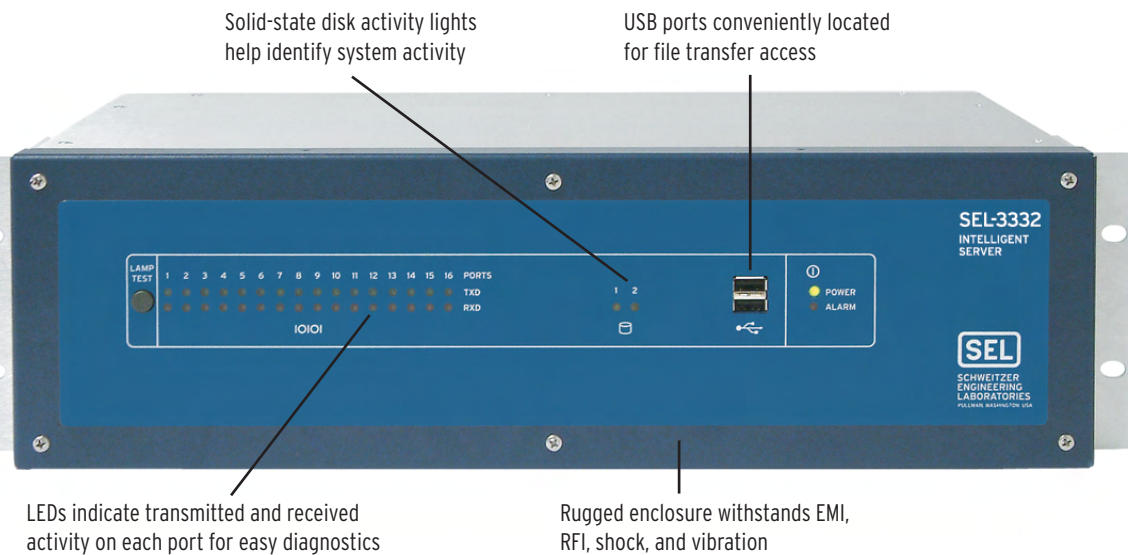


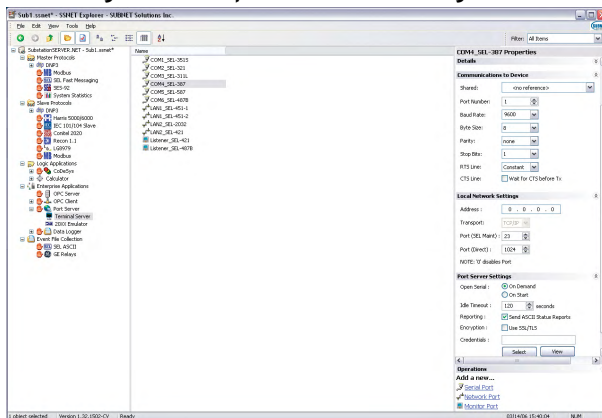


SEL-3332 Intelligent Server

Complete Automation System for Data Concentration and IED Integration



Drag-and-Drop Protocol Configuration



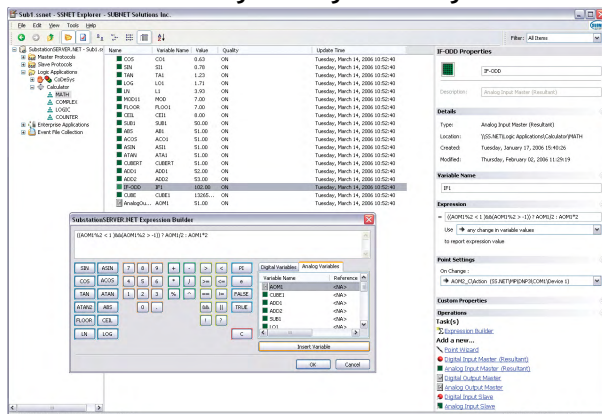
Simple Setup

- Automatically configure IEDs with the IED wizard
- Efficiently map and translate data with the drag-and-drop interface

Wide Protocol Conversion Capability

- Choose any available protocol on any port
- Map to OPC Client/Server
- Ethernet and Serial Communications
- IEC 61850 GOOSE
- Master protocols such as IEC 61850 MMS, SEL Fast Message, SEL ASCII Event File Collection, DNP3 Serial and LAN/WAN, Modbus[®] RTU and TCP/IP, IEC 60870-5-103, LG8979, SES-92, and Harris 5000/6000
- Slave protocols such as IEC 61850 MMS, DNP3 Serial and LAN/WAN, Modbus[®] RTU and TCP/IP, IEC 60870-5-101/104, LG8979, SES-92, Harris 5000/6000, Conitel 2020, GETAC/BETAC 7020, CDC Type 2, and Recon 1.1

