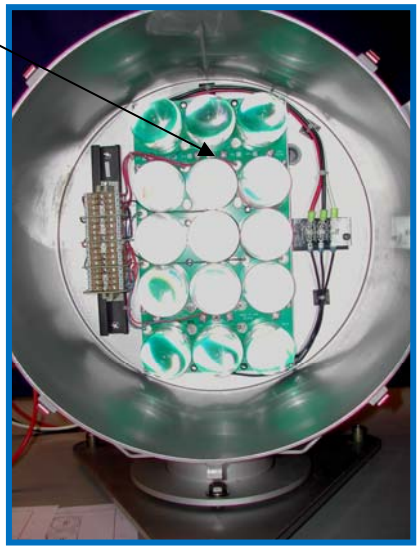
TIDELAND SIGNAL CORPORATION
RL14 & FA-240 LEDBULLET RETROFIT KIT
INSTALLATION & SERVICING INSTRUCTIONS

Recent advances in Light Emitting Diode (LED) technology have enabled us to duplicate the output of most 12 VDC filament lamps used in the RL14 and FA-240 range lanterns with direct emitting LED retrofit assemblies. The kit replaces all of the optical components used inside the range lantern. The mirror, lampchanger, flasher and lamps are replaced with the LEDBullet retrofit kit. The existing spread lens is used with the kit to achieve the desired horizontal divergence for the range.

LED Color
Check Boxes

FA-240 Version



RL14 Version
(15-Head shown)

The LEDBullets delivered as part of the development contract are universal in that they contain 8-15 LEDs and the intensity is adjustable from the lowest setting to the highest by turning on the appropriate number of LEDs and adjusting the power setting. This makes the LEDBullet very versatile as only one assembly for each color installed in the ANT's AOR is needed as a spare. LEDBullets for the RL14 with 2, 4, 8, 12 and 15 LEDs are available on contract. For new conversions, purchase the number of LEDs required to achieve the desired intensity. Due to the limited number of FA-240s in service, only the 2-head LEDBullets will be used, however a 4-head is available if higher intensities are desired (Contact SILC ATON/MER).

It is not apparent what color will be displayed from the LEDs as all lenses are clear. The LEDBullet color is marked in a box on the circuit board between lenses, as shown above.

Purchase

A Blanket Purchase Agreement (BPA) has been established with Tideland Signal Corporation. The 2, 4, 8, 12 and 15 head LEDBullets along with the MLED-120 LED lantern

are available on this contract. Ordering information is available via the CG Portal accessed via the Ocean Engineering website: http://www.uscg.mil/hq/cg4/cg432/products.asp.

LED Color & Spread Lenses

The LED determines the signal color, not the lens, i.e., a **white** LEDBullet cannot be used with a *yellow*, *red* or *green* spread lens. A **red** LEDBullet can be used with a *red* or *clear* spread lens, the **yellow** LEDBullet with a *yellow* or *clear* spread lens, and the **green** LEDBullet with a *green* or *clear* spread lens. The green LEDBullet is a poor color match to the green spread lenses therefore a substantial increase of intensity is possible using a clear spread lens (see intensity tables). NOTE: because of the difficulty of changing spread lenses in the field due to seized fasteners, the existing spread lens should be retained. For new installations the color and angle of the spread lens can be optimized.

Tools Needed

To program and install the LEDBullet, the following tools are needed:

1/8” wide flat tipped screwdriver
1/4” wide flat tipped screwdriver
#2 Phillip’s screwdriver
#3 Square drive screwdriver (for VLB-67-SA)
5/16” Nut driver (for VLB-67-SA)
5/32” Allen wrench, long (supplied with LEDBullet)
Adjustable crescent wrench (for FA-240)
Wire Strippers
Heat Sink Grease (supplied with LEDBullet or Radio Shack 276-1372)
Popsicle Stick or similar for spreading heat sink grease
Electrical tape or duct tape
Mild soap & water
Soft rag or cloth

Programming

The LED assemblies must be programmed to the proper flash rhythm, intensity and bench tested in the shop before deployment. The number of LEDs energized and the intensity setting must be configured before transiting to the aid. While it is more economical to purchase the correct number of LEDs for the particular installation, a LEDBullet with more LEDs can be used if some of the LEDs are turned off, which is useful for discrepancy response.

Intensity

Most applications of the RL14 use a spread lens (3, 8, 11, 20 or 28 degree). The LEDBullet has sufficient horizontal divergence such that a spread lens may not be needed to provide

adequate coverage in the waterway. The existing spread lens can be replaced with clear glass for increased intensity if the following horizontal divergences are acceptable:

RL14 Vertical Divergence & Horizontal Divergence Using a Clear Glass Lens
White - 2.5 degrees (to 50% peak intensity, 1.25 degrees either side of rangeline)
Green - 2.9 degrees, Red - 3.1 degrees, Yellow - 3.2 degrees

The FA-240 is generally fitted with 3.5, or 8 spread lenses. Retain the original lens when outfitting that lantern with a 2-head LEDBullet.

FA-240 Vertical Divergence Using all spread lenses
White - 2.5 degrees (to 50% peak intensity)
Green - 2.5 degrees, Red – 2.9 degrees

Intensity tables are provided next. It is suggested that the Range Design program available on our website (http://www.uscg.mil/hq/cg4/cg432/publications.asp) be used to verify the required intensities for the range. Intensities of existing RL14 and FA-240 lamp/lens combinations are detailed in the right margin of the Ranges Solar Sizing Program so that you can match the intensity with the appropriate LEDBullet.

Effective Luminous Intensities – in Candelas

RL14 White LEDBullet 0 Deg (Clear Glass)

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
1,300	1,800	2,000	2,200	0.024	2	1110
1,900	2,700	3,000	3,300	0.030	2	0110
4,800	6,600	7,500	8,000	0.058	2	1010
9,000	12,400	14,000	15,000	0.085	4	0010
24,600	34,100	38,400	41,000	0.230	8	1100
36,000	49,900	56,200	60,000	0.324	8	0100
55,200	76,600	86,200	92,000	0.483	8	1000
70,200	97,540	109,700	117,000	0.610	8	0000
99,600	138,200	155,700	166,000	0.775	10	0000
119,400	165,700	186,600	199,000	0.917	12	0000
96,000	133,200	150,000	160,000	0.921	15	1010
108,000	149,900	168,800	180,000	1.059	15	0010
144,000	199,900	225,100	240,000	1.368	15	1100
204,000	283,320	318,900	340,000	1.911	15	0100
324,000	449,800	506,500	540,000	2.788	15	1000
390,000	541,400	609,700	650,000	3.482	15	0000

