

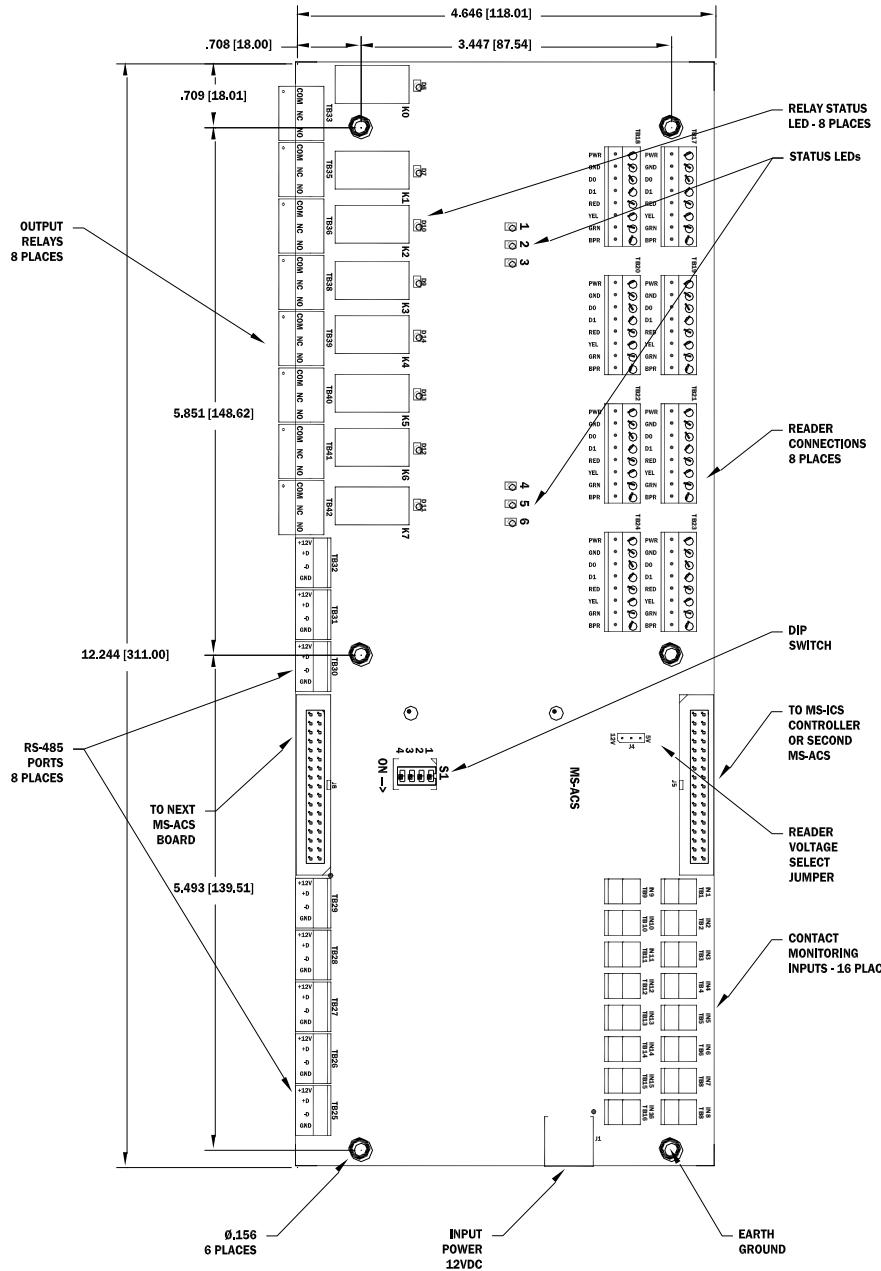
MS-ACS PROCESSOR

Installation and Specifications:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1. General:

The MS-ACS is part of Mercury Security's bridging hardware technology for replacing the Software House ACM module that provides reader and door hardware interface when migrating to the Mercury platform. Mercury's MS-ACS board supports eight readers with TTL signaling (D1/D0, Clock/Data), 16 inputs which may be configured to support unsupervised or supervised alarm input circuits, eight output relays and eight RS-485 multiplexer ports for downstream serial devices. The MS-ICS controller supports up to two MS-ACS units.