Intuitive Logic Programming Tools



Built-In Logic Processing Platform

- Perform substation automation
- Flexibly concentrate data
- Easily perform scaling and Boolean logic

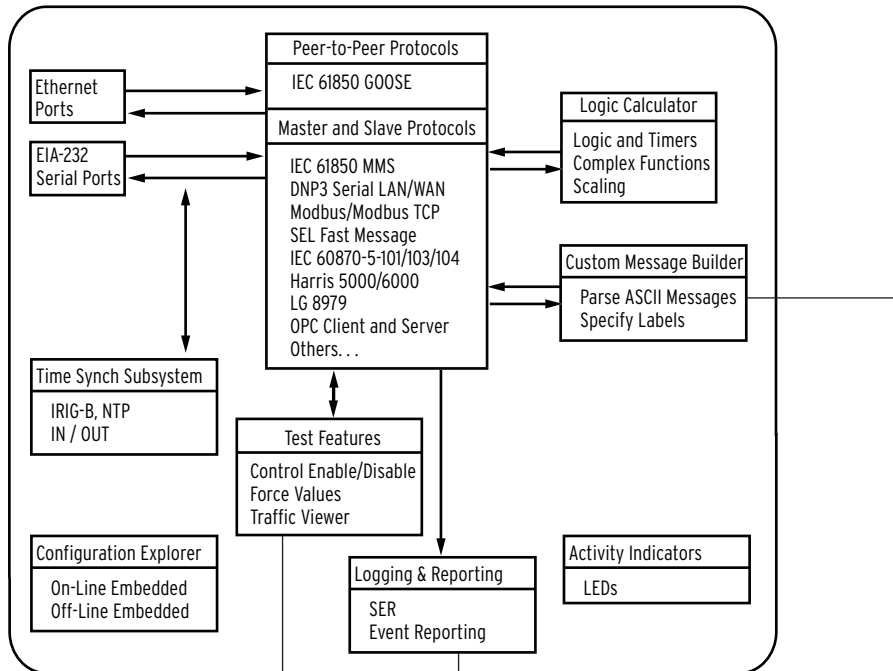
Cybersecurity Management

- Encrypt Ethernet-based engineering access and SCADA protocols with SSL/TLS
- Protect VPN access with IPsec link security

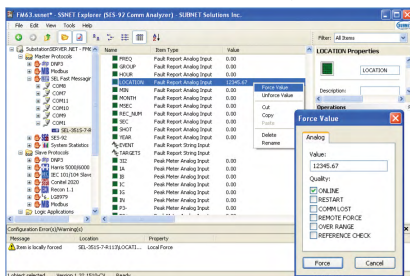
Product Summary

The SEL Intelligent Server empowers you to build your integrated substation to fit your needs. The most powerful processing engine in the industry and SEL hardware reliability come together with intuitive software to deliver a complete automation system.

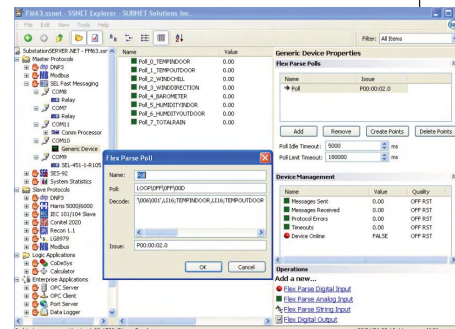
Functional Block Diagram



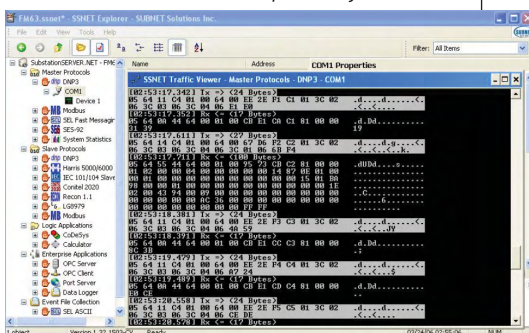
Force Values for Testing



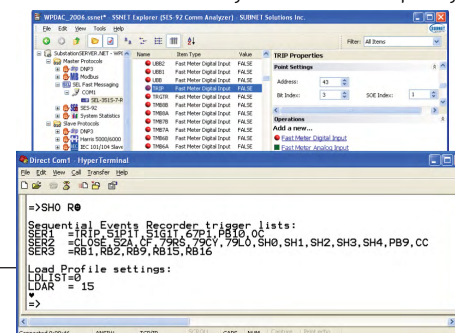
Custom Messages Provide Flexibility



Traffic Viewer Simplifies Diagnostics



Automatic SER Point Configuration Facilitates Reporting



Ordering Options

Standard Features

- Intel® Pentium® M 1.4 GHz with 1 GB DDR ECC SDRAM
- 1 EIA-232 Serial Port
- 2 Ethernet Ports
- 4 USB Ports
- IRIG-B Input
- Embedded Operating System

