EMRI-2 Board Installation Guide

INTRODUCTION

This document describes the current installation considerations for the EMRI-2 board.

FEATURES

Each EMRI-2 board is capable of controlling 2 proximity card or magnetic stripe readers.

Each reader is associated with two output controls. One is an open-collector Darlington transistor output and the other is a DPST relay. Either or both can be used to control doors or gates. Four analog inputs are associated with each reader.

The EMRI-2 board can be powered by AC or DC from 12V up to 24V input. Battery backup is available. Unregulated DC power is available to power locks or relays. The exact voltage depends on the input power to the board.

The EMRI-2 board can be controlled by either an RS-232 or connected to an RS-485 multi-drop bus. Either interface uses 19200 or 38400 baud, 8 bits and no parity. Only one of the serial interfaces may be used on a particular board.

Up to 8 EMRI-2 boards can be controlled on a single RS-485 multi-drop bus.

Although there is an Auxiliary RS-232 interface on board, its use is not currently implemented.

RESTRICTIONS

Batteries used for battery backup must be 12V gel-cell lead-acid types. If the board is powered by DC and you wish to use battery backup, DC voltage must be at least 14V. If it's powered by 12-24V AC the board will trickle charge the battery.

The transistor outputs can be used for controlling DC locks directly if the activation current is less than 1A. The current can be up to 2A if a heat sink is mounted on the output transistor. Transistor outputs can be used to power a relay to control AC or high power locks, sirens, etc.

The internally generated power must be used to power the locks if the board is to operate locks in battery backup mode.

All pins labeled GND or G are connected together. This is important to know to avoid possible damage to the EMRI-2 board.

SETTINGS and CONNECTIONS

SW1 - DIP Switch Settings:

1 On = Reader 1 in magnetic stripe mode
Off = Reader 1 in proximity mode

2 On = Reader 2 in magnetic stripe mode
Off = Reader 2 in proximity mode

3 On = Reader 2 transistor output in normally open mode
Off = Reader 2 transistor output in normally closed mode

4 On = Reader 1 transistor output in normally open mode
Off = Reader 1 transistor output in normally closed mode

5 On = Communications Speed is 19200 baud
Off = Communications Speed is 38400 baud

6, 7 and 8 control the reader address assignments:

6	7	8	
On	On	On	= Reader 1 assigned to address 1
			= Reader 2 assigned to address 2
On	On	Off	= Reader 1 assigned to address 3
			= Reader 2 assigned to address 4
On	Off	On	= Reader 1 assigned to address 5
			= Reader 2 assigned to address 6
On	Off	Off	= Reader 1 assigned to address 7
			= Reader 2 assigned to address 8
Off	On	On	= Reader 1 assigned to address 9
			= Reader 2 assigned to address 10
Off	On	Off	= Reader 1 assigned to address 11
			= Reader 2 assigned to address 12
Off	Off	On	= Reader 1 assigned to address 13
			= Reader 2 assigned to address 14
Off	Off	Off	= Reader 1 assigned to address 15
			= Reader 2 assigned to address 16

SW4 - Reader 1 power selector (Jumper)

Top and Middle = +12V
Middle and Bottom = +5V

SW5 - Reader 2 power selector (Jumper)

Top and Middle = +12V
Middle and Bottom = +5V

P1 - Power

~	= Board power input #1
~	= Board power input #2

P2 - Reader 1 connector

D0	= Data 0 (green wire)
D1	= Data 1 (white wire)
G	= Ground (black wire)
+V	= Power (red wire) (+5 or +12)
L	= LED (brown wire)

P3 - Reader 2 connector

D0	= Data 0 (green wire)
D1	= Data 1 (white wire)
G	= Ground (black wire)
+V	= Power (red wire) (+5 or +12)
L	= LED (brown wire)

P4 - LCD display connector

This is for optional equipment supplied by EMS

P5 - Reader 1 keypad input

This is for optional equipment supplied by EMS

P6 - Reader 1 Relay

N/O	= Normally Open contact
N/C	= Normally Closed contact
COM	= Common contact

P7 - Reader 2 Relay

N/O	= Normally Open contact
N/C	= Normally Closed contact
COM	= Common contact

P8 - Reader 1 Transistor output

+V	= Unregulated DC +12 to +24 VDC (Voltage depends on board input power)
C	= Transistor collector
GND	= Board ground

P9 - Reader 2 Transistor output

+V	= Unregulated DC +12 to +24 VDC (Voltage depends on board input power)
C	= Transistor collector
GND	= Board ground

P10 – Reader 1 Analog contact inputs

C1	= Contact 1 input
C2	= Contact 2 input
C3	= Contact 3 input
C4	= Contact 4 input
GND	= Ground

