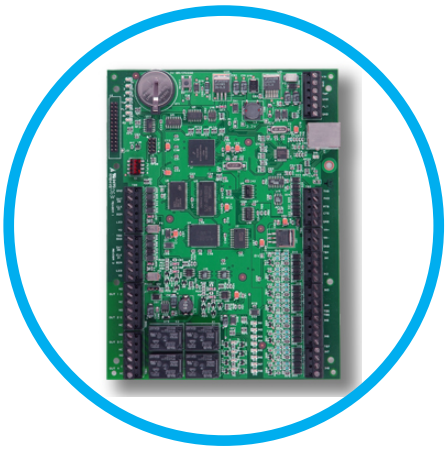

Legacy Hardware Manual

OPEN OPTIONS™
ACCESS TECHNOLOGY

The DNA Fusion™ Access Control Software and SSP™ Security System Processor use equipment that generates, uses, and radiates radio frequency energy. If not installed and deployed in accordance with the guidelines of this installation manual, they may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be required to correct the interference at their own expense.

The DNA Fusion™ Access Control Software and SSP™ Security System Processor shall be installed in accordance with this installation manual and in accordance with the National Electric Code (N.E.C), ANSI and NFPA 70 Regulations and recommendations.

Print Date: June 14, 2018
Manual Number: LM-2.0

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Introduction 1

In This Chapter
√ Manual Overview √ Hardware Overview √ Hardware Installation Guidelines

This manual is designed to provide information regarding legacy Open Options hardware products as well as installation and configuration instructions for each device. "Legacy" refers to products that have been discontinued but remain in older access control systems.

How This Manual is Organized

Chapter 1, "Introduction," provides an overview of the system hardware and installation guidelines.

Chapter 2, "Controllers," describes the SSP Series legacy controllers and their configuration requirements.

Chapter 3, "Reader Modules," covers the configuration requirements for Series 1 and 2 RSC devices.

Chapter 4, "I/O Subcontrollers," provides information regarding Series 1 and 2 input/output subcontrollers.

Chapter 5, "Communication Devices," describes the communication devices for legacy hardware.

Chapter 6, "Network Devices," provides information regarding the NController-X network controller.

Chapter 7, "Dial-Up Connection," provides connection information for dial-up options.

Chapter 8, "Allegion Locks," covers Version 1 of the PIM400-485 for AD-400 wireless lock systems.

Appendix A, "UL Compliance," outlines conditions for UL listing of Open Options products.

Appendix B, "Legacy Migration," explains how to replace legacy controllers with current models.

Icons and Conventions Used in This Manual

The following icons call attention to useful or important information:

	This icon highlights time-saving hints, useful tips, and helpful shortcuts.
	This icon designates information that is important enough to keep filed in an easily accessible portion of your gray matter.
	If an action could damage the system, cost big bucks, lock the operator out the system, or otherwise bring an end to civilization as we know it, it will be marked by this icon.

In addition to the icons above, this guide uses several typeface conventions to improve readability:

- Special: Indicates a specific item on the hardware device or in the software application.
- **Boldface**: Indicates an instruction or user action; bold text usually appears in numbered steps.

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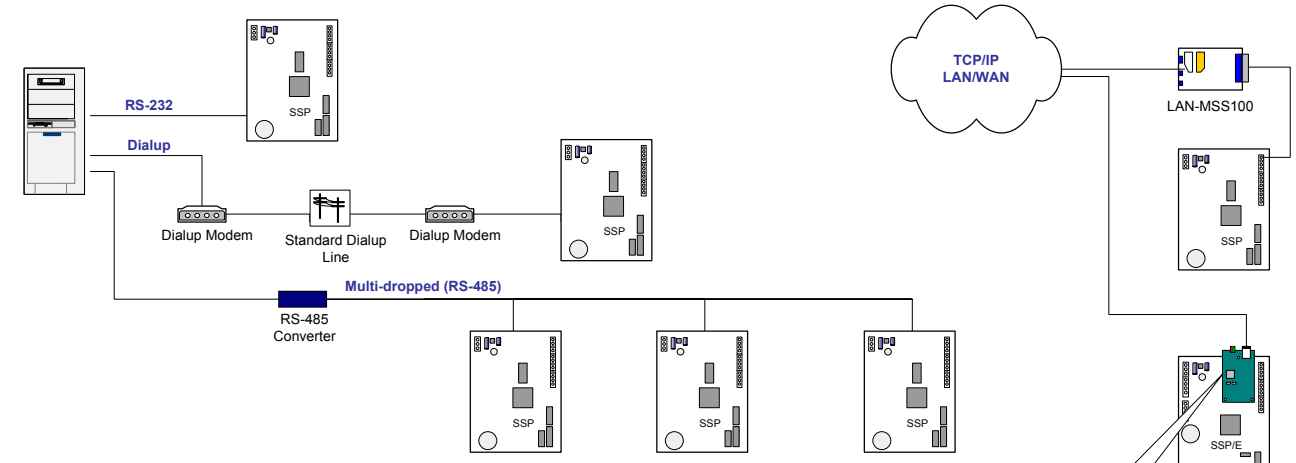
Hardware Overview

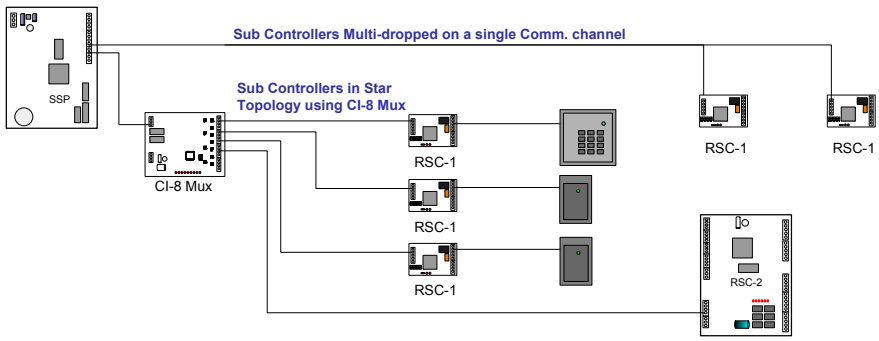
SSP Controllers

The SSP is an intelligent controller that functions as the brain of the Open Options hardware platform. The access control software, known as DNA Fusion, loads application-specific settings into the controller to control and monitor the access control system. The SSP contains the intelligence and decision-making capabilities necessary to maintain complete functionality when disconnected from the host computer.

The SSP Series contains three (3) legacy models: the SSP, SSP-C, SSP-E. Each panel has different port and memory configurations to suit a variety of customer application requirements. Most installations use the first serial port on the SSP for host communication. The host port supports direct or multidrop serial communications with baud rates up to 38,400. A TCP/IP interface is available for network operations that use standard network-interface hardware. All three models are capable of using Ethernet via on-board RJ45 connectors.



SSP Series Sub Controller Communications



Subcontroller Panels

Serial Input and Output (SIO) panels, or subcontrollers, collect data and interface to external field devices. These panels are connected to SSP controllers via "downstream" communication ports. The communication link, known as a channel, is established by using an Ethernet or multidrop RS-485 interface. Each channel is capable of communicating up to 4,000 feet (roughly 1,200 meters).

External devices are connected to the subcontrollers to provide additional flexibility when installing the hardware. The following subcontroller models are included in this manual: the RSC-1, RSC-2, ISC-16, and OSC-16. However, different subcontrollers may be used for integrated products. The number of input, output, and reader ports varies with each subcontroller.

The DNA Fusion software defines the physical nature of the input/output points and how to use them. The system operator can configure input points as Normally Open or Normally Closed, and Supervised or Unsupervised. DNA Fusion is also used to configure the reader properties for attached readers.

Subcontrollers interface to many of the devices common in the access control industry. The specific parameters for each device are configured through DNA Fusion.

NOTES:

Installation Guidelines

Hardware products operate with various power sources and communicate through a variety of interfaces. Understanding the power requirements and communication interfaces as well as their characteristics and limitations will ensure a successful installation.

Power Supply

All legacy Open Options hardware products can use a DC power source. Connect the GND signal to earth ground at one location within the system.

> ***!*** *Multiple ground connections may cause ground loop problems and is not advised.*

Power Requirements

When planning a system, it is important to understand the power requirements of each hardware device as well as the actual output of the power supplies being used.

If multiple devices are expected to share a common power supply, proper care must be exercised to avoid excess voltage loss through the power-transmitting wires. Voltage loss can lead to intermittent communication problems when devices are consuming more power than the power supply is able to provide. When choosing a power supply, ensure that the system will never max out its electrical load. As a safety precaution, always use at least a 25% overage factor when sizing the power supply.

When designing a system, place the power supply as close to the equipment as possible. The farther the power supply is placed from the equipment, the larger the wire gauge (diameter) must be to ensure adequate current is supplied to the hardware. Be sure to select the appropriate wire size for the distance between the power source and the equipment.

Unsupervised Inputs

Unsupervised alarm inputs sense whether a contact is open or closed. Configuration via DNA Fusion allows open circuits to be programmed as an alarm condition. Open contacts should result in terminal voltages of 3.5 to 5 Vdc. Closed contact terminal voltage should be between 0 and 0.8 Vdc.

Supervised Inputs

Several Open Options hardware products provide contact supervision. If an alarm input is supervised, an end-of-line (EOL) terminator must be installed for the monitored contact. When supervised inputs are configured, the circuit will report Open and Closed states as well as Open Circuit, Shorted, Grounded, and Foreign Voltage.

All alarm inputs require twisted-pair wires. Connect Normally Closed (NC) contacts in series and connect Normally Open (NO) contacts in parallel.

The installer must add two resistors to the supervised input circuit in order to facilitate proper reporting. The standard supervised circuit requires 1K ohm 1% resistors, and should be located as close as possible to the sensor.

State	Alarm N/C	Alarm N/O
Normal	1K ± 25%	2K ± 25%
Alarm	2K ± 25%	1K ± 25%
Fault - Line Short	0-50	0-50
Fault - Line Open	15K	15K
Fault - Foreign Voltage	50-750 1250-1500 2500-15K	50-750 1250-1500 2500-15K

Reader Data Input

Reader data input is a digital signal using either a Wiegand or Clock/Data signaling method. It interfaces to reader signals DATA 1/DATA 0 and produces a nominal signal swing of 0 to 5 volts.

Relay Outputs

Various Open Options hardware products provide Form C relay contacts. These are dry contacts that are capable of switching signals as well as higher current loads. Each board has different relay contact ratings.

RS-485 Communication

RS-485 is a TIA/EIA protocol that defines a standard electrical interface for multidrop communication on bus wiring schemes. Unlike the RS-232C or current loop interfaces, the RS-485 interface allows multiple devices to communicate over a single cable and transfer data at high speeds over long distances (up to 4,000 feet).

RS-485 Wiring

Open Options hardware products use a 2-wire RS-485 interface between devices. The total length of the communication cable must not exceed 4,000 feet (1,219 meters) for 24 AWG wire size per leg of the communication tree.

Device-to-Device Connection

RS-485 communication cables should be installed in the form of a daisy chain. DO NOT connect devices via star topology unless using the OptoHub™ or CI-8 board.

Cable Termination

The RS-485 interface uses a balance of differential transmitters/receivers to reject common mode noise. RS-485 must be terminated at both ends of the RS-485 line. Terminating the line increases communication reliability by minimizing the signal reflection and external noise coupling. The installer should determine which device is at the end of the communication line.

Two methods can be used for end-of-line (EOL) termination:

- Termination from the Host to the SSP — The documentation for each hardware device will indicate how the termination should be configured.
- Termination from the SSP to Downstream Subcontrollers - Termination of this section of the RS-485 bus always remains the same. Each end of the RS-485 bus must be terminated using the on-board jumpers provided with each Open Options hardware device. Refer to the section of this manual for the specific board in question.

RS-232 Communication

A number of Open Options products accept an RS-232 communication interface. RS-232 is intended for short-distance communication because its high impedance is more susceptible to noise. Cable length is generally limited to 25 ft (7.6 m).

RS-232 Wiring

In an RS-232 interface, the communication cable's length must not exceed 25 ft (7.6 m) for 24 AWG.

Mounting

Most board dimensions are 6 x 8 inches and contain mounting holes along the long edges. For smaller modules, only four of the mounting holes are used; the last two holes need support standoffs, which come installed from the factory.

System Start-Up

The system should never be wired and powered up all at once. Open Options recommends the following procedure.

1. **Verify** that the power supply is NOT applied to any system device.
2. **Check** all wiring and device switch settings.
3. **Disconnect** all devices from the RS-485 communication line and/or Ethernet port.
4. **Power up** the controller and **verify** that it is working properly.
5. **Configure** the controller in DNA Fusion and **verify** that it is online.
   See page 3-9 in the Technical Installation Manual for more information.
6. **Connect** one port of the RS-485 communication line or Ethernet port to the controller.
7. **Power up** a subcontroller and **verify** that it is working properly.
8. **Connect** the subcontroller to the RS-485 line and/or Ethernet port.
9. **Configure** the subcontroller in DNA Fusion and bring in online with the controller.
   See page 3-17 in the Technical Installation Manual for more information.
10. **Verify** all functions of the subcontroller device.
11. **Repeat** steps 7-10 for each additional subcontroller.

Firmware Updates

Open Options provides the current firmware version with the DNA Fusion software. The firmware, which acts as a middleman between the hardware and software, is automatically installed during the initial DNA Fusion installation. Each subsequent software release will include the most recent firmware version.

For best system performance results, update the firmware when:

- Installing a new system
- Upgrading to a new DNA Fusion version
- Adding a new controller
- Replacing a controller
- Connecting to a controller for the first time

See page 20-13 in the DNA Fusion User Manual for instructions on updating the controller and subcontroller firmware.

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Controllers 2

In This Chapter
√ SSP √ SSP-C √ SSP-E

Legacy Controllers

The SSP Series controllers are designed with power, performance, and flexibility in mind. At the heart of the field hardware, the controller performs all intelligent decisions and provides real-time processing for the subcontroller(s) connected to it. It also provides battery-backed memory to store the configuration data, cardholder database, and event buffer information.

> ! *The controller's 3V lithium battery should be replaced annually.*

The SSP Series includes three (3) legacy controller models:

- SSP (Standard) - Supports up to 32 subcontrollers; expandable to 4MB RAM.
- SSP-C (Compact) - Supports up to 32 subcontrollers; supports Ethernet connection.
- SSP-E (Extended) - Supports up to 64 subcontrollers; supports Ethernet connection; expandable to 8MB RAM.

Each controller will be discussed independently on the following pages.

Ports

The SSP Series has a dedicated host port for communication to the host that supports both RS-232 and RS-485 serial communication protocol. The RS-485 interface may be a 2-wire or 4-wire configuration.

Configuration data and event/status reports are communicated via Port 1, the host port. I/O devices are connected via Port 2 through Port 5 (with the exception of the SSP-E, which contains a sixth port). Port 6 on the SSP-E is a redundant host port that can also be configured as an RS-232 or RS-485 interface.

Ports 2 through 5 are 2-wire RS-485 ports used to communicate to subcontrollers. If a 4-wire interface is required, Ports 2/3 and Ports 4/5 can be combined into two separate 4-wire ports.

Legacy SSP Controllers

SSP **SSP-C** **SSP-E**

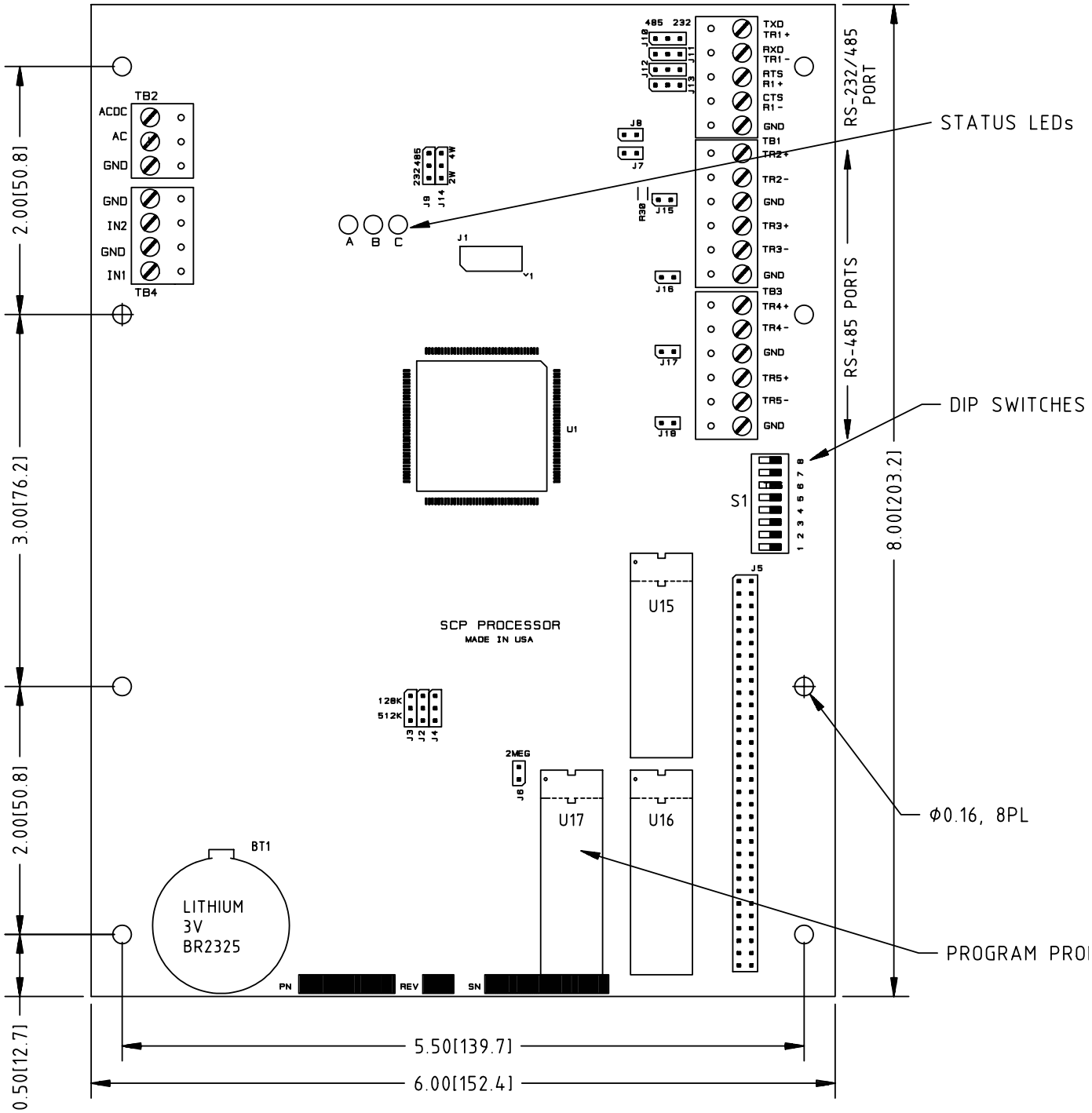
Status LEDs

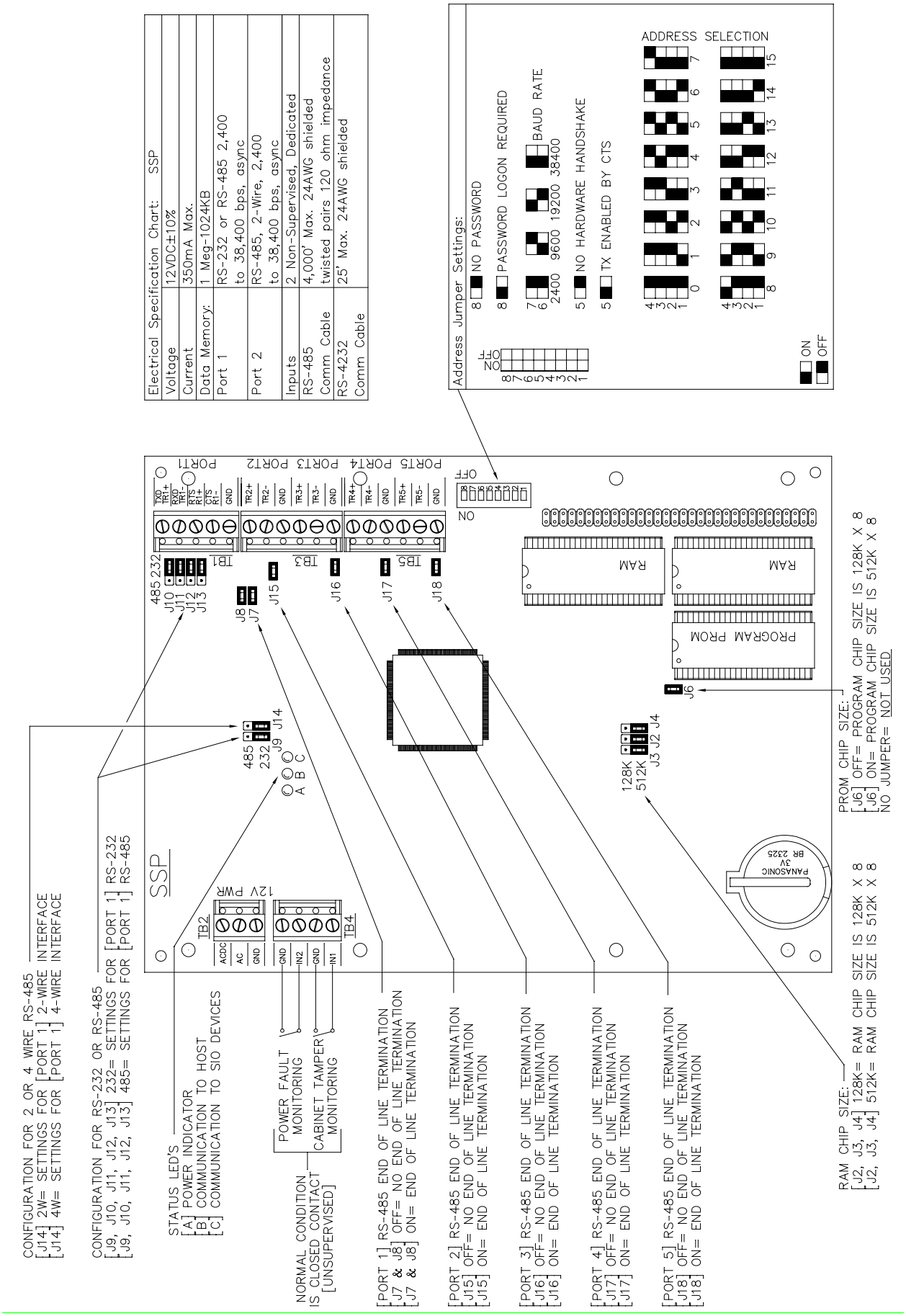
The LED lights on the legacy controllers indicate the following status information:

LED	Description	Indicator
A	Power / CPU Status (Heartbeat)	Flashing = Normal Steady On = Firmware Problem (Reset Panel) Off = No Power
B	Upstream Communication (SSP to Host)	Fast Flash = Online 2x/20 Seconds = Not Connected to Host 1x/5 Seconds = Polling Information from Driver; Host is Not Responding. (Reset Panel)
C	Downstream Communication (SSP to SIO Devices)	Fast Flast = Online Slow Flash = Offline (Download to Panel)

SSP Controller

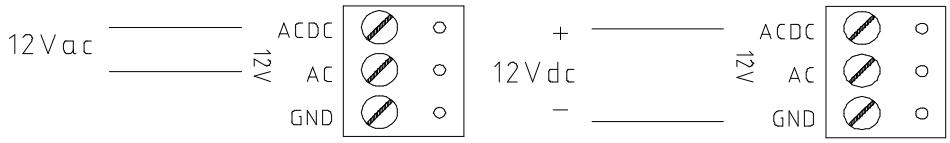
The SSP standard intelligent controller supports up to 64 card readers, expands up to 4MB RAM with an optional memory module, and supports speeds of up to 38.4 Kbps. The SSP contains two unsupervised alarm inputs, one RS-232 or RS-485 interface, four RS-485 interfaces, one power input, eight DIP switches, and sixteen jumpers. It also contains three status LEDs and one lithium battery for backup memory.




Electrical Specification Chart: SSP
Voltage 12VDC±10%
Current 350mA Max.
Data Memory: 1 Meg-1024KB
Port 1 RS-232 or RS-485 2,400 to 38,400 bps, async
Port 2 RS-485, 2-Wire, 2,400 to 38,400 bps, async
Inputs 2 Non-Supervised, Dedicated
RS-485 Comm Cable 4,000' Max. 24AWG shielded twisted pairs 120 ohm impedance
RS-4232 Comm Cable 25' Max. 24AWG shielded
Address Jumper Settings:
8 NO PASSWORD
8 PASSWORD LOGON REQUIRED
7 6 2400 9600 19200 38400 BAUD RATE
5 NO HARDWARE HANDSHAKE
5 TX ENABLED BY CTS
ADDRESS SELECTION
ON
OFF
SSP
PORT1 PORT2 PORT3 PORT4 PORT5
TB1 TB3 TB5
485 232
J10 J11 J12 J13
J8 J7 J15 J16 J17 J18
J9 J14
TB2 12V PWR
TB4
J3 J2 J4 128K 512K
J6
RAM
PROGRAM PROM
PANASONIC 3V BR 2325
CONFIGURATION FOR 2 OR 4 WIRE RS-485
[J14] 2W= SETTINGS FOR [PORT 1] 2-WIRE INTERFACE
[J14] 4W= SETTINGS FOR [PORT 1] 4-WIRE INTERFACE
CONFIGURATION FOR RS-232 OR RS-485
[J9, J10, J11, J12, J13] 232= SETTINGS FOR [PORT 1] RS-232
[J9, J10, J11, J12, J13] 485= SETTINGS FOR [PORT 1] RS-485
STATUS LED'S
[A] POWER INDICATOR
[B] COMMUNICATION TO HOST
[C] COMMUNICATION TO SIO DEVICES
POWER FAULT MONITORING
CABINET TAMPER MONITORING
NORMAL CONDITION IS CLOSED CONTACT [UNSUPERVISED]
[PORT 1] RS-485 END OF LINE TERMINATION
[J7 & J8] OFF= NO END OF LINE TERMINATION
[J7 & J8] ON= END OF LINE TERMINATION
[PORT 2] RS-485 END OF LINE TERMINATION
[J15] OFF= NO END OF LINE TERMINATION
[J15] ON= END OF LINE TERMINATION
[PORT 3] RS-485 END OF LINE TERMINATION
[J16] OFF= NO END OF LINE TERMINATION
[J16] ON= END OF LINE TERMINATION
[PORT 4] RS-485 END OF LINE TERMINATION
[J17] OFF= NO END OF LINE TERMINATION
[J17] ON= END OF LINE TERMINATION
[PORT 5] RS-485 END OF LINE TERMINATION
[J18] OFF= NO END OF LINE TERMINATION
[J18] ON= END OF LINE TERMINATION
RAM CHIP SIZE:
[J2, J3, J4] 128K= RAM CHIP SIZE IS 128K X 8
[J2, J3, J4] 512K= RAM CHIP SIZE IS 512K X 8
PROM CHIP SIZE:
[J6] OFF= PROGRAM CHIP SIZE IS 128K X 8
[J6] ON= PROGRAM CHIP SIZE IS 512K X 8
NO JUMPER= NOT USED

Power Supply

The SSP controller accepts a 12 Vdc or 12 Vac power supply. Install the power source as close to the unit as possible. Connect power on TB2 with a minimum of 18 AWG wires.

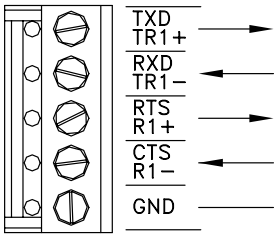


Observe polarity when using 12 Vdc power connection.

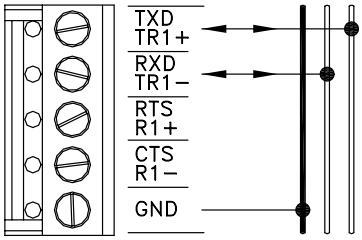
Host Communication Wiring

The SSP communicates to the host via Port 1, which can be configured as an RS-232 or RS-485 interface.

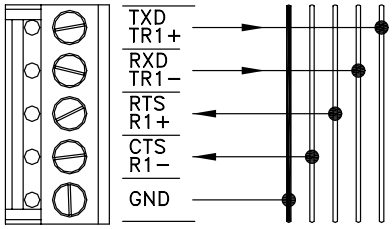
The RS-232 interface is commonly used for a direct one-to-one connection to the host computer with a maximum distance of 50 feet. The RS-485 interface is used when more than one SSP is connected to the host or if the wiring exceeds the 50-ft limit of RS-232. RS-485 distance is limited to 4,000 feet from end to end, regardless of the number of devices on the bus. RS-485 can be either 2-wire or 4-wire.



Port 1
RS-232



Port 1
2-Wire RS-485



Port 1
4-Wire RS-485

RS-232 Connection

When using RS-232 serial communication to the host computer, set jumpers J9 through J13 to 232 on the SSP. The table below describes the correct pin configuration for this type of communication.

Port 1 Pin	SSP Signal	DB-25 Pin	DB-9 Pin	Host Signal
1	TXD (Data Transmit)	3	2	RX (Data Receive)
2	RXD (Data Receive)	2	3	TX (Data Transmit)
5	GND (Ground)	7	5	GND (Ground)

RS-485 Connection

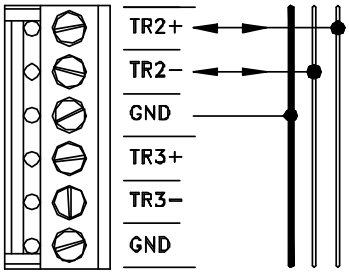
When using RS-485 serial communication to the host computer, set jumpers J9 through J13 to 485 on the SSP. Use an RS-232 to RS-485 converter to convert the chain to the RS-232 host port. The following table describes how to configure this type of communication.

SSP Port 1		RS-485 Converter
PIN #	SSP Signal	Signal
1	TX+	RX+
2	TX-	RX-
3	RX+	TX+
4	RX-	TX-
5	GND	None

The pin numbers on the RS-485 converter vary by manufacturer.

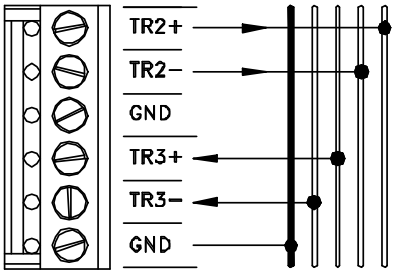
Downstream Communication Wiring

Ports 2 through 5 on the SSP (TB3 and TB5) require a 2-wire or 4-wire RS-485 interface. This type of interface allows multidrop communication on a single bus of up to 4,000 ft (1,200 m). Use twisted pairs (min. 24 AWG) for communication. Termination jumpers should be installed only on the devices at the end of the line (see page 2-7 for jumper settings).



2-Wire

Install jumper on 2W



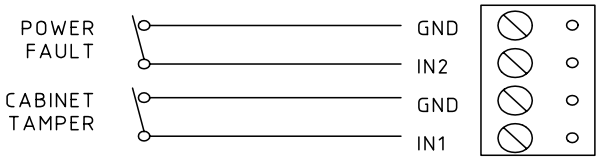
4-Wire

Install jumper on 4W

When using 4-wire communication, Ports 2/3 *and* 4/5 *must be configured as two separate 4-wire interface ports.*

Alarm Inputs Wiring

Inputs IN1 and IN2 on TB4 are used to monitor the cabinet tamper and power failure. The normal (safe) condition is closed circuit. If these inputs are not used, connect the shorting wire that came attached to the input. If the shorting wire is not connected, the system will receive two alarms per controller.



Memory Backup Battery

The lithium battery, type BR2325, serves two purposes: it powers the controller's static RAM and real-time clock device when input power is interrupted, and it backs up the event buffer. The battery should be replaced annually. If the data in the static RAM is corrupted, all data—including flash memory—is considered invalid and is permanently erased.

