# eMAX-MR52 READER INTERFACE

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 eMAX-MR52 reader interface provides a solution for interfacing to TTL/wiegand/*RS-485 type readers and
door hardware. The eMAX-MR52 can accept data from reader with clock/data, wiegand or *RS-485 signaling,
provide a tri-stated LED control and buzzer control. Six form-C relay outputs may be used for strike control
or alarm signaling. Eight supervised inputs are provided for monitoring the door contact, exit push button and
alarm contacts. Communication to the eMAX-MR52 is accomplished via a 2-wire RS-485 interface. The MR-52
requires 12 to 24Vdc for power. See following figure for component location.
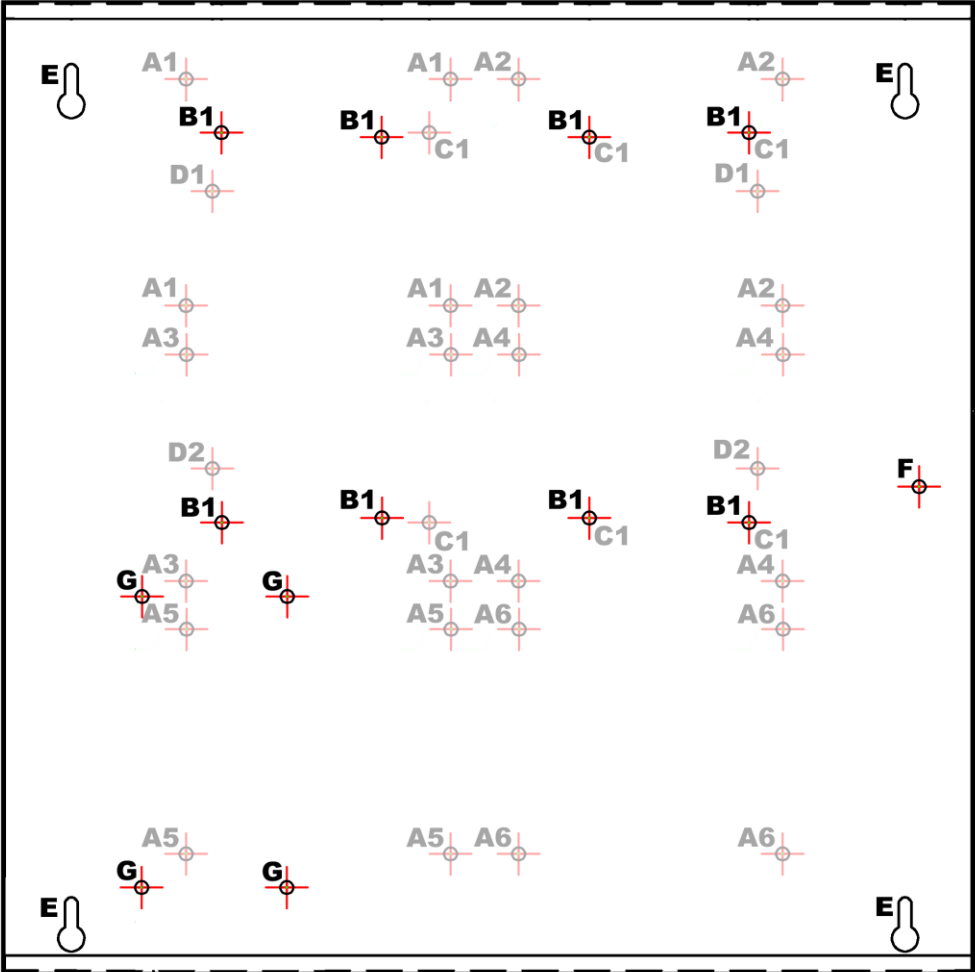
2. eMAX-MR52 Hardware:
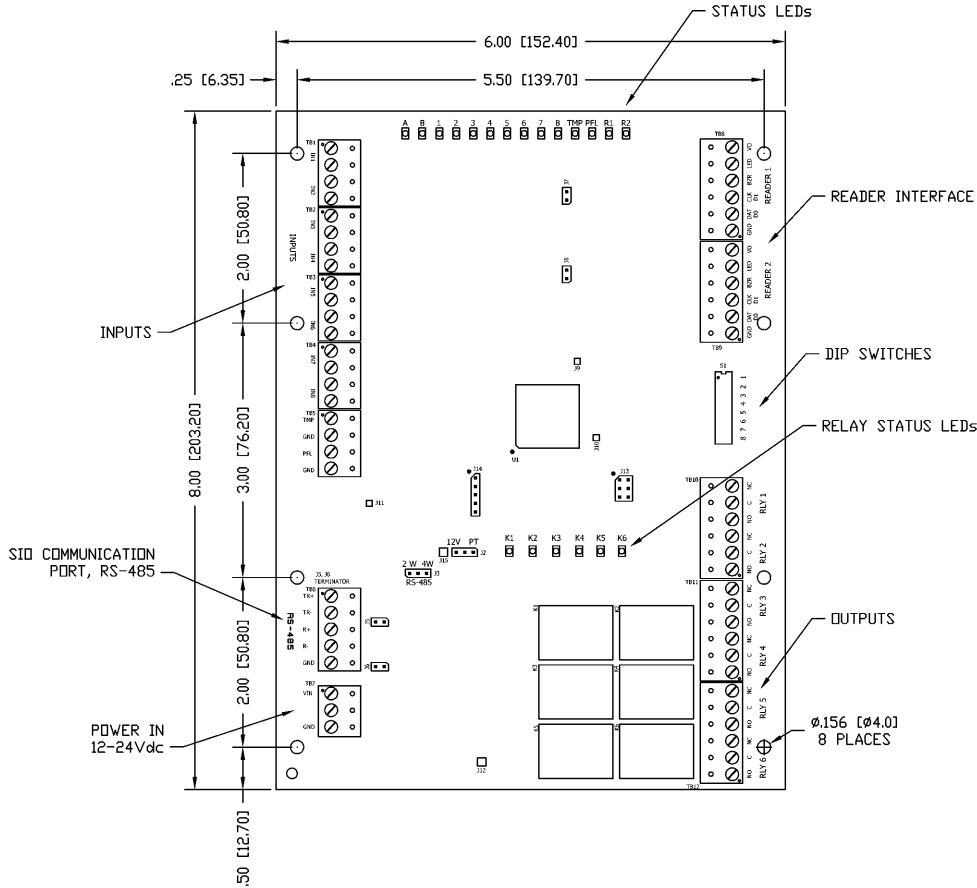
3. eMAX-MR52 Enclosure:

Maxxess North American Enclosure (small 14.0" x 14.0")

The eMAX-MR52 board may be mounted in the Maxxess enclosure. One eMAX-MR52 per enclosure allows space for the battery backup. Plastic spacers are included with the eMAX-MR52 panel for mounting. The eMAX-MR52 mounts in the holes marked B1.
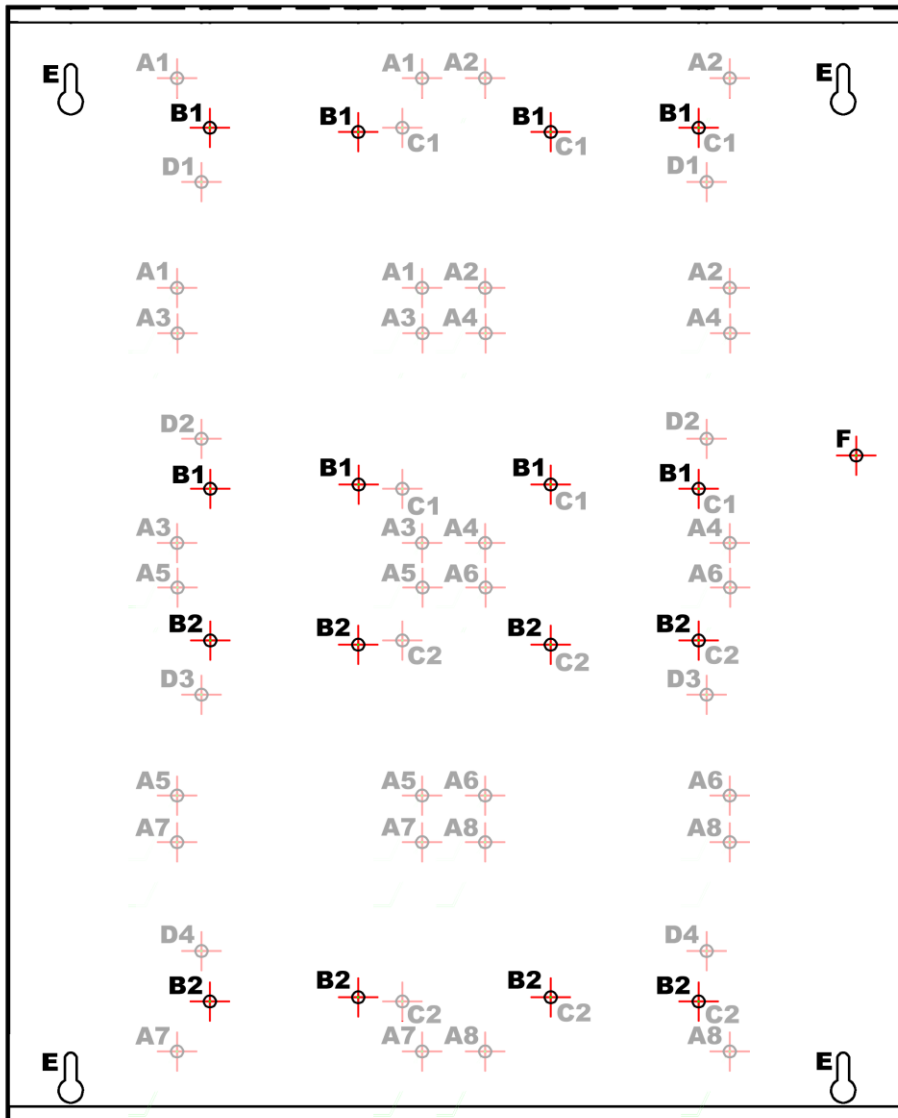

