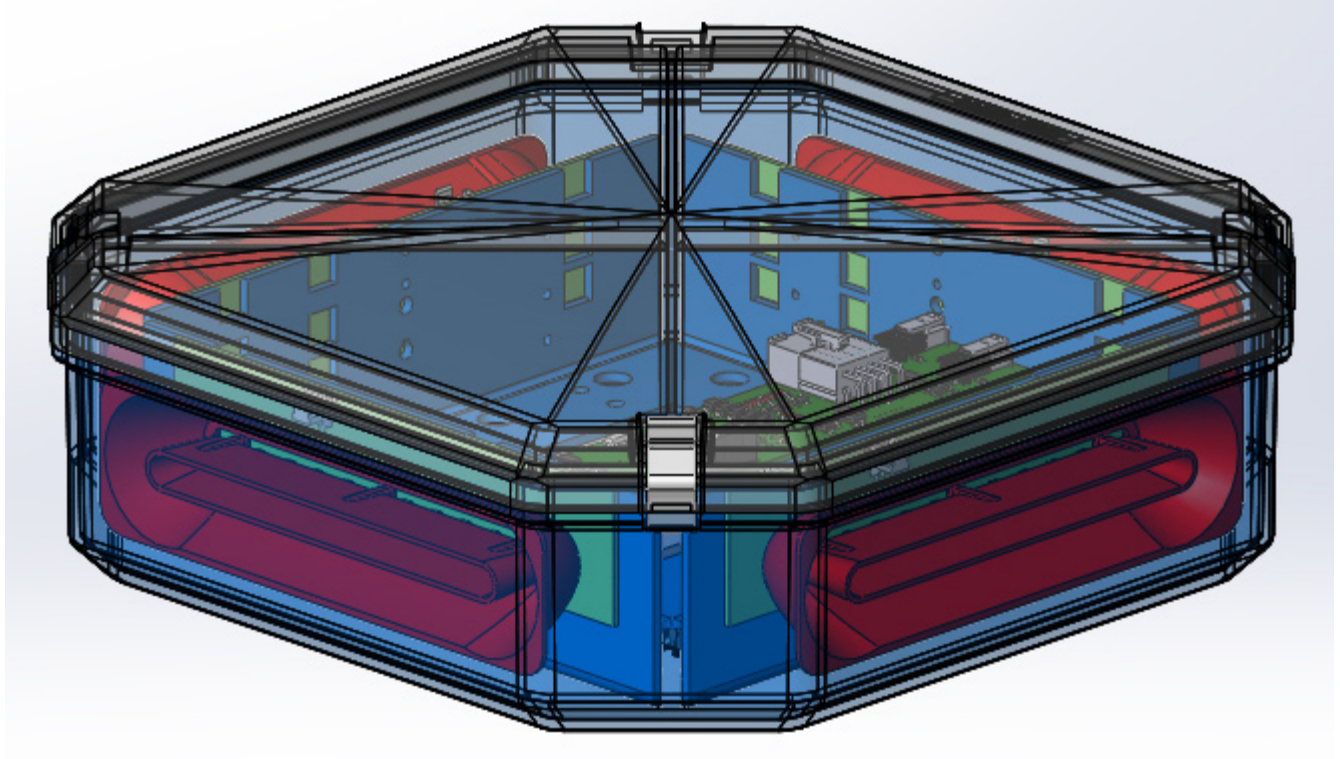


# INSTALLATION & OPERATION MANUAL



**CODE 3<sup>®</sup>**  
A PUBLIC SAFETY EQUIPMENT COMPANY

## *DuoBeam II*

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### **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 LED DuoBeam II™ 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 Duo-Beam will exceed SAE Class 1 and California Title 13 requirements.



## WARNING!

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.

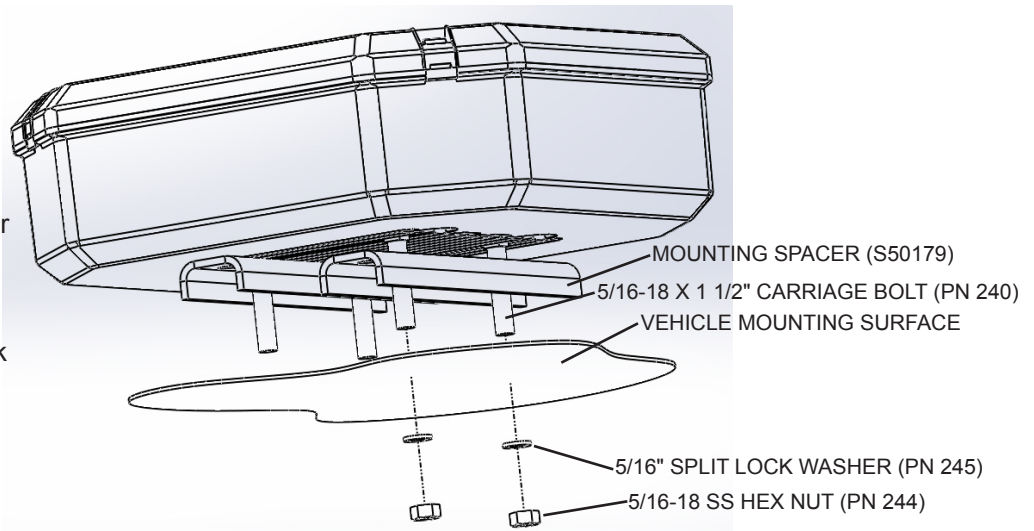
The LED DuoBeam II™ is built to operate on 12 volt D.C. negative ground (earth) vehicles. If you have an electrical system other than 12 volt D.C. negative ground (earth) contact the factory.

