

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.

EP1502 Intelligent Controller

with Two Reader Interface

Installation and Specifications:

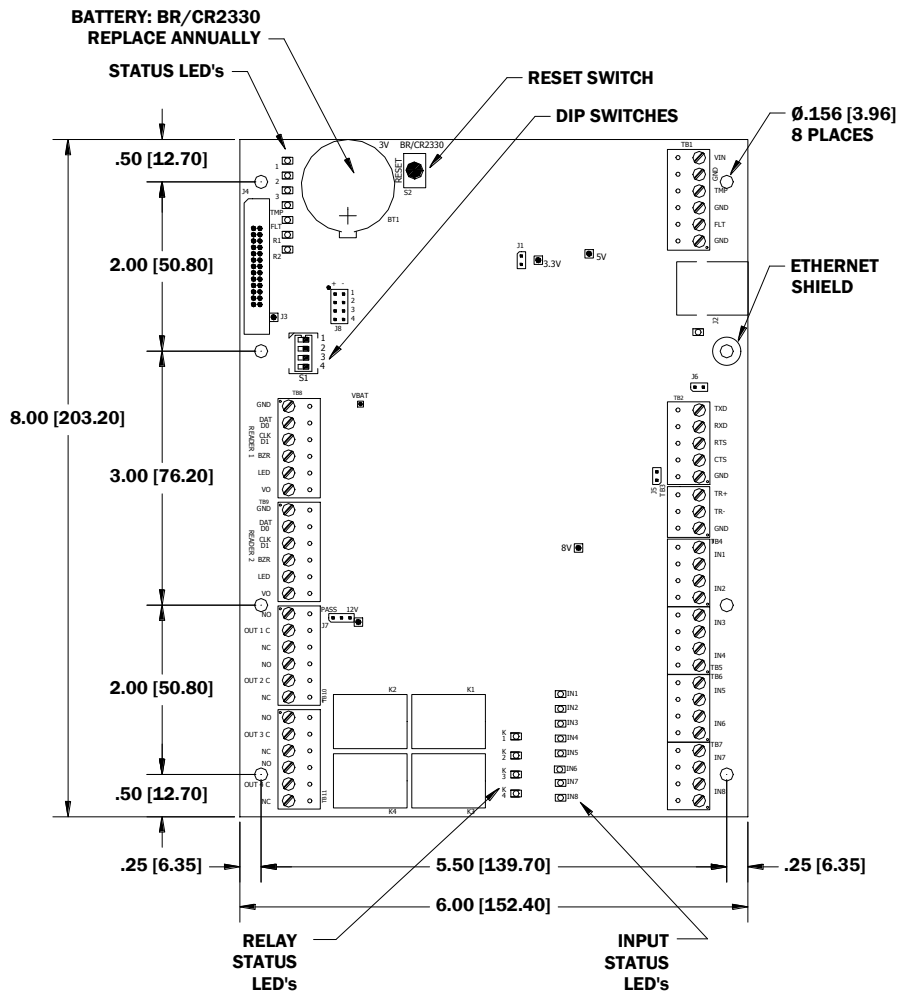
1. General

The EP1502 intelligent controller provides decision making, event reporting, and database storage for the Mercury hardware platform. Two reader interfaces provide control for two doors.

It communicates with the host via on-board 10-BaseT/100Base-TX Ethernet port. Alternatively, port 1 (RS-232) can be used for host communication.

Two physical barriers can be controlled with the EP1502. Each reader port can accommodate a read-head that utilizes Wiegand, magnetic stripe, or 2-wire RS-485 electrical signaling standards, one or two wire LED controls, and buzzer control (one wire LED mode only). Four Form-C relay outputs may be used for strike control or alarm signaling. The relay contacts are rated at 5 A @ 30 Vdc, dry contact configuration. Eight inputs are provided for monitoring the door contacts, exit push buttons and alarm contacts. The EP1502 requires 12-24 Vdc for power. It is recommended that the EP1502 be mounted .25" minimum above any conductive surface.

