Architectural and Engineering Specification for Input/Output System Integration Modules

UltraLink™

This document is intended to provide performance specifications and operational requirements for UltraLink perimeter system integration I/O modules. It is written in a generic format. These specifications may be copied verbatim to form a generic procurement specification.

Part 1 GENERAL

1.1 System Summary

The contractor shall install software-configurable input/output (I/O) modules for the purposes of integrating multiple devices, including security sensors, alarm devices, safety equipment, cameras, and other devices that drive output relays or are managed via dry-contact inputs.

The I/O modules shall consist of easy-to-install boards whose number of available input/output points can be expanded through the use of add-on modules.

The I/O modules shall be capable of communicating alarms from Senstar's Silver Network family of networked security sensors as well as being integrated into the facility's Security Management System (SMS).

1.2 Submittals

A. Contractor submittals to the facility owner shall include the following as a minimum:

1. Site conditions report as per article 3.1
2. Configuration settings for each I/O module in the system after installation and configuration are complete as per article 3.1
3. All manufacturer-supplied software required for the configuration and operation of the I/O modules.

1.3 Spares

A. The contractor shall deliver to the facility owner spare system components.

B. For each system component, spares consisting of least one unit or 10% of the number that comprise the system, whichever is greater, shall be provided.

1.4 Warranty

A. The product shall be under warranty for a minimum of three years from the date of shipment.

1.5 References

A. Abbreviations and acronyms: The following acronyms and abbreviations are used in this document:

1. DIN: Deutsches Institut für Normung
2. I/O: Input/Output
3. MTBF: Mean Time Between Failures
4. MTTR: Mean Time To Replace
5. SMS: Security Management System
6. VMS: Video Management System

B. Reference Standards: The following regulatory and industry standards are referenced in this document:

1. Federal Communications Commission: FCC 47 CFR Part 15, Subpart B requirements for Class B devices
2. Industry Canada ICES-003, Issue 4 requirements for Class A devices
3. CE standards:
   a. EN 61000-6-4:2007/A1: 2011 (Part 6-4: Generic standards - Emission standard for industrial environments)
   b. EN 50130-4:1995 + A1, 1998 + A2:2003 (Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems)
   c. Restriction of Hazardous Substances Directive 2017/2102/EU (RoHS2)
4. International Organization for Standardization: ISO 9001:2015
5. European Union Regulation 1907/2006: Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)

Part 2 PRODUCTS

2.1 Software-Configurable I/O Modules

A. The contractor shall supply software-configurable, expandable I/O modules.

B. The I/O modules shall be capable of communicating over the network with Senstar's Silver Network family of security sensors.

2.2 Manufacturers

A. The UltraLink™ system from Senstar Corporation (www.senstar.com) meets the requirements stated in this document.

2.3 Regulatory Requirements

A. The system shall comply with the following regulations:

1. FCC 47 CFR Part 15, Subpart B requirements for Class B devices
2. CE: EN 61000-6-4/A1: 2011, EN 50130-4: 2011, RoHS2
3. Industry Canada ICES-003, Issue 4 requirements for Class A devices
4. REACH

2.4 Manufacturing Quality Requirements

A. The manufacturer's quality management system shall be certified as conforming to ISO 9001:2015.

B. Outdoor system components:

1. All electronic modules and assemblies intended for use in outdoor applications shall use conformal coating.
2. The modules and assemblies shall be tested during manufacture over their entire operational temperature range on a sample basis.

2.5 Mechanical Requirements

A. Each I/O module shall be mountable on a standard 35 mm DIN rail.

B. The manufacturer shall provide the facility owner with the option of installing the I/O modules on a swing-out mounting plate designed for installation on a 19-inch rack.

C. To improve accessibility during installation and maintenance, two-piece pluggable terminal blocks shall be used on the I/O modules.

D. The processor I/O module shall detect and indicate if the wiring to any I/O module's input or inter-module communication connectors is disconnected.

2.6 Environmental Requirements

A. Operating range: The processor in its standard enclosure shall operate within specifications under the following environmental conditions:

1. Temperature: –40°C to 70°C (–40°F to 158°F)
2. Relative humidity: 0% to 95% (non-condensing)

2.7 Reliability and Maintenance Requirements

A. Each I/O module shall have a predicted mean time between failures (MTBF) of greater than 110,000 hours based on field service data.

B. The I/O modules shall have a mean time to replace (MTTR) of less than 10 minutes.

C. The processor module shall be capable of performing internal self-diagnostic tests of the internal circuitry and any connected I/O modules.

D. The processor module firmware shall be field-upgradeable, either locally via a USB connection or over the network.

2.8 Electrical Requirements

A. Each I/O module shall meet the following electrical requirements:

1. Input power source: 12 to 48 VDC
2. Power consumption (networked processor module): 1.5W
3. Power consumption (per I/O module): 0.6W (not including any supplied power to connected devices)

B. The manufacturer shall provide the facility owner with the option of installing a DIN rail power supply to power the I/O modules.

C. Lightning/surge protection: The processor shall include transient voltage protection to protect the system from lighting strikes or electrical tampering.

D. The system shall be capable of having up to 9 I/O modules share power from a single 48V (nominal) power source.

E. Auxiliary input and output electrical configuration:

1. Output relays: Each relay shall be rated for at least 1A at 30V.
2. Auxiliary inputs: The values of the supervision resistor(s) for each dry contact input shall be set from the configuration software.
3. Open-collector outputs: Up to 48 VDC, 100 mA maximum "on" current.

F. Any optional communication card connected to the processor module will be capable of using the processor’s power source and not require any additional power connections.