Hardware Setup

The SSP controller hardware is configured through a set of sixteen (16) jumpers and eight (8) DIP switches. These jumpers/switches determine the RAM size, port interface, end-of-line (EOL) termination, communication address, and baud rate. Refer to the following tables for more information.

Jumper Settings

The table below describes the jumper settings for the standard SSP. These settings vary depending on the SSP's memory configuration, PROM size, and communication protocol.

Jumper(s)	Set At	Description
J2, J3, J4	128	RAM Chip Size is 128K x 8
	512	RAM Chip Size is 512K x 8
J6	OFF	PROM Chip Size is 128K x 8
	ON	PROM Chip Size is 512K x 8
J9, J10, J11, J12, J13	232	Port 1 is RS-232
	485	Port 1 is RS-485
J14	2W	Port 1 is 2-Wire for RS-485 Interface
	4W	Port 1 is 4-Wire for RS-485 Interface
J7, J8	OFF	Port 1 RS-485 EOL Terminator is OFF
	ON	Port 1 RS-485 EOL Terminator is ON
J15	OFF	Port 2 RS-485 EOL Terminator is OFF
	ON	Port 2 RS-485 EOL Terminator is ON
J16	OFF	Port 3 RS-485 EOL Terminator is OFF
	ON	Port 3 RS-485 EOL Terminator is ON
J17	OFF	Port 4 RS-485 EOL Terminator is OFF
	ON	Port 4 RS-485 EOL Terminator is ON
J18	OFF	Port 5 RS-485 EOL Terminator is OFF
	ON	Port 5 RS-485 EOL Terminator is ON

DIP Switch Settings

The SSP board contains eight (8) DIP switches to set the address and communication options for the controller. The table below describes the DIP switch settings for the SSP.

The SSP uses the following default settings:

- Address = 0
- Hardware Handshake = OFF
- Baud Rate = 38,400 BPS
- Password = None

Selection	S1	S2	S3	S4	S5	S6	S7	S8
Address 0	OFF	OFF	OFF	OFF				
Address 1	ON	OFF	OFF	OFF				
Address 2	OFF	ON	OFF	OFF				
Address 3	ON	ON	OFF	OFF				
Address 4	OFF	OFF	ON	OFF				
Address 5	ON	OFF	ON	OFF				
Address 6	OFF	ON	ON	OFF				
Address 7	ON	ON	ON	OFF				
Address 8	OFF	OFF	OFF	ON				
Address 9	ON	OFF	OFF	ON				
Address 10	OFF	ON	OFF	ON				
Address 11	ON	ON	OFF	ON				
Address 12	OFF	OFF	ON	ON				
Address 13	ON	OFF	ON	ON				
Address 14	OFF	ON	ON	ON				
Address 15	ON	ON	ON	ON				
No Hardware Handshake					OFF			
TX Enabled by CTS					ON			
2,400 BPS						OFF	OFF	
9,600 BPS						ON	OFF	
19,200 BPS						OFF	ON	
38,400 BPS						ON	ON	
No Password								OFF
Password Logon Required								ON

See diagram on page 2-4 for a visual representation of jumper settings.

Specifications

The SSP controller is for use in low-voltage, Class 2 circuits only.

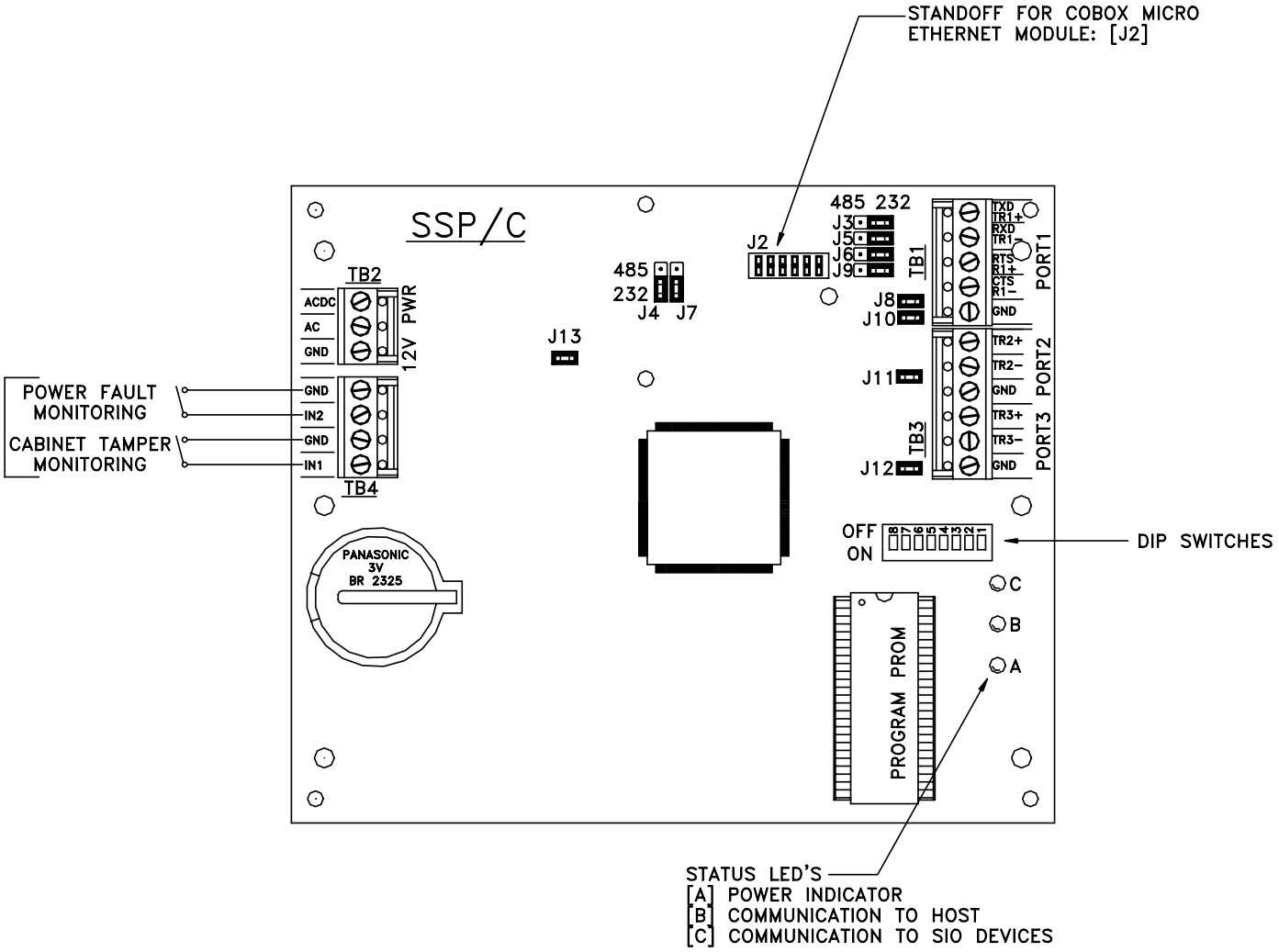
Primary Power:	*Voltage/Current:*	12 Vdc @ 350 mA max. 12 Vac @ 600 mA max.
Ports:	*Port 1:*	RS-232 or RS-485, 2,400 to 38,400 bps, async.
	Ports 2-5:	2- or 4-wire RS-485, 2,400 to 38,400 bps, async.
Inputs:		2 unsupervised, dedicated for cabinet tamper and power fault monitoring
Cable Requirements:	*Power:*	1 twisted pair, 18 AWG min.
	RS-485:	4,000 ft (1,200 m) max., 24 AWG min.
	RS-232:	25 ft (7.6 m) max., 24 AWG min.
	Alarm Input:	1 twisted pair, 30 ohms max.
Data Memory:		1 MB Standard (Optional Memory Module)
Mechanical:	*Dimension:*	6” (152 mm) W x 8” (203 mm) L x 1” (25 mm) H
	Weight:	10 oz. (290 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0 to 95% RHNC

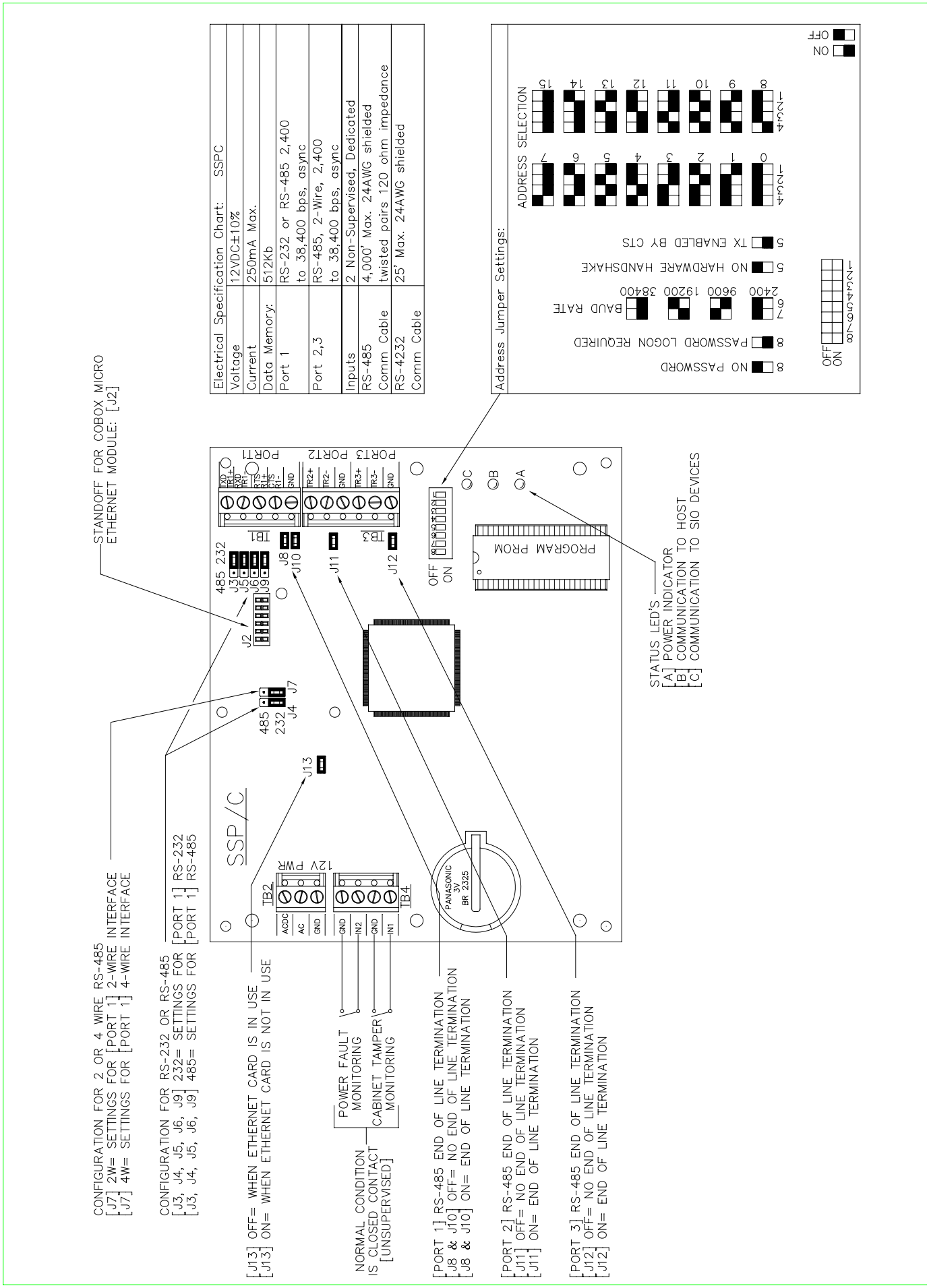
Specifications are subject to change without notice.

NOTES:

SSP-C Controller

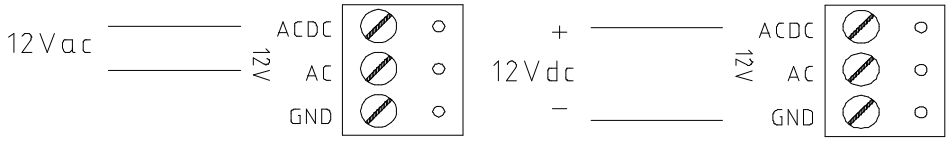
The SSP-C compact controller supports up to 32 card readers, speeds up to 38.4 Kbps, and has 512 KB maximum RAM for storage. The SSP-C also supports the Cobox Micro add-on Ethernet card for TCP/IP communication to the host. See page 5-3 for more information on the Cobox Micro.




Electrical Specification Chart: SSPC
Voltage 12VDC±10%
Current 250mA Max.
Data Memory: 512Kb
Port 1 RS-232 or RS-485 2,400 to 38,400 bps, async
Port 2,3 RS-485, 2-Wire, 2,400 to 38,400 bps, async
Inputs 2 Non-Supervised, Dedicated
RS-485 Comm Cable 4,000' Max. 24AWG shielded twisted pairs 120 ohm impedance
RS-4232 Comm Cable 25' Max. 24AWG shielded
Address Jumper Settings:
ADDRESS SELECTION
NO PASSWORD
PASSWORD LOGON REQUIRED
BAUD RATE
2400 9600 19200 38400
NO HARDWARE HANDSHAKE
TX ENABLED BY CTS
ON
OFF
STANDOFF FOR COBOX MICRO ETHERNET MODULE: [J2]
CONFIGURATION FOR 2 OR 4 WIRE RS-485
[J7] 2W= SETTINGS FOR [PORT 1] 2-WIRE INTERFACE
[J7] 4W= SETTINGS FOR [PORT 1] 4-WIRE INTERFACE
CONFIGURATION FOR RS-232 OR RS-485
[J3, J4, J5, J6, J9] 232= SETTINGS FOR [PORT 1] RS-232
[J3, J4, J5, J6, J9] 485= SETTINGS FOR [PORT 1] RS-485
SSP/C
PROGRAM PROM
PANASONIC 3V BR 2325
12V PWR
ACDC
AC
GND
IN2
IN1
STATUS LED'S
[A] POWER INDICATOR
[B] COMMUNICATION TO HOST
[C] COMMUNICATION TO SIO DEVICES
[J13] OFF= WHEN ETHERNET CARD IS IN USE
[J13] ON= WHEN ETHERNET CARD IS NOT IN USE
POWER FAULT MONITORING
CABINET TAMPER MONITORING
NORMAL CONDITION IS CLOSED CONTACT [UNSUPERVISED]
[PORT 1] RS-485 END OF LINE TERMINATION
[J8 & J10] OFF= NO END OF LINE TERMINATION
[J8 & J10] ON= END OF LINE TERMINATION
[PORT 2] RS-485 END OF LINE TERMINATION
[J11] OFF= NO END OF LINE TERMINATION
[J11] ON= END OF LINE TERMINATION
[PORT 3] RS-485 END OF LINE TERMINATION
[J12] OFF= NO END OF LINE TERMINATION
[J12] ON= END OF LINE TERMINATION

Power Supply

The SSP-C controller accepts a 12 Vdc or 12 Vac power supply. Install the power source as close to the unit as possible. Connect power on TB2 with a minimum of 18 AWG wires.

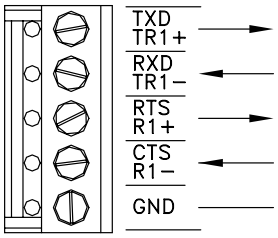


Observe polarity when using 12 Vdc power connection.

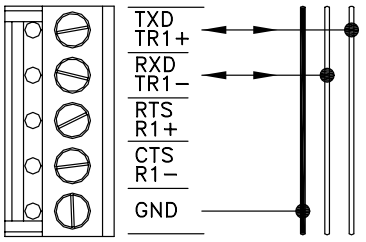
Host Communication Wiring

The SSP-C communicates to the host via Port 1, which can be configured as an RS-232 or RS-485 interface.

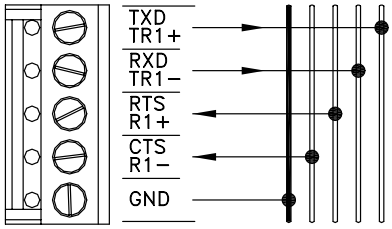
The RS-232 interface is commonly used for a direct one-to-one connection to the host computer with a maximum distance of 50 feet. The RS-485 interface is used when more than one SSP-C is connected to the host or if the wiring exceeds the 50-ft limit of RS-232. RS-485 distance is limited to 4,000 feet from end to end, regardless of the number of devices on the bus. RS-485 can be either 2-wire or 4-wire.



Port 1
RS-232



Port 1
2-Wire RS-485



Port 1
4-Wire RS-485

RS-232 Connection

When using RS-232 serial communication to the host computer, set jumpers J3 through J9 to 232 on the SSP-C. The table below describes the correct pin configuration for this type of communication.

Port 1 Pin	SSP Signal	DB-25 Pin	DB-9 Pin	Host Signal
1	TXD (Data Transmit)	3	2	RX (Data Receive)
2	RXD (Data Receive)	2	3	TX (Data Transmit)
5	GND (Ground)	7	5	GND (Ground)

RS-485 Connection

When using RS-485 serial communication to the host computer, set jumpers J3 through J9 to 485 on the SSP-C. Use an RS-232 to RS-485 converter to convert the chain to the RS-232 host port. The following table describes how to configure this type of communication.

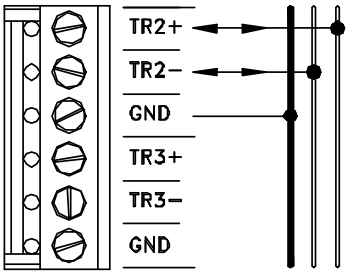
SSP Port 1		RS-485 Converter
PIN #	SSP Signal	Signal
1	TX+	RX+
2	TX-	RX-
3	RX+	TX+
4	RX-	TX-
5	GND	None

The pin numbers on the RS-485 converter vary by manufacturer.

Downstream Communication Wiring

Ports 2 and 3 on the SSP-C require a 2-wire RS-485 interface. This type of interface allows multidrop communication on a single bus of up to 4,000 ft (1,200 m). Use twisted pairs (min. 24 AWG) for communication. Termination jumpers should be installed only on the devices at the end of the line (see page 2-15 for jumper settings).

Wire the TR+, TR-, and GND connections on TB3.

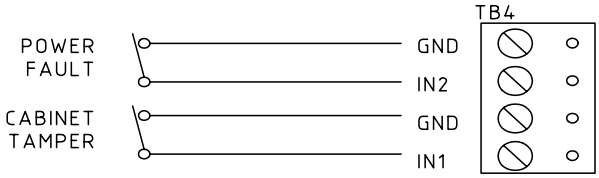


Ports 2 & 3

2-Wire RS-485

Alarm Inputs Wiring

Inputs IN1 and IN2 on TB4 are used to monitor the cabinet tamper and power failure. The normal (safe) condition is closed circuit. If these inputs are not used, connect the shorting wire that came attached to the input. If the shorting wire is not connected, the system will receive two alarms per controller.



Memory Backup Battery

The lithium battery, type BR2325, serves two purposes: it powers the controller's static RAM and real-time clock device when input power is interrupted, and it backs up the event buffer. The battery should be replaced annually. If the data in the static RAM is corrupted, all data—including flash memory—is considered invalid and is permanently erased.

Hardware Setup

The SSP-C controller hardware is configured through a set of eleven (11) jumpers and eight (8) DIP switches. The jumpers/switches determine the port interface, end-of-line (EOL) termination, communication address and baud rate. Refer to the following tables for more information.

Jumper Settings

The table below describes the jumper settings for the SSP-C. These settings vary depending on the communication protocol used.

Jumpers	Set At	Selected
J3, J4, J5, J6, J9	232	Port 1 is RS-232
	485	Port 1 is RS-485
J7	2W	Port 1 is 2-Wire for RS-485 Interface
	4W	Port 1 is 4-Wire for RS-485 Interface
J8, J10	OFF	Port 1 RS-485 EOL Terminator is OFF
	ON	Port 1 RS-485 EOL Terminator is ON
J11	OFF	Port 2 RS-485 EOL Terminator is OFF
	ON	Port 2 RS-485 EOL Terminator is ON
J12	OFF	Port 3 RS-485 EOL Terminator is OFF
	ON	Port 3 RS-485 EOL Terminator is ON
J13	OFF	Ethernet Card is Used
	ON	Ethernet Card is Not Used

DIP Switch Settings

The SSP-C board contains eight (8) DIP switches to set the address and communication options for the controller. The table below describes the DIP switch settings for the SSP-C.

The SSP-C uses the following default settings:

- Address = 0
- Hardware Handshake = OFF
- Baud Rate = 38,400 BPS
- Password = None

Selection	S1	S2	S3	S4	S5	S6	S7	S8
Address 0	OFF	OFF	OFF	OFF				
Address 1	ON	OFF	OFF	OFF				
Address 2	OFF	ON	OFF	OFF				
Address 3	ON	ON	OFF	OFF				
Address 4	OFF	OFF	ON	OFF				
Address 5	ON	OFF	ON	OFF				
Address 6	OFF	ON	ON	OFF				
Address 7	ON	ON	ON	OFF				
Address 8	OFF	OFF	OFF	ON				
Address 9	ON	OFF	OFF	ON				
Address 10	OFF	ON	OFF	ON				
Address 11	ON	ON	OFF	ON				
Address 12	OFF	OFF	ON	ON				
Address 13	ON	OFF	ON	ON				
Address 14	OFF	ON	ON	ON				
Address 15	ON	ON	ON	ON				
No Hardware Handshake					OFF			
TX Enabled by CTS					ON			
2,400 BPS						OFF	OFF	
9,600 BPS						ON	OFF	
19,200 BPS						OFF	ON	
38,400 BPS						ON	ON	
No Password								OFF
Password Logon Required								ON

See diagram on page 2-12 for a visual representation of jumper settings.

Specifications

The SSP-C is for use in low-voltage, Class 2 circuits only.

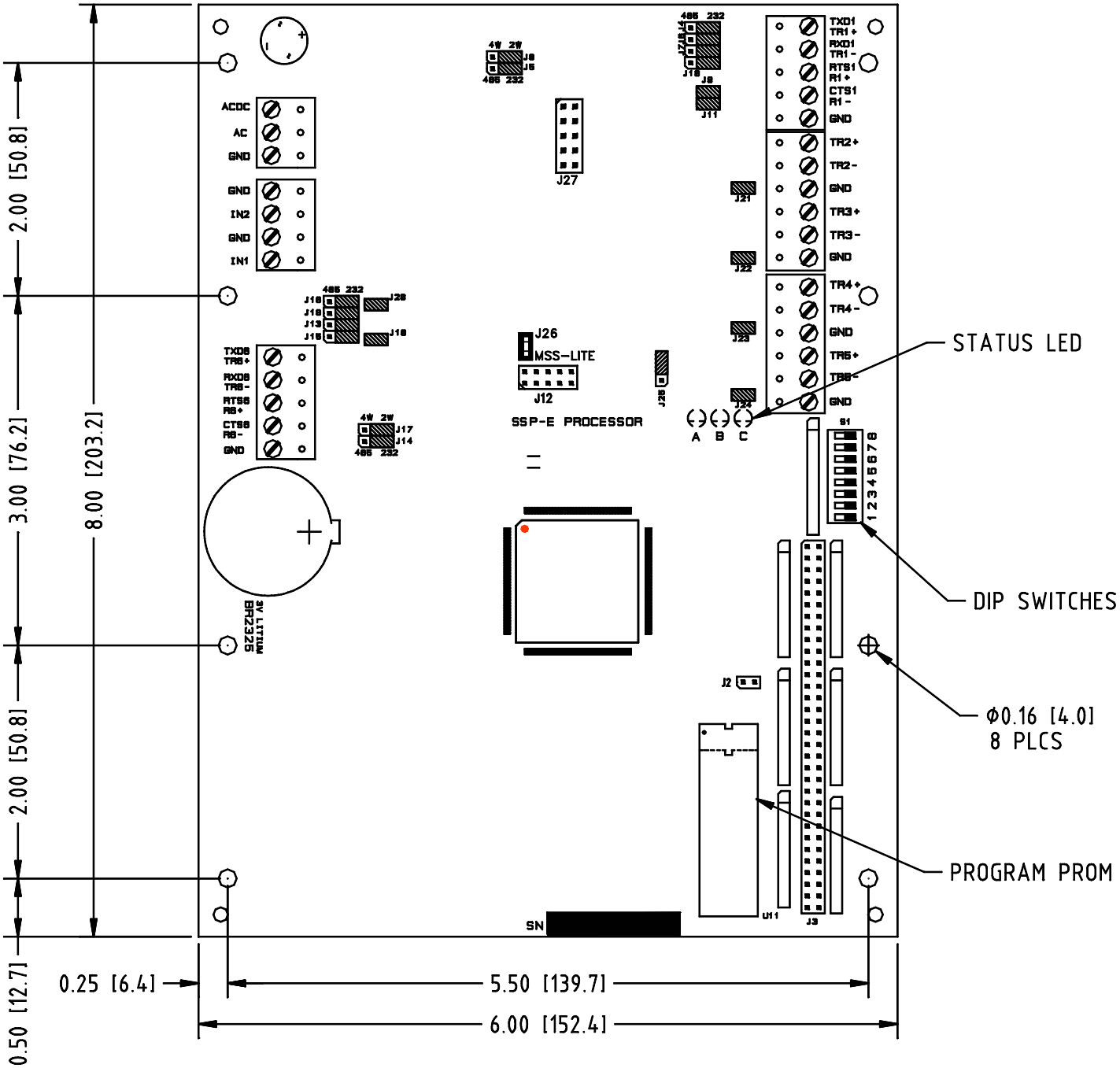
Primary Power:	*Voltage/Current:*	12 Vdc @ 250 mA max. 12 Vac @ 400 mA max.
Ports:	*Port 1:*	RS-232 or RS-485, 2,400 to 38,400 bps, async.
	Ports 2 & 3:	2- or 4-wire RS-485, 2,400 to 38,400 bps, async.
Inputs:		2 unsupervised, dedicated for cabinet tamper and power fault monitoring
Cable Requirements:	*Power:*	1 twisted pair, 18 AWG min.
	RS-485:	4,000 ft (1,200 m) max., 24 AWG min.
	RS-232:	25 ft (7.6 m) max., 24 AWG min.
	Alarm Input:	1 twisted pair, 30 ohms max.
Data Memory:		512 KB Standard
Mechanical:	*Dimension:*	6” (152 mm) W x 5” (127 mm) L x 1” (25 mm) H
	Weight:	8 oz. (230 g) nominal
Environmental:	*Temperature:*	-55 to 85°C, storage / 0 to 70°C, operating
	Humidity:	0% to 95% RHNC

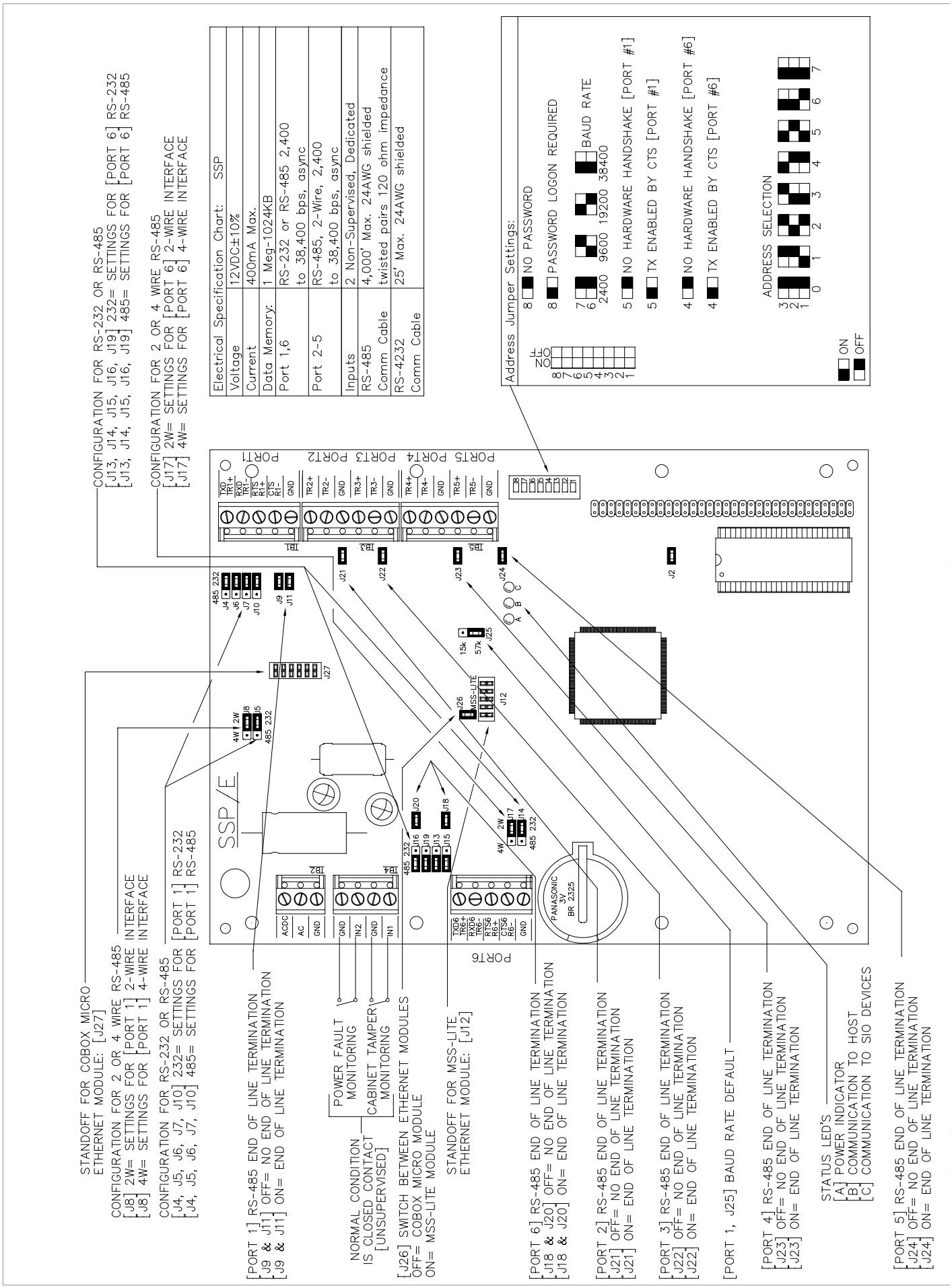
Specifications are subject to change without notice.

NOTES:

SSP-E Controller

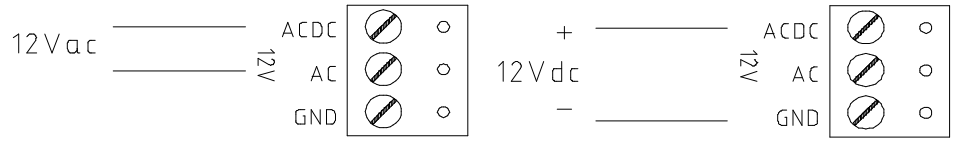
The SSP-E extended controller supports up to 64 card readers, expands to 8 MB RAM, and supports speeds of up to 115.2 Kbps. The SSP-E also supports two add-on Ethernet cards for TCP/IP communication to the host.




