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MR52-S3 READER INTERFACE

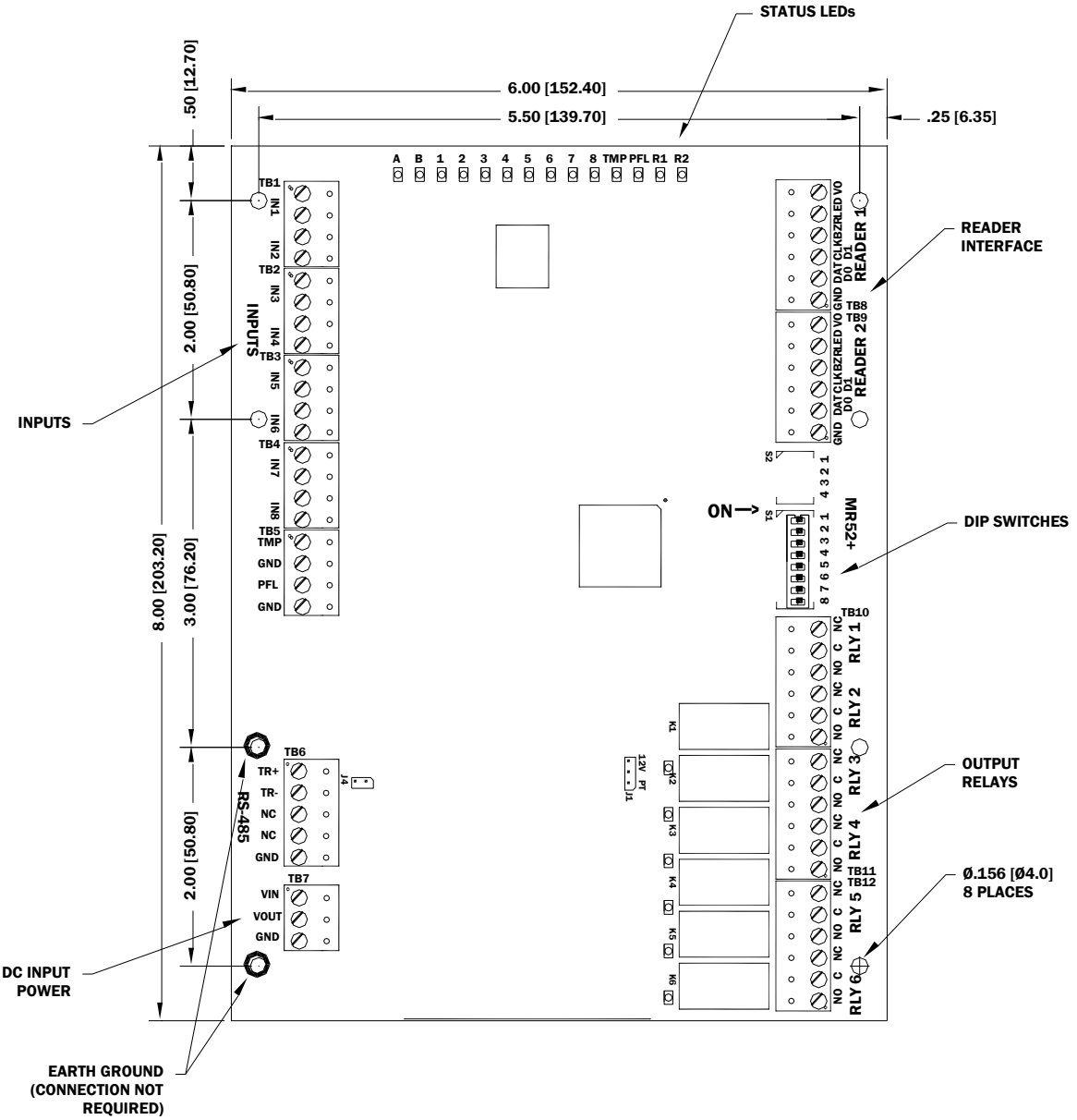
Series 3

Installation and Specifications:

1. General:

The MR52-S3 reader interface boards provide a solution to the OEM system integrator for interfacing to TTL (D1/D0, Clock/Data), F/2F, 2-wire RS-485 device and door hardware. The MR52-S3 provides a tristate LED control and buzzer control. Six Form-C relay outputs may be used for strike control or alarm signaling. Eight inputs are provided that may be used for monitoring the door contact, request to exit push button and alarm contacts. Input circuits can be configured as unsupervised or supervised. The MR52-S3 communicates to the controller via a 2-wire RS-485.

