

## MODEL BFD - BIG FLEXIBLE DISPLAY



- LARGE 38.5" (977.9 mm) X 19" (482.6 mm) RED LED DISPLAY WITH 0.2" DIAMETER PIXELS; 128 X 64 DOT RESOLUTION
- DISPLAYS THE INFORMATION FROM ANY G3 TO THE PLANT FLOOR
- CONNECTS DIRECTLY TO THE RS485 PORT OF A G3
- FIELD REPLACEABLE DISPLAY BOARDS
- REPLACEABLE FAN FILTER
- FLEXIBLE 4 EYEBOLT MOUNTING
- UNIVERSAL AC POWER (100 - 240 VAC, 50 / 60 HZ)



### DESCRIPTION

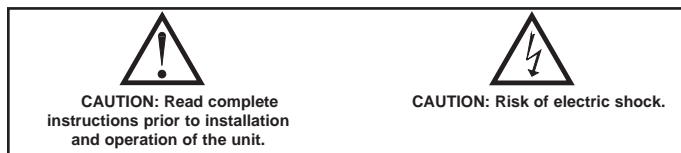
The BFD is a large (38.5" x 19") LED display (128 x 64 pixel resolution) which is driven from the RS485 port of a G3. The BFD is built using 32 display boards in an 8 column by 4 row configuration. When used with a G303, the BFD will display the contents of the current G3 page. When used with larger G3s, the desired information is selected by using a "display primitive" on the current G3 page. Multiple BFDs can be driven from a single G3 (see Using Multiple BFDs with a single G3). The exact number is dependent upon the lengths of the individual wiring runs. Contact Red Lion Tech Support for more info.

The display is housed in a welded steel enclosure and the display window (0.118" thick red acrylic) is sealed to the enclosure using a gasket and bezel strips. The gasketed rear panel is bolted to the enclosure. The ventilation slots and internal fan are designed to provide adequate cooling in a normal industrial environment. The enclosure is designed to hang from an overhead support.

Power to the BFD is provided by a universal AC input power supply. The AC power and the G3 RS485 cable enter the enclosure thru separate conduit fittings. AC power connects to the power supply via a removable 3 position terminal block. The RS485 signal connects to the communication board via either an RJ45 modular plug or a removable 2 position terminal block.

### SAFETY SUMMARY

All safety related regulations, local codes and instructions that appear in the literature or on equipment must be observed to ensure personal safety and to prevent damage to either the instrument or equipment connected to it. If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



### CONTENTS OF PACKAGE

- G3BFD Display
- Hardware kit including #8-32 screws & #8 flat washers for the rear cover; air filter, retainer and this instruction booklet.
- Mounting kit including eyebolts, locknuts, conduit fittings & seals & hole plugs
- Ferrite core for RS-485 cable

### ORDERING INFORMATION

MODEL NO.	DESCRIPTION	PART NUMBER
BFD	Big Flexible Display	G3BFD00
Crimson	Crimson 2.0 for G3 <sup>2</sup>	SFCRM200
CBL	10-foot RS485 cable for communications between G3 and G3BFD	CBLRLC04
	Replacement Display Module	G3BFD00
	Replacement Fan Filter	G3BFD00

Notes:

1. Visit [www.redlion.net/g3](http://www.redlion.net/g3) for additional features, options and drivers for your G3.
2. Use this part number to purchase Crimson 2.0 on CD with a printed manual, USB cable, and RS-232 cable. Otherwise, download from <http://www.redlion.net/g3>

# SPECIFICATIONS

1. **POWER:** Universal AC input (100 - 240 VAC 50/60 Hz); 2.0 A @ 120 VAC; 1.0 A @ 240 VAC.

Power connection via removable three position terminal block.

**Main Power Supply:** Protected by 5 A/250 VAC slow blow fuse; Littelfuse #0313005 313 series 3AG Slo-Blo® glass body fuse.

**5V Display:** Protected by two 25 A/32 VDC fast acting fuses; Littelfuse #257.025 257 series ATO® Fast Acting Automotive Blade fuse.

2. **DISPLAY:** 128 x 64 resolution using 0.2" (5.08 mm) diameter red LED pixels. Overall display measures 38.5" (977.9 mm) x 19" (482.6 mm).

3. **COMMUNICATIONS:** Connects to the host G3 thru RS485 port via either RJ45 or a removable 2 position terminal block; 115,200 baud, 8 bit, 1 stop bit, no parity. The RS232 ports (either the COMMs or PGM ports) may also be used with the appropriate RS232 to RS485 converter. Note that the RS232 and RS485 ports provided by the Expansion card are not currently supported.