2. Input power Wiring:

The MS-ACS requires 12 Vdc for input power and is connected to J1. Pins 1 and 2 are connected to ground and pin 3 is connected to +12 Vdc.

J1 mates with the following housing and uses two crimp contacts:

Housing: Molex 39-01-4030

Crimp contact: Molex 39-00-0047 (22-28 gauge), 39-00-0039 (18-24 gauge)

3. Communication Connection:

MS-ICS downstream communication port 2 (channel 1): the first MS-ACS is connected to the MS-ICS by using a 34-conductor ribbon cable. This connection is J1 of the MS-ICS to J5 of the MS-ACS. If two MS-ACS are used, the second MS-ACS is connected to the first MS-ACS. J6 of the first unit connects to J5 of the second unit.

 The 34-conductor ribbon cable is non-standard. Do use a floppy disk drive cable.

MS-ICS downstream communication port 2 (channel 2): each MS-ACS has eight RS-485 multiplexer ports for downstream serial devices for a total of sixteen ports when two MS-ACS are connected to the MS-ICS. A maximum of two downstream serial devices can be connected to each port. 12 Vdc is available on each port. See specification section for maximum current restrictions.

RS-485:

| CONNECTION | | |
|------------|-----------|----------|
| TB25-1 | RS-485 #1 | +12V |
| TB25-2 | | +D (TR+) |
| TB25-3 | | -D (TR-) |
| TB25-4 | | GND |
| TB27-1 | RS-485 #3 | +12V |
| TB27-2 | | +D (TR+) |
| TB27-3 | | -D (TR-) |
| TB27-4 | | GND |
| TB29-1 | RS-485 #5 | +12V |
| TB29-2 | | +D (TR+) |
| TB29-3 | | -D (TR-) |
| TB29-4 | | GND |
| TB31-1 | RS-485 #7 | +12V |
| TB31-2 | | +D (TR+) |
| TB31-3 | | -D (TR-) |
| TB31-4 | | GND |

| CONNECTION | | |
|------------|-----------|----------|
| TB26-1 | RS-485 #2 | +12V |
| TB26-2 | | +D (TR+) |
| TB26-3 | | -D (TR-) |
| TB26-4 | | GND |
| TB28-1 | RS-485 #4 | +12V |
| TB28-2 | | +D (TR+) |
| TB28-3 | | -D (TR-) |
| TB28-4 | | GND |
| TB30-1 | RS-485 #6 | +12V |
| TB30-2 | | +D (TR+) |
| TB30-3 | | -D (TR-) |
| TB30-4 | | GND |
| TB32-1 | RS-485 #8 | +12V |
| TB32-2 | | +D (TR+) |
| TB32-3 | | -D (TR-) |
| TB32-4 | | GND |

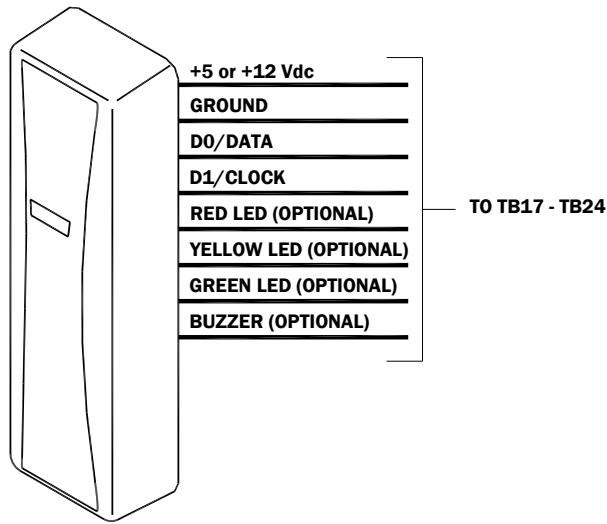
4. Reader Wiring:

The MS-ACS provides eight reader ports. Each reader port supports a reader with TTL (D1/D0, Clock/Data) signaling. Power to the readers is selectable: 5 Vdc or 12 Vdc. See specification section for maximum current restrictions. Readers that require different voltage or have high current requirements must be powered separately. Refer to the reader manufacture specifications for cabling requirements. Each reader port supports three LEDs (red, green and yellow) and a buzzer. Reader port configuration is set via the host software.