RL14 White LEDBullet 3 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
1,000	1,400	1,500	1,700	0.024	2	1110
1,500	2,000	2,300	2,500	0.030	2	0110
3,600	5,000	5,700	6,100	0.058	2	1010
7,200	9,900	11,200	12,000	0.085	4	0010
20,100	27,900	31,400	33,500	0.230	8	1100
29,500	41,000	46,200	49,300	0.324	8	0100
45,000	62,540	70,300	75,000	0.483	8	1000
57,600	79,900	90,000	96,000	0.610	8	0000
73,200	101,600	114,400	122,000	0.775	10	0000
87,600	121,600	136,900	146,000	0.917	12	0000
69,600	96,600	108,800	116,000	0.921	15	1010
78,600	109,100	122,800	131,000	1.059	15	0010
105,000	145,700	164,100	175,000	1.368	15	1100
148,800	206,500	232,600	248,000	1.911	15	0100
229,800	319,000	359,200	383,000	2.788	15	1000
287,400	399,000	449,300	479,000	3.482	15	0000

Effective Luminous Intensities – in Candelas

RL14 White LEDBullet 8 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
400	600	700	800	0.024	2	1110
700	1,000	1,200	1,300	0.030	2	0110
1,900	2,600	3,000	3,200	0.058	2	1010
3,700	5,100	5,800	6,200	0.085	4	0010
10,200	14,100	15,900	17,000	0.230	8	1100
15,000	20,900	23,500	25,100	0.324	8	0100
23,100	32,000	36,100	38,500	0.483	8	1000
29,400	40,800	45,900	49,000	0.610	8	0000
37,500	52,000	58,600	62,500	0.775	10	0000
44,800	62,300	70,100	74,800	0.917	12	0000
37,500	52,400	59,000	63,000	0.921	15	1010
42,600	59,100	66,500	71,000	1.059	15	0010
57,000	79,100	89,100	95,000	1.368	15	1100
81,000	112,400	126,600	135,000	1.911	15	0100
124,800	173,200	195,100	208,000	2.788	15	1000
156,000	216,500	243,800	260,000	3.482	15	0000

RL14 White LEDBullet 11 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
300	400	500	600	0.024	2	1110
500	700	800	900	0.030	2	0110
1,200	1,700	1,900	2,100	0.058	2	1010
2,700	3,700	4,200	4,500	0.085	4	0010
7,300	10,100	11,400	12,200	0.230	8	1100
10,700	14,900	16,700	17,900	0.324	8	0100
16,300	22,700	25,600	27,300	0.483	8	1000
20,900	29,000	32,700	34,900	0.610	8	0000
26,100	36,300	40,800	43,600	0.775	10	0000
31,200	43,300	48,800	52,100	0.917	12	0000
26,400	36,600	41,200	44,000	0.921	15	1010
30,000	41,600	46,900	50,000	1.059	15	0010
40,200	55,800	62,800	67,000	1.368	15	1100
57,000	79,100	89,100	95,000	1.911	15	0100
89,400	124,100	139,700	149,000	2.788	15	1000
112,200	155,700	175,400	187,000	3.482	15	0000

Effective Luminous Intensities – in Candelas

RL14 White LEDBullet 20 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
100	200	200	300	0.024	2	1110
200	400	300	400	0.030	2	0110
700	1,000	1,200	1,300	0.058	2	1010
1,400	1,900	2,200	2,400	0.085	4	0010
4,000	5,600	6,300	6,800	0.230	8	1100
6,000	8,300	9,300	10,000	0.324	8	0100
9,100	12,600	14,200	15,200	0.483	8	1000
11,600	16,100	18,100	19,400	0.610	8	0000
14,800	20,500	23,100	24,700	0.775	10	0000
17,700	24,600	27,700	29,600	0.917	12	0000
14,400	19,900	22,500	24,000	0.921	15	1010
16,800	23,300	26,200	28,000	1.059	15	0010
22,200	30,800	34,700	37,000	1.368	15	1100
31,200	43,300	48,700	52,000	1.911	15	0100
48,600	67,400	75,900	81,000	2.788	15	1000
61,200	84,900	95,600	102,000	3.482	15	0000

RL14 White LEDBullet 28 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
100	100	100	200	0.024	2	1110
200	300	300	400	0.030	2	0110
500	700	800	900	0.058	2	1010
1,000	1,400	1,600	1,800	0.085	4	0010
3,100	4,300	4,800	5,200	0.230	8	1100
4,500	6,300	7,100	7,600	0.324	8	0100
7,000	9,700	10,900	11,700	0.483	8	1000
8,900	12,400	13,900	14,900	0.610	8	0000
11,200	15,600	17,600	18,800	0.775	10	0000
13,500	18,700	21,100	22,500	0.917	12	0000
11,400	15,800	17,800	19,000	0.921	15	1010
12,600	17,400	19,600	21,000	1.059	15	0010
17,400	24,100	27,200	29,000	1.368	15	1100
24,600	34,100	38,400	41,000	1.911	15	0100
37,800	52,400	59,000	63,000	2.788	15	1000
47,400	65,800	74,100	79,000	3.482	15	0000

Effective Luminous Intensities – in Candelas

RL14 Yellow LEDBullet 0 Deg (Yellow or Clear) Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
2,100	2,900	3,300	3,600	0.045	2	0110
3,100	4,300	4,800	5,200	0.058	4	1010
4,600	6,500	7,400	7,900	0.083	8	0010
6,300	8,800	9,900	10,600	0.103	10*	0010
9,800	13,600	15,300	16,400	0.170	12	0110
15,300	21,200	23,900	25,500	0.254	15	1100
22,600	31,400	35,400	37,800	0.367	15	0100
34,900	48,400	54,500	58,200	0.558	15	1000
46,000	63,900	72,000	76,800	0.743	15	0000

RL14 Yellow LEDBullet 3 Deg (Yellow or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
1,200	1,700	1,900	2,100	0.045	2	0110
1,900	2,700	3,000	3,300	0.058	4	1010
3,700	5,200	5,900	6,300	0.083	8	0010
4,400	6,100	6,900	7,400	0.103	10*	0010
7,800	10,800	12,100	13,000	0.170	12	0110
11,400	15,900	17,900	19,100	0.254	15	1100
16,900	23,500	26,500	28,300	0.367	15	0100
25,100	34,900	39,300	41,900	0.558	15	1000
33,100	45,900	51,700	55,200	0.743	15	0000

RL14 Yellow LEDBullet 8 Deg (Yellow or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
700	900	1,100	1,200	0.045	2	0110
1,100	1,500	1,700	1,900	0.058	4	1010
2,100	2,900	3,200	3,500	0.083	8	0010
2,700	3,800	4,300	4,600	0.103	10*	0010
4,300	6,000	6,800	7,300	0.170	12	0110
6,200	8,600	9,700	10,400	0.254	15	1100
9,100	12,700	14,300	15,300	0.367	15	0100
13,600	18,900	21,200	22,700	0.558	15	1000
18,000	24,900	28,100	30,000	0.743	15	0000

Effective Luminous Intensities – in Candelas

RL14 Yellow LEDBullet 11 Deg (Yellow or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
400	500	600	700	0.045	2	0110
600	900	1,000	1,100	0.058	4	1010
1,200	1,700	1,900	2,100	0.083	8	0010
1,500	2,000	2,300	2,500	0.103	10*	0010
2,700	3,700	4,200	4,500	0.170	12	0110
3,900	5,400	6,100	6,600	0.254	15	1100
5,800	8,100	9,100	9,800	0.367	15	0100
8,700	12,000	13,600	14,500	0.558	15	1000
11,400	15,900	17,900	19,100	0.743	15	0000

