

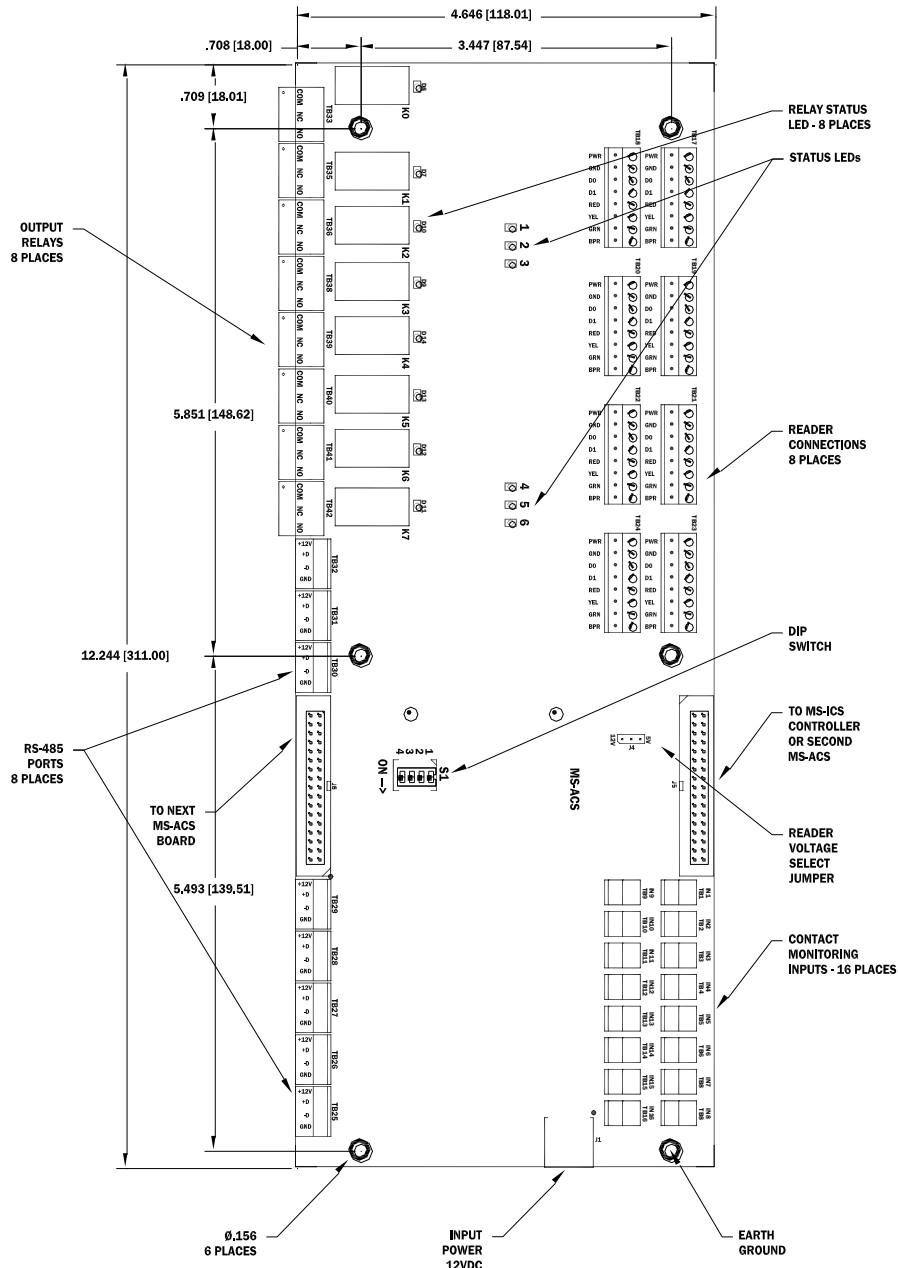
# MS-ACS PROCESSOR

## 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 not 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

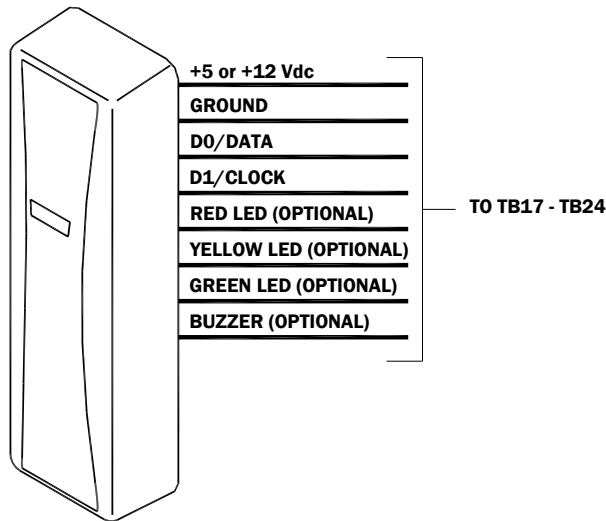
## 4. Reader Wiring:

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
	<b>5 Vdc IS AVAILABLE ON READER PORTS</b>
	<b>12 Vdc IS AVAILABLE ON READER PORTS</b>

### J4 – Reader Port Power Select



### Reader Wiring

#### Readers:

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

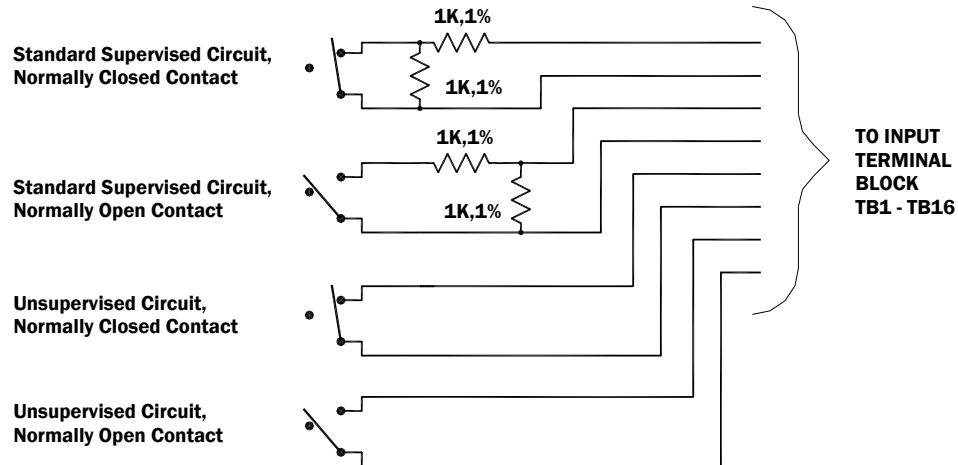
CONNECTION		
TB18-1	Reader 2	BPR: Beeper
TB18-2		GRN: Green LED
TB18-3		YEL: Yellow LED
TB18-4		RED: Red LED
TB18-5		D1: Data 1/Clock
TB18-6		D0: Data 0/Data
TB18-7		GND: Ground
TB18-8		PWR: 5 or 12 Vdc
TB20-1	Reader 4	BPR: Beeper
TB20-2		GRN: Green LED
TB20-3		YEL: Yellow LED
TB20-4		RED: Red LED
TB20-5		D1: Data 1/Clock
TB20-6		D0: Data 0/Data
TB20-7		GND: Ground
TB20-8		PWR: 5 or 12 Vdc
TB22-1	Reader 6	BPR: Beeper
TB22-2		GRN: Green LED
TB22-3		YEL: Yellow LED
TB22-4		RED: Red LED
TB22-5		D1: Data 1/Clock
TB22-6		D0: Data 0/Data
TB22-7		GND: Ground
TB22-8		PWR: 5 or 12 Vdc
TB24-1	Reader 8	BPR: Beeper
TB24-2		GRN: Green LED
TB24-3		YEL: Yellow LED
TB24-4		RED: Red LED
TB24-5		D1: Data 1/Clock
TB24-6		D0: Data 0/Data
TB24-7		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
TB2-2		
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		

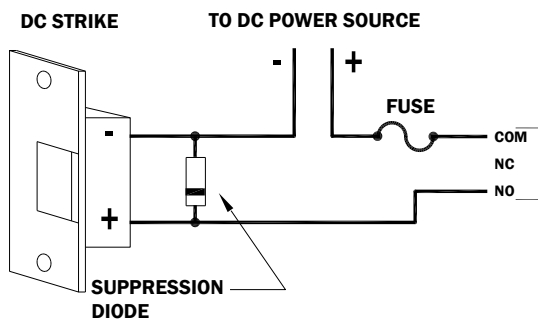
CONNECTION		
TB9-1	Input 9	IN9
TB9-2		
TB10-1	Input 10	IN10
TB10-2		
TB11-1	Input 11	IN11
TB11-2		
TB12-1	Input 12	IN12
TB12-2		
TB13-1	Input 13	IN13
TB13-2		
TB14-1	Input 14	IN14
TB14-2		
TB15-1	Input 15	IN15
TB15-2		
TB16-1	Input 16	IN16
TB16-2		

## 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.

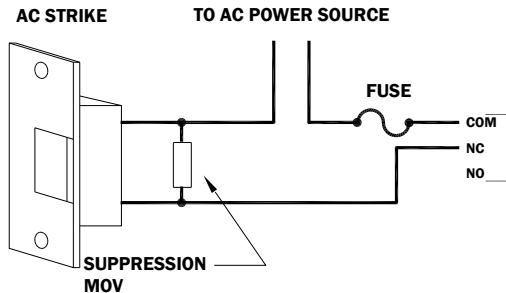


### DIODE SELECTION:

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

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