Standard Software

- SubstationSERVER.NET by SUBNET Solutions, Inc.
- Option 1: 10 Master Ports, 8192 Points, 3 Protocols
- SEL Fast Messaging

Peer-to-Peer Protocols

- IEC 61850 GOOSE

Available Master Protocols

- IEC 61850 MMS
- SEL Fast Message
- DNP3 Serial and LAN/WAN
- Modbus RTU and TCP/IP
- IEC 60870-5-103
- LG8979
- SES-92
- Harris 5000/6000

Optional Features

- Up to 8 GB Primary Flash Memory
- Up to 8 GB Secondary Flash Memory
- 8 or 16 EIA-232 Ports

Optional Software

- AX-S4 MMS IEC 61850 Software by SISCO, Inc.
- Option 2: 25 Master Ports, 16384 Points with 7 Protocols
- Option 3: 100 Master Ports, 32768 Points with 15 Protocols
- OPC Client/Server
- Port Server
- Logic Calculator
- Data Logger
- Relay Event Collection (SEL & GE)

Available Slave Protocols

- IEC 61850 MMS
- DNP3 Serial and LAN/WAN
- Modbus RTU and TCP/IP
- IEC 60870-5-101/104
- LG8979
- SES-92
- Harris 5000/6000
- Conitel 2020
- GETAC/BETAC 7020
- CDC Type 2
- Recon 1.1

Accessories

Order your Intelligent Server with the accessories you need to build a customized automation system.

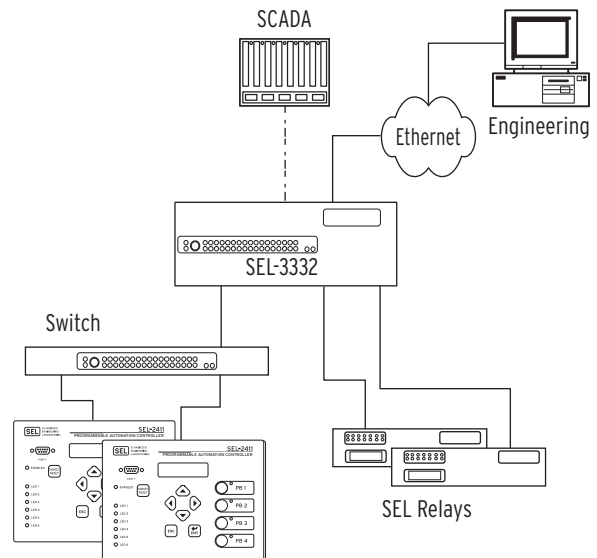
- | | |
|--|--|
| <ul style="list-style-type: none"> ➤ Encrypted Serial Communications ➤ Encrypted Wireless Serial Communications ➤ GPS Satellite Clock ➤ I/O Programmable Controller ➤ Contact I/O for local/remote jurisdiction | <ul style="list-style-type: none"> ➤ Local Annunciator ➤ Rack-mount USB keyboard/drawer with integrated trackball ➤ 17" touchscreen monitor with a 19" rack-mount bracket |
|--|--|

Applications

Electrical Substation SCADA, Report Retrieval, and Engineering Access

Use the SEL-3332 Intelligent Server with your protective relays and other IEDs as the substation SCADA data concentrator. Optionally configure the Intelligent Server to collect and view station-wide SER and event reports from SEL and other IEDs. The Intelligent Server is designed to work seamlessly with SEL Event Report Manager software on your PC.

Complete all of your Engineering access tasks for your IEDs with the Intelligent Server while maintaining SCADA updates. All SEL software running on your Engineering PC integrates with the Intelligent Server. Remotely manage protection and control settings using ACSELERATOR[®] QuickSet SEL-5030 software.



