

# **RECTANGULAR RAPID FLASHING BEACON USER'S MANUAL**

THE BEST IN THE BUSINESS



**INFORMATION DISPLAY**  
COMPANY

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## REVISION HISTORY

Rev	Date	Description
1.0	November 26, 2015	Initial draft
1.1	December 19, 2015	Photos updated
1.2	February 1, 2016	Photos updated
1.3	January 10, 2017	Planning guide and flashbar details added

## NOTICES

The information in this document is subject to change without notice and should not be construed as a commitment by Information Display Company. The specifications of the rectangular rapid flashing beacon and other components described in this manual are subject to change without notice.

While reasonable precautions have been taken, Information Display Company assumes no responsibility for any errors or omissions that may occur in this manual. Customers are advised to verify all information contained in this document.

The electronic equipment described herein generates, uses and radiates radio frequency energy, which can cause radio interference. Information Display Company assumes no liability for any damages caused by such interference.

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## TRADEMARKS

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# INTRODUCTION



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## 1.1 OVERVIEW

This manual provides information about how to configure and install the Rectangular Rapid-Flashing Beacon (RRFB) from Information Display Company.

This manual is broken down into seven chapters:

[Chapter 1: Introduction](#)

[Chapter 2: General Information](#)

[Chapter 3: Specifications](#)

[Chapter 4: Installing the RRFB](#)

[Chapter 5: Maintenance](#)

[Chapter 6: Troubleshooting](#)

[Chapter 7: FCC / IC Notices](#)

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## 1.2 PREFACE

The Rectangular Rapid-Flashing Beacon is used for pedestrian and school crossings to warn oncoming drivers. The rapid flashing provides a more visible notification than a typical round flashing beacon.

### 1.2.1 AUDIENCE

This manual is for end users and installers of Information Display Company's Rectangular Rapid-Flashing Beacon.

### 1.2.2 SCOPE

This manual contains the following chapters:

[Chapter 1: Introduction and Planning](#). This chapter provides an overview of this Manual.

[Chapter 2: General Information](#). This chapter provides an overview of the features and functions of the RRFB.

[Chapter 3: Specifications](#). This chapter covers the general specifications and options for the RRFB.

[Chapter 4: Installing the RRFB](#). This chapter explains how to install the RRFB and verify that it is operating correctly.

[Chapter 5: Maintenance](#). This chapter provides details of all periodic maintenance.

[Chapter 6: Troubleshooting](#). This chapter provides general suggestions for troubleshooting.

[Chapter 7: FCC / IC Notices](#). Required FCC and Industry Canada notices regarding radio transmissions.

## 1.2.3 GETTING HELP

This manual gives specific steps for installing your Rectangular Rapid Flashing Beacon. If you have trouble installing or configuring your system, first read [Chapter 6, “Problem Resolution”](#). If this information does not enable you to solve your problems, please contact Information Display Company for assistance:

email:	<a href="mailto:support@informationdisplay.com">support@informationdisplay.com</a>
web:	<a href="http://www.informationdisplay.com">www.informationdisplay.com</a>
telephone:	800.421.8325
fax:	503 .626.3417

## 1.2.4 CONVENTIONS USED IN THIS MANUAL

This document uses various icon conventions and abbreviations to make the documents clearer and easier to read. These conventions cover typography for such elements as sample software code and keystrokes, signal meanings, and graphical elements for important information such as warnings or cautions.

The following table defines the icons used throughout this manual.

**Table 1-1: Icon Definitions**



on

Cross references to other documents are used when a subject being discussed is addressed in depth by another, more authoritative document. Cross references are also used for document chapters and sections.



The warning icon indicates procedures in the manual that, if not carried out, or if carried out incorrectly, could cause physical injury, electrical damage to equipment, or a non-recoverable corruption of data. Warnings include instructions for preventing such damage. *Please observe warning icons and read the accompanying text completely before carrying out the procedure.*



The caution icon indicates non-catastrophic incidents, complex practices, or procedures which, if not observed, could result in damage to the hardware. Cautions include specific instructions for avoiding or minimizing these incidents.



**Nte**

The note icon highlights exceptions and special information.



Tips provide extra information on the subject matter.

## 1.3 ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

The following table summarizes the terminology, acronyms, etc. that are specific to the Rectangular Rapid-Flashing Beacon product.

