

INSTALLATION & OPERATION MANUAL



21IF™ LIGHTBAR



21IF™

LIGHTBAR

CONTENTS:

Introduction.....	2
Unpacking & Pre-Installation.....	2
Installation & Mounting.....	3-4
Wiring Instructions & Fusing.....	5-6
Setting Flash Patterns.....	6
Takedown & Alley Lights.....	7
Maintenance.....	8
Parts List (Replacement Parts / Exploded View) & Troubleshooting.....	9
Notes.....	10-11
Warranty.....	12

For future reference record your lightbar's serial no. here _____

IMPORTANT: Read all instructions and warnings before installing and using.
INSTALLER: This manual must be delivered to the end user of this equipment.

Introduction

The 211F™ Light Bar is approximately 2" high, yet delivers unobstructed 360° warning and more signal power and versatility than any other light bar of its size through the use of newly designed Torus Technology™ optics. The low profile and aerodynamic lines reduce air drag, which results in fuel savings and stability at high speeds. This light bar has a strong extruded internal frame, shock-resistant polycarbonate lenses, and warning signals that exceed SAE standards. The light bar is designed on a modular basis, which means that the light bar can be customized to meet any requirement. It has room for numerous halogen and LED options, and offers the ultimate flexibility in the location of warning and auxiliary lights.



The use of this or any warning device does not ensure that all drivers can or will observe or react to an emergency warning signal. Never take the right-of-way for granted. It is your responsibility to be sure you can proceed safely before entering an intersection, driving against traffic, responding at a high rate of speed, or walking on or around traffic lanes.

The effectiveness of this warning device is highly dependent upon correct mounting and wiring. Read and follow the manufacturer's instructions before installing or using this device. The vehicle operator should insure daily that all features of the device operate correctly. In use, the vehicle operator should insure the projection of the warning signal is not blocked by vehicle components (i.e.: open trunks or compartment doors), people, vehicles, or other obstructions.

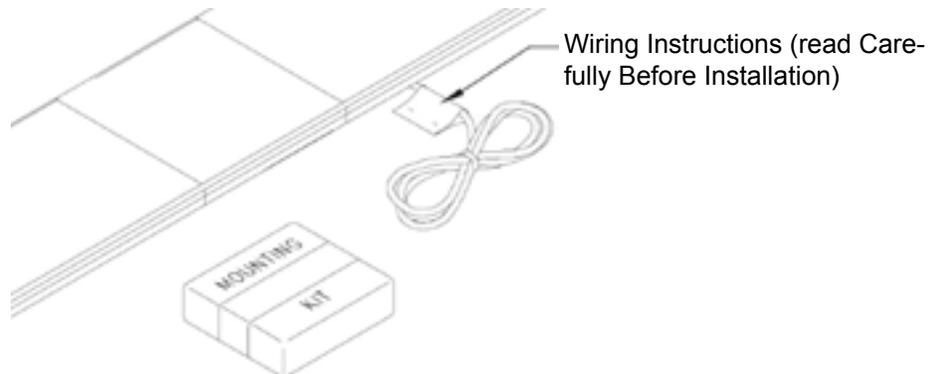
This equipment is intended for use by authorized personnel only. It is the user's responsibility to understand and obey all laws regarding emergency warning devices. The user should check all applicable city, state and federal laws and regulations.

Code 3, Inc., assumes no liability for any loss resulting from the use of this warning device.

Proper installation is vital to the performance of this warning device and the safe operation of the emergency vehicle. It is important to recognize that the operator of the emergency vehicle is under psychological and physiological stress caused by the emergency situation. The warning device should be installed in such a manner as to: A) Not reduce the output performance of the system, B) Place the controls within convenient reach of the operator so that he can operate the system without losing eye contact with the roadway.

Emergency warning devices often require high electrical voltages and/or currents. Properly protect and use caution around live electrical connections. Grounding or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or severe vehicle damage, including fire.

PROPER INSTALLATION COMBINED WITH OPERATOR TRAINING IN THE PROPER USE OF EMERGENCY WARNING DEVICES IS ESSENTIAL TO INSURE THE SAFETY OF EMERGENCY PERSONNEL AND THE PUBLIC.