2. EP1502 Hardware:



Information Subject to Change Without Notice

3. EP1502 Wiring and Setup:

CONNECTION		
TB8	Reader 1	GND: Ground
		DAT/D0: Data/Data 0/TR-
		CLK/D1: Clock/Data 1/TR+
		BZR: Reader Buzzer
		LED: Reader LED
		VO: Reader Power
TB9	Reader 2	GND: Ground
		DAT/D0: Data/Data 0/TR-
		CLK/D1: Clock/Data 1/TR+
		BZR: Reader Buzzer
		LED: Reader LED
		VO: Reader Power
TB10	Out 1	NO: Normally Open Contact
		C: Common
		NC: Normally Closed Contact
	Out 2	NO: Normally Open Contact
		C: Common
		NC: Normally Closed Contact
TB11	Out 3	NO: Normally Open Contact
		C: Common
		NC: Normally Closed Contact
	Out 4	NO: Normally Open Contact
		C: Common
		NC: Normally Closed Contact

CONNECTION		
TB1	Power Input	VIN: 12 to 24 Vdc
		GND
	Cabinet Tamper Input	TMP
	Power Fault Input	GND
TB2	Host Port 1	TXD (RS-232)
		RXD (RS-232)
		RTS (RS-232)
		CTS (RS-232)
		GND (RS-232)
TB3	SIO Port	TR+ (2-wire RS-485)
		TR- (2-wire RS-485)
		GND (2-wire RS-485)
TB4	Input 1	IN1
		IN1
	Input 2	IN2
		IN2
TB5	Input 3	IN3
		IN3
	Input 4	IN4
		IN4
TB6	Input 5	IN5
		IN5
	Input 6	IN6
		IN6
TB7	Input 7	IN7
		IN7
	Input 8	IN8
		IN8

Jumpers:

The EP1502 processor hardware interface is configured using jumpers to setup the port interface and end of line termination.

JUMPERS	SET AT	DESCRIPTION
J1	N/A	Factory Use Only
J2	N/A	10Base-T/100Base-Tx Ethernet Connection (Port 0)
J3	N/A	Factory Use Only
J4	N/A	Factory Use Only
J5	OFF	Port 2 RS-485 EOL Terminator is Off
	ON	Port 2 RS-485 EOL Terminator is On
J6	N/A	Factory Use Only
J7		Reader Power Select. See Note 1
	12V	12 Vdc at Reader Ports
	PASS	VIN "Pass Through" to Reader Ports
J8-1	N/A	Remote Status Led #1. See Note 2
J8-2	N/A	Remote Status Led #2. See Note 2
J8-3	N/A	Remote Status Led #3. See Note 2
J8-4	N/A	Remote Status Led #4. See Note 2

Note 1: The input power (VIN) must be 20 Vdc minimum if the 12 Vdc selection is to be used.

Note 2: Observe POLARITY connection to LED. External current limiting is not required.

DIP Switches:

The four switches on S1 DIP switch configure the operating mode of the EP1502 processor. DIP switches are read on power-up except where noted. Pressing switch S2 causes the EP1502 to reset.

1	2	3	4	Definitions
OFF	OFF	X	OFF	Normal operating mode.
ON	X	X	X	After initialization, enable default User Name (admin) and Password (password). The switch is read on the fly, no need to re-boot.
OFF	ON	X	OFF	Use factory default communication parameters.
ON	ON	X	OFF	Use OEM default communication parameters. Contact system manufacture for details. See Bulk Erase below.
X	X	ON	X	Disable TLS secure link. Switch is read only when logging on.
ON	ON	OFF	OFF	Bulk Erase prompt mode at power up. See Bulk Erase below.

All other switch settings for unassigned and are reserved for future use. X = don't care.



In the factory or OEM default modes, downloaded configuration/database is not saved to flash memory.

Factory Default Communication Parameters:

Network: static IP address: 192.168.0.251

Communication address: 0

Primary Host port: IP server, no encryption, port 3001.

Alternate Host Port 1: RS-232, 38,400 baud, no encryption, no flow control.

Bulk Erase Configuration Memory:

The bulk erase function can be used for the following purposes:

- To erase all configuration and cardholder database data.
- To recover from a corrupted database in the unlikely event the database gets corrupted and causes the EP1502 to continuously reboot.

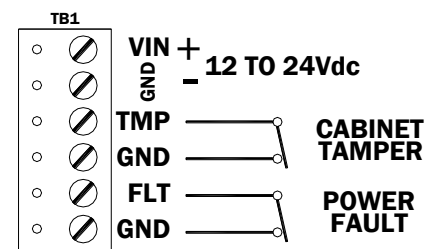
When power is applied with S1 switches set to 1 & 2 ON and 3 & 4 OFF, there is a 10-second window that if switch 1 or 2 is changed to the OFF position memory is erased. The LEDs flash the following pattern when in the reset window: LED 1 & 2 and LED 3 & 4 flash alternately at .5 second rate. When erasing memory, LED 2 flashes at a 2 second rate; **DO NOT CYCLE POWER**. It takes less than 60 seconds to erase the memory. LEDs 1 and 4 flash for 10 seconds after the memory has been erased, then the EP1502 will re-boot.