**Dielectric Withstand:** test per 1 minute:

Power to chassis ground:	3000 VAC
Power to RS485 communications:	1000 VAC
RS485 communications to chassis ground:	1000 VAC
RS485 communications to DC circuit common:	1000 VDC

4. **CERTIFICATIONS AND COMPLIANCES:**

**SAFETY**

IEC 61010-1, EN 61010-1: Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1.

**ELECTROMAGNETIC COMPATIBILITY**

Emissions and Immunity to EN 61326:2006: Electrical Equipment for Measurement, Control and Laboratory use.

**Immunity to Industrial Locations:**

Electrostatic discharge	EN 61000-4-2	Criterion B 4 kV contact discharge 8 kV air discharge
Electromagnetic RF fields	EN 61000-4-3	Criterion A 10 V/m (80 MHz to 1 GHz) 3 V/m (1.4 GHz to 2 GHz) 1 V/m (2 GHz to 2.7 GHz)
Fast transients (burst)	EN 61000-4-4	Criterion B power 2 kV I/O signal 1 kV
Surge	EN 61000-4-5	Criterion A power 1 kV L to L, 2 kV L to G signal 1 kV
RF conducted interference	EN 61000-4-6	Criterion A 3 Vrms

AC power	EN 61000-4-11	
Voltage dip		Criterion A 0% during 1 cycle Criterion B 40% during 10/12 cycle Criterion B 70% during 25/30 cycle
Short interruptions		Criterion B 0% during 250/300 cycles

**Emissions:**

Emissions	EN 55011	Class A
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**Notes:**

1. Criterion A: Normal operation within specified limits.
2. Criterion B: Temporary loss of performance from which the unit self-recovers.

Refer to EMC Installation Guidelines section of the bulletin for additional information.

5. **ENVIRONMENTAL CONDITIONS:**

**Operating Temperature:** 0 - 50°C

**Storage Temperature:** -10 - 60°C

**Operating and Storage Humidity:** 80% maximum relative humidity (non-condensing) from 0 to 50°C

**Altitude:** Up to 2000 meters

6. **CONNECTIONS:** Compression cage-clamp terminal block

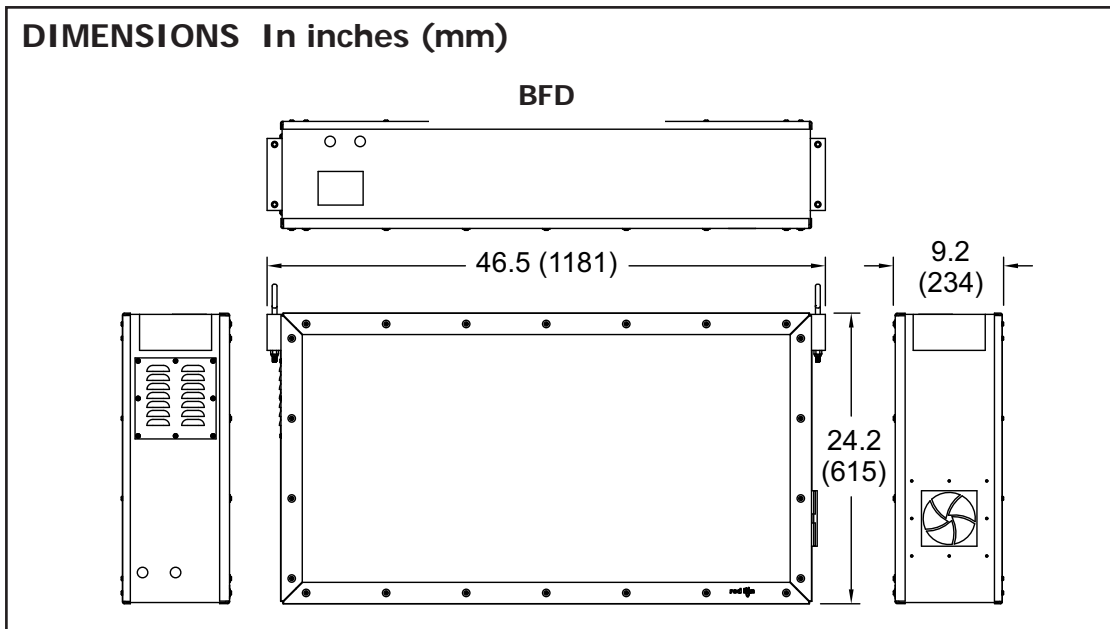
Wire Gage: 12-26 AWG copper wire

Torque: 5-7 inch-lbs (56-79 N-cm) 3.54 inch-lbs minimum.