Unpacking & Pre-installation

Carefully remove the light bar and place it on a flat surface, taking care not to scratch the lenses or damage the cable coming out of the bottom. Examine the unit for transit damage, broken lamps, etc. Report any damage to the carrier and keep the shipping carton.

Standard light bars are built to operate on 12 volt D.C. negative ground (earth) vehicles. If you have an electrical system other than 12 volt D.C. negative ground (earth), and have not ordered a specially wired light bar, contact the factory for instructions.

Test the unit before installation. To test, touch the black wire to the ground (earth) and the other wires to +12 volts D.C., in accordance with the instructions attached to the cable (an automotive battery is preferable for this test). A battery charger may be used, but please note that some electronic options (flashers, etc.) may not operate normally when powered by a battery charger. If problems occur at this point, contact the factory.

Installation & Mounting

WARNING!



Utilizing non-factory supplied screws and/or mounting brackets and/or the improper number of screws may result in loss of warranty coverage on the equipment.

Mounting Hardware

All mounting hardware is packed in a small box inside the main carton. Four standard kits are available: (1) Hook-On Type, (1) Tow and Recovery and (2) Permanent Types. These are discussed in detail later. Note: Hook-on mounting for "gutterless" type vehicles will require a special hook for mounting. Several special application hooks are available. Contact the factory for details.

Hook-on Mounting

Begin the installation by attaching the rubber feet to the mounting brackets using the black 1/4" carriage bolts and 1/4" nuts provided. See Figure 1. (Do not install shims at this time). Place the light bar upside down on a table or other work surface, being careful not to scratch the lenses. Slide the 5/16" carriage bolts into the frame. Secure the mounting brackets finger tight so they support the weight of the light bar, but can still be positioned. Locate the vehicle on a level surface. Place the light bar on the roof of the vehicle. Place a soft pad in the center of the roof to protect the paint. The mounting brackets must be placed so that the rubber feet are resting on the curved section of the roof, see Figure 2. This is the strongest part of the roof. Once the light bar is centered, tighten the mounting bracket to the light bar. Using a tape measure and a level, center the light bar from side to side and locate a position on the roof where the light bar is level.