## Installation & Mounting

\*\*For orientation purposes, the DuoBeam was built with the carriage bolt track running from left to right - (not front to back).

### FLUSH MOUNT

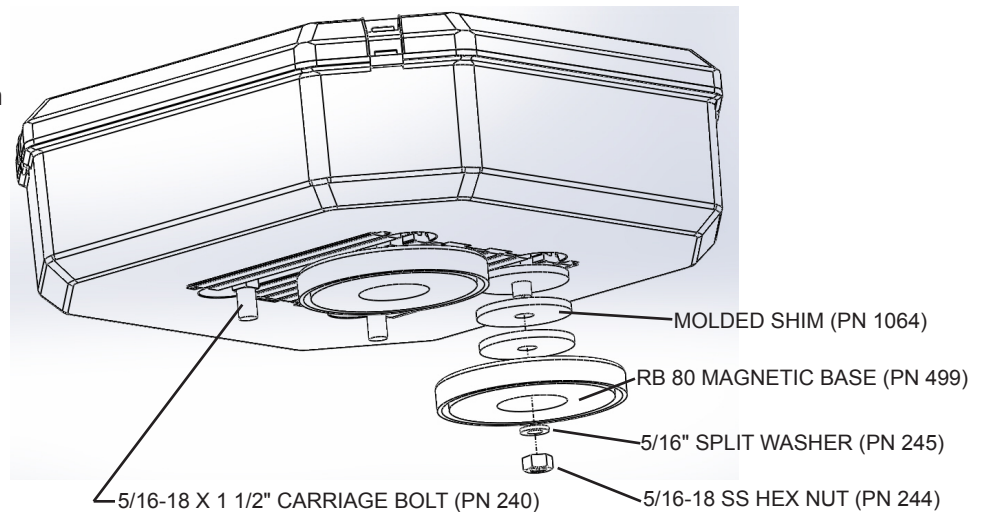
Insert carriage bolts into track. Place spacer over bolts as shown to the right. Align bolts with pre-drilled holes in vehicle's surface. Place lock washer and nut on bolt and tighten until snug.



NOTE: Spacer must be used to prevent water from entering the bar.

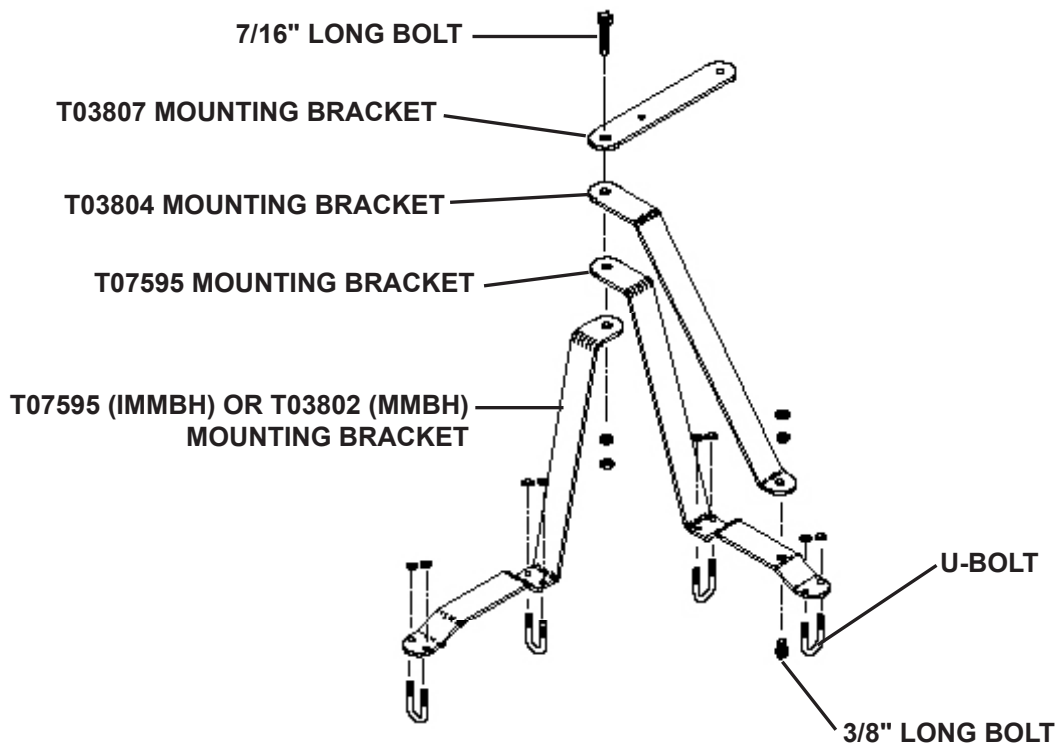
## MAGNETIC MOUNT

Insert carriage bolts into track. Place molded shims over bolts as shown. Attach magnetic base over bolts. Place lock washer and nut on bolt then tighten until snug.



