MR50 READER INTERFACE

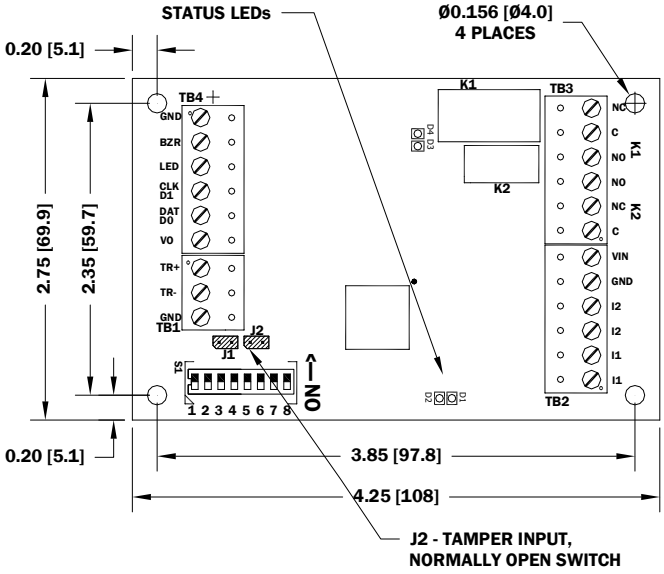
Series 3

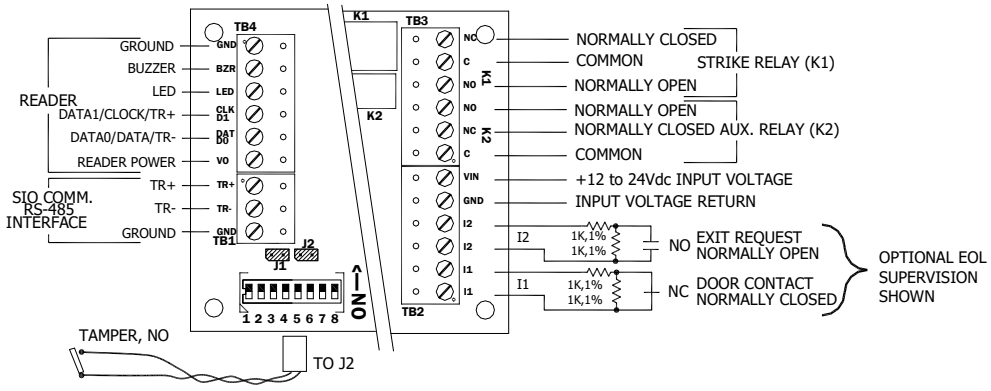
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Installation and Specifications:

General:

The MR50 reader interface provides a solution to the OEM system integrator for interfacing to a TTL (D1/D0, Clock/Data), F/2F or RS-485 device, and door hardware. It also provides a tri-stated LED control and buzzer control. Two Form-C contact relay outputs may be used for strike control or alarm signaling. Two inputs are provided that can be used for monitoring the door contact and request to exit push button. Input circuits can be configured as unsupervised or supervised. Communication to the controller is accomplished via a 2-wire RS-485 interface. The MR50 requires 12 to 24 Vdc for power.





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Compatibility:

The MR50 is not functional unless it is connected to a controller board (refer to document T71-000-020 Rev. B for comprehensive installation instructions). The MR50 is compatible with the following AccessNsite UL Listed Commercial Proprietary Burglar Alarm and Access Control subassemblies:

- E2M LifeSafety Power 20" x 16" x 4.5" Enclosure
- E4M LifeSafety Power 24" x 20" x 6.5" Enclosure
- E8M LifeSafety Power 36" x 30" x 6.5" Enclosure
- FPO75 LifeSafety Power 6A/12V or 3A/24V 75W Power Supply
- FPO150 LifeSafety Power 12A/12V or 6A/24V 150W Power Supply
- FPO250 LifeSafety Power 20A/12V or 10A/24V 250W Power Supply
- C8P LifeSafety Power, Power Controller Module
- D8P LifeSafety Power, Power Distribution Module
- LP1501 Mercury Intelligent Controller w/ One Access Point Interface
- LP1502 Mercury Intelligent Controller w/ Two Access Point Interface
- LP2500 Mercury Intelligent Controller
- LP4502 Mercury High Capacity Intelligent Controller
- MUX8 Mercury 8/1 RS-485 Multiplexer