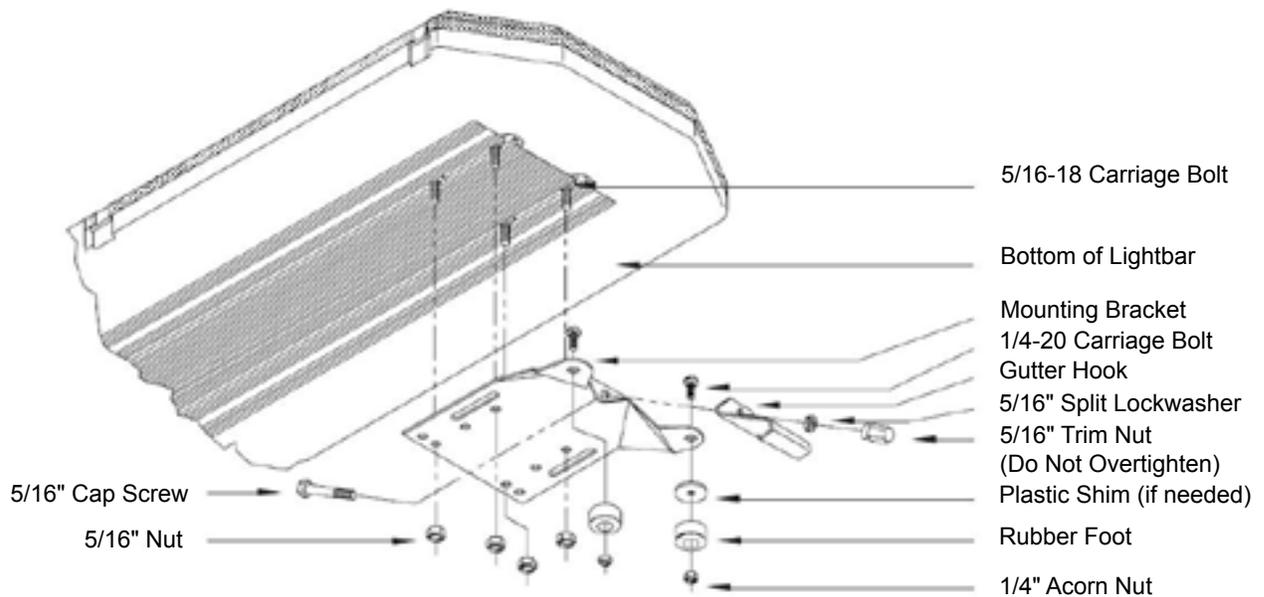


FIGURE 1

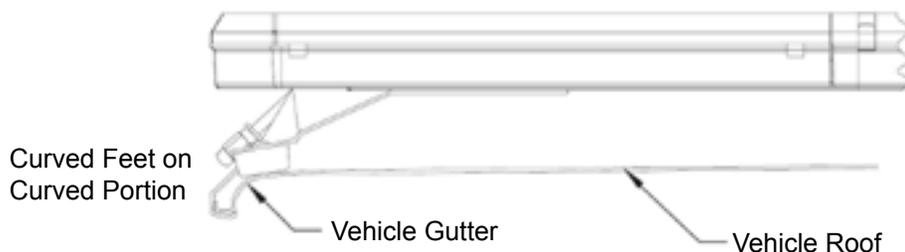


FIGURE 2

The shims provided may be used here to help level the light bar, see Figure 1. Also, the tabs on the mounting brackets may be bent at any angle to match the curvature of the roof. Select the appropriate length cap screw and insert through the holes in the gutter hook and mounting bracket, and into a lock washer and acorn nut as shown in Figure 1. If a special hook for a "gutterless" vehicle is used, refer to the instructions for that hook at this time. The stainless steel cap screws supplied are sized for the most common installations, but longer and shorter bolts are available at any hardware store. Tighten the cap screws on both sides evenly keeping the light bar centered and level.

NOTE: Tighten only until the bar is secure (bar does not move when bumped sharply with the heel of the palm). It is NOT necessary to dimple the roof to obtain a stable attachment. If the light bar "bows" more than 3/16" (determined by placing a straightedge along the front, bottom part of the frame and measuring downward at the center of the frame), loosen the 5/16" trim nut slightly.

Re-Installation: When moving a light bar from one vehicle to another, we suggest that new rubber feet be used. These are standard hardware items, and can usually be found at any hardware store, or can be ordered from the factory. The special hooks are stainless steel and should be saved and reused. Mounting kit parts are available to permit remounting on vehicles of different design or make. Consult your local dealer or Code 3, Inc. for detailed information.

Permanent Mounting

Typical Mounting: Refer to Figure 3. Place the light bar upside down on a table or other work surface, being careful not to scratch the lenses. Slide the 5/16" carriage bolts into the frame. Secure the mounting brackets finger tight so they support the weight of the light bar. Place the unit on the roof of the vehicle. Place a soft pad in the center of the roof to protect the paint. The mounting brackets must be placed so that they are resting on the curved section of the roof, see Figure 4. This is the strongest part of the roof. Once the light bar is centered, tighten mounting brackets to light bar. Using a tape measure and a level, center the light bar from side to side and locate a position of the roof where the light bar is level. The shims provided may be used here to help level the light bar. Also, the tabs on the mounting bracket may be bent at any angle to match the curvature of the roof (see Figure 4).

