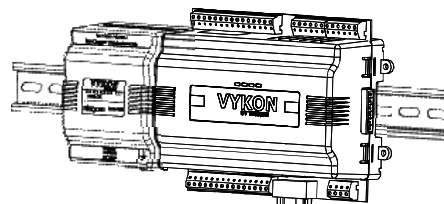


Security JACE (SEC-J-601) Mounting & Wiring Guide

This document covers the mounting and wiring of the Vykon® Security JACE® (S-JACE) controller. It assumes that you are an engineer, technician, or service person who is performing access system design or installation. Instructions apply to the following models:



Models	Description
SEC-J-601	Security JACE base unit controller, referred to in this document as an “S-JACE”.



Note Another Security JACE controller model is available (SEC-J-201), which has the same form factor and onboard security I/O. However, it supports fewer expansion modules. It has a separate mounting & wiring document. See “[Related Documentation](#),” page 5. Separate documents also cover the mounting and wiring of [expansion modules](#), and also the software configuration required for a functioning system.

Table of Contents

Product Description, page 2	Security I/O Wiring, page 16
Onboard Security I/O, 2	Door Terminal Associations, 16
Expansion Modules, 2	Reader Input, 18
Option Cards, 3	Supervised Input, 19
Vykon Security Enclosure, 4	Relay Output, 21
Related Documentation, 5	Digital Input, 23
System Planning, page 5	Communications Wiring, page 24
Basic Design Rules (SEC-J-601), 5	Ethernet, 24
Estimating Power and Battery Requirements, 6	Serial, 25
Voltage Drop Considerations, 8	Power Wiring, page 26
Maximum Output Load Considerations, 9	Enclosure Power Supply, 26
Preparation, page 9	Power Up and Initial Checkout, page 27
Included in this Package, 9	Connect the Backup Batteries, 27
Material and Tools Required, 9	Apply Power, 28
Precautions, page 9	Check the Status LEDs, 28
Safety Precautions, 10	About the Backup Batteries, 28
Static Discharge Precautions, 10	UL Requirements, page 30
Mounting, page 11	Mounting and Wiring, 30
Environmental Requirements, 11	Compatible Readers, 30
Physical Mounting, 11	Battery-backed Power Supplies, 31
Removing and Replacing the Cover, 12	(Appendixes):
Board Layout, page 13	Using Status LEDs, 31
About Screw Terminal Connectors, 13	Maintaining the Security JACE, 33
Wiring Details, page 14	Replacement Parts, 34
General Wiring Rules, 14	Replacing the Security JACE base assembly, 36
Connection Overview, 15	Returning a Defective Unit, 37
Grounding, 15	Certifications, 38
Cable Types and Lengths, 15	



See “[Certifications](#),” page 38.

Information and specifications published here are current as of the date of publication of this document. Tridium, Inc. reserves the right to change or modify specifications without prior notice. The latest product specifications can be found by contacting our corporate headquarters, Richmond, Virginia. Products or features contained herein may be covered by one or more U.S. or foreign patents. © 2009 Tridium, Inc

Product Description

The Security JACE (model SEC-J-601) is an expandable, DIN rail-mountable, controller that provides an embedded access control and security alarm monitoring system. The controller hosts the Vykon Security Application, allowing password-authorized users to access the system using a standard web browser. Once authenticated, a user can configure and administer the system. Apart from providing access control, features include graphical real-time display of data, calendar and scheduling functions, historical data logging, alarm monitoring, and event handling. For more details on features, see the data sheet for the SEC-J-601.

One or two rechargeable, sealed-lead-acid backup batteries allow system operation upon loss of primary power, for some duration. In addition, the Security JACE has a standard on-board NiMH battery to ensure its configuration is always retained. See [“About the Backup Batteries”](#) on page 28 for more information.

See the following sections for more details:

- [Onboard Security I/O](#)
- [Expansion Modules](#)
- [Option Cards](#)
- [Vykon Security Enclosure](#)

Onboard Security I/O

The SEC-J-601 model of S-JACE controller provides standard onboard security I/O points, as follows:

- 2 card reader inputs (7-pin connectors, each can power a 12V Wiegand-type reader)
- 6 supervised inputs (4 allocated for usage with readers, 2 are general usage)
- 4 Form-C relay outputs (2 allocated for usage with readers, 2 are general usage)
- 3 digital inputs (unsupervised, for predefined system monitoring)

Additional security I/O points are achieved by adding expansion modules. A fully expanded SEC-J-601 can support a total of 32 readers (using 15 SEC-R2R expansion modules). Or, other combinations are possible with fewer readers but more general usage I/O using SEC-RIO expansion modules. See [“Expansion Modules.”](#)

Expansion Modules

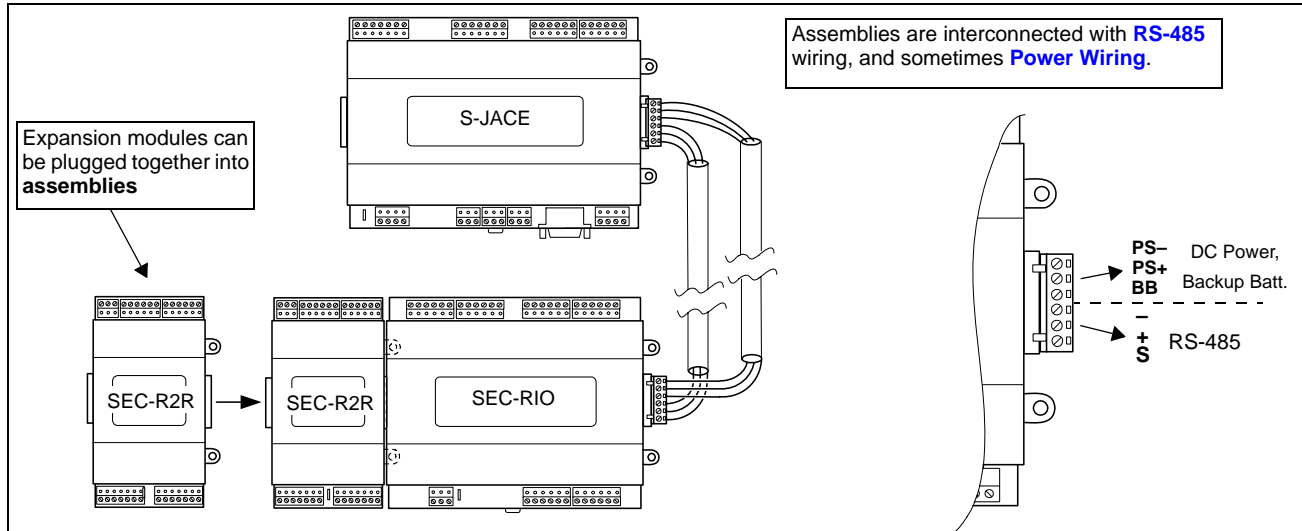
[Table 1](#) lists the currently available Security JACE expansion modules. Note that the SEC-J-601 S-JACE supports a maximum of 15 expansion modules, in *any combination* of SEC-R2R and SEC-RIO needed. This varies from the SEC-J-201 controller, which also supports up to 15 expansion modules—however, only 7 of them can be SEC-R2R modules (others must be SEC-RIO modules).

Table 1 Security JACE (SEC-J-601) type expansion modules.

Model	Description	Notes
SEC-R2R	Remote 2 Reader Module DIN-mountable module that expands the door reader capacity by 2, with associated digital inputs and outputs.	Each SEC-R2R provides the following security points: <ul style="list-style-type: none"> • 2 - Reader ports (each 7-pin, to power a 12V Wiegand-type reader) • 4 - Supervised inputs (2 per reader). • 2 - Form-C relay outputs (1 per reader). • 2 - Digital inputs for cabinet tamper and low battery detection. Up to 15 (maximum) SEC-R2R modules are supported by an SEC-J-601.
SEC-RIO	Remote I/O Module DIN-mountable module that expands capacity with 8 supervised inputs and 8 relay outputs.	Each SEC-RIO provides the following security points: <ul style="list-style-type: none"> • 8 - Supervised four-state inputs (open, closed, short, and cut). • 8 - Form-C relay outputs. • 2 - Digital inputs for cabinet tamper and low battery detection.

The S-JACE and its expansion modules all have end-mounted, 6-pin, connectors that support direct chaining of modules into assemblies. Connectors pass RS-485 communications and DC power (and battery backup) through connected modules. Also, you can mount expansion modules *remotely* from the S-JACE, and use the supplied 6-position terminal plugs to wire RS-485 and backup-battery¹ cabling between the S-JACE assembly and expansion module assemblies.

Figure 1 Expansion modules are Remote 2 Reader (SEC-R2R), Remote I/O (SEC-RIO).



Note Expansion modules can be plugged into, and removed from, a powered system without causing damage. However, this is generally not recommended—especially if the system is operational.

Option Cards

The S-JACE controller has two (2) option slots for on-board mounting of custom option cards. Each slot has a 30-pin connector on the Security JACE base board (see [Figure 4](#) on page 13). An option card typically provides additional communication ports.



- Notes**
- Option cards not evaluated by U.L.
 - Option card usage in a Security JACE is expected to be infrequent.



Warning All power to the S-JACE must be OFF when installing or removing option cards, or damage will occur! Also, you must be very careful to plug an option card into its connector properly (pins aligned). Install option cards before performing any other mounting or wiring of the S-JACE.

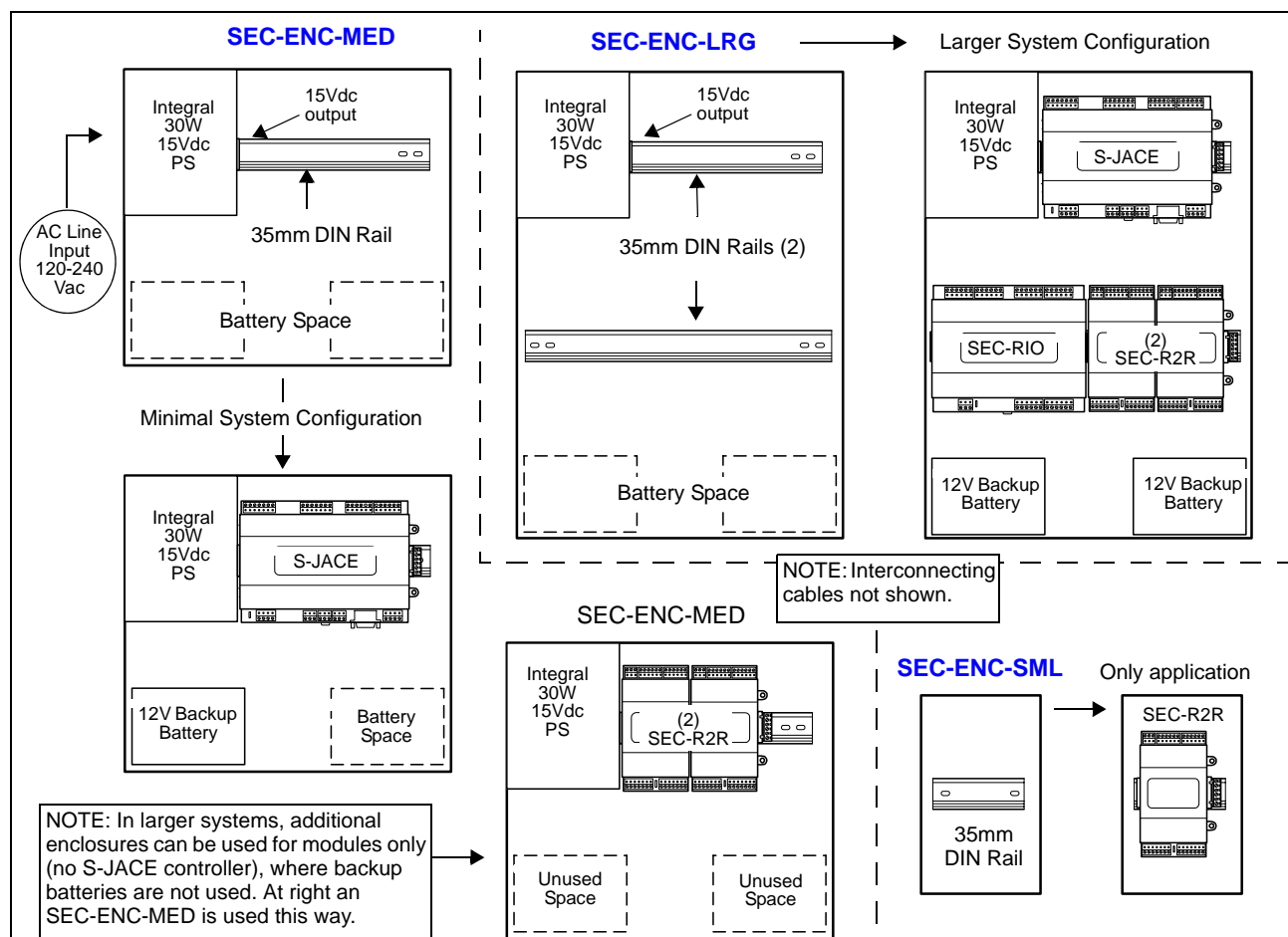
For installation details, refer to the installation sheet that accompanies the option card.

¹ In most cases, backup-battery cabling requires two conductors: PS-, BB. However, if a remote expansion module is mounted in a Security Enclosure without an integral power supply (SEC-ENC-SML, SEC-ENC-MNP, SEC-ENC-LNP), it needs 3-conductor “triad” cabling supplying 15Vdc power and backup battery (PS-, PS+, BB).

Vykon Security Enclosure

For a UL Listed system, the S-JACE controller, plus all expansion modules, must be mounted in one or more Vykon Security Enclosures. These enclosures meet the UL 294 listing, have a pre-mounted DIN rail (or rails), and include a door with a key lock and tamper switch. Two models have an integral 30W 15Vdc power supply that powers the SEC-J-601 controller and/or the expansion modules inside the enclosure.

Figure 2 S-JACE must be mounted in Vykon Security Enclosure (model SEC-ENC-MED or SEC-ENC-LRG).



As shown in [Figure 2](#), there are 3 different-sized Vykon Security Enclosures available, including these models:

SEC-ENC-MED: (Medium) For the S-JACE controller in the smallest job configuration, or where additional expansion modules are located remotely (in other Security Enclosures). It provides a single DIN rail and an integral 30W 15Vdc power supply to power the controller, *or* up to two SEC-R2Rs, or one SEC-RIO. The controller (or modules) plug directly into the power supply, see [Figure 2](#). Brackets at the bottom of the enclosure secure one or two rechargeable sealed lead-acid backup batteries (batteries used only if an S-JACE is housed). In larger systems, more Security Enclosures can be used to house additional expansion modules.

Another medium-sized enclosure *without* an integral power supply is also available, model **SEC-ENC-MNP**. It is used for expansion modules only (not the S-JACE), and it has room for one additional SEC-R2R module.