Terminal Blocks:

CONNECTION		
TB1-1	RS-485	TR+
TB1-2		TR-
TB1-3		GND
TB2-1	Input 1	IN1
TB2-2		IN1
TB2-3	Input 2	IN2
TB2-4		IN2
TB2-5	Power	VIN
TB2-6		GND

CONNECTION		
TB3-1	RLY 2	GND: Ground
TB3-2		DAT/D0/TR- (A) See note 1
TB3-3		CLK/D1/TR+ (B) See note 1
TB3-4		BZR: Reader Buzzer
TB3-5		LED: Reader LED
TB3-6		VO: Reader Power
TB4-1	Reader	GND: Ground
TB4-2		BZR: Reader Buzzer
TB4-3		LED: Reader LED
TB4-4		CLK/D1/TR+ (B) See note
TB4-5		DAT/D0/TR- (A) See note 1
TB4-6		VO: Reader Power

Note 1: Terms A & B are from the RS-485 standard

Jumper and DIP Switch Usage:

JUMPER	DESCRIPTION
J1	RS-485 Termination, install in first and last units only
J2	Cabinet Tamper, Unsupervised

Switches 1 to 5 select the device address. Switch 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

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			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, See note 1 below.
	OFF	ON						9,600 BPS
	ON	OFF						19,200 BPS
	ON	ON						38,400 BPS
OFF								Encrypted communication not required See note 2 below.
ON								Encrypted communication required See note 2 below.

Note 1: Firmware revisions prior to 1.39.1, this setting is 2,400 BPS

Note 2: Firmware revisions prior to 1.39.1, SW8 is not defined. Set to the OFF position

Board Installation and Power

A qualified service person, complying with all applicable codes, should perform all required hardware installation. For UL installations, install the unit in accordance with National Electrical Code NFPA 70. If installing in Canada, install the unit according to Part 1 of the Canadian Electrical code CSA C22.1. For UL installations, install the board in a UL 294/1076 listed enclosure. It is recommended that the MR50 be mounted 0.50" above any conductive surface. The MR50 requires filtered 12 to 24 Vdc ± 10% for power. The power source must be filtered. Locate the power source as close to the unit as possible. Connect power with a minimum of 18AWG wire. Keep a minimum of ¼" spacing between power limited outputs and non-power limited wiring. **Connect the GND signal to earth ground in ONE LOCATION within the System. Multiple earth ground connections may cause ground loop problems and is not advised. Observe POLARITY on the 12-24Vdc input.**