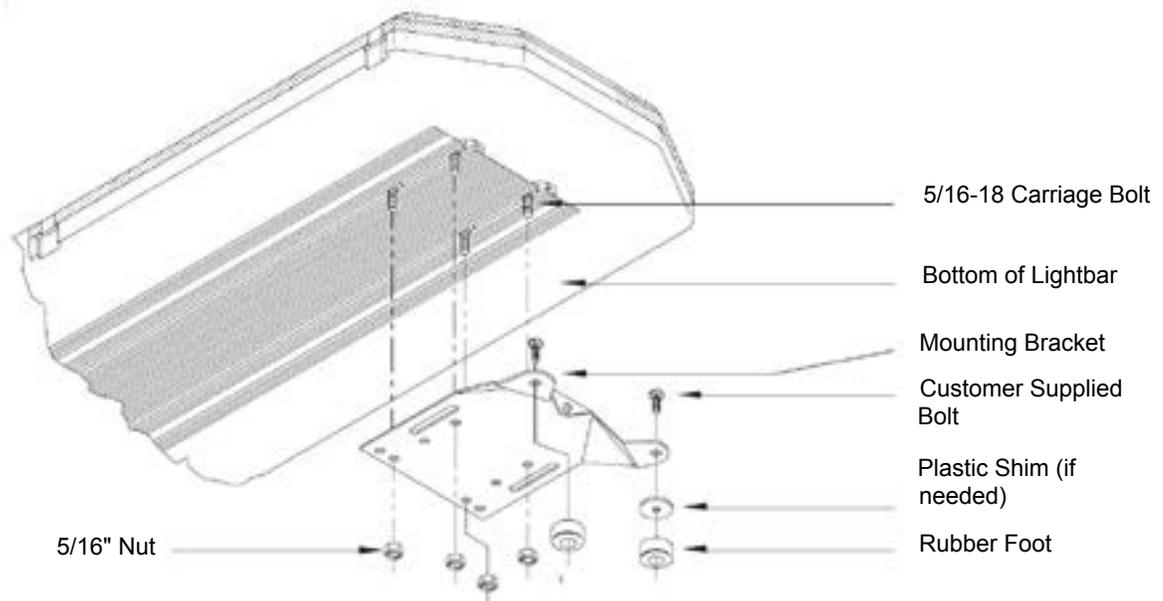


FIGURE 3

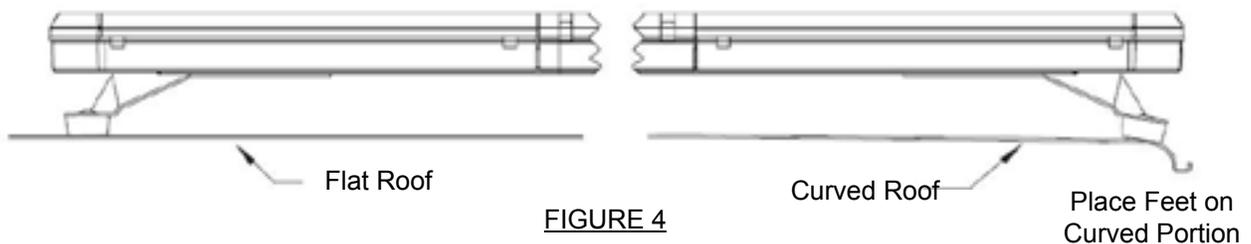


FIGURE 4

Once the light bar is level and centered, mark the holes through the mounting tabs and remove the light bar from the vehicle. Make sure that the drill will not damage anything when penetrating the roof. Drill the mounting holes and remove any burrs. Attachment can be made using 1/4" cap screws, toggle bolts, or other fasteners as may be convenient. Use sealant as necessary to prevent water leakage into the vehicle.

Wiring Instructions

Before attempting to connect wiring refer to wire tag attached to the lightbar's main cable. Each wire in the cable controls a separate lightbar function as described in the wire tag.



Larger wires and tight connections will provide longer service life for components. For high current wires it is highly recommended that terminal blocks or soldered connections be used with shrink tubing to protect the connections. Do not use insulation displacement connectors (e.g. 3M® Scotchlock type connectors). Route wiring using grommets and sealant when passing through compartment walls. Minimize the number of splices to reduce voltage drop. High ambient temperatures (e.g. underhood) will significantly reduce the current carrying capacity of wires, fuses, and circuit breakers. Use "SXL" type wire in engine compartment. All wiring should conform to the minimum wire size and other recommendations of the manufacturer and be protected from moving parts and hot surfaces. Looms, grommets, cable ties, and similar installation hardware should be used to anchor and protect all wiring. Fuses or circuit breakers should be located as close to the power takeoff points as possible and properly sized to protect the wiring and devices. Particular attention should be paid to the location and method of making electrical connections and splices to protect these points from corrosion and loss of conductivity. Ground terminations should only be made to substantial chassis components, preferably directly to the vehicle battery. The user should install a fuse sized to approximately 125% of the maximum Amp capacity in the supply line to protect against short circuits. For example, a 30 Amp fuse should carry a maximum of 24 Amps. **DO NOT USE 1/4" DIAMETER GLASS FUSES AS THEY ARE NOT SUITABLE FOR CONTINUOUS DUTY IN SIZES ABOVE 15 AMPS.** Circuit breakers are very sensitive to high temperatures and will "false trip" when mounted in hot environments or operated close to their capacity.