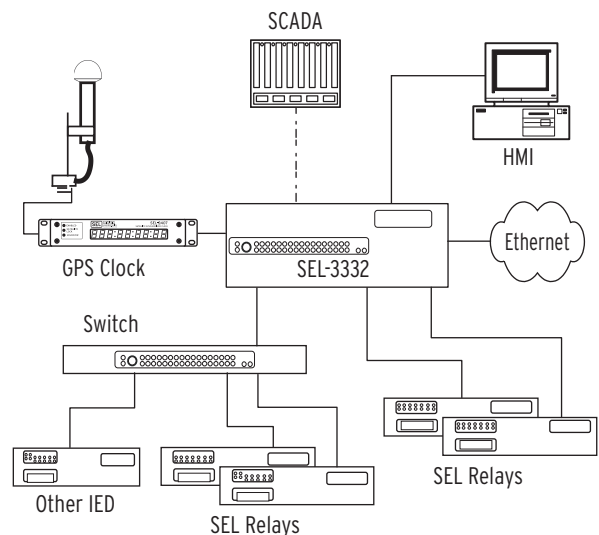
Protocol Conversion, Data Concentration, and Time Synchronization

Integrate all SEL devices and many other IEDs using the Intelligent Server. Use the wide variety of available master and slave protocols, along with peer-to-peer protocols, to collect data from existing IEDs for use in HMI, historian, and SCADA applications. Extend the flexibility of the system with optional protocols, such as OPC client/server.

The intuitive configuration software provides simple setup of analog and binary points into data maps. Use integrated tools to scale values and calculate logic in a familiar editing environment.

The Intelligent Server can synchronize the time clocks in attached devices, such as relays, that accept a demodulated IRIG-B time signal. The demodulated IRIG-B signal is regenerated in the SEL-3332 from an external modulated or demodulated source, such as a GPS satellite clock receiver.

If no IRIG-B source is available, the demodulated IRIG-B time signal is generated internally by the Intelligent Server. The SEL-3332 also accepts network time protocol (NTP) commands to set its internal clock.

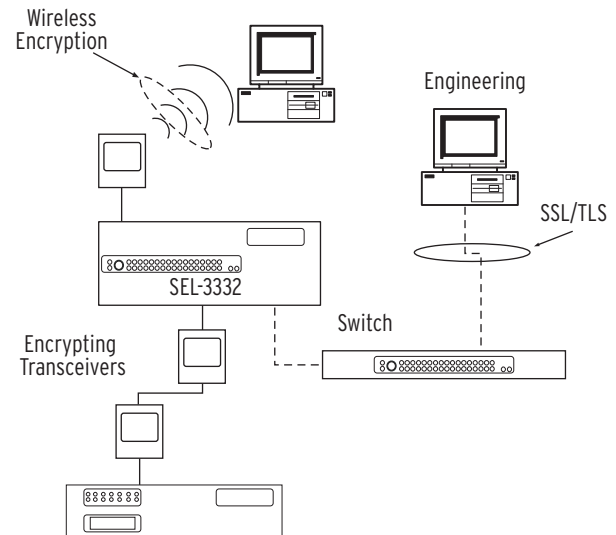


Secure Communications and User Management

Secure your automation network using the Intelligent Server and SEL accessories. Configure your engineering access channels over Ethernet to use SSL/TLS. Implement per-user security profiles to comply with role-based requirements.

Implement system security auditing, logging, and password restrictions to enforce NERC standards.

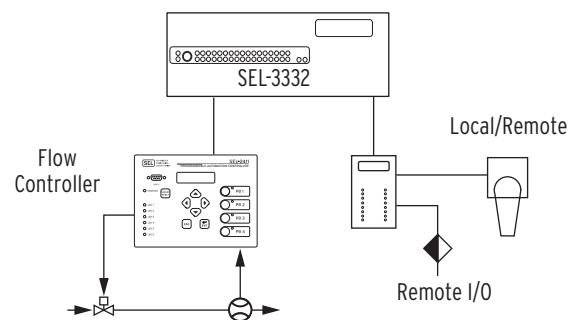
Optionally include serial and wireless encrypting devices with the Intelligent Server in order to protect communications to the IEDs, recloser controls, or other connected devices.



Integrated I/O Systems and Remote/Local Jurisdiction

Use SEL Remote I/O Modules to provide optically connected local I/O for remote/local jurisdiction of controls, physical access security, and cyberalarm monitoring. The Remote I/O Module HMI simplifies installation, testing, and diagnostics.

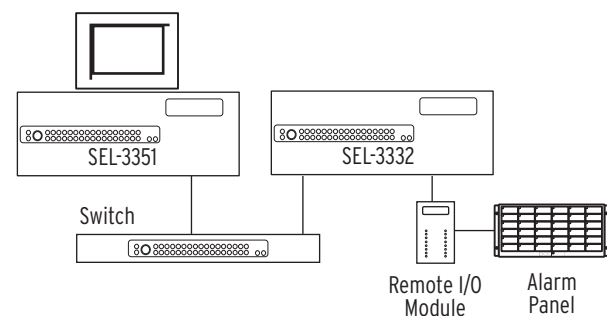
The Intelligent Server integrates with all SEL devices and many other IEDs. Automatically configure the communication parameters for many SEL products, including the SEL-2411 Programmable Automation Controller. Use the SEL-2411 in conjunction with the SEL-3332 to create a distributed I/O and control system to suit your system requirements. Expand the contact I/O capability of the system with SEL Remote I/O Modules.



