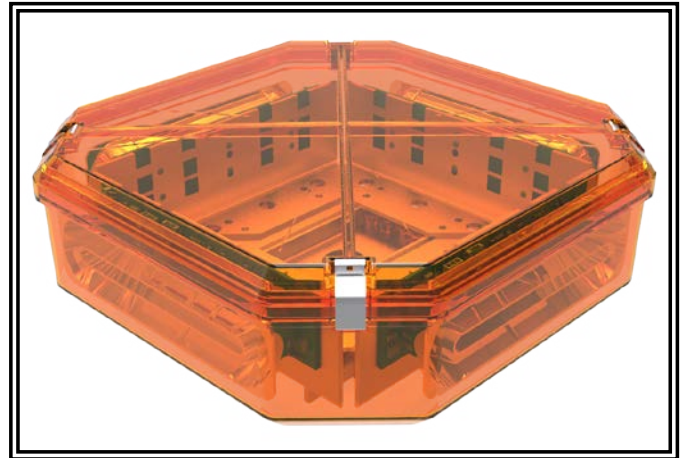




# Installation and Operation Instructions DuoBeam™

The ECCO LED DuoBeam™ uses state of the art LEDs and optics to provide superior optical output. The rugged design and long life capabilities make it virtually maintenance free. When properly configured, the DuoBeam™ will exceed SAE Class 1 and California Title 13 requirements.



## Unpacking and Pre-Installation:

Carefully remove the lightbar and place it on a flat surface. Examine the unit for transit damage and locate all parts. If damage is found or parts are missing, contact the transit company or ECCO. Do not use damaged or broken parts.

Ensure the lightbar voltage is compatible with the planned installation.

**IMPORTANT!** Read all instructions before installing and using. Installer: This manual must be delivered to the end user. This manual assumes installation by a suitably qualified Automotive Technician.



### WARNING!

Failure to install or use this product according to manufacturer's recommendations may result in property damage, serious bodily/personal injury, and/or death to you and those you are seeking to protect!



**Do not install and/or operate this safety product unless you have read and understand the safety information contained in this manual.**

1. Proper installation combined with operator training in the use, care and maintenance of emergency warning devices are essential to ensure the safety of emergency personnel and the public.
2. Emergency warning devices often require high electrical voltages and/or currents. Exercise caution when working with live electrical connections.
3. This product must be properly grounded. Inadequate grounding and/or shorting of electrical connections can cause high current arcing, which can cause personal injury and/or severe vehicle damage, including fire.
4. Proper placement and installation is vital to the performance of this warning device. Install this product so that output performance of the system is maximized and the controls are placed within convenient reach of the operator so that s/he can operate the system without losing eye contact with the roadway.
5. It is the responsibility of the vehicle operator to ensure daily that all features of this product work correctly. In use, the vehicle operator should ensure the projection of the warning signal is not blocked by vehicle components (i.e., open trunks or compartment doors), people, vehicles or other obstructions.
6. The use of this or any other warning device does not ensure 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, drive against traffic, respond at a high rate of speed, or walk on or around traffic lanes.
7. This equipment is intended for use by authorized personnel only. The user is responsible for understanding and obeying all laws regarding emergency warning devices. Therefore, the user should check all applicable city, state, and federal laws and regulations. The manufacturer assumes no liability for any loss resulting from the use of this warning device.
8. This product may contain high intensity LEDs staring directly into these lights could result in temporary and/or permanent vision impairment.

## Specifications:

Dimensions:	10.3" x 10.3" x 3.3"
Average Weight:	6 lbs.
Input Voltage:	10-16 VDC
Nominal Current @ 12.8VDC:	
6 LED Module:	0.5 A max.
8 LED Module:	1.0 A max.
9 LED Module:	1.0 A max.
12 LED Module:	1.5 A max.

Flash Rate: See Wiring Section

Temp. Range: -22°F to 122°F  
-30°C to 50°C

## Installation & Mounting:

### Mounting

Before proceeding with installation, plan all wiring and cable routing. For orientation purposes, the DuoBeam™ was built with the carriage bolt track running from left to right (not front to back). The mounting location for the lightbar should be chosen such that the lightbar is level and visibility to approaching traffic is optimized.