Routing

The only significant difference between the 211F™ with optional ArrowStik® and a conventional 211F™ is the additional, thinner cable exiting the bottom of the lightbar. The larger cable is the lightbar power cable. Route the wiring cable into the engine or passenger compartment, taking care to use grommets and to apply sealant around openings to keep water out. It is advisable to leave an extra loop of cable when installing the light bar to allow for future changes or reinstallations. Connect the black lead to a solid frame ground (earth), preferably, the (-) or ground (earth) side of the battery and bring the other wires to the control head or switches. Connect the wires as directed by the wiring instructions on the cable.

Arrowstik® / Narrowstik®

OPTIONAL L.E.D. NARROWSTIK® (11-wire) WIRING AND CONTROL HEAD INSTALLATION - After installation of the lightbar, route the smaller of the two power cables through the vehicle to the location chosen for the control head. Cut the cable to length and strip back the outer insulation to expose the seven or eleven colored wires. Strip back 1/8" - 1/4" of colored insulation from each of the wires in the cable. Connect these wires to the seven position / eleven position terminal plug enclosed in the user parts bag, according to the diagram on the bottom of the control head.

Refer to the control head manual packaged with the lightbar for control head installation and operation instruction.

L.E.D. Fusing Considerations

The average current draw per light engine assembly is very low; however, the instantaneous peak current to a module can be significantly higher during low voltage conditions. To avoid prematurely blowing ATO style fuses or tripping breakers it is recommended the following rule-of-thumb be used to size fuses or breakers. This is especially important in lightbars with many LED modules (light engine assemblies) running off a single fused source.

Minimum fuse size calculation is as follows:

Multiply the total number of light engine assemblies by 1.5. For example, a light bar with 18 light heads would require a single 27A fuse, minimum ($18 \times 1.5 = 27$).

WARNING!



This Product contains high intensity LED devices. To prevent eye damage, DO NOT stare into light beam at close range.

Setting Flash Patterns (Torus™ with Independent Flashing Lightheads)