7. **CONSTRUCTION:** Welded steel enclosure with sealed red acrylic display window. Removable gasketed rear cover attaches with bolts. Welded mounting blocks to receive 3/8" (9.53 mm) eyebolts (provided) for suspension.

8. **MOUNTING REQUIREMENTS:** Suspend from overhead truss or other suitable structure using cable or chain capable of supporting the BFD. Suspension eyebolts and locknuts are included. See "Mounting Instructions" for more info. Refer to local safety codes for additional requirements.

9. **WEIGHT:** 117 lbs. (53.07 Kg)



# INSTALLING THE BFD

## MOUNTING INSTRUCTIONS

This display is designed to be suspended from a ceiling truss or other suitable structure capable of supporting the BFD. Extreme caution should be exercised when hanging the display to provide for the safety of personnel. Install ALL four eyebolts (provided) into the holes of the mounting blocks (see Figure 1). The eyebolts should be installed so that enough of the threads are exposed at the bottom of the mounting block that the four locknuts (provided) can be fitted with a minimum of one thread exposed (see Figure 1). Note that the eyebolt must be orientated so that the load is applied in the same plane as the loop of the "eye" (see Figure 1).

The angle of the display can be adjusted by altering the length of the front suspension cables (or chains) relative to that of the rear cables (or chains). Further adjustment is possible by threading the eyebolt farther into the mounting block as shown. It is critical that the minimum thread exposure shown in Figure 1 is maintained.

*Note: Loads must always be applied to each eyebolt in the plane of the eye, not to some angle to this plane.*

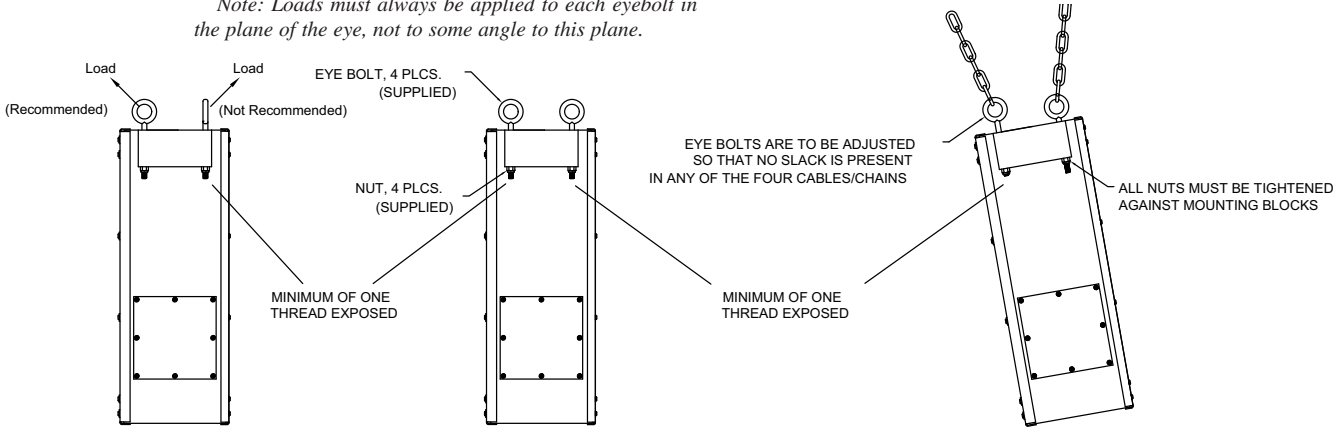


FIGURE 1

## POWER CONNECTIONS

Access to the electrical connections is provided by removing the rear cover of the BFD. The BFD enclosure provides four holes to receive 2 - 1/2 inch conduit fittings (two on the top of the enclosure and two on the right side of the enclosure as viewed from the rear of the enclosure). Install the conduit fittings and water tight conduit seals in the desired positions (place the indicated surface of the seal against the BFD enclosure to guarantee a proper seal. See Figure 2) and install the hole seals into the remaining holes.



The protective conductor terminal is bonded to conductive parts of the equipment for safety purposes and must be connected to an external protective earthing system.

Using one of the conduit fittings, connect the AC power to one of the available removable terminal blocks on the DIN rail mounted wiring assembly. A separate earth grounding point is provided. The AC input must be able to supply the BFD with 2.0 A @ 120 VAC 60 Hz or 1.0 A @ 240 VAC 50 Hz. A properly sized circuit breaker must be used to power the G3BFD. This breaker must be clearly identified, be in close proximity to the equipment, and be within easy reach. Be certain the chassis of the BFD is properly earth grounded and correctly protected with circuit breaker protection before applying power to the unit. Refer to Figure 3.

