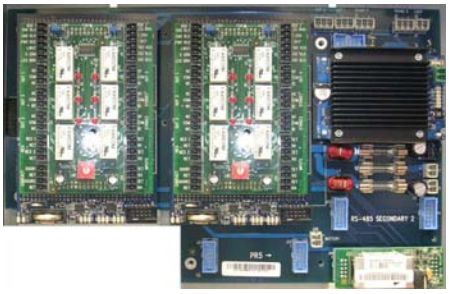
Sielox AC-1500 Controllers Series Installation Manual



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Introduction

The Sielox AC-1500 Series controllers manage access control and related events. They are modular and scalable allowing from 2 to 8 doors and 8 to 32 I/O points on the same backplane. With expansion, up to 256 I/O points can be monitored and controlled.

Certifications

FCC - Federal Communications Commission Notice

This equipment complies with Part 15 of the FCC rules; operation is subject to the following two conditions:

This device may not cause harmful interference, and

This device must accept any interference received, including interference that may cause undesired operation.

Operation of this equipment in a residential area may cause unacceptable interference to radio and TV reception requiring the operator to take whatever steps are necessary to correct the interference.

WARNING: Changes or modifications to Sielox's EAC equipment not expressly approved by the party responsible for assuring compliance could void the user's authority to operate the equipment in a safe or otherwise regulatory compliant manner. If equipment is not installed and used in accordance with the instructions in the User Manual, it may cause interference; in which case, the user at their own expense must take whatever measures are required to correct interference.

"This Class A digital apparatus complies with Canadian ICES-003."

«Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.»

UL 294 and UL 1076

The following are ETL certifications to UL 294 and UL 1076 standards and have been achieved on the following 32-bit series controller sub-assembly/component providing you the flexibility of meeting compliance requirements your final LANLink 1500 and AC-1500 Series.

LAN Controller Module: 7195578

CPU Module: 6800066

Reader Module: 753547

Input Module: 060256

Output Module: 361207

AC-1500 Series Backplanes: 6800067, 6800064, 6800065

AC-1508 Series Backplanes: 6800068, 7246916

RS-485 Module: 95310

Dual Power Regulator(12V and 6V): 6800063

Enclosure: 7969269 (AC-1500L Series)

Enclosure: 7106307 (AC-1500S Series)

For the latest ETL information list, click on the link below:
http://etlwhidirectory.etlsemko.com/WebClients/ITS/DLP/products.nsf/$$Search?OpenForm

Technical Support & RMA's

Phone: 800-424-2126, prompt 8
FAX: 856-939-9306
8:30 am – 7:30 pm Eastern time, Monday - Friday
E-Mail:tech.support@sielox.com

Controller Features

The Sielox AC-1500 Controller Series is powered by a 32-bit microcontroller. It comes with a built in power regulator/UPS/Battery charger module (PR-DUAL) that keeps the unit running in the event of a power failure.

Each controller has the following features:

- 2 doors, 2 Request to Exit, 2 Door Contacts and Door Locks.
- 50,000 Card holder database
- 10,000 Off-line events
- 4 General purpose Inputs (Supervised or Unsupervised)
- 4 General purpose Outputs
- Real Time Clock (RTC)
- Lithium Battery Backup keeps the card holder database, off-line events and RTC running in case of power loss.
- Status Lights (Lithium Battery, Communications and power)

The AC-1500 comes in two sizes AC-1500L or AC-1500S.

The AC-1500L has 3 backplanes configurations:

- AC-1500-BP4L a 2-8 door configuration with expansion to up 4 BP7 I/O Backplanes.
- AC-1500-BP5 RIO a 2 door and I/O.
- AC-1500-BP7 I/O backplane.

The AC-1500 Series has large and small backplanes:

Large Backplanes

AC-1500-BP4L	8 readers
AC-1500-BP5 RIO	2 readers and 4 I/O Modules (32 I/O)
AC-1500-BP7 I/O	7 I/O modules (56 I/O)

Small Backplanes

AC-1500-BP2S	4 readers
AC-1500-BP4S	2 readers and 4 I/O Modules (32 I/O)

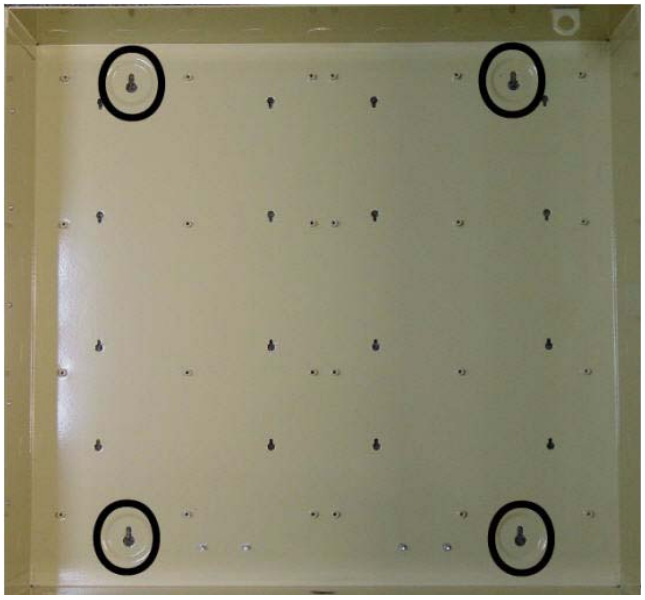
Installing Sielox Enclosures

Sielox provides 2 types of enclosures:

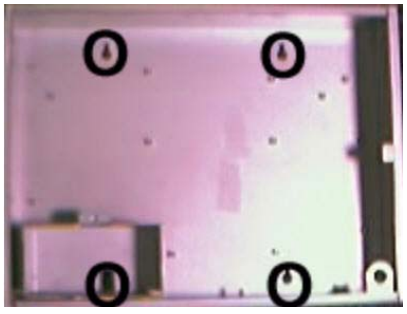
- Large Enclosure p/n 7969269 for large backplanes
- Small Enclosure p/n 7106307 for small backplanes

To install the Sielox enclosures, perform the following procedure:

1. Position the enclosure or template at the desired installation location and mark the four keyhole slot locations for mounting.
2. Install the applicable mounting fasteners such as wood screws, moly bolts, or masonry fasteners, but do not tighten them completely.
3. Position the enclosure on the four fasteners and tighten them completely.
4. Install the conduit, if not already completed.
5. Install a grounding lug to the Enclosure; ensure that the lug is terminated to an earth ground.
6. Clean any debris from the enclosure.



Large Enclosure p/n 7969269

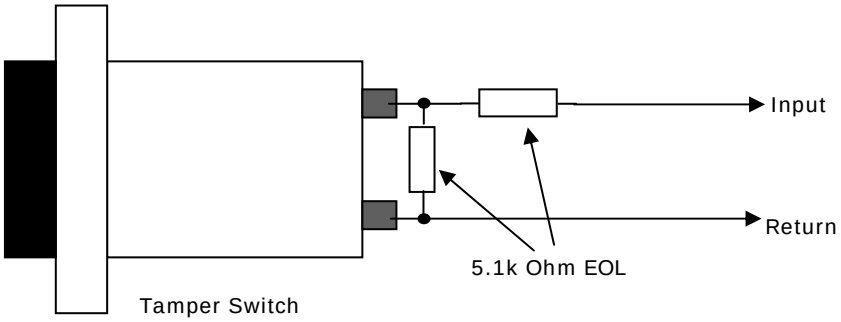


Small Enclosure p/n 7106307

Installing Tamper Switch

A Tamper Switch mounting channel is available in the upper right hand corner of the large enclosure p/n 7969269 or in the lower right hand corner of the small enclosure p/n 7106307. The switch provided by Sielox will be installed in this mounting channel.
The Tamper Switch must be connected to an Input of an installed controller. This input shall be configured as normally closed with supervision. Two supervisory resistors (5.1KOhm) shall be inserted in the wiring from the switch to the terminal controller, one across the contact of the switch, the other in the Signal data line to the controller. When configured and connected in this way, the controller will properly report an Input Active event when the enclosure door is open and Input Secure when the door is closed.
An Input Cut or Input Shorted status will be reported if the switch or supervision resistors are not properly assembled and connected.

Please refer to the following drawing for wiring of the Tamper Switch:



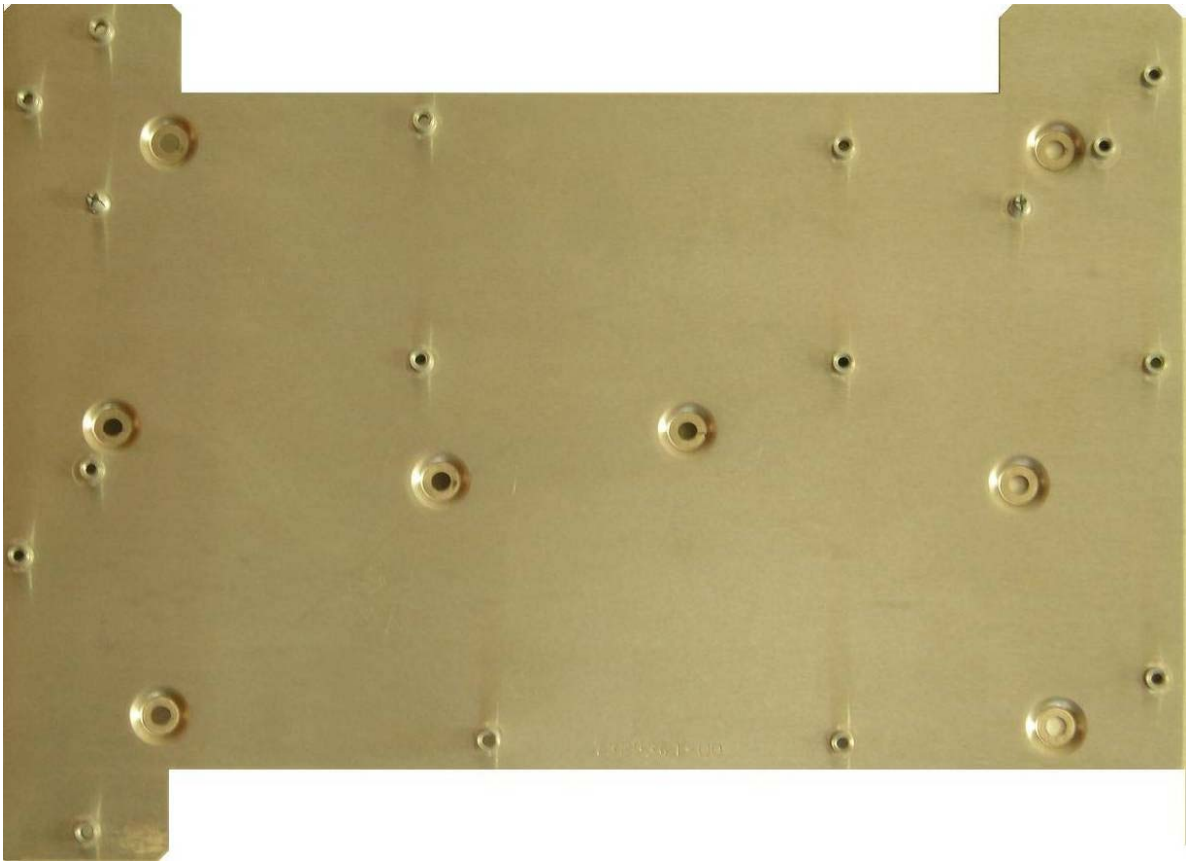
Mounting Plate (P/N 7372565)