### Caution:

When drilling into any vehicle surface, make sure that the area is free from any electrical wires, fuel lines, vehicle upholstery, vehicle support members, etc. that could be damaged.

### Permanent Mount

1. Insert carriage bolts into track
2. Place spacer over bolts as shown in FIGURE 1.
3. Align bolts with pre-drilled holes in the vehicle's surface.
4. Place lock washer and nut on bolt and tighten until secure.

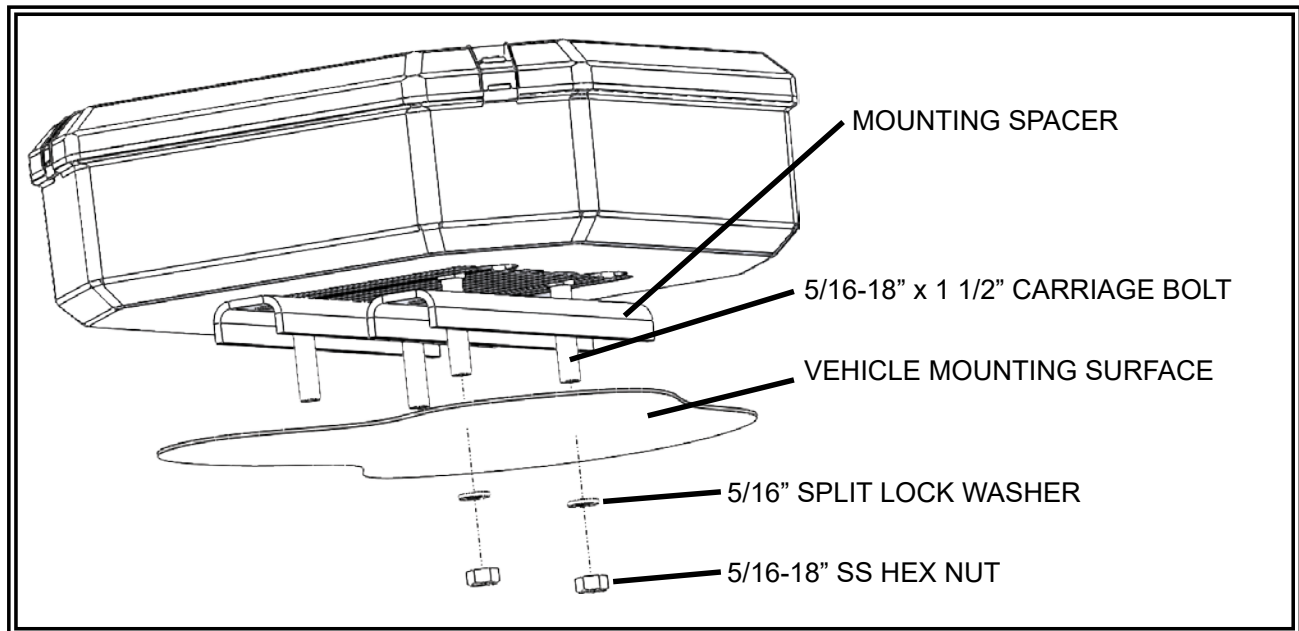


FIGURE 1

## Magnet Mount

1. Insert carriage bolts into track.
2. Place oversized washers over bolts as shown in FIGURE 2.
3. Attach magnetic base over bolts.
4. Place lock washer and nut on bolt and tighten until secure.

