of the physical port to which it is mapped. Secure your communications applications by choosing the new encrypted port for communication.

You configure the port to enable AT passthrough mode by using a modem for communication. This allows the PC to communicate in the clear to a modem until you have established a carrier, at which point encryption turns on. You can disconnect the modem in the usual manner, by transmitting a hang-up sequence to the modem or deasserting DTR (Data Terminal Ready).

When the Secure Port Service starts, it installs a tray application (accessible through the task bar tray area) that you can use to configure the secure serial port and

show its status. *Figure 4* shows the screen from which you would configure the secure port service to use COM1 and to provide COM99 as the SEL Secured Communications Port for applications. The speed and

format parameters copy automatically from the port you select, but you can also change these parameters as necessary.

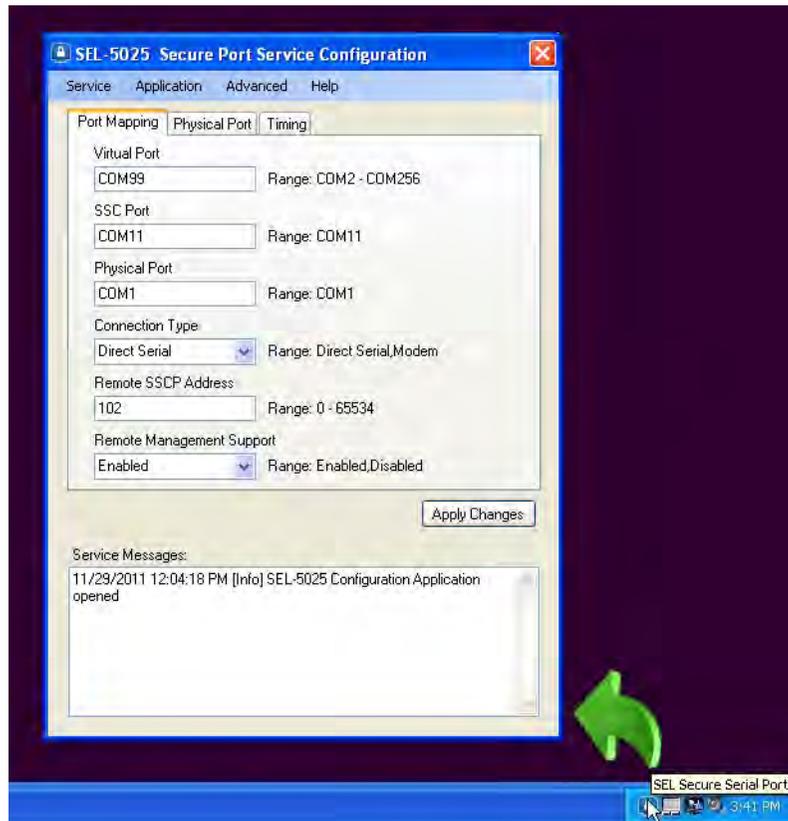


Figure 4 Tray Application User Interface

Use ACCELERATOR QuickSet to establish the cryptographic settings and keys necessary to communicate with the distant end device. *Figure 5* shows ACCELERATOR QuickSet, which is used for configuring the SSCP shared keys. See the *SEL-3025 Instruction Manual* for more information.