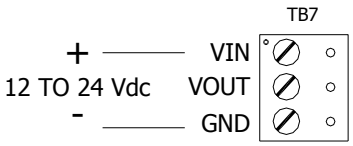
See the following figure for component location (some components shown are not present on the MR52-S3).



MR52-S3 Layout

2. Supplying Power to the MR52-S3:

The MR52-S3 accepts 12 to 24 Vdc for power on TB7 (VIN and GND). Locate the power source as close to the MR52-S3 as possible. Make power connection with minimum of 18 AWG wires.



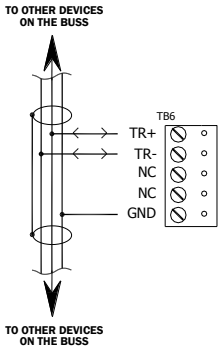
Observe POLARITY on VIN!

The VOUT terminal on TB7 is the same as VIN.

3. Communication Wiring (SIO Communication Port):

The MR52-S3 communicates to a Mercury Security intelligent controller (EP2500 for example) via a 2-wire RS-485 interface. The MR52-S3 allows for multi-drop communication on a bus of up to 4,000 feet (1,200 m). Use twisted pair, shielded, 24 AWG for communication. See specifications section.

Install RS-485 termination jumper, J4, on the interface boards at each end of the communication line only.



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

4. Reader Wiring:

Each reader port supports a reader with TTL (D1/D0, Clock/Data), F/2F, or 2-wire RS-485 signaling. Power to the reader is selectable: 12 Vdc (VIN must be greater than 20 Vdc), or power is passed-through (PT) from the input voltage of the MR52-S3 (TB7-VIN), 300 mA maximum per reader port. Readers that require different voltage or have high current requirements must be powered separately. Refer to the reader manufacture specifications for cabling requirements. In the 2-wire LED mode the buzzer output is used to drive the second LED. Do not terminate any RS-485 device connected to a reader port. Reader port configuration is set via the host software.

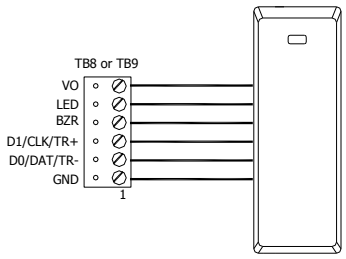
To fully utilize each reader port:

- TTL signaling requires a 6-conductor cable (18 AWG)
- F/2F signaling requires a 4-conductor cable
- RS-485 signaling may require two 2-conductor cables. Use one cable for power (18 AWG) and one cable for communication (shielded 24 AWG)

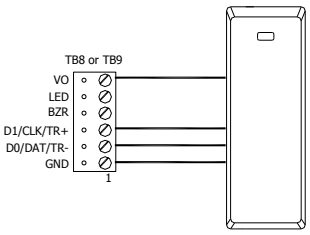
12V PT	READER POWER
	12 Vdc IS AVAILABLE ON READER PORTS (VIN>20 Vdc)
	VIN POWER IS "PASSED THROUGH" TO READER PORTS

J1 – Reader Port Power Select

Note:
Install jumper J1 in the 12V position **ONLY** if the input voltage (VIN) is greater than 20 Vdc! Failure to do so may damage the reader or MR52-S3!