**Table 1-1: Terminology and Abbreviations**

Abbreviation	Definition
FHWA	Federal Highway Administration
LED	Light Emitting Diode
RRFB	Rectangular Rapid Flashing Beacon
MUTCD	Manual for Uniform Traffic Control Devices, published by the FHWA



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## GENERAL INFORMATION



## 2.1 INTRODUCTION AND PLANNING

Rectangular Rapid Flashing Beacons (RRFB) are used in areas where pedestrians must cross vehicular roadways and other similar situations. They are an alternative to typical flashing yellow or red beacons which are activated by a pedestrian pushbutton.

RRFBs can gain a driver's attention much more quickly and alert them to situations where pedestrians are crossing, or are about to cross, a roadway.

Information Display Company RRFBs can be configured with your choice of activation buttons, signage, and single or dual flashing bars, and Master / Slave / Repeater flashbars to meet your particular needs.

The following planning sheet can be used to determine which equipment will be placed at various points in the pedestrian crossing area.

<b>INFORMATION DISPLAY COMPANY</b> <b>RRFB CONFIGURATION WORKSHEET</b>			
COMPLETED BY: _____			
DATE: _____			
FOR INTERSECTION: _____			
LOCATION NAME: _____			
<b>SYSTEM 1</b> BAR 1: ( Y / N ) BAR 2: ( Y / N ) TOTAL BARS _____ POWER ( AC / SOLAR ) _____ BUTTON OR BUTTON STATION _____	<b>MEDIAN SYSTEM 3</b> BAR 1: ( Y / N ) BAR 2: ( Y / N ) TOTAL BARS _____ POWER ( AC / SOLAR ) _____ BUTTON OR BUTTON STATION _____	<b>SYSTEM 2</b> BAR 1: ( Y / N ) BAR 2: ( Y / N ) TOTAL BARS _____ POWER ( AC / SOLAR ) _____ BUTTON OR BUTTON STATION _____	

## 2.2 Feature Summary

**Table 2-1** lists the features of Information Display Company's RRFB product, while **Figure 2-1** shows a typical pole mounted installation with activation button and optional solar power system.

**Table 2-1: RRFB Feature Summary**

Proven Effective
High-intensity LEDs
Side-mounted indicators provided as standard
Efficient
Lightweight and easy to install
"Green" product – solar powered, low footprint
Wireless, synchronized, and maintenance-free
Simple one-piece solar panel mounting bracket
Flexible
Integration and communication options available
Activation data and remote monitoring available
Single, Dual top-bottom, or Dual back-to-back flashbar configuration
Advance Warning system available up to 500 feet away
Reliable
Three-year warranty on products and technical support, 10 years on LEDs
Highly-acclaimed customer service team

**Figure 2-1: Typical Pole Mount Installation**





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# **SPECIFICATIONS**

## 3.1 GENERAL

<b>RRFB Assembly</b>	Dual RRFB high-brightness LED array flash bar with standard FHWA alternating “wig-wag” flash pattern FHWA-approved in all states.
<b>RRFB Flashers</b>	Amber LEDs in two flasher panels 7”W x 3”H spaced 7” apart. Includes side-confirmation LEDs visible to the pedestrians on the end of the bar for notification that the RRFB is operating. Synchronized by 900 MHz FHSS radio.
<b>Brightness</b>	Meets SAE J595 Class 1 brightness specification. Includes auto-dimming for nighttime operation.
<b>Flasher Housing</b>	Rustproof aluminum housing (21.75”W x 3.5”H x 1”D) with shatterproof polycarbonate window, and pedestrian notification end-facing LEDs. Housing is powder coat painted dull black per Federal Standard 595A-3708) ). Housing width is within width of W11-2 and S1-1 sign faces.
<b>Operation</b>	RRFB is dark until activated (called) by the pedestrian push button, when the LEDs will flash for a user-configurable pre-set time ranging from 5 to 75 seconds. Matches the clearance time for pedestrian signals per FHWA MUTCD. The flashing timer automatically resets each time a pedestrian call is received.
<b>Battery Cabinet</b>	NEMA 4X lockable housing for battery / solar controller or AC supply, with mounting bracket for 4” OD pole. Internal space provided for user-supplied pushbutton controller or other electronics modules up to 5”W x 7”H x 1”D.
<b>DC Power</b>	12V DC, 0.50 watts average of night/day activation.
<b>Solar Power System</b>	Includes battery, solar panel, charge controller which prevents overcharging, and pole-mounted battery box. Sized for geographic region in which the system will be installed, with guaranteed operation 24/7/365 with 10 days of autonomy.
<b>Activation Button</b>	Heavy-duty activation button and sign station for mounting on 4” O.D. pole; other button options available. Natural aluminum sign housing.
<b>Mounting</b>	Flashbar and power enclosure include banding plates for 4”-8” diameter poles using standard banding equipment.
<b>Environmental</b>	Moisture and dust resistant NEMA 3R enclosure, operating temperature range - 30C to +75C, -22F to +167F. 90% RH non-condensing, 5-30Hz 3-axis vibration, ½-sine 3-axis shock.
<b>Warranty</b>	Three years on products and technical support, 10 years on LEDs.
<b>Options</b>	<p>Up to a total of six additional slave flashbars and pre-warning flashbars may be installed, synchronized via internal secure radio systems to activate on a single button activation within a range of 500 feet.</p> <p>AC power option is available, 110/220V AC, &lt;2 watts average.</p>