RL14 Yellow LEDBullet 20 Deg (Yellow or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
100	200	200	300	0.045	2	0110
300	400	400	500	0.058	4	1010
600	900	1,000	1,100	0.083	8	0010
700	1,000	1,200	1,300	0.103	10*	0010
1,300	1,900	2,100	2,300	0.170	12	0110
1,900	2,700	3,000	3,300	0.254	15	1100
3,000	4,100	4,600	5,000	0.367	15	0100
4,400	6,100	6,900	7,400	0.558	15	1000
5,800	8,000	9,000	9,700	0.743	15	0000

RL14 Yellow LEDBullet 28 Deg (Yellow or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
100	100	100	200	0.045	2	0110
200	300	300	400	0.058	4	1010
400	600	700	800	0.083	8	0010
600	800	900	1,000	0.103	10*	0010
1,000	1,400	1,500	1,700	0.170	12	0110
1,500	2,000	2,300	2,500	0.254	15	1100
2,200	3,100	3,500	3,800	0.367	15	0100
3,300	4,600	5,200	5,600	0.558	15	1000
4,400	6,100	6,900	7,400	0.743	15	0000

Effective Luminous Intensities – in Candelas

RL14 Red LEDBullet 0 Deg (Red or Clear) Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
2,200	3,100	3,500	3,800	0.050	2	1001
3,600	5,000	5,700	6,100	0.073	2	0001
6,300	8,700	9,800	10,500	0.136	4	1110
8,700	12,100	13,600	14,600	0.168	4	0110
13,600	18,900	21,300	22,800	0.253	4	1010
16,400	22,800	25,700	27,400	0.293	8	0010
21,600	30,000	33,800	36,100	0.367	10*	0010
24,200	33,600	37,800	40,400	0.440	12	0010
30,800	42,800	48,200	51,400	0.500	15	1100
44,000	61,100	68,800	73,400	0.706	15	0100
60,600	84,100	94,700	101,000	0.981	15	1000
81,400	113,100	127,300	135,800	1.302	15	0000

RL14 Red LEDBullet 3 Deg (Red or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
1,200	1,600	1,800	2,000	0.050	2	1001
1,900	2,700	3,000	3,300	0.073	2	0001
4,500	6,200	7,000	7,500	0.136	4	1110
5,800	8,100	9,100	9,800	0.168	4	0110
8,900	12,400	13,900	14,900	0.253	4	1010
12,600	17,400	19,600	21,000	0.293	8	0010
14,400	19,900	22,500	24,000	0.367	10*	0010
18,600	25,800	29,000	31,000	0.440	12	0010
19,900	27,600	31,100	33,200	0.500	15	1100
28,300	39,300	44,200	47,200	0.706	15	0100
38,500	53,400	60,200	64,200	0.981	15	1000
51,600	71,600	80,600	86,000	1.302	15	0000

Effective Luminous Intensities – in Candelas

RL14 Red LEDBullet 8 Deg (Red or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
600	900	1,000	1,100	0.050	2	1001
1,000	1,400	1,600	1,800	0.073	2	0001
2,300	3,200	3,600	3,900	0.136	4	1110
3,000	4,100	4,600	5,000	0.168	4	0110
4,600	6,400	7,300	7,800	0.253	4	1010
6,600	9,200	10,400	11,100	0.293	8	0010
7,500	10,400	11,800	12,600	0.367	10*	0010
9,800	13,600	15,300	16,400	0.440	12	0010
10,600	14,700	16,600	17,700	0.500	15	1100
15,000	20,900	23,500	25,100	0.706	15	0100
20,500	28,400	32,000	34,200	0.981	15	1000
27,300	37,900	42,700	45,600	1.302	15	0000

RL14 Red LEDBullet 11 Deg (Red or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
500	700	800	900	0.050	2	1001
900	1,200	1,400	1,500	0.073	2	0001
1,900	2,700	3,000	3,300	0.136	4	1110
2,500	3,500	4,000	4,300	0.168	4	0110
3,900	5,400	6,100	6,600	0.253	4	1010
5,500	7,700	8,700	9,300	0.293	8	0010
6,300	8,700	9,800	10,500	0.367	10*	0010
8,200	11,400	12,900	13,800	0.440	12	0010
9,000	12,500	14,100	15,100	0.500	15	1100
12,600	17,500	19,700	21,100	0.706	15	0100
17,400	24,200	27,200	29,100	0.981	15	1000
23,100	32,000	36,100	38,500	1.302	15	0000

Effective Luminous Intensities – in Candelas

RL14 Red LEDBullet 20 Deg (Red or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
300	400	400	500	0.050	2	1001
400	600	700	800	0.073	2	0001
1,000	1,400	1,600	1,800	0.136	4	1110
1,300	1,900	2,100	2,300	0.168	4	0110
2,100	2,900	3,200	3,500	0.253	4	1010
3,100	4,300	4,800	5,200	0.293	8	0010
3,400	4,800	5,400	5,800	0.367	10*	0010
4,600	6,400	7,200	7,700	0.440	12	0010
5,200	7,300	8,200	8,800	0.500	15	1100
7,300	10,200	11,500	12,300	0.706	15	0100
9,900	13,700	15,400	16,500	0.981	15	1000
13,000	18,000	20,300	21,700	1.302	15	0000

RL14 Red LEDBullet 28 Deg (Red or Clear) Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
200	300	300	400	0.050	2	1001
400	500	600	700	0.073	2	0001
800	1,100	1,300	1,400	0.136	4	1110
1,000	1,400	1,600	1,800	0.168	4	0110
1,600	2,200	2,500	2,700	0.253	4	1010
2,400	3,400	3,800	4,100	0.293	8	0010
2,700	3,700	4,200	4,500	0.367	10*	0010
3,600	5,000	5,700	6,100	0.440	12	0010
4,200	5,900	6,600	7,100	0.500	15	1100
5,800	8,000	9,000	9,700	0.706	15	0100
7,800	10,900	12,200	13,100	0.981	15	1000
10,400	14,400	16,300	17,400	1.302	15	0000

Effective Luminous Intensities – in Candelas

RL14 Green LEDBullet 0 Deg Green Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
1,800	2,400	2,800	3,000	0.077	2	1001
2,400	3,400	3,800	4,100	0.098	2	0001
5,500	7,700	8,700	9,300	0.183	2	1110
7,100	9,900	11,100	11,900	0.230	2	0110
11,000	15,300	17,200	18,400	0.323	4	1010
19,100	26,500	29,500	31,900	0.548	4	0010
34,200	47,400	53,400	57,000	0.627	8	1100
27,200	37,800	42,500	45,400	0.744	10*	1100
38,800	53,900	60,700	64,800	1.029	10*	0100
59,400	82,400	92,800	99,000	1.128	12	1000
52,600	73,100	82,300	87,800	1.403	15	1000
71,200	98,800	111,300	118,700	1.862	15	0000