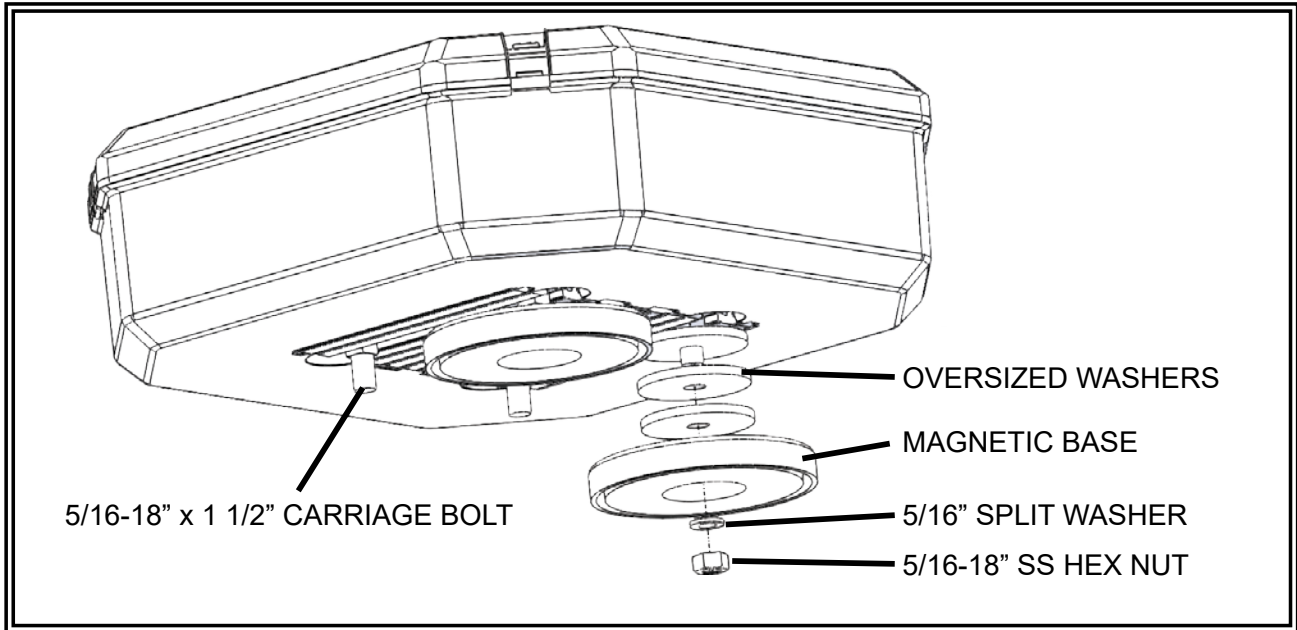


FIGURE 2

## Pylon/Headache Rack Mounting

1. Insert the four (4) 5/16"-18 carriage bolts in the channels on the under side of the light bar and loosely attach the mounting brackets.
2. Place the lightbar on the vehicle and slide the mounting brackets into position.
3. Secure the brackets to the lightbar with the supplied washers and nuts as shown in FIGURE 3.
4. With the mounting brackets positioned, mark the locations of the mounting hole centers on the roof of the vehicle. Remove the bar and drill the mounting holes as marked.
5. Secure the mounting brackets to the vehicle with customer supplied hardware.