Legend:

A1 through A6	-	Mounting holes for EP1501 or MR51e.
B1	-	Mounting holes for EP1502, MR52, MR16IN, MR16OUT.
C1	-	Mounting holes for EP2500.
D1 and D2	-	Mounting studs for Maxxess DIN rain.
E	-	Wall mounting holes.
F	-	Grounding stud.
G	-	Mounting holes for BUPS.

Maxxess North American Enclosure (large 14.0" x 17.5")

Up to two of the eMAX-MR52 board may be mounted in the large Maxxess enclosure. Plastic spacers are included with the eMAX-MR52 for mounting. The eMAX-MR52 mounts in the holes marked B1 or B2.

Legend:

A1 through A8	-	Mounting holes for EP1501 or MR51e.
B1 and B2	-	Mounting holes for EP1502, MR52, MR16IN, MR16OUT.
C1 and C2	-	Mounting holes for EP2500.
D1 and D2	-	Mounting studs for Maxxess DIN rain.
E	-	Wall mounting holes.
F	-	Grounding stud.

Maxxess European Enclosure

The eMAX-MR52 board may be mounted in the Maxxess enclosure. One eMAX-MR52 per enclosure allows space for the power supply and battery backup. Plastic spacers are included with the enclosure for mounting.   The eMAX-MR52 mounts in the holes marked B.
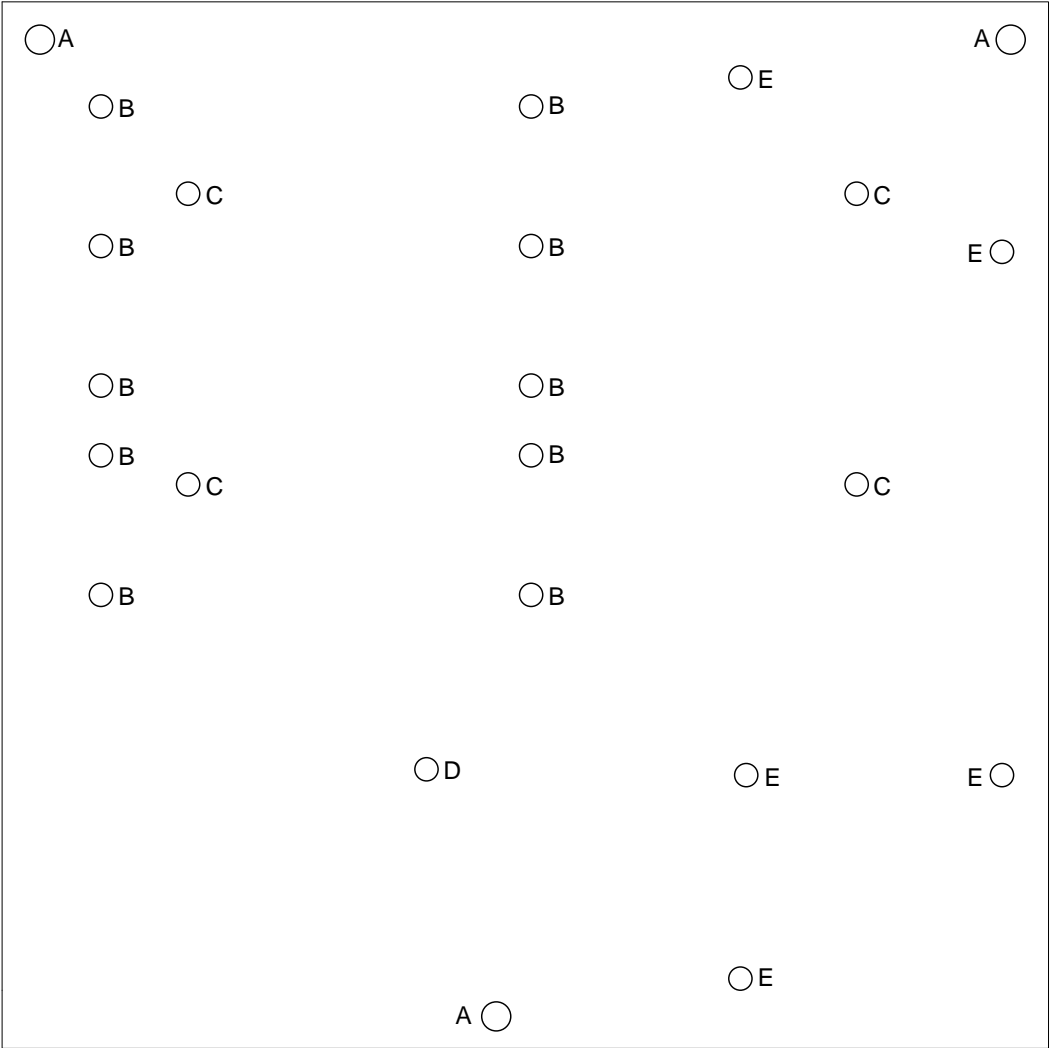