CONFIGURATION FOR RS-232 OR RS-485
[J13, J14, J15, J16, J19] 232= SETTINGS FOR [PORT 6] RS-232
[J13, J14, J15, J16, J19] 485= SETTINGS FOR [PORT 6] RS-485
CONFIGURATION FOR 2 OR 4 WIRE RS-485
[J17] 2W= SETTINGS FOR [PORT 6] 2-WIRE INTERFACE
[J17] 4W= SETTINGS FOR [PORT 6] 4-WIRE INTERFACE
Electrical Specification Chart: SSP
Voltage 12VDC±10%
Current 400mA Max.
Data Memory: 1 Meg-1024KB
Port 1,6 RS-232 or RS-485 2,400 to 38,400 bps, async
Port 2-5 RS-485, 2-Wire, 2,400 to 38,400 bps, async
Inputs 2 Non-Supervised, Dedicated
RS-485 Comm Cable 4,000' Max. 24AWG shielded twisted pairs 120 ohm impedance
RS-4232 Comm Cable 25' Max. 24AWG shielded
Address Jumper Settings:
NO PASSWORD
PASSWORD LOGON REQUIRED
BAUD RATE
2400 9600 19200 38400
NO HARDWARE HANDSHAKE [PORT #1]
TX ENABLED BY CTS [PORT #1]
NO HARDWARE HANDSHAKE [PORT #6]
TX ENABLED BY CTS [PORT #6]
ADDRESS SELECTION
ON
OFF
PORT1 PORT2 PORT3 PORT4 PORT5
PORT6
SSP/E
PANASONIC 3V BR 2325
MSS-LITE
STANDOFF FOR COBOX MICRO ETHERNET MODULE: [J27]
CONFIGURATION FOR 2 OR 4 WIRE RS-485 INTERFACE
[J8] 2W= SETTINGS FOR [PORT 1] 2-WIRE INTERFACE
[J8] 4W= SETTINGS FOR [PORT 1] 4-WIRE INTERFACE
CONFIGURATION FOR RS-232 OR RS-485 INTERFACE
[J4, J5, J6, J7, J10] 232= SETTINGS FOR [PORT 1] RS-232
[J4, J5, J6, J7, J10] 485= SETTINGS FOR [PORT 1] RS-485
[PORT 1] RS-485 END OF LINE TERMINATION
[J9 & J11] OFF= NO END OF LINE TERMINATION
[J9 & J11] ON= END OF LINE TERMINATION
POWER FAULT MONITORING
NORMAL CONDITION IS CLOSED CONTACT [UNSUPERVISED]
CABINET TAMPER MONITORING
[J26] SWITCH BETWEEN ETHERNET MODULES
OFF= COBOX MICRO MODULE
ON= MSS-LITE MODULE
STANDOFF FOR MSS-LITE ETHERNET MODULE: [J12]
[PORT 6] RS-485 END OF LINE TERMINATION
[J18 & J20] OFF= NO END OF LINE TERMINATION
[J18 & J20] ON= END OF LINE TERMINATION
[PORT 2] RS-485 END OF LINE TERMINATION
[J21] OFF= NO END OF LINE TERMINATION
[J21] ON= END OF LINE TERMINATION
[PORT 3] RS-485 END OF LINE TERMINATION
[J22] OFF= NO END OF LINE TERMINATION
[J22] ON= END OF LINE TERMINATION
[PORT 1, J25] BAUD RATE DEFAULT
[PORT 4] RS-485 END OF LINE TERMINATION
[J23] OFF= NO END OF LINE TERMINATION
[J23] ON= END OF LINE TERMINATION
STATUS LED'S
[A] POWER INDICATOR
[B] COMMUNICATION TO HOST
[C] COMMUNICATION TO SIO DEVICES
[PORT 5] RS-485 END OF LINE TERMINATION
[J24] OFF= NO END OF LINE TERMINATION
[J24] ON= END OF LINE TERMINATION

Power Supply

The SSP-E controller accepts a 12 Vdc or 12 Vac power supply. Install the power source as close to the unit as possible. Connect power on TB2 with a minimum of 18 AWG wires.

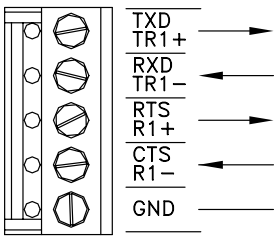


Observe polarity when using 12 Vdc power connection.

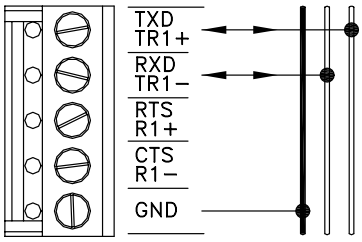
Host Communication Wiring

The SSP-E communicates to the host via Port 1, which can be configured as an RS-232 or RS-485 interface. Port 6 is a redundant host port.

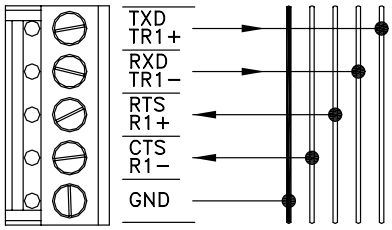
The RS-232 interface is commonly used for a direct one-to-one connection to the host computer with a maximum distance of 50 feet. The RS-485 interface is used when more than one SSP-E is connected to the host or if the wiring exceeds the 50-ft limit of RS-232. RS-485 distance is limited to 4,000 feet from end to end, regardless of the number of devices on the bus. RS-485 can be either 2-wire or 4-wire.



Port 1 & 6
RS-232



Port 1 & 6
2-Wire RS-485



Port 1 & 6
4-Wire RS-485

RS-232 Connection

When using RS-232 serial communication to the host computer, set jumpers J4 through J7 and J10 to 232 for Port 1 and/or J13 through J16 and J19 to 232 for Port 6.

Port 1 Pin	SSP Signal	DB-25 Pin	DB-9 Pin	Host Signal
1	TXD (Data Transmit)	3	2	RX (Data Receive)
2	RXD (Data Receive)	2	3	TX (Data Transmit)
5	GND (Ground)	7	5	GND (Ground)

RS-485 Connection

When using RS-485 serial communication to the host computer, set jumpers J4 through J7 and J10 to 485 on the SSP-E. Use an RS-232 to RS-485 converter to convert the chain to the RS-232 host port. The following table describes how to configure this type of communication.

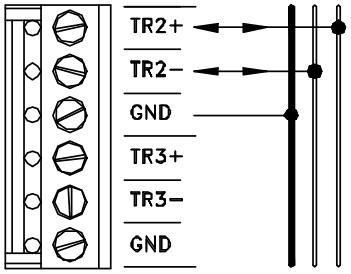
SSP Port 1		RS-485 Converter
PIN #	SSP Signal	Signal
1	TX+	RX+
2	TX-	RX-
3	RX+	TX+
4	RX-	TX-
5	GND	None

The pin numbers on the RS-485 converter vary by manufacturer.

Downstream Communication Wiring

Ports 2 through 5 on the SSP-E require a 2-wire RS-485 interface. This type of interface allows multidrop communication on a single bus of up to 4,000 ft (1,200 m). Use twisted pairs (min. 24 AWG) for communication. Termination jumpers should be installed only on the devices at the end of the line (see page 2-23 for jumper settings).

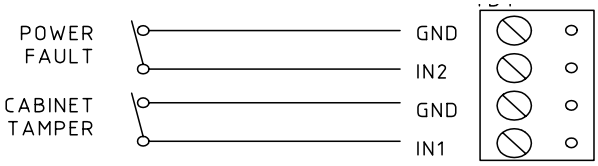
Wire the TR+, TR-, and GND connections on TB3 and/or TB5.



Ports 2 - 5
2-Wire RS-485

Alarm Inputs Wiring

Inputs IN1 and IN2 on TB4 are used to monitor the cabinet tamper and power failure. The normal (safe) condition is closed circuit. If these inputs are not used, connect the shorting wire that came attached to the input. If the shorting wire is not connected, the system will receive two alarms per controller.



Memory Backup Battery

The lithium battery, type BR2325, serves two purposes: it powers the controller's static RAM and real-time clock device when input power is interrupted, and it backs up the event buffer. The battery should be replaced annually. If the data in the static RAM is corrupted, all data—including flash memory—is considered invalid and is permanently erased.

Hardware Setup

The SSP-E controller hardware is configured with 23 jumpers and a set of eight (8) DIP switches. The jumpers/switches determine the RAM size, port interface, end-of-line (EOL) termination, communication address, and baud rate. Refer to the following tables for more information.

Jumper Settings

The table below describes the jumper settings for the SSP-E. These settings vary depending on the communication protocol used.

Jumpers	Set At	Selected
J2	OFF	PROM Chip Size 128K x 8 (Factory Setting)
	ON	PROM Chip Size 256K x 8 (Factory Setting)
J4, J5, J6, J7, J10	232	Port 1 is RS-232 / Lantronix MSSLite
	485	Port 1 is RS-485
J8	2W	Port 1 is 2-Wire RS-485 Interface
	4W	Port 1 is 4-Wire RS-485 Interface
J13, J14, J15, J16, J19	232	Port 6 is RS-232
	485	Port 6 is RS-485
J17	2W	Port 6 is 2-Wire RS-485 Interface
	4W	Port 6 is 4-Wire RS-485 Interface
J9, J11	OFF	Port 1 RS-485 EOL Terminator is OFF
	ON	Port 1 RS-485 EOL Terminator is ON
J18, J20	OFF	Port 6 RS-485 EOL Terminator is OFF
	ON	Port 6 RS-485 EOL Terminator is ON
J21	OFF	Port 2 RS-485 EOL Terminator is OFF
	ON	Port 2 RS-485 EOL Terminator is ON
J22	OFF	Port 3 RS-485 EOL Terminator is OFF
	ON	Port 3 RS-485 EOL Terminator is ON
J23	OFF	Port 4 RS-485 EOL Terminator is OFF
	ON	Port 4 RS-485 EOL Terminator is ON
J24	OFF	Port 5 RS-485 EOL Terminator is OFF
	ON	Port 5 RS-485 EOL Terminator is ON
J23	15K	Default Baud Rate for Port 1
	57K	
J26	OFF	Port 1 is Lantronix Cobox Micro
	ON	Port 1 is RS-232 / RS-485 / Lantronix MSSLite

DIP Switch Settings

The SSP-E board contains eight (8) DIP switches to set the address and communication options for the controller. The table below describes the DIP switch settings for the SSP-E.

The SSP-E uses the following default settings:

- Address = 0
- Hardware Handshake = OFF
- Baud Rate = 38,400 BPS
- Password = None

Selection	S1	S2	S3	S4	S5	S6	S7	S8
Address 0	OFF	OFF	OFF					
Address 1	ON	OFF	OFF					
Address 2	OFF	ON	OFF					
Address 3	ON	ON	OFF					
Address 4	OFF	OFF	ON					
Address 5	ON	OFF	ON					
Address 6	OFF	ON	ON					
Address 7	ON	ON	ON					
Port 6: No Hardware Handshake				OFF				
Port 6: TX Enabled by CTS				ON				
Port 1: No Hardware Handshake					OFF			
Port 1: TX Enabled by CTS					ON			
2,400 BPS						OFF	OFF	
9,600 BPS						ON	OFF	
19,200 BPS						OFF	ON	
38,400 BPS						ON	ON	
No Password								OFF
Password Logon Required								ON

See diagram on page 2-20 for a visual representation of jumper settings.

Specifications

The SSP-E is for use in low-voltage, Class 2 circuits only.

Primary Power:	*Voltage/Current:*	12 Vdc @ 400-550 mA with NIC 12 Vac @ 650-800 mA with NIC
Ports:	*Ports 1 & 6:*	RS-232 or RS-485, 2,400 to 38,400 bps, async.
	Ports 2-5:	2-wire RS-485, 2,400 to 38,400 bps, async.
Inputs:		2 unsupervised, dedicated for cabinet tamper and power fault monitoring
Cable Requirements:	*Power:*	1 twisted pair, 18 AWG min.
	RS-485:	4,000 ft (1,200 m) max., 24 AWG min.
	RS-232:	25 ft (7.6 m) max., 24 AWG min.
	Alarm Input:	1 twisted pair, 30 ohms max.
Data Memory:		1 MB Standard (Optional Memory Module)
Mechanical:	*Dimension:*	6” (152 mm) W x 8” (203 mm) L x 1” (25 mm) H
	Weight:	10 oz. (290 g) nominal
Environmental:	*Temperature:*	-55 to 85°C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

NOTES:

SSP Series Controller Comparison

The following table provides comparison information for the various legacy controllers.

Controller Type	Memory	# of Sub-Controllers	# of Card Readers	Daughter Cards	Host Ports	Reg. Ports
SSP	1MB Standard / 3MB Upgrade	32 (0-31)	64 (RSC-2)	None	1	4
SSP-C	512KB Standard	32 (0-31)	32 (RSC-2)	Cobox Micro	1	2
SSP-E	1MB Standard / 3MB & 7MB Upgrade	64 (0-31 & 0-31)	2 (1 Door)	Cobox Micro / Lantronix MSSLite	2	4

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Reader Modules 3

In This Chapter
√ RSC-1 (Series 1 & 2) √ RSC-2 (Series 1 & 2)

Legacy Reader Subcontrollers

Reader subcontrollers provide the interface between door devices and the SSP controller. The RSC Series supports a multitude of magnetic stripe, Wiegand, and proximity readers. It also provides input/output (I/O) support for door devices, such as requests-to-exit (REX) and door contacts.

Open Options has two types of legacy reader modules:

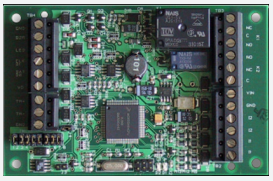
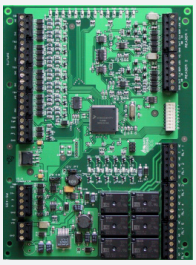
- RSC-1 – Single-door configuration with 2 programmable inputs and 2 relay outputs.
- RSC-2 – Dual-reader interface with 8 programmable inputs and 6 relay outputs.

The legacy RSCs are comprised of Series 1 and Series 2 models, both of which are discussed in this chapter. For information on Series 3 RSCs, refer to Chapter 3 in the Hardware Manual.

Reader Interface

The reader interface provides a solution to the OEM system integrator when door hardware is required to interface with a TTL- or Wiegand-based reader. The reader interface can accept data from a reader with Clock/Data or Wiegand signaling. It also provides tri-state LED and buzzer control.

Legacy RSC Subcontrollers

Series 1		Series 2	
			
RSC-1	**RSC-2**	**RSC-1**	**RSC-2**

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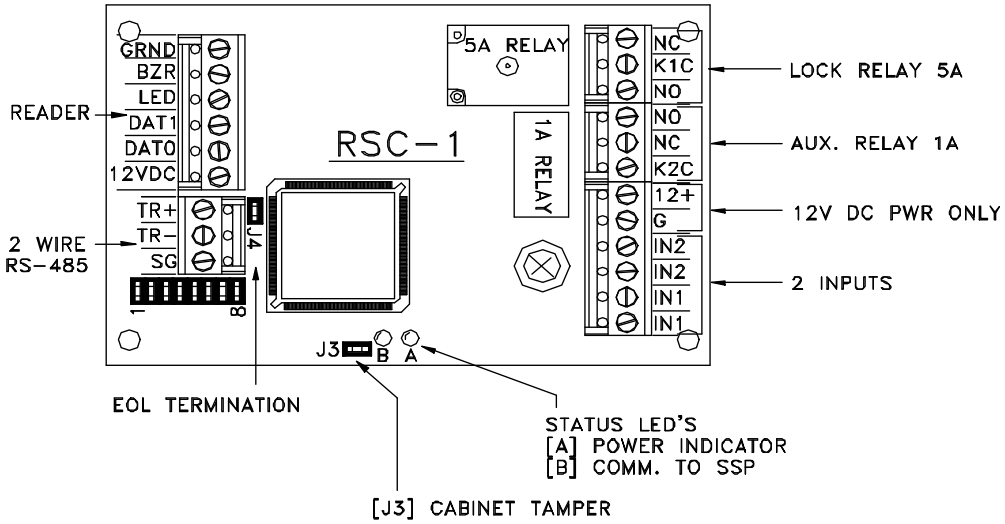
RSC-1 Single-Reader Interface

The RSC-1 subcontroller is the ideal solution for most single-door configurations. It contains two (2) Form C relay outputs to control door strikes and signal alarms as well as two (2) supervised inputs to monitor the door contact and request-to-exit (REX) devices. The RSC-1 communicates upstream to the SSP controller via 2-wire RS-485 interface.

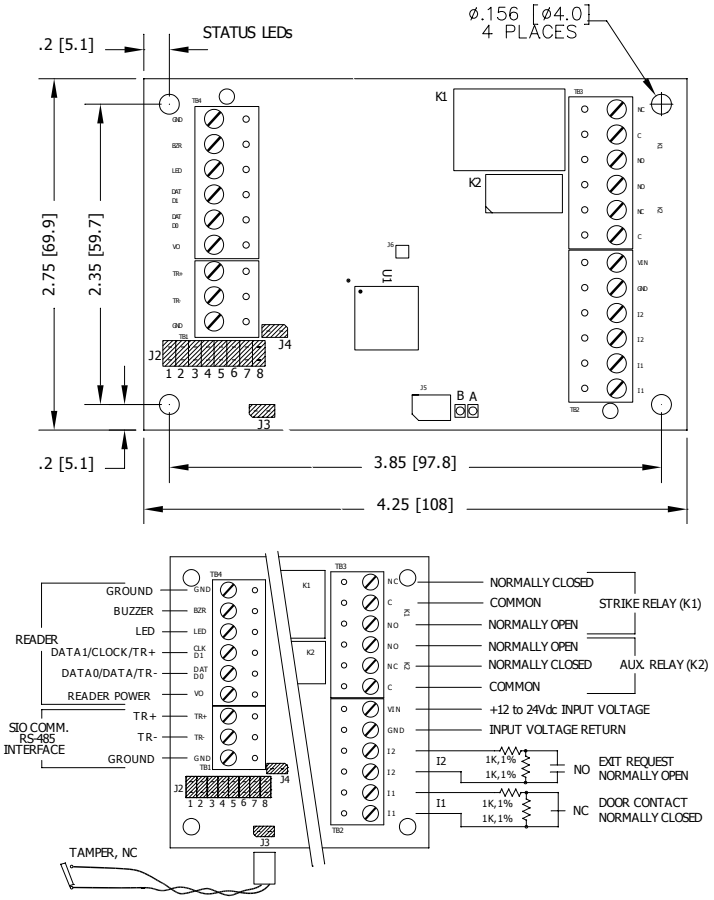
For best results, mount the RSC-1 in a standard 2- or 3-gang junction enclosure (not provided).

See the diagrams below for component locations on both Series 1 and Series 2 RSC-1 subcontrollers.

Series 1 – RSC-1 Subcontroller



Series 2 – RSC-1 Subcontroller



Installation

To install the RSC-1 subcontroller:

1. If required, **mount** the RSC-1 in an Open Options enclosure.
2. **Wire** the supervised alarm inputs.
3. **Wire** the controller communication.
4. If required, **connect** the cabinet tamper jumper (J3).
   See page 3-7 for more information on jumper settings.
5. **Wire** the power input.
6. **Wire** the relay outputs.
7. **Wire** the downstream TTL interface for card readers and/or keypads.

Default Settings

Each RSC-1 board ships with the following default configuration:

- DIP Switches: OFF
- Physical Address: 0
- Serial Port Settings: No flow control
- Baud Rate: 38400

Power Supply

The RSC-1 requires the following filtered power source:

- Series 1 — 12 Vdc ± 15%
- Series 2 — 12-24 Vdc ± 10%

Do NOT use an AC transformer to directly power the interface. The input power is passed through to the reader interface, where it is available to power a reader.

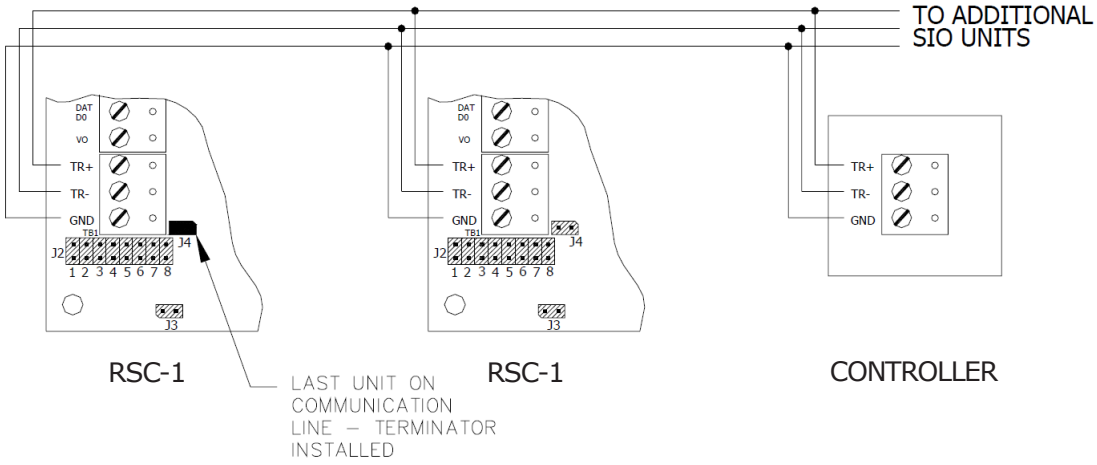
Wire the VIN (or 12+) and GND (or G) inputs on TB2 with a minimum of 18 AWG twisted-pair cable.

> ***The RSC-1 and connected reader will be damaged if AC power is supplied to the interface.***

Upstream Communication Wiring

The RSC-1 communicates to the host controller on Port 1 via 2-wire, multidrop RS-485 interface. The total cable length is limited to 4,000 feet (1,200 meters) from end to end. Set the end-of-line (EOL) termination jumper (J4) to ON for the first and last device on the cable. See page 3-7 for jumper settings.

Wire the TR+, TR-, and GND (or SG) connections on TB1 using 24 AWG shielded cable with a characteristic impedance of 120 ohms.

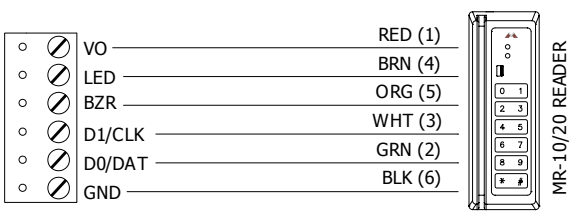


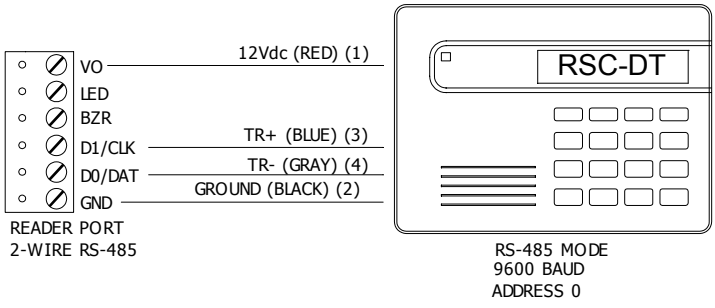
Reader Wiring

The TB4 port on the RSC-1 is a six-wire interface that includes buzzer control and LED control wiring connections. It supports a TTL, Wiegand, or RS-485 reader interface and accepts a maximum of 80 mA for reader power.

Refer to the card reader's documentation to verify proper wiring connections. A 6-conductor cable (18 AWG) is required when TTL signaling is used. RS-485 signaling requires two separate 2-conductor cables: one cable for power (18 AWG) and one cable for communication (24 AWG). Configure the reader port settings in DNA Fusion.

The figures below illustrate a typical TTL interface to an MR-10/20 card reader and an RS-485 interface to an RSC-DT keypad.





Alarm Input Wiring

Two supervised inputs are typically used for the door contact and request-to-exit device. Connect the I1 and I2 alarm inputs (labeled IN1 and IN2 on the Series 1 RSC-1) on TB2 using twisted-pair cables. Inputs can be configured as unsupervised or supervised. If the input is configured as unsupervised, the only states that will be reported are Open or Closed. Input properties are configured via the DNA software.

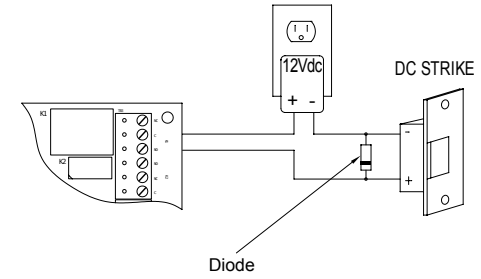
When the inputs are configured as supervised, the circuit will report Open and Closed states as well as Open Circuit, Shorted, Grounded, and Foreign Voltage. A supervised input circuit requires two resistors to facilitate proper reporting. The standard supervised circuit requires 1K ohm, 1% resistors and should be located as close as possible to the sensor. End-of-line resistors are required for line supervision.

Control Output Wiring

Two Form C relay contacts are provided on TB3 to control the door strike and/or other output devices. The K1 relay contact is rated 5A and the K2 relay contact is rated 1A. Each relay has a Common pole (C), a Normally Open pole (NO), and a Normally Closed pole (NC). When momentarily removing power to unlock the door, as with a maglock, the Normally Closed and Common poles are used. Check the local building code for proper egress door installation.

Load switching can cause abnormal wear to the contacts as well as premature contact failure. Switching of inductive loads (strike) also causes electromagnetic interference (EMI), which may interfere with the normal operation of other equipment.

A contact protection circuit must be used to increase system reliability and minimize the risk of premature contact failure. Locate the protection circuit as close to the load as possible (within 12 inches or 30 centimeters) to increase effectiveness. Open Options recommends using a diode or metal oxide varistor (MOV) for protection.

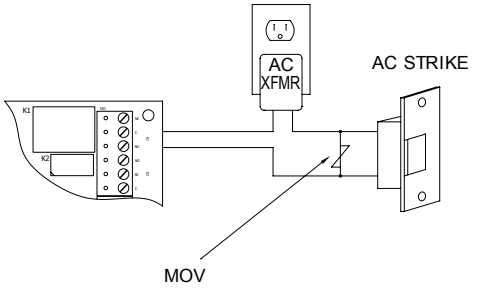


Diode Selection:

Diode Current Rating: > 1 x Strike Current

Diode Breakdown Voltage: 4 x Strike Voltage

For 12 or 24 Vdc Strike: Diode 1N4002 (100V/1A) Typical



MOV Selection:

Clamp Voltage: > 1.5 x Vacs RMS

For 24 Vdc Strike: Panasonic ERZ-C07DK470 Typical

Cabinet Tamper

The J3 jumper is used to configure the cabinet tamper. When the jumper is ON, the cabinet tamper is bypassed. When the jumper is OFF, wiring is required in order for the tamper to work. If the cabinet tamper input is not used, install the jumper and pigtail that shipped with the board.

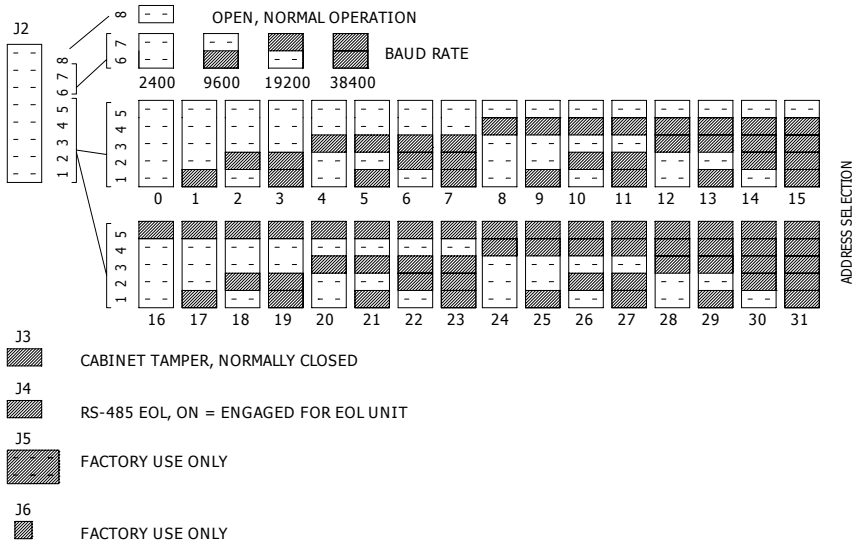
Elevator Control

The Open Options system is capable of supporting elevator control for up to 128 floors. In addition to the RSC-1, an input and/or output board may be needed to control access to elevator floors.

To implement elevator control, DNA Fusion must be configured for elevators. See page 3-33 in the Technical Installation Manual for more information.

Jumper Settings

Each reader interface must be configured with a baud rate and unique address. The address and baud rate are determined by the board's jumpers. The jumper settings are the same for both Series 1 and Series 2 RSC-1 subcontrollers.



Terminal Block Connections

The following tables describe the terminal block connections for Series 1 and Series 2 RSC-1 subcontrollers.

Terminal Block	Description	Series 1	Series 2
TB1	Upstream Communication Port (SIO to Host Controller)	TR+	TR+
		TR-	TR-
		SG	GND
TB2	Power Input	12+	VIN
		G	GND
	Input Ports	IN2	I2
		IN2	I2
		IN1	I1
		IN1	I1
TB3	Relay Ports	NC	NC
		K1C	C
		NO	NO
		NO	NO
		NC	NC
		K2C	C
TB4	Reader Port 1	GRND	GND
		BZR	BZR
		LED	LED
		DAT1	CLK/D1
		DAT0	DAT/D0
		12VDC	VO

Status LEDs

The LED lights on the RSC-1 subcontroller indicate the following status information:

LED	Description	Indicator
A	Power/CPU (Heartbeat)	Flashing = Normal Steady On = Firmware Problem (Reset Panel) Off = No Power
B	Upstream Communication (SIO to Controller)	Fast Flash = Online 2x/20 Seconds = Not Connected to Host 1x/5 Seconds = Polling Information from Driver; Host is Not Responding. (Reset Panel)

Specifications

The RSC-1 interface is for use in low-voltage, Class 2 circuits only.

Series 1*		
Electrical:	*Voltage:*	12 Vdc ± 15%
	Current:	125 mA max. (plus reader current)
Relay Contacts:	*Relay 1:*	5A @ 30 Vdc
	Relay 2:	1A @ 30 Vdc
Monitor Inputs:		2 supervised inputs, end-of-line resistors, 1K ohm 1% 1/4 Watt standard
RS-485 Cable:		4,000 ft (1,200 m) max., 24 AWG min., 120-ohm impedance
LED Output:		TTL compatible, high > 3V, low < 0.5V, 5 mA source/sink max.
Buzzer Output:		Open collector, 5 Vdc open circuit max., 10 mA sink max.
Reader:		6 conductors, 22 AWG with shield, 500 ft (100 m) max. (300 ft max. recommended)
Reader Data Inputs:		TTL-compatible inputs
Reader Power:		12 Vdc, 50 mA max.
Mechanical:	*Dimensions:*	4.25” (108 mm) W x 2.75” (70 mm) x 1” (25.4 mm) H
	Weight:	4 oz. (120 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

* Series 2 specifications are described on page 3-10.

Series 2		
Electrical:	*Voltage:*	12-24 Vdc ± 10%
	Current:	12 Vdc @ 110 mA max. (plus reader current) nominal 24 Vdc @ 60 mA (plus reader current) nominal
Relay Contacts:	*Relay K1:*	5A @ 28 Vdc
	Relay K2:	1A @ 28 Vdc
Monitor Inputs:		2 supervised inputs, end-of-line resistors, 1K ohm 1% 1/4 Watt standard
RS-485 Cable:		4,000 ft (1,200 m) max., 24 AWG min., 120-ohm impedance
LED Output:		TTL compatible, high > 3V, low < 0.5V, 5 mA source/sink max.
Buzzer Output:		Open collector, 5 Vdc open circuit max., 10 mA sink max.
Reader:		6 conductors, 22 AWG with shield, 500 ft (100 m) max. (300 ft max. recommended)
Reader Data Inputs:		TTL-compatible inputs or 2-wire RS-485
Reader Power:		12 to 24 Vdc ± 10% (input voltage passed through)
Mechanical:	*Dimensions:*	4.25” (108 mm) W x 2.75” (70 mm) x 1” (25.4 mm) H
	Weight:	4 oz. (120 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

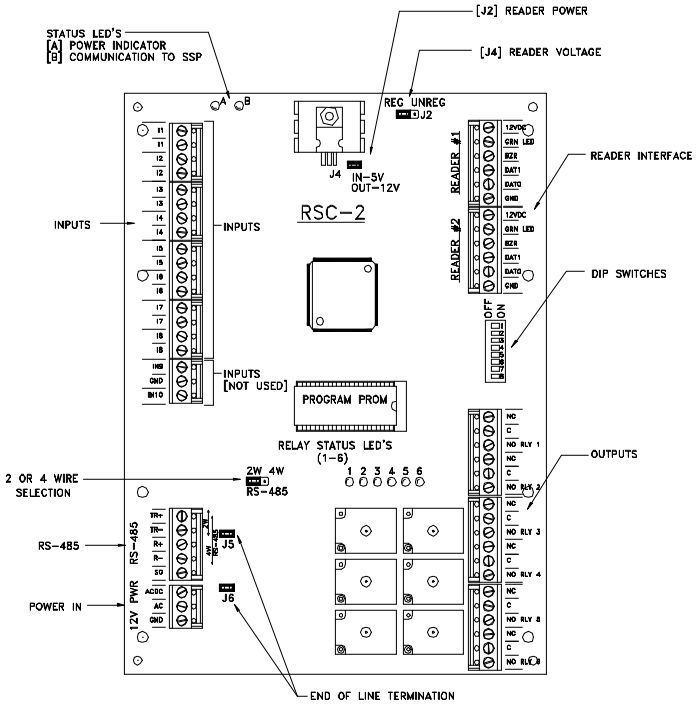
RSC-2 Dual-Reader Interface

The RSC-2 subcontroller supports two readers and includes inputs and outputs beyond the requirements for a typical door configuration, which reduces costs frequently associated with system expansion. Six (6) Form C relay outputs can be used to control strikes and signal alarms. Eight (8) supervised inputs are provided to monitor the door contact, request-to-exit (REX) devices, and alarm contacts.