SEC-ENC-LRG: (Large) Used for the S-JACE controller in larger job configurations, it provides a DIN rail mount and an integral 30W 15Vdc power supply for the controller, and a second DIN rail for expansion modules—for example, up to four (4) SEC-R2R modules. The SEC-J-601 controller plugs directly into the power supply, see [Figure 2](#). A supplied six-conductor wiring harness (not shown) provides power and [RS-485](#)

communications to expansion modules mounted on the lower DIN rail. Brackets at the bottom of the enclosure secure one or two rechargeable sealed lead-acid backup batteries (backup batteries used only if enclosure houses an S-JACE controller). In larger systems, more Security Enclosures can be used to house additional modules.

Another large-sized enclosure *without* the integral power supply is also available, model **SEC-ENC-LNP**. It is used for expansion modules only (not the S-JACE), and it has room for one additional SEC-R2R module.

SEC-ENC-SML: (Small) Has a single DIN rail, and is used only for one SEC-R2R module—it has no integral power supply or backup battery area. See [Figure 2](#). When wiring back to the S-JACE controller, you must use a 3-conductor cable for power/battery backup (PS-, PS+, BB), in addition to [RS-485](#) wiring.

Related Documentation

For more information on mounting and wiring a Vykon Security system, refer to the following documents:

- *Remote 2 Reader Module (SEC-R2R) Mounting & Wiring Guide*, part number 10698
- *Remote I/O Module (SEC-RIO) Mounting & Wiring Guide*, part number 10699
- *SEC-ENC-Mxx & SEC-ENC-Lxx Security Enclosure Install Guide*, part number 10700
- *SEC-ENC-SML Security Enclosure Install Sheet*, part number 10701
- *Security JACE (SEC-J-201) Mounting & Wiring Guide*, part number 10697

For details on software configuration for a fully functioning security system, refer to the following documents:

- *Vykon Enterprise Security Guide*, part number 11216

System Planning

The following sections provide information necessary to plan a Vykon Security System using a SEC-J-601 S-JACE controller. Because of the flexibility of the system architecture, a number of factors may be in play.

- [Basic Design Rules \(SEC-J-601\)](#)
- [Estimating Power and Battery Requirements](#)
- [Voltage Drop Considerations](#) and [Maximum Output Load Considerations](#)

Basic Design Rules (SEC-J-601)

1. Only one S-JACE controller, unless part of an Enterprise Security system. The controller provides access control for 2 doors (one reader per door), plus additional I/O points. See [“Onboard Security I/O,”](#) page 2.
2. Per SEC-J-601 controller, a maximum of 15 additional SEC-R2R (2 reader) modules and SEC-RIO (remote I/O) modules total, in any combination. If needed, all 15 can be SEC-R2R modules. See [“Expansion Modules,”](#) page 2.
3. For a UL 294 listed system, all equipment above must be installed in one or more Vykon Security Enclosures, with a model SEC-ENC-MED or SEC-ENC-LRG used to house the SEC-J-601 controller. See [“Vykon Security Enclosure,”](#) page 4.
4. All expansion modules must be connected to the S-JACE controller on an [RS-485](#) communications trunk, using a daisy chain topology. Also, each reader must be located within 500 feet of the reader input used. For related details, see [“Connection Overview”](#) on page 15.
5. Because readers are powered by the S-JACE and any SEC-R2R modules, system power requirements vary depending on the exact reader models used. Identify the power used/amps drawn by readers.
6. The S-JACE controller requires 15Vdc primary power—typically, this is supplied by the integral power supply of the required [SEC-ENC-MED](#) or [SEC-ENC-LRG](#) model enclosure. Note that 15Vdc is required so that the S-JACE can keep its attached 12V backup battery(ies) trickle charged.

7. Expansion modules can be powered from 12–15Vdc—modules directly attached (in *same enclosure*) with the S-JACE use the enclosure’s 15Vdc source and backup battery. On larger jobs, when installing additional [SEC-ENC-MED](#) or [SEC-ENC-LRG](#) enclosures to house (remote) expansion modules, expansion modules are powered by the local (enclosure) power supply, where you can wire the backup battery supply from the enclosure with the S-JACE controller (at a *maximum of 2.5A load*). This method uses a single pair (2 twisted conductor) cable to connect terminals “PS-”, “BB”.

If installing a non-powered enclosure (SEC-ENC-MNP, SEC-ENC-LNP, SEC-ENC-SML) to house one or more expansion modules, you can either:

- Wire a “triad” (3 twisted conductor) cable back to the S-JACE enclosure, for both 15Vdc power and battery backup (terminals “PS+”, “PS-”, “BB”).
 - Use a UL 294 approved, third-party, battery-backed, 12Vdc power supply to locally power the remote expansion modules. See the expansion module installation documents for more details.
8. When the system is operating on backup battery (AC power lost scenario), system operation for a minimum of 4 hours is the intended goal. To achieve this, size the [Backup Battery](#)(ies) accordingly, using the section “[Estimating Power and Battery Requirements](#).”

Estimating Power and Battery Requirements

[Table 2](#) provides example “worst case” power consumptions and minimum recommended [Backup Battery](#) capacity needed in a Vykon Security system, by the S-JACE controller and possible expansion modules.



- Notes**
- The S-JACE, as well as SEC-R2R modules, *supply power* to connected Wiegand-type readers. Depending on the exact reader type and manufacturer, the power used will vary. Examples here use two reader models: one that draws 0.13A maximum, and another that draws 0.04A maximum. For best estimates, refer to the amp usage specifications of the readers that you will be using.
 - Maximum current ratings for reader-capable devices (S-JACE and SEC-R2R) are as follows:
 - Maximum **peak** current for both readers combined is **0.40A**.
 - Maximum **average** current for both readers combined is **0.30A**.
 - Estimates assume all on-board *relays* of devices are *energized*—not typically found in an actual application, but necessary for worst-case power usage calculations.
 - Door strike power is *not included*, nor is power for other loads switched by the S-JACE and its expansion modules. Door strikes and other loads should be always be powered by other sources.

Table 2 Amps/Watts, Recommended Minimum 12V SLA battery A-Hr capacities, for SEC-J-601 and modules.

Device	Max per System	Amps / W used @ 15Vdc (each)	12V Backup Battery (4 hours) min. recommended Ah (each)	Notes
SEC-J-601 (0.13A readers)	1	0.67A / 10.0W	3.33 Ah	SEC-J-601 powers two readers, measured drawing 0.13A each.
SEC-J-601 (0.04A readers)		0.48A / 7.2W	2.40 Ah	SEC-J-601 powers two readers, measured drawing 0.04A each.
SEC-R2R (0.13A readers)	15 in aggregate	0.33A / 5.0W	1.67 Ah	SEC-R2R powers two readers, measured drawing 0.13A each.
SEC-R2R (0.04A readers)		0.11A / 1.7W	0.56 Ah	SEC-R2R powers two readers, measured drawing 0.04A each.
SEC-RIO		0.40A / 6.0W	2.00 Ah	No reader inputs, but has 8 on-board relays.

Note that minimum Ah (Amp hour) figures for the backup battery were calculated using “80% capacity” (1.25 multiplier) due to either charge level or age. For example, each SEC-RIO (with all 8 relays energized) draws about 0.4A (6.0W at 15Vdc). When powered by the 12V backup battery, Ah is calculated as follows:

$$0.4A \times 4 \text{ hours} = 1.60Ah \times 1.25 = 2.0Ah$$

To calculate the system (total) DC power supply requirements and minimum SLA backup battery capacity, add up the total watts (W) and minimum Amp hours (Ah), for all devices. Where n is number of modules:

- Min. power supply (W) = SEC-J-601 W + ($n \times$ SEC-R2R W) + ($n \times$ SEC-RIO W) = **total W**
- Min. backup battery (Ah) = SEC-J-601 Ah + ($n \times$ SEC-R2R Ah) + ($n \times$ SEC-RIO Ah) = **total Ah**



- Notes**
- Backup battery(ies) are often sized greater than the recommended minimum, for additional reserve.
 - A maximum 2.5A load is supported at the SEC-J-201 controller’s output terminals (PS-, PS+, BB), above which an *onboard fuse may blow*. See “[Maximum Output Load Considerations](#),” page 9.

Power Estimate Examples

Two example estimates are provided here, as follows:

- [System 1, 8 door readers](#)
- [System 2, 10 door readers](#)

System 1, 8 door readers—This system requires 8 door readers and additional IO points requiring one SEC-RIO module. Two readers attach to the S-JACE, the other 6 readers require 3 SEC-R2R modules (2 readers each). All readers draw 0.04A maximum, such that power/battery calculations ([Table 2](#)) factor this in.

- Min. power supply (W) = 7.2W + ($3 \times 1.7W$) + ($1 \times 6.0W$) = 7.2W + 5.1W + 6.0W = **18.3W**
- Min. backup battery (Ah) = 2.40Ah + ($3 \times 0.56Ah$) + ($1 \times 2.0Ah$) = 2.4Ah + 1.68Ah + 2.0Ah = **6.08Ah**

In this case, a single 30W [enclosure power supply](#) provides ample reserve, and the equipment could be housed in two enclosures as follows:

- [SEC-ENC-LRG](#) (large): SEC-J-601 controller, one SEC-RIO module, two SEC-R2R modules.
- [SEC-ENC-SML](#) (small): one SEC-R2R module.

The sealed lead acid [backup battery](#) in this case might be two 12V 7.0Ah types in parallel, providing 14.0Ah total. Between the two Security Enclosures, module assemblies are wired together using 3-conductors for power/backup battery (“PS-”, “PS+”, “BB”).

System 2, 10 door readers—The system requires 10 door readers and additional IO points requiring two SEC-RIO modules. Two readers attach to the S-JACE, the other 8 readers require 4 SEC-R2R modules (2 readers each). Readers draw 0.13A maximum, such that power/battery calculations ([Table 2](#)) factor this in.

- Total min. power supply (W) = 10.0W + ($4 \times 5.0W$) + ($2 \times 6.0W$) = 10.0W + 25.0W + 12.0W = **42.0W**
- Min. backup battery (Ah) = 3.33Ah + ($4 \times 1.67Ah$) + ($2 \times 2.0Ah$) = 3.33Ah + 6.68Ah + 4.0Ah = **14.01Ah**

Assuming that all equipment is located relatively nearby, it could be housed in two large enclosures, with each enclosure’s 30W power supply providing ample 15Vdc power to equipment inside, as follows:

- [SEC-ENC-LRG A](#) (large): SEC-J-601 controller, one SEC-RIO module, two SEC-R2R modules (26W).
- [SEC-ENC-LRG B](#) (large): One SEC-RIO, two SEC-R2R (16W).

Between Security Enclosures, module assemblies are wired together using 2-conductors for battery backup, that is “PS-” and “BB”. In this case, the sealed lead acid [backup battery](#) in this case might be two 12V 12.0Ah types in parallel, providing 24.0Ah total.



Note If the SEC-R2R and/or SEC-RIO expansion modules are mounted in *remote locations* from the S-JACE and its backup batteries, or if a large system with *multiple* local *power supplies*, additional factors apply. See the next sections “[Voltage Drop Considerations](#)” and “[Maximum Output Load Considerations](#).”

Voltage Drop Considerations

When using an [enclosure power supply](#) and backup battery to power the Security JACE plus all expansion modules, and some modules are not mounted in the same enclosure with the SEC-J-601, you must be aware of voltage drops in the connecting “trunk power” cabling. Typically, this applies only if modules are located in different locations—that is, not in the same enclosure or in adjacent enclosures.



Note The 15Vdc power supply and the backup battery(ies) charged by the S-JACE must always be located in the same Security Enclosure as the S-JACE.

Undersized selection of cabling can result in unacceptably high voltage drops, and expansion modules/attached readers may not operate correctly—especially during emergency (battery backup) operation.

The maximum allowable voltage drop due to wiring is 1.5V. This equates to the difference in voltage measured across the PS+ and PS- at the source [SEC-ENC-MED](#) or [SEC-ENC-LRG](#) enclosure power supply, and the PS+ and PS- at the furthest non-powered Security Enclosure that houses an expansion module. Or, when powered by battery backup, the difference in voltage measured across the BB and PS- at the enclosure with the S-JACE, and the BB and PS- at the furthest [Vykon Security Enclosure](#).

[Table 3](#) provides a voltage drop chart, showing voltage drops per 100 feet of paired wire of different gauges (AWG), at different load amps. Also see “[Connection Overview](#)” on page 15.

Table 3 Voltage Drop Per 100 Feet Run (30m) of Paired Wire.

Gauge (AWG)	Load Current						
	0.10A	0.25A	0.5A	1.0A	1.5A	2.0A	4.0A
10	0.020	0.05	0.10	0.20	0.30	0.40	0.80
12	0.032	0.08	0.16	0.32	0.48	0.64	1.27
14	0.050	0.13	0.25	0.50	0.75	1.01	2.02
16	0.080	0.20	0.40	0.80	1.20	1.60	3.20
18	0.127	0.32	0.64	1.27	1.91	2.54	5.08
20	0.202	0.50	1.01	2.02	3.03	4.03	8.07
22	0.320	0.80	1.60	3.20	4.80	6.40	12.81

See [Table 2](#) on page 6 for “worst case” amps used by SEC-R2R and SEC-RIO modules, using two different reader types (readers draw either 0.13A or 0.04A each).

For an example, consider in the previous [System 2, 10 door readers](#), that two of the four SEC-R2R modules are mounted remotely in locations 500 feet (366m) away. In this example, worst-case amps used by each remote SEC-R2R is 0.33A. Looking at [Table 3](#) at the 0.25A column, a #16 AWG cable pair drops 0.20V per 100 feet, meaning a 500 foot run would drop slightly over 1V—this would be a good choice over an #18 AWG cable, which would drop over 2V (above the 1.5V maximum allowable drop).

Maximum Output Load Considerations

If using multiple *powered* Security Enclosures (SEC-ENC-MED, SEC-ENC-LRG) to power a large system, and running only battery backup power from the SEC-J-201 controller (on terminals PS-, BB of the SEC-J-201) to expansion modules in other enclosures, be aware that the output load cannot exceed 2.5A.

If the output load exceeds this, a soldered (unreplaceable) 2.5A fuse on the SEC-J-201 controller can blow.

Therefore, large systems that are dependent on battery backup operation may need to have remote expansion modules mounted in *unpowered* Security Enclosures, where they are powered locally using approved third-party, battery-backed 12Vdc power supplies. See the “[UL Requirements](#)” section “[Battery-backed Power Supplies](#)” on page 31 for a listing of approved power supply models. Related wiring details are in the installation document for expansion modules; see “[Related Documentation](#)” on page 5.

Preparation

Unpack the S-JACE and inspect the contents of the package for damaged or missing components. If damaged, notify the appropriate carrier at once and return any damaged components for immediate repair or replacement. See “[Returning a Defective Unit](#)” on page 37. See the following sections: “[Included in this Package](#)” and “[Material and Tools Required](#).”