# 4

## RRFB INSTALLATION



## 4.1 SYSTEM COMPONENTS

### 4.1.1 COMPONENTS SUPPLIED WITH RRFB SYSTEM

#### Display System

- Flashbar unit: **Figure 4-1**; note that the Master and Slave flashbars need not be opened unless the flashing duration needs to be changed.
- The Repeater flashbars will need to be opened to connect the cable from the Master or Slave flashbar via 4-pin connector.
- Power enclosure (options for Solar or AC): **Figure 4-2**
- Pushbutton station (activation button with signage): **Figure 4-3**
- Mounting brackets and fasteners ¼-20x1/2" BH Cap screws (mounted to beacon rails for shipping)
- Flexible conduit ½" liquid-tight



**Figure 4-1**



**Figure 4-2**

**Figure 4-3**





**Figure 4-4****Solar Package (if purchased with the System)**

- Solar panel(s) (may be separately drop-shipped from a solar panel distributor): **Figure 4-4**
- Solar panel mounting bracket(s); top mount bracket is standard – side mount is available for light, telephone or other existing tall poles (sent directly from IDC): **Figures 4-5, 4-6**
- Pole-mounted battery box (including solar battery) with charge controller.
- Conduit end fittings, ring terminals for connecting battery and flash bar (included in battery box)
- Wiring cable (to be cut and used between solar panel, battery box, and display)

**Figure 4-6****Figure 4-5**

## 4.1.2 END USER SUPPLIED COMPONENTS

### AC Powered System – Recommendations for Overhead Drop

- 3" diameter or larger round pole recommended
- Frangible or break-away base and hardware if required by local regulations
- Footing materials for frangible or break-away base if required
- ½" weather head or pole cap

### Sign strapping and strap installation tool (see chart in

- [Table 4-2](#) for strap size recommendations), heavy-duty tamper proof band clamps, or appropriate size U-bolts with back plates. Consult your local regulations for appropriate attachment methods.
- Hose clamps of the proper diameter for the pole size. These are used to determine best alignment before permanently attaching the flashbar to the pole.

## 4.2 POWER FEED REQUIREMENTS

### 4.2.1 AC POWERED

#### Wiring Internal to pole (recommended)

The cleanest installation method is to use internal wiring with an entrance fitting going through the side of the pole 1'-2' above the flashbar housing location, on the side of the pole facing the flashbar. To do this you will also need the following items:

- A length of  $\frac{3}{4}$ " conduit for burial as lead-in to pole base
- Pole cap
- $\frac{3}{4}$ " entrance elbow to be mounted to the pole
- Fittings to go from this entrance elbow to the entrance elbow on the flashbar – liquid-tight conduit is supplied

#### Wiring External to pole

The simplest installation uses external conduit strapped to the pole. To do this you will also need these items in addition to those listed above:

- A length of  $\frac{1}{2}$ " conduit suitable for the application (recommended IMC)
- Three additional bands to attach the conduit to the pole