RL14 Green LEDBullet 3 Deg Green Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
1,500	2,100	2,400	2,600	0.077	2	1001
2,200	3,000	3,400	3,700	0.098	2	0001
4,900	6,900	7,700	8,300	0.183	2	1110
6,300	8,800	9,900	10,600	0.230	2	0110
10,100	14,000	15,800	16,900	0.323	4	1010
17,700	24,500	27,600	29,500	0.548	4	0010
18,000	24,900	28,100	30,000	0.627	8	1100
24,600	34,100	38,400	41,000	0.744	10*	1100
35,200	48,800	55,000	58,700	1.029	10*	0100
34,500	47,900	54,000	57,600	1.128	12	1000
47,700	66,200	74,500	79,500	1.403	15	1000
63,300	87,900	99,000	105,600	1.862	15	0000

Effective Luminous Intensities – in Candelas

RL14 Green LEDBullet 8 Deg Green Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
700	900	1,100	1,200	0.077	2	1001
1,000	1,400	1,500	1,700	0.098	2	0001
2,300	3,200	3,600	3,900	0.183	2	1110
3,000	4,100	4,600	5,000	0.230	2	0110
4,600	6,400	7,200	7,700	0.323	4	1010
8,000	11,100	12,500	13,400	0.548	4	0010
8,400	11,600	13,100	14,000	0.627	8	1100
11,600	16,100	18,100	19,400	0.744	10*	1100
16,600	23,100	26,000	27,800	1.029	10*	0100
16,200	22,400	25,300	27,000	1.128	12	1000
23,200	32,300	36,300	38,800	1.403	15	1000
31,200	43,300	48,700	52,000	1.862	15	0000

RL14 Green LEDBullet 11 Deg Green Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
600	800	900	1,000	0.077	2	1001
800	1,100	1,300	1,400	0.098	2	0001
1,900	2,600	3,000	3,200	0.183	2	1110
2,400	3,400	3,800	4,100	0.230	2	0110
3,900	5,400	6,100	6,600	0.323	4	1010
6,900	9,600	10,800	11,600	0.548	4	0010
7,200	9,900	11,200	12,000	0.627	8	1100
10,000	13,900	15,600	16,700	0.744	10*	1100
14,200	19,800	22,300	23,800	1.029	10*	0100
13,800	19,100	21,500	23,000	1.128	12	1000
19,900	27,700	31,200	33,300	1.403	15	1000
26,900	37,400	42,100	44,900	1.862	15	0000

Effective Luminous Intensities – in Candelas

RL14 Green LEDBullet 20 Deg Green Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
300	400	400	500	0.077	2	1001
400	500	600	700	0.098	2	0001
1,000	1,400	1,500	1,700	0.183	2	1110
1,300	1,800	2,000	2,200	0.230	2	0110
2,100	2,900	3,300	3,600	0.323	4	1010
3,700	5,200	5,900	6,300	0.548	4	0010
3,900	5,400	6,000	6,500	0.627	8	1100
5,500	7,600	8,600	9,200	0.744	10*	1100
7,900	10,900	12,300	13,200	1.029	10*	0100
7,500	10,400	11,700	12,500	1.128	12	1000
10,900	15,100	17,000	18,200	1.403	15	1000
14,700	20,400	22,900	24,500	1.862	15	0000

RL14 Green LEDBullet 28 Deg Green Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
200	300	300	400	0.077	2	1001
300	400	400	500	0.098	2	0001
700	900	1,100	1,200	0.183	2	1110
900	1,300	1,500	1,600	0.230	2	0110
1,500	2,100	2,400	2,600	0.323	4	1010
2,700	3,700	4,200	4,500	0.548	4	0010
2,800	3,900	4,400	4,700	0.627	8	1100
3,900	5,400	6,100	6,600	0.744	10*	1100
5,500	7,700	8,700	9,300	1.029	10*	0100
5,400	7,400	8,400	9,000	1.128	12	1000
8,200	11,400	12,800	13,700	1.403	15	1000
10,900	15,100	17,000	18,200	1.862	15	0000

Effective Luminous Intensities – in Candelas

RL14 Green LEDBullet 0 Deg Clear Glass

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
3,000	4,100	4,600	5,000	0.077	2	1001
4,200	5,800	6,500	7,000	0.098	2	0001
9,500	13,200	14,900	15,900	0.183	2	1110
12,200	16,900	19,100	20,400	0.230	2	0110
18,900	26,200	29,500	31,500	0.323	4	1010
32,800	45,600	51,400	54,800	0.548	4	0010
34,200	47,400	53,400	57,000	0.627	8	1100
46,800	64,900	73,100	78,000	0.744	10*	1100
66,700	82,400	104,300	111,200	1.029	10*	0100
59,400	101,400	92,800	99,000	1.128	12	1000
91,000	126,300	142,200	151,700	1.403	15	1000
122,600	170,200	191,700	204,400	1.862	15	0000

RL14 Green LEDBullet 3 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
2,400	3,300	3,700	4,000	0.077	2	1001
3,400	4,700	5,300	5,700	0.098	2	0001
7,700	10,700	12,100	12,900	0.183	2	1110
9,900	13,800	15,500	16,600	0.230	2	0110
15,700	21,800	24,500	26,200	0.323	4	1010
27,300	37,900	42,700	45,600	0.548	4	0010
28,200	39,100	44,000	47,000	0.627	8	1100
39,000	54,100	60,900	65,000	0.744	10*	1100
55,600	77,200	86,900	92,700	1.029	10*	0100
53,800	74,800	84,200	89,800	1.128	12	1000
74,100	102,800	115,800	123,500	1.403	15	1000
99,900	138,700	156,200	166,600	1.862	15	0000

Effective Luminous Intensities – in Candelas

RL14 Green LEDBullet 8 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
1,300	1,800	2,000	2,200	0.077	2	1001
1,800	2,500	2,900	3,100	0.098	2	0001
4,200	5,900	6,600	7,100	0.183	2	1110
5,500	7,600	8,600	9,200	0.230	2	0110
8,700	12,000	13,600	14,500	0.323	4	1010
15,100	20,900	23,600	25,200	0.548	4	0010
15,800	21,900	24,700	26,400	0.627	8	1100
21,500	29,900	33,600	35,900	0.744	10*	1100
34,500	47,800	53,900	57,500	1.029	10*	0100
30,300	42,000	47,300	50,500	1.128	12	1000
42,100	58,400	65,800	70,200	1.403	15	1000
56,800	78,800	88,800	94,700	1.862	15	0000

RL14 Green LEDBullet 11 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
900	1,200	1,400	1,500	0.077	2	1001
1,200	1,700	1,900	2,100	0.098	2	0001
2,800	3,900	4,500	4,800	0.183	2	1110
3,700	5,200	5,900	6,300	0.230	2	0110
6,400	8,900	10,000	10,700	0.323	4	1010
10,000	13,900	15,700	16,800	0.548	4	0010
11,200	15,500	17,500	18,700	0.627	8	1100
15,900	22,000	24,800	26,500	0.744	10*	1100
22,500	31,300	35,200	37,600	1.029	10*	0100
21,400	29,800	33,500	35,800	1.128	12	1000
31,300	43,400	48,900	52,200	1.403	15	1000
42,100	58,400	65,800	70,200	1.862	15	0000