4. Input Power, Cabinet Tamper and UPS Fault Input Wiring:

The EP1502 requires 12-24 Vdc power. Locate power source as close to the unit as possible. Connect power with minimum of 18 AWG wire. **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 12-24 Vdc input!

There are two dedicated inputs for cabinet tamper and UPS fault monitoring. Normal (safe) condition is a closed contact. If these inputs are not used, install a jumper wire.

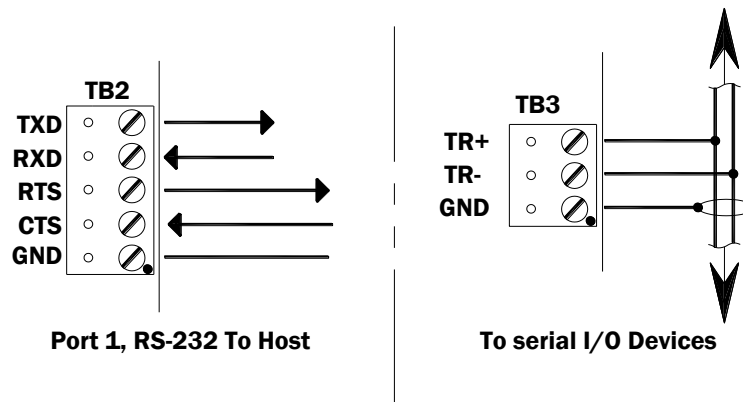


5. Communication Wiring:

The EP1502 controller communicates to the host via the on-board 10-BaseT/100Base-TX Ethernet interface (port 0) and/or RS-232 interface (port 1). RS-232 interface is for direct one to one connection to a host computer port or via modem, 25 feet maximum.

The serial I/O device communication port (TB3) is a 2-wire RS-485 interface which can be used to connect additional I/O panels. The interface allows multi-drop communication on a single bus of up to 4,000 feet (1,219 m). Use twisted pairs (minimum 24 AWG) with an overall shield for communication.

Communication Wiring (continued):



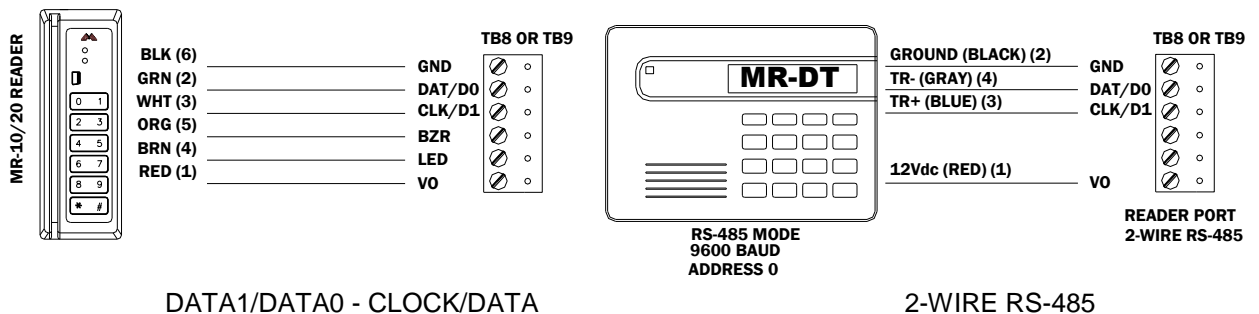
IMPORTANT NOTE! Install the termination jumper **ONLY** on the panel at each end of the RS-485 bus. Failure to do so will compromise the proper operation of the communication channel!

6. Reader Wiring:

Each reader port supports Wiegand, magnetic stripe, and 2-wire RS-485 electrical interfaces. 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 EP1502 (TB1-VIN) and is current limited to 150 mA for each reader port. Readers that require different voltage or have high current requirements should 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. Reader port configuration is set via the host software.

PASS 12V	READER POWER
<input type="checkbox"/>	12Vdc IS AVAILABLE ON READER PORTS (VIN ≥ 20Vdc)
<input checked="" type="checkbox"/>	VIN POWER IS "PASSED THROUGH" TO READER PORTS