A   Housing Mounting Holes

B   EP1502, EP2500, MR16IN, MR16OUT & MR52 Mounting Holes

C   Din Rail Mounting Holes for MR50, MR51e & EP1501

D   Standard Power Supply Mounting Point

E   Monitored Power Supply Mounting Points

4. eMAX-MR52 Power

The eMAX-MR52 accepts 12 to 24Vdc for power. Locate the power source as close to the eMAX-MR52 as possible. Make power connection with minimum 18AWG wires.

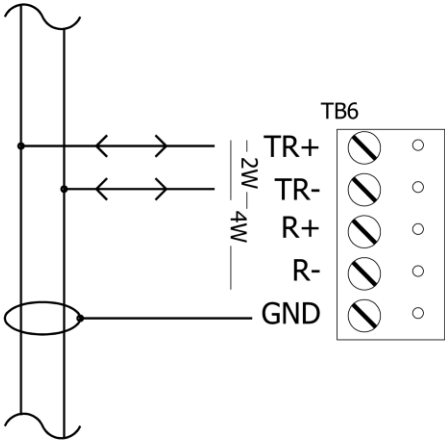**Refer to eMAX-EP controller Installation and Specifications manual for proper grounding details.**

```
 +  ──────  VIN  [⊘  ○]
12 TO 24Vdc      [⊘  ○]
 -  ──────  GND  [⊘  ○]
```
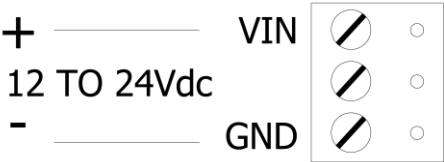
Observe POLARITY on VIN!

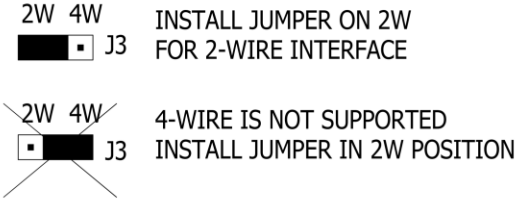## 5. Communication Wiring (SIO Communication Port):

The eMAX-MR52 communicates to an intelligent controller (such as an eMAX-EP1502 or eMAX-EP2500) via a 2-wire RS-485 interface. The eMAX-MR52 allows for multi-drop communication on a bus of up to 4,000 feet (1,200 m). Use twisted pair(s) (minimum 24AWG) with shield for communication. See specifications section.