To fully utilize each reader port requires an 8-conductor cable (18 AWG).

| 5V 12V | READER POWER |
|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | 5 Vdc IS AVAILABLE ON READER PORTS |
| <input type="checkbox"/> | 12 Vdc IS AVAILABLE ON READER PORTS |

J4 – Reader Port Power Select



Reader Wiring

Readers:

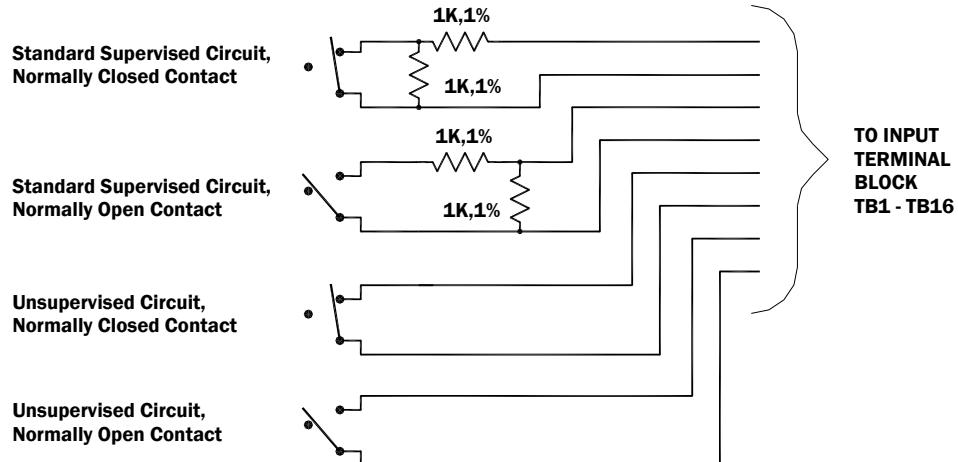
| CONNECTION | | |
|--|----------|------------------|
| TB17-1 TB17-2 TB17-3 TB17-4 TB17-5 TB17-6 TB17-7 TB17-8 | Reader 1 | BPR: Beeper |
| | | GRN: Green LED |
| | | YEL: Yellow LED |
| | | RED: Red LED |
| | | D1: Data 1/Clock |
| | | D0: Data 0/Data |
| | | GND: Ground |
| | | PWR: 5 or 12 Vdc |
| TB19-1 TB19-2 TB19-3 TB19-4 TB19-5 TB19-6 TB19-7 TB19-8 | Reader 3 | BPR: Beeper |
| | | GRN: Green LED |
| | | YEL: Yellow LED |
| | | RED: Red LED |
| | | D1: Data 1/Clock |
| | | D0: Data 0/Data |
| | | GND: Ground |
| | | PWR: 5 or 12 Vdc |
| TB21-1 TB21-2 TB21-3 TB21-4 TB21-5 TB21-6 TB21-7 TB21-8 | Reader 5 | BPR: Beeper |
| | | GRN: Green LED |
| | | YEL: Yellow LED |
| | | RED: Red LED |
| | | D1: Data 1/Clock |
| | | D0: Data 0/Data |
| | | GND: Ground |
| | | PWR: 5 or 12 Vdc |
| TB23-1 TB23-2 TB23-3 TB23-4 TB23-5 TB23-6 TB23-7 | Reader 7 | BPR: Beeper |
| | | GRN: Green LED |
| | | YEL: Yellow LED |
| | | RED: Red LED |
| | | D1: Data 1/Clock |
| | | D0: Data 0/Data |
| | | GND: Ground |
| | | |
| TB18-1 TB18-2 TB18-3 TB18-4 TB18-5 TB18-6 TB18-7 TB18-8 | Reader 2 | BPR: Beeper |
| | | GRN: Green LED |
| | | YEL: Yellow LED |
| | | RED: Red LED |
| | | D1: Data 1/Clock |
| | | D0: Data 0/Data |
| | | GND: Ground |
| | | PWR: 5 or 12 Vdc |
| TB20-1 TB20-2 TB20-3 TB20-4 TB20-5 TB20-6 TB20-7 TB20-8 | Reader 4 | BPR: Beeper |
| | | GRN: Green LED |
| | | YEL: Yellow LED |
| | | RED: Red LED |
| | | D1: Data 1/Clock |
| | | D0: Data 0/Data |
| | | GND: Ground |
| | | PWR: 5 or 12 Vdc |
| TB22-1 TB22-2 TB22-3 TB22-4 TB22-5 TB22-6 TB22-7 TB22-8 | Reader 6 | BPR: Beeper |
| | | GRN: Green LED |
| | | YEL: Yellow LED |
| | | RED: Red LED |
| | | D1: Data 1/Clock |
| | | D0: Data 0/Data |
| | | GND: Ground |
| | | PWR: 5 or 12 Vdc |
| TB24-1 TB24-2 TB24-3 TB24-4 TB24-5 TB24-6 TB24-7 | Reader 8 | BPR: Beeper |
| | | GRN: Green LED |
| | | YEL: Yellow LED |
| | | RED: Red LED |
| | | D1: Data 1/Clock |
| | | D0: Data 0/Data |
| | | GND: Ground |
| | | |