Included in this Package

Included in this package you should find the following items:

- a Security JACE base controller (SEC-J-601).
- This document, *Security JACE (SEC-J-601) Mounting & Wiring Guide*, Part Number 10908, Rev. 3
- a hardware bag containing the following items:
 - Nine (9) pin-mount, screw-terminal connectors (two 7-position, two 6-position, two 4-position, three 3-position) for connection of security I/O points, sealed lead-acid backup battery. For more details, see “[About Screw Terminal Connectors](#),” page 13.
 - One (1) grounding wire, with quick-disconnect 0.187" female connector.
 - 6 end-of-line resistor packs (four leads each) for installation at contacts wired to supervised inputs.
 - One (1) 6-position screw terminal end-plug, for optional wiring of power, battery, and RS-485 communications to another chain of modules (*not* mounted in-line with the SEC-J-601 controller).

Material and Tools Required

The following supplies and tools are required for installation:

- Medium or large sized Wykon Security Enclosure, model [SEC-ENC-MED](#) or [SEC-ENC-LRG](#). See “[Wykon Security Enclosure](#),” page 4, for more details.
- Suitable tools and supplies for mounting enclosure, SEC-J-601 model of S-JACE and expansion modules, and for making all wiring terminations.

Precautions

This document uses the following warning and caution conventions:

**Caution**

Cautions remind the reader to be careful. They alert readers to situations where there is a chance that the reader might perform an action that cannot be undone, might receive unexpected results, or might lose data. Cautions contain an explanation of why the action is potentially problematic.

**Warning**

Warnings alert the reader to proceed with extreme care. They alert readers to situations where there is a chance that the reader might do something that can result in personal injury or equipment damage. Warnings contain an explanation of why the action is potentially dangerous.

Safety Precautions

The following items are warnings of a general nature relating to the installation and start-up of the Security JACE controller. Be sure to heed these warnings to prevent personal injury or equipment damage.

**Warning**

- **The circuit powering the controller is from 120 to 240Vac at 50/60 Hz. Disconnect power before installation or servicing to prevent electrical shock or equipment damage.**
- **Make all connections in accordance with national and local electrical codes. Use copper conductors only.**
- **To reduce the risk of fire or electrical shock, install in a controlled environment relatively free of contaminants.**
- **This device is only intended for use as a monitoring and control device. To prevent data loss or equipment damage, do not use it for any other purpose.**

Static Discharge Precautions

Static charges produce voltages high enough to damage electronic components. The microprocessors and associated circuitry within a Security JACE controller are sensitive to static discharge. Follow these precautions when installing, servicing, or operating the system:

**Caution**

- **Work in a static-free area.**
- **Discharge any static electricity you may have accumulated. Discharge static electricity by touching a known, securely grounded object.**
- **Do not handle the printed circuit board (PCB) without proper protection against static discharge. Use a wrist strap when handling PCBs. The wrist strap clamp must be secured to earth ground.**

Mounting

Mount the SEC-J-601 controller in a Vykon Security Enclosure (model [SEC-ENC-MED](#) or [SEC-ENC-LRG](#)). This enclosure meets the UL 294 Listing, has an integral 30W power supply, either one or two pre-mounted DIN rails, a door with a key lock and tamper switch, and brackets to secure backup batteries.



Note All U.S. Installations: For a UL Listed system (UL 294) you must mount the Security JACE (SEC-J-601) in a [Vykon Security Enclosure](#). All expansion modules must also be mounted in a Vykon Security Enclosure, either the same enclosure or in additional enclosures. If the S-JACE and/or expansion modules are removed and installed in any other enclosure (even one with the same listings), both UL listings are voided! Also refer to the “[UL Requirements](#)” section on page 30.

The following general mounting information applies to a SEC-J-601 controller:

- [Environmental Requirements](#)
- [Physical Mounting](#)

Environmental Requirements

Note the following requirements for the S-JACE mounting location:

- This product is intended for indoor use only. Do not expose the unit to ambient conditions outside of the range of 2°C (35° F) to 50°C (122° F) and relative humidity outside the range 5% to 95% non-condensing (pollution degree 1).
- The Vykon Security Enclosure is designed to keep the unit within its required operating range considering a 20-watt dissipation by the controller.
- Do not mount the unit:
 - in an area where excessive moisture, corrosive fumes, or explosive vapors are present.
 - where vibration or shock is likely to occur.
 - in a location subject to electrical noise. This includes the proximity of large electrical contractors, electrical machinery, welding equipment, and spark igniters.

Physical Mounting

The following information applies about physically mounting the unit.

- Before mounting the S-JACE, install [option cards](#) (if any) in the unit. See “[Removing and Replacing the Cover](#),” page 12. Refer also to the installation sheet that came with the option card.
- Mount inside a Vykon Security Enclosure (see previous [Note](#)), onto the top 35mm wide DIN rail. Plug the S-JACE controller directly into the integral power supply.
- It is not necessary to remove the cover before mounting.

The following procedure provides step-by-step DIN rail mounting instructions for the SEC-J-601 (see [Figure 3](#)).

Procedure 1 To mount on DIN rail

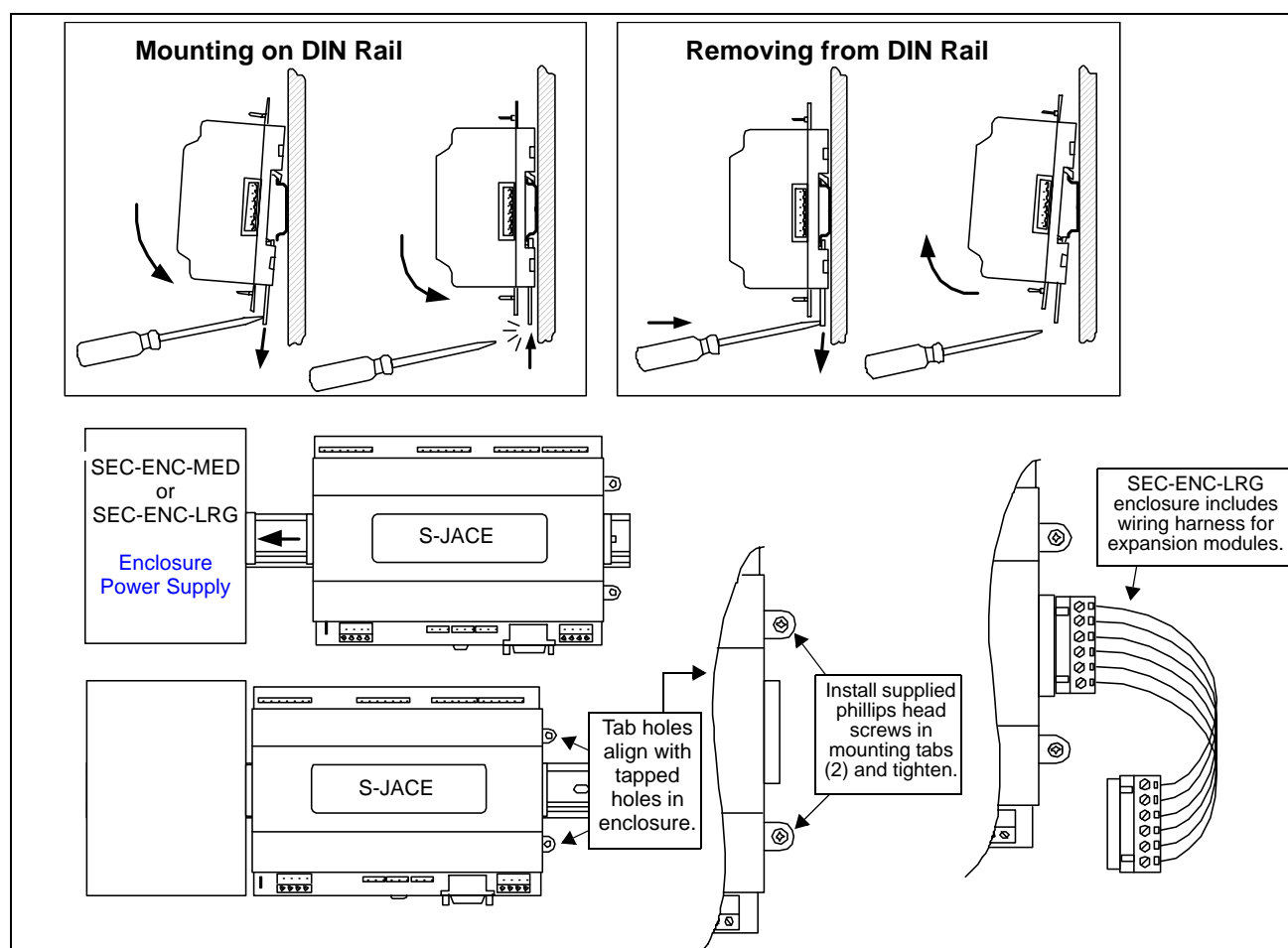
- | | |
|---------------|--|
| Step 1 | Position the S-JACE on the top DIN rail, tilting to hook DIN rail tabs over one edge of the DIN rail. |
| Step 2 | Use a screwdriver to pry down the plastic locking clip, and push down and in on the S-JACE, to force the locking clip to snap over the other edge of the DIN rail. |
| Step 3 | Slide the S-JACE along the DIN rail to connect its 6-position plug into power supply socket.
On the right side of the controller, holes in the two plastic mounting tabs should be aligned with the |

Removing and Replacing the Cover

tapped holes in the back of the enclosure.

- Step 4** Install supplied screws through the mounting tab holes into the enclosure holes, and tighten. If a medium-sized **SEC-ENC-MED** enclosure, this is the last mounting step.
- Step 5** If a large **SEC-ENC-LRG** enclosure, clip all expansion modules onto the lower DIN rail in the same way, but do not secure yet.
- Step 6** Slide the left-most module to the far left, such that its locking-tab holes align with tapped holes in the enclosure, and secure with two supplied screws.
- Step 7** Slide the next expansion module into the left (secured) module, connecting the 6-position connectors between them firmly together, and secure with two supplied screws into its mounting tabs.
- Step 8** Repeat this for all items, until all are mounted on the lower DIN rail, firmly connected to each other, and secured with mounting tab screws. Connect the 6-wire plug harness between the S-JACE controller and the assembly of expansion modules on the lower DIN rail.

Figure 3 Security JACE mounting details.



Removing and Replacing the Cover

You must remove the S-JACE cover to connect the NiMH battery (new unit), or to replace this battery, or to install any option boards. The cover snaps onto the base with four plastic tabs (two on each end).

To remove the cover, press in the four tabs on both ends of the unit, and lift the cover off.



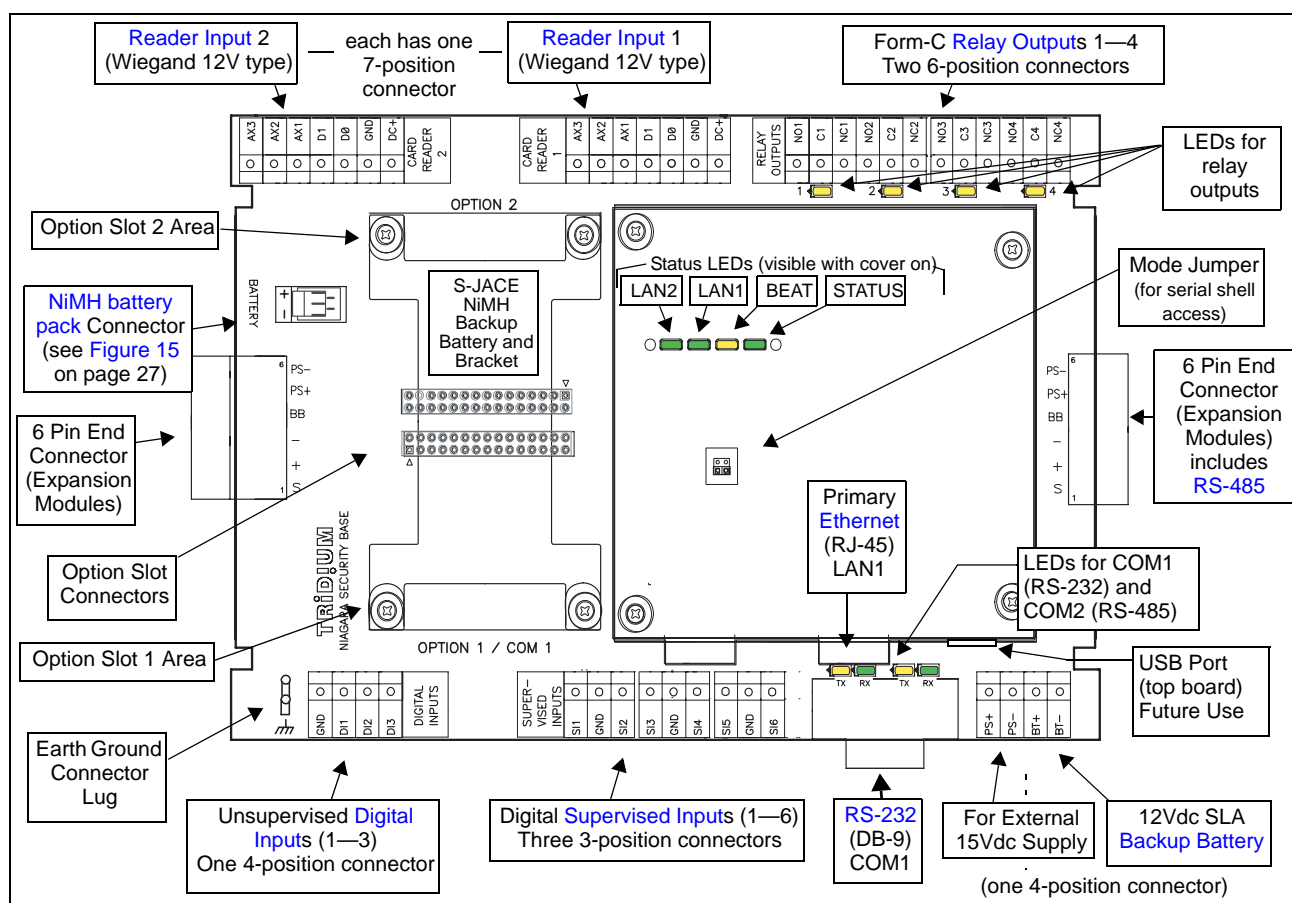
Note If expansion modules are plugged into the S-JACE, you may need to slide them away from the unit to get to the cover tabs.

To replace the cover, orient it so the cutout area for comm ports is correct, then push inwards to snap in place.

Board Layout

Figure 4 shows the location of LEDs, option slots, and other features of the SEC-J-601 S-JACE controller, with cover removed. For a side view of communications ports and other features, see Figure 13 on page 24.

Figure 4 Security JACE (SEC-J-601) board layout details.