## 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 Duo Beam mounting bracket should be parallel to the ground.



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.

# Wiring & Fusing



## WARNING!

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.

## One of two cable types will be installed in the DuoBeam:

- **2 conductor** (1 red & 1 black) - This cable is used when the light heads have an integrated flasher installed. The light heads flash independently. The red conductor should be connected to power (+12VDC) via a switch or controller of some kind and the black conductor should be connected to ground.
- **7 conductor** - This cable is used when there is a central controller installed. All TriCore™ models and most multi-color models will employ a CC. These models will require a somewhat more sophisticated method of control (switchbox or siren with lighting controls) as more options are available. Further explanation can be found starting on Page 6 of this manual.

## LED Fusing Considerations

Although the average current draw per LED module is very low, the instantaneous peak current to a module can be higher during low voltage conditions. To avoid prematurely blowing of 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 light bars with many LED modules running off a single fused source. It is always best to have 20-25% head room in calculating for fusing. Please use the values below to calculate fuse values for DuoBeam installation.

For PriZm II™ lightheads:

REF8 -  $1.0 \times (\text{number of lightheads being fused})$

REF12 -  $1.5 \times (\text{number of lightheads being fused})$

Example:

DuoBeam with (4) REF12 lightheads -  $4 \times 1.5A = 6A$  minimum

For Torus™ lightheads:

TRS6 -  $1.0 \times (\text{number of lightheads being fused})$

For TriCore™ lightheads:

TC6 -  $2.0 \times (\text{number of lightheads being fused})$



# LED Lighthead Description and Pattern Change

The DuoBeam can be populated with one of three different types of Code 3 LED's - PriZm II™, Torus™ and TriCore™ technologies. The PriZm™ and Torus™ lightheads are available with an integrated flash control and do not require a separate flasher, however, all models CAN be controlled by a flasher.