Effective Luminous Intensities – in Candelas

RL14 Green LEDBullet 20 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
500	700	800	900	0.077	2	1001
700	900	1,100	1,200	0.098	2	0001
1,600	2,300	2,600	2,800	0.183	2	1110
2,100	2,900	3,300	3,600	0.230	2	0110
3,600	4,900	5,600	6,000	0.323	4	1010
6,200	8,600	9,700	10,400	0.548	4	0010
6,400	8,900	10,100	10,800	0.627	8	1100
9,400	13,000	14,700	15,700	0.744	10*	1100
13,300	18,400	20,800	22,200	1.029	10*	0100
9,400	13,000	14,700	15,700	1.128	12	1000
17,900	24,900	28,000	29,900	1.403	15	1000
24,100	33,400	37,700	40,200	1.862	15	0000

RL14 Green LEDBullet 28 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
400	500	600	700	0.077	2	1001
500	700	800	900	0.098	2	0001
1,200	1,700	1,900	2,100	0.183	2	1110
1,600	2,200	2,500	2,700	0.230	2	0110
2,700	3,700	4,200	4,500	0.323	4	1010
4,600	6,400	7,300	7,800	0.548	4	0010
4,800	6,700	7,500	8,100	0.627	8	1100
7,200	9,900	11,200	12,000	0.744	10*	1100
9,700	13,500	15,200	16,300	1.029	10*	0100
9,300	12,900	14,500	15,500	1.128	12	1000
13,800	19,200	21,600	23,100	1.403	15	1000
18,600	25,900	29,100	31,100	1.862	15	0000

*Note – Purchase a 12 head LEDBullet for 10 LED installations or use existing 15-head units with 5 LEDs turned off..

Effective Luminous Intensities – in Candelas

FA-240 White LEDBullet 3.5 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
2,100	2,900	3,200	3,500	0.050	2	1110
6,000	8,300	9,300	10,000	0.135	2	1001
11,400	15,800	17,800	19,000	0.250	2	0110
24,000	33,300	37,500	40,000	0.505	2	0010
28,500	39,500	44,500	47,500	0.605	2	0000

FA-240 White LEDBullet 8 Deg Clear Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
1,200	1,600	1,800	2,000	0.050	2	1110
3,600	4,900	5,600	6,000	0.135	2	1001
6,600	9,100	10,300	11,000	0.250	2	0110
14,100	19,500	22,000	23,500	0.505	2	0010
17,100	23,700	26,700	28,500	0.605	2	0000

FA-240 Red LEDBullet 3.5 Deg Red Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
400	600	700	800	0.024	2	1110
1,500	2,000	2,300	2,500	0.061	2	1001
2,700	3,700	4,200	4,500	0.110	2	0110
5,700	7,900	8,900	9,500	0.225	2	0010
6,600	9,100	10,300	11,000	0.270	2	0000

FA-240 Red LEDBullet 8 Deg Red Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
300	400	400	500	0.024	2	1110
900	1,200	1,400	1,500	0.061	2	1001
1,500	2,000	2,300	2,500	0.110	2	0110
3,000	4,100	4,600	5,000	0.225	2	0010
3,600	4,900	5,600	6,000	0.270	2	0000

Effective Luminous Intensities – in Candelas

FA-240 Green LEDBullet 3.5 Deg Green Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
500	700	800	900	0.033	2	1110
1,600	2,300	2,600	2,800	0.085	2	1001
3,300	4,500	5,100	5,500	0.165	2	0110
6,900	9,500	10,700	11,500	0.325	2	0010
8,400	11,600	13,100	14,000	0.395	2	0000

FA-240 Green LEDBullet 8 Deg Green Spread Lens

Q	Iso2/FL2.5(1)	Iso6/Oc4	Fixed	Amps	# of LEDs	Power Setting
300	400	400	500	0.033	2	1110
900	1,300	1,500	1,600	0.085	2	1001
1,900	2,700	3,000	3,300	0.165	2	0110
4,000	5,500	6,200	6,700	0.325	2	0010
4,800	6,600	7,500	8,000	0.395	2	0000

Higher intensities using the 4-head LEDBullet in the FA-240 are possible. Contact the SILC ATON/MER Product Line for details.

250mm lantern with Condensing Panels (w/CP)

The 250mm w/cp provides an all-around light with an intense beam down the rangeline. A direct replacement will be available in late 2103, however a RL14 (or FA-240) with either a 0 or 3.5 degree spread lens equipped with a LEDBullet synced to an additional light (a Tideland MLED-120, Vega VLB-67-SA or 155mm lantern using incandescent lamps) will provide an equivalent signal. In most cases a single tier MLED-120 or VLB-67-SA will provide an adequate additional light. The omni-directional intensity of the 250mm is about 1/12 the below values (see CIM M16510.2A):

Effective Luminous Intensities – in Candelas

250mm w/cp White

Lamp	Q	Iso2/FL2.5(1)	Oc4/Iso 6	Fixed
0.25a	460	700	790	14,000
0.55a	900	1,500	1,700	36,000
0.77a	2,000	3,200	3,700	850
1.15a	2,500	4,400	5,100	1,800
2.03a	3,500	7,000	8,400	9,000
3.05a	-	8,500	10,000	11,000
250w	20,000	39,000	47,000	50,000

250mm w/cp Yellow

Lamp	Q	Iso2/FL2.5(1)	Oc4/Iso 6	Fixed
0.25a	330	490	560	600
0.55a	630	1,000	1,200	1,300
0.77a	1,400	2,300	2,600	2,800
1.15a	1,800	3,100	3,600	3,900
2.03a	2,500	5,000	5,900	6,400
3.05a	-	6,000	7,200	7,800
250w	14,000	28,000	33,000	36,000

250mm w/cp Red & Green

Lamp	Q	Iso2/FL2.5(1)	Oc4/Iso 6	Fixed
0.25a	140	220	250	600
0.55a	280	450	520	1,300
0.77a	620	1,000	1,100	2,800
1.15a	770	1,400	1,600	3,900
2.03a	1,100	2,200	2,600	6,400
3.05a	-	2,600	3,100	7,800
250w	6,000	12,000	14,000	36,000

Tideland MLED-120 1-Tier

Color	Q	Iso2/FL2.5(1)	Oc4/Iso 6	Fixed
White	21	29	33	35
Yellow	22	27	25	22
Red	22	29	31	33
Green	37	50	56	60

VLB-67-SA LED lanterns have the following effective intensity selections in candelas (all colors and rhythms, except the maximum effective intensity for yellow is 29 candelas (cd)):