About Screw Terminal Connectors

Screw-terminal connectors are shipped loose in a separate hardware bag. If desired, you can make wiring terminations to connectors *before* installing on the S-JACE circuit board pins. Please note the following:

- When you install a connector onto the board pins, terminal labels (on the circuit board) are *covered*.
- Once installed, removal of larger connectors (readers, relay outputs) may be difficult, especially if wiring has been landed. Here, removal is recommended only if replacing the device.

In general, it may be easiest to wire to *loose* connectors (held next to pins), then install them after completing.

Wiring Details

The following sections provide general wiring information:

- [General Wiring Rules](#)
- [Connection Overview](#)
- [Grounding](#)
- [Cable Types and Lengths](#)

General Wiring Rules

The authorized installation contractor should comply with the following rules:

- Obey all national, state, and local electrical and safety codes.
- Obtain any required permits and/or inspections. Contact the local fire marshal for assistance, if necessary.
- Connect the enclosure housing the Security JACE (enclosure model SEC-ENC-MED or SEC-ENC-LRG) to the nearest earth ground.
- Use individually shielded pairs of cable only. All wiring must comply with local, state, and federal electrical codes and fire codes.

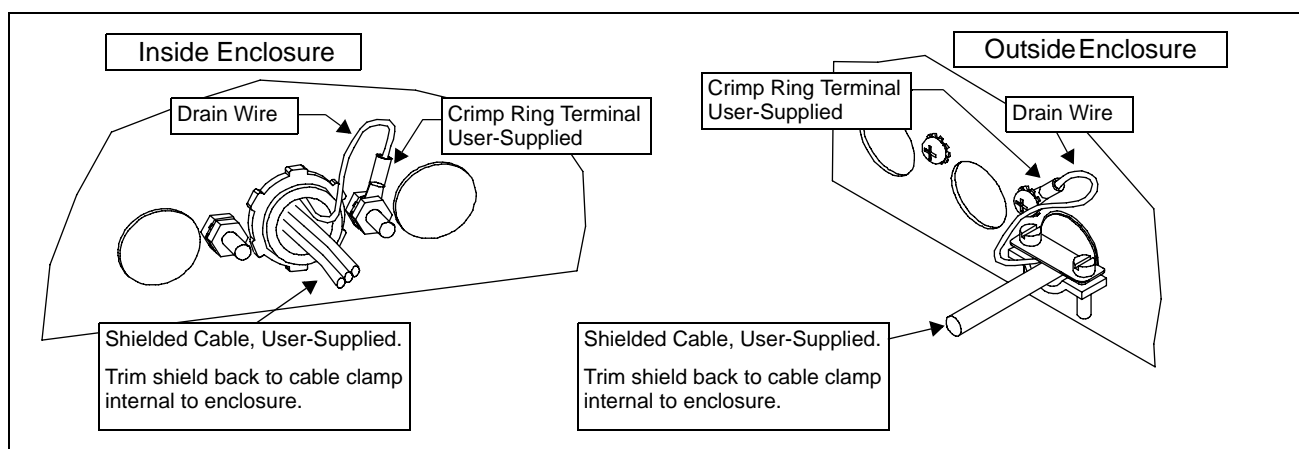


Caution Do not run signal wiring in same conduit with AC power wiring.

- Neatly label cables at both ends.
For example, label should include: S-JACE terminal #s/Device or Reader #.
- Neatly dress and tie or lace all wiring in a professional manner.
- Gather together and tape all unused conductors in multiple conductor cables.
- Ground all shield drain wires at the Security JACE enclosure, using crimp ring terminals fastened to internal grounding studs/screws or with external screws and star washers. See [Figure 5](#).

At the *other end* of shielded cables, *leave shield drain wires open*, either taping back or insulating to prevent electrical contact.

Figure 5 Ground All Shielded Cable/Drain Wires at Enclosure, Either Internally (Left) or Outside (Right).



Connection Overview

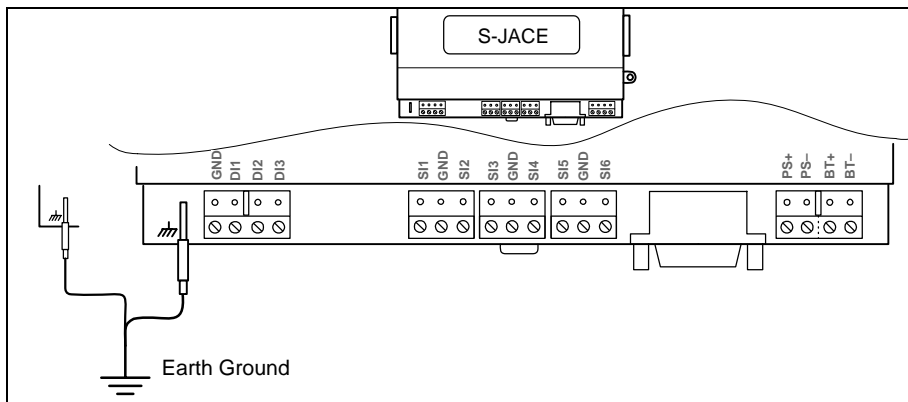
See [Figure 4](#) on page 13 to locate connectors and other components on the Security JACE controller. Make connections to the S-JACE in the following order.

1. Connect the earth grounding wire to a nearby earth grounding point. See [“Grounding”](#) for details.
2. Connect wiring to door readers, door strikes, door switches, and any other security I/O to the S-JACE. See the [“Security I/O Wiring”](#) section on page 16.
3. If SEC-R2R and/or SEC-RIO expansion modules are installed, make similar security I/O connections to these devices. Refer to the appropriate mounting and wiring guide for complete details.
4. Connect communications cables. See [“Communications Wiring,”](#) page 24, for ports available on the S-JACE base unit.
5. Prepare power wiring (leave the unit powered off). See [“Power Wiring,”](#) page 26 for details.
6. Connect the backup battery to the SEC-J-601 battery connector, and apply power to the unit. See [“Connect the Backup Batteries,”](#) page 27, and [“Apply Power,”](#) page 28.

Grounding

Connect the supplied earth grounding wire to the ground spade lug (0.187") on the S-JACE controller, and to a nearby earth ground (see [Figure 6](#)). Keep this wire as short as possible.

Figure 6 Connect earth ground using supplied grounding wire to grounding lug.



In addition, connect the earth grounding lug of *each expansion module* to earth ground in the same manner.

Cable Types and Lengths

Recommended cable types and maximum lengths are as follows:

- [RS-485](#) communications between the Security JACE and expansion modules, use a 24 AWG shielded, twisted pair communication cable with low capacitance (Belden #9501 or equivalent). Maximum length is 4000 feet (1220m).
- [Reader Inputs](#) use Belden #8725 (4-pair) or #8723 (2-pair) or equivalent. Maximum length 500 feet (152m).
- [Supervised Inputs](#) and [Digital Inputs](#) use a 22 AWG shielded, twisted pair cable control cable (Belden #9461 or equivalent). Maximum length 2000 feet (610m).
- [Relay Outputs](#) use 18 AWG unshielded instrumentation cable (Belden #9740 or equivalent), maximum length is 2000 feet (610m). Relay outputs are rated for a maximum load of 3.0A.

- For lengths between different enclosures: Battery Backup cabling (PS-, BB): a single pair (2-conductor) shielded cable. If wiring to expansion modules in a non-powered Security Enclosure, “Trunk power” cabling (PS-, PS+, BB), using a “triad” type (3 conductor) shielded cable, such as Belden #1031A (14AWG), or equivalent. Maximum distances vary, see “[Voltage Drop Considerations](#),” page 8.

Security I/O Wiring

Security I/O wiring is covered in the following subsections:

- “[Door Terminal Associations](#),” page 16
- “[Reader Input](#),” page 18
- “[Supervised Input](#),” page 19
- “[Relay Output](#),” page 21
- “[Digital Input](#),” page 23

Door Terminal Associations

The SEC-J-601 controller provides access control for two doors. For each door, the controller *allocates*:

- One [reader input](#) (for a Wiegand-type, 12V reader)
- Two [supervised inputs](#): one for door switch monitor, one for REX (request-to-exit)
- One [relay output](#): for door strike control.

A default convention is used for the logical association between reader inputs, supervised inputs, and relay outputs for each door, as shown in [Table 4](#).

Table 4 Door mapping to security I/O terminal points.

Door	Reader Input	Supervised Input Terminals (with GND)		Relay Output Terminals Door Lock
		Door Switch Monitor	Request to Exit (REX)	
Door 1	Card Reader 1	SI1	SI2	1 (C1 and NO1, or NC1)
Door 2	Card Reader 2	SI3	SI4	2 (C2 and NO2, or NC2)



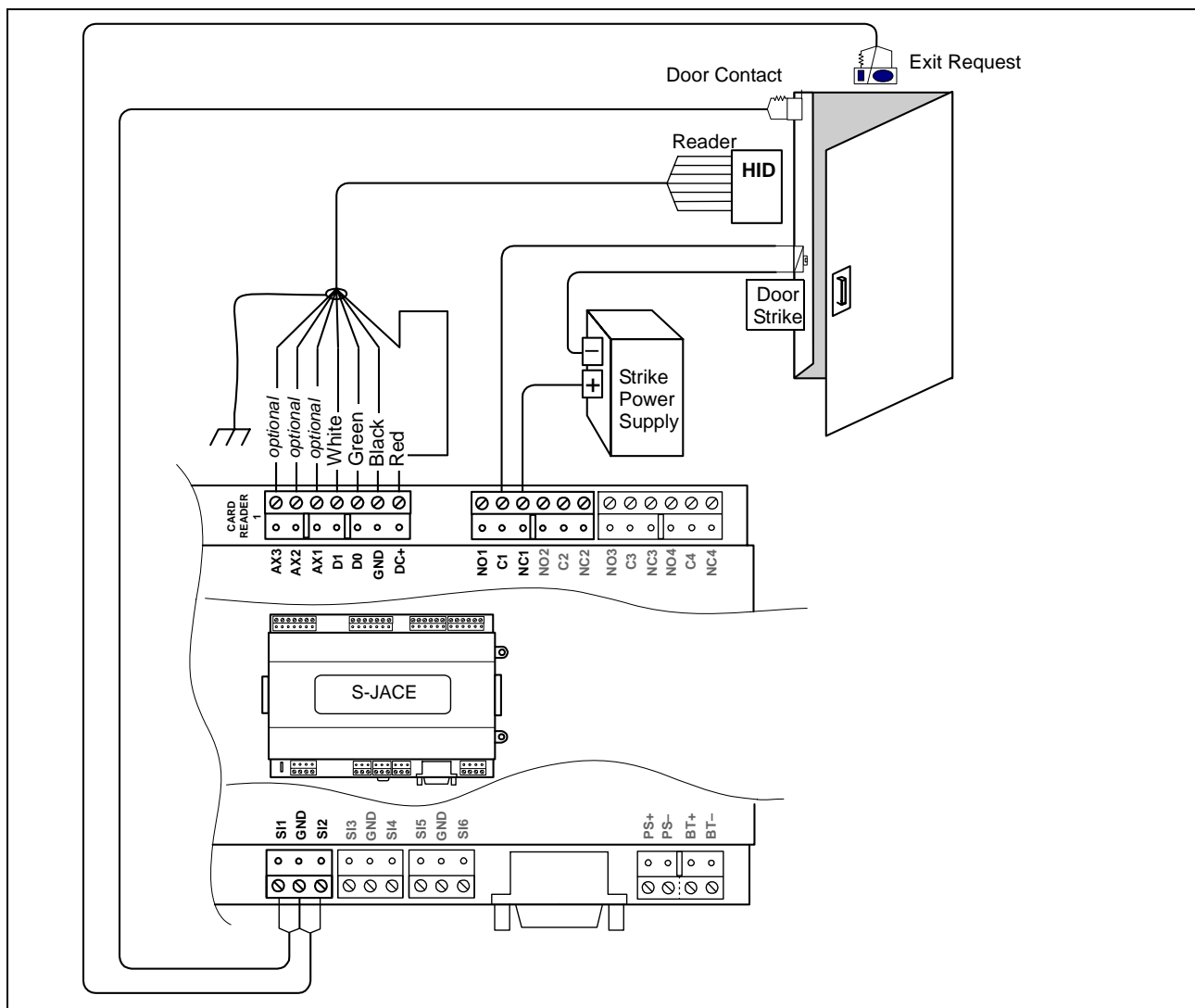
Note Terminal associations shown in [Table 4](#) also apply if wiring a SEC-R2R (2 reader) expansion module.

See the following sections for more details:

- [Example Door 1 Wiring](#)
- [Other Terminal Associations](#)

Example Door 1 Wiring

[Figure 7](#) shows an S-JACE wiring schematic for a door with an HID-type reader, normally-closed door contact, normally-closed exit (REX) device, and a fail-safe DC door strike (normally-closed control).

Figure 7 Example Door 1 wiring (fail-safe).

Other Terminal Associations

In addition to the pre-allocated I/O for [door terminal associations](#), the S-JACE has the following terminals:

- Supervised Inputs 5 and 6 (SI5, SI6), for general usage. See [“Supervised Input,”](#) page 19.
- Relay Outputs 3 and 4, for general usage. See [“Auxiliary Relay Output Wiring,”](#) page 22.
- Three unsupervised Digital Inputs (DIs). See [“Digital Input,”](#) page 23.

Reader Input

The SEC-J-601 controller has two door reader inputs, each supporting a Wiegand-type 12Vdc reader. Each reader input has a 7-position connector, on the circuit board labeled as Card Reader 2 and 1 (see [Figure 4](#) on page 13). Typical wiring is shown in [Figure 8](#). Pinouts for each card reader connector are shown in [Table 5](#).



Note A door wired to a reader input has other I/O points, see [“Door Terminal Associations,”](#) page 16.

Figure 8 Reader wiring to S-JACE.