The AC-1200-MAP mounting plate can be used where an AC-1500 is not being installed in the AC-1200-ENC-32 Enclosure.

Not evaluated by UL *(The AC-1200-MAP has not been evaluated by UL and is not UL294 compliant. Use the AC-1200-ENCL for UL294 compliance.)*

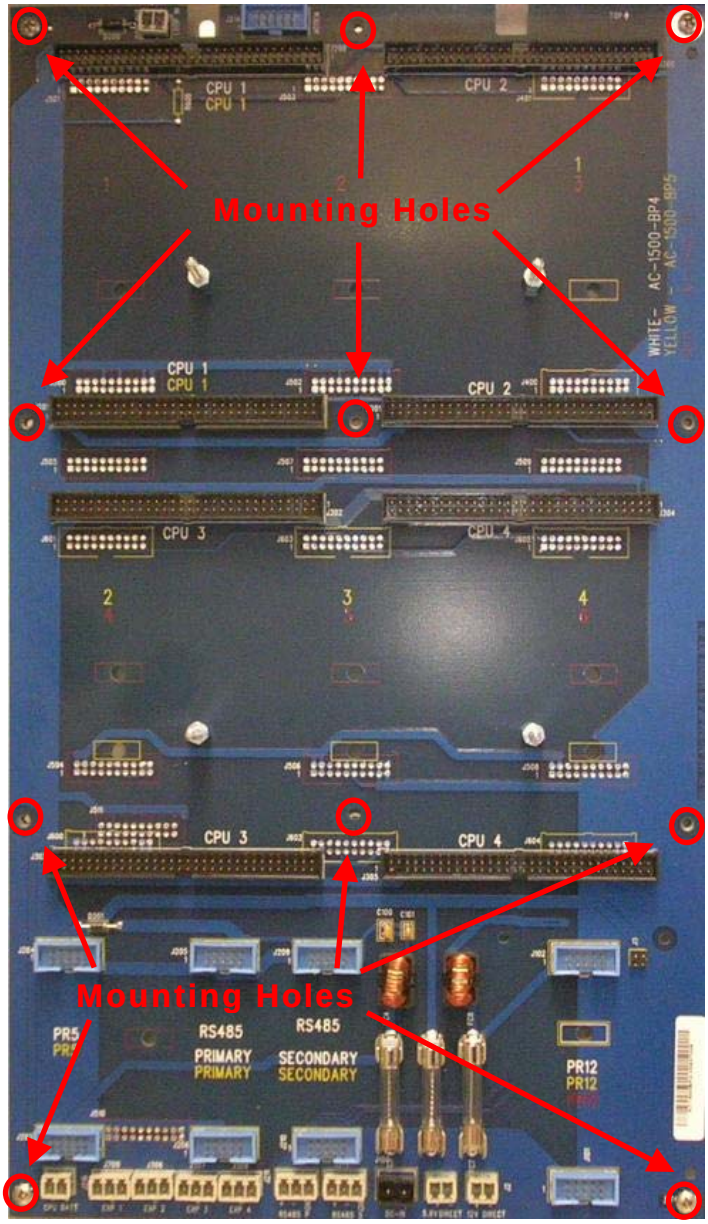
Retrofit Plate Kit (P/N 7202975)

AC-1200-RFK (Retrofit Plate Kit).
Not evaluated by UL *(The AC-1200-RFK has not been evaluated by UL and is not UL294 compliant. Use the AC-1200-ENCS for UL294 compliance.)*



Installation of AC-1500L Backplanes BP4, BP5 or BP7

In order to mount the AC-1500 series of backplanes into the enclosure or mounting plate, 12 SEMS screws #6-32 x 5/16 must be used. The enclosure and the mounting plate have threaded studs for the utilization of these screws. The AC-1500 series backplanes have circular cutouts that allow these screws to be utilized, thereby securing the printed circuit board into the enclosure.
The AC-1500 series of backplanes, when purchased, are shipped with all hardware necessary for mounting the backplane to the enclosure.



AC-1500L BP4 Mounting Holes

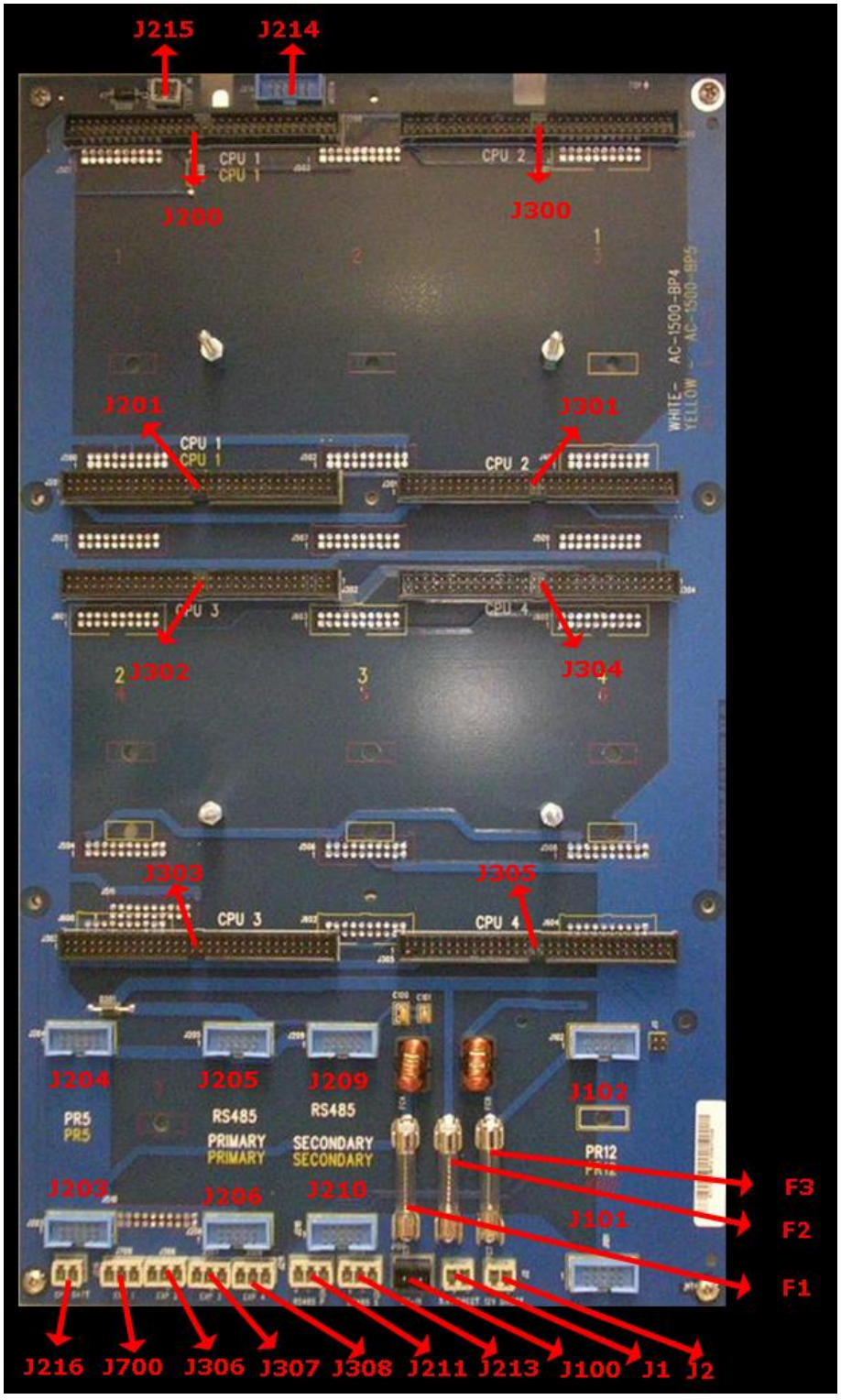
Connectors and Fuses Assignment

Connectors	Description
J200/J201	AC-1500-CPU (CPU 1 slot)
J300/J301	AC-1500-CPU (CPU 2 slot)
J302/J303	AC-1500-CPU (CPU 3 slot)
J304/J305	AC-1500-CPU (CPU 4 slot)
J204/J203	*AC-1200-PR5 (Used with AC-1200 only)* [1]
J205/J206	AC-LAN-COMM or AC-1500-RS485 Primary
J209/J210	AC-LAN-COMM or AC-1500-RS485 Secondary (Reserved)
J102/J101/J3	AC-1500-PRDUAL or *AC-1200-PR12 (Used with AC-1200 only)* [2]
J100	DC-IN +11.5 to +25 VDC with AC-1500-PRDUAL
J700	Connection to I/O Backplane 1
J306	Connection to I/O Backplane 2
J307	Connection to I/O Backplane 3
J308	Connection to I/O Backplane 4
J216	*Battery connection for CPU memory retention AC-1200 Only* [3]
J211	RS485 Connection Primary Channel
J213	RS485 Connection Secondary Channel (Reserved) [4]
J1	External 5.8-6.0 VDC Input
J2	External 12 VDC Input
J215	Loop connection for controller supervision
J214	MODEM Connection

Notes:
Some connectors were left on this backplane for backward compatibility with the AC-1200 Series. The PRDUAL is a 6 Volts, 12 Volts and battery charger it replaces both PR5 and PR12.