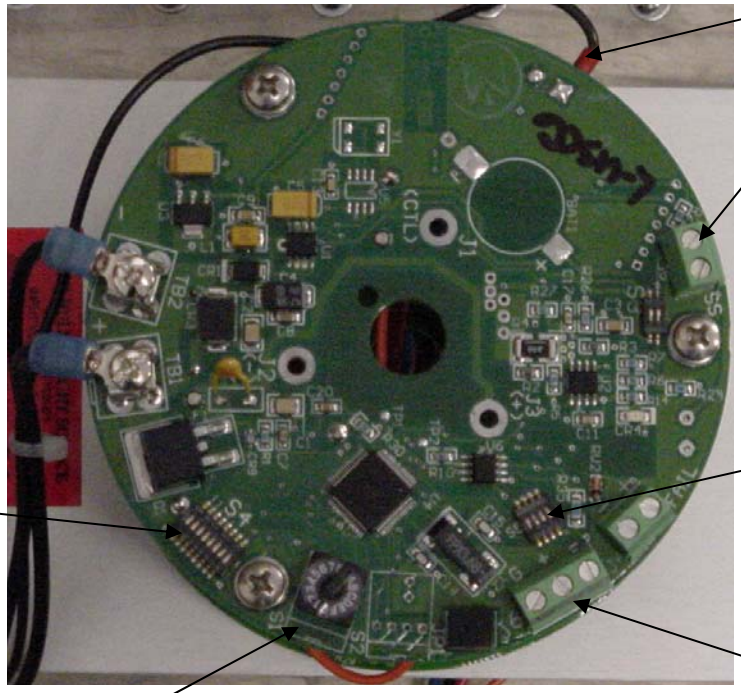
5	24	37
10	25	54
15	29	77

Solar Sizing

The Ranges Solar Sizing Program can be used to size the new power system for the aid http://www.uscg.mil/hq/cg4/cg432/publications.asp. The printout provides the number of LEDs used and the intensity power level to assist with programming the LEDBullet. Program operation assistance is available from the SILC ATON/MER Product Line.

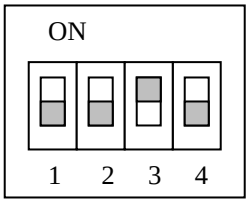
Configure the LEDBullet

Review the district work order and determine the required flash rhythm, color, intensity and spread lens. Using the tables on the previous pages, determine the number of LEDs required and the power setting for the LEDBullet. For the following example, the LEDBullet will use 4 LEDs with a power setting of 0010.



Pulse Sync Lead for CG-504 Flasher & VLB-67-SA Lantern

Daylight Control Terminals, Block J5



ASCII synchronization and dimming switch S4

Intensity Micro Switch S5; ON is "1", Off is "0" Above example is **0010**

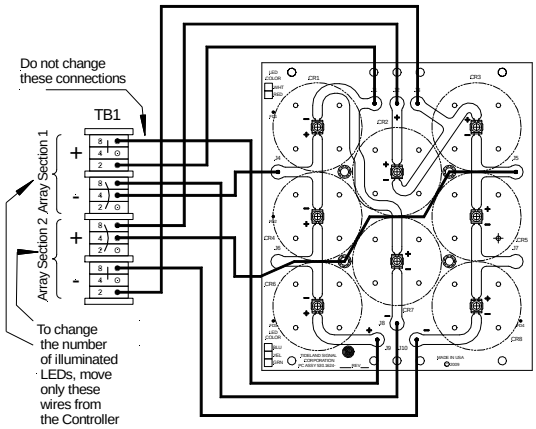
ASCII Sync Output. Center Terminal of Block J6 for another LEDBullet or MLED-120 lantern

Flash Rhythm Selector S1

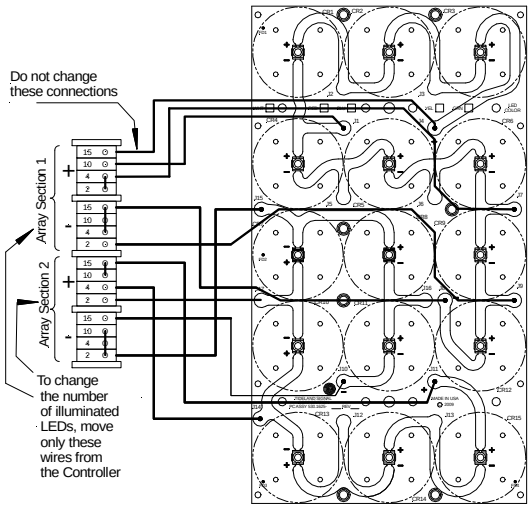
On the LEDBullet flasher/driver, the switch S1 pictured above is used to set the flash rhythm. Determine the proper rhythm for the aid and select the switch setting according to the table shown on the next page. Lay the LEDBullet assembly on a soft cloth and rotate switch S1 so the "window" exposes the correct setting.

S1 Setting	Flash Rhythm	Timing On/Off Sec	Duty Cycle [%]
0	Fixed		100
1	Fl2.5	1.0/1.5	40
2	Q	0.3/0.7	30
3	Iso2	1.0/1.0	50
4	Iso6	3.0/3.0	50
5	Oc4	3.0/1.0	75

Intensity selection is accomplished by moving jumpers on the outside of the terminal board corresponding to the number of LEDs used AND the selection of dip switches (S5) located on the LED Flasher/Driver for the power setting. This is for the RL14 version only. The 2-head LEDBullet is the only version used in the FA-240 and does not use jumpers.



8-Head LEDBullet



15-Head LEDBullet

Numbers on the *outside* of the terminal board correspond to the number of LEDs lit. Move **all** jumpers on the outside terminals to properly configure the number of LEDs for the required intensity setting. WARNING: Never move jumper wires while LEDFlasher is powered. Intensities requiring two LEDs will have the four wires inserted into the respective terminals labeled “2”, etc.

Next, select the power setting. Microswitch S5 shown on page 14 is used to set the power level. In the 4 digit power level, “0” refers to OFF and “1” refers to ON. Reading from left to right, use your small flat blade screwdriver to set the microswitch to the proper power setting.

Synchronization

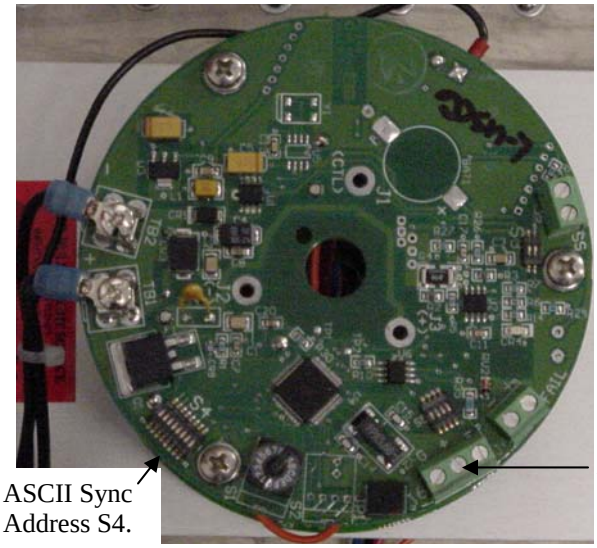
The LEDBullet in a RL14 or FA-240 can be synchronized to another LEDBullet in multi-lantern installations and to an additional/passing light typically located above the range lantern when an all-around signal is desired. This configuration can be used to replace a 250mm with a condensing panel. The LEDBullet, when operated as a master unit will sync with a CG-504 flasher (or an existing "slave" flasher) set to the "sync" setting on the programmable control and the Vega VLB-67-SA (standalone lantern) equipped with a sync converter module. Additionally, the LEDBullet will sync with Tideland Signal Corporation's MLED-120 omnidirectional LED lantern (specify "sync" option when ordering lantern).