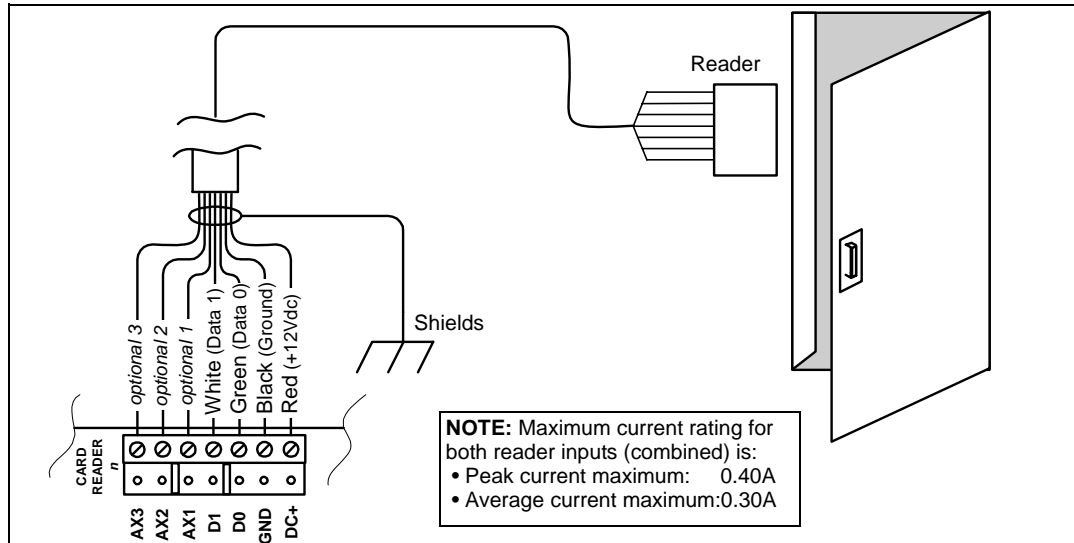


Table 5 Pinouts for Card Reader Inputs

Terminal	Terminal Name	Terminal Notes	Typical cabling colors
DC+	+12Vdc to Reader	Always wire these four terminals to the corresponding reader terminals.	Typically Red wire.
GND	Ground		Typically Black wire.
D0	Reader Data 0		Typically Green wire.
D1	Reader Data 1		Typically White wire.
AX1	Auxiliary 1	Optional, wire to reader's Green LED control	At reader, typically Orange wire.
AX2	Auxiliary 2	Optional, wire to reader's Red LED control	At reader, typically Brown wire.
AX3	Auxiliary 3	Optional, wire to reader's Beeper control	At reader, typically Blue or Yellow wire.

Reader Wiring Notes

- Mount the reader, referring to the specific manual for that reader for instructions.
- Use shielded, twisted-pair, cabling (Belden #8725 or #8723 or equivalent, as needed) to connect the reader to the S-JACE. Maximum cable distance is 500 feet (152m).
- Run this cabling from the reader to the S-JACE, bringing it through an appropriate knockout in the enclosure used. Allow sufficient slack cable for servicing.
- Tie all shield wires together, and connect to the designated grounding point at the enclosure. See [Figure 5](#) on page 14.
- Place the appropriate wires in the appropriate screw terminals of the 7-position reader connector. Refer to the pinouts in [Table 5](#) for reader input designations. [Figure 8](#) lists typical wiring colors.

Supervised Input

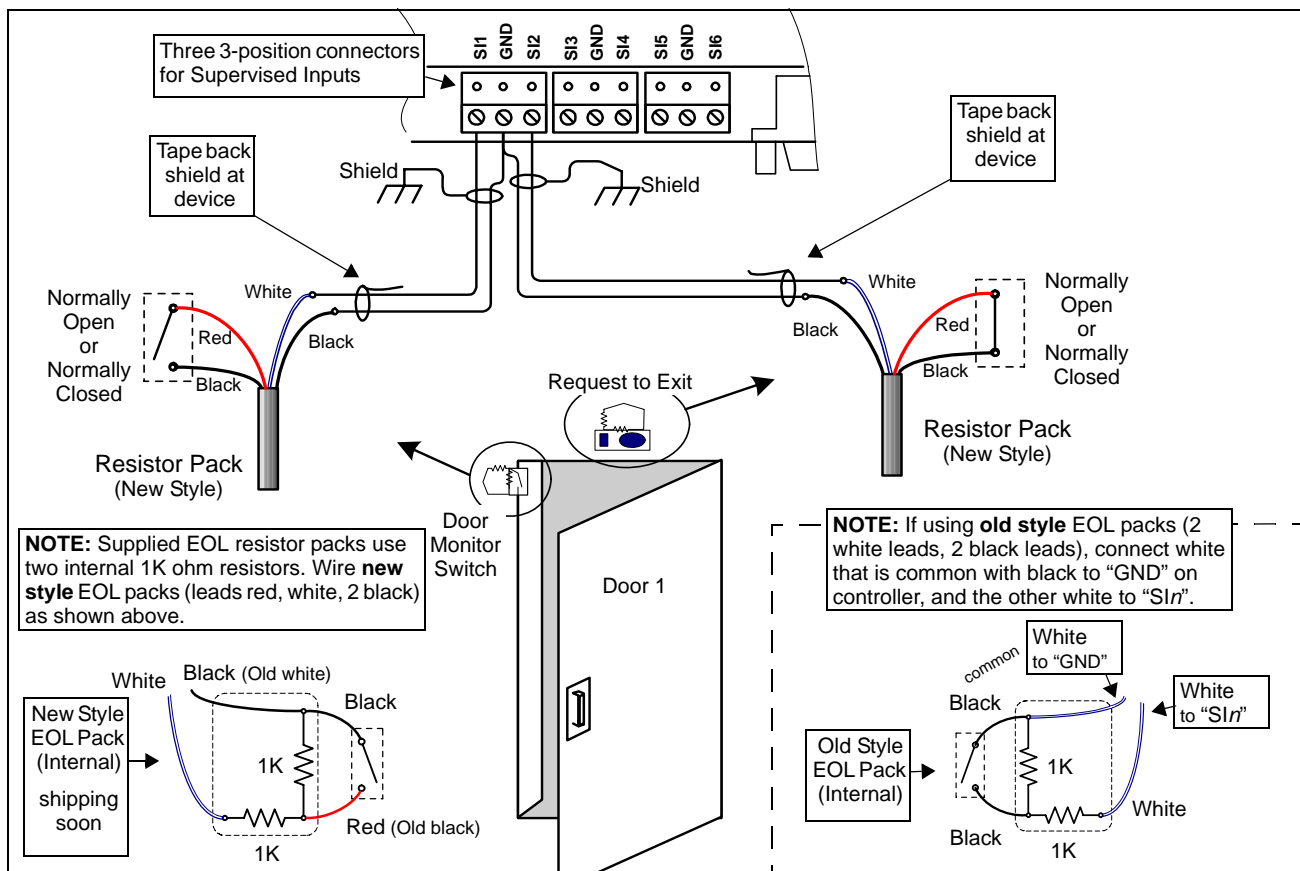
The SEC-J-601 controller has six (6) supervised inputs, located on three 3-position connectors next to the DB-9 connector (see [Figure 9](#)). Under each connector, terminals are labeled SI_n , GND, SI_n , for example: SI_3 , GND, SI_4 . This means when wiring, *two* conductors are typically landed to each GND terminal.



Note Supervised inputs SI_1 through SI_4 are reserved for Door 1 and 2 usage. Supervised inputs SI_5 and SI_6 are available for general usage. For more details, see “[Door Terminal Associations](#),” page 16.

Each supervised input can monitor dry contacts, either normally-open (N.O.) or normally-closed (N.C.). One [end-of-line resistor pack](#) is required at the monitored contacts for each input, for proper operation. [Figure 9](#) shows wiring of supervised inputs SI_1 and SI_2 , which are reserved for Door 1 usage.

Figure 9 Supervised input wiring to S-JACE.



End-of-Line Resistor Pack

You must install an end-of-line (EOL) resistor pack at the monitored device for proper operation of each input. Six (6) EOL resistor packs are shipped with each SEC-J-601 controller. Each resistor pack has four leads:

- New style (shipping soon): One red, one white, two black leads. Wire as shown in [Figure 9](#).
- Old style: Two white, two black leads. Wire black leads across contacts, and wire the white lead shown internally connected to the black lead (common) to the “GND” input, and the other white lead to the “ SI_n ” input. See the detail in lower right of [Figure 9](#).

Install each EOL resistor pack as close as possible to the actual monitored switch/contacts.

Supervised Input Wiring Notes

- The device monitored by a supervised input should have dry contacts (voltage free) as either a normally-open or normally-closed type switch. Mount the device per the vendor's instructions.
- Use shielded, twisted-pair, cabling to connect the device to the S-JACE. Maximum cable distance is 2000 feet (610m)
- Run this cabling from the device to the S-JACE, bringing it through an appropriate knockout in the enclosure used. Allow sufficient slack cable for servicing.
- At the device, connect the cable by installing one of the supplied 4-lead EOL resistor packs. Install this resistor pack as close as possible to the device's contacts.

Depending on **new** or **old style** EOL resistor pack, wire the EOL leads by color. See [Figure 9](#) on page 19.

- If a **new style** EOL pack, wire the red lead and either black lead across the monitored contacts, and wire the white lead to the “SIn” input, and the other black lead to the SI “GND” input.
- If an **old style** EOL pack, wire the black leads across the contacts, and wire the white lead shown internally connected to the black lead (common) to the “GND” input, and the other white lead to the “SIn” input. Note you can use a multimeter to determine which of the two EOL pack white leads are common to one of the black leads.

Insulate the shield wire at the device by taping back or using shrink tubing.

- At the S-JACE, ground shield drain wires at the enclosure. See [Figure 5](#) on page 14.
- Connect the two conductors from the device's contacts to the appropriate SIn terminal and adjacent GND terminal. Note that inputs SI5 and SI6 are available for general usage, while the other SI inputs (SI1–SI4) are reserved for Door 1 and 2 usage.

About Supervised Input States

Although monitoring a digital (two-state) device, each supervised input has four possible states:

- Shorted—A “trouble” state, meaning shorted input—supervision resistors cannot be detected.
- Closed—A “normal” state, meaning contacts closed, with supervision resistor(s) detected.
- Open—A “normal” state, meaning contacts open, with supervision resistor(s) detected.
- Cut—A “trouble” state, meaning an open input—supervision resistors not detected.

Each supervised input tests for the current state using a simple voltage divider, using a (fixed) 1.5K ohm onboard pull-up resistor, and the resistance (R) value in ohms of the monitored device, where

Input %	=	$R / (R + 1500)$
0%–17%	=	0 (shorted wires) to 300
17%–50%	=	300 to 1500 (Closed)
50%–83%	=	1500 to 7500 (Open)
83%–100%	=	7500 to infinite (cut wires)

Relay Output

The SEC-J-601 controller has four (4) Form-C relay outputs, each rated to switch 24VAC/DC loads up to 3A. Output terminals are located two 6-position connectors next to the card reader 2 input (see [Figure 4](#) on page 13). Terminals are labeled numerically 1 and 2 under one connector, and 3 and 4 under the other connector. Each has a NO_n, C_n, NC_n terminal—for example NO3, C3, NC3 for relay output 3.



Note Relay outputs 1 and 2 are reserved for Door 1 and Door 2 strike control, respectively. Relay outputs 3 and 4 are available for general usage. For more details, see [“Door Terminal Associations,”](#) page 16.

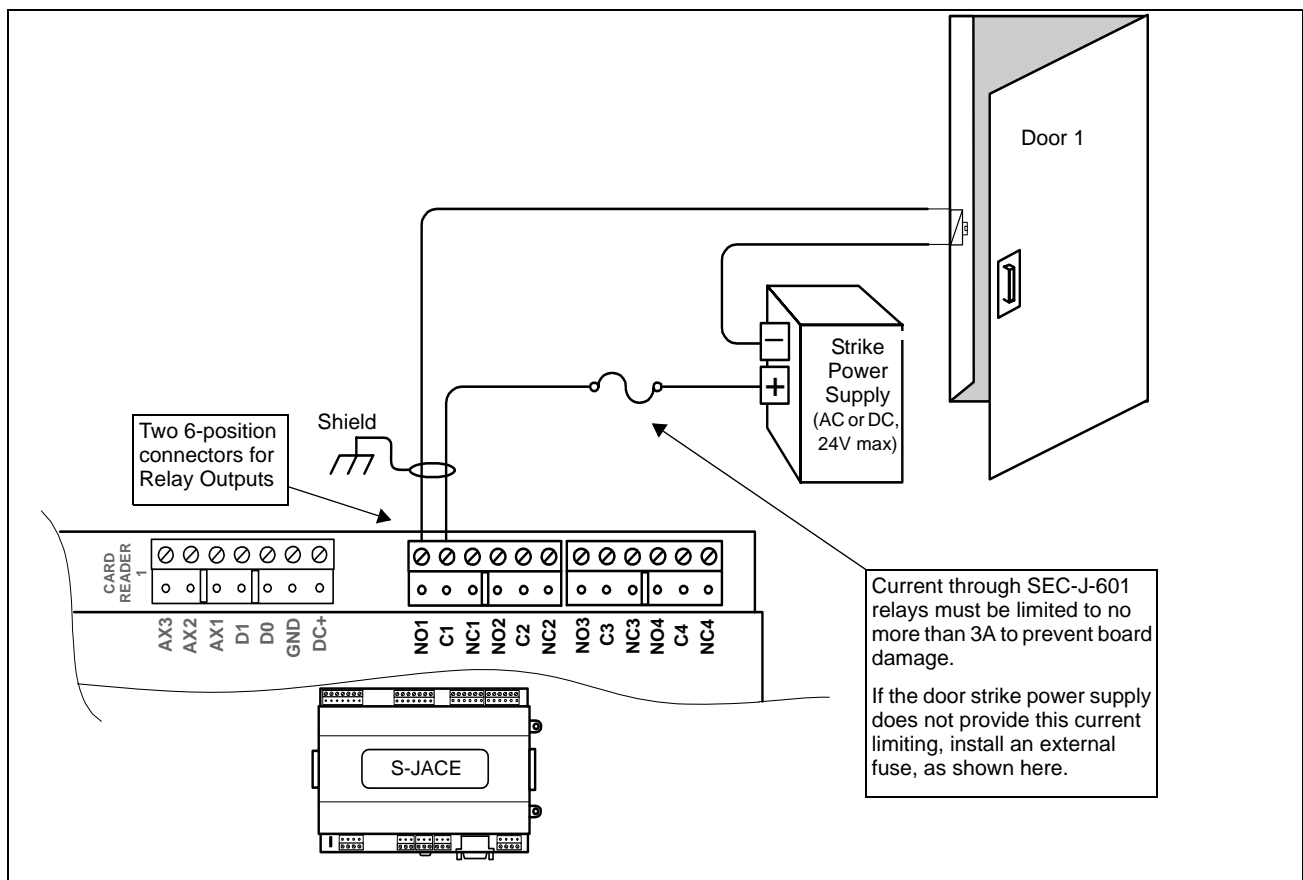
Output Status LEDs

An LED status indicator for each relay output is located next to that output’s C (common) terminal on the circuit board—when lit, that relay is energized. Therefore, a circuit wired through the normally open (NO_n) terminal is On (closed) when the LED is lit, and Off (open) when the LED is not lit.

Door Strike Wiring

Typical “fail secure” door strike wiring, in this case for Door 1 using relay output 1, is shown in [Figure 10](#).

Figure 10 Relay output wiring from S-JACE to door strike (fail-secure).