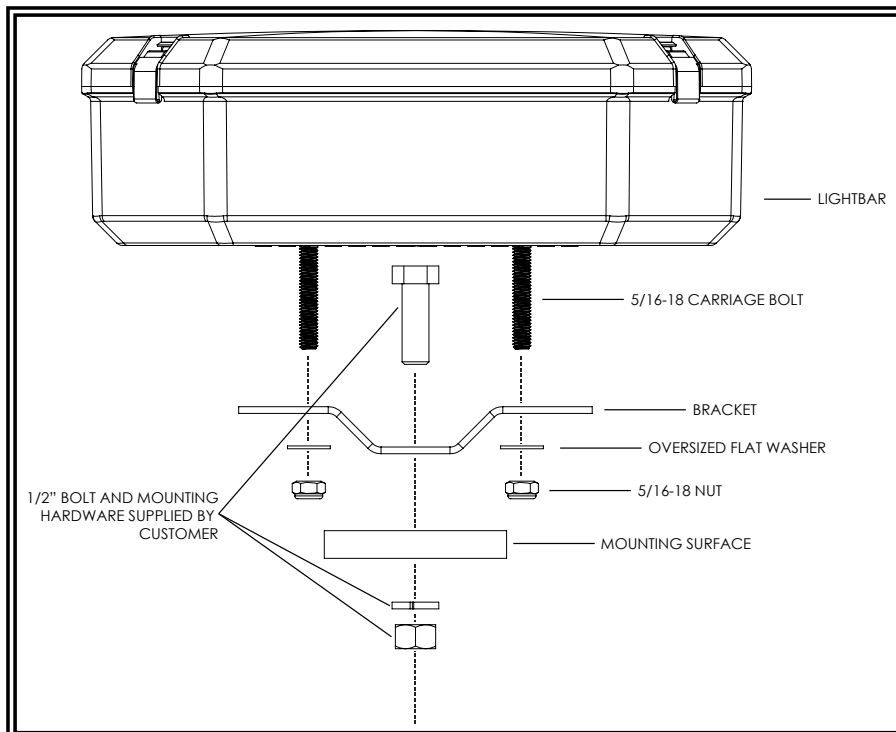


FIGURE 3

## Mirror Mount Bracket

1. Assemble the brackets. Tighten the 3/8" bolt, but leave the 7/16" bolt finger tight at this time.
2. Position bracket assembly on top mirror supports, bracket A on rear support and bracket B on front support. Note: some mirror designs require reversing bracket A and B. Rotate bracket A as necessary to get the best fit. Some additional bending of brackets may be necessary in some cases to achieve a satisfactory fit.
3. Attach bracket assembly to mirror supports with U-bolts. Position bracket assembly as desired and tighten U-bolts. The DuoBeam™ mounting bracket should be parallel to the ground.
4. Insert two carriage bolts into underside of the DuoBeam™ bracket. Secure the unit to the top of the DuoBeam™ bracket.