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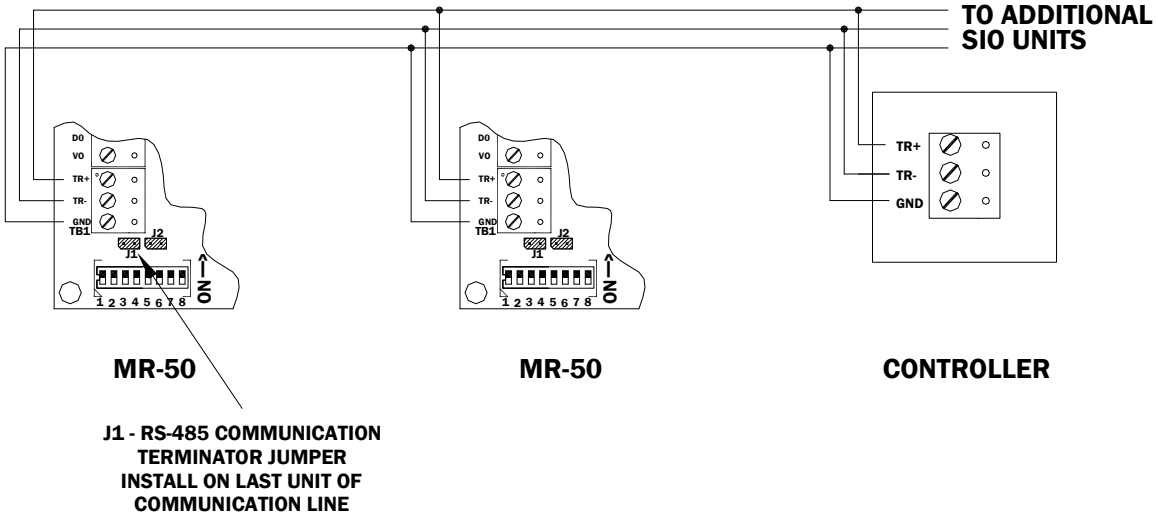
UL Note: The MR50 module has been evaluated for use with the LifeSafety Power FPO75, FPO150, and FPO250 power supplies or any UL Listed Power Supply evaluated to UL 603 (Power Supplies for use with Burglar –Alarm Systems). It must be a UL class 2 power supply of suitable ratings with a minimum of 4 hours of standby power.

Cable Routing and Connection

All low level input cables (reader cables, sensor input cables, controller communication cables, etc.) should be shielded and should preferably be run in grounded conduit or be run at least two feet from AC power, fluorescent lights, or other high energy sources. If conduit is used, do not run data cables in the same conduit as power cables.

Communication Wiring:

The MR50 communicates to a Mercury Security intelligent controller (EP2500 for example) via a half-duplex multi-drop 2-wire RS-485 interface. The total cable length is limited to 4,000 feet (1,219 meters). Use shielded twisted pair cable (minimum 24 AWG) with a drain wire and a characteristic impedance of 120 ohm. The last device on each end of the communication line should have the terminator installed (install jumper J1).



Cabinet Tamper Wiring:

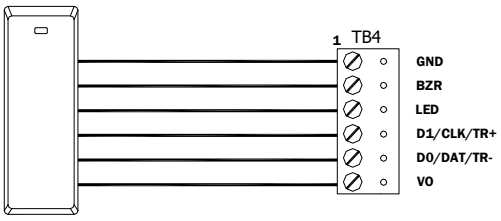
Input J2 is used for monitoring cabinet tamper. This input is for contact closure monitoring only, and does not use an End-Of-Line (EOL) resistor. Normal (safe) condition is closed contact. If this input is not used, install the jumper.

Reader Wiring:

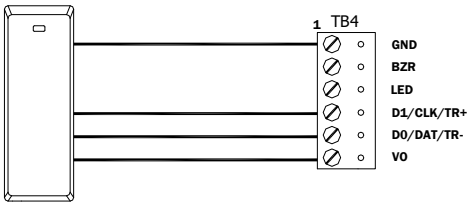
The reader port supports a reader with TTL (D1/D0, Clock/Data), F/2F, or 2-wire RS-485 signaling. Refer to the reader manufacture specifications for cabling requirements. In the 2-wire LED mode the buzzer output is used to drive the second LED. Reader port configuration is set via the host software.

Note: The input power is passed through to the reader terminal strip and is available for powering a reader. Readers that require different voltage requirements must be powered separately. Care must be taken to insure that the input voltage is within the voltage range of the reader. The reader power output terminal, TB4-6 (VO), is not current limited.