### 4.2.2 SOLAR POWERED SYSTEM

#### Pole Requirements

- For solar powered installations, a 4" OD pole is recommended to provide a solid platform that will withstand heavy wind loads with solar panels mounted. For your specific installation, number and size of solar panels, regional minimum wind design requirements, etc., a traffic engineer or traffic control equipment specialist may suggest another approach.
- Frangible or break-away base and hardware, if required by local regulations
- Footing materials, if required
- If power is run on outside of pole (as is typically done when installing to existing poles, or in the case of direct burial of pole), two lengths of  $\frac{1}{2}$ " conduit suitable for application (recommended IMC or Rigid)

#### Flashbar attachment banding and installation tool (see chart in

- **Table 4-2** for strap size recommendations) or heavy-duty tamper proof band clamps; U-bolts cannot be used with pole mounted battery box or RRFB solar racks.
- Hose clamps of the proper diameter for the pole size. These are used to determine best flashbar alignment before permanently banding flashbar to pole.

## 4.3 GENERAL INSTALLATION

Overall pole length is not given, as it will vary depending upon footing, frangible base use, etc. Additional pole-mounted signage or devices may require higher and stronger poles. Select pole length to achieve desired above-ground heights for button, flash bar, and signage.

For square posts, you may want to use the IDC Flat Surface Mounting Bracket. If such square post mounting is used with a solar-powered installation, remove the battery box banding brackets and bolt the box directly to the square post. Attach a section of round pipe to the top of the post for mounting the solar panel to allow correct panel orientation due (true) south.



The power supply enclosure is not drilled for conduit fittings, as your installation may require a specific configuration of entry holes into the enclosure.

## 4.4 SOLAR PANEL INSTALLATION

When installing solar panel(s) always refer to manufacturer specifications for those particular panel(s), or feel free to call *Information Display Company* for technical assistance.

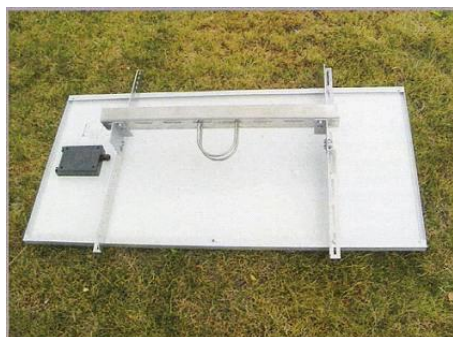


*Always use a volt meter to determine proper terminal connection. Open solar panel circuit voltage should be between 17 – 22 volts. Actual terminal connections may vary depending upon the solar panel purchased.*

When attaching conduit to the junction box, use caution to put a minimum amount of strain on the box. A broken junction box cannot be repaired.



When a typical pole top mount is used, fully assemble the mounting bracket as shown in the assembly instructions that come with the bracket.



Adjust the mounting bracket to fit the solar panel mounting holes.  
Do not mount to panel yet.

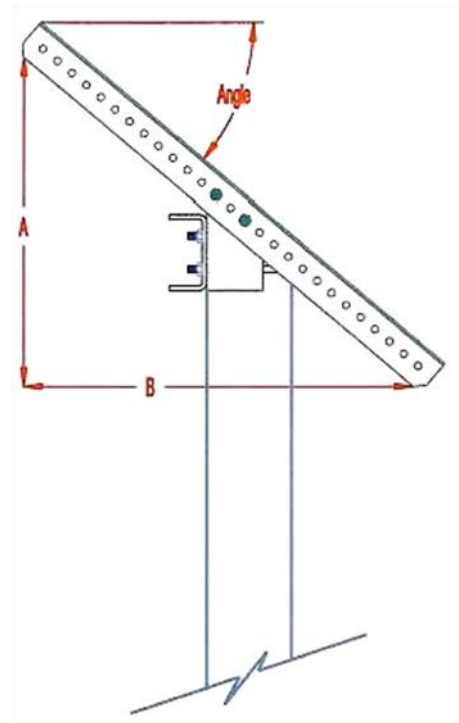
After the mounting bracket is assembled and properly set up for your specific solar panels, mount the bracket to the pole without the solar panel(s).



The mounting bracket allows the panel to be tilted towards the sun at the appropriate angle. Determine the correct angle for your location using the table below, and adjust the bracket to the approximate angle shown (accuracy within 5 degrees is close enough).