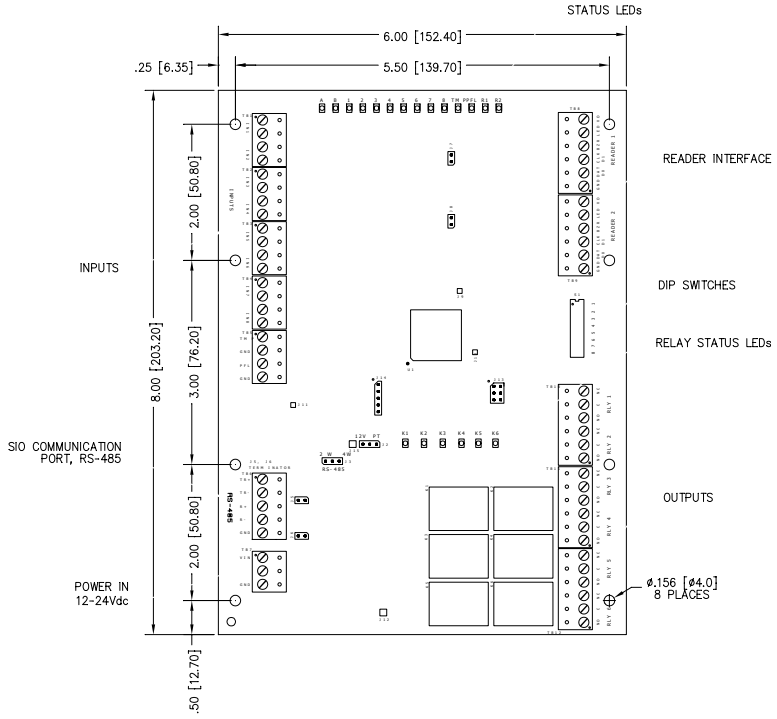
The RSC-2 communicates to the SSP controller through a 2- or 4-wire RS-485 interface. The Series 1 RSC-2 requires 12 Vdc or 12 Vac for power, while the Series 2 RSC-2 requires 12 to 24 Vdc for power.

The RSC-2 board dimensions are 6 x 8 inches with mounting holes along the longer edges that can be used to secure the interface to an enclosure. See the following figures for component locations.

Series 1 – RSC-2 Subcontroller



Series 2 – RSC-2 Subcontroller



Installation

To install the RSC-2 subcontroller:

1. If required, **mount** the subcontroller in an Open Options enclosure.
2. **Wire** the supervised alarm inputs.
3. **Wire** the controller communication.
4. If required, **wire** the unsupervised alarm inputs for power fault and cabinet tamper monitoring.
5. **Wire** the power input.
6. **Wire** the relay outputs.
7. **Wire** the downstream TTL interface for card readers and/or keypads.

Default Settings

Each RSC-2 board ships with the following default configuration:

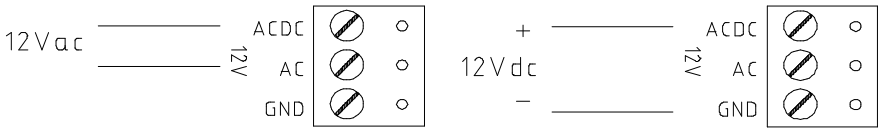
- DIP Switches: OFF
- Physical Address: 0
- Serial Port Settings: No flow control
- Encryption: None
- Baud Rate: 38400

Power Supply

Series 1

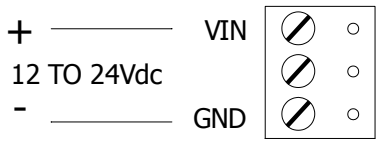
The Series 1 RSC-2 accepts either 12 Vdc or 12 Vac for power. Locate the power source as close to the RSC-2 unit as possible and connect the power input with a minimum of 18 AWG wire. The input voltage is filtered and regulated to 5 Vdc or 12 Vdc. The filtered or regulated voltage is available to power the reader(s).

Power settings are configured via jumpers J2 and J4. See page 3-17 for jumper settings.



Series 2

The Series 2 RSC-2 accepts 12 to 24 Vdc for power. Locate the power source as close to the RSC-2 unit as possible and connect the VIN and GND inputs on TB7 with a minimum of 18 AWG wire.

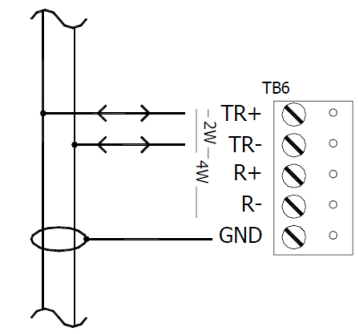


> *Observe polarity on VIN for both Series 1 and Series 2 subcontrollers.*

Upstream Communication Wiring

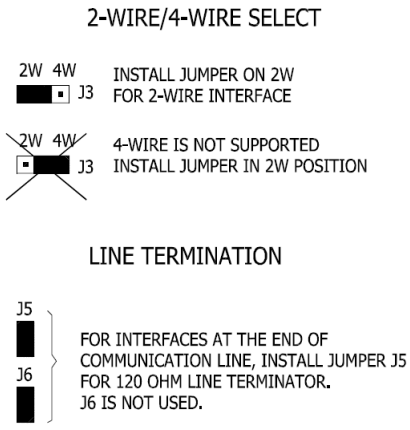
The RSC-2 communicates to the host controller (SSP) via a 2-wire RS-485 interface on TB6, which allows for multidrop communication on a bus of up to 4,000 feet (1,200 meters). Use twisted pair(s) (minimum 24 AWG) with shield for communication. Termination jumpers should only be installed on devices at the end of the RS-485 bus.

Install jumpers J3 and J5 for the RS-485 interface according to the selected configuration. If the RSC-2 is a Series 1 model, jumper J6 must also be installed. See page 3-17 for Series 1 and Series 2 jumper settings.



2-WIRE

(ONLY 2-WIRE RS-485 IS SUPPORTED)



Cabinet Tamper / Power Fault

The TB5 port on the RSC-2 contains two unsupervised inputs for cabinet tamper and power fault monitoring. The input connections are labeled differently depending on the RSC-2 model:

- Series 1 — IN9 and IN10
- Series 2 — TMP and PFL

These two inputs are for contact closure monitoring only; they do NOT require EOL resistors. If neither input is used, jumper each input to the adjacent GND connection.

Reader Power

Series 1

Each reader port on the Series 1 RSC-2 supports a reader with TTL interface. Reader power is jumper selectable as 5 Vdc, 12 Vdc, or input voltage pass through. This selection, which is configured via jumpers J2 and J4, determines the operating voltage for both readers. Readers that require a different voltage or current capability must be powered separately.

Jumper	Description	Selection
J2	Reader Power	REG: Voltage is provided and regulated by the RSC-2 UNREG: Voltage is NOT provided by RSC-2
J4	Voltage Selection (if J2 is set to REG)	OFF: 12 Vdc provided by RSC-2 ON: 5 Vdc provided by RSC-2

> ***Setting the** J2 **jumper to** UNREG **on 5-volt readers may cause component failure (even if** J4 **is set to 5 Vdc). Verify that** J2 **and** J4 **are set correctly prior to attaching the reader.***

Series 2

Each reader port on the Series 2 RSC-2 supports a reader with TTL or RS-485 interface. Reader power is jumper selectable as 12 Vdc or input voltage pass through (PT), 125 mA max. per reader port.

This selection, which is configured via jumper J2, determines the operating voltage for both readers. If 12V is selected, the RSC-2 must be powered by a 20 Vdc minimum source. Readers that require a different voltage or current capability must be powered separately.

Jumper	Description	Selection
J2	Reader Power	12V: 12 Vdc is available on both reader ports (VIN ≥ 20 Vdc) PT: VIN Power is "passed through" to both reader ports

12V PT	READER POWER
■	12Vdc IS AVAILABLE ON READER PORTS (VIN>20Vdc)
■	VIN POWER IS "PASSED THROUGH" TO READER PORTS

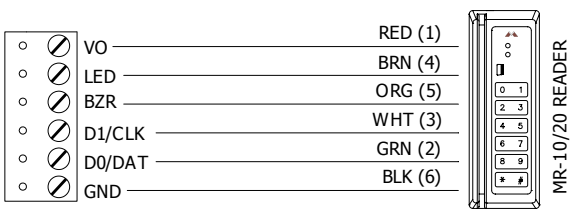
J2 - READER POWER SELECT

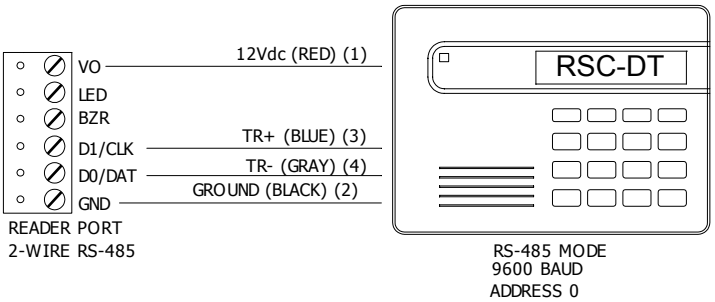
Reader Wiring

The TB8 and TB9 reader ports are six-wire interfaces that include buzzer control and LED control wiring connections. Refer to the card reader's documentation to verify proper wiring connections.

A 6-conductor cable (18 AWG) is required when TTL signaling is used. RS-485 signaling requires two separate 2-conductor cables: one cable for power (18 AWG) and one cable for communication (24 AWG). Configure the reader port settings in DNA Fusion.

The figures below illustrate a typical TTL interface to an MR-10/20 card reader and an RS-485 interface to an RSC-DT keypad.



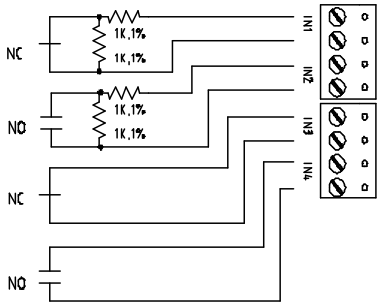


Alarm Input Wiring

The RSC-2 contains eight (8) supervised inputs that can be used for door contacts, request-to-exit (REX) devices, and alarm signaling.

When the inputs are configured for end-of-line (EOL) supervision, the circuit will report Open and Closed states as well as Open Circuit, Shorted, Grounded, and Foreign Voltage. A supervised input circuit requires two resistors to facilitate proper reporting. The standard supervised circuit requires 1k ohm, 1% resistors and should be located as close to the sensor as possible.

Wire the alarm inputs to the IN1 through IN8 port connections on TB1 through TB4 using twisted-pair cables.

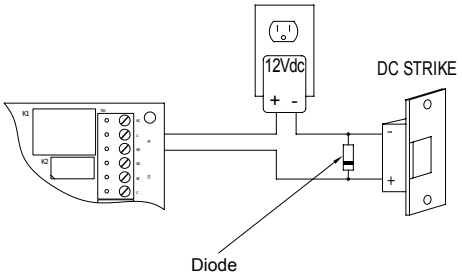


Control Output Wiring

Six Form C relay contacts, located on TB10 through TB12, can be used to control the door strike and/or other output devices. Each relay has three poles: Common (C), Normally Open (NO), and Normally Closed (NC). When momentarily removing power to unlock the door, as with a maglock, the Normally Closed and Common poles are used. Check the local building code for proper egress door installation.

Load switching can cause abnormal contact wear and/or premature contact failure. Switching of inductive loads (strike) also causes electromagnetic interference (EMI), which may interfere with the normal operation of other equipment.

A contact protection circuit must be used to increase system reliability and minimize the risk of premature contact failure. Locate the protection circuit as close to the load as possible (within 12 inches or 30 centimeters) to increase effectiveness. Open Options recommends using a diode or metal oxide varistor (MOV) for protection.

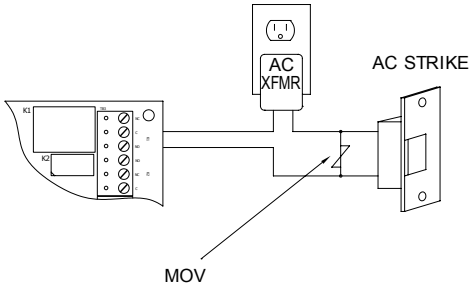


Diode Selection:

Diode Current Rating: > 1 x Strike Current

Diode Breakdown Voltage: 4 x Strike Voltage

For 12 or 24 Vdc Strike: Diode 1N4002 (100V/1A) Typical



MOV Selection:

Clamp Voltage: > 1.5 x Vacs RMS

For 24 Vdc Strike: Panasonic ERZ-C07DK470 Typical

Elevator Control

The Open Options system is capable of supporting elevator control for up to 128 floors. In addition to the RSC-2, an input and/or output board may be needed to control access to elevator floors.

To implement elevator control, DNA Fusion must be configured for elevators. See page 3-33 in the Technical Installation Manual for more information.

Terminal Block Connections

The table below describes the terminal block connections for both Series 1 and Series 2 RSC-2 models.

Terminal Block	Description	Series 1	Series 2
TB1	Inputs 1-2	I1	IN1
		I2	IN2
TB2	Inputs 3-4	I3	IN3
		I4	IN4
TB3	Inputs 5-6	I5	IN5
		I6	IN6
TB4	Inputs 7-8	I7	IN7
		I8	IN8
TB5	Cabinet Tamper / Power Fault	IN9	TMP
		GND	GND
		IN10	PFL
			GND
TB6	Upstream Communication (SIO to Controller, RS-485)	TR+	TR+
		TR-	TR-
		R+	R+
		R-	R-
		SG	GND
TB7	Power Input	ACDC	VIN
		AC	
		GND	GND
TB8 - TB9	Reader Ports 1-2	12VDC	VO
		LED	LED
		BZR	BZR
		DAT1	CLK/D1
		DAT0	DAT/D0
		GND	GND
TB10 - TB12	Output Relays 1-6	NC	NC
		C	C
		NO	NO
		NC	NC
		C	C
		NO	NO

Status LEDs

Initialization

When power is applied, the initialization sequence begins and LED A will turn ON. If the application program cannot be run, LED A will flash rapidly to indicate that the firmware must be downloaded. When initialization is complete, LEDs A through R2 are briefly sequence ON and OFF. If the sequence stops or repeats, contact Open Options Technical Support.

Run Mode

LED	Description	Indicator
A	Online Status (Heartbeat)	80% ON = Online / 20% OFF = Offline
B	Upstream Communication	ON = Communication Activity / OFF = No Activity
1-8	Input Status (IN1-IN8)	ON = Active / OFF = Inactive / Flashing = Trouble
TMP	Cabinet Tamper	ON = Active / OFF = Inactive / Flashing = Trouble
PFL	Power Fault	ON = Active / OFF = Inactive / Flashing = Trouble
R1-R2	Reader Port 1-2	Clock/Data or Data 0/Data 1: Flashing = Data Received RS-485 Mode: Flashing = Data Transmitted
K1-K6	Output Status (K1-K6)	ON = Relay is Energized / OFF = Relay is Not Energized

Jumper Settings

Series 1	
Jumper	**Selection**
J2	REG: Voltage is provided and regulated by the RSC-2 UNREG: Voltage is NOT provided by RSC-2
J3	2W: Setting for 2-wire interface 4W: Setting for 4-wire interface
J4	OFF: 12 Vdc provided by RSC-2 ON: 5 Vdc provided by RSC-2
J5	OFF: No EOL Termination ON: EOL Termination Used (120 ohm)
J6	OFF: No EOL Termination ON: EOL Termination Used (120 ohm)

Series 2	
Jumper	**Selection**
J2	12V: 12 Vdc is available on both reader ports (VIN ≥ 20 Vdc) PT: VIN Power is "passed through" to both reader ports
J3	2W: Setting for 2-wire interface 4W: Setting for 4-wire interface
J5	OFF: No EOL Termination ON: EOL Termination Used (120 ohm)
J6 - J15	Factory Use Only

DIP Switch Settings

DIP switches 1 through 5 determine the RSC-2's physical address. Switches 6 and 7 select the communication baud rate. Switch 8 is not used on this interface and should remain in the OFF position.

All other settings can be configured in the DNA Fusion software.

Selection	S1	S2	S3	S4	S5	S6	S7	S8
Address 0	OFF	OFF	OFF	OFF	OFF			
Address 1	ON	OFF	OFF	OFF	OFF			
Address 2	OFF	ON	OFF	OFF	OFF			
Address 3	ON	ON	OFF	OFF	OFF			
Address 4	OFF	OFF	ON	OFF	OFF			
Address 5	ON	OFF	ON	OFF	OFF			
Address 6	OFF	ON	ON	OFF	OFF			
Address 7	ON	ON	ON	OFF	OFF			
Address 8	OFF	OFF	OFF	ON	OFF			
Address 9	ON	OFF	OFF	ON	OFF			
Address 10	OFF	ON	OFF	ON	OFF			
Address 11	ON	ON	OFF	ON	OFF			
Address 12	OFF	OFF	ON	ON	OFF			
Address 13	ON	OFF	ON	ON	OFF			
Address 14	OFF	ON	ON	ON	OFF			
Address 15	ON	ON	ON	ON	OFF			
Address 16	OFF	OFF	OFF	OFF	ON			
Address 17	ON	OFF	OFF	OFF	ON			
Address 18	OFF	ON	OFF	OFF	ON			
Address 19	ON	ON	OFF	OFF	ON			
Address 20	OFF	OFF	ON	OFF	ON			
Address 21	ON	OFF	ON	OFF	ON			
Address 22	OFF	ON	ON	OFF	ON			
Address 23	ON	ON	ON	OFF	ON			
Address 24	OFF	OFF	OFF	ON	ON			
Address 25	ON	OFF	OFF	ON	ON			
Address 26	OFF	ON	OFF	ON	ON			
Address 27	ON	ON	OFF	ON	ON			
Address 28	OFF	OFF	ON	ON	ON			
Address 29	ON	OFF	ON	ON	ON			
Address 30	OFF	ON	ON	ON	ON			
Address 31	ON	ON	ON	ON	ON			
2,400 BPS						OFF	OFF	
9,600 BPS						ON	OFF	
19,200 BPS						OFF	ON	
38,400 BPS						ON	ON	
Not Used								OFF

Specifications

The RSC-2 interface is for use in low-voltage, Class 2 circuits only.

Series 1*		
Electrical:	*Voltage/Current:*	12 Vdc @ 400 mA max. 12 Vac @ 600 mA max.
Relay Contacts:		6 Form C relays, rated 5A @ 30 Vdc, resistive
Monitor Inputs:		8 supervised/unsupervised, end-of-line resistors, 1k ohm 1% 1/4 Watt standard 2 unsupervised, dedicated for cabinet tamper and power fault monitoring
Communication:	*Type:*	RS-485
	Wire Requirements:	2-wire or 4-wire, 2,400 to 38,400 BPS
Power:		1 twisted pair, 18 AWG min.
RS-485 Comm Cable:		4,000 ft (1,200 m) max., 24 AWG min.
LED Output:		TTL compatible, high > 3V, low < 0.5V, 5 mA source/sink max.
Buzzer Output:		Open collector, 5 Vdc open circuit max., 10 mA sink max.
Reader:		6 conductors, 22 AWG with shield, 500’ (100 m) max. (300’ max. recommended)
Reader Data Inputs:		TTL-compatible inputs or 2-wire RS-485
Reader Power:		5 Vdc (5-6.2), 12 Vdc (10.8-13.2), nominal or unregulated; 75 mA max. each.
Mechanical:	*Dimensions:*	6” (152 mm) W x 8” (203 mm) L x 1” (25 mm) H
	Weight:	11 oz. (312 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

* Series 2 specifications are described on page 3-20.

Series 2		
Electrical:	*Voltage/Current:*	12 to 24 Vdc ± 10%, 550 mA max. (plus reader current) 12 Vdc @ 450 mA max. (plus reader current) nominal 24 Vdc @ 270 mA max. (plus reader current) nominal
Relay Contacts:		6 outputs, Form C, rated 5A @ 28 Vdc, resistive
Monitor Inputs:		8 supervised/unsupervised, standard EOL: 1k ohm, 1% 1/4 watt 2 unsupervised, dedicated for cabinet tamper and power fault monitoring
Communication:	*Type:*	RS-485
	Wire Requirements:	2-wire, 2,400 to 38,400 bps
Power:		1 twisted pair, 18AWG min.
RS-485 Comm Cable:		4,000 ft (1,200 m) max., 24 AWG min.
LED Output:		TTL compatible, high > 3V, low < 0.5V, 5 mA source/sink max.
Buzzer Output:		Open collector, 5 Vdc open circuit max., 10 mA sink max.
Reader:		6 conductors, 22 AWG with shield, 500’ (100 m) max. (300’ max recommended)
Reader Data Inputs:		TTL-compatible inputs or 2-wire RS-485
Reader Power:		12 Vdc regulated, 125 mA max. each reader or 12 to 24 Vdc (input voltage passed through), 125 mA max each reader
Mechanical:	*Dimension:*	6” (152 mm) W x 8” (203 mm) L x 1” (25 mm) H
	Weight:	11 oz. (312 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

I/O Subcontrollers 4

In This Chapter
√ ISC-16 (Series 1 & 2) √ OSC-16 (Series 1 & 2)

Legacy I/O Subcontrollers

Input/output subcontrollers provide a wide range of application options within the open architecture system; they can be clustered or distributed to best suit each installation environment.

Open Options has two legacy I/O subcontrollers:

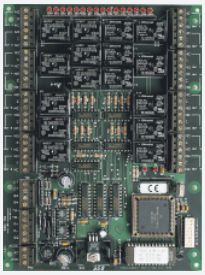
- ISC-16 – A multi-device interface panel dedicated to point control and monitoring; supports 16 programmable input circuits and 2 programmable relay outputs. The ISC-16 is the ideal choice for monitoring high concentrations of inputs combined with low output control requirements.
- OSC-16 – A multi-device interface panel dedicated to point control and monitoring; supports 16 programmable output circuits using Form C relay contacts. The OSC-16 is the ideal choice for monitoring high concentrations of output devices.

The legacy I/O subcontrollers consist of Series 1 and 2 models, both of which are discussed in this chapter. For information on the Series 3 ISC-16 and OSC-16 models, refer to Chapter 4 in the Hardware Manual.

Input/Output Subcontrollers

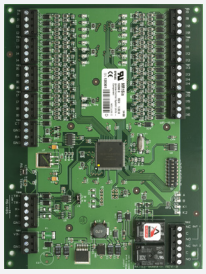
Series 1

ISC-16

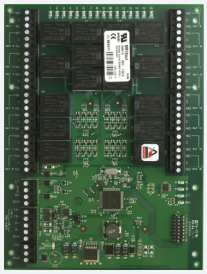


OSC-16

Series 2



ISC-16



OSC-16

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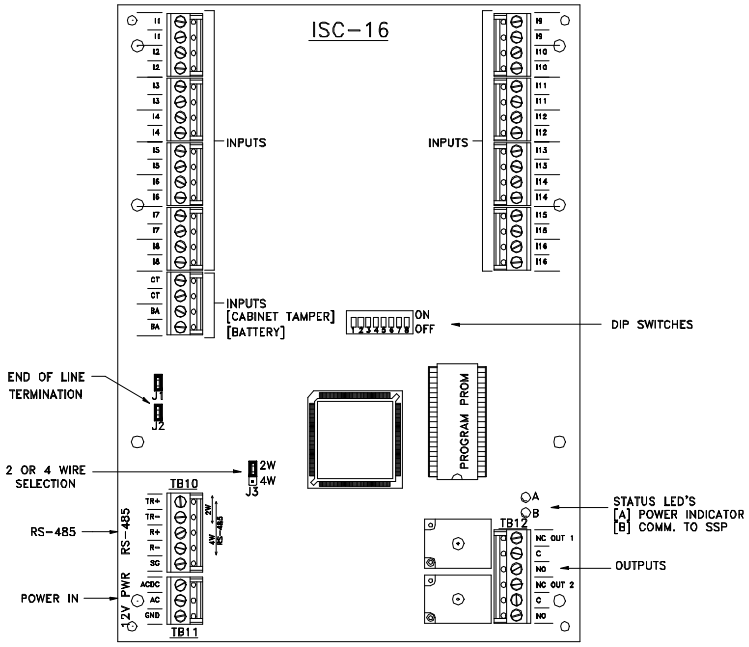
ISC-16 Input Subcontroller

The ISC-16 subcontroller delivers a cost-effective and flexible means of expanding the general input and alarm monitoring capability. With sixteen (16) programmable inputs and two (2) relay outputs, the ISC-16 is the ideal solution when it comes to I/O expansion.

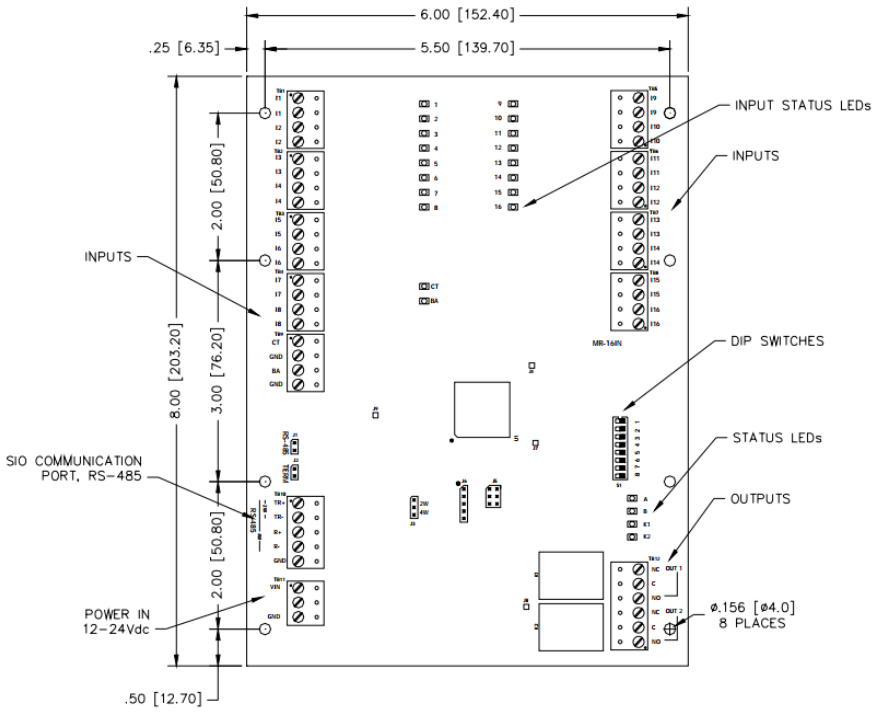
The ISC-16 provides sensor monitoring and output control for system integrators in security and access control applications. The subcontroller has sixteen (16) input circuits for supervised contact monitoring and two (2) Form C relay contacts for load switching. Additionally, it contains two (2) unsupervised inputs that are used for cabinet tamper and power fault monitoring.

See the diagrams below for component locations on both Series 1 and Series 2 ISC-16 subcontrollers.

Series 1 – ISC-16 Subcontroller



Series 2 – ISC-16 Subcontroller



Installation

To install the ISC-16 subcontroller:

1. If required, **mount** the subcontroller in an Open Options enclosure.
2. **Wire** the supervised alarm inputs.
3. If needed, **wire** the relay outputs.
4. **Wire** the upstream controller communication.
5. If required, **wire** the unsupervised alarm inputs for power fault and cabinet tamper monitoring.
6. **Wire** the power input.

Default Settings

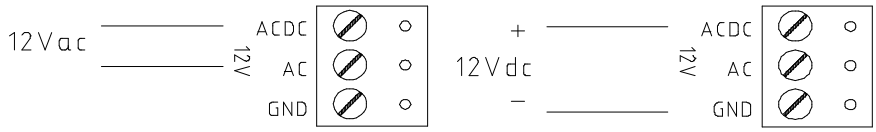
Each ISC-16 board ships with the following default configuration:

- DIP Switches: OFF
- Physical Address: 0
- Serial Port Settings: No flow control
- Encryption: None
- Baud Rate: 38400

Power Supply

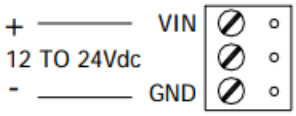
Series 1

The Series 1 ISC-16 accepts either 12 Vdc or 12 Vac for power. Locate the power source as close to the unit as possible and connect the power on TB11 with a minimum of 18 AWG wire.



Series 2

The Series 2 ISC-16 accepts a 12 to 24 Vdc power supply. Locate the power source as close to the unit as possible and connect the VIN and GND ports on TB11 using a minimum of 18 AWG wires.



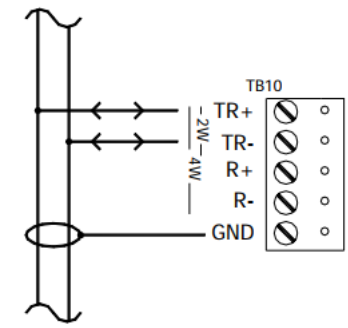
> *Observe polarity on VIN for both Series 1 and Series 2 subcontrollers.*

Upstream Communication Wiring

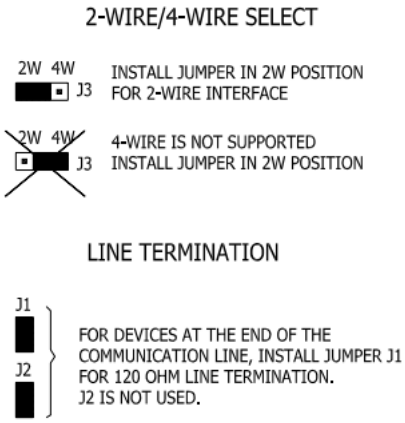
The ISC-16 communicates to the host controller (SSP) via a 2-wire RS-485 interface. The interface allows multidrop communication on a single bus of up to 4,000 ft (1,200 m). Communication on the RS-485 serial port is asynchronous and half-duplex; it uses 1 start bit, 8 data bits, and 1 stop bit.

Wire the TR+, TR-, and GND (or SG) connections on TB10 using twisted-pair cables (min. 24 AWG) with shield and 120-ohm impedance. The termination jumper(s) should only be installed on end-of-line devices.

Jumper J3 must be installed on the 2W selection to configure the 2-wire RS-485 interface. Do NOT set the jumper to 4W; the ISC-16 does not support a 4-wire RS-485 configuration. See page 1-7 for additional jumper settings.



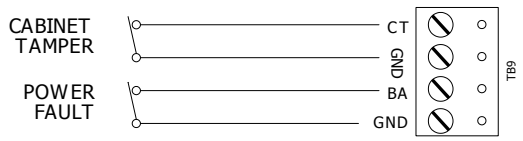
2-WIRE
(ONLY 2-WIRE RS-485 IS SUPPORTED)



Cabinet Tamper / Power Fault

Connect inputs CT and BA on TB9 with twisted-pair cables to monitor cabinet tamper and power failure. These two inputs are only used to monitor contact closure; they do not require EOL resistors.