J7 - READER POWER SELECT



DATA1/DATA0 - CLOCK/DATA

2-WIRE RS-485

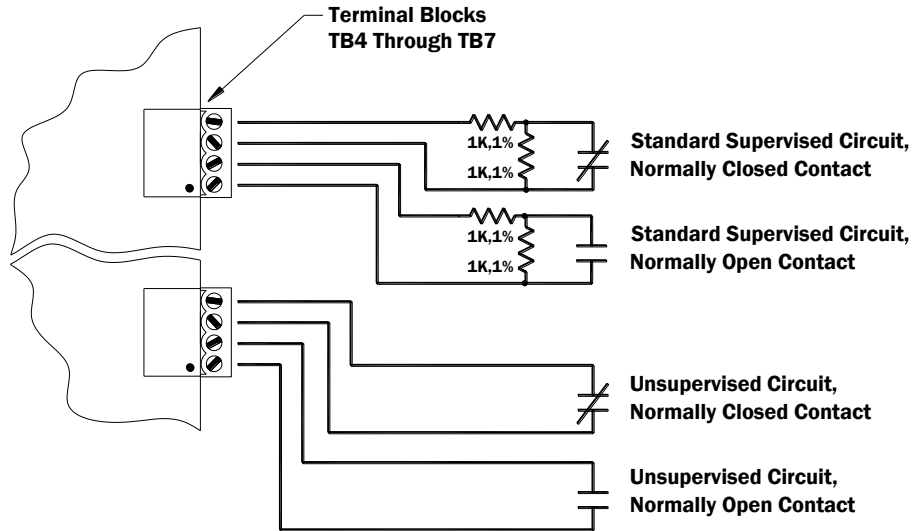
7. Input Circuit Wiring:

Typically, these inputs are used to monitor door position, request to exit, or alarm contacts. Input circuits can be configured as unsupervised or supervised. When unsupervised, reporting consists of only the open or closed states. When configured as supervised, the input circuit will report not only open and closed, but also open circuit, shorted, grounded*, and foreign voltage*. A supervised input circuit requires two 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. 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.

Input Circuit Wiring (continued):

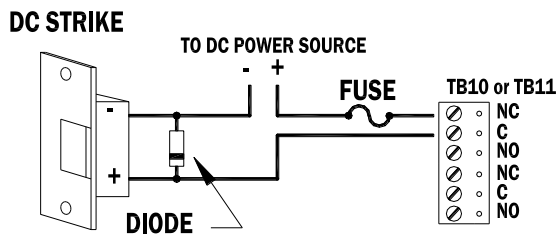
The input circuit wiring configurations shown are supported but may not be typical:



8. Relay Circuit Wiring:

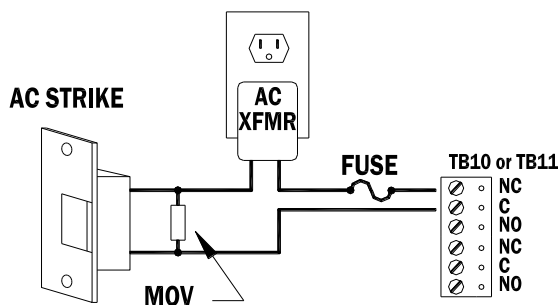
Four relays with Form-C contacts are provided for controlling door lock mechanisms or alarm signaling. The relay contacts are rated at 5 A @ 30 Vdc, dry contact configuration. Each relay has a Common pole (C), a Normally Open pole (NO) and a Normally Closed pole (NC). When you are controlling the delivery 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.

Door lock mechanisms can generate feedback to the relay circuit that can cause damage and premature failure of the relay. For this reason, it is recommended that either a diode or MOV (metal oxide varistor) be used to protect the relay. Wire should be of sufficient gauge to avoid voltage loss.



Diode Selection:

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



MOV Selection:

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

9. Memory and Real Time Clock Backup Battery:

The static RAM and the real time clock are backed up by a lithium battery when input power is removed. This battery should be replaced annually. If data in the static RAM is determined to be corrupt after power up, all data, including flash memory, is considered invalid and is erased. All configuration data must be re-downloaded. Remove the insulator from the battery holder after installation. Battery type: BR2325, BR2330, or CR2330.

10. Status LEDs:

Power-up: All LED's OFF.

Initialization: LED's 1, 2, 3, TMP, FLT, R1, R2, IN1, IN2, IN3, IN4, IN5, IN6, IN7 and IN8 are sequenced during initialization. LED's 1, 3, and TMP are turned ON for approximately 4 seconds after the hardware initialization has completed, then the application code is initialized. The amount of time the application takes to initialize depends on the size of the database, about 3 seconds without a card database. Each 10,000 cards will add about 3 seconds to the application initialization. When LED's 1, 2, 3 and TMP flash at the same time, data is being read from or written to flash memory, do not cycle power when in this state.

Running: After initialization is complete, the LEDs have the following meanings: At power up, LEDs 2 through 6 are turned ON then OFF in sequence.