5. Alarm Inputs Wiring:

Input circuits can be configured as unsupervised or supervised. When unsupervised, reporting consists of only the open or closed states.

When an input circuit is configured for supervision, then the MS-ACS board also monitors the following abnormal circuit conditions: open circuit, shorted circuit, the grounding of either side of the circuit*, or the introduction of a foreign voltage*. A supervised input circuit requires adding two resistors to the circuit to facilitate proper reporting. The standard supervised circuit requires 1K Ohm, 1 % resistors and should be located as close to the sensor as possible. Custom end of line (EOL) resistances may be configured via the host software.

* Grounded and foreign voltage states are not UL 294 required and therefore not verified by UL.
The input circuit wiring configurations shown are supported, but may not be typical:



Inputs:

| CONNECTION | | |
|------------|---------|-----|
| TB1-1 | Input 1 | IN1 |
| TB1-2 | | |
| TB2-1 | Input 2 | IN2 |
| TB2-1 | | |
| TB3-1 | Input 3 | IN3 |
| TB3-2 | | |
| TB4-1 | Input 4 | IN4 |
| TB4-2 | | |
| TB5-1 | Input 5 | IN5 |
| TB5-2 | | |
| TB6-1 | Input 6 | IN6 |
| TB6-2 | | |
| TB7-1 | Input 7 | IN7 |
| TB7-2 | | |
| TB8-1 | Input 8 | IN8 |
| TB8-2 | | |

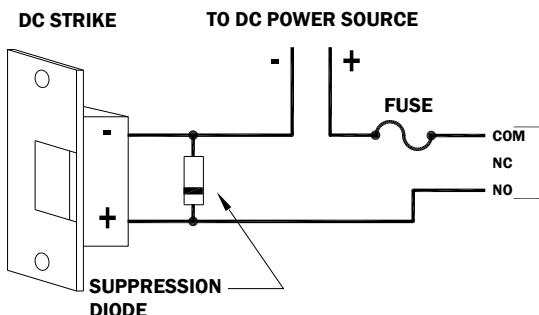
| CONNECTION | | |
|------------|----------|------|
| TB9-1 | Input 9 | IN9 |
| TB9-2 | | |
| TB10-1 | Input 10 | IN10 |
| TB10-1 | | |
| TB11-1 | Input 11 | IN11 |
| TB11-2 | | |
| TB12-1 | Input 12 | IN12 |
| TB12-2 | | |
| TB13-1 | Input 13 | IN13 |
| TB13-2 | | |
| TB14-1 | Input 14 | IN14 |
| TB14-2 | | |
| TB15-1 | Input 15 | IN15 |
| TB15-2 | | |
| TB16-1 | Input 16 | IN16 |
| TB16-2 | | |