**Table 4-2: Solar panel mounting angle**

Your Latitude	Angle From Horizontal	Rise / Run (A/B)
60	77	4.33
55	72	3.08
50	67	2.36
45	62	1.88
40	57	1.54
35	52	1.28
30	47	1.07
25	42	0.90
20	37	0.75



Locate the panel rotationally on the pole so that it is directed due (true) south. Note that true south may be different from magnetic south in your area.

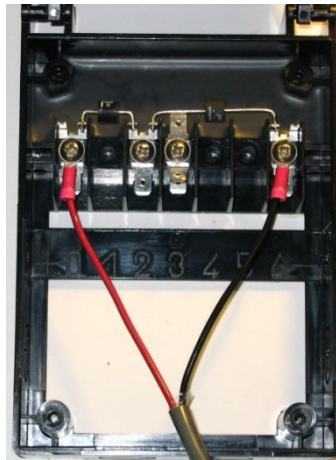
With smaller solar panels using a one-piece mounting bracket with no angle adjustments, simply bolt the solar panel to the bracket with the clips and hardware provided, and band the entire assembly to the pole.

## 4.5 CONNECTING SOLAR PANEL, SOLAR CONTROLLER, BATTERY AND SIGN

### 4.5.1 AT THE SOLAR PANEL

Using a voltmeter, check for voltage (17v – 22v) at the junction box on the back of the solar panel.

- Connect the red 16-gauge wire to the positive voltage terminal
- Connect the black 16-gauge wire to the negative voltage terminal



### 4.5.2 IN THE BATTERY BOX

1. Ensure you have solar panel voltage at the panel cable terminals; if not, re-check the step above.
2. Connect the battery to the ASC Controller *before* connecting the solar panel.
3. The 16-gauge cable connects from the sign directly to the battery terminals. **DO NOT** yet connect the power cable from the sign to the solar controller.
4. Connect the 16-gauge cable from the solar panel to the solar controller. Double check voltage polarity: Red = 12-17 volts positive, Black = negative

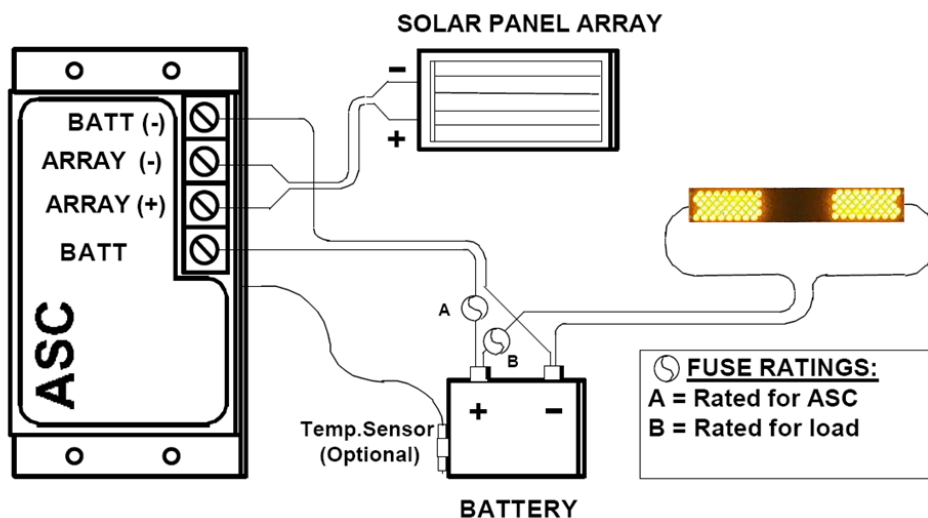
**Red** wire connects to the **ARRAY (+)**

**Black** wire connects to the **ARRAY (-)**

5. If included, place the temperature sensor against the battery, half-way up the side, and hold in place with supplied adhesive insulating foam.



*If the cable is cut or the sensor damaged, the controller will not function.*

**Figure 4-0-1: Solar power wiring**

**Figure 4-0-2** shows typical pole mount installation for overhead AC and solar powered installations.

Use hose clamps for initial setup and alignment of the display to determine proper radar detection of oncoming vehicles. Adjust as necessary before permanently attaching the display to the pole with strapping or U-bolts.