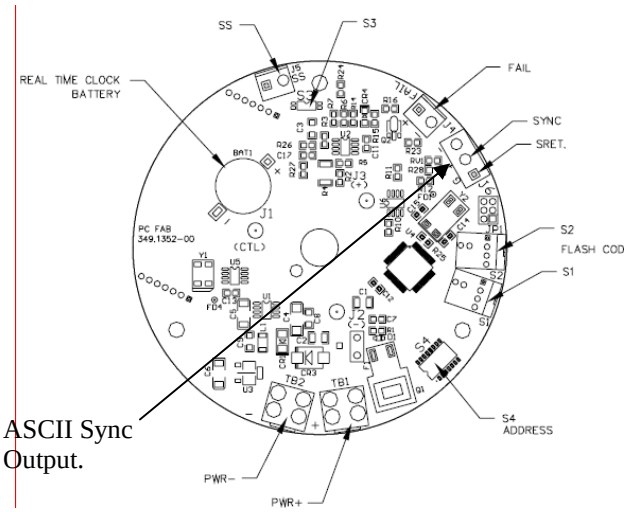
155mm Lantern Synchronization

To sync the LEDBullet to a legacy 155mm lantern using a CG6P lampchanger and CG-504 flasher, connect the "sync" wire from the LEDBullet to the "S/Sy" terminal of the CG-504 flasher (no daylight control installed on the CG-504). Turn the program dial on the CG-504 to the "Sync" setting and the 155mm will only turn on and flash in unison when the LEDBullet operates. If separate power systems are used, the negative leads from both battery banks must be tied together to provide a common ground reference for both lanterns.

LEDBullet or MLED-120 Lantern Synchronization

To sync the LEDBullet to another LEDBullet (for multiple lanterns used in the daytime) or to a Tideland MLED-120 omnidirectional LED lantern (used as a passing light at night), use the ACSI output from the LEDBullet flasher. Do not use the sync wire already wired to the LEDFlasher. Attach a wire to the center terminal of block J6, as shown below to the center "Sync" terminal of the MLED-120 (also shown below).

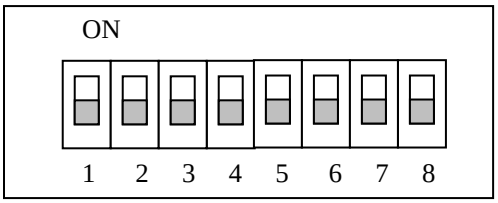




LEDBullet Flasher

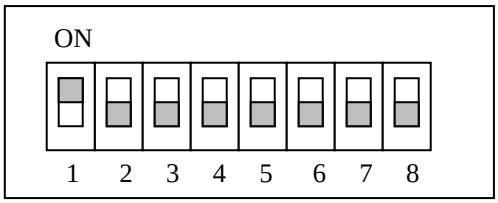
MLED-120 Lantern

The sync address of the LEDBullet(s) and MLED-120 must be set (microswitch S4). The Master LEDBullet on the left is set to address 0 (all switches OFF or down). The address for the Slave unit (other RLEDBullet or MLED-120) is set to 1 (left switch in the ON position; all other switches OFF).



S4

Master LEDBullet



S4

Slave LEDBullet or MLED-120

If separate power systems are used, the negative leads from both battery banks must be tied together to provide a common ground reference for both lanterns.

VLB-67-SA Synchronization

To sync the LEDBullet to a Vega VLB-67-SA (stand-alone) lantern, the sync pulse must be inverted by a sync convertor mounted in the base of the lantern (available from the SILC ATON/MER Product Line). To install the convertor, open the lantern by removing the four fasteners using an 8mm or 5/16” nut driver and #3 square drive screwdriver. Note there are washers under the screws in the top of the lantern (don’t lose them).

VLB-67-SA Opened

Sync Convertor Installed

Mount the sync convertor in the base using the two supplied screws with the components on the circuit card facing up. Write with a Sharpie the word “Sync” on the base.

Disconnect the power lead connector (follow the leads from the cable gland to the connector). Connect the sync convertor to the input power lead connector and the other connector to the leads from the lantern. Plugs are polarized so they only fit one way. There are unused connectors in the lantern. This is normal.

Carefully tuck the wires back into the base of the lantern. Be sure the O-rings are seated properly on both sides of the square frame and carefully close the lantern being sure that wires are not pinched. Reinstall the fasteners and tighten (do not over tighten them).

Sync Convertor Connected

Green/Yellow Sync Lead

The VLB-67-SA must be programmed to the same rhythm as the LEDBullet. In addition, you must program the VLB-67-SA to the desired intensity. See the VLB-67 manual on our website (http://www.uscg.mil/hq/cg4/cg432/2a_ledinstructions.asp) for programming instructions. The VLB-67-SA must be programmed as a Sync Master using the following sequence (this is a failsafe mode such that the VLB-67-SA will continue flashing the programmed rhythm if the sync pulse from the LEDBullet is lost). This sequence can be programmed at the same time the flash rhythm and intensity are programmed (just enter this sequence after the intensity or rhythm is programmed):

1 3 0 0 0 **(1 3 9 9 9 to disable synchronization)**

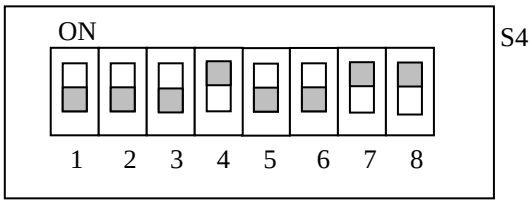
The VLB-67-SA will flash the programmed rhythm when powered, and will sync to the LEDBullet when the green/yellow sync lead from the VLB-67-SA is connected to the Sync Pulse lead from the LEDBullet when both are powered using the same power system.

Day/Night Dimming

The LEDBullet can be configured to change intensity based on input from the daylight control. One LEDBullet (in one lantern) can satisfy both daytime and nighttime lighting requirements if the range of intensities falls within the limitations of the device. The limitation, at this time, is that the number of LEDs lit cannot be reconfigured to change the intensity, only the power level can be changed. That is, a 15-head LEDBullet cannot reduce its intensity to that of a 2-head LEDBullet; it must stay within the range of the 12-head intensities. Control of the number of LEDs lit and the programmed intensities are planned for future releases of the LEDBullet. Note: you must specify the day/night dimming option when ordering the LEDBullet otherwise this feature is not accessible on standard LEDBullets.