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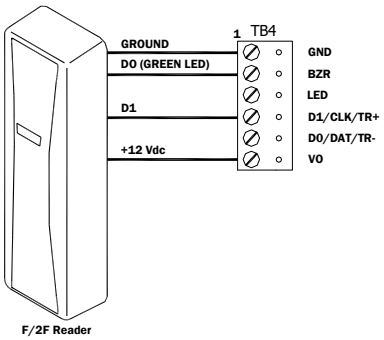


Typical D1/D0 or Clock/Data Reader

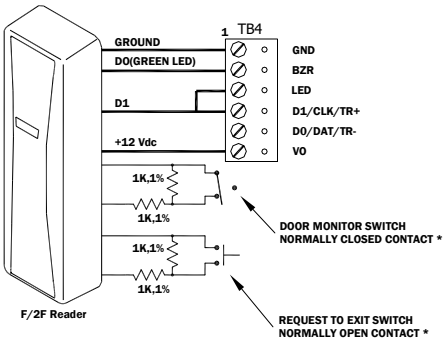


Typical RS-485 Device

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



Typical Unsupervised F/2F Reader



Typical Supervised F/2F Reader

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

Input Circuit Wiring:

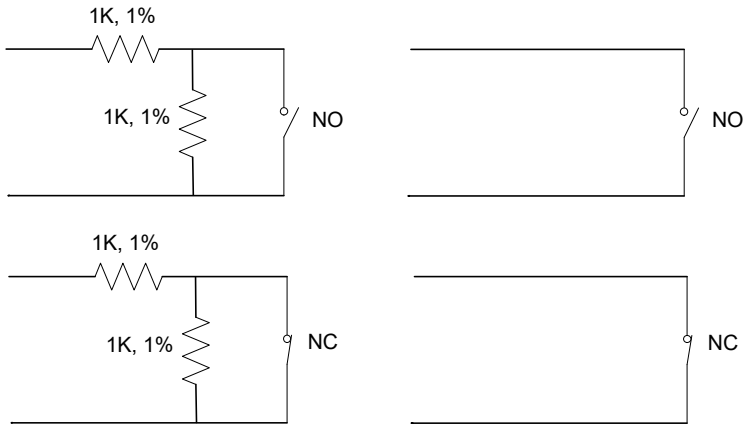
The SRI offers two inputs that are typically used for door contact and request-to-exit (REX) monitoring at a door. The inputs can be configured as unsupervised or supervised. When using unsupervised circuits, reporting consists of only the open or closed states. Supervised circuits are used to provide greater protection against circuit tampering. A supervised input circuit requires two end-of-line (EOL) resistors be added 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. The resistor network provides a different input resistance to the MR50 board for four different possible circuit states. This is sometimes referred to as four-state supervision.

Consider the "Standard Supervised Circuit, Normally Open Contact" circuit shown in the figure below. When the monitored contact changes to the closed state, the MR50 board sees a 1k Ohm resistance because one of the resistors is shorted out. This would be reported by the access control system as the secure state. When the monitored contact opens, the MR50 board sees a 2k Ohm resistance because current then flows through both resistors. This would be reported by the access control system as an alarm condition. If someone were to tamper with the cable by shorting the wires somewhere between the resistor network and the MR50 board this would be reported by the access control system as a short circuit alarm condition. Finally, if someone were to tamper with the cable by cutting one or both of the wires somewhere between the resistor network and the MR50 board this would be reported by the access control system as an open circuit alarm condition. Two other conditions that can be reported are grounded*, and foreign voltage*.

Custom EOL resistances may be configured via the host software. For UL, circuits must be supervised using only 1k ohm, 1% listed accessory EOL resistors.

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

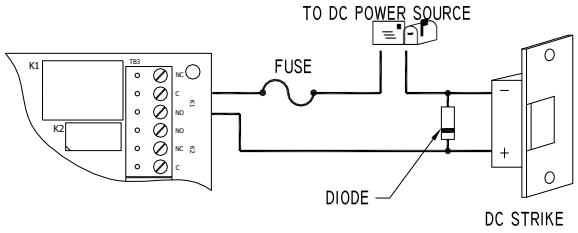
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Relay Circuit Wiring:

Two Form-C contact relays are provided for controlling door strikes or other devices. Each relay has a Common pole (C), a Normally Open pole (NO), and a Normally Closed pole (NC). When controlling the delivery of power to a door strike, the Normally Open and Common poles are typically used. When momentarily removing power to unlock the door, as with a mag lock, the Normally Closed and Common poles are typically used. Check with local building codes for proper egress door installation.