**Figure 4-0-2: AC and Solar pole mount configurations**

**Figure 4-0-3** illustrates the mounting of the flash bar and battery box to a pole. Beacon and battery box brackets are best attached to the pole using standard stainless steel strapping equipment. The chart in Table 4-1 lists the strapping requirements.



**Figure 4-0-3: Mounting details**

**Table 4-1: Strapping sizing**

<b>Strapping size recommendations for RRFB display</b>	
90 MPH wind loading	
<b>3/4" x .030" band</b>	Single wrap provides adequate strength for 90 MPH wind loading
<b>5/8" x .030" band</b>	Single wrap provides adequate strength for 90 MPH wind loading.
<b>1/2" x .030" band</b>	Single wrap provides adequate strength for 90 MPH wind loading. However double wrap is preferred on upper mounting bracket to prevent rotational slippage.

The photos above show installation details and options. The top photos show an installation where the power cables are run inside the pole. The display conduit is run up to the top of the pole and down the inside.

On existing poles, or new installations of buried poles, external conduit strapped to the outside of the pole is the easiest method to route wiring.

In areas that are well away from the reach of pedestrians, stainless steel hose clamps are a simple, quick, and reliable way to attach the conduit to the pole and brackets.



Strapping provides the most secure and vandal-resistant mounting. If strapping equipment is not available, U-bolts can be used for most applications.

## 4.6 ACCESSING INTERNAL COMPONENTS



### Warning!

Before working on an AC-powered display, disconnect power at the source. On solar powered units, disconnect power at the battery box. Wait 30 seconds for the power capacitor to discharge before handling and removing the LED display boards.

## 4.7 RRFB BOARD CONNECTORS AND JUMPERS

The jumpers are pre-set at the factory to reflect the settings you specified upon ordering. If changes are required in the field, refer to the information below. Generally, only the flash duration jumpers (JB-4) will need to be changed upon installation – all other settings are pre-set.

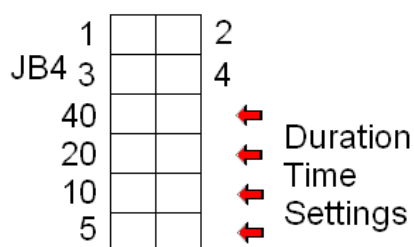
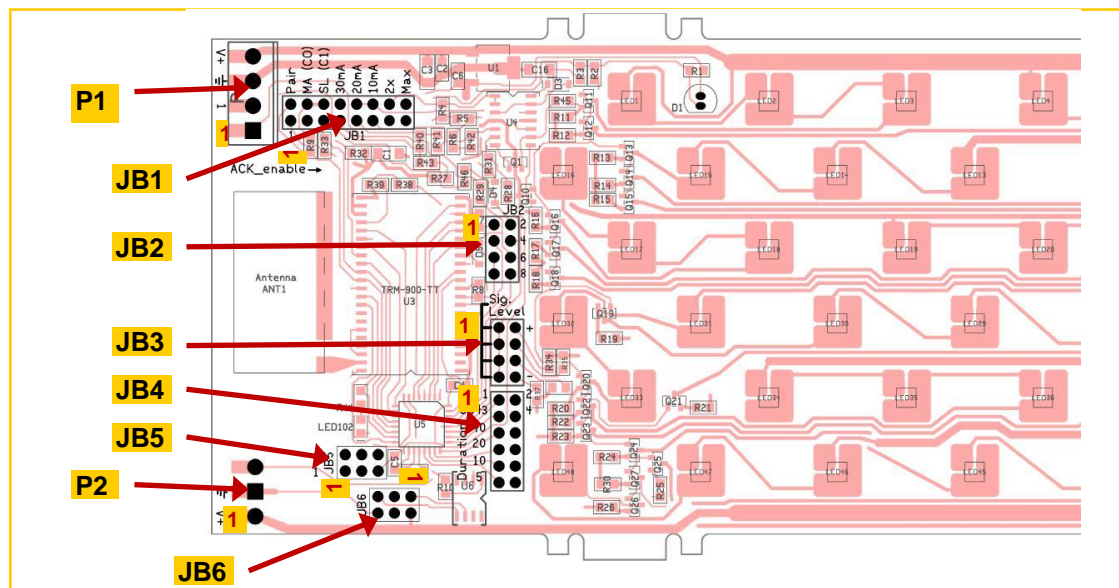


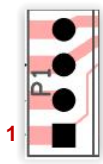
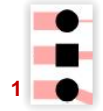






Figure 4-0-1 shows the locations of the all connectors and jumpers on the RRFB circuit board.