6. Door Strike Wiring:

Eight relays with Form-C contacts are provided for controlling door lock mechanisms or alarm signaling. The relay contacts are rated at 2.5 A @ 30 Vac/Vdc, dry contact configuration. Each relay has a Common pole (COM), a Normally Open pole (NO) and a Normally Closed pole (NC). When controlling the delivery of power to the door strike, the Normally Open and Common poles are used. When momentarily removing power to unlock the door, as with a mag lock, the Normally Closed and Common poles are used. Check with local building codes for proper egress door installation.

Load switching can cause abnormal contact wear and premature contact failure. Switching of inductive loads (strike) also causes EMI (electromagnetic interference) which may interfere with normal operation of other equipment. To minimize premature contact failure and to increase system reliability, contact protection circuit must be used. The following two circuits are recommended. Locate the protection circuit as close to the load as possible (within 12 inches [30 cm]), as the effectiveness of the circuit will decrease if it is located further away.

Wire should be of sufficient gauge to avoid voltage loss.

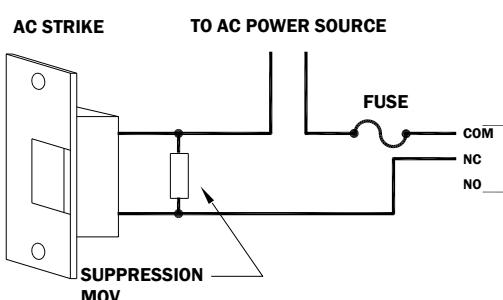


DIODE SELECTION:

DIODE CURRENT RATING > 1 X STRIKE CURRENT

DIODE BREAK DOWN VOLTAGE: 4X STRIKE VOLTAGE

FOR 12Vdc or 24Vdc STRIKE, DIODE 1N4002 (100V /1A) TYPICAL



MOV SELECTION:

CLAMP VOLTAGE > 1.5 X Vac RMS

FOR 24Vac STRIKE, PANASONIC

ERZ-C07DK470 TYPICAL

Relays:

| CONNECTION | | |
|------------|---------------------|-----|
| TB33-1 | Relay K0 LED D8 | COM |
| TB33-2 | | NC |
| TB33-3 | | NO |
| TB36-1 | Relay K2 LED D10 | COM |
| TB36-2 | | NC |
| TB36-3 | | NO |
| TB39-1 | Relay K4 LED D14 | COM |
| TB39-2 | | NC |
| TB39-3 | | NO |
| TB41-1 | Relay K6 LED D12 | COM |
| TB41-2 | | NC |
| TB41-3 | | NO |

| CONNECTION | | |
|------------|---------------------|-----|
| TB35-1 | Relay K1 LED D7 | COM |
| TB35-2 | | NC |
| TB35-3 | | NO |
| TB38-1 | Relay K3 LED D9 | COM |
| TB38-2 | | NC |
| TB38-3 | | NO |
| TB40-1 | Relay K5 LED D13 | COM |
| TB40-2 | | NC |
| TB40-3 | | NO |
| TB42-1 | Relay K7 LED 11 | COM |
| TB42-2 | | NC |
| TB42-3 | | NO |

7. DIP Switch Usage:

Switch S1-1 selects the MS-ACS communication addresses. Switch S1-2 and S1-3 select the communication baud rate. Switch S1-4 enables encrypted communication. All other configuration settings are set via host software.