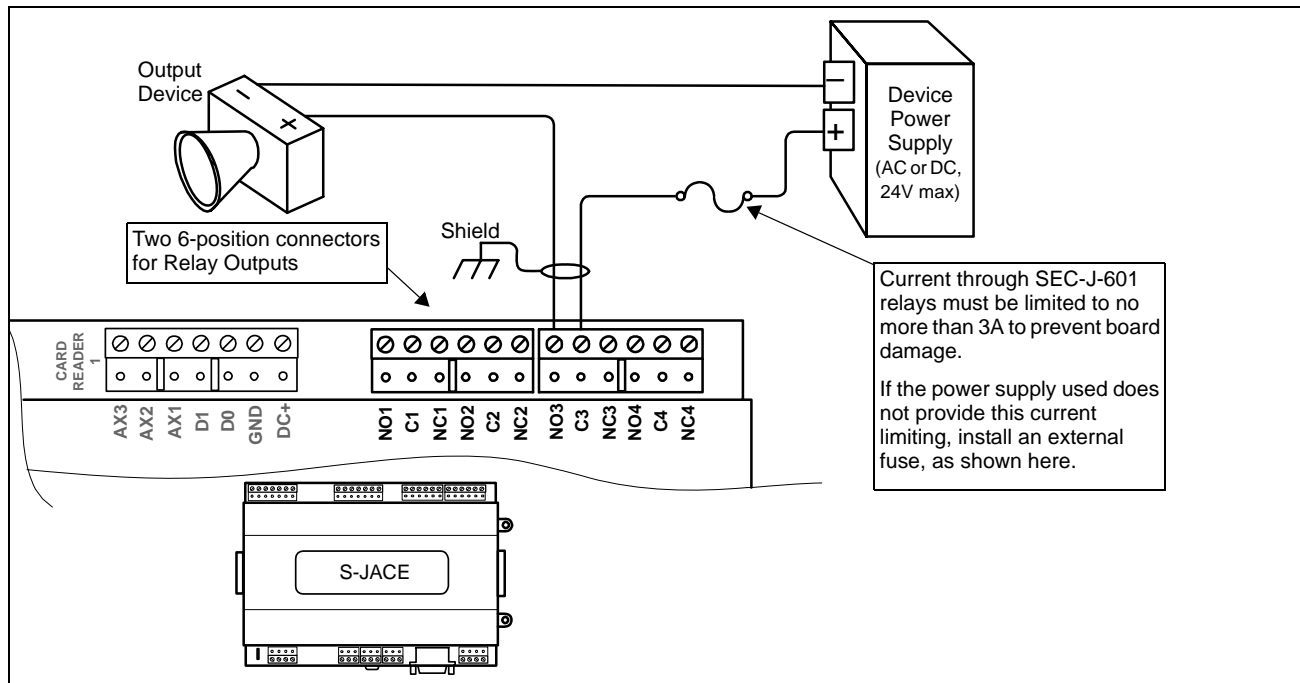


Auxiliary Relay Output Wiring

Relay outputs 3 and 4 are available for controlling an auxiliary device, such as a horn annunciator.

Figure 11 shows example wiring for controlling an output device.

Figure 11 Relay output wiring from S-JACE to an auxiliary device.



Relay Output Wiring Notes

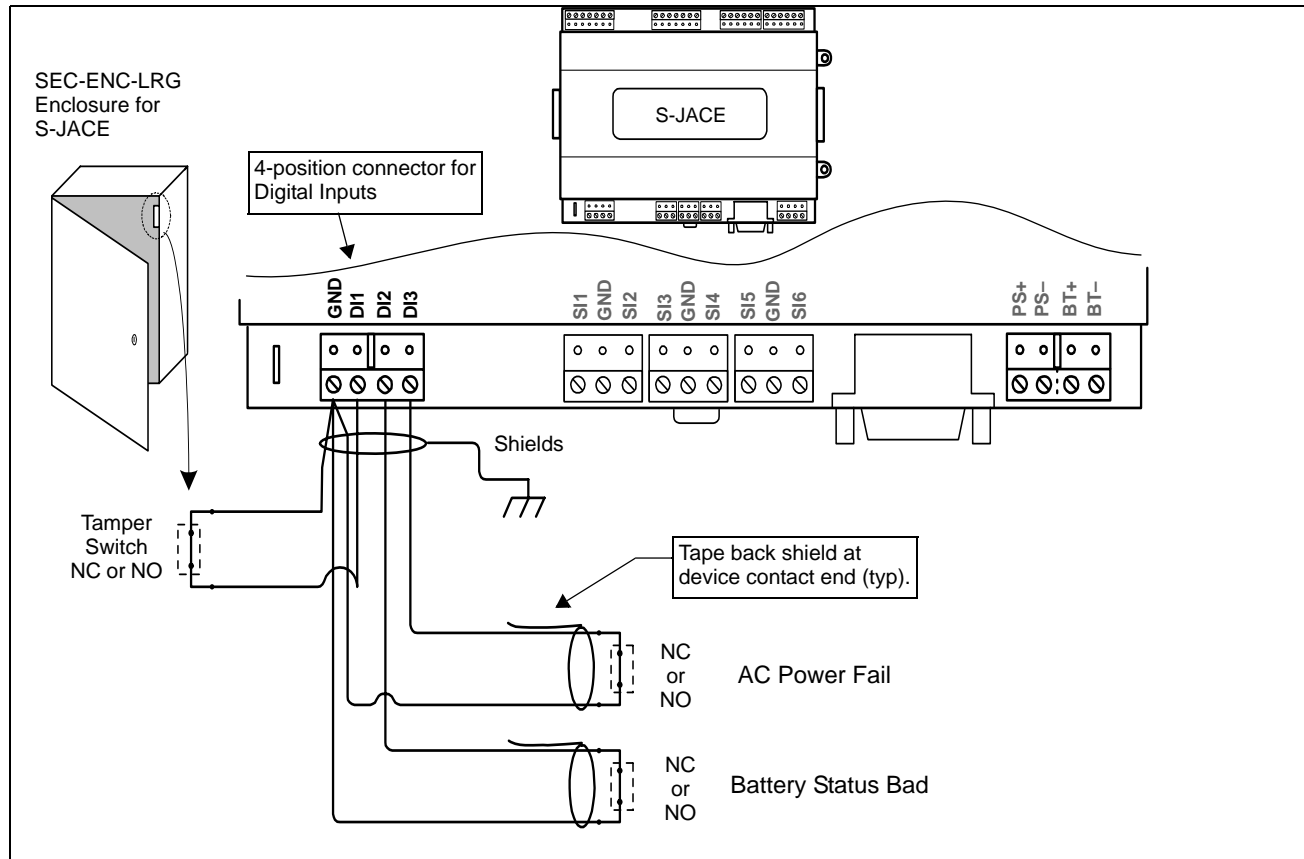
- Install the door strike or auxiliary output device per the vendor's instructions.
- Use shielded, twisted-pair cabling to connect the circuit to the S-JACE. Maximum cable distance is 2000 feet (610m)
- Wire the door strike or auxiliary output device to the appropriate relay output on the S-JACE and to the power supply used to power the strike or device. Each relay output on the S-JACE has a common terminal (C), and normally open (NO) and normally closed (NC) terminal.
- At the S-JACE, ground shield wires to the designated grounding point at the enclosure. See Figure 5 on page 14.

Digital Input

The SEC-J-601 controller has three (3) digital inputs, located on a 4-position connector next to supervised input connector (see [Figure 4](#) on page 13). Under the connector, terminals are labeled GND, DI1, DI2, DI3. This means when wiring, as many as *three* conductors can be landed to the common GND terminal.

Each digital input can monitor dry contacts, either normally-open (N.O.) or normally-closed (N.C.). All three inputs are *unsupervised*—no end-of-line resistors are required. Figure 12 shows example wiring to all three digital inputs of the SEC-J-601 controller.

Figure 12 **Digital input wiring example to S-JACE.**



Note The Vykon Security Application is pre-configured to support the following connections:

- DI1 — Tamper switch (typically for enclosure door)
- DI2 — Battery status bad (if contacts available)
- DI3 — AC power fail (if contacts available)

Depending on the installation, not all DIs may require connection. In almost all cases, input DI1 is wired to the tamper switch of the [Vykon Security Enclosure](#) enclosure housing the S-JACE.

Digital Input Wiring Notes

- The device monitored by a digital input should have dry contacts (voltage free) as either a normally-open or normally-closed type switch. Mount the device per the vendor's instructions.
- Use shielded, twisted-pair cabling to connect the device to the S-JACE. Maximum cable distance is 2000 feet (610m).
- Run this cabling from the device to the S-JACE, bringing it through an appropriate knockout in the enclosure used. Allow sufficient slack cable for servicing.
- At the device, connect its contacts to the cable pair, and insulate the shield wire by taping it back or using shrink tubing.
- At the S-JACE, ground shield wires to the designated grounding point at the enclosure. See [Figure 5](#) on page 14.
- Connect the two conductors from the device's contacts to the appropriate DI_n terminal and common GND terminal. Note that the software expects DIs to monitor specific items—see previous [Note](#) on page 23.

Communications Wiring

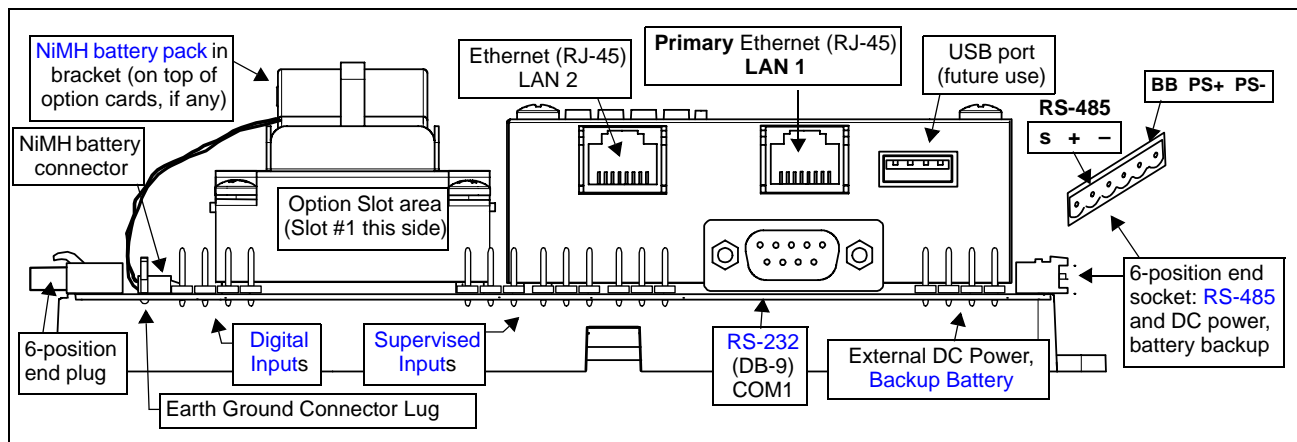
Connect communications wiring to the S-JACE using ports on the bottom of the unit ([Figure 4](#)), which include:

- [Ethernet](#)
- [Serial](#)



Note Prior to connecting cables, provide strain relief for them to prevent damage to the controller.

Figure 13 S-JACE controller (SEC-J-601) bottom side, cover removed.



Ethernet

Two, female 10/100-Mbit Ethernet connections are provided on the S-JACE. These are RJ-45 connectors labeled LAN2 and LAN1. Use a standard Ethernet patch cable for connecting to a hub or Ethernet switch. An activity LED for each Ethernet port is visible, and are labeled “LAN2” and “LAN1” on the cover.



Note Typically, you *only use LAN1* (primary port). Do *not* use LAN2 as the primary port.

The default “factory-shipped” IP settings for the LAN1 port are IP address 192.168.1.120, with a subnet mask of 255.255.255.0. Refer to the *Vykon Enterprise Security Guide* for details on changing IP address.

Serial

There are two serial ports on the SEC-J-601 base unit. At the bottom of the board (see [Figure 13](#)), the DB-9 is an [RS-232](#) port using an DB-9 plug (male) connector. At the ends of the unit, an [RS-485](#) port “passes through” the unit using the lower 3 terminals of the 6-position connectors.



- Notes**
- A green “receive” LED and yellow “transmit” LED are provided for each serial port. These LEDs are located on the bottom board, next to each port connector (see [Figure 4](#) on page 13).
 - There is also a USB port on the top board. However, it is for future use only.

RS-232—An RS-232 serial port using a male DB-9 connector always operates as COM1. You can use standard DB-9 serial cables with this port. The Security JACE is a serial DTE device, requiring a “null modem” cable for connection to another DTE device, such as a PC. If connecting the S-JACE to a DCE device (modem, for example), a straight-through cable is used. [Table 4](#) provides standard serial DB-9 pinouts.



- Note** If a modem option card (NPB-MDM) is installed, this port becomes disabled—except if rebooted with the mode jumper (see [Figure 4](#) on page 13) in the “Serial Shell” position.

Table 6 Serial port (RS-232 and RS-485) pinouts.

Base RS-232 DB-9 Port (COM1)				Base RS-485 Port (COM2)		
Pinout References		Signal	DB-9 Plug Pin	Pinouts		
<div>DB-9 Plug (male)</div> <div><div>15</div><div><div><div></div><div></div><div></div><div></div><div></div></div><div><div></div><div></div><div></div><div></div></div></div><div>69</div></div>		DCD	Data carrier detect	1	<div>6-position end connector (male)</div> <div><div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>S+-</div></div>	
		RXD	Receive data	2		
		TXD	Transmit data	3		
		DTR	Data terminal ready	4		
		GND	Ground	5		
		DSR	Data set ready	6		
		RTS	Request to send	7		
		CTS	Clear to send	8		
		not used on the Security JACE		9		

RS-485—An RS-485, optically isolated port is dedicated for communications to security expansion modules (SEC-R2R, SEC-RIO), and always operates as COM2. Wiring is not necessary to any modules that *directly* attach in-line with the S-JACE—the RS-485 signal passes through the 6-position end connectors.

If modules are not mounted in-line with the S-JACE, wire between the device assemblies using the 6-position end connector plugs. Use shielded 18-22AWG wiring (refer to the TIA/EIA-485 standard). As shown in [Table 6](#), the screw terminals (from left-to-right) are shield, plus (+), and minus (–).

Wire in a continuous multidrop fashion, meaning “plus to plus,” “minus to minus”, and “shield to shield.” Connect the shield to earth ground at one end only, such as at the S-JACE. See [Figure 14](#) on page 26 for example cabling.

15Vdc from Vykon Security Enclosure

S-JACE

SEC-R2R

SEC-RIO

SEC-R2R

SEC-RIO

SEC-R2R

NOTE: Not shown is 15Vdc power and battery backup connections, which use the other (top) 3 positions on the 6-position connector plugs.

Shielded, twisted pair cabling

Connect RS-485 shield wire to ground at one end only.

Terminals on the 6-position connector plugs used for RS-485 between assemblies.

- +

For UL 294 installations, the SEC-J-601 must be powered by the approved NPB-PWR-UN, regulated 15Vdc power source. For related information, see [“Estimating Power and Battery Requirements,”](#) page 6.



- Door strike power, as well as power for other loads switched by the SEC-J-601 and/or its expansion modules, should always be provided from a different source.
- Do not apply power to the SEC-J-601 until all other mounting and wiring is completed. See [“Power Up and Initial Checkout,”](#) page 27.