LED	DESCRIPTION
1	Off-Line / On-Line and Battery Status
	Off-Line = 20% ON, On-Line = 80% ON
	Double Flash if Battery is Low
2	Host Communication Activity (Ethernet or Serial Port 1)
3	Internal SIO Communication Activity
TMP	External SIO Communication Activity
FLT	Unassigned
R1	Reader 1: Clock/Data or D1/D0 Mode = Flashes when Data is Received, Either Input. RS-485 Mode = Flashes when Transmitting Data
R2	Reader 2: Clock/Data or D1/D0 Mode = Flashes when Data is Received, Either Input. RS-485 Mode = Flashes when Transmitting Data
D16	Flashes with Host Communication (Ethernet Port 0)
YEL	Ethernet Speed: OFF = 10Mb/S, ON = 100Mb/S
GRN	OFF = No Link, ON = Good Link, Flashing = Ethernet Activity
IN1	Input IN1 Status: OFF = Inactive, ON = Active, Flash = Trouble. See Note 1.
IN2	Input IN2 Status: OFF = Inactive, ON = Active, Flash = Trouble. See Note 1.
IN3	Input IN3 Status: OFF = Inactive, ON = Active, Flash = Trouble. See Note 1.
IN4	Input IN4 Status: OFF = Inactive, ON = Active, Flash = Trouble. See Note 1.
IN5	Input IN5 Status: OFF = Inactive, ON = Active, Flash = Trouble. See Note 1.
IN6	Input IN6 Status: OFF = Inactive, ON = Active, Flash = Trouble. See Note 1.
IN7	Input IN7 Status: OFF = Inactive, ON = Active, Flash = Trouble. See Note 1.
IN8	Input IN8 Status: OFF = Inactive, ON = Active, Flash = Trouble. See Note 1.
K1	Relay K1: ON = Energized
K2	Relay K2: ON = Energized
K3	Relay K3: ON = Energized
K4	Relay K4: ON = Energized

Note 1: If this input is defined, every three seconds the LED is pulsed to its opposite state for 0.1 seconds, otherwise, the LED is off.

11. Specifications:

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: 12-24 Vdc±10%, 500 mA maximum (reader current not included)
12 Vdc @ 250 mA (plus reader current) nominal
24 Vdc @ 150 mA (plus reader current) nominal

Memory and Clock Backup Battery: 3 Volt Lithium, type BR2325, BR2330 or CR2330

Host Communication: Ethernet: 10BaseT/100Base-TX, and RS-232; 9,600 to 115,200 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit.

SIO Communication 2-wire RS-485, 2,400 to 115,200 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit.

Inputs: Two dedicated for tamper and UPS fault monitoring.
Eight for door position monitoring, request to exit or alarm contacts.

Relays: Four each: Form-C, 5 A @ 30 Vdc, resistive.

Reader Interface:

Reader Power: 12 Vdc±10% regulated, current limited to 150 mA for each reader.
(jumper selectable) or
12 to 24 Vdc±10% (input voltage passed through) current limited to 150 mA for each reader.

Data Inputs: TTL compatible inputs, mag stripe and Wiegand standards supported.
Maximum cable length: 500 ft (152 m).

RS-485 Mode: 9,600 to 38,400 bps, asynchronous, half-duplex, 1 start bit, 8 data bits, and 1 stop bit. Maximum cable length: 2000 ft (609.6 m).

LED Output: TTL levels, high>3 V, Low<0.5 V, 5 mA source/sink maximum.

Buzzer Output: TTL levels, high>3 V, Low<0.5 V, Low=Active, 5 mA source/sink maximum.

Cable requirements:

Power: 1 twisted pair, 18 AWG.

Ethernet: CAT-5, minimum.

RS-485:

(I/O Device Port): 24 AWG, 4,000 ft (1,219 m) maximum, twisted pair(s) with an overall shield.

(Reader Port): 24 AWG, 2,000 ft (609.6 m) maximum, twisted pair(s) with an overall shield.

RS-232: 24 AWG, 25 ft (7.6 m) maximum.

Alarm Input: 1 twisted pair, 30 ohms maximum, typically 22 AWG @ 1000 ft (304.8 m).

Environmental:

Temperature: 0 to 70 °C, operating, -55 to +85 °C, storage

Humidity: 10 to 95% RHNC

Mechanical:

Dimension: 8 in (203.2 mm) W x 6 in (152.4 mm) L x 1 in (25 mm) H

Weight: 9 oz (255 g) nominal, board only

Warranty

Mercury Security Corporation 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 Corporation 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 Corporation 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.

Returned units are repaired or replaced from a stock of reconditioned units. Returns must be accompanied by a return authorization number (RMA) 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 Corporation 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 Corporation's liability does not extend beyond the purchase price of the product.