**WARNING!**

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

## PriZm II™ (Integrated flasher in lighthead)

### Flash Pattern

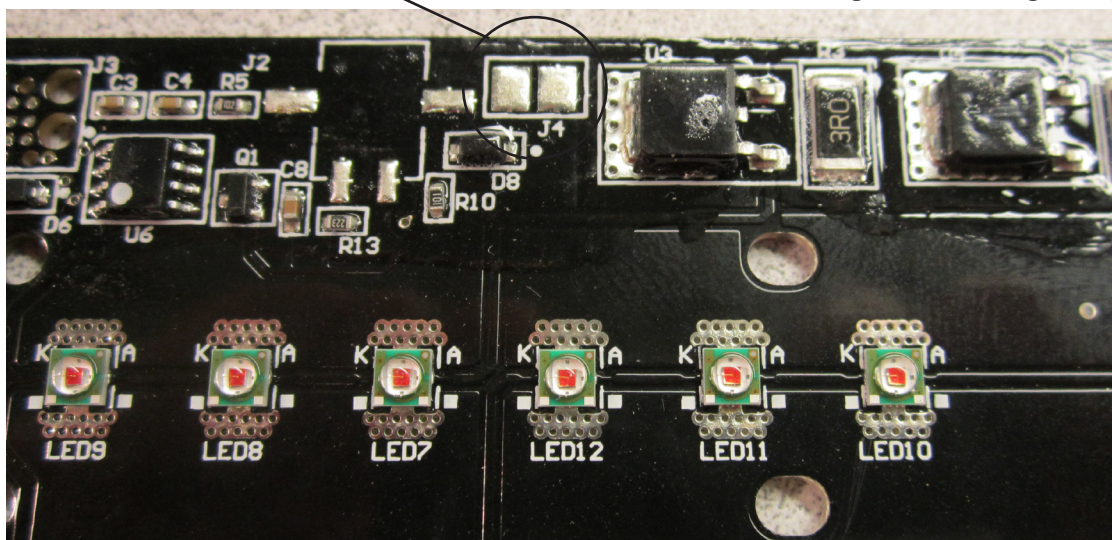
### Description

1. Cycle Flash (DEFAULT)-----Cycles through various patterns @ 70 fpm
2. NFPA Quad Flash 80 FPM-----Four Pulses per flash @ 80 fpm
3. Steadyburn-----Steady-Burn
4. Five Flash 150 FPM-----Five Pulses per flash @ 150 fpm
5. Quad Flash 150 FPM-----Four Pulses per flash @ 150 fpm
6. Triple Flash 150 FPM -----Three Pulses per flash @ 150 fpm
7. Double Flash 150 FPM-----Two Pulses per flash @ 150 fpm
8. Single Flash 150 FPM-----One Pulse per flash @ 150 fpm
9. Single Flash 250 FPM-----One Pulse per flash @ 250 fpm
10. Single Flash 375 FPM-----One Pulse per flash @ 375 fpm
11. Triple Pop Flash 75 FPM-----Three Pulses per flash ( 2 equal, 1 extended) @ 75 fpm
12. Quad Pop Flash 75 FPM-----Four Pulses per flash ( 3 equal, 1 extended) @ 75 fpm
13. Single Flash 75 FPM-----One Pulse per flash @ 75 fpm
14. Double Flash 75 FPM-----Two Pulses per flash @ 75 fpm
15. Triple Flash 70 FPM -----Three Pulses per flash @ 70 fpm
16. Quad Flash 70 FPM -----Four Pulses per flash @ 70 fpm
17. Five Flash 70 FPM -----Five Pulses per flash @ 70 fpm
18. Mod Flash
19. Action Flash

The flash pattern can be changed by shorting the J4 pad with a wire or blade of a screwdriver (shown below). The lighthead can be reset to the default by shorting the J4 pad for greater than 5 seconds and then releasing

**Momentarily short and release to change patterns**

**Located on front of Integrated PCB/Light Engine**



**Reflector removed for clarity**

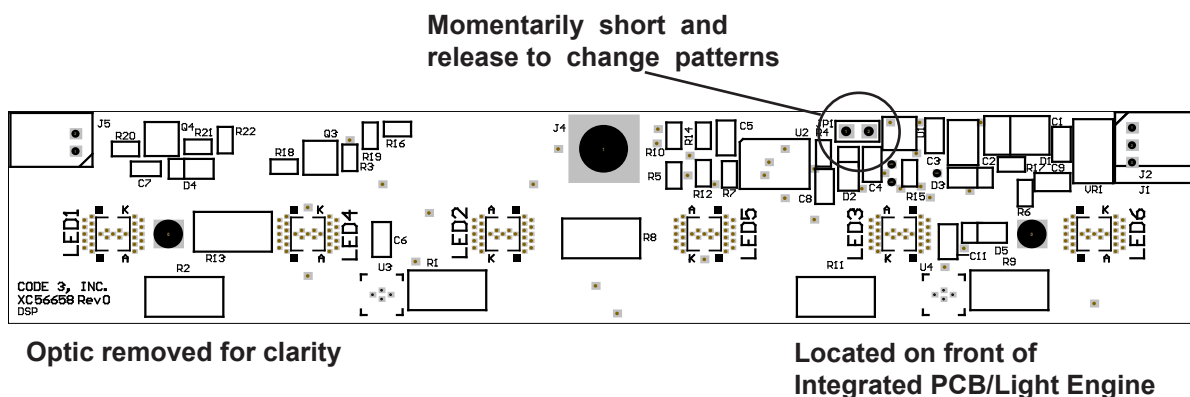
## Torus™ (Integrated flasher in lighthouse)

### 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 J4 pad with a wire or blade of a screwdriver (shown below). The lighthouse can be reset to the default by shorting the J4 pad for greater than 5 seconds and then releasing



## PriZm II™, Torus™, and TriCore™ modules with Central Controller

The following table shows the functions of the conductors of the 7 conductor cable. Please note that the CC must be powered (red conductor must have +12VDC) before any of the functions can be enabled. The blue, orange, and yellow flash activation conductors, when energized, enable the lightheads to be flashed.

**Note: All control inputs are +power enabled.**

Control Input Function Definition		
Wire Color	Function	Description
BLUE (primary)	Flash Activation	Energizes light heads per the pattern chosen by the end user or, if left unchanged, per the defaults set at the factory (see table of flash patterns).
ORANGE (secondary)		
YELLOW (multi-color)		
WHITE	Dimming	Dims lighthouse modules
GREEN	Pattern Select	Light Bar Flash Pattern Select Wire & Diagnostic Test
BLACK	Ground	Ground
RED	Power	+12V Input Supply

## Progressive vs. Independent Switching

Depending on how the blue, orange, and yellow activation wires are connected, different levels of control are possible. For example, activating the blue wire allows a flash pattern to be set. Activating the blue + orange wires allows a different pattern to be set. Activating only the orange wire allows yet another to be set. Seven combinations are possible.

## Flash Pattern Selection (Very important - read carefully)

Energize (+12VDC) to the red wire and ground the black wire. Energize the activation wires desired to begin flashing the lightheads. Observe the flash pattern (Default). Change the flash pattern as follows:

If touched for **0-2 seconds**, the lighthead will **steady burn dimly** and the **next pattern** in line will begin when the green wire is deactivated.