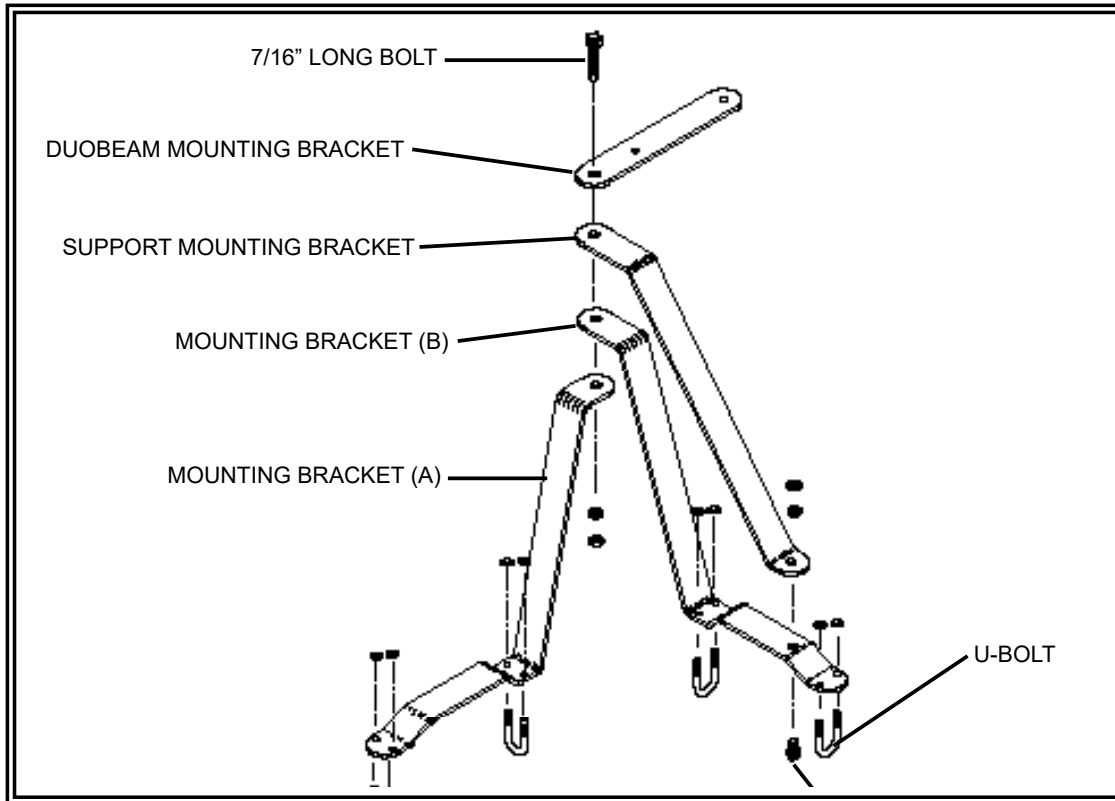


FIGURE 4

## Wiring Instructions:

### Important!

This unit is a safety device and it must be connected to its own separate, fused power point to assure its continued operation should any other electrical accessory fail. Do not wire in parallel with any other accessory.

### Notes:

1. 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).
2. 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., under-hood) will significantly reduce the current carrying capacity of wires, fuses, and circuit breakers. 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.
3. 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.
4. 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.
5. Ground termination should only be made to substantial chassis components, preferably directly to the vehicle battery.
6. Circuit breakers are very sensitive to high temperatures and will "false trip" when mounted in hot environments or operated close to their capacity.



### Caution:

Disconnect the battery before wiring up the lightbar, to prevent accidental shorting, arcing and/or electrical shock.

## IF Series Wiring

An IF series DuoBeam™ has a dedicated ground wire and one or more +power wires routed to the modules. The black ground wire should be connected directly to the battery. The amp ratings for each module type are detailed in the specifications section of this installation guide.

## IF Series Flash Pattern Selection

The DuoBeam can be populated with one of two different module types - PriZm™ or Torus™. For PriZm™ (8 or 12 LED) style modules, the flash pattern on each individual module can be cycled to the next flash pattern (shown in TABLE 1) by briefly shorting together the 2 short pads with a wire or the blade of a screwdriver as shown in FIGURE 5. The modules can be reset to the default flash pattern by shorting the pads together for longer than 5 seconds. A thin layer of conformal coat may need to be scraped from the surface of the short pads if the modules aren't changing patterns easily.

PriZm™ Flash Patterns	
Order	Flash Pattern
1	Cycle Flash (Default)
2	NFPA Quad Flash 80 FPM
3	Steady Burn
4	Single Flash 75 FPM
5	Single Flash 150 FPM
6	Single Flash 300 FPM
7	Double Flash 75 FPM
8	Double Flash 150 FPM
9	Triple Pop Flash 75 FPM
10	Triple Flash 150 FPM
11	Quad Pop Flash 75 FPM
12	Quad Pop Flash 150 FPM
13	Five Flash 70 FPM
14	Five Flash 150 FPM
15	Modular Flash