G. The system shall be capable of being powered via Power-over-Ethernet (PoE) when an Ethernet communications card is installed.

2.9 External Input/Output Capabilities

A. Processor module:

1. Input points:

a. The processor module shall have a minimum of eight dry-contact inputs to accept the indication of alarm conditions detected or generated by third-party devices.

b. Each input shall be configurable for normally open (NO) or normally closed (NC) operation.

c. Each input shall support configurable supervision types (none, single, double) and programmable supervision resistor values.

d. The state of each input shall be indicated by an on-board LED.

2. Output points:

a. The processor module shall have a minimum of eight Form-C relay outputs to signal alarm and supervision conditions to third-party security equipment.

b. For each relay output it shall be possible to assign one or more conditions from the following list under which the relay will activate:

i. Alarm condition reported from Senstar Silver Network sensor

ii. Supervision alarm of input

iii. Input power fail

iv. Internal hardware fault

v. Fail safe (assert on total loss of power)

c. The following user-configurable activation types shall be supported: latching, flash, and pulse.

d. The state of each output shall be indicated by an on-board LED.

3. Expansion modules: Each processor module shall support at least 8 input, relay-output, or collector-output expansion modules in order to add additional control points.

B. Input module:

1. An optional input module shall provide a minimum of 32 dry-contact inputs.

2. The inputs shall support the same functionality as the input used on the processor module.

C. Relay output module:

1. An optional relay output module shall provide a minimum of 32 Form-C relay outputs.

2. The relay output points shall support the same functionality as the relay outputs used on the processor module.

D. Open-collector output module:

1. An optional collector-output module shall provide a minimum of 32 open-collector outputs.

2. The source voltage for the outputs shall be provided externally, with four source voltage connections being routed to eight open-collector high-side contacts.
3. The state of each output shall be indicated by an on-board LED.

2.10 Installation and Configuration Capabilities

A. The I/O modules shall be simple to install and shall have the following characteristics, as a minimum:

1. The I/O modules shall be DIN-rail mountable.
2. All electrical connections to each I/O module shall be made with screw-terminals on removable connectors.

B. The system shall support the following configuration and calibration features:

1. The processor module shall provide a standard USB connector for attachment to a PC running Microsoft Windows.
2. Configuration and calibration shall be performed via a Windows-based software tool with a graphical user interface.
3. Configuration settings shall be capable of being stored in a computer file for record keeping purposes and available for reuse when configuring additional or replacement I/O modules.

2.11 Networking Capabilities

A. The system shall be capable of operating in a networked configuration:

1. The processor module shall support a networked configuration. The processor shall use the Silver Network protocol to convey alarm, status, and supervision information to the Network Manager software. The Network Manager shall then communicate the information to a security management system.

B. Networked processor self-test: It shall be possible to initiate a self-test over the network.

C. Network communications and integration:

1. The processor module shall be capable of communicating alarm, status, and configuration information to and from a central location over an integrated sensor network.
2. The processor module shall support the following physical media options for communication with the integrated sensor network:
   a. EIA-422 cable
   b. Multi-mode fiber optic cable
   c. Single-mode fiber optic cable
   d. Ethernet with POE capability

3. The processor modules shall be capable of being connected in a loop configuration and of being polled from both ends of the loop to provide redundant communication paths to each processor.
4. The processor module shall maintain an internal alarm queue in the event of a network interruption. The alarms shall automatically be resent when network connectivity is re-established.
5. Networking of auxiliary input and output relays:
    a. The status of the I/O modules' dry contact inputs shall be communicated over the integrated sensor network.
    b. The processor's output relays shall be controllable over the integrated sensor network.

D. Network management:
1. The I/O modules shall include network management software to manage the communications over the network. The network management software shall be capable of running on a standard Windows PC.
2. The I/O modules network management software shall provide the following interfaces:
    a. TCP/IP-based interface for communicating alarm, status, and configuration data to and from security and video management systems. The system supplier shall furnish complete documentation of this interface to facilitate integration with Security or Video Management Systems (SMS/VMS).
    b. Serial and TCP/IP-based interfaces for communicating alarm, status, and configuration data to and from security management systems using configurable, ASCII-based text strings.
    c. TCP/IP-based interface to be used by the system's PC-based software configuration tool to allow configuration of all I/O modules settings to be done from a central location.

2.12 Direct-Connect Mode ("Network Manager Mode")

A. The I/O system shall support a mode in which the processor module communicates directly with perimeter intrusion detection sensors. Alarms generated by the sensors shall activate the relay outputs on the I/O modules without requiring any additional hardware or software.

B. The I/O system shall support the following communication interfaces between the processor module and the perimeter intrusion detection sensors while in direct-connect mode:
    a. EIA-422 cable
    b. Multi-mode fiber optic cable

c. Single-mode fiber optic cable

C. The I/O system's direct-connect mode shall support at least 8 perimeter intrusion detection sensors and at least 136 output relays on the I/O modules.

D. The I/O system shall be capable of being connected to the perimeter intrusion detection sensors in a loop configuration, in which the system polls from both ends of the loop in order to provide redundant communication paths to each sensor.

E. The direct-connect mode of operation shall support configurable relay output activations for sensor alarms, hardware faults, and supervision conditions.

Part 3 EXECUTION

3.1 Site Assessment

A. Before installation begins, the installation contractor shall provide a report to the facility's owner documenting any site conditions that may prevent the I/O modules from operating satisfactorily.

3.2 System Installation

A. The system shall be installed in accordance with the manufacturer's recommended procedures as defined in the manufacturer's documentation for the system.

3.1 System Configuration

A. The installation contractor shall submit to the Owner the configuration settings for each I/O module in the system.