1. AC-1200-PR5 is not used with AC-1500.
2. AC-1200-PR12 is not used with AC-1500.
3. This External 6 Volt battery is not use with AC-1500 Reader Modules (REK).
4. The Secondary channel is reserved for communication between the AC-1500 Main Controller and Pinnacle hardware server.

Fuses	Description
F1	DC-IN Fuse 5 Amp / 125 Volts
F2	5.8V Direct Fuse 5 Amp / 125 Volts
F3	12V Direct Fuse 5 Amp / 125 Volts



AC-1500L BP4 Connectors and Fuses location

AC-1500 Controller Modules

AC-1500-CPU

CPU Module (Requires AC-1500-RDR)
Capacity of
- Real Time Clock (RTC)
- Data and RTC Battery Backup
- 50K Cards
- 10K off-line events

AC-1500-OUT

Output Module
- 8 Outputs

(Relays- C, NO,NC)

AC-1500-RDR

Reader Module (requires AC-1500-CPU)
- 2 Readers
- 2 Door Contacts
- 2 Door Strikes
- 2 REX
- 4 Inputs (Supervised/Unsupervised)
- 4 Outputs (relays- C, NO,NC)

AC-LAN-COMM

LANLink™ Controller Module

AC-1500-REK (Terminal Controller)

This module is a combination of the AC-1500-CPU and AC-1500-RDR.
The AC-1500-RDR plugs on top of the AC-1500-CPU.

AC-1500-RS485

RS-485 Controller Module

AC-1500-INP

Input Module
- 8 Inputs (Sup/Unsupervised)

AC-1500-PRDUAL

12 VDC & 6 VDC Power Regulator / Battery Charger and AC-Fail status.
Required with backplanes:
- AC-1500-BP2
- AC-1500-BP4L
- AC-1500-BP4S I/O
- AC-1500-BP5 RIO
- AC-1500-BP7 I/O

AC-1500 Modules Table

Installing Cables into the Sielox Enclosure

Signal Cables

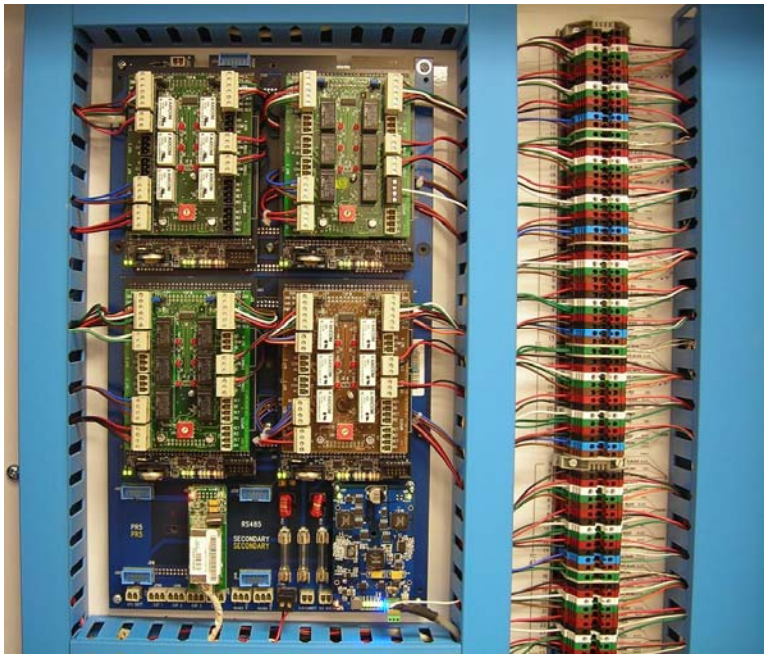
Connect signal cables to any reader, door strike, output, input, request-to-exit and door switch. Follow these procedures:

1. Pull signal cables through the Sielox Enclosure. (See table below)
2. When connecting these cables to the AC-1500 reader, input or output modules, form a cable bundle using plastic cable ties (Tie wraps).
3. Arrange conductors so that they split out at the right angles from the bundle. Allow enough slack so that the enclosure door can shut easily without pinching the cable bundle.
4. Strip ¼ inch of insulation from each conductor that inserts into a connector block.
5. Insert the stripped conductors into respective removable connectors and tighten set screws.(See REK Connectors and AC-1500L BP4 Connectors details)
6. Verify cable connections.
7. Insert removable connectors on the appropriate module fixed connector.

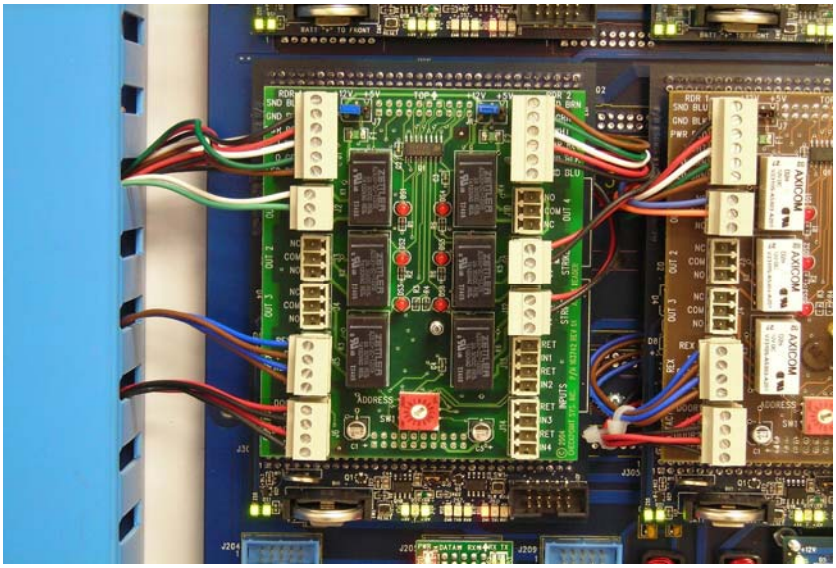
Cable Type	AWG	Wires	Where Used	Color Code	Max. Dist.
Belden 8761 (Shielded)	22	2	Inputs (Door, REX)	Clear / Black	500 ft.
Belden 9460 (Shielded)	18	2	Outputs (Door Lock)	Clear / Black	*
West Penn 5304E (Shielded)	18	5	Wiegand Readers	Red/Black/White/Green/Brown	500 ft.
Belden 8723 (Shielded)	22	4	Communication RS-485	Red/Black/White/Green	4000 ft.
Belden 1307A	16	2	Power / Battery	Red/Black	50 ft.

*Application dependent but typically runs 500 ft.

AC-1500 Cables



AC-1500 Typical Wiring



Field wires connected to a Terminal Controller

Communications

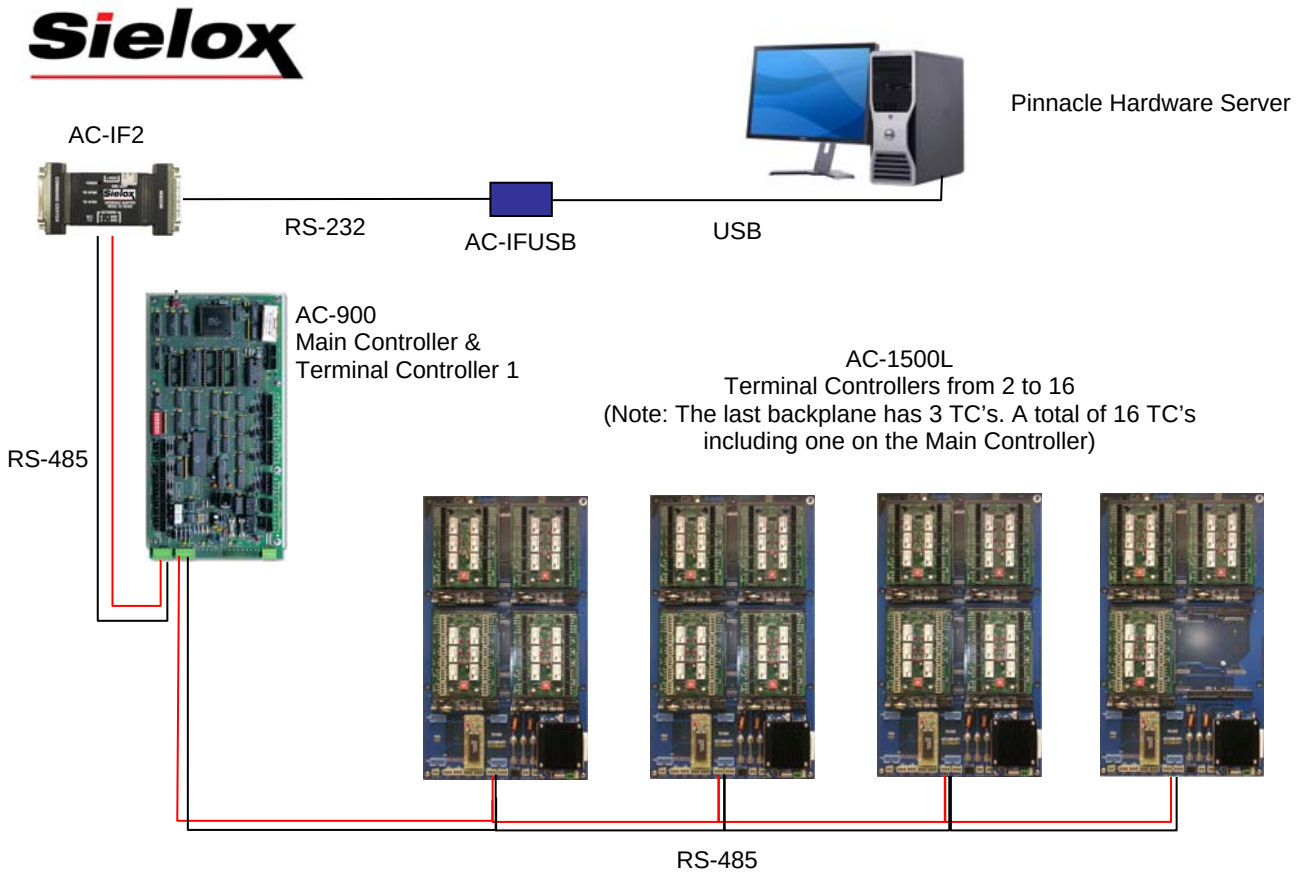
The AC-1500 controller communicates directly to a Pinnacle Hardware Server via Ethernet or a combination of Ethernet and RS-485.