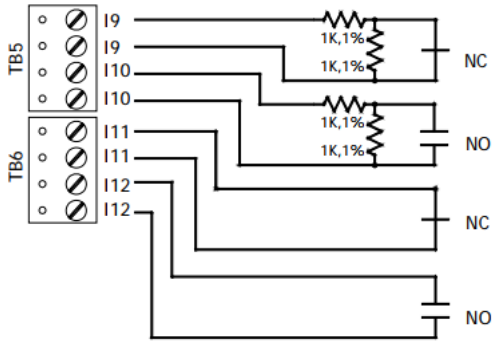
If neither input is used, install the jumper and pigtail that ship with the board.



Alarm Input Wiring

The ISC-16 contains 16 supervised inputs that can be used for door contacts, request-to-exit devices, alarm signals, and elevator floor control. Connect the alarm inputs (I1-I16) on TB1 through TB8 using twisted-pair cables (min. 24 AWG).

The inputs can be configured as supervised or unsupervised. Supervised inputs require two end-of-line (EOL) resistors in order to facilitate proper reporting. The standard supervised circuit uses 1K ohm, 1% resistors and should be located as close to the sensor as possible.

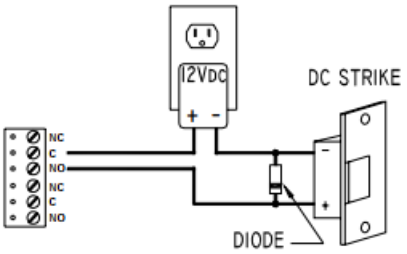


Control Output Wiring

Two (2) Form C relay contacts, located on TB12, provide the ability to control door strikes and other devices. The relays are rated 5A @ 30 Vdc, dry contact configuration. Each relay contains a Common pole (C), Normally Open pole (NO), and Normally Closed pole (NC).

Load switching can cause abnormal contact wear and premature contact failure. Switching of inductive loads (strike) also causes electromagnetic interference (EMI) that may interfere with the normal operation of other equipment. A contact protection circuit must be used to increase system reliability and minimize the risk of premature contact failure. Use wire gauge sufficient for the load current to prevent voltage loss.

Open Options recommends using a diode or metal oxide varistor (MOV) to protect the relay circuit. Locate the protection circuit as close to the load as possible (within 12 inches), as the circuit's effectiveness will decrease if located farther away.

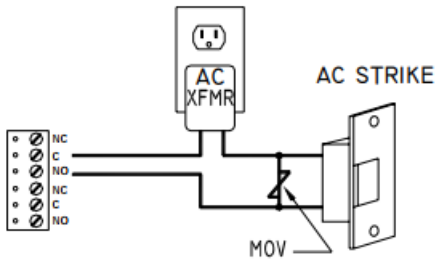


Diode Selection:

Diode current rating: 1 x strike count

Diode breakdown voltage: 4 x strike voltage

For 12 Vdc or 24 Vdc strike, diode 1N4002 (100V/1A) typical



MOV Selection:

Clamp voltage: 1.5 x Vac RMS

For 24 Vac strike, Panasonic ERZ-C07DK470 typical

Elevator Control

The Open Options system is capable of supporting elevator control for up to 128 floors. Depending on the configuration, a reader board and an OSC-16 board may be needed in addition to the ISC-16.

To use this feature, DNA Fusion must be configured for elevators. See page 3-33 in the Technical Installation Manual for more information.

Status LEDs

Initialization

Once power is applied, initialization for the ISC-16 begins.

LED A is turned ON at the beginning of the initialization. If the application program cannot run, LED A will flash at a rapid rate; this indicates that firmware needs to be downloaded. If the sequence stops or repeats, contact Open Options Technical Support.

When initialization is complete, LEDs 1 through 16, CT, and BA are briefly sequenced ON then OFF.

Running

After the above sequence, the LEDs indicate the following states:

LED	Description	Indicator
A	Online Status (Heartbeat)	Online = 80% ON, 1-second rate Offline = 20% ON, 1-second rate
B	SIO Communication Port Status	ON = Downstream Communication Activity
CT	Cabinet Tamper	OFF = Inactive (briefly flashes ON every 3 seconds) ON = Active (briefly flashes OFF every 3 seconds) Rapid Flash = Fault
BA	Power Fault	
1-16	Input I1-I16 Status	OFF = Inactive (briefly flashes ON every 3 seconds) ON = Active (briefly flashes OFF every 3 seconds) Rapid Flash = Fault
K1-K2	Output 1-2 Status	ON = Energized

Jumper Settings

The following tables describe the jumper settings for the Series 1 and Series 2 ISC-16:

Series 1		
Jumper(s)	**Set At**	**Description**
J1	OFF	No EOL Termination
	ON	EOL Termination Used (120 ohm)
J2	OFF	No EOL Termination
	ON	EOL Termination Used (120 ohm)
J3	2W	Setting for 2-wire RS-485 interface; install in 2W position only (4-wire not supported)

Series 2		
Jumper(s)	**Set At**	**Description**
J1	OFF	No EOL Termination
	ON	EOL Termination Used (120 ohm)
J2	N/A	Factory Use Only
J3	2W	Setting for 2-wire RS-485 interface; install in 2W position only (4-wire not supported)
J4-J9	N/A	Factory Use Only

DIP Switch Settings

Switches 1 through 5 determine the ISC-16's physical address (0-31). Switches 6 and 7 select the communication baud rate. Switch 8 is not used on this interface and should remain in the OFF position.

Selection	S1	S2	S3	S4	S5	S6	S7	S8
Address 0	OFF	OFF	OFF	OFF	OFF			
Address 1	ON	OFF	OFF	OFF	OFF			
Address 2	OFF	ON	OFF	OFF	OFF			
Address 3	ON	ON	OFF	OFF	OFF			
Address 4	OFF	OFF	ON	OFF	OFF			
Address 5	ON	OFF	ON	OFF	OFF			
Address 6	OFF	ON	ON	OFF	OFF			
Address 7	ON	ON	ON	OFF	OFF			
Address 8	OFF	OFF	OFF	ON	OFF			
Address 9	ON	OFF	OFF	ON	OFF			
Address 10	OFF	ON	OFF	ON	OFF			
Address 11	ON	ON	OFF	ON	OFF			
Address 12	OFF	OFF	ON	ON	OFF			
Address 13	ON	OFF	ON	ON	OFF			
Address 14	OFF	ON	ON	ON	OFF			
Address 15	ON	ON	ON	ON	OFF			
Address 16	OFF	OFF	OFF	OFF	ON			
Address 17	ON	OFF	OFF	OFF	ON			
Address 18	OFF	ON	OFF	OFF	ON			
Address 19	ON	ON	OFF	OFF	ON			
Address 20	OFF	OFF	ON	OFF	ON			
Address 21	ON	OFF	ON	OFF	ON			
Address 22	OFF	ON	ON	OFF	ON			
Address 23	ON	ON	ON	OFF	ON			
Address 24	OFF	OFF	OFF	ON	ON			
Address 25	ON	OFF	OFF	ON	ON			
Address 26	OFF	ON	OFF	ON	ON			
Address 27	ON	ON	OFF	ON	ON			
Address 28	OFF	OFF	ON	ON	ON			
Address 29	ON	OFF	ON	ON	ON			
Address 30	OFF	ON	ON	ON	ON			
Address 31	ON	ON	ON	ON	ON			
2,400 BPS						OFF	OFF	
9,600 BPS						ON	OFF	
19,200 BPS						OFF	ON	
38,400 BPS						ON	ON	
Not Used								OFF

Terminal Block Connections

The table below describes the terminal block connections for the Series 1 and Series 2 ISC-16.

Terminal Block	Description	Series 1		Series 2	
TB1	Input 1	I1	I1	I1	I1
	Input 2	I2	I2	I2	I2
TB2	Input 3	I3	I3	I3	I3
	Input 4	I4	I4	I4	I4
TB3	Input 5	I5	I5	I5	I5
	Input 6	I6	I6	I6	I6
TB4	Input 7	I7	I7	I7	I7
	Input 8	I8	I8	I8	I8
TB5	Input 9	I9	I9	I9	I9
	Input 10	I10	I10	I10	I10
TB6	Input 11	I11	I11	I11	I11
	Input 12	I12	I12	I12	I12
TB7	Input 13	I13	I13	I13	I13
	Input 14	I14	I14	I14	I14
TB8	Input 15	I15	I15	I15	I15
	Input 16	I16	I16	I16	I16
TB9	Cabinet Tamper	CT		CT	
		GND		CT	
	Power Fault	BA		BA	
		GND		BA	
TB10	Host Communication (Port 1 - RS-485)	TR+		TR+	
		TR-		TR-	
		R+		R+	
		R-		R-	
		GND		SG	
TB11	Power Input	VIN		ACDC	
				AC	
		GND		GND	
TB12	Output 1	NC		NC	
		C		C	
		NO		NO	
	Output 2	NC		NC	
		C		C	
		NO		NO	

NOTES:

Specifications

The ISC-16 is for use in low-voltage, Class 2 circuits only.

Series 1		
Electrical:	*Voltage/Current:*	12 Vdc @ 350 mA nominal
		12 Vac @ 600 mA nominal
Relay Contacts:		2 outputs, Form C, 5A @ 30 Vdc or 125 Vac, resistive
Monitor Inputs:		16 supervised, end-of-line resistors, 1k ohm 1% watt standard 2 unsupervised, dedicated for power fault and cabinet tamper
RS-485 Cable:		4,000 ft (1,200 m) max., 24 AWG min.
Mechanical:	*Dimensions:*	6.0” (152 mm) W x 8.0” (203 mm) L x 1.0” (25 mm) H
	Weight:	10 oz. (290 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

Series 2		
Electrical:	*Voltage:*	12 to 24 Vdc ± 10%, 350 mA max.
	Current:	12 Vdc @ 300 mA nominal 24 Vdc @ 220 mA nominal
Relay Contacts:		2 outputs, Form C, 5A @ 28 Vdc, resistive
Monitor Inputs:		16 supervised, end-of-line resistors, 1k ohm 1% watt standard 2 unsupervised, dedicated for power fault and cabinet tamper
RS-485 Cable:		4,000 ft (1,200 m) max., 24 AWG min.
Mechanical:	*Dimensions:*	6.0” (152 mm) W x 8.0” (203 mm) L x 1.0” (25.4 mm) H
	Weight:	9 oz. (250 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

NOTES:

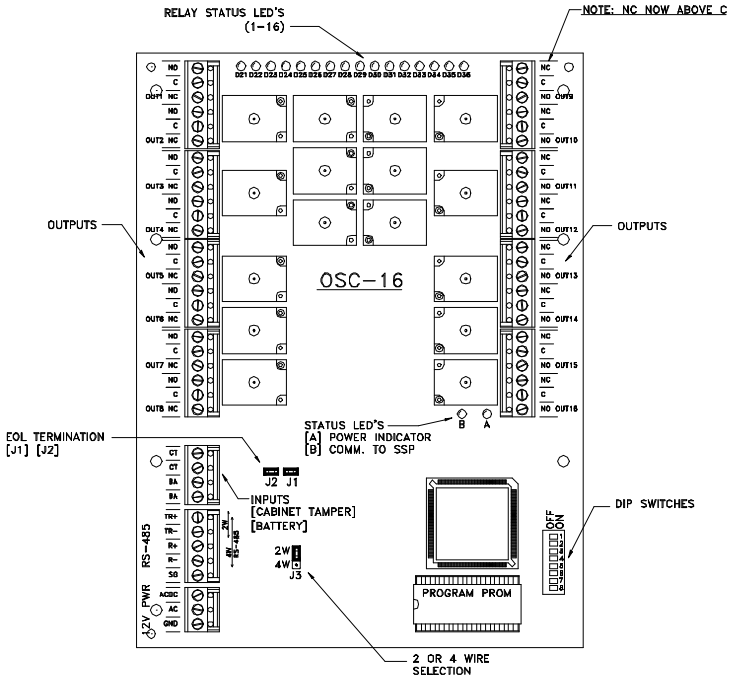
OSC-16 Output Subcontroller

The OSC-16 delivers a cost-effective and flexible means of expanding the output capability of a system. The 16 programmable relay outputs can be used for general facility control, such as lighting, energy management, and door/elevator control.

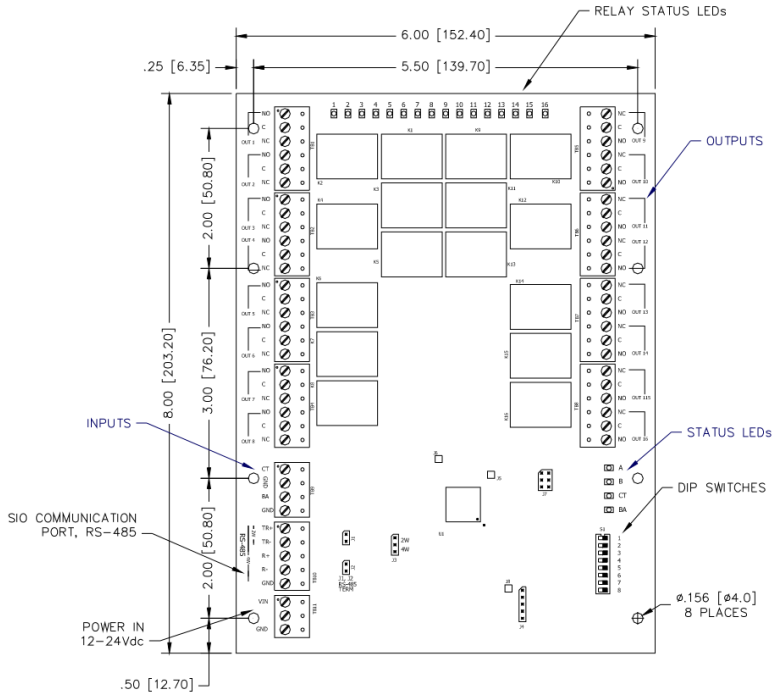
The OSC-16 provides output control for system integrators in security and access control applications. The subcontroller has 16 Form C contacts for load switching. Additionally, it contains two (2) unsupervised inputs that are used for cabinet tamper and power fault monitoring.

See the diagrams below for component locations on both Series 1 and Series 2 OSC-16 subcontrollers.

Series 1 – OSC-16 Subcontroller



Series 2 – OSC-16 Subcontroller



Installation

To install the OSC-16 subcontroller:

1. If required, **mount** the subcontroller in an Open Options enclosure.
2. **Wire** the relay outputs.
3. **Wire** the upstream controller communication.
4. If required, **wire** the unsupervised alarm inputs for power fault and cabinet tamper monitoring.
5. **Wire** the power input.

Default Settings

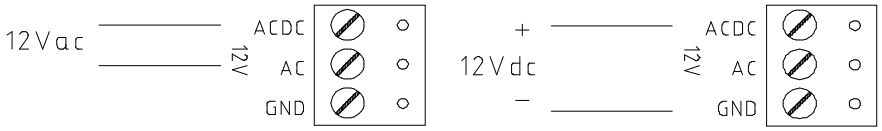
Each OSC-16 board ships with the following default configuration:

- DIP Switches: OFF
- Physical Address: 0
- Serial Port Settings: No flow control
- Encryption: None
- Baud Rate: 38400

Power Supply

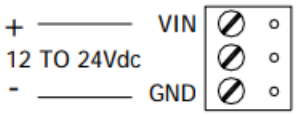
Series 1

The Series 1 OSC-16 accepts either 12 Vdc or 12 Vac for power. Locate the power source as close to the unit as possible and connect the power on TB11 with a minimum of 18 AWG wire.



Series 2

The Series 2 OSC-16 accepts a 12 to 24 Vdc power supply. Locate the power source as close to the unit as possible and connect the VIN and GND ports on TB11 using a minimum of 18 AWG wire.



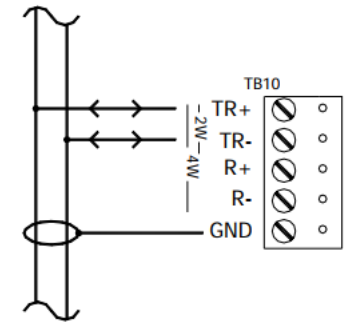
> *Observe polarity on VIN for both Series 1 and Series 2 subcontrollers.*

Upstream Communication Wiring

The OSC-16 communicates to the host controller (SSP) via a 2-wire RS-485 interface. The interface allows multidrop communication on a single bus of up to 4,000 ft (1,200 m). Communication on the RS-485 serial port is asynchronous and half-duplex; it uses 1 start bit, 8 data bits, and 1 stop bit.

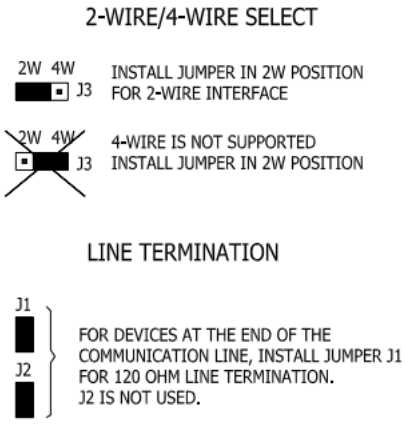
Wire the TR+, TR-, and GND (or SG) connections on TB10 using twisted-pair cables (min. 24 AWG) with shield and 120-ohm impedance. The termination jumper(s) should only be installed on end-of-line devices.

Jumper J3 must be installed on the 2W selection to configure the 2-wire RS-485 interface. Do NOT set the jumper to 4W; the ISC-16 does not support a 4-wire RS-485 configuration. See page 1-17 for additional jumper settings.



2-WIRE

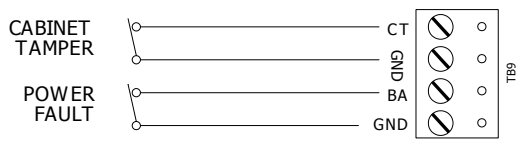
(ONLY 2-WIRE RS-485 IS SUPPORTED)



Cabinet Tamper / Power Fault

Connect inputs CT and BA on TB9 with twisted-pair cables to monitor the cabinet tamper and power failure. These two inputs are only used to monitor contact closure; they do not require EOL resistors.

If neither input is used, install the jumper and pigtail that ship with the board.

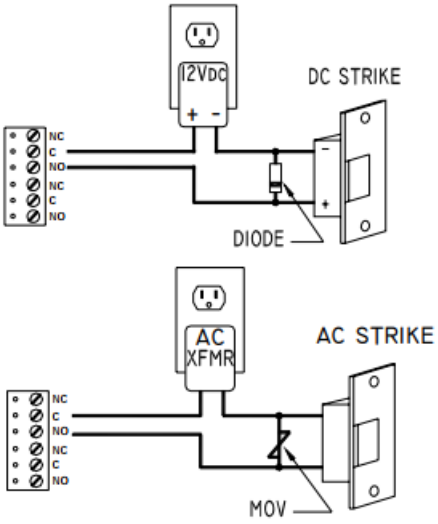


Control Output Wiring

Sixteen (16) Form C relay contacts, located on TB1 through TB8, provide the ability to control door strikes and other devices. The relays are rated 5A @ 30 Vdc, dry contact configuration. Each relay contains a Common pole (C), Normally Open pole (NO), and Normally Closed pole (NC).

Load switching can cause abnormal contact wear and premature contact failure. Switching of inductive loads (strike) also causes electromagnetic interference (EMI) that may interfere with the normal operation of other equipment. A contact protection circuit must be used to increase system reliability and minimize the risk of premature contact failure. Use wire gauge sufficient for the load current to prevent voltage loss.

Open Options recommends using a diode or metal oxide varistor (MOV) to protect the relay circuit. Locate the protection circuit as close to the load as possible (within 12 inches), as the circuit's effectiveness will decrease if located farther away.



Diode Selection:

Diode current rating: 1 x strike count

Diode breakdown voltage: 4 x strike voltage

For 12 Vdc or 24 Vdc strike, diode 1N4002 (100V/1A) typical

MOV Selection:

Clamp voltage: 1.5 x Vac RMS

For 24 Vac strike, Panasonic ERZ-C07DK470 typical

Elevator Control

The Open Options system is capable of supporting elevator control for up to 128 floors. Depending on the configuration, a reader board and an ISC-16 board may be needed in addition to the OSC-16.

To use this feature, DNA Fusion must be configured for elevators. See page 3-33 in the Technical Installation Manual for more information.

Status LEDs

Initialization

Once power is applied, initialization for the OSC-16 begins.

LED A is turned ON at the beginning of the initialization. If the application program cannot run, LED A will flash at a rapid rate; this indicates that firmware needs to be downloaded. If the sequence stops or repeats, contact Open Options Technical Support.

When initialization is complete, LEDs 1 through 16, CT, and BA are briefly sequenced ON then OFF.

Running

After the above sequence, the LEDs indicate the following states:

LED	Description	Indicator
A	Online Status (Heartbeat)	Online = 80% ON, 1-second rate Offline = 20% ON, 1-second rate
B	SIO Communication Port Status	ON = Downstream Communication Activity
CT	Cabinet Tamper	OFF = Inactive (briefly flashes ON every 3 seconds) ON = Active (briefly flashes OFF every 3 seconds) Rapid Flash = Fault
BA	Power Fault	
1-16	Output Status (OUT 1 - OUT 16)	ON = Energized

Jumper Settings

The following tables describe the jumper settings for the Series 1 and Series 2 OSC-16:

Series 1		
Jumper(s)	**Set At**	**Description**
J1	OFF	No EOL Termination
	ON	EOL Termination Used (120 ohm)
J2	OFF	No EOL Termination
	ON	EOL Termination Used (120 ohm)
J3	2W	Setting for 2-wire RS-485 interface; install in 2W position only (4-wire not supported)

Series 2		
Jumper(s)	**Set At**	**Description**
J1	OFF	No EOL Termination
	ON	EOL Termination Used (120 ohm)
J2	N/A	Factory Use Only
J3	2W	Setting for 2-wire RS-485 interface; install in 2W position only (4-wire not supported)
J4-J8	N/A	Factory Use Only

DIP Switch Settings

Switches 1 through 5 determine the OSC-16's physical address (0-31). Switches 6 and 7 select the communication baud rate. Switch 8 is not used on this interface and should remain in the OFF position.

Selection	S1	S2	S3	S4	S5	S6	S7	S8
Address 0	OFF	OFF	OFF	OFF	OFF			
Address 1	ON	OFF	OFF	OFF	OFF			
Address 2	OFF	ON	OFF	OFF	OFF			
Address 3	ON	ON	OFF	OFF	OFF			
Address 4	OFF	OFF	ON	OFF	OFF			
Address 5	ON	OFF	ON	OFF	OFF			
Address 6	OFF	ON	ON	OFF	OFF			
Address 7	ON	ON	ON	OFF	OFF			
Address 8	OFF	OFF	OFF	ON	OFF			
Address 9	ON	OFF	OFF	ON	OFF			
Address 10	OFF	ON	OFF	ON	OFF			
Address 11	ON	ON	OFF	ON	OFF			
Address 12	OFF	OFF	ON	ON	OFF			
Address 13	ON	OFF	ON	ON	OFF			
Address 14	OFF	ON	ON	ON	OFF			
Address 15	ON	ON	ON	ON	OFF			
Address 16	OFF	OFF	OFF	OFF	ON			
Address 17	ON	OFF	OFF	OFF	ON			
Address 18	OFF	ON	OFF	OFF	ON			
Address 19	ON	ON	OFF	OFF	ON			
Address 20	OFF	OFF	ON	OFF	ON			
Address 21	ON	OFF	ON	OFF	ON			
Address 22	OFF	ON	ON	OFF	ON			
Address 23	ON	ON	ON	OFF	ON			
Address 24	OFF	OFF	OFF	ON	ON			
Address 25	ON	OFF	OFF	ON	ON			
Address 26	OFF	ON	OFF	ON	ON			
Address 27	ON	ON	OFF	ON	ON			
Address 28	OFF	OFF	ON	ON	ON			
Address 29	ON	OFF	ON	ON	ON			
Address 30	OFF	ON	ON	ON	ON			
Address 31	ON	ON	ON	ON	ON			
2,400 BPS						OFF	OFF	
9,600 BPS						ON	OFF	
19,200 BPS						OFF	ON	
38,400 BPS						ON	ON	
Not Used								OFF

Terminal Block Connections

The table below describes the terminal block connections for the Series 1 and Series 2 OSC-16.

Terminal Block	Description	Series 1	Series 2
TB1 - TB8	Outputs 1-16	NC	NC
		C	C
		NO	NO
		NC	NC
		C	C
		NO	NO
TB9	Cabinet Tamper	CT	CT
		GND	CT
	Power Fault	BA	BA
		GND	BA
TB10	Host Communication (Port 1 - RS-485)	TR+	TR+
		TR-	TR-
		R+	R+
		R-	R-
		GND	SG
TB11	Power Input	VIN	ACDC
			AC
		GND	GND

NOTES:

Specifications

The OSC-16 is for use in low-voltage, Class 2 circuits only.

Series 1		
Electrical:	*Voltage/Current:*	12 Vdc @ 500 mA nominal
		12 Vac @ 600 mA nominal
Relay Contacts:		16 outputs, Form C, 5A @ 30 Vdc or 125 Vac, resistive
Monitor Inputs:		2 unsupervised, dedicated for power fault and cabinet tamper
RS-485 Cable:		4,000 ft (1,200 m) max., 24 AWG min.
Mechanical:	*Dimensions:*	6.0” (152 mm) W x 8.0” (203 mm) L x 1.0” (25 mm) H
	Weight:	16 oz. (454 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

Series 2		
Electrical:	*Voltage:*	12 to 24 Vdc ± 10%, 1100 mA max.
	Current:	12 Vdc @ 850 mA nominal 24 Vdc @ 450 mA nominal
Relay Contacts:		16 Form C, 5A @ 28 Vdc, resistive
Monitor Inputs:		2 unsupervised, dedicated for power fault and cabinet tamper
RS-485 Cable:		4,000 ft (1,200 m) max., 24 AWG min.
Mechanical:	*Dimensions:*	6.0” (152 mm) W x 8.0” (203 mm) L x 1.0” (25.4 mm) H
	Weight:	14 oz. (400 g) nominal
Environmental:	*Temperature:*	-55 to 85 °C, storage / 0 to 70 °C, operating
	Humidity:	0% to 95% RHNC

Specifications are subject to change without notice.

NOTES:

I/O Subcontroller Comparison

The following table provides comparison information for the I/O subcontrollers.

Type	Inputs	Ouputs	Speed	Power	Tampers
ISC-16	16	2	Up to 38,400 bps	12 Vdc or 12 Vac (Series 1) 12 to 24 Vdc (Series 2)	2 (Cabinet/Power)
OSC-16	0	16	Up to 38,400 bps	12 Vdc or 12 Vac (Series 1) 12 to 24 Vdc (Series 2)	2 (Cabinet/Power)

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Communication Devices 5

In This Chapter
√ CoBox Micro Configuration √ Micro Serial Server (MSS) Configuration

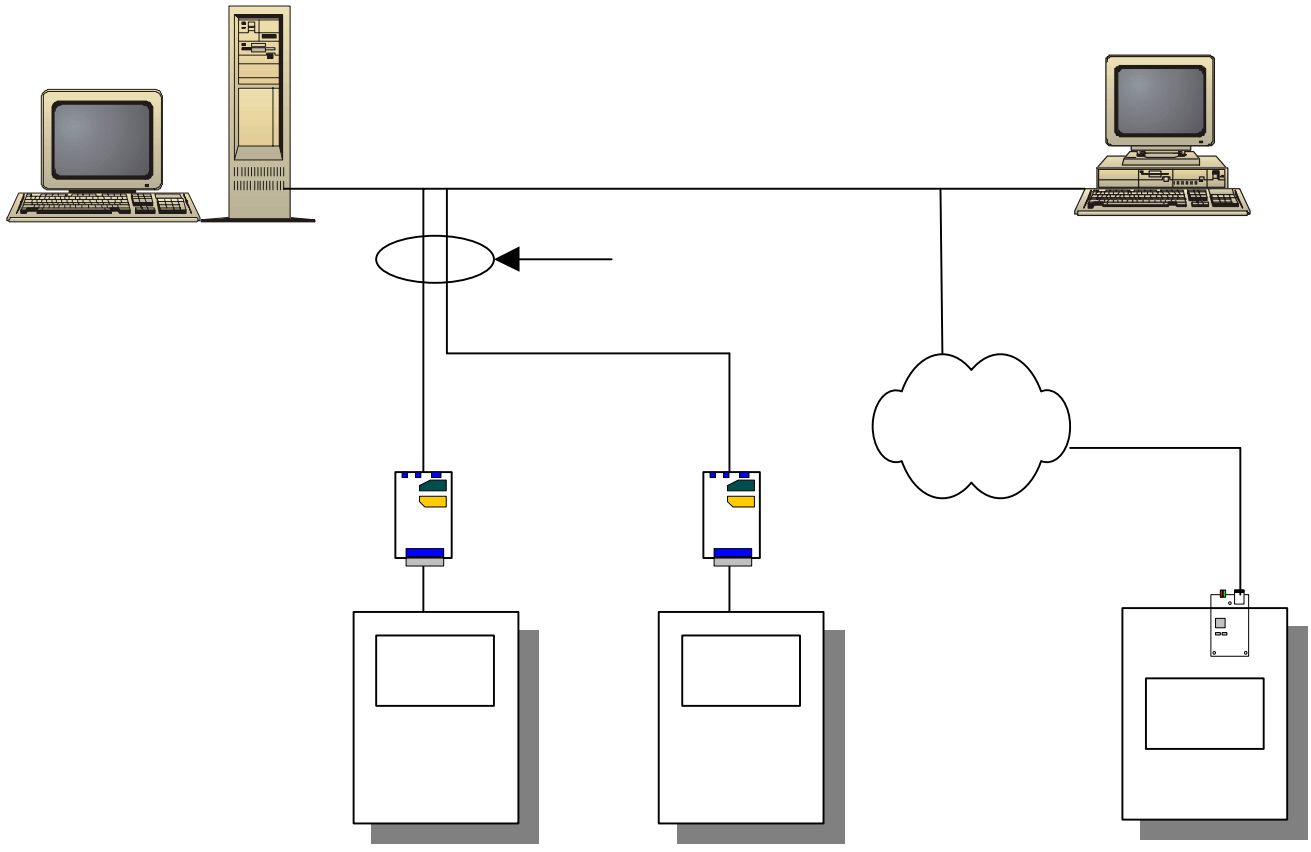
Communication Devices

The legacy SSP controllers (SSP, SSP-C, and SSP-E) support hardwired connections via a PC port as well as network connections via TCP/IP communication. The legacy controllers can also be configured through a dial-up connection (see Chapter 7: Dial-Up Connection).

SSP controllers are designed for a 10/100 Ethernet network connection. Open Options recommends using a Lantronix Micro Serial Server (MSS) or Cobox Micro when converting RS-232 data to be sent over the network. These devices enable the SSP controllers to connect to the polling machine (host) via Local Area Networks (LANs) and Wide Area Networks (WANs).

Each network device must be programmed with an initial IP address, and the serial communication port must be configured for parameters such as baud rate, flow control, etc. These settings are configured differently depending on the type of network device being used.

The diagram below illustrates a typical installation setup using a TCP/IP connection between the SSP controller and the host.