Local Monitoring and HMI

In addition to SCADA applications, use the Intelligent Server as part of local monitoring system. With SEL Remote I/O Modules and Alarm Panels your substation control system provides quick indication of status and alarms.

Combine the Intelligent Server with an SEL-3351 Rugged Computing Platform and your own HMI software to provide complete monitoring and control of your substation automation system. The optional OPC client/server support in the Intelligent Server interfaces natively with many modern HMI software packages.

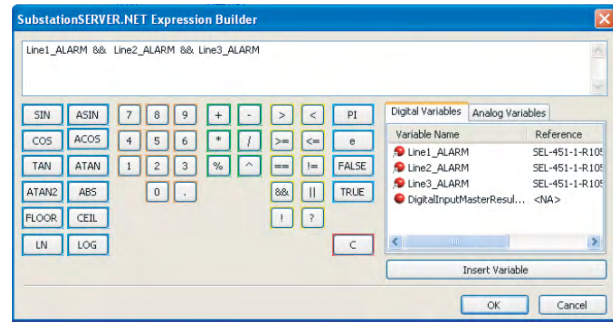


Custom Logic and Scaling

Use the optional calculator to simply create powerful logic equations for the Intelligent Server. Use any master or slave data point (analog and binary) within logic expressions. Define labels for the resultant values of the equations and then drag the resultants into master or slave device maps just like data points directly reported from an IED.

Use provided timer functions, such as time-on-delay, time-off-delay, and pulse timers to provide the functionality you need in your control system.

Also use resultants as intermediate variables in other logic. All of the viewing and testing features can be used with logically derived data points.



Guideform Specification

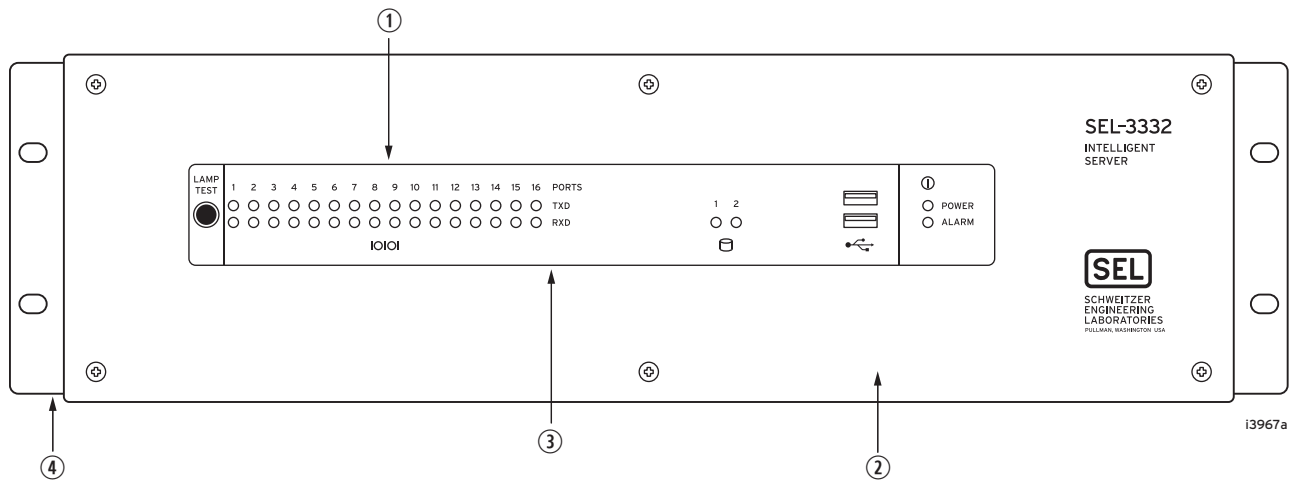
The SEL-3332 Intelligent Server shall operate in star, ring, and multidrop communications networks and provide a combination of functions including automatic transmission of outgoing messages and parsing of responses, data aggregation, simultaneous collection of data from serial and Ethernet server devices (both SEL and non-SEL), and simultaneous data access for multiple client devices. The Intelligent Server shall provide the operational and functional requirements as follows:

- **Power Supply.** The Intelligent Server shall be capable of operating on a wide range of power supply voltages and shall be available with one of three power supply types: 24/48 Vdc, 48/125 Vdc or 120 Vac, or 125/250 Vdc or 120/240 Vac.
- **Temperature.** The Intelligent Server shall be capable of continuous operation over a temperature range of -40°C to $+75^{\circ}\text{C}$ at 50 percent processor burden in order to allow mounting in an outdoor control cubicle. The Intelligent Server shall be type tested to IEC 60068-2-1:1990 (Test Ad 16 hr @ -40°C), IEC 60068-2-2:1974 (Test Bd 16 hr @ $+75^{\circ}\text{C}$), and IEC 60068-2-30:1980 (Test Db 12 + 12-hour cycle @ 25° to 55°C , 6 cycles).
- **Environmental Testing.** The Intelligent Server shall be tested to the same standards as protective relays including IEC 60255-21-1, IEC 60255-21-2, IEC 60255-21-3, IEC 60255-22-1, IEC 60255-22-2, EN 61000-4-2, IEC 60255-22-3, IEC 60255-22-4, EN 61000-4-4, and IEEE C37.90.1 (see *Specifications on page 9* for details).
- **Communication Ports.** The Intelligent Server shall have two USB front-panel ports. Two USB ports, sixteen serial ports, and two Ethernet ports shall be located on the rear panel. Two pins on each

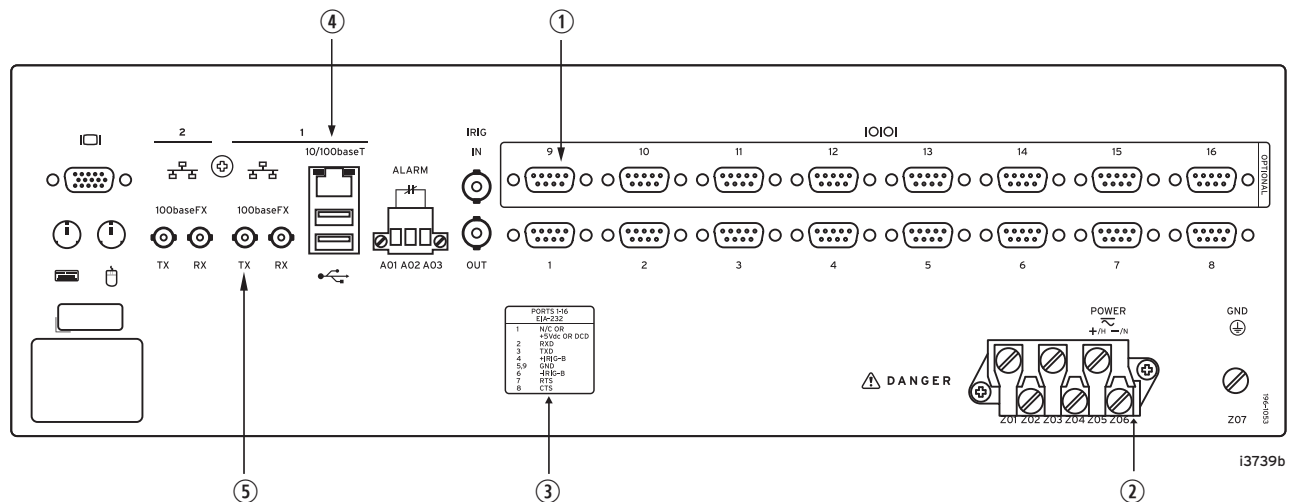
serial port shall be available as a demodulated IRIG-B time-synchronization signal. Sixteen rear ports shall have a selectable +5 Vdc output on Pin 1. Each rear serial port shall be capable of operation at 300–115200 bps. Ethernet ports shall be independent. All communication ports shall be ESD and RFI protected.

- **Password Security.** The Intelligent Server shall have a standard Microsoft® Windows® logon system. The passwords shall be user configurable and allow up to 12 characters including case sensitive letters, digits, and special characters including !@#%&^&(*)_-=+;,.<.>/?'"/\.. This password scheme meets or exceeds all of the requirements of the DOE Password Guide (DOE G 205.3-1).
- **Database.** Each port shall have a separate database that allows data collection and labeling.
- **Configuration.** Configuration of messages and data processing functions shall be through a simple GUI interface. Configuration interface shall be through local keyboard, mouse, and monitor port or via Windows Remote Desktop.
- **Configuration Storage.** The Intelligent Server shall store all settings and configuration in nonvolatile memory allowing recovery after prolonged loss of power including failure of the internal battery.
- **Alarm Output.** There shall be an alarm contact output to signal internal errors and malfunctions. The alarm contact shall be controlled by an internal watchdog system that independently monitors the operating system.
- **Warranty.** The Intelligent Server shall be warranted for a minimum of 10 years.