If touched for **2-4 seconds**, the lightheads will **shut off** and the **previous pattern** will begin when the green wire is deactivated.

If touched for **more than 4 seconds**, the lightheads will **shut off and then turn on again**. **All patterns will be reset to factory default.**

The pattern that is selected will be stored even when power is removed.

There are 16 patterns for single color models and 47 for multi-color models. Alternating refers to a pair of lights flashing together while simultaneous refers to all heads (of the same color) flashing together.

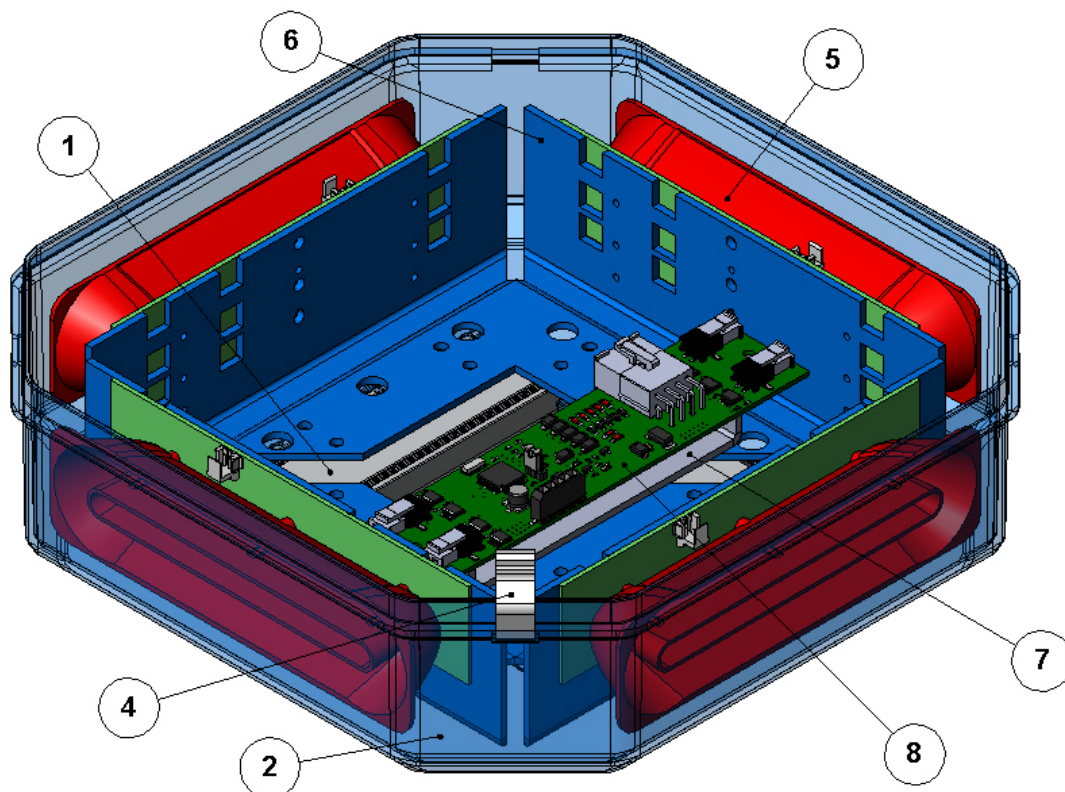
FP#	Single Color	Multi-Color	FP#	Multi-Color
1	Cycle Flash Sim. 70 fpm	Cycle Flash Sim. 70 fpm	25	Variable Single Alt. (primary)
2	Cycle Flash Alt. 70 fpm	Cycle Flash Alt. 70 fpm	26	Cycle Flash Sim. 150 fpm (primary)
3	NFPA Quad Sim. 80 fpm	NFPA Quad Sim. 80 fpm	27	Cycle Flash Alt. 150 fpm (primary)
4	NFPA Quad Alt. 80 fpm	NFPA Quad Alt. 80 fpm	28	Single Sim. 250 fpm (primary)
5	Triple Simultaneous 70 fpm	Triple Simultaneous 70 fpm	29	Single Alternating 250 fpm (primary)
6	Triple Alternating 70 fpm	Triple Alternating 70 fpm	30	Rotate (primary)
7	Double Simultaneous 70 fpm	Double Simultaneous 70 fpm	31	Cruise (primary)
8	Double Alternating 70 fpm	Double Alternating 70 fpm	32	Cycle Flash Sim. 70 fpm (secondary)
9	Variable Single Sim.	Variable Single Sim.	33	Cycle Flash Alt. 70 fpm (secondary)
10	Variable Single Alt	Variable Single Alt	34	NFPA Quad Sim. 80 fpm (secondary)
11	Cycle Flash Sim. 150 fpm	Cycle Flash Sim. 150 fpm	35	NFPA Quad Alt. 80 fpm (secondary)
12	Cycle Flash Alt. 150 fpm	Cycle Flash Alt. 150 fpm	36	Triple Sim. 70 fpm (secondary)
13	Single Sim. 250 fpm	Single Sim. 250 fpm	37	Triple Alt. 70 fpm (secondary)
14	Single Alternating 250 fpm	Single Alternating 250 fpm	38	Double Sim. 70 fpm (secondary)
15	Rotate	Rotate	39	Double Alt. 70 fpm (secondary)
16	Cruise	Cycle Flash Sim. 70 fpm (primary)	40	Variable Single Sim. (secondary)
17	-	Cycle Flash Alt. 70 fpm (primary)	41	Variable Single Alt (secondary)
18	-	NFPA Quad Sim. 80 fpm (primary)	42	Cycle Flash Sim. 150 fpm (secondary)
19	-	NFPA Quad Alt. 80 fpm (primary)	43	Cycle Flash Alt. 150 fpm (secondary)
20	-	Triple Simultaneous 70 fpm (primary)	44	Single Sim. 250 fpm (secondary)
21	-	Triple Alternating 70 fpm (primary)	45	Single Alternating 250 fpm (secondary)
22	-	Double Simultaneous 70 fpm (primary)	46	Rotate (secondary)
23	-	Double Alternating 70 fpm (primary)	47	Cruise (secondary)
24	-	Variable Single Sim. (primary)		