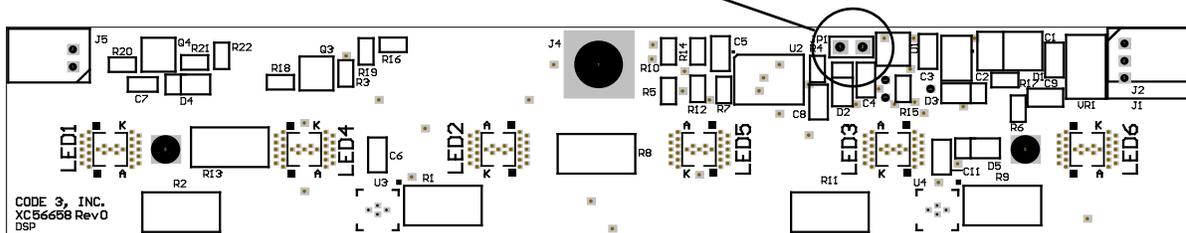
Flash Pattern

Description

1. Cycle Flash (DEFAULT)-----Cycles through various patterns @ 70 fpm
2. NFPA Quad Flash 80 FPM-----Four Pulses per flash @ 80 fpm
3. Quad Flash 70 FPM-----Four Pulses per flash @ 70 fpm
4. Steadyburn-----Steady-Burn
5. Five Flash 70 FPM-----Five Pulses per flash @ 70 fpm
6. Triple Flash 70 FPM -----Three Pulses per flash @ 70 fpm
7. Double Flash 70 FPM-----Two Pulses per flash @ 70 fpm
8. Single Flash 70 FPM-----One Pulse per flash @ 70 fpm
9. Quad Pop Flash 70 FPM-----Four Pulses per flash (3 equal, 1 extended) @ 70 fpm
10. Triple Pop Flash 70 FPM-----Three Pulses per flash (2 equal, 1 extended) @ 70 fpm
11. Mod Flash
12. Cycle Flash 150 FPM-----Cycles through various patterns @ 150 fpm
13. Five Flash 150 FPM-----Five Pulses per flash @ 150 fpm
14. Quad Flash 150 FPM-----Four Pulses per flash @ 150 fpm
15. Triple Flash 150 FPM -----Three Pulses per flash @ 150 fpm
16. Double Flash 150 FPM-----Two Pulses per flash @ 150 fpm
17. Single Flash 150 FPM-----One Pulse per flash @ 150 fpm
18. Single Flash 250 FPM-----One Pulse per flash @ 250 fpm
19. Single Flash 375 FPM-----One Pulse per flash @ 375 fpm

The flash pattern can be changed by shorting the JP1 pins with a wire or blade of a screwdriver (shown below). The light-head can be reset to the default by shorting the JP1 pins for greater than 5 seconds and then releasing.

Momentarily short and re-
lease to change patterns



Optic removed for clarity

Located on front of
Integrated PCB/Light Engine

Take Down and Alley Lights

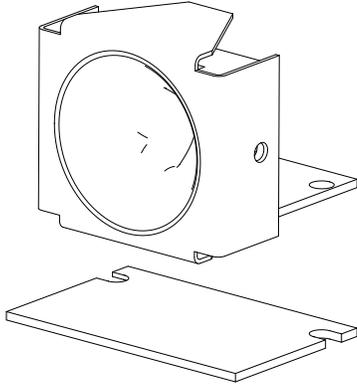
Alley Lights

Located at the ends of the light bar to provide light to the side of the vehicle.

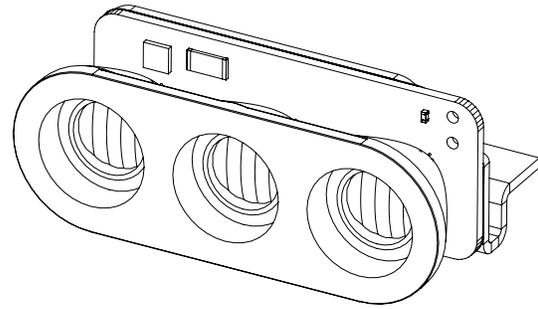
Stationary Lamps/Takedown Lights

A stationary assembly used for ArrowStik flashing, takedown, and/or work light applications.

The lamps used for either application are either MR11 Halogen or LED. Reference Figure 5.



MR-11 (Halogen)



LED

FIGURE 5

Maintenance

Lens Cleaning

Use plain water and a soft cloth, or Code 3® lens polish and a very soft paper towel or facial tissue. Because plastic scratches easily, cleaning is recommended only when necessary (about every six months). Do not subject the lenses to car washes that use brushes, as these will scratch the lenses.

Lens Removal

First, disengage the lens clips (4 per lens) as shown in Figure 6. Finally, insert a screwdriver into the small slot in the lens clip pocket or the lens edge, and twist the screwdriver to lift the lens.