The AC-1500 controller communicates to an AC-900 Main Controller via RS-485, the AC-1500 LANLink™ provides an Ethernet connection to the controller's backplane.

The X-LAN device provides an external Ethernet to RS-485 conversion. The communication interface at the Pinnacle Server is Ethernet. The communication interface at the controller's backplane is RS-485.

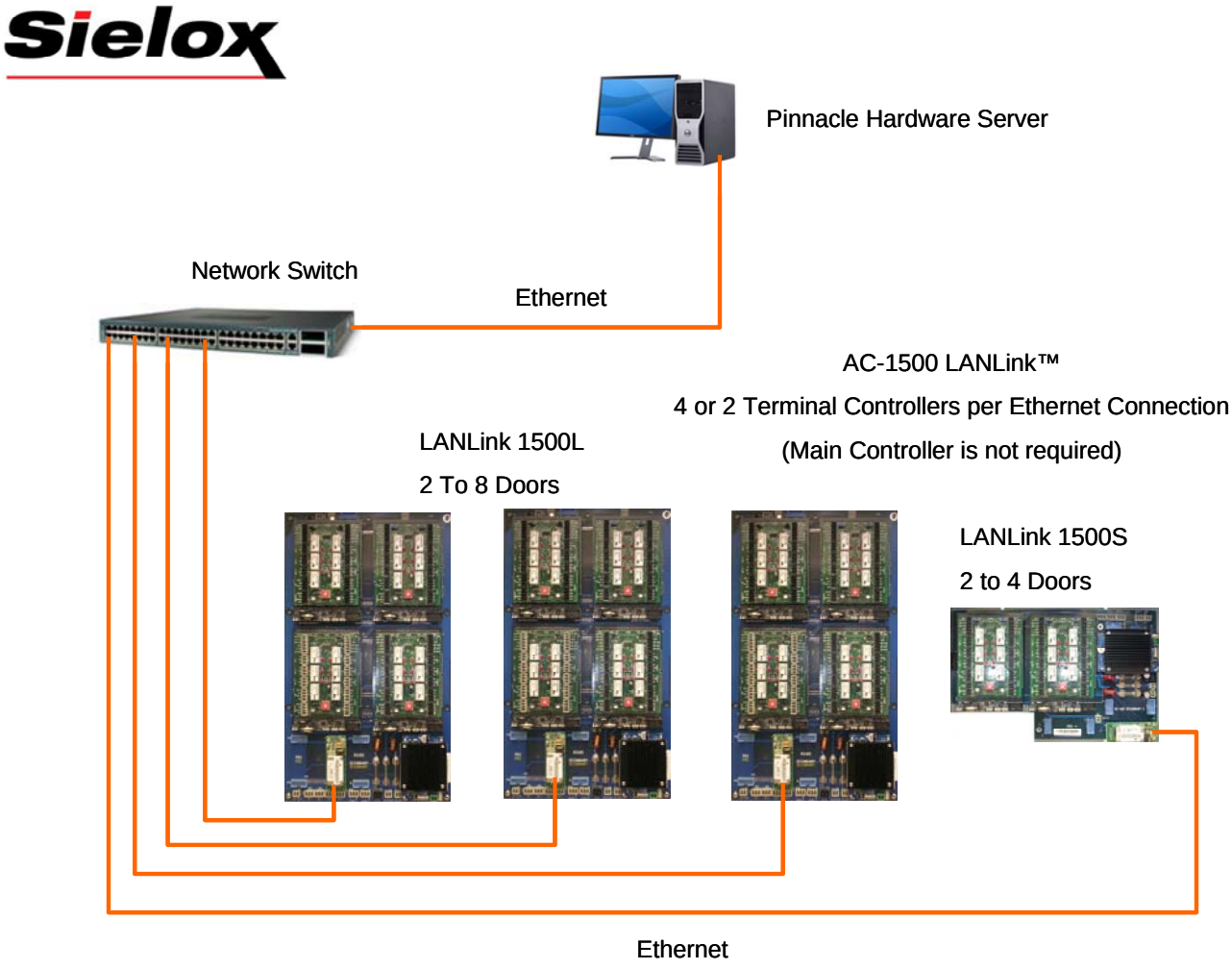
Main Controller

The Main Controller (MC) is connected to the Pinnacle Hardware Server through an AC-IF2, which is an RS-232 to RS-485 converter.
Many computer manufacturers no longer provide RS-232 serial communication ports. In these situations, an AC-IFUSB adapter can be used for USB to RS-232 conversion and connection to the AC-IF2.



LANLink™

LANLink™ is Sielox's IP-based access control controller, also known as the LAN Controller (LC), with 2 to 8 doors per LC.

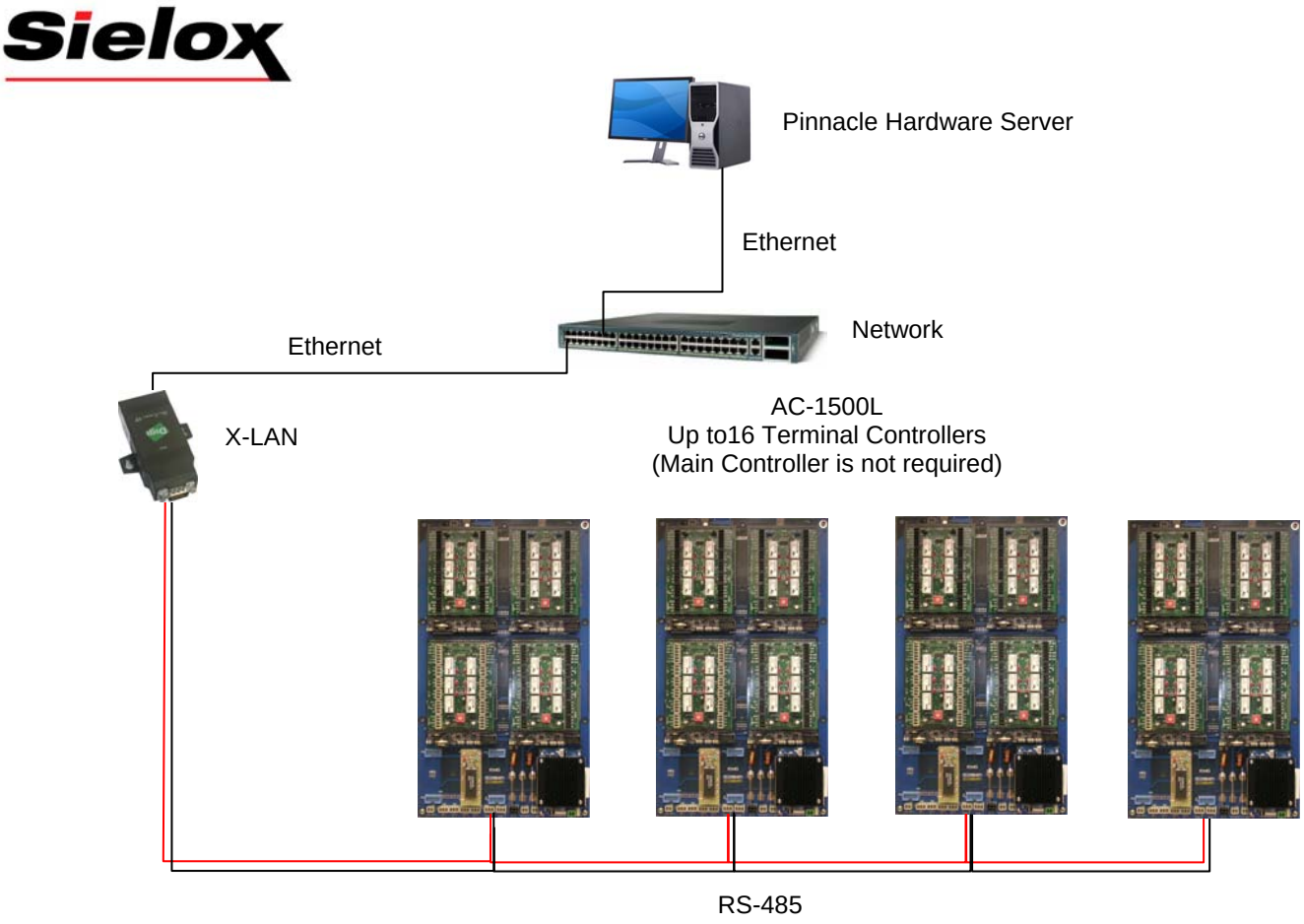


X-LAN

X-LAN is an Ethernet to RS-485 converter. The X-LAN does not require a Main controller and allows up to 16 TC's (4 fully populated BP4 backplanes) per Ethernet connection.