Door lock mechanisms can generate electromagnetic feedback to the relay circuit that can cause damage and premature failure of the relay and affect the operation of the MR50. For this reason, it is recommended that either a diode be used to protect the relay when DC power for the lock or an MOV (metal oxide varistor) be used when using AC power for the lock. 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.



Typical DC Door Strike Wiring

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

UL Note: Door strike wiring has only been evaluated for DC strikes. AC strike wiring has not been evaluated by UL. The DC Source must be a UL Listed Power Supply evaluated to UL 603 (Power Supplies for use with Burglar –Alarm Systems). It must be a UL class 2 power supply of suitable ratings, with a minimum of 4 hours of standby power. The relay shall be wired to enforce fail safe operation.

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Status LEDs:

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

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

The **D1 LED** is turned **ON** at the beginning of initialization

Run time: After a successful initialization, the LEDs have the following meanings:

D1 LED: Heartbeat and On-Line Status:
Off-line: 1 second rate, 20% **ON**, 80% **OFF**
On-line:
Non-encrypted communication: 1 second rate, 80% **ON**, 20% **OFF**
Encrypted communication:
.1 S **ON**, .1 S **OFF**, .1 S **ON**, .1 S **OFF**, .1 S **ON**, .1 S **OFF**, .1 sec **ON**, .3 S **OFF**

D1 LED Error Indication:
Waiting for application firmware to be downloaded: .1 S **ON**, .1 S **OFF**

D2 LED: SIO Communication Port Status:
Indicates communication activity on the SIO communication port

Specifications:

Revision E assembly:

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

Primary Power:	12 to 24 Vdc ± 10%, 150 mA maximum (plus reader current)
Outputs:	Two Form-C contact relays: K1: Normally open contact (NO) contact: 5 A @ 30 Vdc resistive Normally closed contact (NC) contact: 3 A @ 30 Vdc resistive K2: 1 A @ 30 Vdc resistive
Inputs:	Two unsupervised/supervised, standard EOL, 1k/1k ohm, 1%, ¼ watt One unsupervised, dedicated for cabinet tamper
Reader Interface:	
Reader power:	12 to 24 Vdc ± 10% (input voltage passed through)
Reader 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
Data Inputs:	TTL compatible, F/2F or 2-wire RS-485
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 with drain wire and shield, 24 AWG, 120 ohm impedance, 4,000 ft. (1,219 m) maximum
Alarm Inputs:	1 twisted pair per input, 30 ohms maximum
Outputs:	As required for the load
Reader data (TTL):	6-conductor, 18 AWG, 500 ft. (150 m) maximum
Reader data (F/2F):	4-conductor, 18 AWG, 500 ft. (150 m) maximum
Reader data (RS-485):	1 twisted pair with drain wire and shield, 24 AWG, 120 ohm impedance, 2,000 ft. (610 m) maximum

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Mechanical:

Dimension:	4.25 in. (108 mm) W x 2.75 in. (70 mm) L x 1 in. (25.4 mm) H
Weight:	4 oz. (120 g) nominal

Environment:

Temperature:	-55 to +85 °C, storage, -40 to +75 °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

AccessNsite warrants the product is free from defects in material and workmanship under normal use and service with proper maintenance for one year (30 days for repaired or replaced products) from the date of shipment. AccessNsite assumes no responsibility for products damaged by improper handling or installation. This warranty is limited to the repair or replacement of the defective unit. Returns must be accompanied by a Return Material Authorization (RMA) number obtained from customer service, and prepaid postage and insurance. AccessNsite's obligation under this warranty shall not arise until Buyer returns the defective product to AccessNsite's facility or another specified location.

There are no expressed warranties other than set forth herein. AccessNsite 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.

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

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