Front- and Rear-Panel Diagrams



- ① LEDs indicate transmitted and received activity on each port for easy diagnostics.
- ② Rugged enclosure withstands EMI, RFI, shock, and vibration. Clock battery lasts 10 years. No other maintenance is required.
- ③ High-contrast white-on-blue lettering is highly legible even in dark cubicles.
- ④ Reversible flanges for flush or projection mounting.



- ① All rear serial ports provide communication and time code. Internal clock generates time code and synchronizes to modulated or demodulated time-code input.
- ② Wide-range power supply.
- ③ All DB-9 connector pin assignments are clearly identified.
- ④ High-contrast white-on-blue lettering is highly legible even in dark cubicles.
- ⑤ Dual Ethernet connection.

RACK-MOUNT CHASSIS



Specifications

General

Peer-to-Peer Protocols

IEC 61850 GOOSE

Master Protocols

IEC 61850 MMS, SEL ASCII Event File Collection, SEL Fast Message, DNP3 Serial and LAN/WAN, Modbus® RTU and TCP/IP, IEC 60870-5-103, LG8979, SES-92, Harris 5000/6000

Slave Protocols

IEC 61850 MMS, DNP3 Serial and LAN/WAN, Modbus® RTU and TCP/IP, IEC 60870-5-101/104, LG8979, SES-92, Harris 5000/6000, Conitel 2020, GETAC/BETAC 7020, CDC Type 2, Recon 1.1

Enterprise Applications

Port Server, Logic Calculator, Data Logger, Event File Collection, OPC Client/Server

Terminal Connections

Rear Screw-Terminal Tightening Torque

| | |
|----------|-------------------|
| Minimum: | 0.8 Nm (7 in-lb) |
| Maximum: | 1.4 Nm (12 in-lb) |

User terminals and stranded copper wire should have a minimum temperature rating of 105°C and a minimum insulation thickness of 0.4 mm. Ring terminals are recommended.

Power Supply

Option: 125/250 Vdc or 120/230 V
50/60 Hz

| | |
|------------------|------------|
| DC Range: | 85–300 Vdc |
| AC Range: | 85–264 Vac |
| Frequency Range: | 30–120 Hz |
| Burden: | <40 W |

Option: 48/125 Vdc or 120 V
50/60 Hz

| | |
|------------------|------------|
| DC Range: | 38–140 Vdc |
| AC Range: | 85–140 Vac |
| Frequency Range: | 30–120 Hz |
| Burden: | <40 W |

Option: 24/48 Vdc

| | |
|-----------|------------------------------|
| DC Range: | 20–60 Vdc polarity dependent |
| Burden: | <40 W |

Operating Temperature, Performance

–40° to +75°C (–40° to +167°F)

Operating Temperature, Safety

–40° to +75°C (–40° to +167°F)

Storage Temperature

–40° to +85°C

Relative Humidity

5 to 95% noncondensing

Maximum Altitude

2000 m

Atmospheric Pressure

80 ... 110 kPa

Overvoltage Category

Category II

Pollution Degree

2

Weight (Maximum)

5 kg (11 lbs)

Serial Ports

1, 8, or 16 rear-panel ports, DB-9 connectors

USB Ports

2 rear-panel ports, 2 front-panel ports
USB 1.1 Compliant
200 mA current limit for rear-panel ports
200 mA current limit for front-panel ports

Ethernet Ports

2 rear-panel fiber-optic ports, 1 rear-panel copper port

Fiber-Optic

| | |
|-----------------|---------|
| Max TX Pwr.: | –14 dBm |
| Min TX Pwr.: | –19 dBm |
| RX Sensitivity: | –32 dBm |
| System Gain: | 13 dB |
| Wavelength: | 1300 nm |
| Source: | LED |
| Connector Type: | ST |

Serial Data Speed

300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps
(meets EIA/TIA-562 specifications)

Time-Code Input

| | |
|------------|---|
| Connector: | Female BNC |
| Time-Code: | Modulated IRIG-B Demodulated IRIG-B TTL compatible |

Note: Automatically sets SEL-3332 real-time clock/calendar.

Time-Code Output

| | |
|-------------|--|
| Pinout: | DB-9 port connectors Pin 4 TTL-level signal Pin 6 chassis ground reference Female BNC |
| Connectors: | 16 rear DB-9 port connectors Female BNC |

Note: Outputs are generated from IRIG-B input (when present) or generated by SEL-3332.