The integral power supply (NPB-PWR-UN) in a [Vykon Security Enclosure \(SEC-ENC-MED or SEC-ENC-LRG\)](#) provides 30W of regulated 15Vdc power to an S-JACE and its connected expansion modules, and is required for UL 294. Input voltage is 120Vac to 240Vac, single phase. You mount the S-JACE on the top DIN rail in the enclosure, where it connects into this power supply (see [Figure 3](#) on page 12). If an [SEC-ENC-LRG](#) enclosure, a provided 6-wire harness lets you connect expansion modules on the second (lower) DIN rail.

Power Up and Initial Checkout

Ensure power wiring to the S-JACE is ready—see the “[Power Wiring](#)” section on page 26. Refer to [Figure 4](#) on page 13 for the locations of the NiMH battery connector, status LEDs, and 4-position connector for 12V sealed lead acid backup battery(ies).

Following all mounting and wiring, perform the following:

Procedure 2 Initial power up and checkout

-
- Step 1** [Connect the Backup Batteries.](#)
- Step 2** [Apply Power.](#)
- Step 3** [Check the Status LEDs.](#)
-

Connect the Backup Batteries

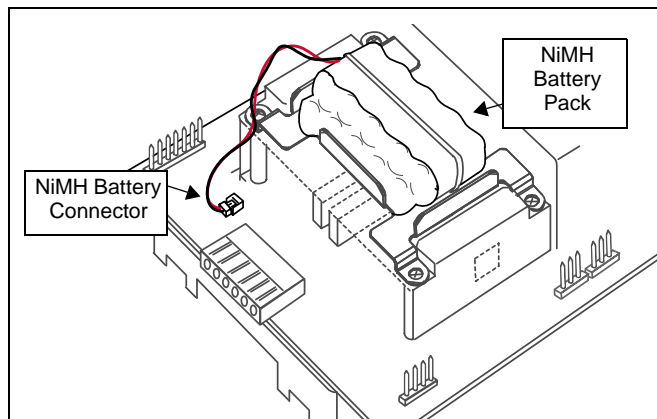
For background details, see “[About the Backup Batteries,](#)” page 28. Make the following battery connections:

- [Connect the NiMH Battery](#)
- [Connect the Backup Battery](#)

Connect the NiMH Battery

With the cover removed from the S-JACE (see “[Removing and Replacing the Cover,](#)” page 5), locate the red and black wires coming from the NiMH battery pack, with 2-position connector plug. Insert the plug into the battery connector on the bottom board (near option slot 2 area), as shown in [Figure 15](#).

Figure 15 NiMH battery connector on Security JACE bottom board.



Note

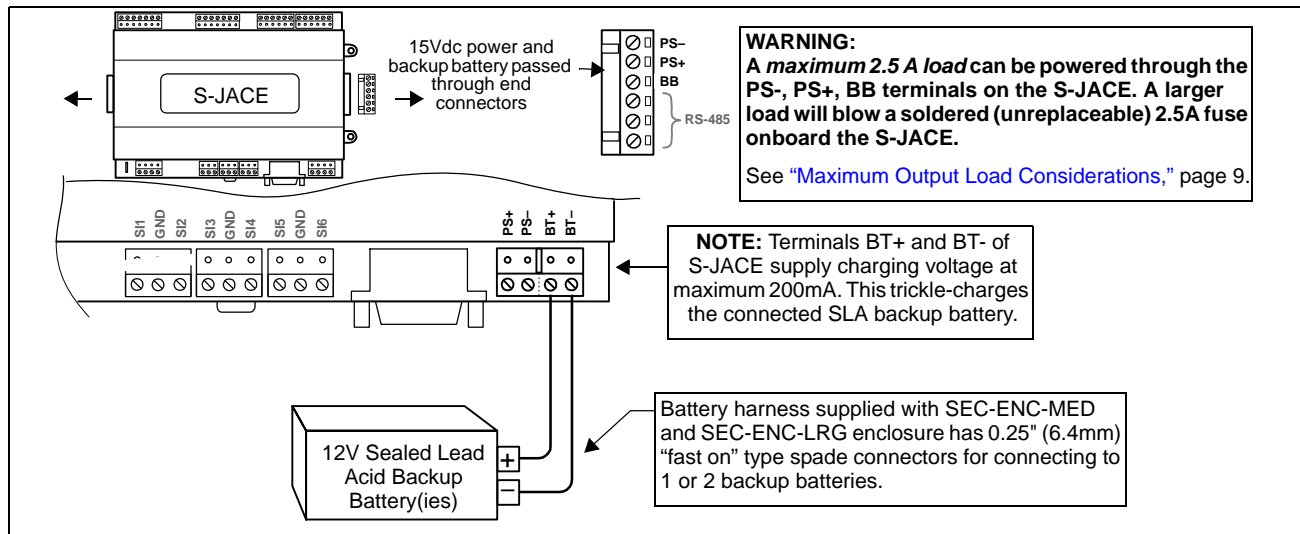
The NiMH battery is required to provide sufficient time for an orderly shutdown in the event of a power failure.

This connector is keyed—you cannot insert it incorrectly. The red (positive) connection should be the furthest from the two 30-pin option board connectors. Replace the S-JACE cover after connecting the battery.

Connect the Backup Battery

Connect the 12V sealed lead-acid [backup battery](#) to the 4-position connector next to the DB-9 connector, on terminals BT+ and BT-. When the S-JACE is powered up, charging voltage is applied to the battery(ies).

Apply Power

Figure 16 Sealed lead-acid backup battery connection on Security JACE.

Apply Power

Apply power to the S-JACE by energizing its connected [SEC-ENC-MED](#) or [SEC-ENC-LRG](#) enclosure power supply.

Check the Status LEDs

When power is applied, the green LED labeled "STATUS" will light. This indicates that the system is OK and that power is applied. Once the S-JACE boots, the yellow "BEAT" (heartbeat) LED will begin blinking, with a typical rate of about 1 Hz. Blinking should begin within 30 seconds after power is applied.

If after applying power, the STATUS LED goes out, or if the BEAT LED comes on (steady) and stays lit longer than two minutes, contact Systems Engineering for technical assistance. Also see the ["Using Status LEDs"](#) section on page 31.

About the Backup Batteries

The Security JACE has two different backup batteries:

- An external (sealed lead acid) [backup battery](#) (or batteries), and
- An onboard [NiMH battery pack](#).

Both batteries are required for system operation during loss of primary power (15Vdc power supply). Station alarms are generated if either battery is uncharged or unable to hold a sufficient charge, as well as whenever primary power is lost. You should always investigate any alarm related to backup batteries.

Backup Battery

The sealed lead-acid backup battery is an external, 12V, rechargeable battery (or multiple batteries) sized to operate the system during loss of primary power, for some duration. This includes the S-JACE, including power to attached readers and onboard relays, plus any "chained" expansion modules (and their attached readers and relays). For related details, see ["Estimating Power and Battery Requirements"](#) on page 6.



Note A maximum 2.5 A load can be powered through the PS-, PS+, BB terminals on the S-JACE. See [“Maximum Output Load Considerations,”](#) page 9.

You connect the backup battery to the S-JACE controller using two terminals of a 4-position connector—see [Figure 16](#) on page 28. Whenever primary-powered, the S-JACE supplies a constant “trickle” charge to this battery, at 200mA maximum. At startup (boot), a test of the backup battery is performed, as well as a periodic test. A system alarm is generated if a battery test deems the backup battery to be bad.

Providing that the backup battery has tested good, upon loss of primary power the system operates from this backup battery power until the charge level of the onboard [NiMH battery pack](#) reaches 0. Note that both batteries discharge in parallel. However, as the sealed lead-acid backup battery capacity is much greater, the [NiMH battery pack](#) discharges much slower than if these backup battery(ies) were bad or not present.



Note If the backup battery test was “bad,” upon loss of primary power, the Security JACE performs an immediate shutdown, backing up data and powering off (including attached readers, expansion modules).

You should replace the sealed lead-acid backup battery(ies) approximately every three years, or more often if the unit is in a high temperature environment.

NiMH battery pack

A custom 10-cell NiMH (nickel metal hydride) battery pack is mounted onto the unit, under the cover—see [Figure 15](#) on page 27. This battery allows the S-JACE to continue station operation (only) through very short power bumps, meaning a few seconds in duration. If a longer outage, the NiMH battery provides enough run time for the unit to backup data and then shutdown. Typically, this process takes about one minute. Shutdown occurs automatically, after data is backed up to on-board flash memory.

Upon startup (boot), a test of the NiMH battery is performed. A system alarm is generated if the NiMH battery voltage level is found to be bad. A charge is also initiated upon startup, which lasts from 3 hours minimum, and can range up to 18 hours if the battery is completely discharged. During this NiMH battery charge period, neither the NiMH battery or the [Backup Battery](#) is tested. After the startup NiMH charge period, a periodic test of *both* batteries occurs, and the appropriate battery alarm is generated is either battery is found to be bad.



-
- Notes**
- If the last NiMH battery test was “bad,” upon loss of primary power the S-JACE performs an immediate shutdown, backing up data and powering off (including attached readers, and expansion modules).
 - A NiMH battery characteristic is to lose charge if not left in charge mode (trickle charge). Leaving the battery unconnected, or in the unit powered off will cause the battery to fully discharge in a matter of weeks. Note that in the case of a new S-JACE, it ships from the factory with a completely discharged battery. Therefore, allow at least 18 hours for the battery to charge if it has not been in a powered unit.
-

You should replace the NiMH battery pack approximately every three years, or more often if the unit is in a high temperature environment. For more information on the use and replacement of the NiMH battery, refer to the [“Required NiMH Battery Maintenance”](#) section on page 33.

UL Requirements

This section provides requirements for a UL 294 Listed system. Failure to install the Security JACE and its expansion modules in accordance with these instructions voids the listing mark of Underwriters Laboratories, Inc.



Note This product is not Listed to UL 1076. For UL Listed systems, this product should not be programmed or configured for burglar alarm functions.

- [Mounting and Wiring](#)
- [Compatible Readers](#)
- [Battery-backed Power Supplies](#)

Mounting and Wiring

1. The S-JACE controller must be mounted in a [Vykon Security Enclosure](#), model SEC-ENC-MED or SEC-ENC-LRG, which provides an integral 15Vdc power supply (NPB-PWR-UN) to power the unit. Expansion modules must also be mounted in Vykon Security Enclosures, either (the same or different) enclosure, depending on number and location of expansion modules needed.
2. Enclosures must be mounted inside the secured area.
3. Grounding must be in accordance with Article 250 of the National Electrical Code.
4. Digital input DI1 of the SEC-J-601 must be wired to the door tamper switch of its enclosure. See [Figure 12](#) on page 23. If additional Vykon Security Enclosures are used in the system, each door tamper switch must also be wired to DI1 of *one* of the contained expansion modules.
5. Only UL listed, 12V Wiegand-type readers can be used with the system.
6. Exit request input circuits and initiating devices must be contained within the secured area. Exit device circuits must be connected to UL listed switches or exit devices.
7. Door strike power must be provided from a UL listed burglar alarm system power supply. When required in accordance with NFPA 101, if the door strike circuit is arranged as fail secure (door remains locked upon loss of power), UL listed emergency panic hardware must be provided to allow exit from the secured area. A failsafe configuration results in the door strike circuit unlocking in case of a power loss.
8. Audible signal appliance circuits, such as shown in [Figure 11](#) on page 22, are for supplementary use only.

Compatible Readers

Compatible Readers when used with the NPB-PWR-UN power supply are:

- HID — Models 5355, **5365**, 5375, **5395**, **5455**, **6005**, **6100**, **6120**, 6125, 6130
- GE Security — Model **T-200**

Only readers shown **bolded** above are also approved for use with the UL listed [battery-backed power supplies](#) listed in the next section.

This includes HID models 5365, 5395, 5455, 6005, 6100, 6120, and GE Security model T-200 (Reader Input rated 8.1–14 Vdc).

Battery-backed Power Supplies

The following third-party, battery-backed power supplies are UL approved for powering remote SEC-R2R and SEC-RIO expansion modules:



- Notes**
- Configure power supply for 12Vdc output operation.
 - Also see previous “Compatible Readers” section.
 - The Security JACE must be powered by the integral 15Vdc power supply (NPB-PWR-UN) in a [Vykon Security Enclosure](#), model SEC-ENC-MED or SEC-ENC-LRG.

Honeywell http://www.honeywellpower.com/access.html	
Model	Output
HP300ULX	12/24Vdc 2.5A
HP400ULX	12/24Vdc 4.0A
HP600ULX	12/24Vdc 6.0A
HP300ULPD4CB	12/24Vdc 2.5A with Distribution PCB
HP400ULPD4CB	12/24Vdc 4.0A with Distribution PCB
HP600ULPD16CB	12/24Vdc 6.0A with Distribution PCB

AlarmSaf http://alarmsaf.com/	
Model	Output
CPS-200C-7-UL/CSA	12/24Vdc 2.5A
CPS-400C-UL/CSA	12/24Vdc 4.0A
CPS-600C-UL/CSA	12/24Vdc 6.0A
CPS-800C-UL/CSA	12/24Vdc 8.0A

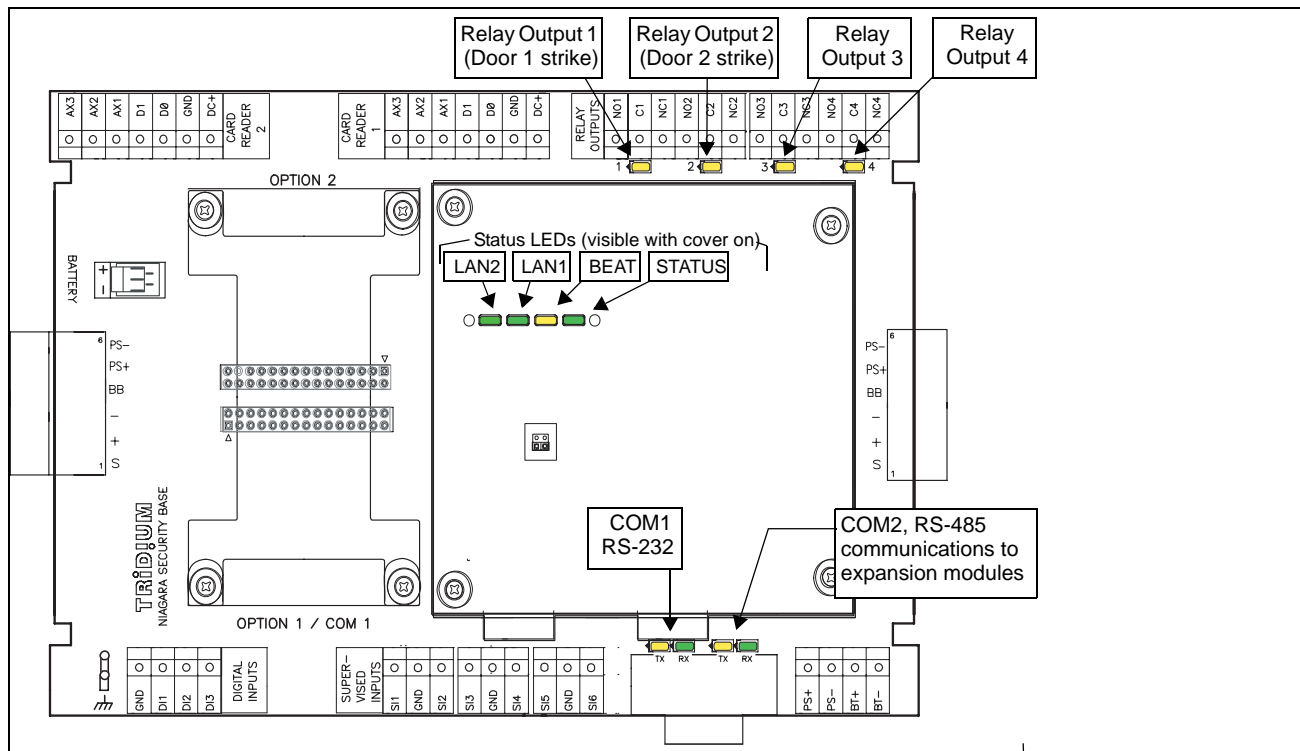
For wiring details related to using third-party, battery-backed power supplies, refer to the installation document for either of the expansion modules. See “[Related Documentation](#),” page 5.