TABLE 1

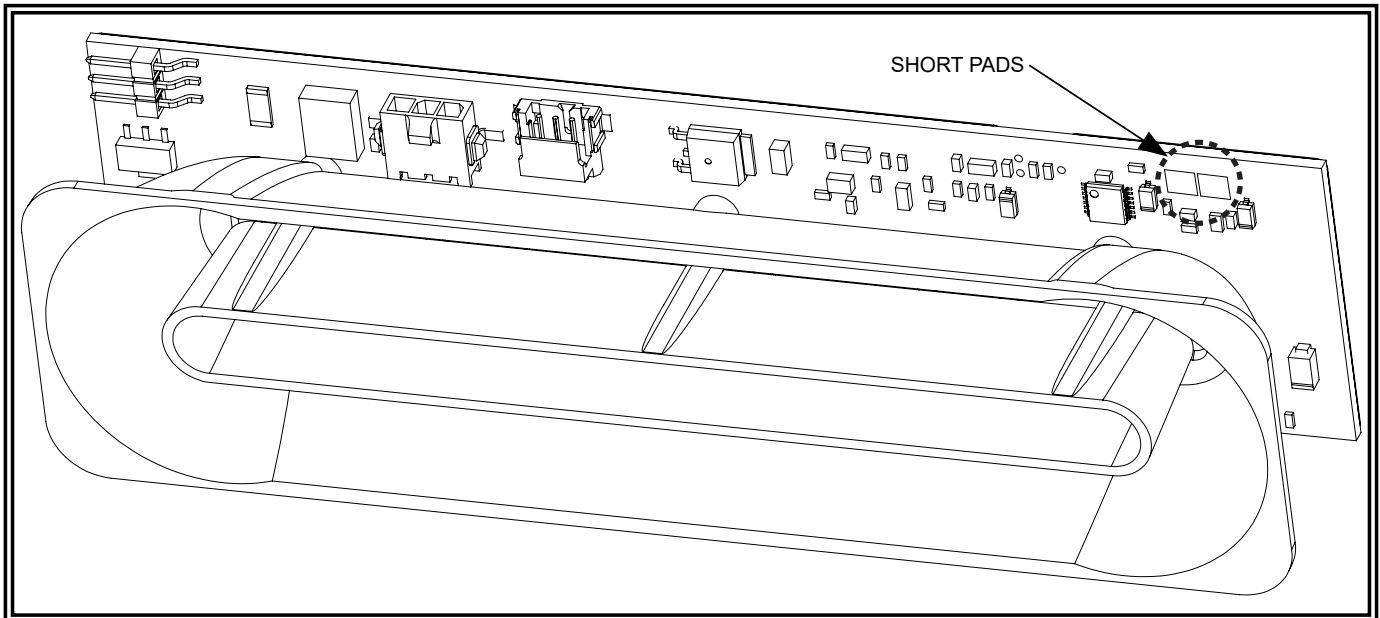


FIGURE 5

For Torus™ (6 or 9 LED) style modules, the flash pattern on each individual module can be cycled to the next flash pattern (shown in Table 2) by momentarily shorting together the JP1 pins with a wire or the blade of a screwdriver as shown in FIGURE 6. The module will reset to the default flash pattern when the JP1 pins are shorted together for 5 seconds or more. Module pairs connected by a sync wire must be individually set to the same flash pattern to properly synchronize.

Torus™ Flash Patterns	
Order	Flash Pattern
1	Cycle Flash (Default)
2	NFPA Quad Flash 80 FPM
3	Quad Pop Flash 70 FPM
4	Steadyburn
5	Five Flash 70 FPM
6	Triple Flash 70 FPM
7	Double Flash 70 FPM
8	Single Flash 70 FPM
9	Quad Pop Flash 70 FPM
10	Triple Pop Flash 70 FPM
11	Mod Flash
12	Cycle Flash 150 FPM
13	Five Flash 150 FPM
14	Quad Flash 150 FPM
15	Triple Flash 150 FPM
16	Double Flash 150 FPM
17	Single Flash 150 FPM
18	Single Flash 250 FPM
19	Single Flash 375 FPM