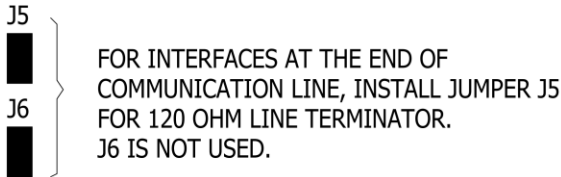Install jumpers according to the selected configuration.

2-WIRE/4-WIRE SELECT

```
TB6
     TR+  [⊘  ○]
     TR-  [⊘  ○]
     R+   [⊘  ○]
     R-   [⊘  ○]
     GND  [⊘  ○]
```

2W 4W
[▮ ▪] J3   INSTALL JUMPER ON 2W
                FOR 2-WIRE INTERFACE

2W 4W
[▪ ▮] J3   4-WIRE IS NOT SUPPORTED
                INSTALL JUMPER IN 2W POSITION

LINE TERMINATION

J5 [▮]   FOR INTERFACES AT THE END OF
                COMMUNICATION LINE, INSTALL JUMPER J5
J6 [▮]   FOR 120 OHM LINE TERMINATOR.
                J6 IS NOT USED.

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

6. Reader Wiring:

Each reader port supports a reader with TTL or *RS-485 interface. Power to the reader is selectable: 12Vdc, or input voltage passed through (PT), 125mA maximum per reader port. This selection is made via jumper J2 and is made for both reader ports. For the selection of 12Vdc, the eMAX-MR52 must be powered by a 20Vdc minimum source. For readers requiring a different voltage or current capability, they must be powered separately.

To fully utilize each reader port, a 6-conductor cable (18AWG) is required when TTL signaling is used. *RS-485 signaling requires two 2-conductor cables. One cable for power (18AWG) and one cable for communication (24AWG). Reader port configuration is set via host software.

12V PT	READER POWER
▬ ▪	12Vdc IS AVAILABLE ON READER PORTS (VIN≥20Vdc) DEFAULT
▪ ▬	VIN POWER IS "PASSED THROUGH" TO READER PORTS

J2 - READER POWER SELECT

Terminal	Wire
VO	RED (1)
LED	BRN (4)
BZR	ORG (5)
D1/CLK	WHT (3)
D0/DAT	GRN (2)
GND	BLK (6)

READER
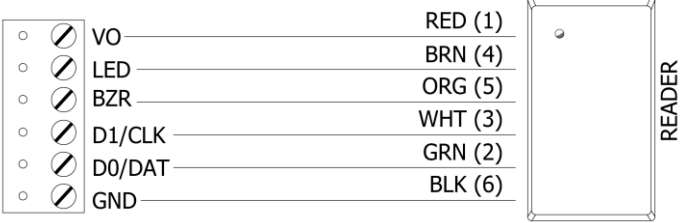
7. Alarm Contact Wiring:

Inputs 1 to 8 may be configured to use or not to use End-Of-Line (EOL) resistors, and for normally open or normally closed contacts. Input TMP is used for monitoring cabinet tamper and PFL input is used power failure monitoring. These two inputs are for contact closure monitoring only. They do not use EOL resistor(s). Input configuration is set via host software.
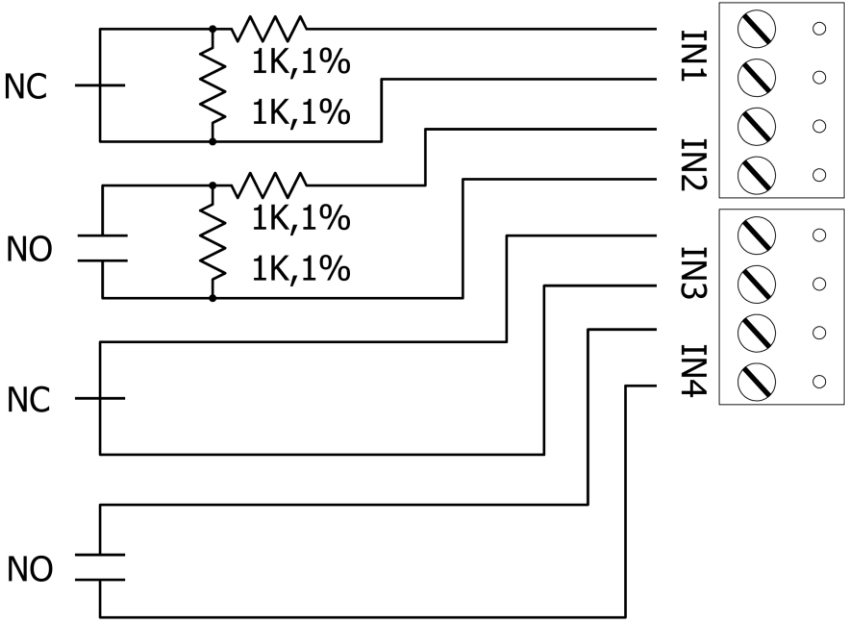