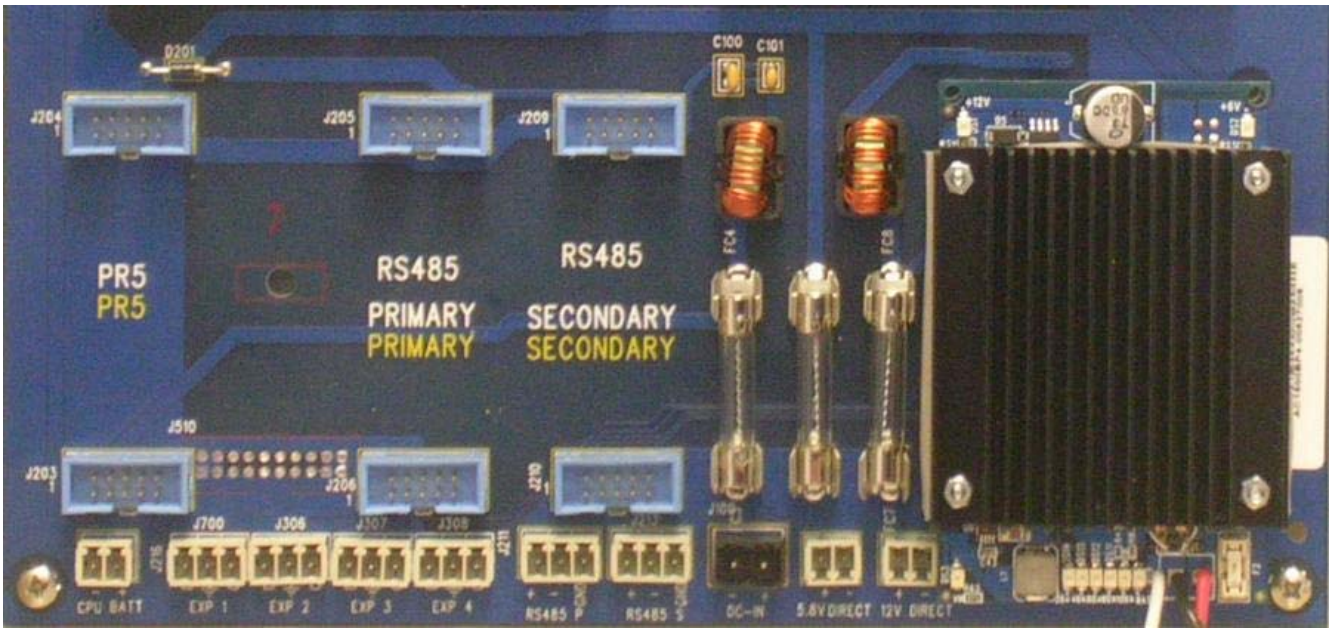
The X-LAN is an ideal solution for installations with existing Ethernet Network infrastructure, because it reduces installation cost.

Note: The XLAN will be available on the third quarter of 2007 and requires Pinnacle 6.1.xx software.



Installing the LAN Module

Plug the AC-LAN-COMM module to connectors J205 and J206 (RS 485 Primary) located on the backplane. (See Backplane Connector Locations and AC-1500 Modules Table). Proper orientation must be observed when installing the module into the connectors, see figures below.



Backplane Bottom View

AC-LAN-COMM Module Installed

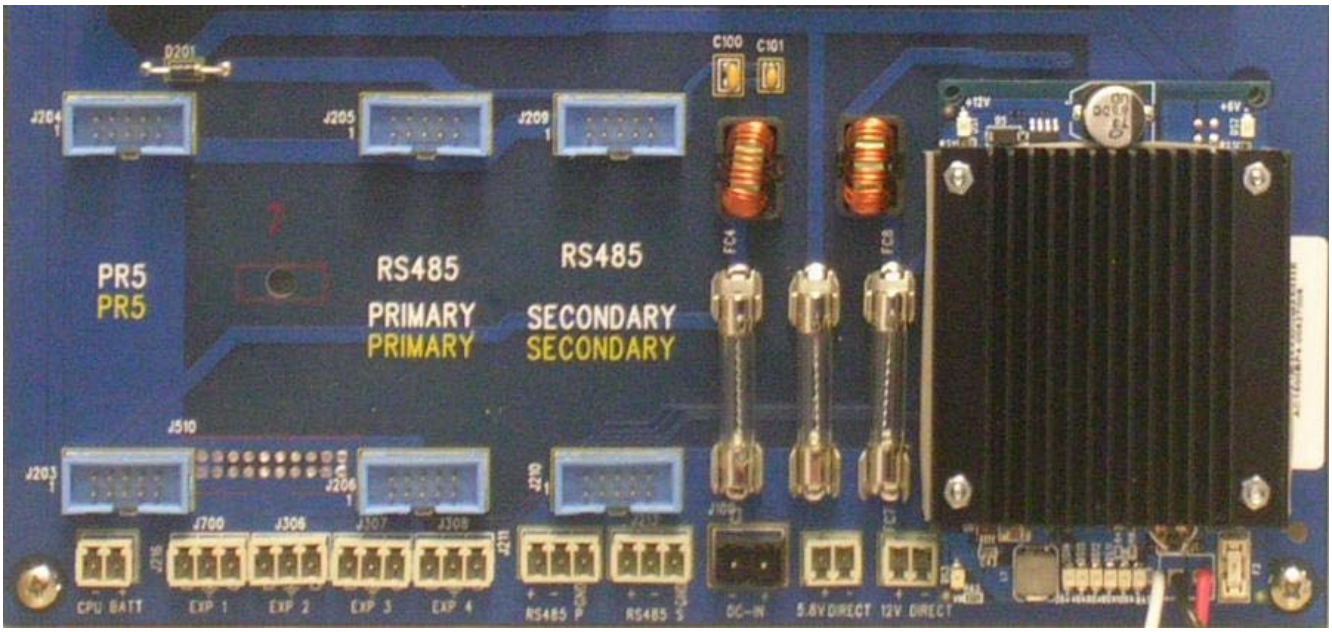
Connecting the Ethernet Cable

1. Pull the communication cable through the Sielox Enclosure. (See table below)
2. Terminate the CAT5 cable with an RJ-45 connector.
3. Connect the RJ-45 connector to the AC-LAN-COMM.

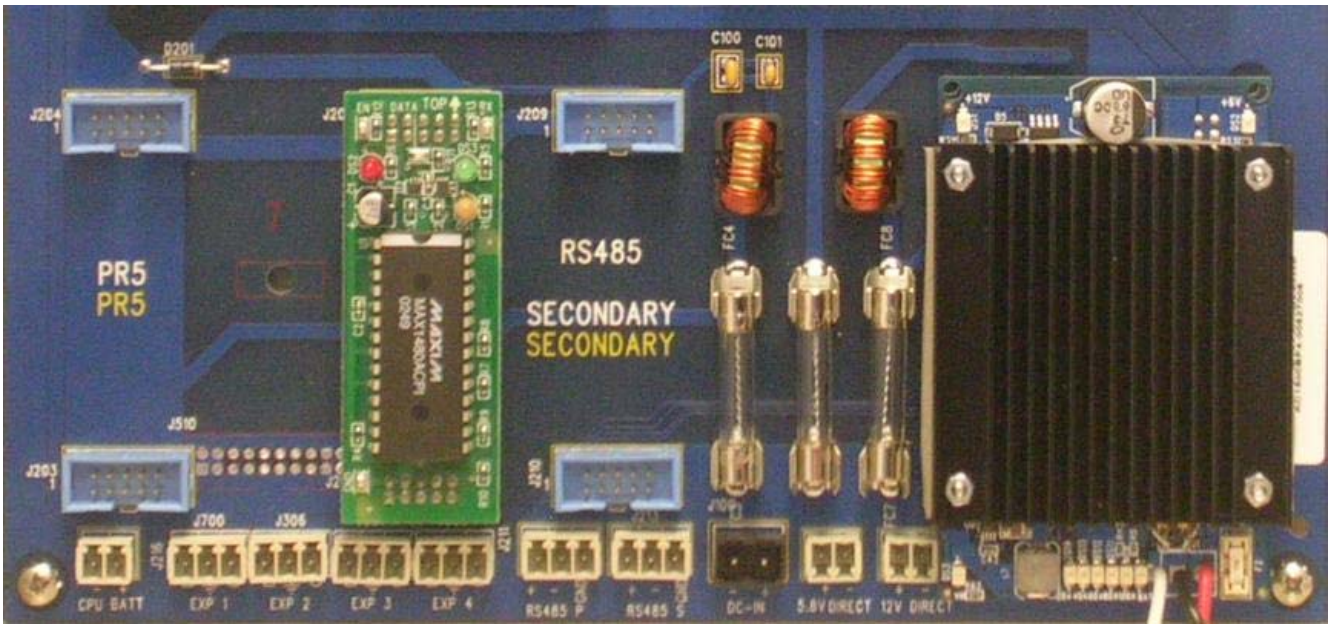
Cable Type	AWG	Wires	Where Used	Color Code	Max. Dist.
Belden 11700A	24	8	Ethernet Communication	Orange/Blue/Green/Brown Striped Orange/Blue/Green/Brown	329 ft.

Installing the RS-485 Module

In order to use this interface you have to plug in the AC-1500-RS485 module to connectors J205 and J206 (RS 485 Primary) located on the backplane. (See Backplane Connector Locations and AC-1500 Modules Table). Proper orientation must be observed when installing the module into the connectors, see figures below.