## Diagnostic Test

There is also a diagnostic test that can be run using the Green pattern change wire. Apply +12V to the Green wire (only). The lights will turn on one at a time and then turn off. Note that it can only be activated by applying power to the Green wire at start up. If the unit has been energized with any other wire, power needs to be removed entirely from the light bar before applying power to the Green wire to enter into this mode again.

## Dimming Operation

The DuoBeam can be operated in a low power "Dimming" mode. Dimming is controlled by connecting the White wire to +12VDC. When Dimming is engaged, the lightheads will operate in reduced power mode.

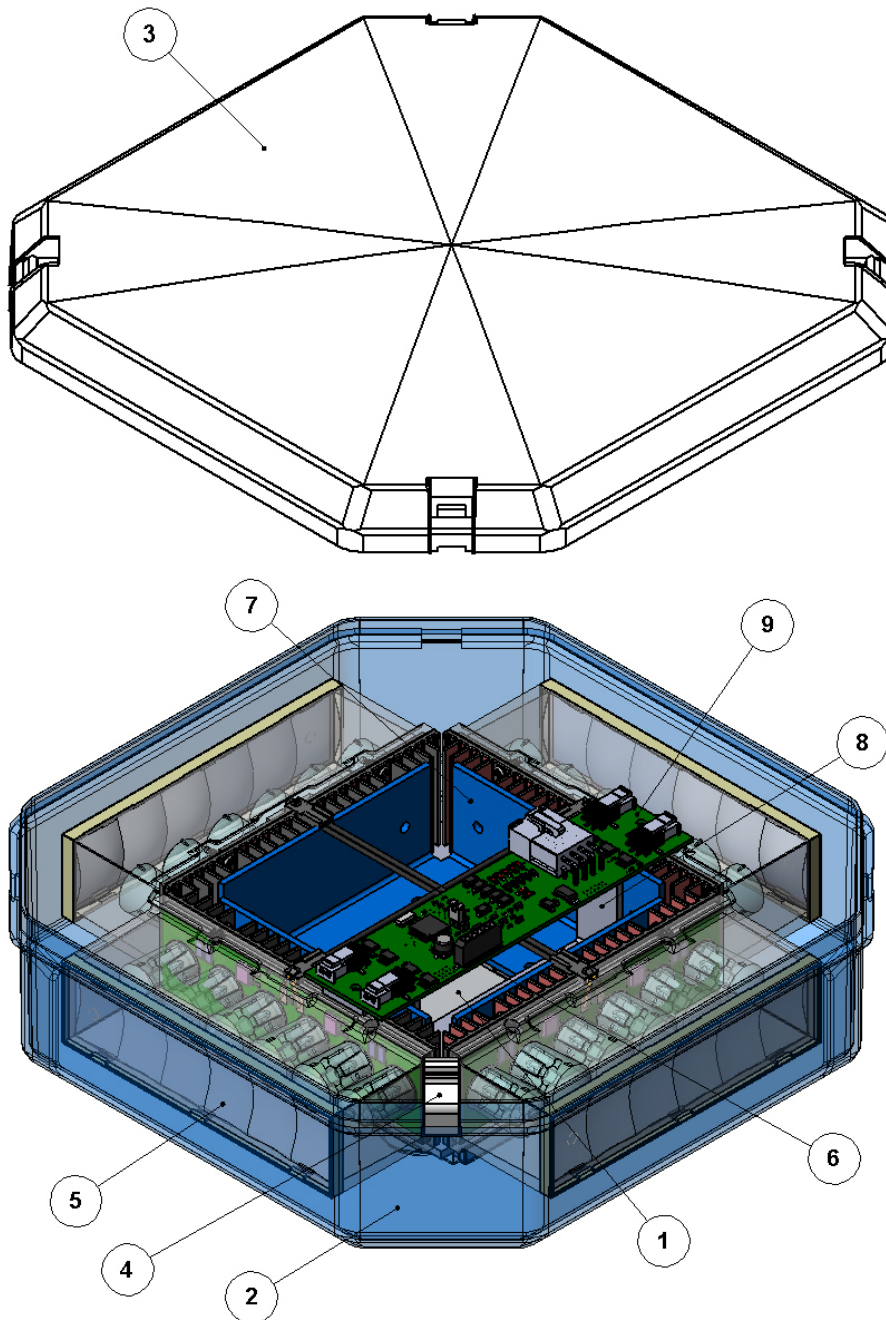


## Parts List for DuoBeam with PriZm II™ Technology

Integrated flasher and Central controller available

Ref No.	Description	Part No.
1	Frame Extrusion Assembly	S24358
2	Lower Lens Clear Red Blue Amber	T16541 T16542 T16543 T16544
3	Upper Lens (not shown for clarity) Clear Red Blue Amber Black	T16551 T16552 T16553 T16554 T16559
4	Lens Clip	T01777
5	REF8 lighthouse assembly (with integrated flasher) REF12 lighthouse assembly (with integrated flasher) REF8 lighthouse assembly (CC) REF12 lighthouse assembly (CC) REF 22 dual color lighthouse assembly (CC)	Call Factory
6	Lighthouse Mounting Bracket (two required)	
7	Mounting Bracket for Central Controller (only on CC models)	
8	Central controller (CC) (only on CC models)	
9	Cable (not shown) 15' (for use with lighthouses with integrated flasher) 35' (for use with lighthouses with integrated flasher) 20' (CC) 35' (CC)	
10	Output Harness (not shown) Four output - Integrated flasher Four output - (CC)	T16568 T16571 T51208 T16575 T16565 T16566