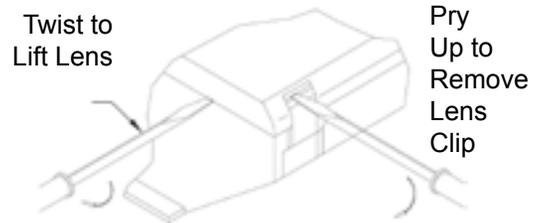


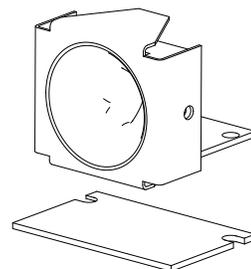
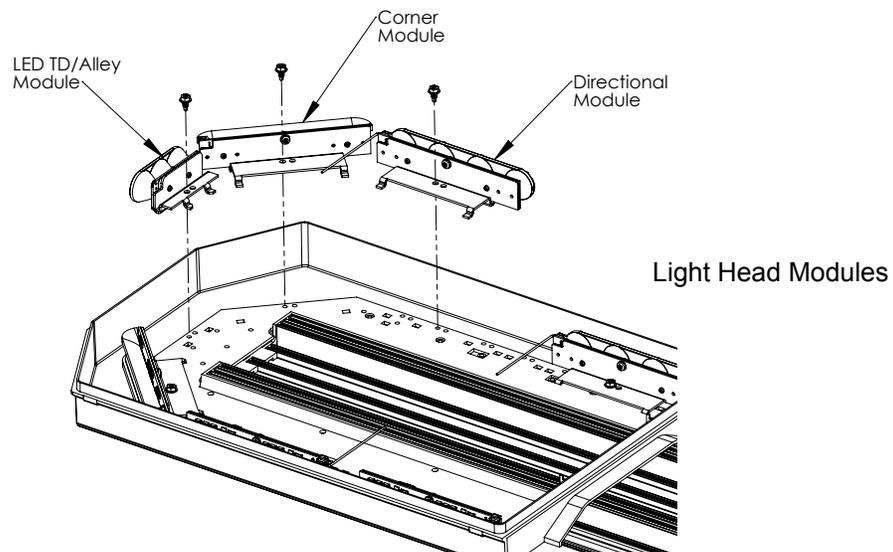
FIGURE 6

Light Head Removal and/or Lamp Replacement

Directional/Corner: Remove single screw securing the light head assembly to the flat plate, lift light head assembly, and then remove the control wire. Reference Figure 7.

LED TD/Alley: Remove the single screw securing the light head assembly to the flat plate, lift light head assembly, and then disconnect the red wire from the control wire by decoupling the quick slides (make sure to pull on the quickslides only, not the wires). Reference Figure 7.

MR11 Halogen TD/Alley: Remove the two screws securing the light head assembly to the flat plate, lift light head assembly, and then disconnect the red wire from the control wire by decoupling the quick slides (make sure to pull on the quickslides only, not the wires). Remove the lamp assembly by removing the appropriate fasteners, remove fasteners sandwiching MR11 in bracket, and remove lamp. Replace the lamp and reassemble. Reference Figure 7.



MR11 Halogen

FIGURE 7

Parts List & Exploded View

(Reference numbers identify items shown in Figure 8)

Ref No.	Description	Part No.
1	Bottom Outboard Lens - Clear	T02361
2	Bottom Center Lens - Clear	T02371
3	Outboard Lens Cap	
	Clear	T03271
	Red	T03272
	Blue	T03273
	Amber	T03274
	Black	T03278
4	Center Lens Cap	
	Clear	T03281
	Red	T03282
	Blue	T03283
	Amber	T03284
	Black	T03288
5	4LED Directional Module	Call Factory
6	6LED Corner Module	
7	3LED Takedown/Alley Module	
8	3LED Directional Module	