Backplane Bottom View



AC-1500-RS485 Module Installed

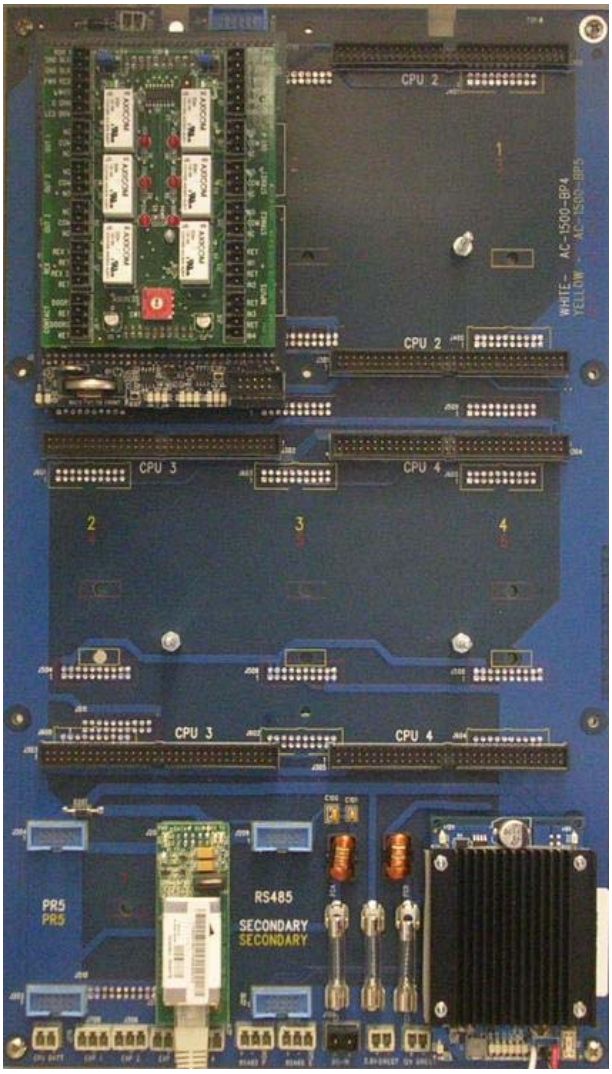
4. Pull the communication cable through the Sielox Enclosure. (See table below)
5. Insert the stripped conductors into the removable RS-485 P (J211) connector and tighten set screws.
6. Observe the polarity.
7. Insert removable connector on the J211 connector.

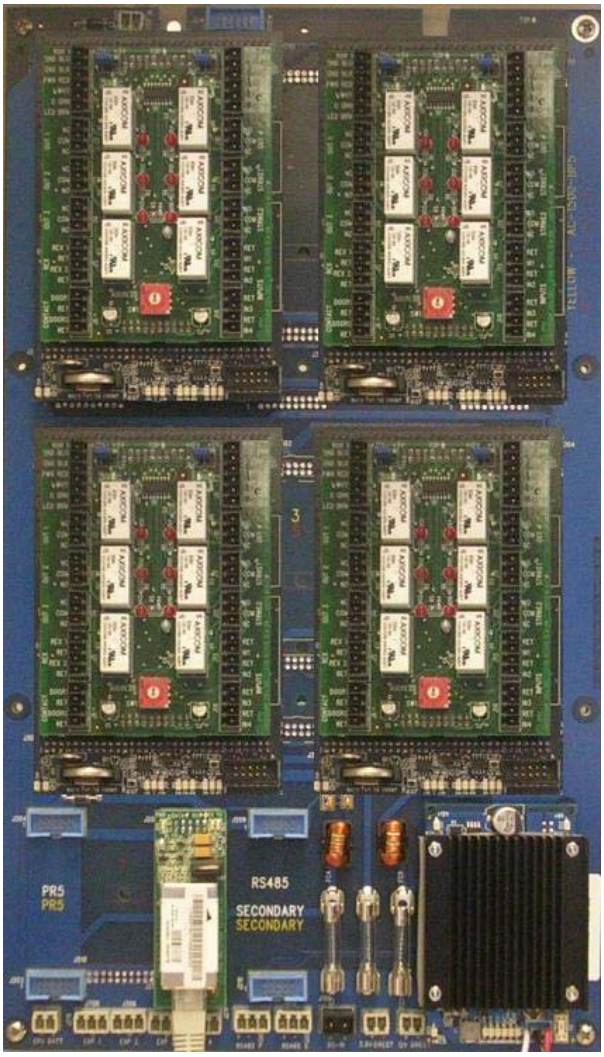
Cable Type	AWG	Wires	Where Used	Color Code	Max. Dist.
Belden 8723 (Shielded)	22	4	Communication RS-485	Red/Black/White/Green	4000 ft.

Installing the Reader Module (AC-1500-REK)

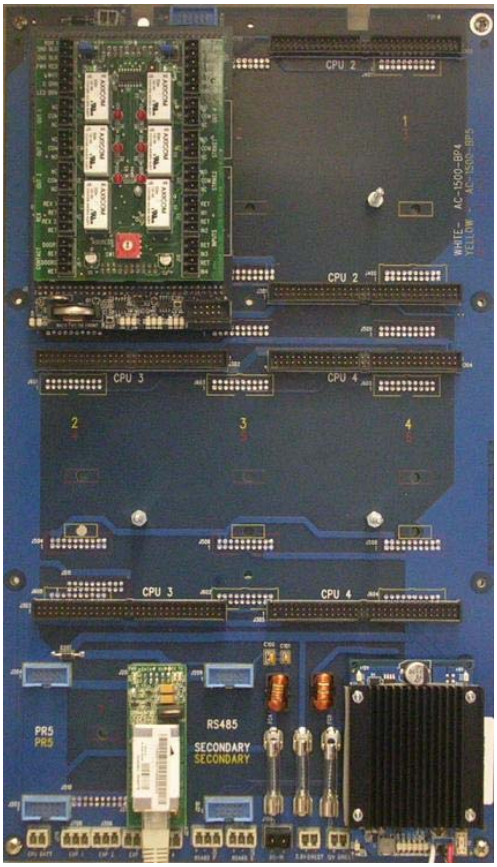
The AC-1500-REK is also know as Terminal Controller (TC).
Plug in the AC-1500-REK reader module to connectors J200 and J201 (CPU 1) located on the backplane. (See Backplane Connector Locations and AC-1500 Modules Table). Proper orientation must be observed when installing the module into the connectors, see figure below.
Repeat the above procedure for all the additional CPU module, plug:

- AC-1500-REK reader module to connectors J300 and J301 (CPU 2)
- AC-1500-REK reader module to connectors J302 and J303 (CPU 3)
- AC-1500-REK reader module to connectors J304 and J305 (CPU 4)





AC-1500L Backplanes with 1 and 4 AC-1500-REK Modules installed


CPU 2
CPU 2
CPU 3
CPU 4
CPU 3
CPU 4
RS485
SECONDARY
SECONDARY
PR5
PR5

Connect signal cables to any reader, door strike, output, input, request-to-exit and door switch. Follow these procedures:

1. Pull signal cables through the Sielox Enclosure. (See table below)
2. When connecting these cables to the AC-1500 reader, input or output modules, form a cable bundle using plastic cable ties (Tie wraps).
3. Arrange conductors so that they split out at the right angles from the bundle. Allow enough slack so that the enclosure door can shut easily without pinching the cable bundle.
4. Strip ¼ inch of insulation from each conductor that inserts into a connector block.
5. Insert the stripped conductors into respective removable connectors and tighten set screws.(See modules for connector details)
6. Verify cable connections.
7. Insert removable connectors on the appropriate module fixed connector.

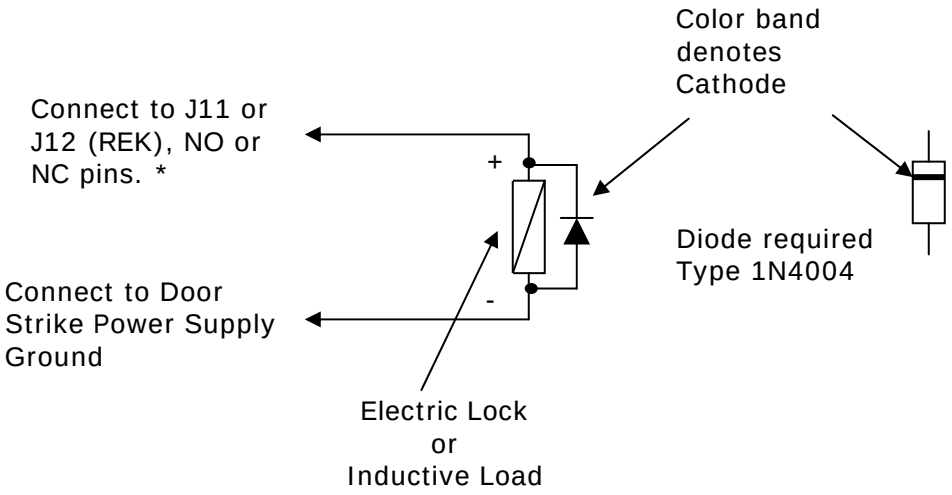
Cable Type	AWG	Wires	Where Used	Color Code	Max. Dist.
Belden 8761 (Shielded)	22	2	Inputs (Door, REX)	Clear / Black	500 ft.
Belden 9460 (Shielded)	18	2	Outputs (Door Lock)	Clear / Black	*
West Penn 5304E (Shielded)	18	5	Wiegand Readers	Red/Black/White/Green/Brown	500 ft.

*Application dependent but typically runs 500 ft.

Note: See the figure AC-1500-REK Connectors.

Transient Suppressor (Door Locks and Outputs)

The installation of suppression diodes is required for all electric door locks or other inductive loads connected to TC outputs. See diagram below.