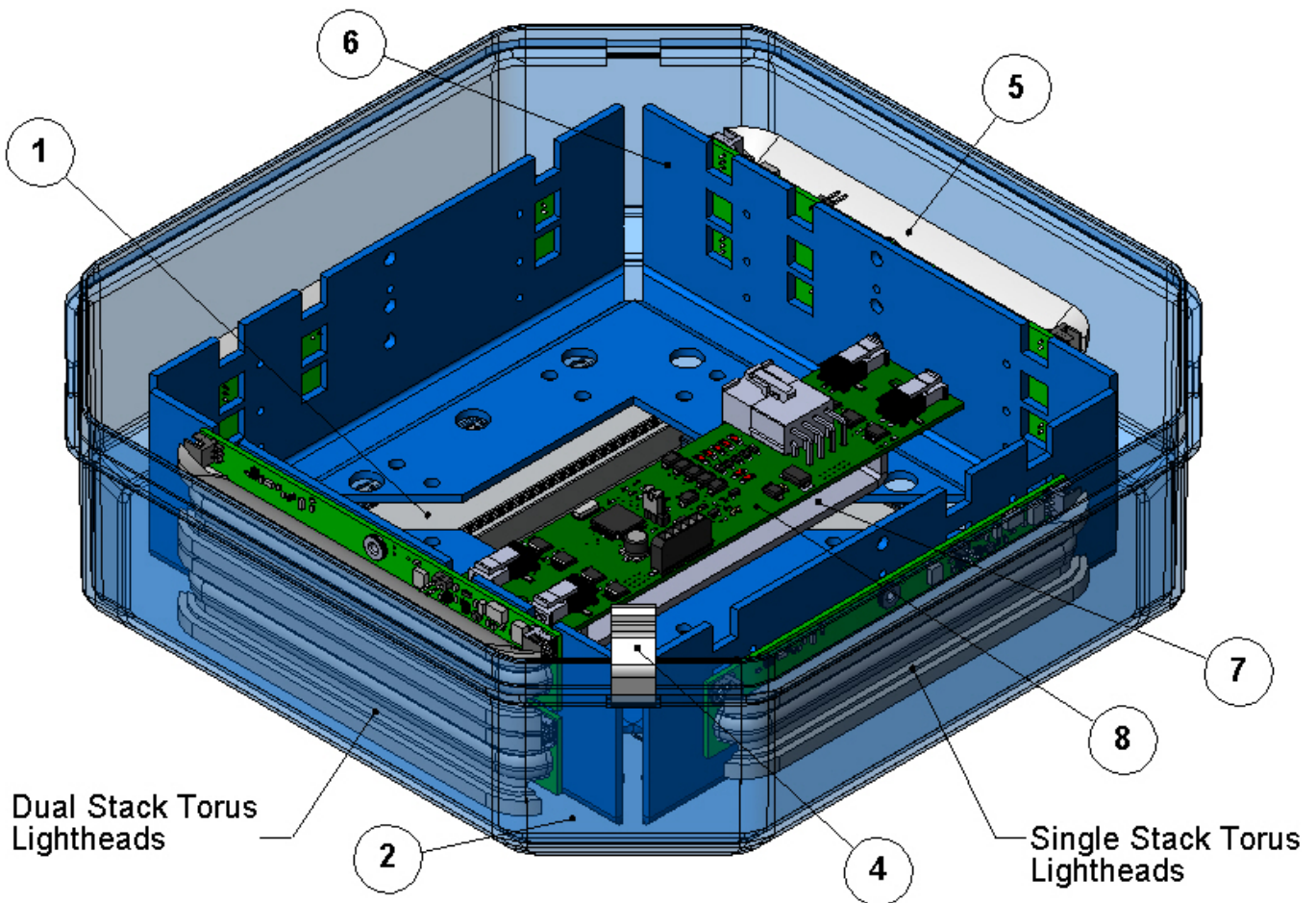




## Parts List for DuoBeam with TriCore™ Technology

Available only with Central Controller

Ref No.	Description	Part No.
****Unless otherwise noted, parts numbers are same as PriZm II model from previous page****		
5	TC6 lighthouse assembly - Contact factory for specific color	
6	Base Locating Plate	S24359
7	Lighthouse Mounting Bracket (2 required)	S24355
8	Mounting Bracket for Central Controller	S24362
9	Central controller (CC)	T11568
10	Cable (not shown) 20' (CC) 35' (CC)	T51208 T16575
11	Output Harness - 4 wire (CC)(not shown)	T16566



## Parts List for DuoBeam with Torus™ technology

Integrated flasher and Central controller available

Ref No.	Description	Part No.
****Unless other wise noted, part numbers are same as PriZm II from previous page****		
5	TRS6 lighthead assembly (with integrated flasher) TRS6 dual stack lighthead assembly (with integrated flasher) TRS6 lighthead assembly (CC) TRS6 dual stack lighthead assembly (CC)	Call Factory
6	Lighthead Mounting Bracket (two required)	S24354
7	Mounting Bracket for Central Controller (only on CC models)	S24361
8	Central controller (CC) (only on CC models)	T11568