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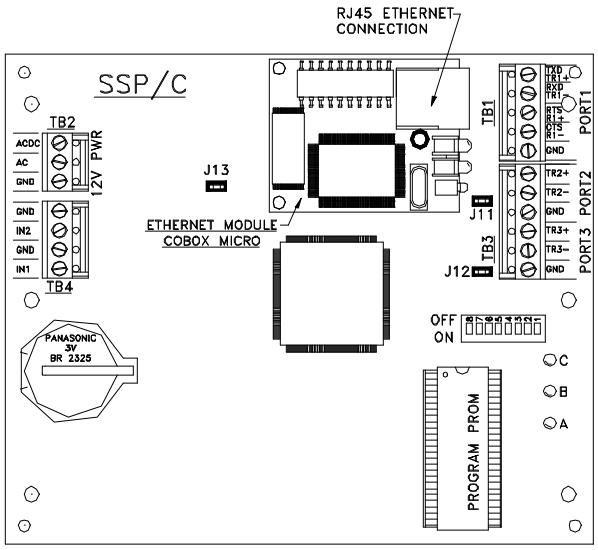
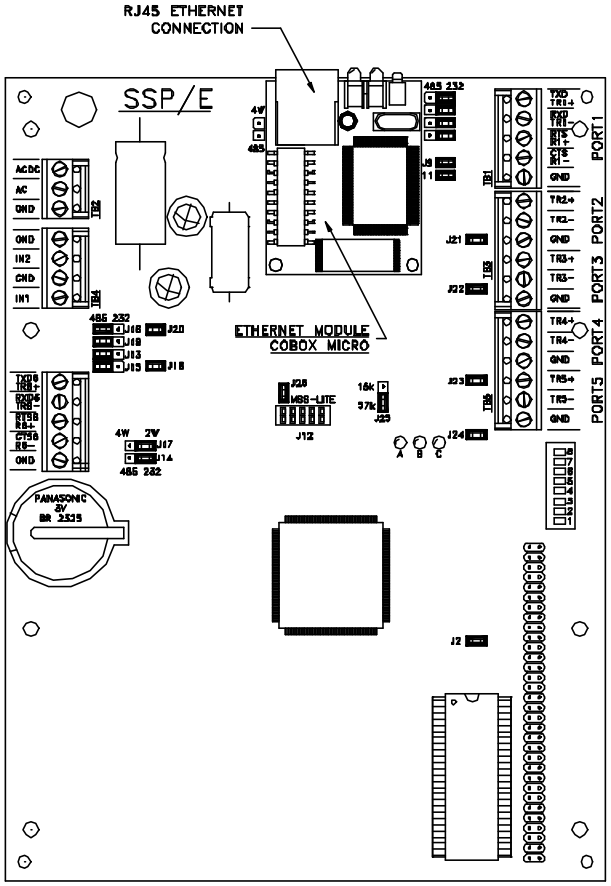
CoBox Micro

The CoBox Micro simplifies the process of connecting an SSP-C or SSP-E controller across LANs or WANs. A serial interface to the controller is established via a TTL connector, and the Ethernet network connection is a standard RJ45 (10Base-T) interface. The controller supplies 5 Vdc regulated power to the CoBox Micro, eliminating the need for an external power supply.

The CoBox Micro is designed to work with the SSP-C and SSP-E legacy controllers. The drawings below illustrate the location of the CoBox Micro for each type of controller.



SSP-C with CoBox Micro



SSP-E with CoBox Micro

The standard SSP legacy controller does not support the CoBox Micro.

NOTES:

Configuring the CoBox Micro

Complete the following steps to configure the CoBox Micro for TCP/IP communication.

1. **Open** the Windows Command Prompt.
2. **Enter** the arp command to set the IP address for the CoBox Micro:

   C:\>arp -s xxx.xxx.xxx.xxx xx-xx-xx-xx-xx-xx-xx

   IP Address to the CoBox — **CoBox Physical Address**
3. **Enter** the IP Address and the Ethernet (MAC) Address as shown above and **press** Enter.

   To verify that the address is stored in the arp table correctly, **enter** arp -a in the Command Prompt.
4. **Telnet** to Port 1 on the CoBox Micro via the IP address assigned in Step 3.

   C:\>telnet xxx.xxx.xxx.xxx 1

   The telnet session will fail; however, it will force the IP address to the CoBox.
5. To configure the CoBox Micro, **telnet** to Port 9999.

   C:\>telnet xxx.xxx.xxx.xxx 9999
6. **Press** Enter to enter the Setup Mode.

   A list of menu options appears.
7. To change the IP address or configure the gateway, **select** 0 Server Configuration under the Change Setup menu option.
8. To configure the serial channel, **select** 1 Channel 1 Configuration and **enter** the appropriate values for each option.
9. **Press** Enter to advance to the next option.

   The table below describes the typical settings for an SSP controller.

Selection	Setting
Baud Rate	38,400 (must match the baud rate on the controller)
I/F Mode	4C
Flow	02 = Handshake (Rec.)
Port Number	3001
Connect Mode	C0

   After the last setting is entered, the screen will display the current settings for both the network and the serial port (Channel 1).
10. **Verify** the settings and **press** 9 Save and Exit to end the telnet session.

Configuring the Hardware

If Channel 1 on the CoBox Micro is configured to use flow control, **turn** flow control ON at the controller and adjust the appropriate jumper setting on the board.

1. **Set** DIP switch 5 on the controller to the ON position.

   See page 2-16 (SSP-C) or 2-24 (SSP-E) for more information on DIP switch settings.

2. **Verify** that the jumpers are configured for RS-232 interface and that the DIP switches are set to the appropriate address and baud rate.
3. **Configure** the appropriate jumper on the controller to indicate that it is using the CoBox Micro:
   - SSP-C – Set J13 to OFF when using the CoBox; see page 2-15 for more information.
   - SSP-E – Set J26 to OFF when using the CoBox; see page 2-23 for more information.

See Chapter 2: Controllers for more information on jumper and DIP switch settings.

Software Settings

The communication channel in DNA Fusion must be associated with the corresponding IP address. See page 3-5 in the Technical Installation Manual for more information.

Micro Serial Server (MSS) Devices

Lantronix offers several different types of MSS devices, including the MSS100, MSS1, and MSSLite. The MSS family, which network-enables a variety of serial devices, is configured using similar steps.

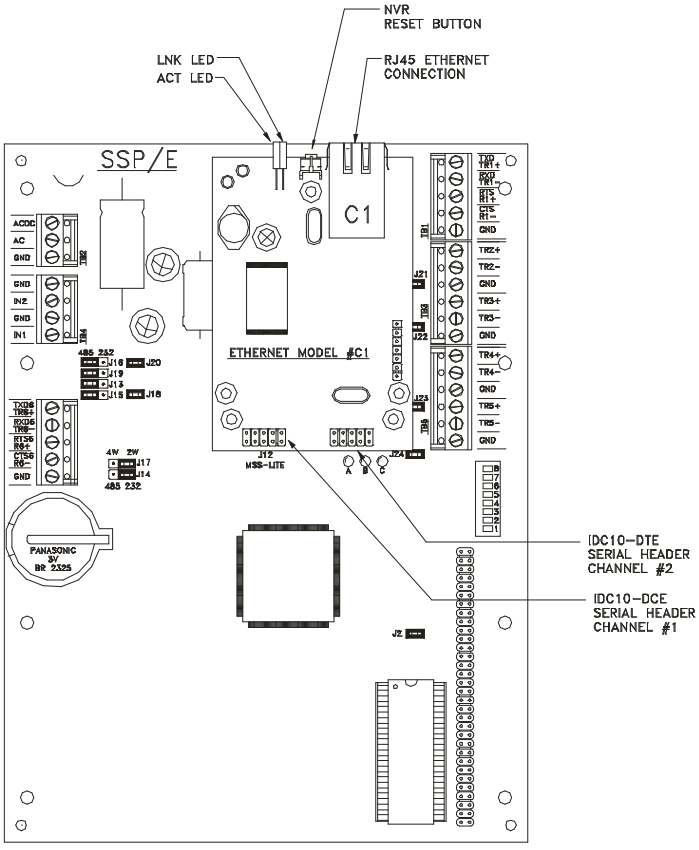
MSS100 / MSS1

The MSS100 (10/100) and the MSS1 (10Base-T) are powered externally; they require connections between the serial port on the MSS device and the host port on the SSP controller.

MSSLite

The MSSLite is an on-board Ethernet card that is specifically designed to interface with the SSP-E controllers; it does not require external power or cable connections. The MSSLite receives regulated power from the controller and communicates via an IDE header located directly on the SSP-E.

The drawing below illustrates the location of the MSSLite on the SSP-E controller.



Serial Cable Configuration

The Lantronix MSS100 requires a serial cable connection between the serial server and the SSP controller. The cable's configuration is similar to the RS-232 hardwire connection; however, CTS/RTS is used differently. See the table below for pinout configuration.

SSP Port 1 Pin #	SSP Signal	DB-25 Pin	DB-9 Pin	Host Signal
1	Data Transmit (TXD)	3	2	Data Receive (RX)
2	Data Receive (RXD)	2	3	Data Transmit (TX)
3	Request to Send (RTS)	Not Used		
4	Clear to Send (CTS)	4	7	Request to Send (RTS)
5	Ground (GND)	7	5	Ground (GND)

If flow control is used, jumper the following pins together depending on the type of connector.

DB-25	DB-9	Signal
20	4	Data Terminal Ready (DTR)
6	6	Data Set Ready (DSR)
5	8	Clear to Send (CTS)

Configuring the MSS Device

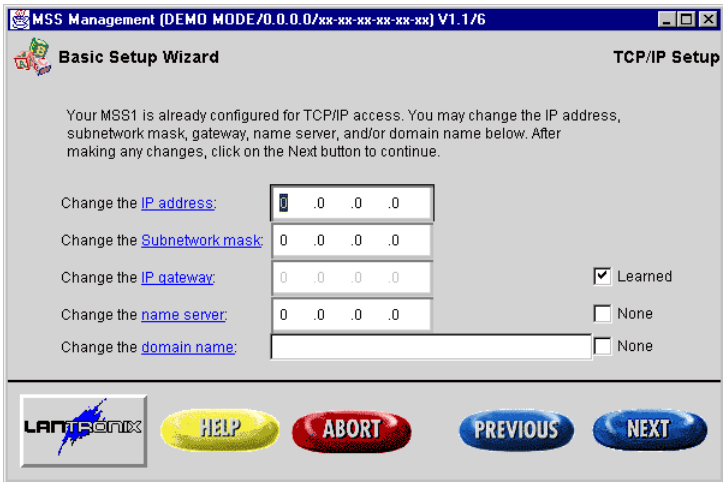
Certain parameters must be configured before the MSS device can function in the network. Open Options recommends using the EZWebCon tool to assign network settings, such as the IP Address and Subnet Mask.

Assigning the IP Address Using EZWebCon

Complete the following steps to configure the MSS devices using EZWebCon.

1. **Install** EZWebCon if it is not already installed on the server.
2. **Verify** that the MSS device is powered up and physically attached to the network.
3. **Launch** EZWebCon and **click** on the Lantronix logo in the bottom-left corner.

4. **Select** Assign IP Address to Server.
   The MSS Management dialog opens.



5. **Enter** the MSS Hardware Address.
   The hardware address is printed on a label on the bottom of the MSS device.
6. **Enter** the desired IP Address that will be permanently assigned to the device.
   If needed, consult with the site's network administrator to obtain the address.
7. If desired, **enter** a subnet other than the default.
8. If desired, **enter** the IP Address of the TFTP server and **click** OK.
9. Depending on the device, the user may be prompted to cycle power on the device.
   After the IP Address has been assigned to the server, a confirmation message will appear.
10. **Click** OK to close the dialog.

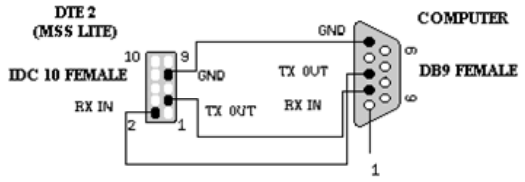
Assigning the IP Address Using HyperTerminal

If the user does not have access to EZWebCon, the MSS device settings can be configured with a serial connection and HyperTerminal.

1. For an MSS100 or MSS1, **use** a null modem cable to connect the device.

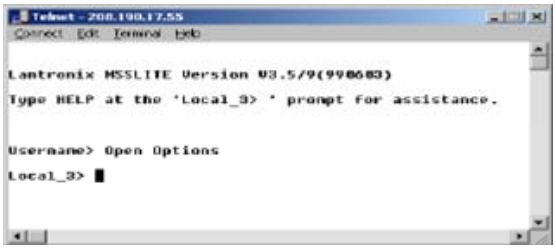
   OR

   For an MSSLite, **refer** to the pinout diagram below to create a serial cable.



2. **Open** HyperTerminal and enter the following default settings for the port:
   - Baud Rate: 9600
   - Bits: 8
   - Parity: None
   - Stop Bit: 1
3. Once connected, **press** Enter.

   A screen similar to the one below should appear.



4. **Enter** a Username.
5. At the Local prompt, **enter** a command for the privileged user:

   Local>SET PRIVILEGED
6. **Enter** the Password.

   The default password is "system."
7. **Change** the IP Address using the Change IP Address command followed by the new IP Address.

   Local>>CHANGE IP ADDRESS xxx.x.x.xxx

Configuring the MSS Device Settings

Configuring the MSS Device Using Telnet

Once a valid IP Address has been assigned to the MSS device, Open Options recommends using Telnet to configure the remaining settings. Log in to the MSS device with the Username and Password configured on page 5-10.

Subnet Mask

IP networks can be divided into several smaller networks via subnetting. When a network is subnetted, a subnet mask is created that allows the MSS device (and other network devices) to decide whether a given TCP/IP host is part of the local network segment and route packets accordingly.

When the IP address is configured, a default subnet mask will be generated. If the network is divided into subnets, a custom subnet mask must be created because the default subnet mask will not be correct for the network.

To change the subnet:

1. **Enter** the Change Subnet Mask command followed by the Subnet Mask Address.

   Local>>CHANGE SUBNET MASK xxx.xxx.xxx.x

Gateway

Generally, a TCP/IP internet is broken down into networks and subnetworks, and a host is only able to see the hosts on its own network. TCP/IP networks rely on routers and gateways to transfer network traffic to hosts on other networks. Gateways are typically connected to two or more networks and will pass or route TCP/IP packets across network boundaries.

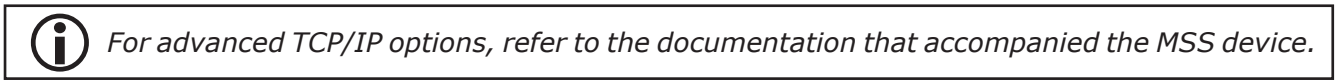
The MSS device can be told which hosts are the gateways for the local network. If no gateway is specified, the MSS will listen to broadcasts from other gateways to decide which hosts are acting as gateways.

To specify which host is the preferred gateway:

1. **Enter** the Change Gateway command followed by the Gateway Address.

   Local>>CHANGE GATEWAY xxx.x.x.xx

   To clear the gateway configuration, **specify** 0.0.0.0 as the IP Address in the above command.



Configuring the MSS Serial Port

The following commands must be entered at the Local>> prompt in order for the MSS device to function properly with the SSP-E.

Character Size, Parity, and Stop Bit

The default character size is eight (8) data bits and the default stop bit count is one (1). Parity is normally None. Communication to the SSP-E does not require these factory defaults to be changed.

Flow Control

Both RTS/CTS (hardware) and XON/XOFF (software) flow control methods can be used with the MSS device. RTS/CTS controls data flow by sending serial port signals between two connected devices.

To change the flow control:

1. **Enter** the Change Flow Control command followed by the correct method:

   Local>>CHANGE FLOW CONTROL CTSRTS

Access Mode

The serial port access mode governs which connections the port can accept. Remote access must be used when connecting to an SSP-E.

To change the serial port's access mode:

1. **Enter** the Change Access command followed by the correct method:

   Local>>CHANGE ACCESS REMOTE

Dedicated Port Service

A dedicated service must be defined for the port. The port automatically connects the user to the specified host. When the connection is closed, the users are automatically logged out of the MSS device. Set the dedicated port to 3001.

To set the port:

1. **Enter** the Change Dedicated command followed by the port number:

   Local>>CHANGE DEDICATED TCP PORT=3001

Baud Rate

The MSS device and attached serial device, such as an SSP, must agree on a speed or a baud rate to use for the serial connection. The assigned baud rate must match the rate of the SSP host port with the physical DIP switches on the controller (see Chapter 2: Controllers for more information on DIP switch settings).

To set the baud rate:

1. **Enter** the Change Speed command followed by the established baud rate of the SSP:

   Local>>CHANGE SPEED 38400

Status Commands

This section provides an overview of what a user will see upon typing the specified "Show" command in interactive (local) mode. The following commands display information about the current configuration and operating status of the MSS device.

Show Port

The Show Port command displays the configuration and connection status of the serial port. It includes settings such as flow control, baud rate, parity, and default hosts. Users can also view the status of DSR and DTR serial signals, port access type, and login status.

Once the port has been configured correctly, it will look similar to the example below:

```
Local_3> show port

Port 1: Username:                      Physical Port 1 (Idle)
   Char Size/Stop Bits:         8/1    Baud Rate:                 38400
   Flow Ctrl:               Cts/Rts    Session Limit:                 4
   Parity:                     None    Modem Control:              None
   Access:                   Remote    Break Ctrl:                Local
   Local Switch:               None    Start Character:            None
   Forward:                    None    Backward:                   None
   Port name:                Port_1    Terminal Type:              None
   Dedicated Service:    TCP: PORT=3001
   Characteristics:  Telnet Pad

   Sessions:                      0    Current Session:            None
   Input/Output Flow Ctrl:      N/N    DSR/DTR/CTS/RTS/CD:     Y/Y/Y/Y/N
```

Show Server Characteristics

The Show Server Characteristics command displays network-related server identification information, including the MSS hardware address, node address, IP address, domain, any configured gateways and name servers, and the subnet mask. In addition, inactivity and retransmission limits, password restrictions, and the types of incoming logins permitted are shown.

Show Server Bootparams

The Show Server Bootparams command displays MSS indentification and boot procedure information. The first lines display the MSS version, hardware address, network name and node number, identification string, and how long the MSS device has been running.

Show Server Counters

The Show Server Counters command enables the system administrator to view quantitative information about send and receive errors. It also displays error information for the Ethernet and TCP/IP protocols that can be used to diagnose network transmission problems.

Show Sessions

The Show Sessions command displays information about current sessions, including each active port, user, and type of session.

Show Users

The Show Users command displays the name, port number, and connection status of all current users, or a specified user.

Logging Out

Once all settings have been configured for the MSS device, log out of the Telnet or HyperTerminal connection.

To manually log out of the MSS device:

1. **Type** Logout at the Local> prompt.

   OR

   Press Ctrl+D.

Configuring the Hardware

Open Options strongly recommends configuring the SSP controller to use flow control.

To set flow control on the SSP:

1. **Set** DIP switch 5 on the controller to the ON position.
   See Chapter 2: Controllers for more information on DIP switch settings.
2. **Verify** that the SSP jumpers are set for an RS-232 connection.
3. **Verify** that the DIP switches are set to the appropriate address and baud rate.
4. **Set** the correct jumper on the controller to indicate that it is using the MSS device:
   - SSP-E – Set J26 to ON when using the MSS device; see page 2-23 for more information.

Software Settings

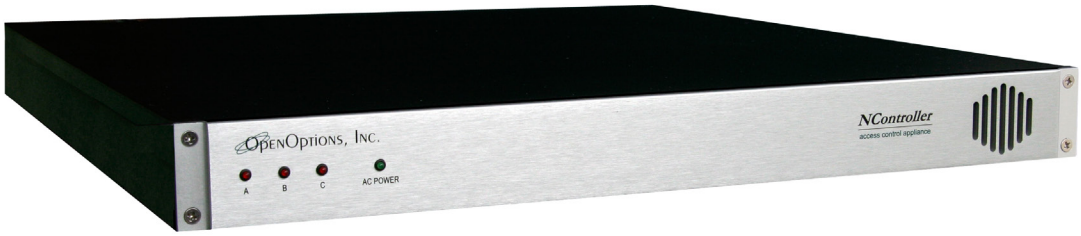
The communication channel in DNA Fusion must be associated with the corresponding IP address. See page 3-5 in the Technical Installation Manual for more information on configuring channels.

Network Devices 6

In This Chapter
√ NController-X √ Communication Wiring

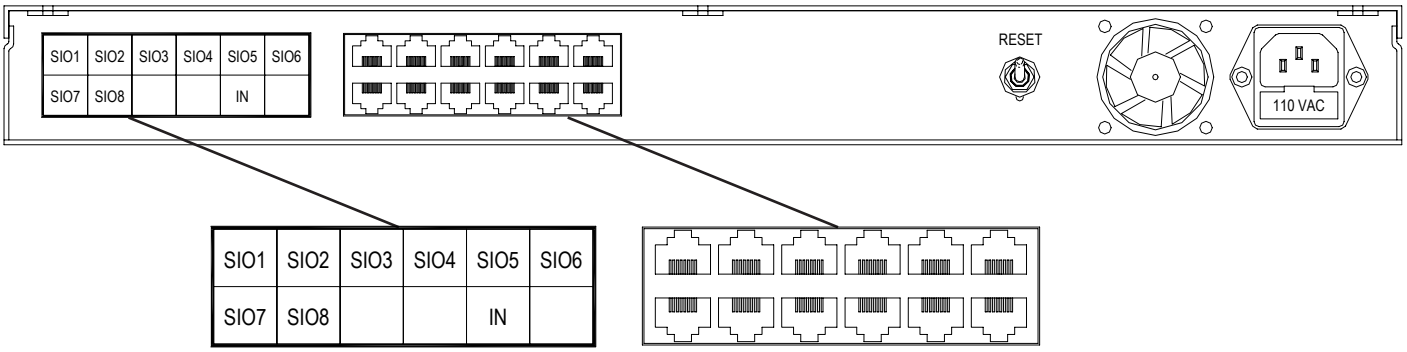
NController-X

The NController-X network device provides optically isolated communication support for up to eight (8) additional subcontrollers or sixteen (16) card readers. The NController mounts in one (1) unit of rack space.

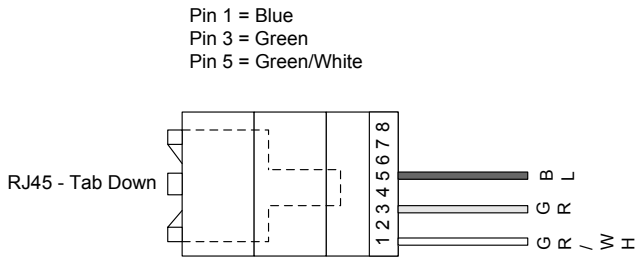


NController Communication Wiring

The NController-X is connected to the NController using the IN port.



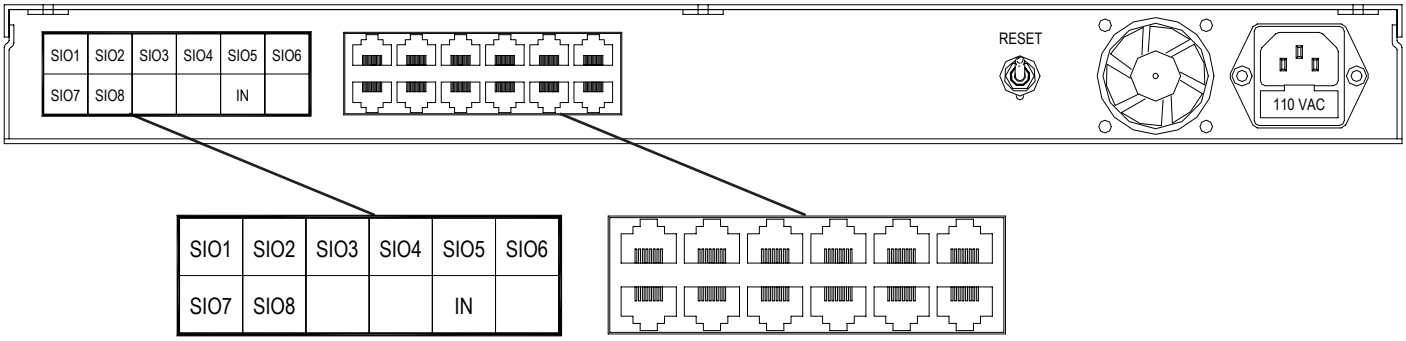
Wire the RJ45 cable as illustrated in the diagram below.



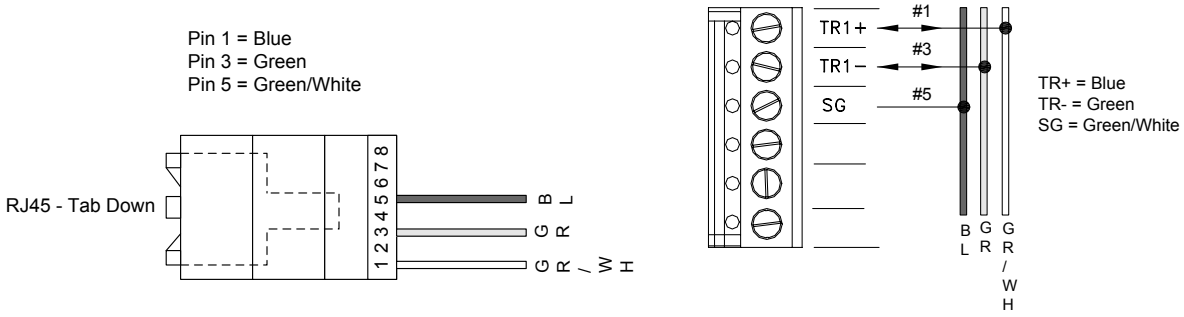
* This board has not been evaluated by UL.

Subcontroller Wiring

Ports SIO1 through SIO8 on the NController-X are RJ45 optically isolated outputs that communicate to additional subcontrollers over an RS-485 interface. Use twisted pairs (min. 24 AWG) for the communication. Termination jumpers should only be installed on end-of-line devices.



Wire the RJ45 cable to subcontrollers as illustrated in the diagrams below.



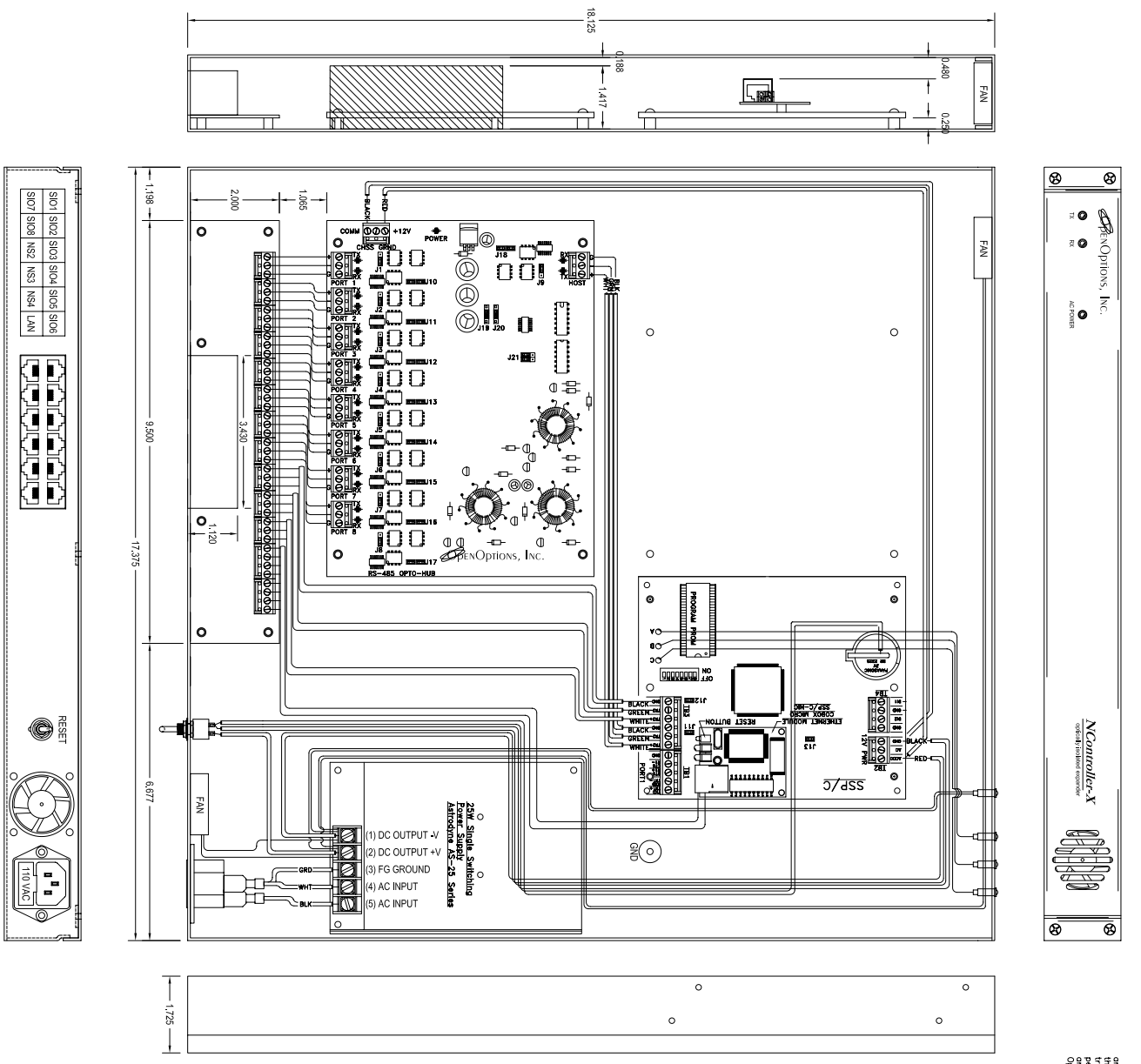
A power supply is required to power the subcontrollers and door hardware.

Specifications

The NController-X is for use in low-voltage, Class 2 circuits only.

Primary Power:		Standard Computer Power Cord Universal AC Input (85-264 Vac) Typical AC Current (1.2A/115 Vac, 0.6A/230 Vac)
Inputs:	*IN Port:* *RJ45:*	Connection from NController master unit 8 optically isolated outputs (RS-485) to subcontrollers
Cable Requirements:	*RS-485*	4,000’ max., 24 AWG shielded twisted pair, 120-ohm impedance
Data Memory:		15 MB Standard
Mechanical:	*Dimensions:* *Weight:*	19” (482.6 mm) W x 18 3/8” (476.25 mm) L x 1 3/4” (44.4 mm) H 4.7 lbs (2.13 km) nominal
Environmental:	*Temperature:* *Humidity:*	-20 to 85 °C, storage / 0 to 60 °C, operating 20% to 95% RHNC

Specifications are subject to change without notice.



101 NController-X, Board Layout

Dial-Up Connection 7

In This Chapter
√ Recommended Hardware √ Serial Cable Configuration √ SSP Configuration

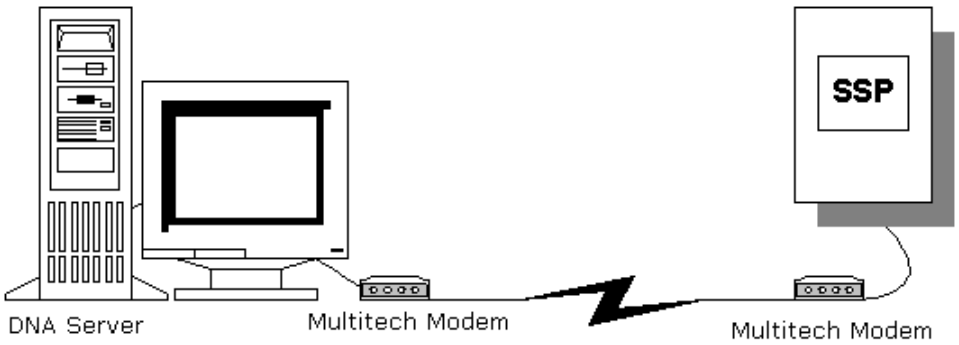
The legacy SSP controllers (SSP, SSP-C, and SSP-E) support hardwired connections via a PC port as well as a dial-up controller modem. The SSP Series Controllers can also be configured to communicate over a network using TCP/IP protocol (see Chapter 5: Communication Devices).

The legacy controllers can be easily configured as a dial-up controller. A dial-up controller is typically used for sites that do not require active event/alarm reporting.

The connection can be initiated by the DNA Fusion server or by the SSP controller itself. The system can be configured in several ways:

- The host PC (DNA Fusion application server) can connect to the controller to download events.
- The controller will dial the host PC in the event of a critical alarm.
- Both scenarios trigger communication.