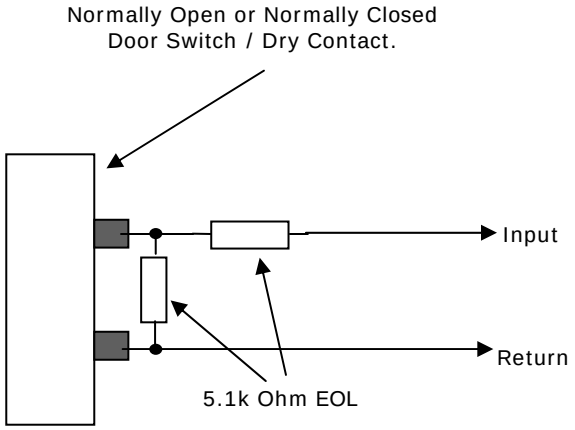


***Note1: Use N.O. when using Maglock. (Fail Safe)**
Note2: Use N.C. when using Electric Strike (Fail Secure)

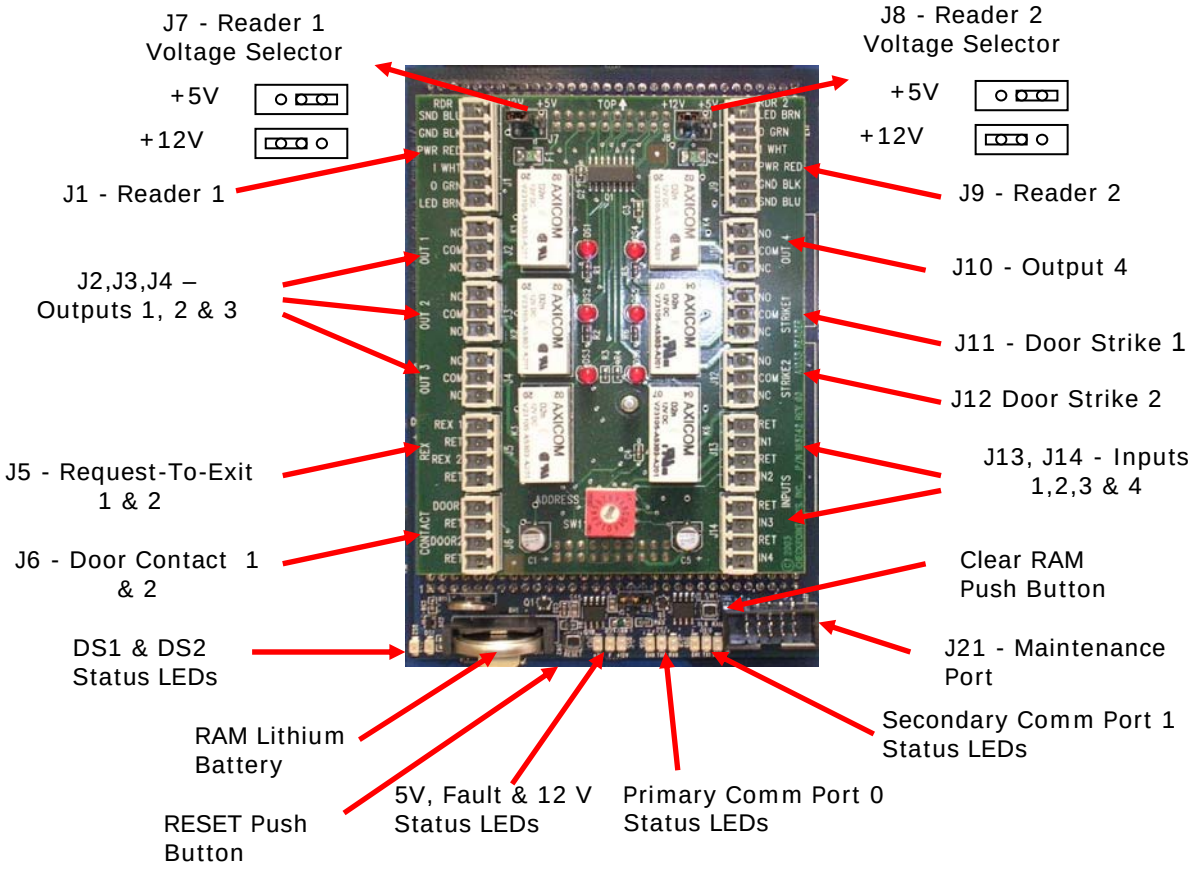
Supervised Inputs

All the REK inputs can be supervised including the door contact.

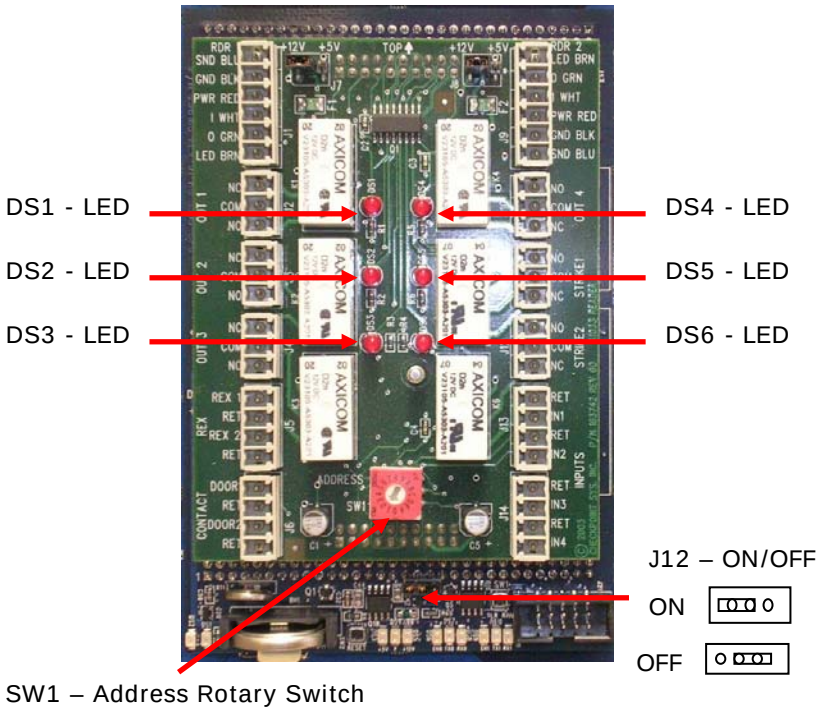
Install two 5.1K Ohm, 5% End-Of-Line resistors as close as possible to the switch. One resistor is connected in parallel with the switch contacts and the other in series with one contact.



Note: Remember to configure the Door Properties or Inputs Properties in Pinnacle Device Setup for the proper switch state and supervision.



AC-1500-REK Connectors, Jumpers, LED's and Push Buttons



AC-1500-REK Jumper, Output LED's and Address Switch

Readers 1 & 2 - J1 & J9

PIN	Name	Wire Color
SND BLU	Sounder*	Blue
GND BLK	Ground	Black
PWR RED	Power**	Red
1 WHT	Data 1	White
0 GRN	Data 0	Green
LED BRN	LED	Brown

* For use with AC-125 series of Performa readers.
** Reader voltage 5VDC or 12 VDC is selectable, see J7.

Door Contacts 1 & 2 Connectors J6

PIN	Name	Wire Color
DOOR1	Signal	Clear
RET	Ground	Black
DOOR2	Signal	Clear
RET	Data 1	White

Door REX (Request to Exit) 1 & 2 - J5

PIN	Name	Wire Color
REX1	Signal	Clear
RET	Ground	Black
REX2	Signal	Clear
RET	Data 1	White

Door Strike 1 & 2 - J11 & J12

PIN	Name	Wire Color
NO	Normally Open	Any
COM	Common	Any
NC	Normally Closed	Any

Outputs 1, 2, 3 & 4 - J2, J3, J4 & J10

PIN	Name	Wire Color
NC	Normally Closed	Any
COM	Common	Any
NO	Normally Open	Any

Inputs 1 & 2 - J13

PIN	Name	Wire Color
RET	Ground	Black
IN1	Signal	Clear
RET	Ground	Black
IN2	Signal	Clear

Inputs 3 & 4 Connector - J14

PIN	Name	Wire Color
RET	Ground	Black
IN3	Signal	Clear
RET	Ground	Black
IN4	Signal	Clear

Setting the Terminal Controller Address

Each Terminal Controller (TC) needs a unique address.

Locate the SW1 rotary switch on the REK. (See REK Address Switch)

SW1 Position	TC Address
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	10
A	11
B	12
C	13
D	14
E	15
F	16

Notes: If using a Main Controller the address of the first TC has to be 2 or higher, the MC is also a TC and it uses address 1.

Status LED CPU Board (Bottom board of the REK)

LED	Description
Lithium Battery	
DS2	ON = Battery Good. OFF=Battery low or missing
Power Indicators	
DS3 (+5)	ON =6 Volts present
DS4 (F)	ON = Fault
DS5 (+12)	ON=12 Volts present
Primary Communication Channel – Host or Main Controller	
DS6 (EN0)	Transmit Enable
DS7 (TX0)	ON= Transmitting Data
DS8 (RX0)	ON=Receiving Data
Secondary Communication Channel *	
DS9 (EN1)	Transmit Enable
DS10 (TX2)	Transmit Data
DS11 (RX3)	Receive Data

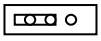
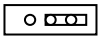
* This channel is reserved for future use.

Status LED Reader Board (Top board of REK)

LED	Description
Outputs	
DS1	Indicates output 1 (OUT1) is in the energized state when lit.
DS2	Indicates output 2 (OUT2) is in the energized state when lit.
DS3	Indicates output 3 (OUT3) is in the energized state when lit.
DS4	Indicates output 4 (OUT4) is in the energized state when lit.
Door Strike	
DS5	Indicates strike 1 (STRIKE1) is in the energized state when lit.
DS6	Indicates strike 2 (STRIKE2) is in the energized state when lit.

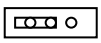
Jumpers CPU Board (Top board of REK)

LED	Description
J7	Reader 1 voltage selector
J8	Reader 2 voltage selector

+12V  +5V 

Jumpers Reader Board (Bottom board of REK)

LED	Description
J12	CPU Power (5 Volts)

ON  OFF 

RAM and Real Time Clock Backup Battery

The AC-1500-REK has a Lithium battery which holds the TC database, transactions and Real Time Clock in the event of AC power loss. This battery needs to be checked on annual basis by the field technician with a voltmeter, during preventive maintenance.
Follow these procedures to check the battery voltage and replace it if needed:

1. Turn off the main power of the backplane by removing the DC-IN connector.
2. With a digital voltmeter, measure the battery voltage on board. (Do not remove the battery from the socket)
3. The voltage should be between 2.7 to 3 volts.
4. Replace the battery if below 2.7 volts.