Table 4-2 shows the details for each connector and header.

### Figure 4-0-1: RRFB connectors and jumpers



**Table 4-2: Connector/jumper details**

Connectors			
P1		+12 VDC Supply Ground and Chassis Ground Button input N/C	Main power connector.
P2		Second board enable Ground +12 VDC	Power and enable for secondary flashbar.
Jumpers			
JB1		1-2: Pair mode 3-4: Master select 5-6: Slave select 7-8: 30 mA display current (default) 9-10: 20 mA display current 11-12: 10 mA display current 13-14: Double current setting 15-16: Full bright (auto-dim disabled)	Jumper 1-2 to start manual radio pairing.  Jumper only 3-4 or 5-6 for master/slave board.  7-12 set basic display brightness. Can be doubled by jumpering 13-14. Jumper 15-16 to disable display dimming at night.
JB2		Primary board: all open Secondary board: jumper 2-4 for normal operation	
JB3		1-2: 1/2 power (+10.8 dBm) 3-4: 1/4 power (+5.8 dBm) 5-6: 1/16 power (+0.5 dBm) 7-8: -6.0 dBm	Set radio power for remote communications. More than one pair may be jumpered to combine power reductions. All jumpered = -8.5 dBm. No jumpers = +12.2 dBm.
JB4		1-2: n/c (factory use only) 3-4: n/c (factory use only) 5-6: 40 s 7-8: 20 s 9-10: 10 s 11-12: 5 s	5-12 set the flashbar on time. More than one pair may be jumpered to combine on times. All jumpered = 75s. No jumpers = on for duration of button push. 1-4 should be left open.
JB5		5-6: momentarily short for board reset	JTAG programming. Factory use only.
JB6		1: photo-isolator collector 2: +12 V 5: photo-isolator emitter 6: ground	For use with opto-isolated output to drive external indicator or relay.



**5**

# **MAINTENANCE**



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## 5.1 FLASHBAR FACE

Ensure that debris and soil are removed from the face of the display and sign, as you would with any road sign. Do NOT use oil based solvents on the polycarbonate window or the sign faces, as this can cause permanent fogging. The securing bolts on the sign face should be checked for tightness, as well as the securing mounting (banding, clamps, or U-bolts) that attaches the display to the pole or other mounting structure.

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## 5.2 SOLAR PANELS

For solar applications, ensure that the solar panels are free from undue debris or obstructions that may reduce the sunlight available to the panel. Solar batteries typically will last five to ten years before replacement is necessary.

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## 5.3 INTERNAL COMPONENTS

The battery, charge controller, solar panel, and panel mounting bracket, and the flash bar itself, are all individually field-replaceable.

The internal parts of the flash bar are not field-replaceable.

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## 5.4 YEARLY MAINTENANCE

Check the following items yearly, more often in harsher environments:

- Clean the LED window if necessary
- Visually inspect for corrosion, rust or worn insulation
- Visually inspect mountings and banding/clamps for security and stability



**6**

# **TROUBLESHOOTING**

## 6.1 NO OPERATION, OR ERRATIC OPERATION

- Verify voltage supply connections are correct and tight.
- Ensure the solar battery voltage is above 10.5 volts.
- With AC systems, ensure the AC power is applied and correctly connected.
- Ensure the solar charger is operational by checking the charge indicator during daylight hours.
- Verify fuses in the fuse blocks and inline fuse holder are of the correct rating:
  - Solar battery fuse: 10A
  - Flashbar 12VDC supply fuse: 2A
- With AC powered systems:
  - Flashbar 110VAC supply fuse: 1/2A SB
  - Flashbar 220VAC supply fuse: 1/4A SB
- Ensure button wiring and button are installed correctly and not damaged

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# FCC/IC NOTICES



This product contains FCC ID: OJMTRM900TTA / IC: 5840A-TRM900TTA

This device complies with Part 15 of the FCC rules and Industry Canada license-exempt RSS standards. Operation of this device 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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any modifications could void the user's authority to operate the equipment.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.