8. Control Output Wiring:

Six form-C contact relays are provided for controlling door strikes or other devices. 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 [30cm]), as the effectiveness of the circuit will decrease if it is located further away.

Use sufficiently large gauge of wires for the load current as to avoid voltage loss.
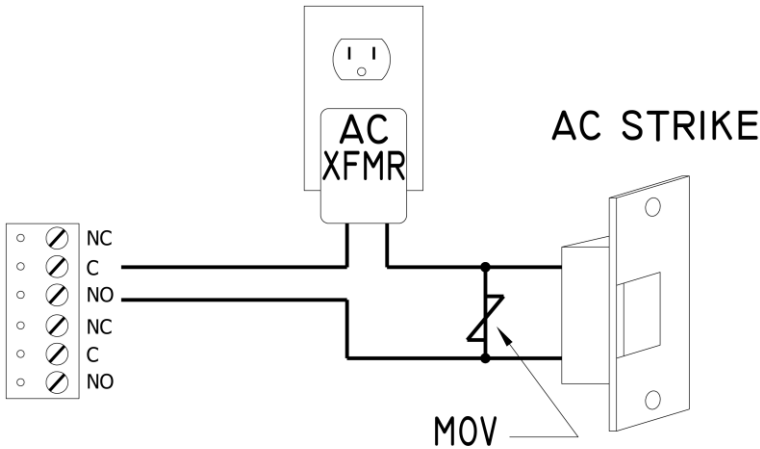
Diode Selection:

Diode current rating: 1x strike current. Diode breakdown voltage 4x strike voltage.
For 12Vdc or 24Vdc strike, diode 1N4002 (100V/1A) typical.
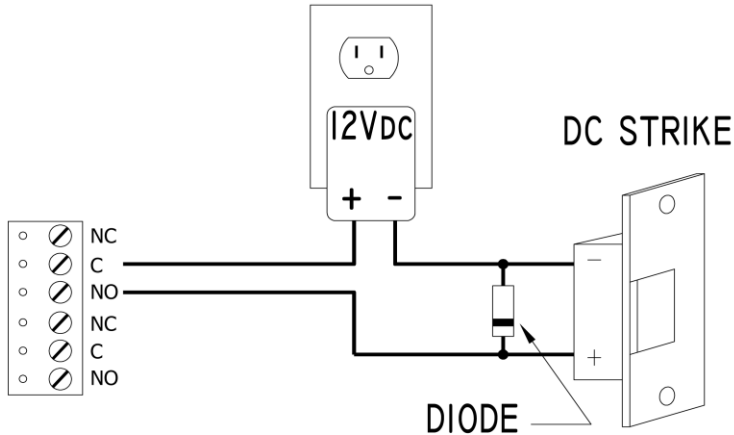
MOV Selection:

Clamp voltage: 1.5x Vac RMS. For 24Vac strike, Panasonic ERZ-C07DK470 typical.

See documentation included with locking device regarding suppression device requirements.

9. Jumper and DIP Switch Usage:

JUMPER	DESCRIPTION
J2	READER POWER SELECT
	12V = 12Vdc AT READER PORTS. *** SEE NOTE BELOW *** (Default)
	PT = VIN 'PASSED THROUGH" TO READER PORTS
J3	2-WIRE/4-WIRE SELECT, INSTALL IN 2W POSITION ONLY (Default is 2 Wire)
J5	RS-485 TERMINATION, INSTALL IN FIRST AND LAST UNITS ONLY (Default is No Termination)
J6	FACTORY USE ONLY
J7	FACTORY USE ONLY
J8	FACTORY USE ONLY
J9	FACTORY USE ONLY
J10	FACTORY USE ONLY
J11	FACTORY USE ONLY
J12	FACTORY USE ONLY
J13	FACTORY USE ONLY
J14	FACTORY USE ONLY
J15	FACTORY USE ONLY

NOTE: The input power (VIN) must be 20Vdc minimum if the 12Vdc selection is to be used.