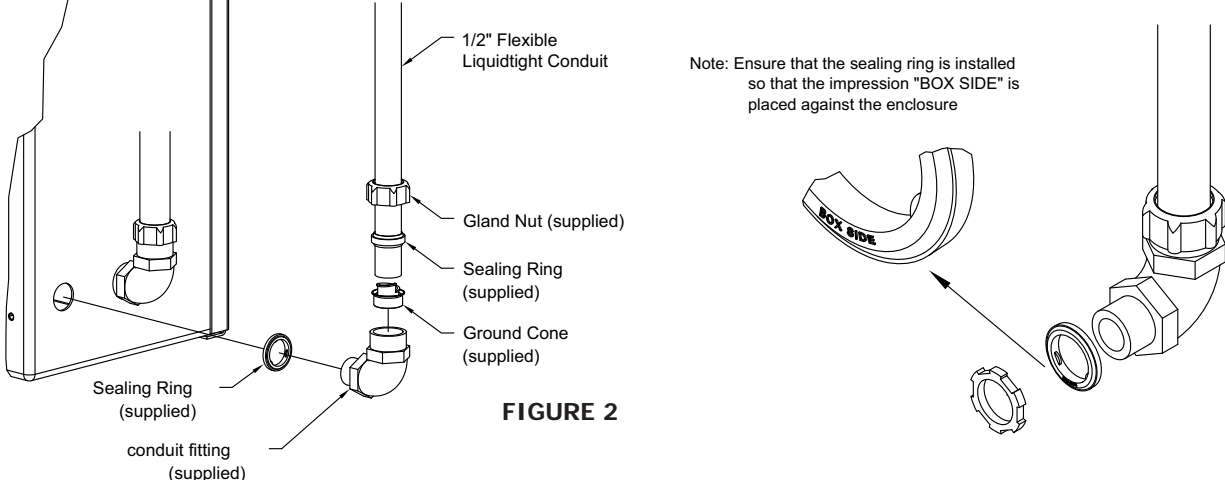


FIGURE 2

## COMMUNICATIONS CONNECTION

The RS485 cable from the G3 enters the enclosure using the conduit fitting not used by the power connections. Shielded cable should be used to connect to the BFD communications board via either the 2 position removable terminal block or the RJ45 jack. See Figure 3. The cable should be looped through the supplied ferrite core as close to the connector as possible.

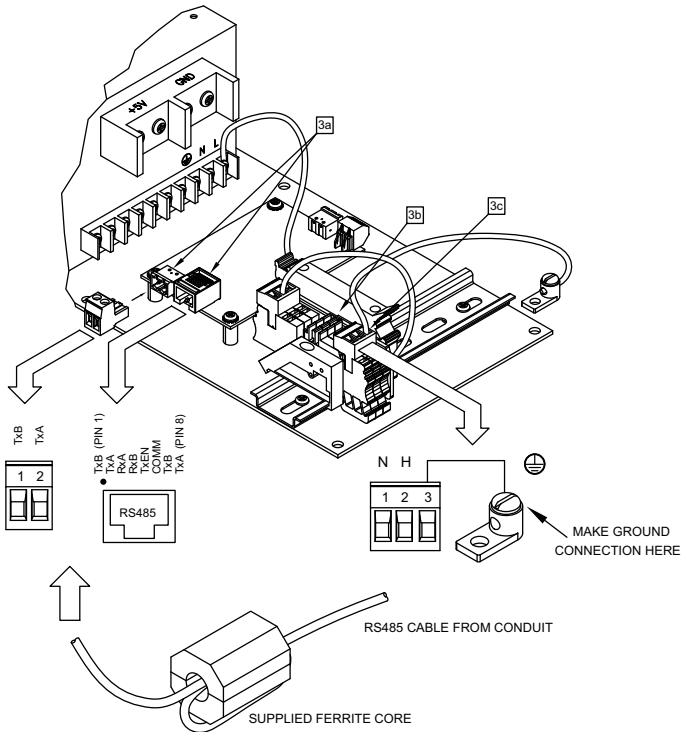


FIGURE 3

## FAN FILTER INSTALLATION & REPLACEMENT

The fan filter and filter retainer are located in the BFD Hardware Pack. Place the filter into the retainer. The retainer will snap onto the filter mounting plate (which is attached to the BFD case. See Figure 4). This filter can be cleaned by rinsing it with water and allowing it to dry.