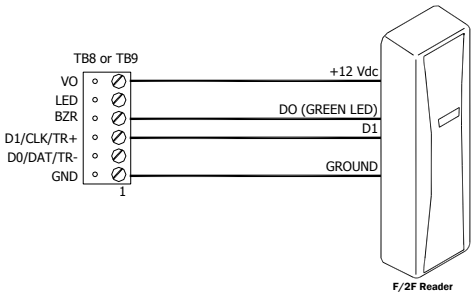


Typical D1/D0 – Clock/Data Reader

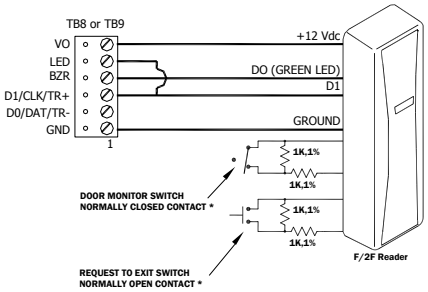


Typical 2-Wire RS-485 Device (OSDP Reader for Example)

* Inputs on supervised F/2F readers may be unsupervised or supervised (supervised shown).



Typical Unsupervised F/2F Reader



Typical Supervised F/2F Reader

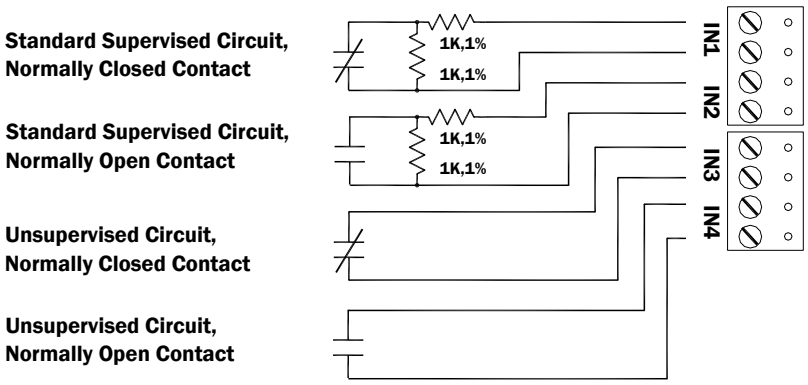
⚠ Jumper D1 to LED on supervised F/2F readers

5. Alarm Contract Wiring:

There are 8 inputs that are typically used to monitor door position, request to exit or alarm contacts. Input circuits can be configured as:
Unsupervised alarm (2 states); reporting as open or closed contact.
Supervised alarm (6 states); reporting as open or closed contact, open circuit, shorted circuit, grounded circuit *, or foreign voltage*.
A supervised input circuit requires adding two resistors with value of 1k ohm, 1% to the circuit to facilitate proper reporting and should be located as close to the sensor as possible. Custom end of line (EOL) resistances may be configured via the host software.

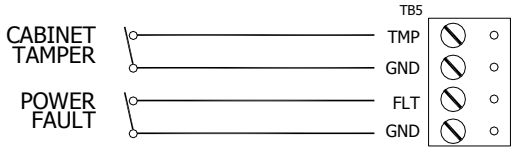
* Grounded and foreign voltage states are not a requirement of UL 294 and therefore not verified by UL.

The input circuit wiring configurations shown are supported but may not be typical.



6. Inputs for Cabinet Tamper/Power Fault:

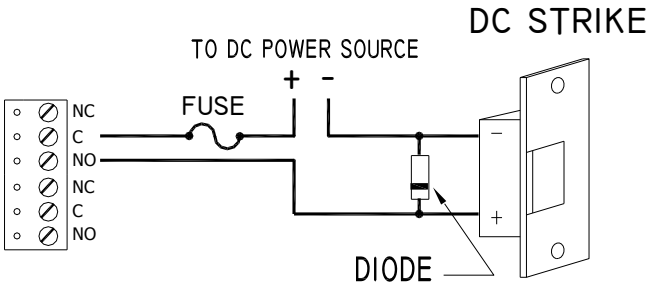
Input CT and input BA are used for monitoring cabinet tamper and power failure with normally closed contacts. These two inputs are for contact closure monitoring only, and do not use EOL resistor(s). If these inputs are not used, install a short piece of wire at the input to indicate a safe condition.



7. Output Relay Wiring:

The MR52-S3provides six Form-C contact relays 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, use the following contact protection circuit. 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.