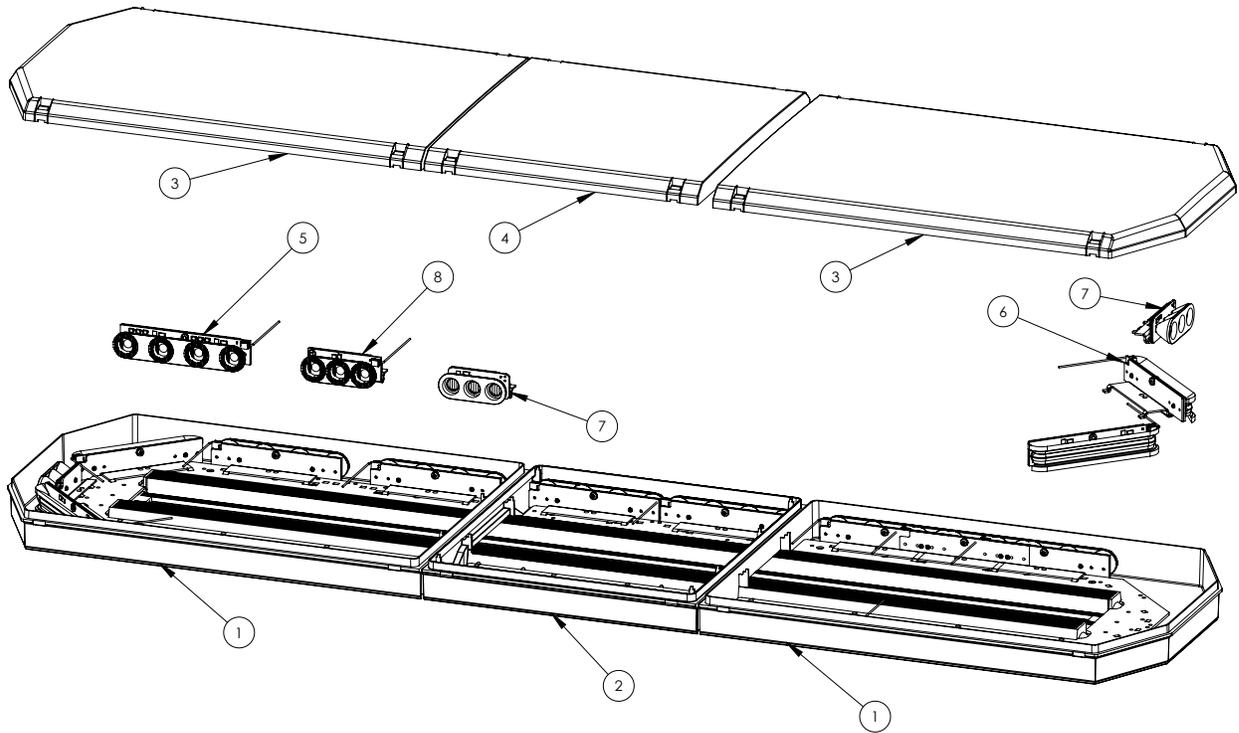


FIGURE 8

Troubleshooting

All lightbars are thoroughly tested prior to shipment. However, should you encounter a problem during installation or during the life of the product, follow the guide below for information on repair and troubleshooting. Additional information may be obtained from the factory technical help line at 314-996-2800.

Notes

Notes

WARRANTY

Code 3®, Inc.'s emergency devices are tested and found to be operational at the time of manufacture. Provided they are installed and operated in accordance with manufacturer's recommendations, Code 3®, Inc. guarantees all parts and components except the lamps to a period of 1 year, LED Lighthouse modules to a period of 5 years (unless otherwise expressed) from the date of purchase or delivery, whichever is later. Units demonstrated to be defective within the warranty period will be repaired or replaced at the factory service center at no cost.

Use of lamp or other electrical load of a wattage higher than installed or recommended by the factory, or use of inappropriate or inadequate wiring or circuit protection causes this warranty to become void. Failure or destruction of the product resulting from abuse or unusual use and/or accidents is not covered by this warranty. Code 3®, Inc. shall in no way be liable for other damages including consequential, indirect or special damages whether loss is due to negligence or breach of warranty.

CODE 3®, INC. MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY INCLUDING, WITHOUT LIMITATION, WARRANTIES OF FITNESS OR MERCHANTABILITY, WITH RESPECT TO THIS PRODUCT.

PRODUCT RETURNS

If a product must be returned for repair or replacement*, please contact our factory to obtain a Return Goods Authorization Number (RGA number) before you ship the product to Code 3®, Inc. Write the RGA number clearly on the package near the mailing label. Be sure you use sufficient packing materials to avoid damage to the product being returned while in transit.

*Code 3®, Inc. reserves the right to repair or replace at its discretion. Code 3®, Inc. assumes no responsibility or liability for expenses incurred for the removal and /or reinstallation of products requiring service and/or repair.; nor for the packaging, handling, and shipping; nor for the handling of products returned to sender after the service has been rendered.

Problems or Questions? Call The Technical Assistance HOTLINE - (314) 996-2800



Code 3, Inc.
10986 N. Warson Road
St. Louis, Missouri 63114-2029—USA
Ph. (314) 426-2700 Fax (314) 426-1337
www.code3pse.com

Code 3,® Inc., a subsidiary of
Public Safety Equipment, Inc.

Code 3 is a registered trademark of
Code 3, Inc.

Revision 0, 09/12 - Instruction Book Part No. T52265
©2012 Public Safety Equipment, Inc. Printed in USA