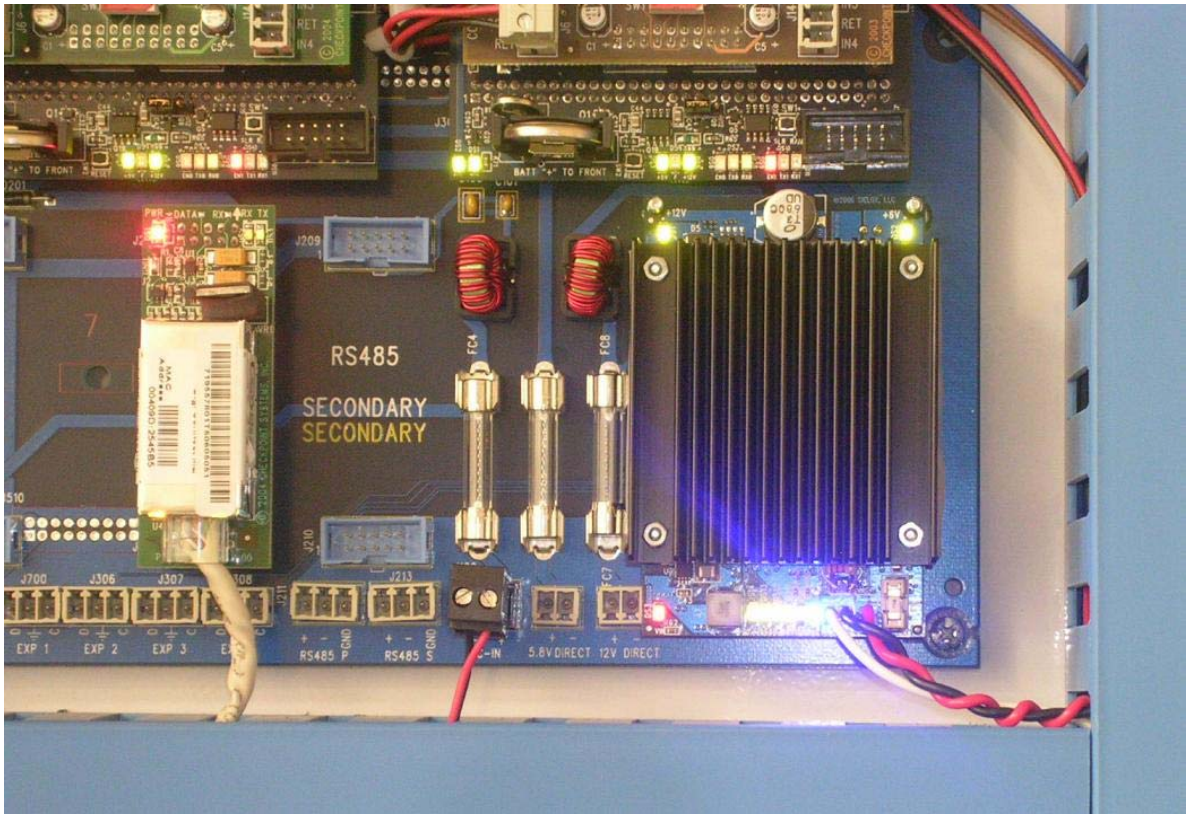
CAUTION
Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries in accordance with the manufacturer instructions.
Battery type: Lithium Battery PANASONIC BR2032.

Power Cables

To connect the power cables to the AC-1500 backplane:

1. Pull power cable through the Sielox Enclosure. (See table below)
2. Insert the stripped conductors into the removable DC-IN (J100) connector and tighten set screws.
3. Observe the polarity.
4. Insert removable connector on the J100 connector.

Cable Type	AWG	Wires	Where Used	Color Code	Max. Dist.
Belden 1307A	16	2	Power / Battery	Red/Black	50 ft.



DC-IN Connection

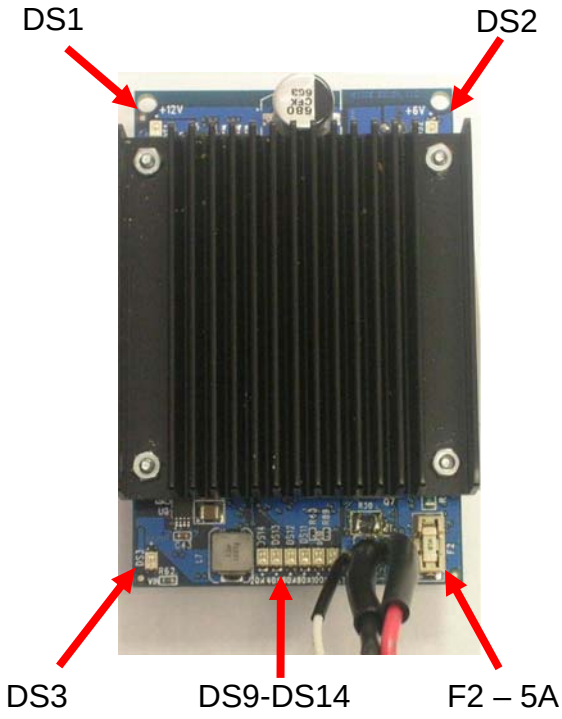
AC Power Surge Suppressor

Sielox highly recommends the use of an AC power surge suppressor such as Ditek-1F. For more information go to http://www.ditekcorp.com/product-details.asp?ProdKey=11

Installing the Power Regulator Module (AC-1500-PRDual)

This Sielox module is a voltage regulator and UPS (Uninterruptible Power Supply) when connected to an external sealed lead acid battery. The AC-1500-PRDUAL has the following features:

- 12 VDC and 6 VDC regulator
- Built-in battery charger (12 VDC / 7 AMP Hour sealed lead acid)
- Battery charge indicator (20%, 40%, 60%, 80% and 100%)
- Trouble LED indicator
- Protection fuses F1 and F2



A-1500-PRDual - Front

AC-1500-PRDual - Back

Wire Pigtail Table

Fuse	Description
White	* AC Fail Status. (0 Volts=AC OK. 5 Volts=AC Fail)
Black	Battery Negative - pole
Red	Battery Positive + pole

* Open Collector limited to 100mA/24 Volts DC

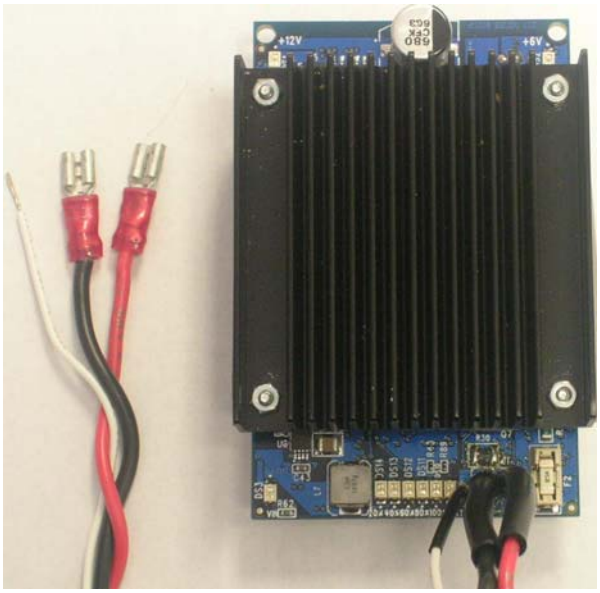
LED Function Table

LED	Description
DS1	12 Volts Indicator (ON=12VDC OK. OFF=No voltage)
DS2	6 Volts Indicator (ON=6VDC OK. OFF=No voltage)
DS3	DC In Indicator (ON=DC In OK. OFF=No voltage
DS9	Trouble Indicator (ON=No trouble. OFF=AC Fail or Battery not charging or not connected)
DS14, DS13, DS12, DS11 and DS10	Battery Charge indicators 20%, 40%, 60%, 80% and 100%

Fuses Table

Fuse	Description
F1	DC In Fuse (5 Amp)
F2	Battery Fuse (5 Amp)

Plug in the AC-1500-PRDual module to connectors J101 and J102 (PR12) located on the backplane (See Backplane Connector Locations and AC-1500 Modules Table).
Proper orientation must be observed when installing the module into the connectors, see figures below.



AC1500-PRDual

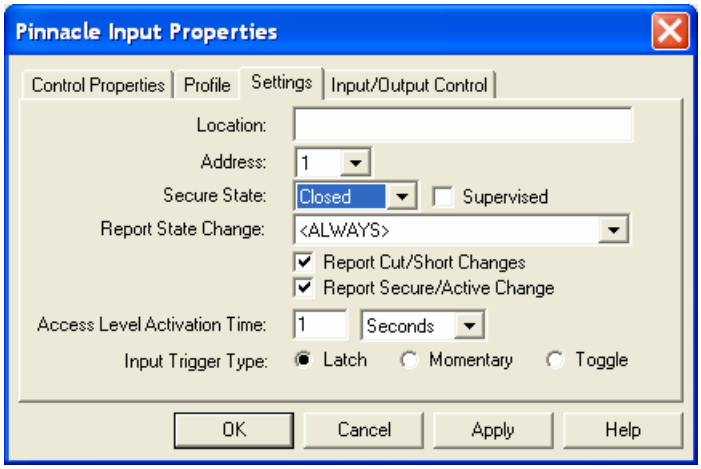
Connecting the 12 Volts Battery

The AC-1500-PRDual module comes with a wire pigtail, white, black and red. Connect the black wire spade lug to the battery negative (-) pole and the red wire spade lug to the battery positive (+) pole.

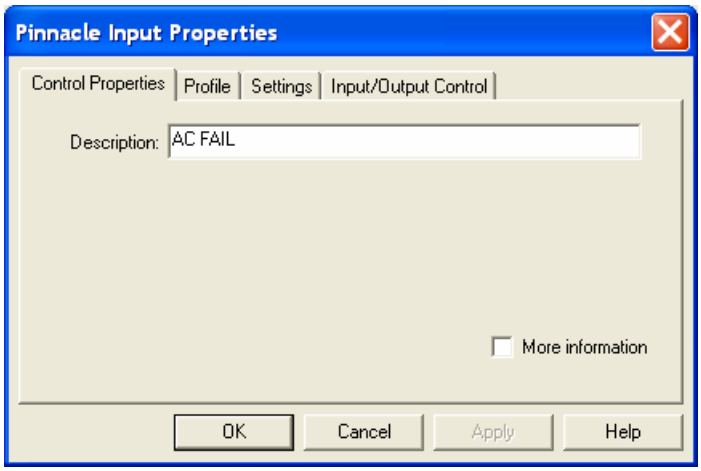
Monitoring AC Fail

If you want to monitor AC fail connect the white wire to one of the available TC inputs.

Note: You have to configure the input “Secure State” under Input Properties in Pinnacle as well the input description. See Pinnacle User Manual for more information.



AC-Fail Input Secure State



AC-Fail Input Description