TABLE 2

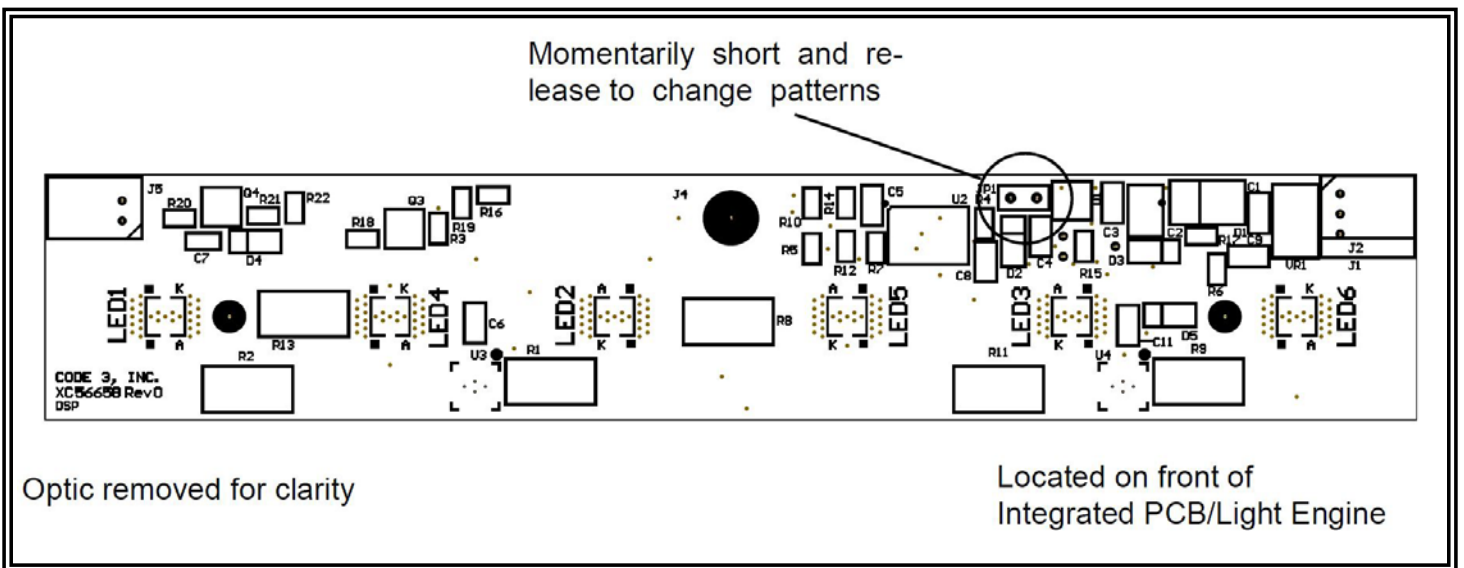


FIGURE 6

## TR Series Wiring

A TR series DuoBeam™ has a single cable with 7 colored wires. A dedicated ground wire, a dedicated power wire and five colored control wires which run through the main driver board.

The 16 AWG black ground wire should be connected directly to the battery. The 16 AWG red power wire requires a constant 10 to 16V(+) power source with a customer supplied in line **15A** fuse.

The five control cable wires (listed in TABLE 3 below) routed through the driver board carry only low current (30 mA average) input signals to control the DuoBeam™ functions and must be routed to the output of a control switch (or directly to multiple switches).

Standard TR Function Wire Definitions		
Function Wire Color	Function	Description
BLU	L1	Level 1 Emergency Mode
ORG	L2	Level 2 Emergency Mode
YEL	L3	Level 3 Emergency Mode
GRN	Pattern Select	
WHT	Lightbar Dim	Set LEDs to DIM mode

TABLE 3

**Notice:** When the GRN Pattern Select wire is connected to +power alone, test mode is enabled to exercise all outputs in sequence.

### Emergency Mode Flash Pattern Selection

There are seven customizable emergency flash pattern modes available based on the wire combinations shown in TABLE 4. When using individual switches, make sure to configure all possible switch combinations.

Level Mode Combinations				
Flash Pattern Modes	Function Wire Color(s)	Pattern	Description	FPM
L1	BLU	1	Cycle Flash Simultaneous	70
L2	ORG	1	Cycle Flash Simultaneous	70
L3	YEL	1	Cycle Flash Simultaneous	70
L1 + L2	BLU & ORG	1	Cycle Flash Simultaneous	70
L1 + L3	BLU & YEL	1	Cycle Flash Simultaneous	70
L2 + L3	ORG & YEL	1	Cycle Flash Simultaneous	70
L1 + L2 + L3	BLU, ORG & YEL	1	Cycle Flash Simultaneous	70

TABLE 4

To change a flash pattern on a single emergency level mode:

1. Power-up the unit and apply +power to the level mode wire(s) you wish to change (see TABLE 4). The unit will flash the default pattern.
2. Momentarily touch the GRN pattern select wire to (+) power to cycle through to the next flash pattern shown on TABLE 5.
3. To reset the flash pattern to the factory default, hold the GRN pattern select wire to (+) power for ~5 seconds.