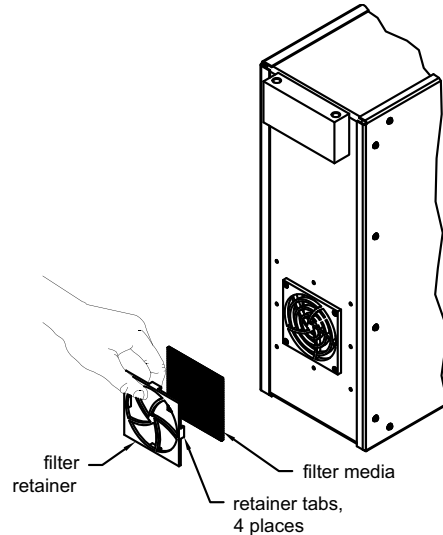


FIGURE 4

# BFD COMMUNICATIONS WITH A G3

## PROGRAMMING THE DISPLAY

When programming the G3 using Crimson 2.0, the display information for the BFD is selected by using the “display primitive” on the active display page. Any information contained within the primitive’s borders will be sent to the BFD.

## BFD SOFTWARE DRIVER

The “Big Flexible Display” driver must be selected in Crimson 2.0 under the “Red Lion” drivers. A G3 unit must be used with this driver. The driver can be used on either the RS232 or RS485 port of the G3. However, only a RS485 port is included on the BFD. If RS232 is used an RS232 to RS485 serial converter must be used. Red Lion offers the ICM5 for just such tasks.

Note the “Big Flexible Display” driver is considered a master protocol. Therefore the other communications port can be used for another master protocol driver, but cannot be used for a slave protocol driver.

## CRIMSON SOFTWARE

The BFD requires the use of Crimson 2.0 build 191 or later. The latest version of the software is always available from the website, and updating your copy is free.

# USING MULTIPLE BFDs WITH A SINGLE G3

## MULTIPLE BFDs DISPLAY THE SAME INFORMATION

Although most of the expected applications for the BFD use a single BFD and a G3, the design allows some flexibility for those applications where more than one BFD is required.

Up to 7 BFDs may be connected to a single serial port, each one identified by a unique address in the range 0..6. The address is set by DIP switch positions 1, 2 & 3, eg, to set BFD address to 6, set 1 and 2 ON, and 3 OFF. Note that each of the 32 display boards in the BFD will have to have these DIP switches set for the same unit address. Power must be cycled OFF, then ON so that the new DIP switch values will take effect.

The remote display primitive describes a region of the current Display page to be rendered on a BFD. The configuration of each “remote display primitive” includes the logical serial port that the BFD is connected to, and the unit address

of the BFD as set by its DIP switches. By placing more than one “remote display primitive” on the G3’s Display Page, each BFD can be made to display different information.

A BFD may show the same information as another BFD on the same serial port by simply setting the unit addresses the same on both units. To show the same information on BFDs on different serial ports, simply overlay the remote display primitives on the current Display page and configure the logical port and BFD address as appropriate.

The display information from the G3 must be passed to each BFD. The easiest way to do this is to wire to the unused RS485 connector in the first BFD (See Figure 3a) and connect it to the second unit (daisy chain wiring). Power for each unit can be wired as normal.

# TROUBLESHOOTING

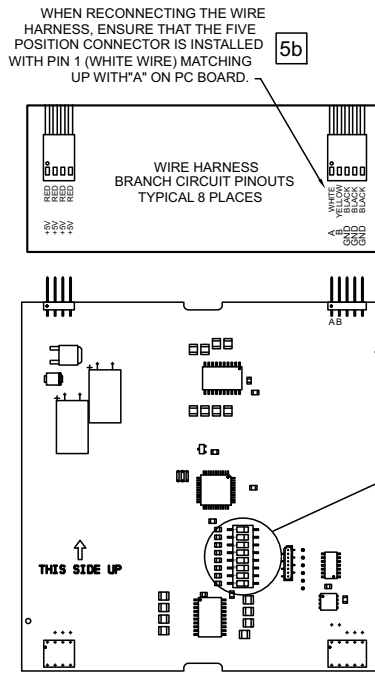
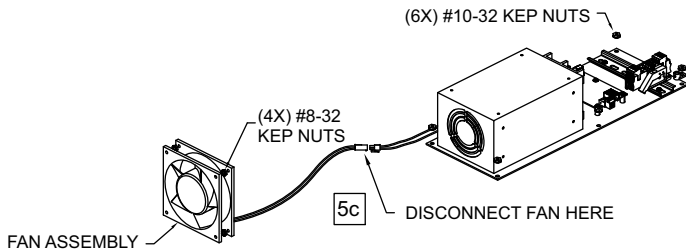
## REPLACING A DISPLAY BOARD