This section focuses on the hardware settings and wiring schemes to use when configuring the controller as a dial-up controller.



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Dial-Up Modem Configuration

Recommended Hardware

Open Options recommends using one modem with the legacy SSP controllers. Use the type of modem on both the host and the controller:

- Multitech MultiModem® ZBA (Model Number: MT5634ZBA) — The modem of choice for business applications; supports remote configuration for centralized setup and control as well as callback security.

Open Options strongly recommends that both ends use POTS lines as opposed to telephone lines that are routed through a PBX system.

Configuring the Modem Device

Generally, the modem's default settings do not need to be changed. However, if problems arise, the following commands can be set to the modem via a HyperTerminal connection.

Command	Description
at&f1	Enables hardware flow control
at&r1	Changes RTS Control settings
at&w0	Writes non-volatile settings to the modem

NOTES:

Serial Cable Configuration

The modem and the SSP controller require a serial cable connection. This configuration is similar to the RS-232 connection for an Ethernet controller. See the table below for pinout information.

SSP Port 1 Pin #	SSP Signal	DB-25 Pin	DB-9 Pin	Host Signal
1	Data Transmit (TXD)	2	3	Data Receive (RX)
2	Data Receive (RXD)	3	2	Data Transmit (TX)
3	Request to Send (RTS)	Not Used		
4	Clear to Send (CTS)	5	8	Request to Send (RTS)
5	Ground (GND)	7	5	Ground (GND)

If flow control is used, jumper the following pins together depending on the type of connector.

DB-25 Pin	DB-9 Pin	Signal
20	4	Data Terminal Ready (DTR)
6	6	Data Set Ready (DSR)
4	7	Request to Send (RTS)

Configuring the Hardware

Open Options strongly recommends configuring the SSP controller to use flow control.

To set flow control on the SSP:

1. **Set** DIP switch 5 on the controller to the ON position.
   See page 2-7 (SSP), 2-15 (SSP-C), or 2-23 (SSP-E) for more information on DIP switch settings.
2. **Verify** that the controller's jumpers are set for RS-232 connection.
3. **Set** the physical address to 1 by setting the appropriate DIP switches on the controller.
4. **Verify** that the DIP switches are set to the correct baud rate.

> For more information on jumper and DIP switch settings, see the appropriate controller in Chapter 2: Controllers.

Software Settings

The communication channel in DNA Fusion must be associated with the corresponding IP address. See page 3-5 in the Technical Installation Manual for more information on configuring channels.

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Allegion Locks 8

In This Chapter
√ PIM400-485 (Version 1) √ PIM400-485 and Wireless Gateway

Allegion Locks

The AD Series electronic locks from Allegion® (formerly Schlage) are designed to provide greater flexibility, functionality, and compatibility with existing access control systems. The series' modular design allows the installer to customize the locks for a variety of field applications.

Open Options partners with Allegion to offer a complete door solution using one of two lock configurations: hardwired (AD-300) and/or wireless (AD-400). With their open-architecture platform, the AD Series locks can seamlessly integrate into new and existing DNA Fusion access control systems.

The Legacy Hardware Manual will only discuss AD-400 wireless lock configurations using Version 1 of the PIM400-485. For information on AD-300 hardwired locks, HandKey II biometric readers, and PIM400-485 Version 2 configurations, refer to the Hardware Manual.

AD-400 Networked Wireless Locks

The Allegion AD-400 is an open-architecture Wireless Access Point Module (WAPM) designed to communicate with third-party panels via a PIM400-485 device. To simplify the installation process, the AD Series combines all the hardware components required at the door—the electronic lock, credential reader, request-to-exit, door sensors, etc.—into a single, integrated product.

See pages 8-5 through 8-14 for installation and configuration information.

AD-400 Wireless Lock

PIM400-485 Version 1

Version 1 of the PIM400-485 device has been discontinued and replaced by the Version 2 model. See page 7-5 in the Hardware Manual for more information.

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AD-400 Wireless System

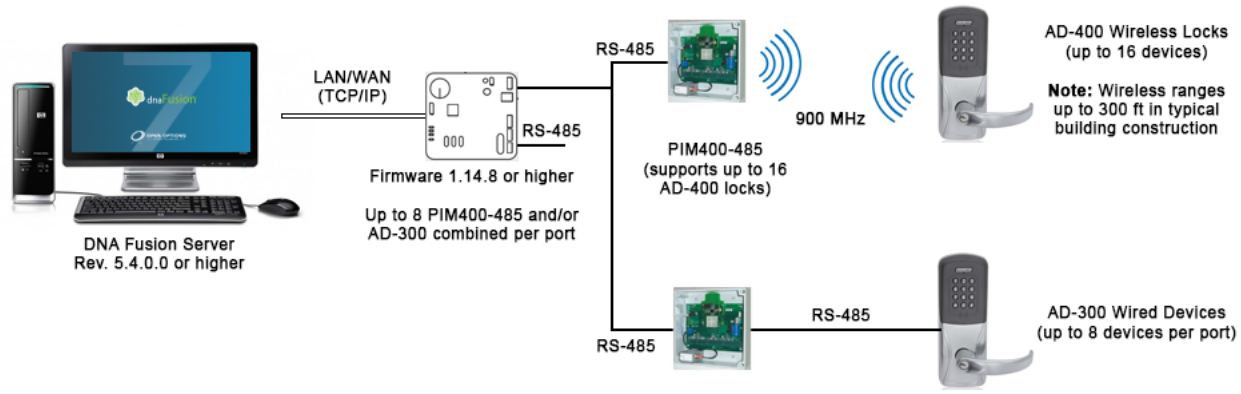
Wireless access solutions provide the benefits of access control without the wires. Unlike traditional wired openings that take several days to install, wireless access solutions can be installed in a fraction of the time.

High-secure, spread spectrum transmissions encode signals using 128-bit keys.

A wireless access system contains two (2) different types of modules:

- Panel Interface Module (PIM)
- Wireless Access Point Module (WAPM)

The diagram below illustrates a possible wireless lock configuration using Version 1 of the PIM400-485.



Configuration Types

The AD-400 wireless locks can be configured with a PIM400-485, a combination of the PIM400-485 and Wireless Gateway, or a PIM400-1501. For information on using a Version 2 PIM400-485 or a PIM400-1501, see the Hardware Manual.

PIM400-485

The PIM400-485 interfaces with the SSP-EP, DController, and NController via a wired RS-485 connection, and it receives card data via RF bitstreams from the AD-400 wireless lock. The PIM400-485 receives authorization to unlock or open an ACM from the SSP Controller; then, it transmits the command to the linked AD-400 lock.

One PIM supports up to 16 AD-400 locks in many combinations. However, if wiring to a legacy controller, only one PIM can be used per wireless reader gateway.

The PIM will also receive notifications from the AD-400 regarding the door position, request-to-exit (REX), reader tamper, low battery status, and interrupted RF communication. A manual override key is provided.

PIM400-485 and Wireless Gateway

The Wireless Gateway interfaces upstream with an SSP controller and communicates downstream with the PIM400-485. Only one (1) panel interface module (PIM) can be used per Wireless Gateway. A single PIM supports up to 16 AD-400s in many combinations.

Installation Overview

Location Placement

The PIM400-485 communicates to the AD-400(s) using radio frequency (RF) signals, which are diminished by walls, distance, metal objects, and other barriers. Consider the following factors when installing the PIM device:

- Mount the PIM400 within 200 horizontal feet (61 meters) of each AD-400 wireless lock. Communication may be possible for up to 1000 feet (305 meters) if clear line-of-sight is available in the building construction.
- Do NOT mount the AD-400(s) and the PIM400 on separate floors; this may diminish the signal and device functionality.
- Do NOT mount the PIM400 on a metal surface. Keep the PIM at least one inch away from any metal in all directions.
- The signal will not pass through metal walls or metal mesh inside the walls (stucco). Use a remote antenna module located outside of the room when necessary.
- Moving vehicles will interrupt the signal; if vehicles may temporarily block the signal, reduce the placement distance by half.
- For optimal communication, mount the PIM400 so that the antenna is vertical.

> *Locations and wiring methods must be in accordance with the National Electrical Code (NEC), ANSI/NFPA 70.*

Pre-Installation Test

Once the mounting locations for the PIM400 and AD-400(s) have been determined, test the performance prior to permanent installation.

1. Temporarily **mount** the AD-400(s) to the access control point (door, gate, etc.) as close to its exact mounting location as possible. Do NOT connect the power yet.
2. Temporarily **mount** the PIM400 as close to the exact mounting location and orientation as possible.
3. **Verify** that the antenna is positioned horizontally.
4. **Power** the PIM400 with a 12 or 24 Vdc power supply capable of delivering 250 mA.

   See Powering the PIM400-485 instructions on page 8-6.
5. **Connect** the Handheld Device (HHD) with the Schlage Utility Software (SUS) to the PIM400.

   See Programming the PIM400-485 instructions on page 8-6.
6. **Verify** that the access point is closed, then **install** the batteries or **connect** a 12 to 24 Vdc power supply to the AD-400(s).

   Each power supply must be capable of delivering 250 mA.
7. **Place** the AD-400(s) into Link Mode.

   See Linking the PIM400-485 to an AD-400 Lock instructions on page 8-7.

> *The green LED on the AD-400 will flash to indicate that the lock has successfully linked to the PIM400. If linking is unsuccessful, move the PIM six (6) to ten (10) inches in any direction (up, down, sideways) and repeat Step 7 until all AD-400s link successfully.*

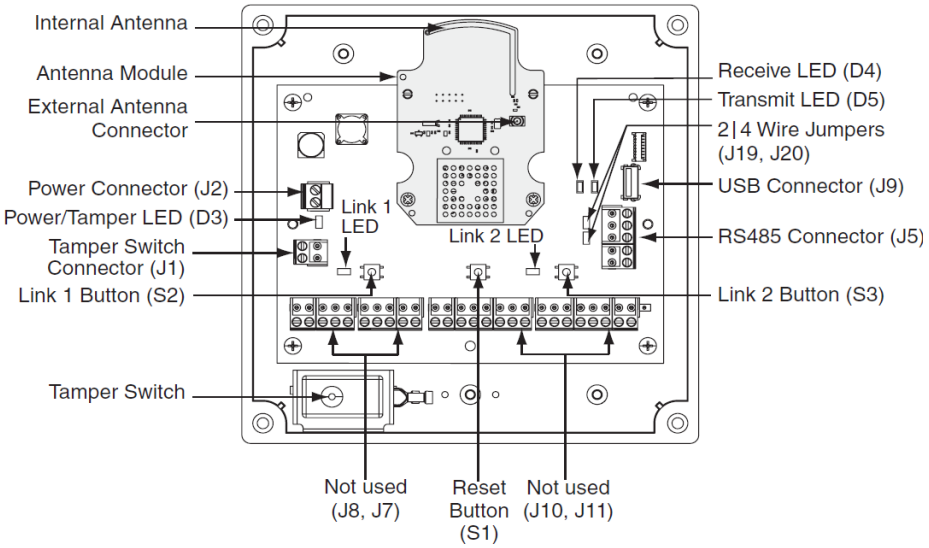
Installation

Once the PIM400 is successfully linked to the AD-400(s), proceed with permanently installing the components. See the Allegion PIM400-485 User Guide for more information on drill holes and mounting procedures.

> *Avoid routing the wires near the internal antenna and the tamper detection mechanism. Improper wire routing may reduce RF performance and/or prevent tamper detection. Wire routing inside the enclosure should be as short as possible.*

PIM400-485

Each PIM400-485 is capable of communicating with a maximum of 16 AD-400 wireless locks and 64 doors (ACMs). The PIM and lock use 900 MHz spread spectrum RF technology to communicate.



PIM400-485 (Version 1)

Powering the PIM400-485

The PIM400 accepts a UL 294 Listed power supply capable of sourcing at least 250 mA at 12 or 24 Vdc. Locate the power source as close to the PIM400-485 as possible. Connect the power supply with a minimum of 18 AWG wire and a maximum 1000-ft run length. Power input is non-polarized.

Connector	Signal
J2	12 to 24 Vdc (+)
	DC Ground (-)

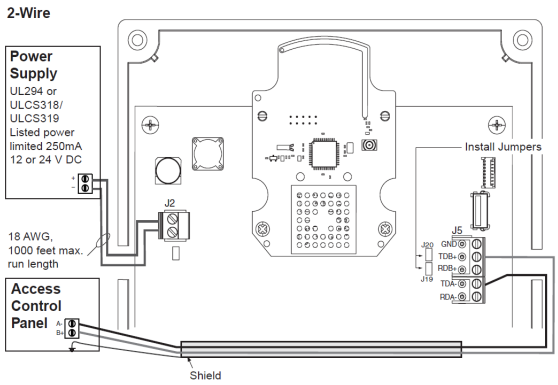
> *Connect a battery backup to the PIM-400 to prevent information from being lost if the power is interrupted.*

Connecting the PIM400-485 to the SSP-EP

The PIM400-485 communicates to the SSP-EP via a 2-wire RS-485 interface on the J5 terminal block. The PIM will connect to the SSP-EP on either of the controller's RS-485 downstream ports (Ports 2 and 3). Use twisted pair(s) (min. 24 AWG) with shield for communication.

1. **Set** the jumper on the SSP-EP to OFF for the downstream port connected to the PIM400-485.
2. **Connect** the PIM400-485 to the SSP-EP on Port 2 or 3 using the following table:

SSP-EP	PIM400-485	Description
TR+	RDA- (J5-1)	Receive Data (-)
TR-	RDB+ (J5-3)	Receive Data (+)
GND	GND (J5-5)	Signal Ground



3. **Remove** the EOL Termination Jumper from the SSP-EP.
4. **Connect** the Handheld Device (HHD) with the Schlage Utility Software (SUS) to the PIM.

   The PIM is placed into Link Mode. Continue to Programming the PIM400-485 on page 8-6.

Connecting the PIM400-485 to the NController

The PIM400-485 communicates to the NController via the DB-9 connector. Use twisted pair(s) (min. 24 AWG) with shield for communication.

1. **Connect** the PIM400-485 to the NController using the following table.

   Use twisted pair (min. 24 AWG) between the NController's DB-9 connection and the PIM's RS-485 connection. Install termination jumper on end-of-line devices only.

DB-9	PIM400-485	Description
8	RDA- (J5-1)	Receive Data (-)
7	RDB+ (J5-2)	Receive Data (+)
6	GND (J5-5)	Signal Ground

2. **Connect** the Handheld Device (HHD) with the Schlage Utility Software (SUS) to the PIM400-485.

   The PIM is set to Link Mode. Continue to Programming the PIM400-485 instructions below.

RS-485 Downstream Connection

If multiple PIM400-485s will share the same downstream port with other RS-485 devices, the PIMs must be addressed in consecutive order (e.g., Physical Address 1-10 for PIMs and 11-20 for other RS-485 devices). The same concept applies when configuring doors within the DNA Fusion software.

Programming the PIM400-485

To program the PIM400-485, the Handheld Device (HHD) must be coupled with the PIM device. See page 25 in the Schlage Utility Software Guide for more information.

1. **Verify** that the PIM400-485 is wired to the controller.
2. **Connect** the HHD to the PIM400-485 using the supplied USB cable.
3. **Log in** to the Schlage Utility Software (SUS) as a Manager.

   The PIM400-485 appears at the bottom.
4. **Select** Device Options.
5. **Select** PIM Properties.
6. From the Edit tab, **enter** a Unique ID (Address).

   This information will be used when configuring the PIM in the DNA Fusion software (Physical Address).
7. **Enter** the Low Door and High Door numbers to match the number of locks that will be linked.

   Each PIM must have a unique set of door numbers (maximum of 16 per PIM400-485).

   Example: SSP-EP Controller

   - PIM400-485 #1: Low Door = 0 / High Door = 5
   - PIM400-485 #2: Low Door = 6 / High Door = 10

   When the doors are programmed in DNA Fusion, they will be ACM 1-10. Doors must be added in order of low to high from PIM #1 to PIM #2.
8. If the reader mode will be set via DNA Fusion, **enable** the Wakeup on Radio feature.

   See page 8-15 for more information.
9. **Continue** to Linking the PIM400-485 to an AD-400 Lock on page 8-7.

Linking the PIM400-485 to an AD-400 Lock

The Schlage Utility Software (SUS) is used to place the PIM into Link Mode. For more information on the SUS, refer to the Schlage Utility Software User Guide.

> *Ensure that no other PIM400-485s are in* Link Mode *during this process; only one AD-400 can be linked at a time.*

1. With the PIM400-485 connected to the Handheld Device (HHD), **select** Device Options.
2. **Select** the PIM Properties option, then **select** the Link tab.
3. **Select** the Door Number from the drop-down list.

   The PIM400-485 will remain in Link Mode for up to 30 minutes.
4. **Open** the AD-400 door and hold down the inside lever to create a Request-to-Exit (REX) condition.
5. While holding the lever, present a card to the reader or, if using a keypad reader, press the "#" key.
6. **Hold** the lever down until the AD-400's Schlage button starts to blink red.
7. **Release** the inside lever.

   If successful, the Schlage button will blink green and the beeper will sound. If the link fails, the button will blink red three (3) times and five (5) short beeps will sound.

   The linked door will appear in the SUS and the PIM400-485 will automatically exit the Link Mode.
8. **Repeat** Steps 1-7 to link all remaining AD-400 locks to the PIM400-485.

Adding the PIM400-485 in DNA Fusion

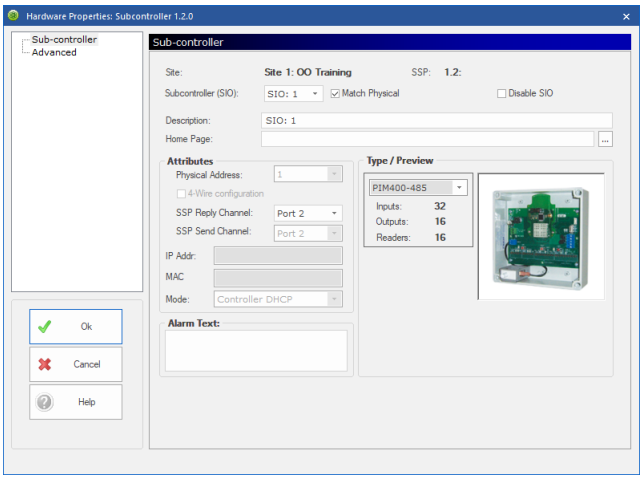
1. **Launch** DNA Fusion.
2. **Right-click** on the Controller (SSP-EP, DController, or NController) that is attached to the PIM400-485 and **select** Properties.

   The Controller Properties dialog opens.
3. In the Downstream Ports section, **set** the Baud Rate to 9600 for the port attached to the PIM400-485.
4. **Click** OK to save the settings.
5. **Right-click** on the Controller in the Hardware Browser and **select** Add / Add Subcontroller.

   The Subcontroller Properties dialog opens.
6. **Select** PIM400-485 from the Type / Preview drop-down.
7. **Verify** that the Physical Address (set in Step 6 of Programming the PIM400-485) and the SSP Relay Channel are correct.

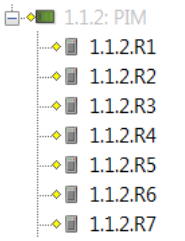
   If needed, change the address and/or port to the correct settings.
8. **Click** OK to add the subcontroller to the system.

   The PIM Subcontroller appears in the Hardware Browser.



Configuring the Doors

It is important to configure the PIM400-485 objects in a sequential order. Program the first reader, output, and inputs until all doors linked to the PIM are programmed.



1. In the Hardware Browser, **expand** the PIM Subcontroller and **locate** the first Reader.
2. **Right-click** on the Reader and **select** Add Door / Use Default.

   The NEW Door dialog opens.
3. **Verify** that each door is assigned a reader, door contact, REX, and strike.
4. **Continue** adding doors in order (1-15) until all doors are configured.

Status LEDs

LED	Description	Indicator
D3	Power/Tamper Status	Solid Green = Power Applied Flashing Green = Tamper Detected
D4 & D5	SSP Communication Status (Receive/Transmit)	Continuous Flash = Communication Activity
Link 1 & 2	AD Lock Communication Status	Link 1 LED Blinking = AD Lock is assigned an odd number Link 2 LED Blinking = AD Lock is assigned an even number

Jumper Settings

Jumper(s)	Set At	Description
J19 & J20	Both ON	RS-485 Port (J5) is 2-Wire Interface
	Both OFF	RS-485 Port (J5) is 4-Wire Interface

Wiring Connections

PIM Connector	PIM Signal	SSP Signal	Description
J1			Tamper Switch Connector
J2	+	12 or 24 Vdc	Power Input
	-	DC Ground	
J5	RDA-	Receive Data (-)	RS-485 Communication Port 2-wire: Install both 2|4 jumpers (J19/J20) 4-wire: Remove both 2|4 jumpers (J19/J20)
	TDA-	Transmit Data (-)	
	RDB+	Receive Data (+)	
	TDB+	Transmit Data (+)	
	GND	Signal Ground	
J7 & J8			Not Used
J9			USB Connector
J10 & J11			Not Used

Buttons

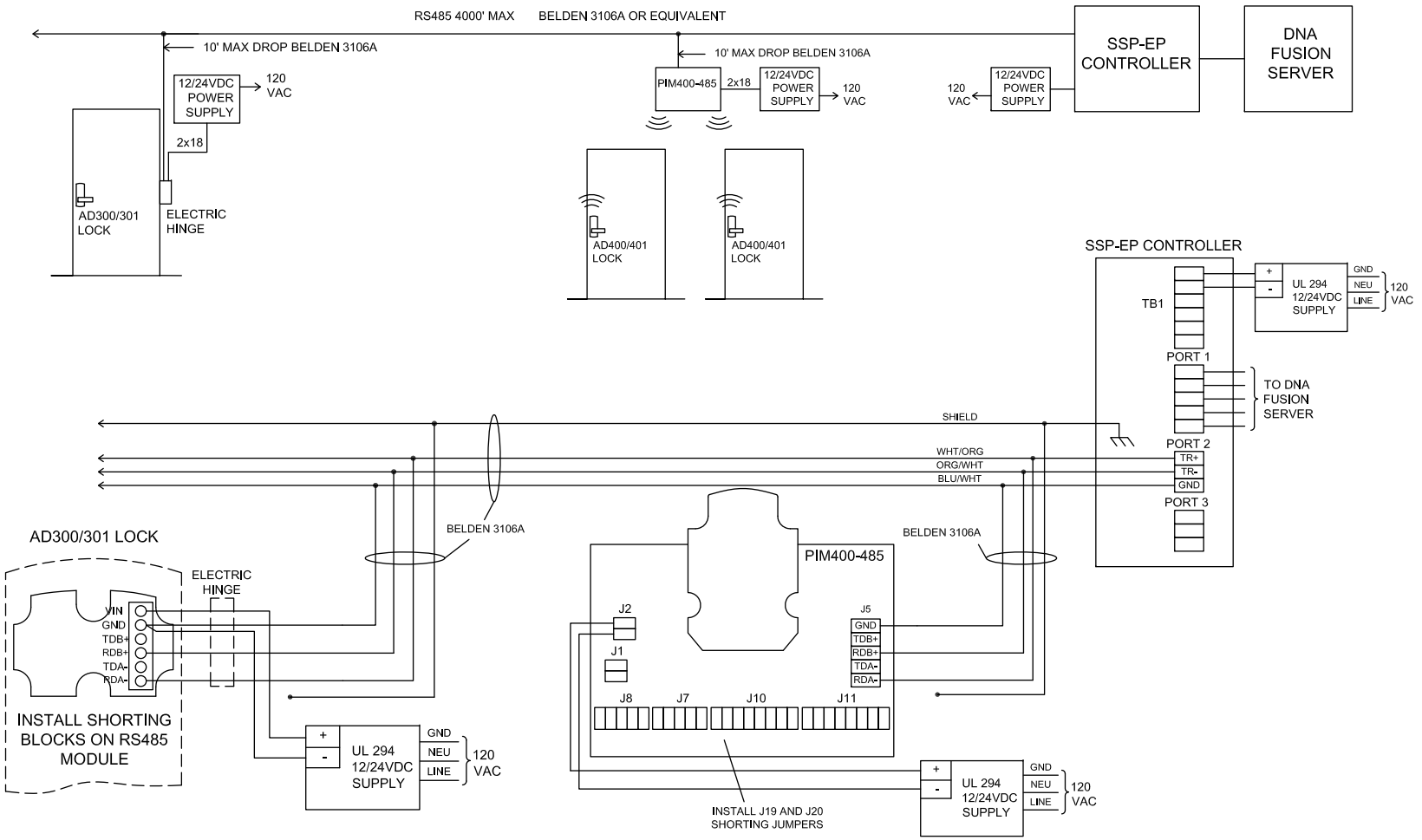
Switch	Component	Description
S1	Reset Button	If pressed, resets the PIM400-485.

Factory Default Reset

If the PIM400-485 is reset to factory default settings, all configuration information will be deleted.

1. **Press** and **hold** the Link 1 and Link 2 buttons for about three (3) seconds.
   The red LEDs next to the Link buttons will flash while configuration takes place.
2. **Release** the Link buttons.
   The green LEDs next to the Link buttons will flash three (3) times when configuration is complete.

SSP-EP with AD-400 & PIM400-485



NOTES:
1) ALL LOW VOLTAGE WIRING TO BE STANDARD, MULTI-CONDUCTOR COLOR CODED WITHOUT SPLICES.

2) WIRING TO CONFORM TO APPLICABLE NATIONAL, STATE AND LOCAL ELECTRICAL CODES.

3) REFER TO SPECIFIC PRODUCT INSTALLATION INSTRUCTIONS FOR SPESCIFIC WIRING REQUIREMENTS.

4) THIS DRAWING IS FOR GRAPHICAL REPRESENTATION OF PRODUCTS DETAILED IN THE HARDWARE SET ONLY.

5) * CONDUCTOR COUNT TO BE DETERMINED BY ACCESS CONTROL PANEL PROVIDER.

OPERATION:

SSP-EP SUPPORTS TWO RS485 DATA LINES WITH UP TO EIGHT EITHER AD300/301 OR PIM400-485 COMBINED PER PORT AND A MAXIMUM OF SIXTY-FOUR READERS PER SSP-EP SPREAD ACROSS A MAXIMUM OF SIXTEEN PIM400-485 AND AD300/301 COMBINED.

SSP-EP PORT 1 CONNECTS DNA FUSION SERVER TO SSP-EP AND PORTS 2 AND 3 ARE RS485 DATA LINES.

EARTH GROUND SHIELD ON BELDEN 3106A CABLE AT SSP-EP CONTROLLER ONLY.

UL 294 POWER SUPPLIES USED SHOULD NOT BOND EARTH GROUND TO SIGNAL GROUND.

IF PLENUM RATED CABLE IS REQUIRED USE BELDEN 82842 OR EQUIVALENT.

WIRING SHOWN REFLECTS WIRING FROM SSP-EP TO PIM400-485 AND AD300/301 ONLY. ADDITIONAL WIRING WILL BE REQUIRED THAT IS NOT BE SHOWN HERE.

NOTE: CONFIGURATION HAS NOT BEEN TESTED BY ALLEGION BUT HAS BEEN REVIEWED AND APPROVED BY OPEN OPTIONS.

ALLEGION™

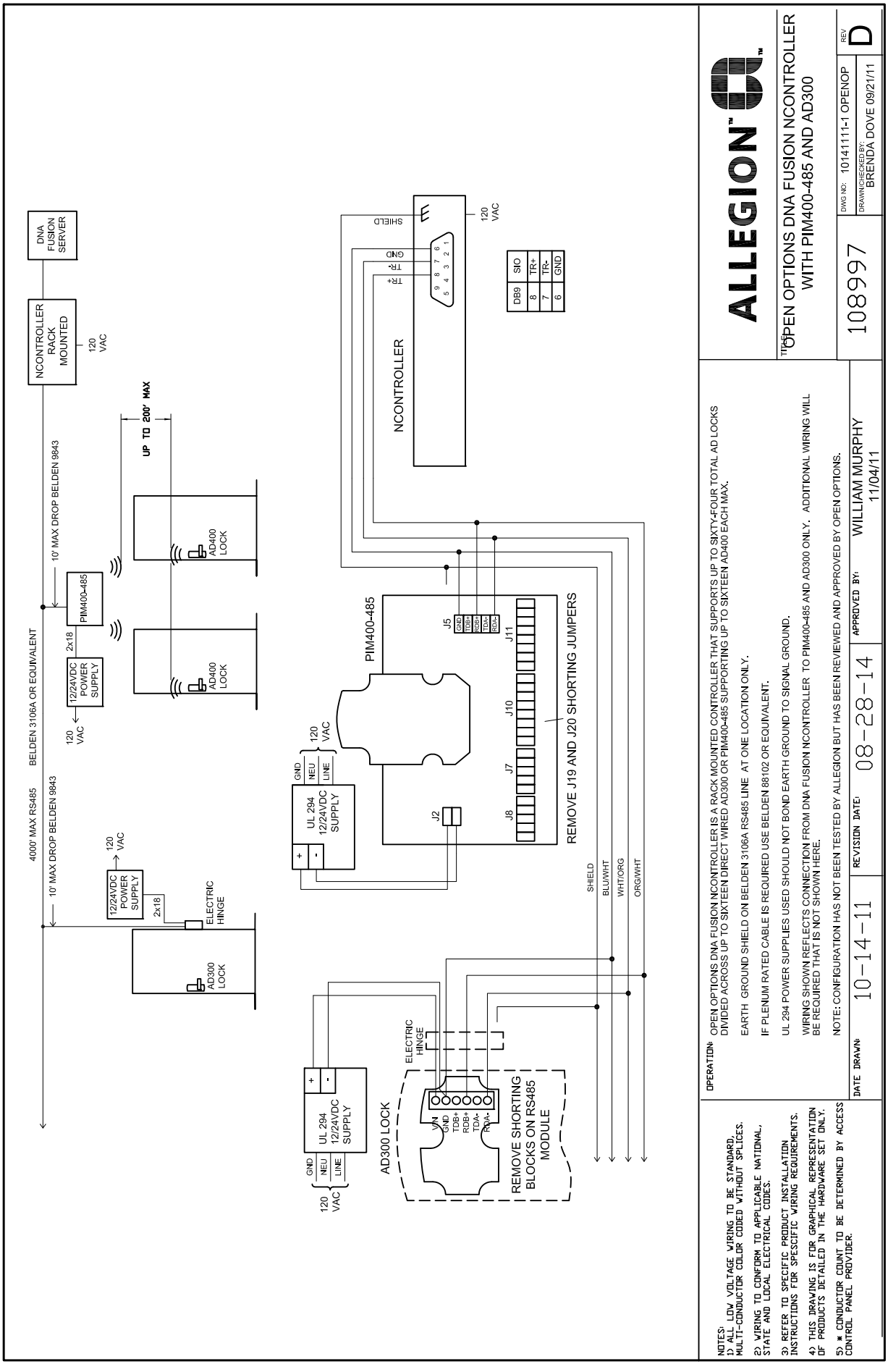
TITLE: OPEN OPTIONS DNA FUSION SSP-EP AND AD300/301 OR PIM400-485 AD400/401

109600

DATE DRAWN:	REVISION DATE:	APPROVED BY:	DWG NO:	REV
09-12-11	11-05-13	WILLIAM MURPHEY 06/11/13	912114-5 OPENOP	E

DRAWN/CHECKED BY: BRENDA DOVE 08/01/12

NController with AD-400 & PIM400-485

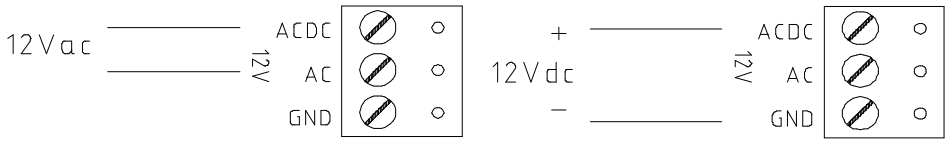


PIM400-485 and Wireless Gateway

The Allegion AD-400 and PIM400-485 Series locks communicate to the controller via the Wireless Gateway board. A single Wireless Gateway supports a maximum of 16 PIM400-485 devices. Additionally, it supports 16 AD-400 locks per PIM with a maximum of 64 doors.