9	Cable (not shown) 15' (for use with lighthead with integrated flasher) 35' (for use with lighthead with integrated flasher) 20' (CC) 35' (CC)	T16568 T16571 T51208 T16575
10	Output Harness (not shown) Four output - Integrated flasher Four output - (CC)	T16565 T16566

# Dimensions & Specifications

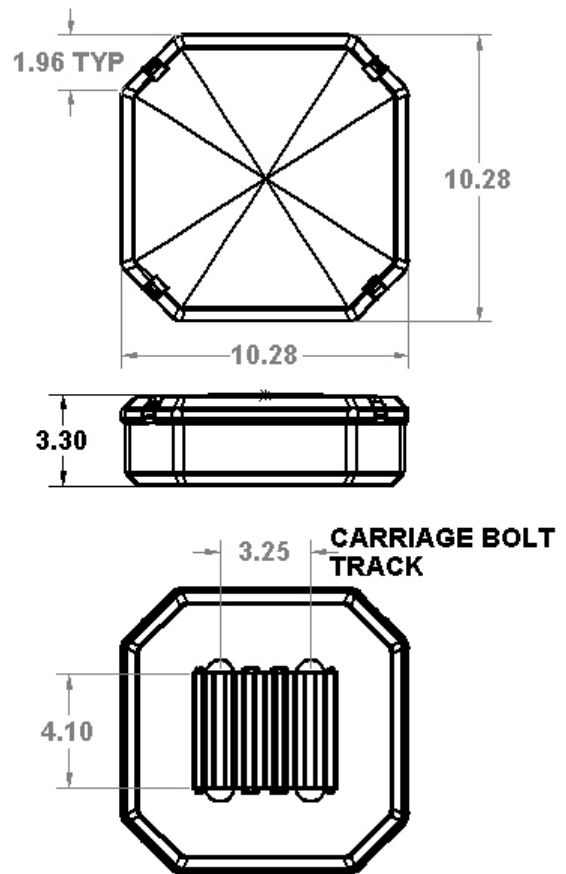
Physical Dimensions - 10.28"L x 10.28"W x 3.30"T

Average Weight - 6 lbs.

Materials:

Upper & Lower Lens - Polycarbonate

Extruded frame - Aluminum alloy



## Electrical Data:

All lightheads have Reverse Polarity Protection installed

**Operating Voltage:** 10-16 VDC

## Current Draw:

### PriZm II™

(for all colors)

REF8 - .75A average

REF12 - 1.0A average

REF22 - .95A average (only 11 LED's are on at one time)

### Torus™

(for all colors)

TRS6 - .5A average

### TriCore™

TC6 (Red & Amber) - 1A average

TC6 (Blue & White) - 1.2A average

# 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.

# 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 return to sender after the service has been rendered.

PROBLEMS OR QUESTIONS? CALL OUR TECHNICAL ASSISTANCE HOTLINE (314) 996-2800

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