The display boards are held in place by a display frame assembly, which is built from nine aluminum display rail extrusions. The extrusions have a slot on each side to receive the PC board edge of the display boards. The boards simply slide into place. A male right angle connector on the top side of the board mates with a female connector of the board above it, thus, passing the power and signal from the top board to the bottom board. In normal operation, the display frame is fastened to the enclosure using 4 nuts (Figure 6a). However, these nuts can be removed to service the display, if required. The display frame has a pivot point along the bottom edge, which allows the top edge of the frame to tilt outside the enclosure, providing access to the top display boards. Display boards are easily removed by disconnecting the appropriate wiring connection from the top board (Figure 5b), separating the boards and sliding them out the top of the frame assembly (Figure 6).

Each display board has a 8 circuit dip switch which is used to set its location address. This address is determined by the board's physical location within the BFD display (Figure 5a).

1. Turn off AC mains power to the BFD at the circuit breaker.
2. Remove the rear cover of the BFD. **Do Not Remove The Front Window To Attempt To Gain Access To The Inside Of The BFD.**
3. Remove the AC mains 3 position removable terminal block (Figure 3c). Disconnect the main wiring harness connector (Figure 7a) from the power supply. Disconnect the fan cable assembly (Figure 5c). Disconnect the RS485 cable to the G3 (Figure 3a).
4. Remove the 6 #8 kep nuts which fasten the power supply subassembly to the enclosure. Remove the power supply subassembly (Figure 6b).
5. Remove the 4 #8 kep nuts which fasten the display frame assembly to the front of the enclosure (See Figure 6a). The display frame assembly will now tilt back to allow access to the display boards.
6. Lift off the display frame top stop bracket (See Figure 6).
7. Locate the column of display boards with the faulty display board and remove the two wiring cables (which connect the main wiring harness to the top display board, Figure 5b).

8. Remove the appropriate board (See Figure 6). Note the DIP switch setting (Figure 5a) on the old board.
9. Change the DIP switch setting on the replacement board and install the new board in the same position as the old board. Make sure that the board-to-board pins are properly aligned.
10. Re-connect the two wiring bundles observing the proper orientation of the connectors (Figure 5b).
12. Repeat steps 1 through 7 in reverse order.
13. Note that if the DIP switch setting on a board must be changed (due to incorrect setting), the power to the unit must be cycled in order for the change to take effect.



BFD Unit Address	Switch #		
	1	2	3
0	OFF	OFF	OFF
1	OFF	OFF	ON
2	OFF	ON	OFF
3	OFF	ON	ON
4	ON	OFF	OFF
5	ON	OFF	ON
6	ON	ON	OFF
Factory Test	ON	ON	ON

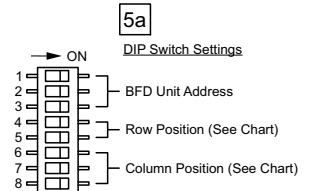
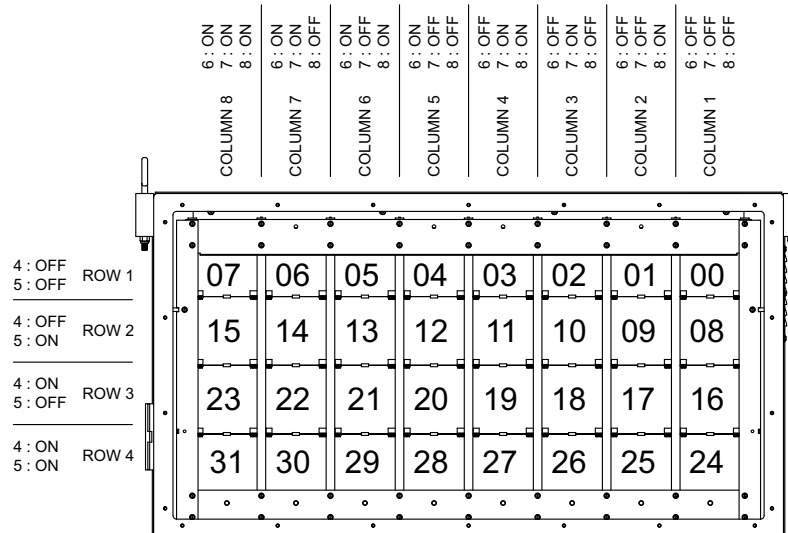