Type Tests

Electromagnetic Compatibility Immunity

| | |
|-----------------------------|--|
| Electrostatic Discharge: | IEC 60255-22-2:1996 IEC 61000-4-2:1995 IEEE C37.90.3-2001 Severity Level: 2, 4, 6, 8 kV contact discharge; 2, 4, 8, 15 kV air discharge |
| Fast Transient Disturbance: | IEC 61000-4-4:1995 IEC 60255-22-4:2002 Severity Level: Class A 4 kV, 2.5 kHz on power supply and outputs; 2 kV, 5 kHz on communication lines |

| | |
|--|---|
| Radiated Radio Frequency: | IEC 61000-4-3:1998 IEC 60255-22-3:2000 Severity Level: 10 V/m IEEE C37.90.2-1995 Severity Level: 35 V/m |
| Surge Withstand: | IEEE C37.90.1-2002 Severity Level: 4 kV, 2.5 kHz on power supply and outputs; 2 kV, 5 kHz on communication lines |
| Conducted Emissions: | EN 55011:1998 Level: Class A IEC 60255-25:2000 |
| Radiated Emissions: | EN 55011:1998 Level: Class A IEC 60255-25 |
| Voltage Fluctuations and Flicker: | IEC 61000-3-3:2002 |
| Harmonic Current Emissions: | IEC 61000-3-2:2001 Level: Class A |
| Surge Withstand Capability Immunity: | IEC 60255-22-1:1988 Severity Level: Power supply and outputs: 2.5 kV peak common mode 1.0 kV peak differential mode Communications ports: 1.0 kV peak common mode |
| Surge Immunity: | IEC 61000-4-5:1995 IEC 60255-22-5:2002 Severity Level: 0.5, 1.0 kV Line-to-Line 0.5, 1.0, 2.0 kV Line-to-Earth |
| Conducted Immunity: | IEC 61000-4-6:1996 IEC 60255-22-6:2001 Severity Level: 10 Vemf |
| Power Frequency Magnetic Field Immunity: | IEC 61000-4-8:1993 Severity Level: 1000 A/m for 1 s 100 A/m for 1 min. |
| Pulse Magnetic Field Immunity: | IEC 61000-4-9:1993 Severity Level: 1000 A/m, Level 5 |
| Power Supply Variation and Interruption: | IEC 61000-4-11 IEC 60255-11 |

Environmental

| | |
|---------------------|---|
| Cold: | IEC 60068-2-1:1990 Test Ad: 16 hours at -40°C |
| Dry Heat: | IEC 60068-2-2:1974 Test Bd: 16 hours at +75°C |
| Damp Heat, Cyclic: | IEC 60068-2-30:1980 Test Db: (12 + 12-hour cycle), 95% r.h. 25° to 55°C, 6 cycles |
| Object Penetration: | IEC 60529:2001, IP30 from front of unit |
| Vibration: | IEC 60255-21-1:1988 Endurance Class 1 Response Class 1 IEC 60255-21-2:1988 Shock Withstand, Bump Class 1 Shock Response Class 1 IEC 60255-21-3:1993 Quake Response Class 2 |

Safety

| | |
|----------------------|---|
| Dielectric Strength: | IEC 60255-5:2000 3100 Vdc on power supply 2500 Vac on contact output Type tested for one minute IEEE C37.90-1989 3100 Vdc for 1 min. on power supply 2500 Vac on contact output Type tested for one minute IEEE Std 1613-2003 |
| Impulse: | IEC 60255-5:2000 IEEE Std 1613-2003 IEEE C37.90-1989 Severity Level: 0.5 Joule, 5 kV |
| LED: | IEC 60825-1:1993 + A1:1997 + A2:2001 |

Real-Time Clock/Calendar

| | |
|---------------|--|
| Battery Type: | IEC No. BR2335 Lithium |
| Battery Life: | 10 years with power 2 years without power |

Memory

| | |
|-------------------------|------------------------------|
| RAM: | 1 GB |
| Primary CompactFlash: | 1 GB, 2 GB, 4 GB, 8 GB |
| Secondary CompactFlash: | None, 1 GB, 2 GB, 4 GB, 8 GB |

Certifications

ISO: SEL-3332 is designed and manufactured using ISO 9001-certified quality program.

CE: CE Mark
EN 50263:1999—EMC Directive, Low Voltage Directive
EN 61010-1:2001—Low-Voltage Directive (Safety)

Notes

Notes

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This product is covered by the standard SEL 10-year warranty. For warranty details, visit www.selinc.com or contact your customer service representative.

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