Powering the Wireless Gateway

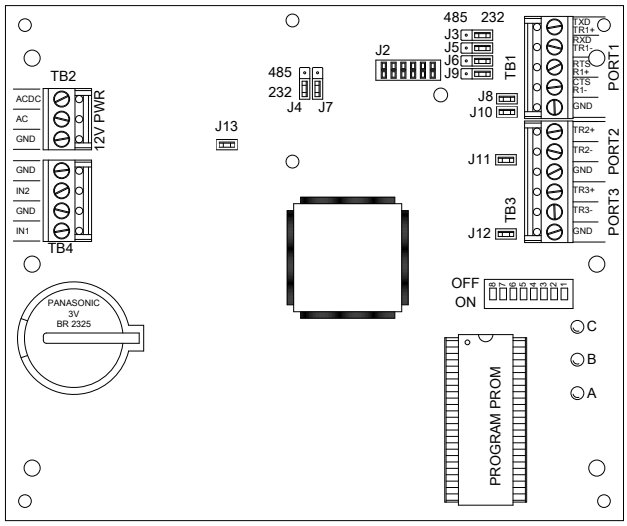
The Wireless Gateway accepts either a 12 Vdc or 12 Vac ± 15% power source. Locate the power source as close to the gateway board as possible using a minimum of 18 AWG wiring connections.



Observe polarity when using a 12 Vdc power connection.

Connecting the PIM400-485 to the Wireless Gateway

The PIM400-485 can be connected to either of the RS-485 downstream ports on the Wireless Gateway (Ports 2 and 3 on TB3). Each PIM device is capable of communicating with up to 16 gateway boards. Use twisted pair(s) (min. 24 AWG) with shield for communication.



1. **Set** DIP switch 8 on the Wireless Gateway.

   This switch position sets the baud rate to 9600.

2. **Connect** the PIM400-485 to the Wireless Gateway on Port 2 or 3 using the following table.

Gateway	PIM	Description
TR+	RA- (TB-)	Receive Data (-)
TR-	RB+ (TB+)	Receive Data (+)
GND	GND	Signal Ground

3. **Remove** the appropriate EOL termination jumper (J11 for Port 2, J12 for Port 3) from the gateway board.

4. **Connect** the Handheld Device (HHD) with the Schlage Utility Software (SUS) to the PIM400-485.

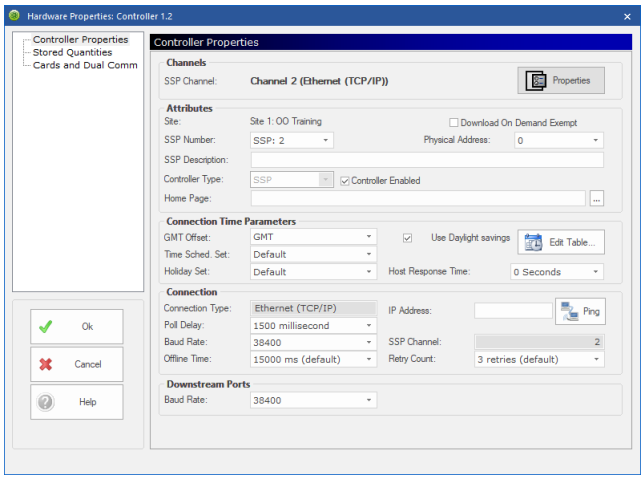
   The PIM is placed into Link Mode. Continue to Programming the PIM400-485 and Linking the PIM400-485 to an AD-400 Lock instructions on page 8-7.

5. Once each AD-400 lock is linked to the PIM, **continue** to Adding the Gateway to DNA Fusion instructions on page 8-12.

Adding the Gateway to DNA Fusion

1. **Open** the DNA Fusion software.
2. In the Hardware Browser, **right-click** on the Controller attached to the Wireless Gateway and **select** Properties.

   The Controller Properties dialog opens.

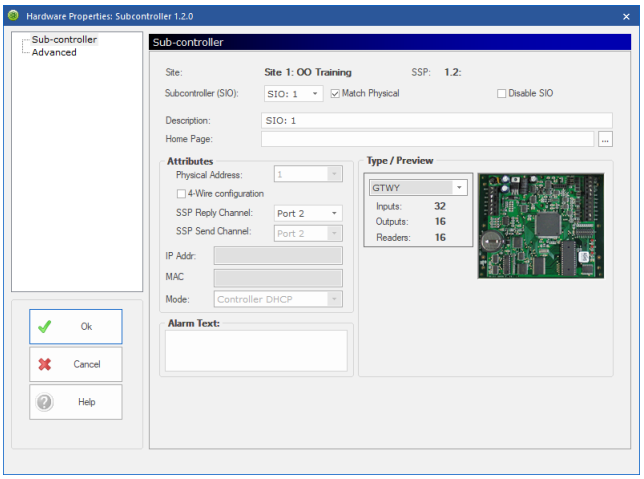


3. In the Downstream Ports section, **set** the Baud Rate to 9600 for the port connected to the Gateway.
4. **Click** OK to save the settings.
5. In the Hardware Browser, **right-click** on the Controller and **select** Add / Add Subcontroller.

   The Subcontroller Properties dialog opens.
6. From the Type drop-down, **select** the GTWY option.
7. **Verify** that the Physical Address (set in Step 6 on page 8-6 – Programming the PIM400-485) and SSP Reply Channel Port are correct.

   If needed, change the address and/or port to the correct settings.
8. **Click** OK to add the subcontroller to the system.

   The Wireless Gateway appears in the Hardware Browser.



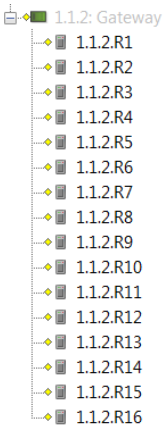
Configuring the Doors

It is important to program the Wireless Gateway's objects in sequential order. Configure the first reader, second reader, and so forth until all doors linked to the PIM400-485 have been programmed.

> *Identify a reader, door contact, request-to-exit (REX), and strike for each AD-400 lock.*

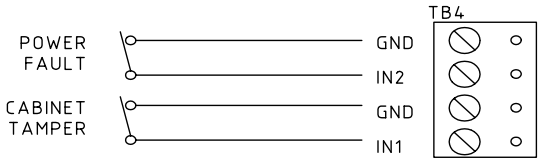
1. In the Hardware Browser, **expand** the Gateway subcontroller object.
2. **Right-click** on the first Reader and **select** Add Door / Create PIM Door X.

   The Door Properties dialog opens.
3. **Select** Door Objects from the dialog menu.
4. **Verify** that a reader, door contact, REX, and strike are assigned to the door.
5. **Repeat** Steps 1-4 for each door in sequential order (1-16) until all doors are configured.



Alarm Inputs Wiring

Inputs 1 and 2 (IN1 and IN2) on TB4 of the Wireless Gateway are used to monitor the cabinet tamper and power fault status. The normal (safe) condition is closed circuit. If these inputs are not used, connect the shorting wire that came attached to the input.



Jumper Settings

The table below describes the jumper settings for the Wireless Gateway board. These settings will vary depending on the communication protocol used.

Jumpers	Set At	Selected
J3, J4, J5, J6, J9	232	Port 1 is RS-232
	485	Port 1 is RS-485
J7	2W	Port 1 is 2-Wire for RS-485 Interface
	4W	Port 1 is 4-Wire for RS-485 Interface
J8, J10	OFF	Port 1 RS-485 EOL Terminator is OFF
	ON	Port 1 RS-485 EOL Terminator is ON
J11	OFF	Port 2 RS-485 EOL Terminator is OFF
	ON	Port 2 RS-485 EOL Terminator is ON
J12	OFF	Port 3 RS-485 EOL Terminator is OFF
	ON	Port 3 RS-485 EOL Terminator is ON
J13	OFF	Port 1, Ethernet Card is Used
	ON	Port 1, Serial (RS-232/RS-485)

DIP Switch Settings

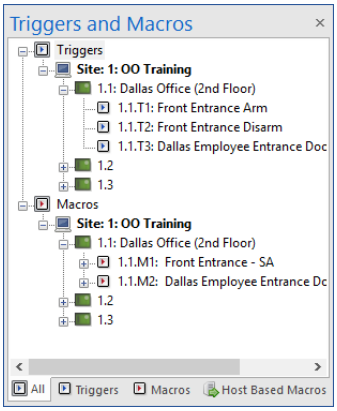
The Wireless Gateway board contains eight (8) DIP switches that must be configured appropriately for the system. The DIP switches determine the address and communication options. The table below describes the DIP switch settings.

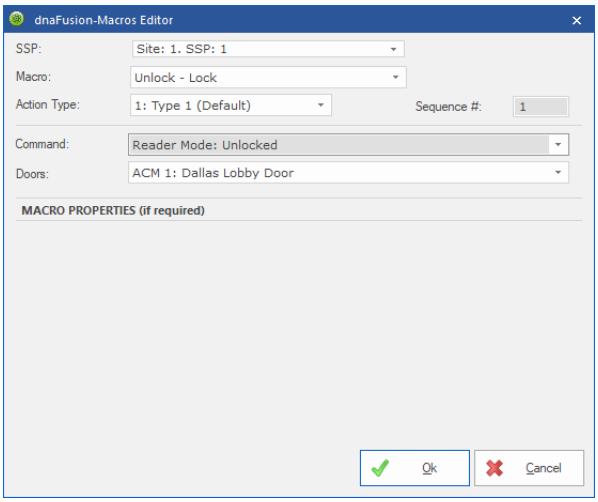
Selection	S1	S2	S3	S4	S5	S6	S7	S8
Address 0	OFF	OFF	OFF	OFF	OFF			
Address 1	ON	OFF	OFF	OFF	OFF			
Address 2	OFF	ON	OFF	OFF	OFF			
Address 3	ON	ON	OFF	OFF	OFF			
Address 4	OFF	OFF	ON	OFF	OFF			
Address 5	ON	OFF	ON	OFF	OFF			
Address 6	OFF	ON	ON	OFF	OFF			
Address 7	ON	ON	ON	OFF	OFF			
Address 8	OFF	OFF	OFF	ON	OFF			
Address 9	ON	OFF	OFF	ON	OFF			
Address 10	OFF	ON	OFF	ON	OFF			
Address 11	ON	ON	OFF	ON	OFF			
Address 12	OFF	OFF	ON	ON	OFF			
Address 13	ON	OFF	ON	ON	OFF			
Address 14	OFF	ON	ON	ON	OFF			
Address 15	ON	ON	ON	ON	OFF			
Address 16	OFF	OFF	OFF	OFF	ON			
Address 17	ON	OFF	OFF	OFF	ON			
Address 18	OFF	ON	OFF	OFF	ON			
Address 19	ON	ON	OFF	OFF	ON			
Address 20	OFF	OFF	ON	OFF	ON			
Address 21	ON	OFF	ON	OFF	ON			
Address 22	OFF	ON	ON	OFF	ON			
Address 23	ON	ON	ON	OFF	ON			
Address 24	OFF	OFF	OFF	ON	ON			
Address 25	ON	OFF	OFF	ON	ON			
Address 26	OFF	ON	OFF	ON	ON			
Address 27	ON	ON	OFF	ON	ON			
Address 28	OFF	OFF	ON	ON	ON			
Address 29	ON	OFF	ON	ON	ON			
Address 30	OFF	ON	ON	ON	ON			
Address 31	ON	ON	ON	ON	ON			
Upstream Baud Rate: 2,400 BPS						OFF	OFF	
Upstream Baud Rate: 9,600 BPS						ON	OFF	
Upstream Baud Rate: 19,200 BPS						OFF	ON	
Upstream Baud Rate: 38,400 BPS						ON	ON	
Downstream Baud Rate: 9,600 BPS								OFF
Not Supported								ON

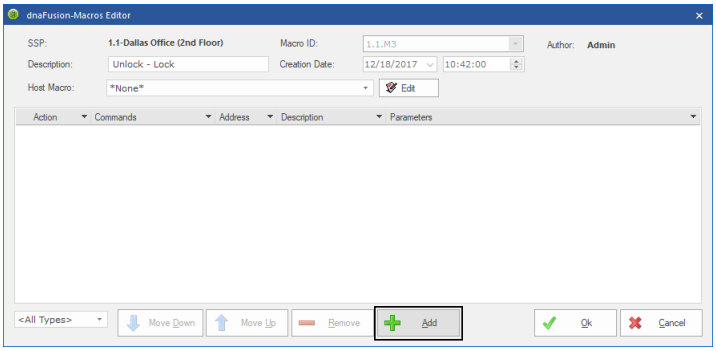
Wakeup on Radio Feature

The Wakeup on Radio feature allows the DNA Fusion operator to momentarily unlock an AD-400 door.

1. With the HHD plugged into the PIM, **open** the Schlage Utility Software (SUS), **click** on Device Options and **select** PIM Properties.
2. **Click** the Edit tab and **verify** that the Wakeup feature is set to Enabled.
3. **Enable** the Dynamic Channel Switching feature and **click** the Save option to save the PIM settings.
4. **Close** the SUS and **disconnect** the HHD from the PIM.
5. **Launch** DNA Fusion and **click** the the Triggers & Macros button on the Standard Toolbar.
   The Triggers & Macros Browser opens.
6. **Expand** the Macros option to the desired Controller.
7. **Right-click** on the Controller and **select** Add Macro from the context menu.
   The Macros Editor dialog opens.
8. **Enter** a Description and **click** the OK button.
9. **Right-click** on the Macro created in Step 8 and **select** Add Command.
   The Macros Editor dialog appears.
10. From the Command drop-down, **select** Reader Mode: Unlocked.
11. **Select** the desired door from the ACM drop-down list and **click** OK to save the macro command.







> *Alternatively,* **double-click** *on the* Macro *created in Step 8 to open the* Macros Editor *dialog and* **click** *the* Add *button to add the* Macro Command(s)*.*

12. **Right-click** on the Macro created in Step 8 and **select** Add Command.
13. From the Command drop-down, **select** TM: Delay Command.
14. **Select** or **enter** a Delay time and **click** OK to save the command.
15. **Add** another Macro Command and **select** Reader Mode: Card Only (or the default door mode).
16. **Click** OK to save the command.
17. **Create** a Trigger to fire the macro. For more information, see Chapter 10 in the DNA Fusion User Manual.
    The door release type determines the Trigger Event. If an input point will be used, **select** MP: Monitor Point Active.

> *The* Cabinet Tamper *input on the PIM must be in a* Secure *state in order for the* Wakeup on Radio *feature to work properly. If the PIM is in a* Tamper *state, the* Wakeup *feature will not function properly.*

NOTES:

Specifications

The AD-400 interface is for use in low-voltage, Class 2 circuits only.

Electrical:	Voltage:	12 to 24 Vdc @ 250 mA max. / 1,000’ max.
RS-485 Comm Cable:		4,000’ (1,200 m) max., 24 AWG min.

Specifications are subject to change without notice.

For more information on the PIM400-485 or AD-400, visit the following webpage:
https://us.allegion.com/en/home/products/brands/schlage.html

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UL Compliance

A

In This Chapter
√ UL Compliance Statement √ UL Canada Compliance Statement

This section of the manual is intended to outline the UL compliance requirements for Open Options products. The information below is subject to change without notice.

UL Compliance Statement

The wiring from the power supply output to the power distribution board (10-fuse board) in the E2-SSPE-OR is a fusible link; it must not be replaced with anything other than the Open Options part number OO-FL05FB (fusible link).

This system is UL Listed as a standalone system.

Low and High (AC mains) voltages must be routed via separate openings in the enclosure.

The following models are UL-recognized components:

- SSP
- SSP-EP
- SSP-E
- RSC-2
- ISC-16
- CI-8
- NController
- NSC-100
- SSP-D2
- SSP-C
- RSC-1
- OSC-16
- OptoHub
- PDD-8PCI
- DController
- RSC-DT

The following models have not been investigated by UL for compliance:

- PDU

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UL Canada Compliance Statement

This system is ULC Listed as a standalone system. It is the responsibility of the installing party to ensure that all components meet CAN/ULC-S319 requirements.

In order to maintain ULC compliance, egress devices must follow ULC-S533 and ULC-CAN4-S104 standards.

Portal locking devices must be tamper resistant in compliance with ULC-S319, section 7.3.1. If a mechanical lock is incorporated in the portal-locking device, the mechanical lock must be compliant with CAN/CGSB-69 and ULC S-328.

If an electric strike will be used, only continuous duty rated strikes can be installed. If an electromagnetic lock is used, door position sensors must be installed to monitor the door status.

If the power supply will be located in the enclosure, the fire alarm override and fire alarm function must operate independently of the enclosure. If a standalone power supply will be used to power portal-locking devices, the power supply must comply with all CAN/ULC-S319 requirements.

Device ratings higher than 30VAC RMS or 42.5 VDC must incorporate a standard conduit knockout for wire entry and shall comply with Canadian Electric Code. Low and High (AC mains) voltages must be routed via separate openings in the enclosure.

Any system that will be powered from a commercial power supply must have a standby power source for a period of 30 minutes. Upon restoration of an extended power failure, the batteries must be recharged to 85% of rated capacity within 24 hours. If the standby power source does not have rechargeable batteries, provisions should be made to test the condition of the batteries.

Controllers and other components must have a standby power source that will support full load for a period of 30 minutes.

When the referenced hardware is connected to the DNA Fusion Access Control System it provides secured access for the configured objects.

The following models are ULC-recognized components:

- SSP-EP
- SSP-D2
- NController
- DController
- NSC-100
- RSC-1
- RSC-2
- ISC-16
- OSC-16
- CI-8

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Legacy Migration B

In This Chapter
√ Replacing Legacy Controllers

Replacing Legacy Controllers

Open Options' legacy controllers—the SSP, SSP-C, and SSP-E—are no longer available and must be replaced with a current model such as the SSP-EP or SSP-D2. The installer/operator must exercise caution when promoting a system's legacy controllers, as this action will affect the current system's wiring and physical addresses. For example, the SSP and SSP-E both contain four (4) downstream RS-485 ports while the SSP-D2 and SSP-EP only contain one (1) and two (2) ports, respectively. It is important to take the appropriate steps to prevent duplicate addressing and/or incorrect port designations.

The process for replacing a legacy controller can be simplified into four (4) steps:

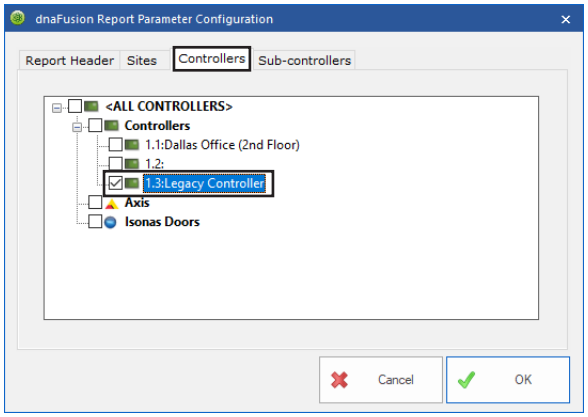
- Generate a Subcontroller Report
- Configure the DIP Switches
- Designate the SIO Port and Physical Address
- Promote the Legacy Controller

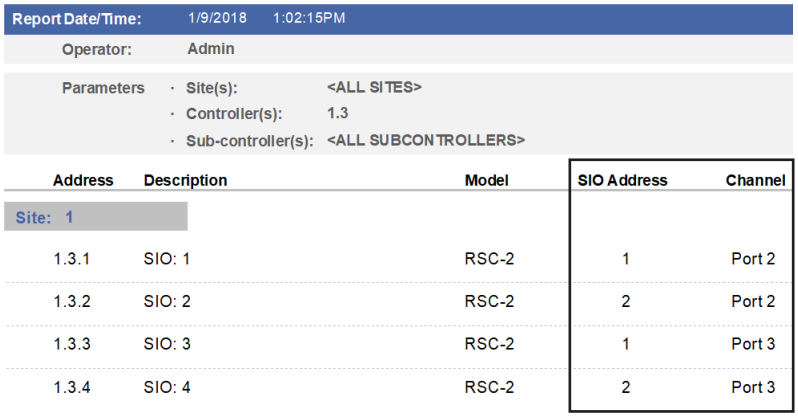
Generating a Subcontroller Report

The Reports feature in DNA Fusion can be used to identify which subcontroller(s) must be changed (i.e., the SSP Reply Channel and/or Physical Address fields) before promoting a legacy controller to a newer model.

1. From the Main Menu, **select** Reports / Hardware Settings / Subcontrollers (SIO).

   The Report Parameter Configuration dialog appears.





Report Date/Time: 1/9/2018 1:02:15PM

Operator: Admin

Parameters · Site(s): <ALL SITES>
· Controller(s): 1.3
· Sub-controller(s): <ALL SUBCONTROLLERS>

Address	Description	Model	SIO Address	Channel
Site: 1				
1.3.1	SIO: 1	RSC-2	1	Port 2
1.3.2	SIO: 2	RSC-2	2	Port 2
1.3.3	SIO: 3	RSC-2	1	Port 3
1.3.4	SIO: 4	RSC-2	2	Port 3

2. **Select** the Controllers parameter and **uncheck** the All Controllers box.
3. **Expand** the Controllers item and **select** the legacy controller(s) to show in the report.
4. **Click** OK.

   The report appears in the data window. This information can be used to identify the SSP Reply Channel and Physical Address fields that must be updated in the Subcontroller Properties prior to promoting the legacy controller(s).

Configuring the DIP Switches

The RSC-1, RSC-2, ISC-16, and OSC-16 contain a set of eight (8) DIP switches. Use switches 1 through 5 to configure each subcontroller's physical address (0-31). No two subcontrollers can share the same address on a single controller. See the table below for DIP switch settings.

> *Switches 6 and 7 determine the communication baud rate. Switch 8 is not used and should remain in the* OFF *position.*

Selection	S1	S2	S3	S4	S5	Selection	S1	S2	S3	S4	S5
Address 0	OFF	OFF	OFF	OFF	OFF	**Address 16**	OFF	OFF	OFF	OFF	ON
Address 1	ON	OFF	OFF	OFF	OFF	**Address 17**	ON	OFF	OFF	OFF	ON
Address 2	OFF	ON	OFF	OFF	OFF	**Address 18**	OFF	ON	OFF	OFF	ON
Address 3	ON	ON	OFF	OFF	OFF	**Address 19**	ON	ON	OFF	OFF	ON
Address 4	OFF	OFF	ON	OFF	OFF	**Address 20**	OFF	OFF	ON	OFF	ON
Address 5	ON	OFF	ON	OFF	OFF	**Address 21**	ON	OFF	ON	OFF	ON
Address 6	OFF	ON	ON	OFF	OFF	**Address 22**	OFF	ON	ON	OFF	ON
Address 7	ON	ON	ON	OFF	OFF	**Address 23**	ON	ON	ON	OFF	ON
Address 8	OFF	OFF	OFF	ON	OFF	**Address 24**	OFF	OFF	OFF	ON	ON
Address 9	ON	OFF	OFF	ON	OFF	**Address 25**	ON	OFF	OFF	ON	ON
Address 10	OFF	ON	OFF	ON	OFF	**Address 26**	OFF	ON	OFF	ON	ON
Address 11	ON	ON	OFF	ON	OFF	**Address 27**	ON	ON	OFF	ON	ON
Address 12	OFF	OFF	ON	ON	OFF	**Address 28**	OFF	OFF	ON	ON	ON
Address 13	ON	OFF	ON	ON	OFF	**Address 29**	ON	OFF	ON	ON	ON
Address 14	OFF	ON	ON	ON	OFF	**Address 30**	OFF	ON	ON	ON	ON
Address 15	ON	ON	ON	ON	OFF	**Address 31**	ON	ON	ON	ON	ON

NSC-100 DIP Switches

The following table describes the DIP switch settings used to configure an NSC-100's addressing mode. For more information, see Chapter 3: Reader Modules.

Selection / Mode	S1	S2	S3	S4
Controller DHCP	OFF	OFF	OFF	OFF
Public DHCP	ON	OFF	OFF	OFF
Enable Static IP Addressing	ON	ON	OFF	OFF
Assign Static IP Address	OFF	ON	OFF	OFF

Designate the SIO Port and Physical Address

Prior to promoting the legacy controller to a newer model, the operator must reconfigure the ports and addresses for each subcontroller in DNA Fusion.

1. In the Hardware Browser, **right-click** on the Legacy Controller and **select** Controller Commands / Disconnect.

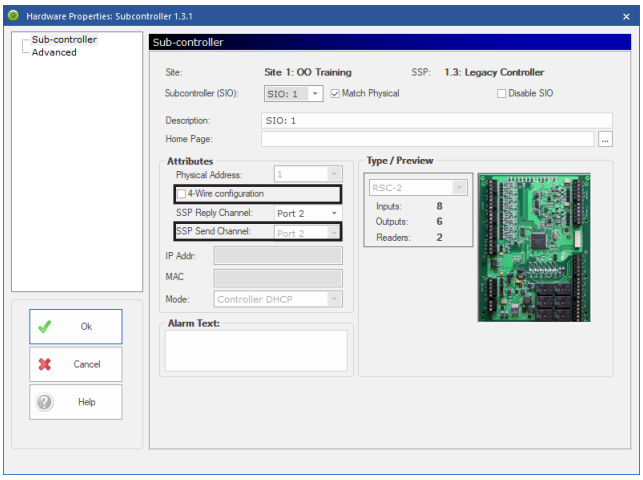
   Repeat this step for each legacy controller.

2. In the Hardware Browser, **right-click** on the Subcontroller object under the legacy controller and **select** Properties.

   The Subcontroller Properties dialog opens.

3. In the Attributes section, **update** the SSP Reply Channel and Physical Address fields based on the information generated in the report on page B-1.

> ***Do NOT create duplicate addresses on the new ports. Keep in mind that the SSP-D2 only contains one (1) RS-485 port and the SSP-EP contains two (2) RS-485 ports.***



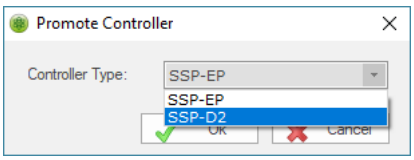
4. **Click** OK to save the settings.
5. **Repeat** steps 1-3 for all subcontrollers as needed.

Promote the Legacy Controller

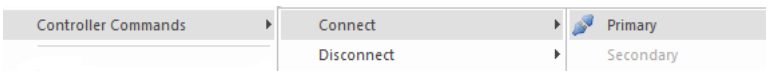
Once the SSP Reply Channels and Physical Addresses have been designated for the subcontrollers, the legacy controller can be promoted to the replacement model (i.e., the SSP-D2 or SSP-EP).

1. In the Hardware Browser, **right-click** on the Legacy Controller and **select** Promote SSP.

   The Promote Controller dialog opens.

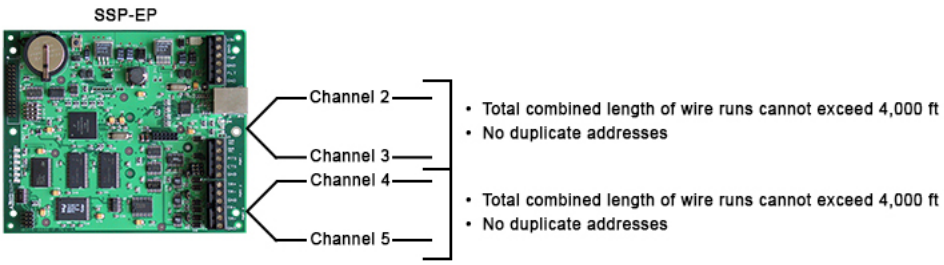


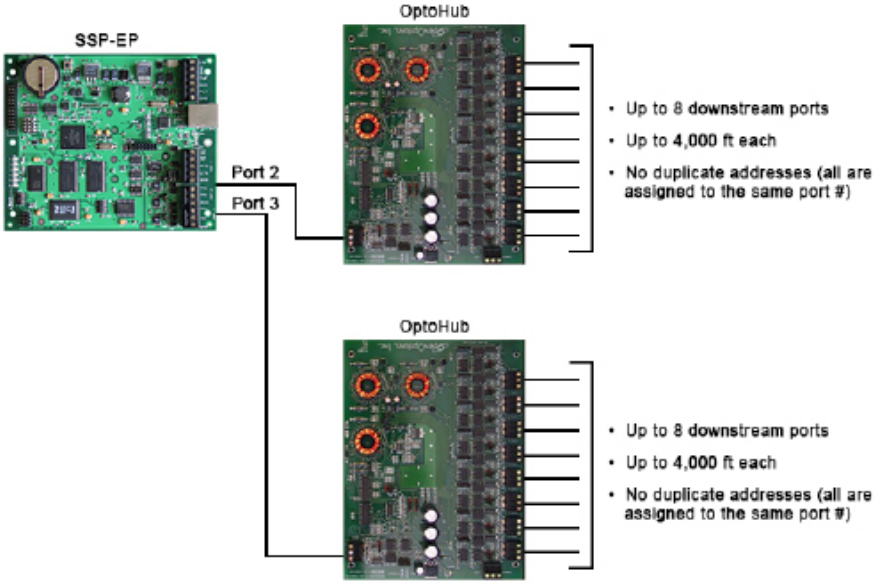
2. **Select** the Controller Type from the drop-down and **click** OK.
3. Assuming that the new controller has been programmed with the same IP address as the legacy controller, **right-click** on the promoted controller in the Hardware Browser and **select** Controller Commands / Connect / Primary.

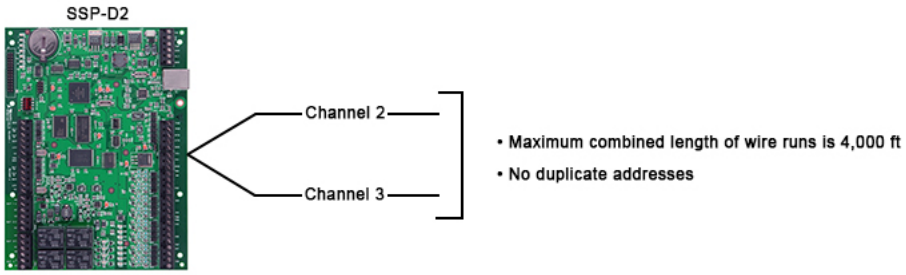


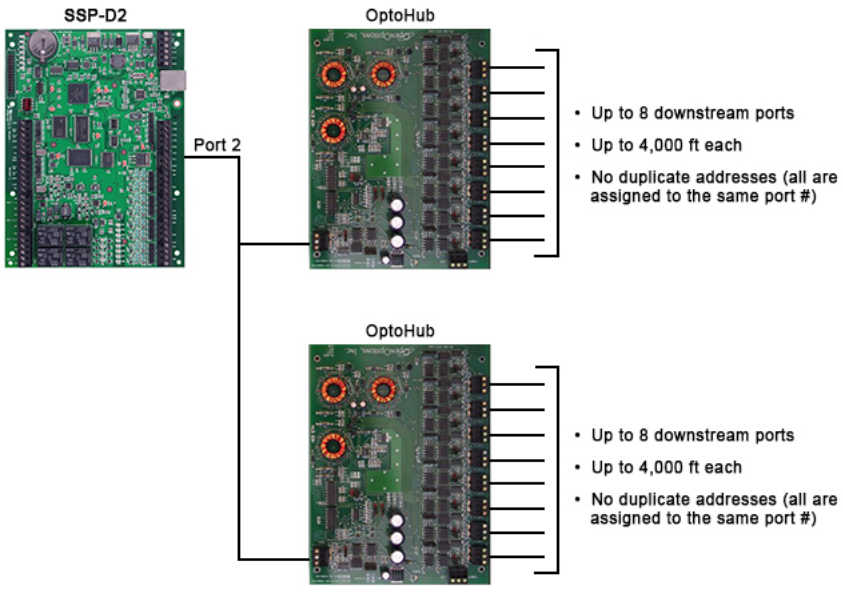
> *Open Options recommends reloading the firmware to the new controller and initiating a* Download All*.*

Valid Configurations









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