FIGURE 5

### Tile Positions (Viewed from rear of display frame)



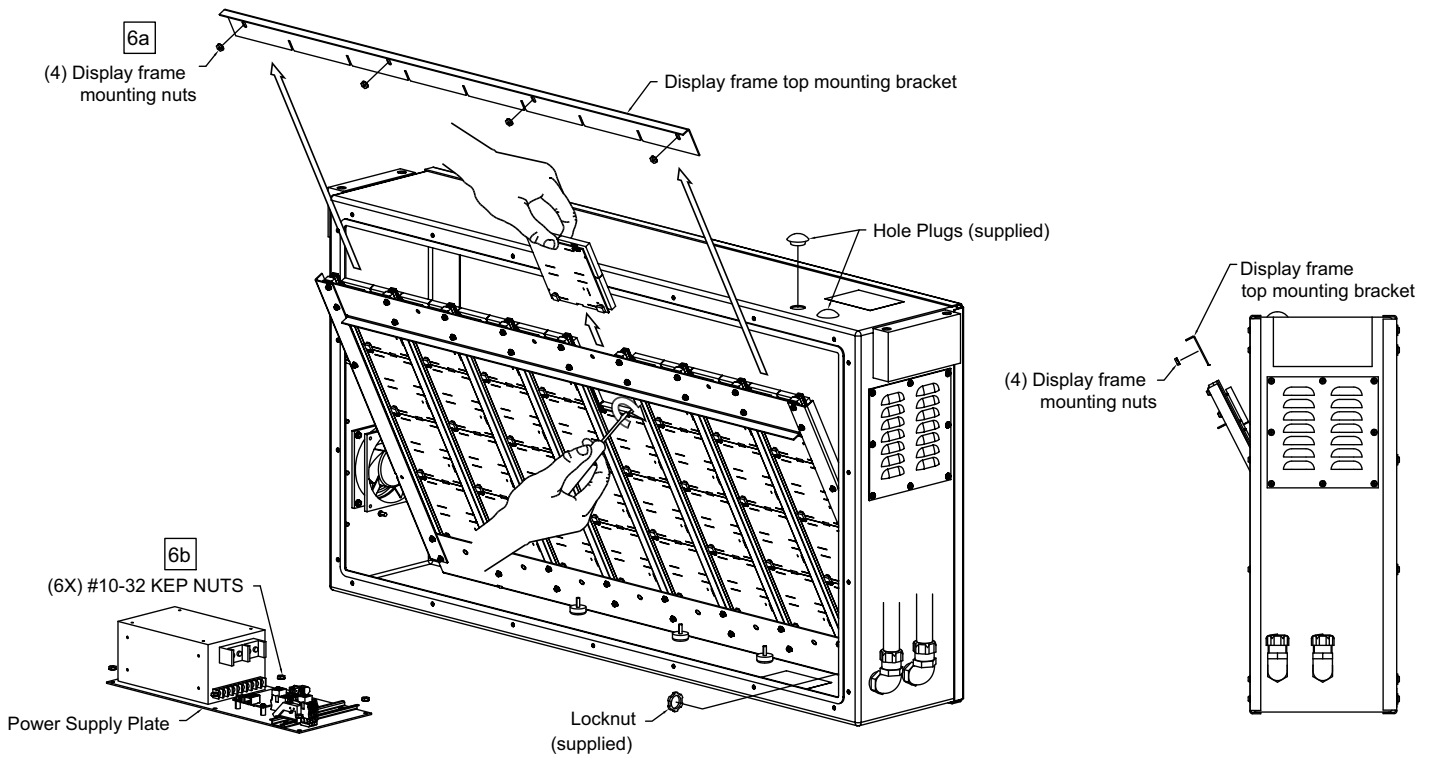


FIGURE 6

## OTHER DISPLAY PROBLEMS

If the BFD display does not look correct (as compared to that of the G3), re-check the DIP switch settings of the BFD display boards. Cycle the power to the BFD if any changes are made to the DIP switches.

If either the left or the right half of the display does not operate, check and replace (if necessary) the in-line fuse in the wiring harness (Figure 7b).

## TROUBLESHOOTING YOUR BFD

If for any reason you have trouble operating, connecting, or simply have questions concerning your new BFD, contact Red Lion's technical support.