Select Device Address

Switches 1 to 5 select the device address. Switch 6 to 7 select the communication baud rate. All other configuration settings are set via host software. **Defaults are address 0 and baud rate 38,000.**

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

10. Status LEDs:

Power-up: All LED's **OFF**

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

The A LED is turned on at the beginning of initialization. If the application program cannot be run, the A LED will flash at a rapid rate. The eMAX-MR52 is waiting for firmware to be downloaded.

When initialization is completed, LEDs A through R2 are briefly sequenced **ON** then **OFF.**

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

A LED: Heartbeat and On-Line Status:
Off-line: 1 second rate, 20% ON
On-line: 1 second rate, 80% ON

B LED: SIO Communication Port Status:
Indicates communication activity on the SIO communication port
1 LED: Input Status: IN1
2 LED: Input Status: IN2
3 LED: Input Status: IN3
4 LED: Input Status: IN4
5 LED: Input Status: IN5
6 LED: Input Status: IN6
7 LED: Input Status: IN7
8 LED: Input Status: IN8
TMP: Cabinet Tamper
PFL: Power Fault

Input in the inactive state: **OFF (briefly flashes ON every 3 seconds)**
Input in the active state: **ON (briefly flashes OFF every 3 seconds)**
Input in a trouble state: **Rapid Flash**

R1: reader port 1:
Clock/Data Mode: **Flashes** when data is received, either input
Data 0/Data 1 Mode: **Flashes** when data is received, either input
*RS-485 Mode : **Flashes** when transmitting data

R2: reader port 2:
Clock/Data Mode: **Flashes** when data is received, either input
Data 0/Data 1 Mode: **Flashes** when data is received, either input
*RS-485 Mode : **Flashes** when transmitting data

LED K1 through **K6:** Illuminates when output relay RLY 1 (K1) through RLY 6 (K6) is energized.

11. Specifications:

The Interface is for use in low voltage, class 2 circuits only.

Primary power:	12 to 24Vdc ±10%, 550mA maximum (plus reader current)
	12Vdc @ 450mA (plus reader current) nominal
	24Vdc @ 270mA (plus reader current) nominal
Outputs:	6 outputs, Form-C, 5A @ 28Vdc, resistive
Inputs:	8 unsupervised/supervised, standard EOL: 1k/1k ohm, 1% 1/4 watt
	2 unsupervised, dedicated for cabinet tamper and UPS fault monitoring

Reader interface:

Reader power:	12Vdc ±10% regulated, 125mA maximum each reader
(jumper selectable)	or 12 to 24Vdc ±10% (input voltage passed through) 125mA maximum each reader
Reader LED output:	TTL compatible, high > 3V, low < 0.5V, 5mA source/sink maximum
Reader buzzer output:	Open collector, 5Vdc open circuit maximum, 10mA sink maximum
Reader data inputs:	TTL compatible inputs or 2-wire RS-485
Communication:	RS-485, 2-wire 2400, 9600, 19200 or 38400bps

Cable requirements:

Power:	18AWG, 1 twisted pair
RS-485:	24AWG, 120 ohm impedance, twisted pair with shield, 4,000 feet (1,200m) maximum
Alarm inputs:	1 twisted pair per input, 30 ohms maximum
Outputs:	As required for the load
Reader data (TTL):	6 conductors, 18AWG, 500 feet (150m) maximum
*Reader data (RS-485):	24AWG, 120 ohm impedance, twisted pair with shield, 4,000 feet (1,200m) maximum

Mechanical:

Dimension:	6" (152mm)W x 8" (203mm)L x 1" (25mm)H
Weight:	11 oz. (312g) nominal

Environment:

Temperature:	-55°C to +85°C, storage
	0°C to +70°C, operating
Humidity:	0% to 95% RHNC

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. Maxxess Systems is not liable under any circumstances for loss or damage caused by or partially caused by the misapplication or malfunction of the product. Maxxess Systems liability does not extend beyond the purchase price of the product.

* Contact factory for availability