P11 - Reader 2 keypad input

This is for optional equipment supplied by EMS

P12 - RS-232 Serial communications

GND	= Ground
RX	= Receive Data (Rx)
TX	= Transmit Data (Tx)

P13 - Auxiliary RS-232 Serial communications

GND	= Ground
TX	= Transmit Data (Tx)
RX	= Receive Data (Rx)

P14 - RS-485 communications

GND	= RS-485 Ground connection
B	= RS-485 B connection
A	= RS-485 A connection

P15 – Alternate Power Input

The orientation of P15 is Pin 1 toward P3 and Pin 4 toward P2
Pin 1 = +5V (red)
Pin 2 = Ground (black)
Pin 3 = Ground (black)
Pin 4 = +12V (yellow)

Pins 1 and 2 are not connected. They are there only to orient the plug. Refer to EMRI-2 drawing.

P16 – Reader 2 Analog contact inputs

C1	= Contact 1 input
C2	= Contact 2 input
C3	= Contact 3 input
C4	= Contact 4 input
GND	= Ground

BT2 - External backup battery connector

-	= Ground
+	= +12V

INSTALLATION NOTES

Here are our recommendations for installing the EMRI-2 board:

- Use a separate power supply for locks and sirens.
- DC inductive loads (magnetic locks, lock strikes, relays, etc.) need to have a reversed biased diode (1N4001 recommended) installed as close as possible to the lock or relay coil.
- Use a 12VAC 20VA transformer to power a single EMRI-2 board, and a 12VAC 40VA to power two EMRI-2 boards.
- If an EMRI-2 board is not powered through a UPS, a battery backup is recommended.
- Wiring from the readers to the EMRI-2 board should be done with shielded cable with the drain connected to the ground on the reader side of the cable and unconnected on the EMRI-2 board side of the cable.
- Use recommended wiring diagram(s) as appropriate. The diagrams are pictured on Page 7.
- The EMRI-2 board should be well grounded. At least one of the ground leads should be connected to an earth ground.
- In situations where long wire runs are needed, especially for RS-485 communications, the EMRI-2 boards may need to be protected by external surge suppression.

When using 12V to power the readers, the heat sink on the 12V regulator will get quite hot. This is normal. The higher the voltage used to power the EMRI-2 board, the hotter it will become.

If the readers require 12V to operate and the EMRI-2 board is powered by DC, you will need to supply the EMRI-2 board with at least 14V to supply the readers with the correct voltage level. As an alternative, the readers could be directly connected to the same 12V DC supply used to power the EMRI-2 board. If the readers require 24V to operate, they must be powered by an external supply.

ELECTRICAL SPECIFICATIONS

Supply power:	12-24V AC or DC @ 500mA Max.
	Note: this includes reader power but does not include lock or relay power.
Relay Contacts:	250VAC @ 5A Max.
Transistor:	24VDC Max. collector to ground. 1A sink current without heat sink installed. 2A sink current with heat sink installed.
Contact inputs:	Source 12VDC @ 1mA.

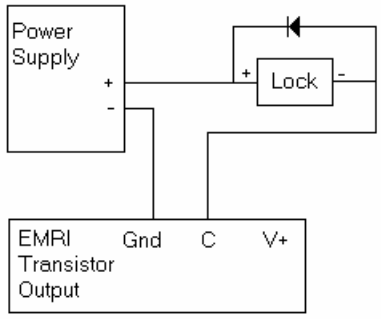
Backup Battery Recommendation:

12V 7.2AH Sealed lead-acid (Gel-Cell) battery.

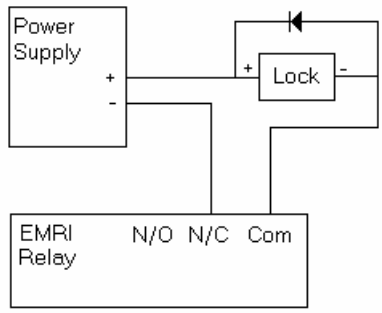
Note: This should run the EMRI-2 board with two readers and power fail-secure locks with occasional use for about 4 hours.

Recommended Wiring Diagrams:

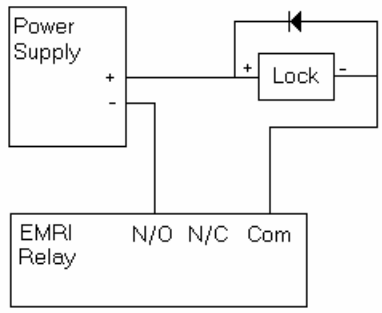
Lock Activated by Transistor



Mag Lock or Fail-Safe Lockstrike on Relay



Fail-Secure Lockstrike on Relay



Relay powered by EMRI power & Activated by Transistor Output