EMAIL: [techsupport@redlion.net](mailto:techsupport@redlion.net)

Web Site: <http://www.redlion.net>

# WIRING DIAGRAM

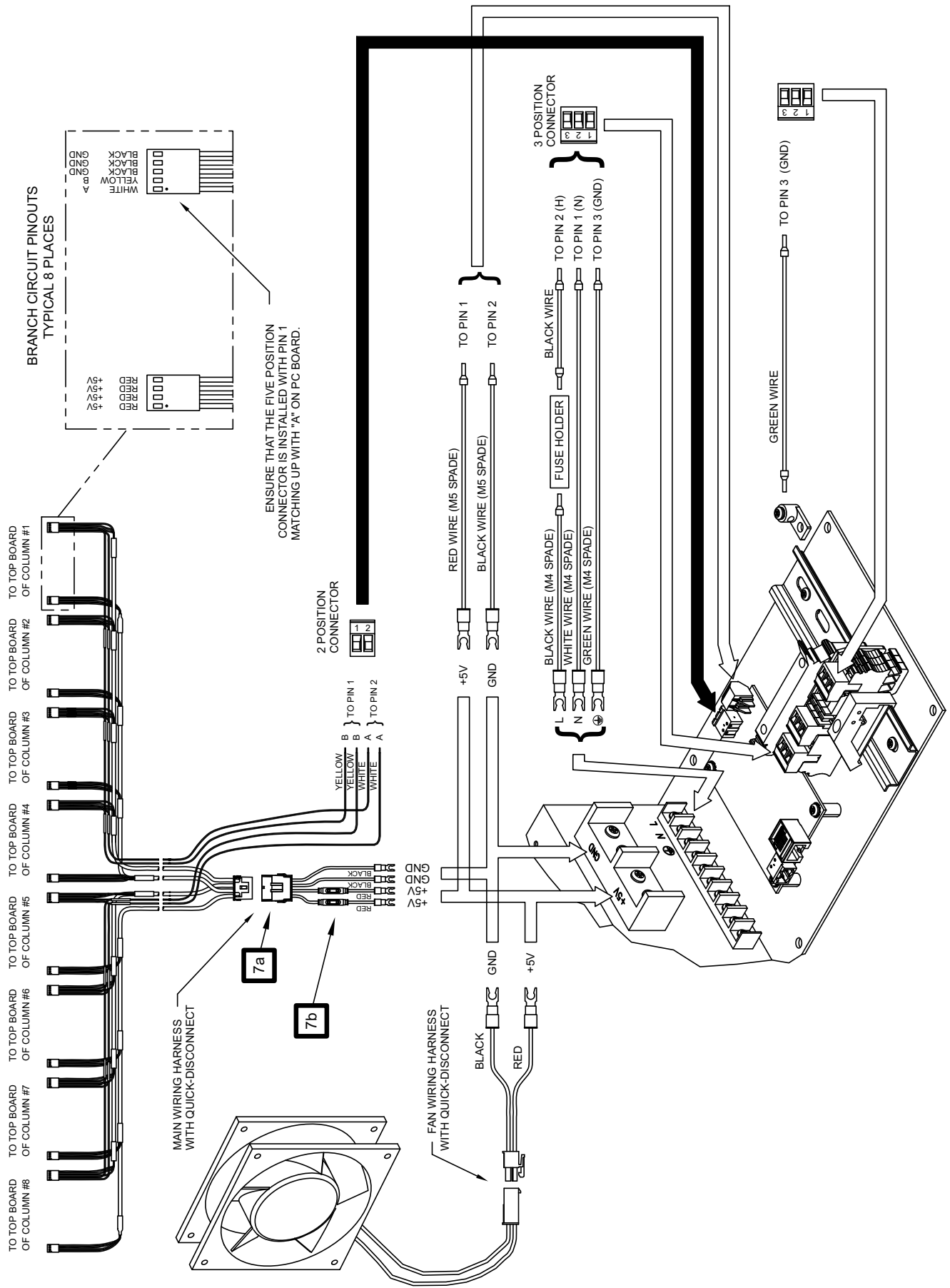


FIGURE 7

### LIMITED WARRANTY

The Company warrants the products it manufactures against defects in materials and workmanship for a period limited to two years from the date of shipment, provided the products have been stored, handled, installed, and used under proper conditions. The Company's liability under this limited warranty shall extend only to the repair or replacement of a defective product, at The Company's option. The Company disclaims all liability for any affirmation, promise or representation with respect to the products.

The customer agrees to hold Red Lion Controls harmless from, defend, and indemnify RLC against damages, claims, and expenses arising out of subsequent sales of RLC products or products containing components manufactured by RLC and based upon personal injuries, deaths, property damage, lost profits, and other matters which Buyer, its employees, or sub-contractors are or may be to any extent liable, including without limitation penalties imposed by the Consumer Product Safety Act (P.L. 92-573) and liability imposed upon any person pursuant to the Magnuson-Moss Warranty Act (P.L. 93-637), as now in effect or as amended hereafter.

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