S1-1 selects the communication address of the MS-ACS(s):

OFF = first MS-ACS uses addresses 0 and 1, the second MS-ACS uses addresses 2 and 3
ON = first MS-ACS uses addresses 4 and 5, the second MS-ACS uses addresses 6 and 7

| S1-2 | S1-3 | Baud Rate |
|------|------|-------------|
| OFF | OFF | 115,200 bps |
| ON | OFF | 9,600 bps |
| OFF | ON | 19,200 bps |
| ON | ON | 38,400 bps |

S1-4 set to ON enables encrypted communication.



The baud of the MS-ACS and the devices on the RS-485 ports must be the same.

8. Status LEDs:

The MS-ACS has two sections, the first section uses LED 1, 2 and 3 (communication address 0 and 2 or 4 and 6). The second section uses LED 4, 5 and 7 (communication address 1 and 3 or 5 and 7).

Power-up: All LED's OFF

Initialization: Once power is applied, initialization of the module begins

When initialization is completed, LEDs 1 through 3 and 4 through 6 are briefly sequenced **ON** then **OFF**.

Run time: After the above sequence, the LEDs have the following meanings:

LED 1 and 3: Heartbeat and On-Line Status:

Off-line: 1 sec rate, 20% **ON**

On-line:

Non-encrypted communication: 1 sec rate, 80% **ON**

Encrypted communication:

.1 sec **ON**, .1 sec **OFF**, .1 sec **ON**, .1 sec **OFF**, .1 sec **ON**, .1 sec **OFF**, .1 sec **ON**, .3 sec **OFF**

LED 1 and 3: Error Indication: Waiting for application firmware to be downloaded: .1 sec **ON**, .1 sec **OFF**

LED 2 and 5: Indicates communication activity on the communication port

LED 3 and 6: Reserved for future use

9. Specifications:

The processor is for use in low voltage, class 2 circuit only.

The installation of this device must comply with all local fire and electrical codes.

Primary power: 12 Vdc $\pm 10\%$, 3 A maximum

Remote device current 350 mA max. per port, not to exceed 2.5 A for readers and RS-485 ports

Inputs: 16 unsupervised/supervised, standard EOL: 500/1k/1k ohm, 1%, 1/4 watt

Communication: 2-wire RS-485. 9600, 19200, 38400, or 115200 bps

Outputs: 8 relays, Form-C contacts, 30 Vac/Vdc @ 2 A, resistive

Cable requirements:

| | |
|---------------|--|
| Power: | 18 AWG, 1 twisted pair |
| RS-485: | 24AWG, 120 ohm impedance, twisted pair with shield, 4,000' (1,200 m) maximum |
| Reader data: | 4 to 8-conductor, 18 AWG, 500 feet (150 m) maximum |
| Alarm inputs: | 1 twisted pair, 30 ohms maximum |
| Outputs: | As required for the load |

Mechanical:

| | |
|------------|---|
| Dimension: | 4.65" (118 mm) W x 12.25" (311 mm) L x .65" (16.5 mm) H |
| Weight: | 9.35 oz. (265 g) nominal (w/o terminal blocks) |

Environmental:

| | |
|--------------|--|
| Temperature: | -55°C to +85°C, storage 0°C to +50°C, operating |
| Humidity: | 5% to 95% RHNC |

Warranty

Mercury Security warrants the product is free from defects in material and workmanship under normal use and service with proper maintenance for one year from the date of factory shipment. Mercury Security assumes no responsibility for products damaged by improper handling or installation. This warranty is limited to the repair or replacement of the defective unit.

There are no expressed warranties other than set forth herein. Mercury Security does not make, nor intends, nor does it authorize any agent or representative to make any other warranties, or implied warranties, and expressly excludes and disclaims all implied warranties of merchantability or fitness for a particular purpose.

Returns must be accompanied by a Return Material Authorization (RMA) number obtained from customer service, and prepaid postage and insurance.

Liability

The Interface should only be used to control exits from areas where an alternative method for exit is available. This product is not intended for, nor is rated for operation in life-critical control applications. Mercury Security is not liable under any circumstances for loss or damage caused by or partially caused by the misapplication or malfunction of the product. Mercury Security's liability does not extend beyond the purchase price of the product.