Using Status LEDs

The S-JACE controller includes several LEDs that can help determine the status of the unit. They are located in two places: the top of the controller (visible through the cover), and for relay outputs and serial ports, on the bottom board (visible with cover removed). From left-to-right these LEDs include:

- [Ethernet Port LEDs](#)
- [Heartbeat LED](#)
- [Status LED](#)
- [Relay Output LEDs](#)
- [Serial Port LEDs](#)

See [Figure 17](#) for the exact locations of all LEDs on the SEC-J-601 S-JACE controller.

Figure 17 LEDs on the S-JACE controller (cover removed).

Ethernet Port LEDs

Each Ethernet port (“LAN2”, “LAN1”) has one green LED, visible on the top cover.

A “LAN x ” LED indicates activity on that port as follows:

- **Off**—No Ethernet link is made
- **On**—Ethernet link is present, but no activity on the LAN
- **Blinking**—Ethernet link is present with data activity on the LAN.

Heartbeat LED

The “BEAT” LED is located to the right of the Ethernet status LEDs, and is yellow. Under normal operation, this LED should blink about once per second. If the heartbeat LED stays *on constantly*, *does not light*, or blinks *very fast* (more than once per second), contact System Engineering for technical support.

Status LED

The “STATUS” LED is located to the right of the heartbeat (“BEAT”) LED, and is green. This LED provides a CPU machine status check, and should remain lit whenever the S-JACE is powered. If the STATUS LED *does not light* while power is applied, contact System Engineering for technical support.

Relay Output LEDs

Each of the four relay outputs has an LED, located near the “C” terminal on the *bottom* circuit board (see [Figure 17](#)). Each relay output LED is lit whenever that relay is energized by the S-JACE. See the “Relay Output” section on page 21 for more details.

Serial Port LEDs

LEDs for the two serial ports are located on the S-JACE's *bottom* board, near the DB-9 connector (see [Figure 17](#)). LEDs show the transmit and receive activity for the serial ports and optional modem.

- The **yellow** transmit LED indicates that the Security JACE is *sending* data out the serial port over a communications line to a connected device.
- The **green** receive LED indicates that the Security JACE is *receiving* data from a connected device.

These LEDs provide a fixed on-time when data is detected on the port. If these LEDs are on constantly, this indicates a problem with the communications channel, such as a shorted wire or reversed wiring.

**Note**

In normal operation, if expansion modules are installed (SEC-R2R, SEC-RIO) and the station is configured, the COM2 ([RS-485](#)) LEDs should continuously flash, approximately 3 times per second. This reflects the continuous polling of the expansion modules performed by the S-JACE.

Maintaining the Security JACE

This section provides information on the following topics:

- [Cleaning](#)
- [Required NiMH Battery Maintenance](#)
- [Replacement Parts](#)
- [Replacing the Security JACE base assembly](#)
- [Returning a Defective Unit](#)

Cleaning

If dust or metal filings are present inside the unit, clean with vacuum or compressed air. Otherwise, no cleaning inside the unit is required. Optionally, if the cover becomes dirty, you can wipe it with a damp cloth and mild detergent.

Required NiMH Battery Maintenance

NiMH battery life expectancy is a function of its discharge cycles (the number of discharges and their depth) and the ambient temperature of the battery during normal operation. In most applications, the battery should see relatively few discharges. Therefore, ambient temperature has more to do with determining the life expectancy of the battery than does any other factor. If the Security JACE is installed in a conditioned space, the NiMH battery should provide dependable service for approximately three years (average). In an environment where the operating temperature is higher (that is, 50°C or 122°F), you should only expect the battery to last approximately one year.

The NiMH battery in the S-JACE controller is fully discharged when factory shipped. Additionally, NiMH batteries lose charge over time if not kept trickle-charged (for more details, see [“NiMH battery pack”](#) on page 29). Therefore, even a new unit (or replacement battery) will require up to 18 hours of powered operation before it can provide reliable backup power, meaning it is at full charge.

The Security JACE monitors both batteries, and periodically loads the NiMH battery to test its ability to maintain backup functions. Investigate any battery trouble message, and check the battery connections to the unit. Replace the battery as required. To order a new NiMH battery, see the the [“Standard Replacement Parts”](#) section on page 35.

Replacing the NiMH Battery

The replacement NPB-BATT battery is a complete assembly, that is a custom NiMH battery pack pre-attached to a battery bracket. See [Figure 15](#) on page 27.



Caution Use only NiMH battery packs approved for use with the Security JACE.

To replace the NiMH battery pack, proceed as follows:

Procedure 3 Replacing the NiMH battery pack in an S-JACE.

- Step 1** Backup the S-JACE's configuration to your PC, using the backup feature within the Security Appliance (or the appropriate NiagaraAX software tool).
- Step 2** Disconnect the sealed lead-acid [Backup Battery](#).
- Step 3** Remove primary power from the S-JACE. The unit should power down after some period, which may range from several seconds to several minutes. Wait for LED activity to stop—all LEDs on the S-JACE should be off.



Note NiMH-powered shutdown on the S-JACE takes notably longer than with a JACE-2 controller.

- Step 4** Remove the cover. See [“Removing and Replacing the Cover,”](#) page 12.
- Step 5** Remove the old battery and bracket assembly by taking out the four screws holding it in place, setting the screws aside for later. Unplug the battery from the connector on the SEC-J-601.
- Step 6** Plug the battery connector plug of the *replacement battery pack* into the NiMH battery connector on the S-JACE. See [“Connect the NiMH Battery,”](#) page 27.
- Step 7** Set the replacement battery/bracket assembly back over the option card slots, with the mounting holes aligned with the standoffs.
- Step 8** Place the four screws through the battery bracket, option cards blanking plates, and into the standoffs on the S-JACE base board. Using a screwdriver, hand tighten these screws.
- Step 9** Replace the cover.
- Step 10** Reconnect the sealed lead-acid backup battery.
- Step 11** Restore power to the S-JACE and verify normal operation.

Replacement Parts

Servicing the S-JACE may call for replacement parts. There are three categories of parts:

- [Non-replaceable Parts](#)
- [Standard Replacement Parts](#)
- [New Replacement Units](#)

Non-replaceable Parts

Other than the parts listed in the replacement parts sections, there are no serviceable components on the base assembly.

Memory

Any addition, modification, or replacement of memory components requires software configuration and is not a field upgrade. For additional information on modifying the memory capacity of the SEC-J-601, consult your regional Tridium office.

Fuse

The S-JACE contains a non-user replaceable fuse, soldered on the circuit board. This fuse provides protection from internal shorts or connection to incorrect power supplies. If the fuse circuitry is suspect, contact your regional Tridium office for technical support. See the [“Returning a Defective Unit”](#) section on page 37.

Standard Replacement Parts

Standard replacement parts are listed in [Table 7](#) and can be ordered from stock without restriction. Standard replacement parts cannot be returned for credit and should be disposed of in an appropriate manner.

Table 7 Standard replacement parts.

Part Number	Description
NPB-BATT	NiMH Battery Pack (with battery bracket)—see “Replacing the NiMH Battery,” page 34.
10429	6-position (end mount) screw terminal connector plug (1), for expansion modules not mounted in-line.
10717	Screw terminal connector, pin-mount, 7-position (2 used), for card reader inputs.
10716	Screw terminal connector, pin-mount, 6-position (2 used), for relay outputs.
10714	Screw terminal connector, pin-mount, 4-position (2 used), for digital inputs, power supply/SLA battery.
10713	Screw terminal connector, pin-mount, 3-position (3 used), for supervised inputs.
10747	4-lead resistor pack (has two internal 1K ohm resistors) for field installation at supervised contacts. One resistor pack required for each supervised input.



Note Screws used for the S-JACE are standard #6-32 x 3/8" types, which you can obtain locally if lost.

New Replacement Units

To replace a faulty unit, order and install a *new* SEC-J-601 S-JACE—please note that Vykon Security series products do *not* have special “field replacement units,” or FRUs, with separate part numbers.

If the faulty SEC-J-601 controller is *still in warranty*, you can receive credit by returning it to Tridium. Be sure to contact Tridium for a return authorization (RA) number before shipping an item for return credit. See the [“Returning a Defective Unit”](#) section on page 37 for more details.



Note Before ordering a new SEC-J-601, it is strongly recommended that you contact your normal technical support resource to eliminate the possibility of a software issue or mis-configuration problem.

Replacing the Security JACE base assembly


Caution

Before handling circuit boards, discharge any accumulated static by touching the metal surface of the Security JACE. For details, see [“Static Discharge Precautions,”](#) page 10.

To replace the Security JACE base assembly (SEC-J-601) in the field, proceed as follows:

Procedure 4 Replacing a Security JACE base assembly.

- Step 1** Using the backup feature within the Security Appliance (or the appropriate NiagaraAX software tool), back up the S-JACE’s configuration to your PC.
- Step 2** Disconnect the [Backup Battery](#).
- Step 3** Remove primary power to the S-JACE by de-energizing the [SEC-ENC-MED](#) or [SEC-ENC-LRG](#) enclosure power supply. The unit should power down automatically.
- Step 4** Remove power to loads switched through its relay outputs, such as door strikes.
- Step 5** Note positions of all communications and other wiring cables going to the S-JACE. If necessary, label connectors to avoid mis-connection later, after the S-JACE is replaced.
- Step 6** Unplug all Ethernet, serial, modem, and security I/O connectors from the S-JACE.


Note

Removal of the larger screw terminal connectors from the circuit board pins may require gentle prying between the connector and the circuit board. When removing, grasp the connector firmly at both ends, and pull out from the circuit board. See [“About Screw Terminal Connectors,”](#) page 13.

- Step 7** Unplug the 6-position end-connector plug from the Security JACE, if present.
- Step 8** Remove the screws in the two mounting tabs, and slide the S-JACE away from the integral power supply of the SEC-ENC-MED or SEC-ENC-LRG enclosure.
- Step 9** Remove the S-JACE from the DIN rail (see [Figure 3](#) on page 12).
- Step 10** Remove the cover from the old S-JACE (see [“Removing and Replacing the Cover,”](#) page 12). Note the position of installed [option cards](#), if any. You must transfer them to the replacement unit.
- Step 11** Remove the option cards from the old S-JACE and install them into the replacement SEC-J-601, if applicable.
- Step 12** Mount the replacement SEC-J-601 controller on the DIN rail, plugging it into the enclosure’s power supply. See [Figure 3](#) on page 12. Re-secure by fastening the screws into the two mounting tabs.
- Step 13** Reconnect the [grounding](#) wire to the grounding connector lug.
- Step 14** Reinstall the other security I/O screw terminal connectors onto the appropriate circuit board pins, including the [reader inputs](#), [supervised inputs](#), [relay outputs](#), and [digital inputs](#).
- Step 15** Reconnect any Ethernet, serial, modem connections to the S-JACE.
- Step 16** Reconnect the 6-position end-connector plug into the S-JACE.
- Step 17** Restore power to loads switched through relay outputs, turn the devices back on, or reconnect power to them.
- Step 18** Reconnect the [Backup Battery](#).

Step 19 Restore power to the S-JACE.

It should boot up as a new unit (see “[Check the Status LEDs](#),” page 28).

Step 20 For software re-configuration details, see the *Vykon Security Appliance Guide*.

Returning a Defective Unit



Note If the defective unit is under warranty, please follow return instructions provided in this section. If the unit is *out of warranty*, please discard it.

- Do not return an out-of-warranty SEC-J-601 to Tridium.
- There is no “return for repair-and-return” service available for any of the Vykon Security products.

For proper credit on an in-warranty unit, ship the defective unit to Tridium within 30 days.

Prior to returning the unit, contact one of the following Tridium offices to obtain a return authorization (RA) number and other instructions. Please provide: • Product model • Serial number • Nature of the defect

United States

Phone: 804-254-7086, ext. 11

Return to:

Tridium, Inc.
2256 Dabney Road, Suite C
Richmond, VA 23230
Attn: Return Department RA# _____

Europe

Phone: +44 (0) 1403 740290

Return to:

Tridium Europe Ltd
1, The Grainstore
Brooks Green Road
Coolham
West Sussex
RH13 8GR
United Kingdom
Attn: Return Department RA# _____

Fax: +44 (0) 1403 741804

Email for technical support:

supportuk@tridium.com

Email for product orders:

ordersuk@tridium.com

Asia/Pacific

Phone: +65 6887 5154

Address:

Tridium Asia Pacific Pte Ltd
101 Cecil Street,
#10-11, Tong Eng Building,
Singapore 069533
Attn: Mr Lim Hoon Chiat, Engineering Manager RA# _____

Sales: (Australia): **Phone:** +61 7 5539 1211

Fax: +65 6887 5342

Mobile: +65 9665 6024

Email for technical support:

hclim@tridium.com

Fax: +61 7 5597 2334

(Japan): **Phone:** +81 044 829 1750

Certifications

Installation : The control units and accessories are intended to be installed in accordance with the following:

1. The National Electrical Code, ANSI/NFPA 70.
2. Canadian Electrical Code, Part I.
3. Local Authority having Jurisdiction.

Underwriters Laboratories, Inc (UL) / Canadian Standards Association (CSA)

When installed in accordance with UL requirements, this equipment meets the following UL listing:

- UL 294 Access Control System Units
- CSA No. C22.2 No. 205 Signal Equipment

See the “[UL Requirements](#)” section on page 30 for more details.

Federal Communications Commission (FCC)

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause interference with radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case, users at their own expense will be required to take whatever measures may be required to correct the interference. Any unauthorized modification of this equipment may result in the revocation of the owner's authority to continue its operation.

Canadian Department of Communications (DOC)

- This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
- Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.