<b>Level Mode Flash Patterns</b>	
<b>Order</b>	<b>Flash Pattern - Module Group</b>
1	Cycle Flash Simultaneous 70 FPM
2	Cycle Flash Alternating 70 FPM
3	NFPA Quad Flash Simultaneous 80 FPM
4	NFPA Quad Flash Alternating 80 FPM
5	Triple Flash Simultaneous 70 FPM
6	Triple Flash Alternating 70 FPM
7	Double Flash Simultaneous 70 FPM
8	Double Flash Alternating 70 FPM
9	Variable Single Flash Simultaneous
10	Variable Single Flash Alternating
11	Cycle Flash Simultaneous 150 FPM
12	Cycle Flash Alternating 150 FPM
13	Single Flash Simultaneous 250 FPM
14	Single Flash Alternating 250 FPM
15	Rotate
16	Cruise

TABLE 5

For instructions related to the California Title 13 steady burning red warning lamp requirement during level mode operation, please contact ECCO directly.

## Replacement Parts/Accessories:

Description	Part No.
<b>Lenses</b>	
Lower Amber	250-0484-02
Lower Clear	250-0484-03
Lower Red	250-0484-04
Upper Amber	250-0433-02
Upper Clear	250-0433-03
Upper Red	250-0433-04
Upper Black	250-0433-07
<b>Mounting</b>	
Permanent Mounting Kit	140-9937-00
Pylon/Headache Rack Mount Kit	EZ21DBPM
Magnet Mount Kit	EZ21DBMG
Mirror Mount Kit	EZ21DBMM
<b>Accessories</b>	
Lens Retaining Clip	EZ2127LC
Lens Retaining Clip, Black	EZ2127LCB
<b>Modules</b>	
TR6 (centrally controlled)	EZ21CC6X*
TR9 (centrally controlled)	EZ21CC9X*
TR6 (independent flashing)	EZ21IF6X*
TR9 (independent flashing)	EZ21IF9X*
REF8 (centrally controlled)	EZ27CC8X*
REF12 (centrally controlled)	EZ27CC12X*
REF8 (independent flashing)	EZ27IF8X*
REF12 (independent flashing)	EZ27IF12X*

\*Where X indicates color options: A=Amber, B=Blue, C=Clear (White), G=Green, R=Red

Contact ECCO for Multicolor Options.

## Options and Maintenance:

### Lens Cleaning

Occasional cleaning of the lenses will ensure optimum light output. Take care when cleaning lenses - although tough, polycarbonate scratches easily. Clean the lens and base with soap and water or a lens polish using a soft cloth. Do not use solvents as they may damage the polycarbonate.

### Lens Removal and Installation

1. Uninstall the lens clips using a flat blade screwdriver.
2. Insert the screwdriver into the gap along the lens edge, and twist the screwdriver to lift the lens.
3. When finished, reinstall making sure the lens gasket is not damaged or folded. Replace the clips by hooking into the bottom lens slot and pressing the upper portion into the clip pocket.

### LED Module Removal and/or Replacement

1. Remove screw(s) securing the mounting bracket to the extrusion.
2. Lift the light head assembly and disconnect wiring at the connectors.
3. Remove screw(s) securing the light head assembly to the mounting bracket.
4. During re-assembly, repeat the prior steps in reverse order. Torque screw(s) securing the light head assembly to the mounting bracket using 10 in-lbs. Torque screws securing the mounting bracket to the extrusion using 50 in-lbs.

## 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 troubleshooting and repair information. If the problem cannot be rectified using the solutions given below, additional information may be obtained from the manufacturer – contact details are at the end of this document.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Does not function	Poor power or ground connection	In CC Lightbars, a green light on the central control board should flash when power is first applied to the bar and during flash pattern selection.
	Blown fuse	Check wiring, replace fuse
Incorrect flash patterns	Wrong flash configuration	Cycle through flash patterns according to the supplied wire key and wiring instructions section of this installation guide.

 **NOTE: Operating the vehicle without the outer lens installed on the product may result in damage that will NOT be covered under the warranty.**