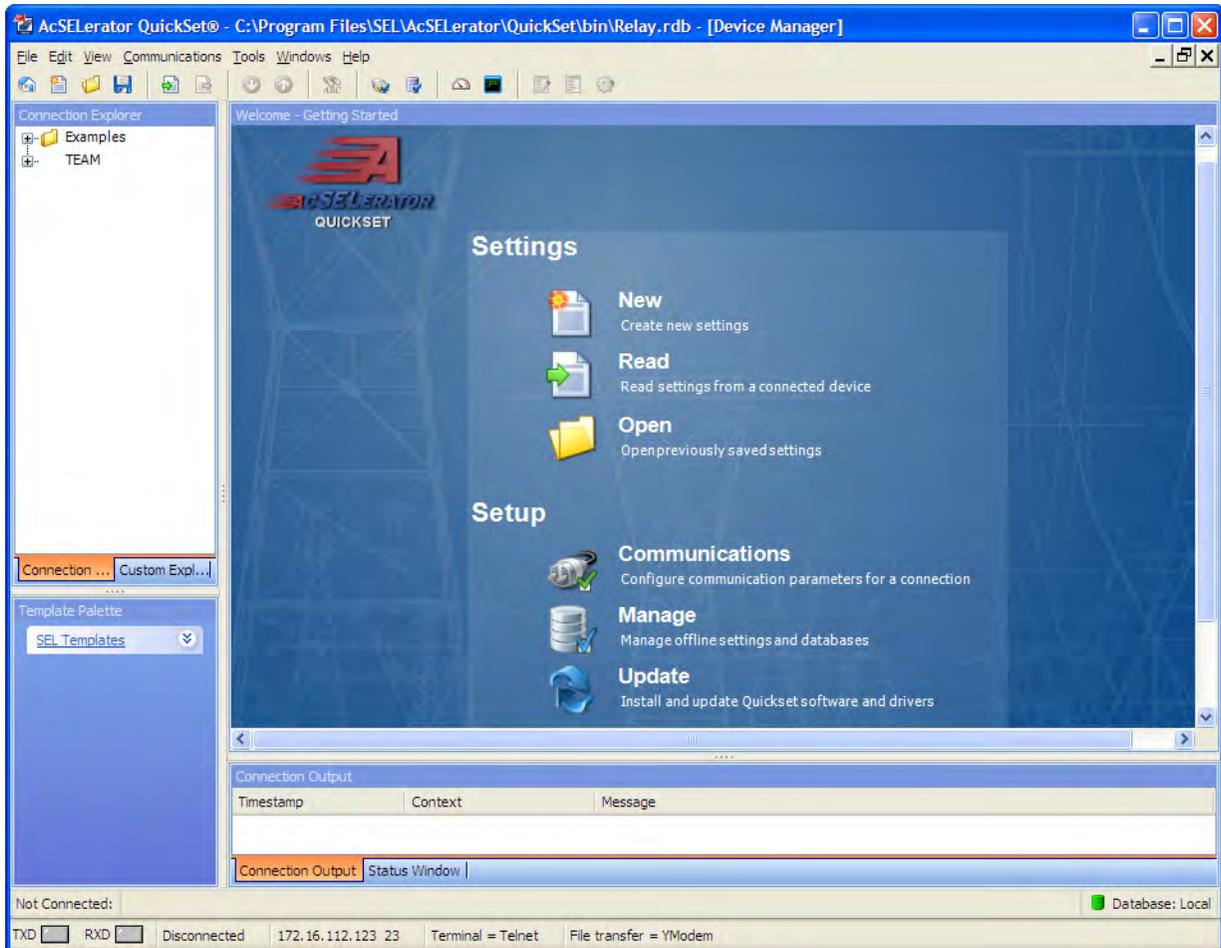


Figure 5 ACSELERATOR QuickSet Application

Related Products

The accompanying CD provides the following products for use with the PC Serial Security Kit.

Software

- The SEL-5025 Secure Port Service Software provides secure serial ports for applications running on the PC.
- ACSELERATOR QuickSet provides configuration assistance for SEL devices including the SEL-3045. You can obtain this software from the CD or download it from www.selinc.com/sel-5030.

Plug-In Cryptographic Cards

The SEL-3045 Secure SCADA Card uses Secure SCADA Communication Protocol (SSCP) with NIST-approved AES encryption to secure remote engineering access communication.

Remote Device Communications Encryption

The SEL-3025 Serial Shield, a bump-in-the-wire encryption device for distant-end serial communication, works with a PC equipped with the PC Serial Security Kit.

Guideform Specification

The following features shall be available during use of the PC Serial Security Kit.

- **Cryptographic Algorithms.** The PC Serial Security Kit shall include an SEL plug-in encryption module that employs SHA-1 and SHA-256 for authenticity and integrity. AES-128 and AES-256 shall be used for data encryption.
- **USB Driver.** The PC Serial Security Kit software CD shall include the appropriate USB 2.0 driver.
- **USB Port Supplied Power.** The SEL-3055 SEL Card Dock with the SEL-3045 Secure SCADA Card plug-in encryption module shall receive power from the USB port of the PC, consuming a maximum of 1.5 W.
- **Integrated Communications.** The Secure Port Service software supplied with the PC Serial Security Kit shall provide the encrypted communications channel as a virtual serial port available to software running on the PC.
- **Configuration.** The PC Serial Security Kit PC software shall support secure upload and download of configuration data.
- **Logging.** The PC Serial Security Kit PC software shall support the Syslog protocol, enabling local logging and remote log collection.
- **Warranty.** The device shall have a minimum 10-year worldwide warranty.

Specifications

General

Indicators

None

PC Interface

USB 2.0 Type A with 6-foot cable

Power Consumption

Less than 1.5 W at 5 Vdc (USB-powered)

Temperature

–0° to +70°C (+32° to +158°F), operating
–40° to +85°C (–40° to +185°F), storage

Humidity

5 to 95% noncondensing

Dimensions

87 mm (3.4 in) W x 102 mm (4.0 in) D x 14 mm (0.55 in) H

Weight

SEL-3055 SEL Card Dock
With SEL-3045 Secure
SCADA Card: 190 g (6.7 oz)

Cryptographic Protocols

Secure SCADA Communication Protocol (SSCP) provided by plug-in cryptographic card.

Certifications

ISO: Designed and manufactured using ISO 9001 certified quality program.
CE Mark

Notes

© 2012 by Schweitzer Engineering Laboratories, Inc. All rights reserved.

All brand or product names appearing in this document are the trademark or registered trademark of their respective holders. No SEL trademarks may be used without written permission. SEL products appearing in this document may be covered by US and Foreign patents.

Schweitzer Engineering Laboratories, Inc. reserves all rights and benefits afforded under federal and international copyright and patent laws in its products, including without limitation software, firmware, and documentation.

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 www.selinc.com or contact your customer service representative.

SCHWEITZER ENGINEERING LABORATORIES

2350 NE Hopkins Court • Pullman, WA 99163-5603 USA

Phone: +1.509.332.1890 • Fax: +1.509.332.7990

Internet: www.selinc.com • E-mail: info@selinc.com