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



DIODE SELECTION:

Diode current rating > 1x strike current
Diode break down voltage: 4x strike voltage
For 12 Vdc or 24 Vdc strike, diode 1N4002 (100V /1A) typical

8. Jumper and DIP Switch Usage:

JUMPER	DESCRIPTION
J1	Reader Power Select
	12V = 12 Vdc at reader ports. ***** See note below *****
	PT = VIN "Passed Through" to reader ports
J4	RS-485 Termination, install only on the first and last unit on the communication bus
	All other jumpers are for factory use only

NOTE:
Install jumper J1 in the 12V position **ONLY** if the input voltage (VIN) is greater than 20 Vdc! Failure to do so may damage the reader or MR52-S3!

Switches 1 through 5 select the device address. Switches 6 and 7 select the communication baud rate. Switch 8 enables encrypted communication. All other configuration settings are set via host software.

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						115,200 BPS
	OFF	ON						9,600 BPS
	ON	OFF						19,200 BPS
	ON	ON						38,400 BPS
OFF								Encrypted communication not required
ON								Encrypted communication required

9. Status LEDs:

Power-up: All LED's OFF

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

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 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**

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

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 LED**:** reader port 1:
Clock/Data Mode: Flashes when data is received, either input
D1/D0 Mode: Flashes when data is received, either input
RS-485 Mode: Flashes when transmitting data
F/2F Mode: Flashes when data/acknowledgment is received

R2 LED**:** reader port 2:
Clock/Data Mode: Flashes when data is received, either input
D1/D0 Mode: Flashes when data is received, either input
RS-485 Mode: Flashes when transmitting data
F/2F Mode: Flashes when data/acknowledgment is received

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

Every three seconds, LEDs **A** through **R2** are pulsed to their opposite state for 0.1 sec.

10. Specifications:

Revision D assembly:

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

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

Primary Power:	12 to 24 Vdc ± 10 %, 550 mA maximum (reader current not included)
Output Relays:	Six Form-C relays with dry contacts: Normally open contact (NO) contact: 5 A @ 30 Vdc resistive Normally closed contact (NC) contact: 3 A @ 30 Vdc resistive
Inputs:	Eight unsupervised/supervised, standard EOL: 1k/1k ohm, 1%, ¼ watt Two unsupervised, dedicated for cabinet tamper and UPS fault monitoring
Reader Interface:	
Power: (jumper selectable)	12 Vdc ± 10 % regulated, 300 mA maximum each reader (input voltage (VIN) must be greater than 20 Vdc) or 12 to 24 Vdc ± 10 % (input voltage passed through), 300 mA maximum each reader
Data Inputs:	TTL compatible, F/2F or 2-wire RS-485
LED Output:	TTL compatible, high > 3 V, low < 0.5 V, 5 mA source/sink maximum
Buzzer Output:	Open collector, 12 Vdc open circuit maximum, 40 mA sink maximum
Communication:	2-wire RS-485: 9600, 19200, 38400 or 115200 bps

Cable requirements:

Power:	1 twisted pair, 18 AWG
RS-485 I/O devices:	1 twisted pair, shielded, 24 AWG, 120 ohm impedance, 4,000 feet (1,200 m) maximum
Alarm inputs:	One twisted pair per input, 30 ohms maximum
Relay Outputs:	As required for the load
Reader data (TTL):	6-conductor, 18 AWG, 500 feet (150 m) maximum
Reader data (F/2F):	4-conductor, 18 AWG, 500 feet (150 m) maximum
Reader data (RS-485):	1 twisted pair, shielded, 24 AWG, 120 ohm impedance, 2,000 feet (610 m) maximum

Mechanical:

Dimension:	6 in. (15 2mm) W x 8 in. (203 mm) L x 1 in. (25 mm) H
Weight:	11 oz. (312 g) nominal

Environment:

Temperature:	-55 to +85 °C, storage 0 to +70 °C, operating
Humidity:	5 to 95 % RHNC

UL294, 6th edition Performance Levels:

Feature	Level
Standby Power	I
Endurance	IV
Line Security	I
Destructive Attack	I

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.