The power level is based on the maximum intensity for the number of LEDs energized in the LEDBullet. For example, if you have a 15-head LEDBullet, Fixed White, all LEDs energized, set to 540,000 candelas (power setting 1000) and you need 65,000 candelas for the nighttime intensity, the power level will be 10% (650,000 candelas; max intensity for a 15-head White LED, x 0.10 (10%) = 65,000 cd). The power consumption at night will be 10% of the current based on the 650,000 intensity value (3.482 amps x 0.10 = 0.3482 amps). If the minimum power level produces an intensity that is too high for the nighttime signal, a second

lantern must be installed to satisfy the nighttime intensity requirements. Note: the calculated intensities for the lower power levels may be conservative. As current is reduced, the LEDs become more efficient (less heat) and may produce intensities higher than calculated. You may have to reduce the intensities further (if not at the 6% setting already) to satisfy users.



Example: 35% Power Level

Power Level	S4 Switch Settings			
	#4	#5	#6	#7
100%	OFF	OFF	OFF	OFF
90%	ON	OFF	OFF	OFF
80%	OFF	ON	OFF	OFF
70%	ON	ON	OFF	OFF
60%	OFF	OFF	ON	OFF
55%	ON	OFF	ON	OFF
50%	OFF	ON	ON	OFF
45%	ON	ON	ON	OFF
40%	OFF	OFF	OFF	ON
35%	ON	OFF	OFF	ON
30%	OFF	ON	OFF	ON
25%	ON	ON	OFF	ON
20%	OFF	OFF	ON	ON
15%	ON	OFF	ON	ON
10%	OFF	ON	ON	ON
6%	ON	ON	ON	ON

Microswitch S4, switch 8 must be ON to activate the dimming feature. The above table details the power/intensity level for the dimming feature. Switches 4 through 7 must be set to the position corresponding to the desired power level.

Due to the complexity of calculating the nighttime power consumption, the Range Solar Sizing Program cannot be used to determine the power system size. Data must be entered into the Old Solar Sizing program to evaluate ranges using this dimming feature. The SILC ATON/MER Product Line can assist in performing these solar sizings.

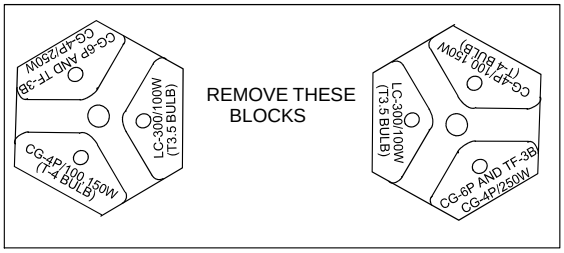
Bench Test

Flip the LEDBullet over so that it is resting on the circuit board on a soft cloth with the LEDs point straight up to the ceiling. Do not attach a daylight control to the LED flasher/driver at this time. Connect the power leads from the LEDBullet to a 12 VDC power source (power supply or ATON battery), check the number of LEDs lit and flash rhythm (**do not look directly into the LEDs as eye damage may result**). Allow the assembly to operate for 24 hours. Note that there is a sync lead that may not be used (do not allow it to contact the power source or terminals). Clip that lug and insulate with a wire nut or remove the wire from the terminal block if the sync option is not used.

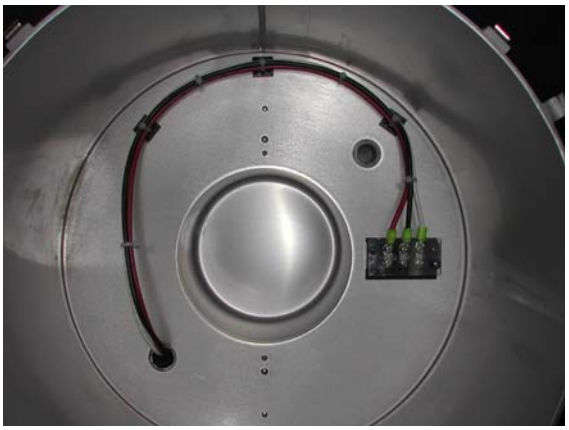
Installation – RL14

The LED assembly replaces the existing flasher, lampchanger, lamps and mirror in the RL14 range lantern. The existing color spread lens will remain in the lantern. Clear glass may be used for some applications, as directed in the district work order.

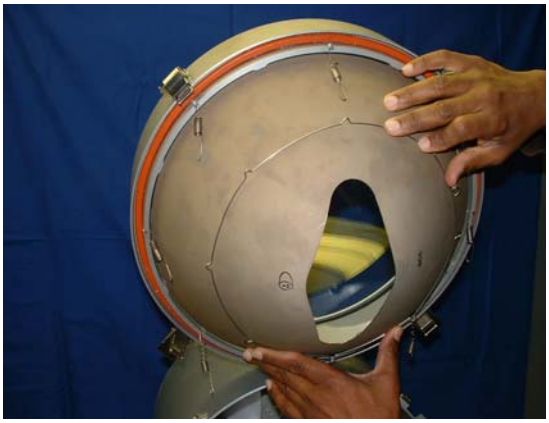
Remove the protective plate on the terminal strip and disconnect the power leads from the flasher at this terminal strip in the back of the lantern. Remove the leads from the daylight control at the “S S” terminals at the flasher (leave the daylight control (if installed) in the lantern). Remove the lampchanger and flasher assembly from the RL14. Remove the spacer blocks from the back of the lantern.



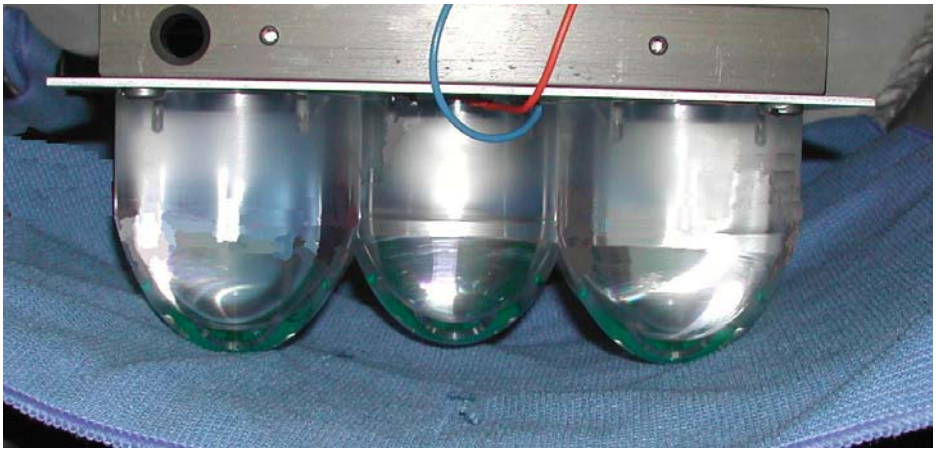
View inside the drum with terminal strip cover, lampchanger, flasher and spacer blocks removed. Use tape to orient the 12/2 SO power cable from the Battery/ATON Power Supply as shown (only two leads are used in a 12 VDC system without sync). It is important that the leads are routed this way to prevent them from getting pinched when the LEDBullet is installed.



Remove the mirror by releasing the springs securing it to the bezel. Hold the mirror while the springs are removed to prevent it from dropping and breaking (it is glass). Carefully pack it for return to the ANT. Clean the lens with a cloth and a non-abrasive cleaner (mild soap and water).



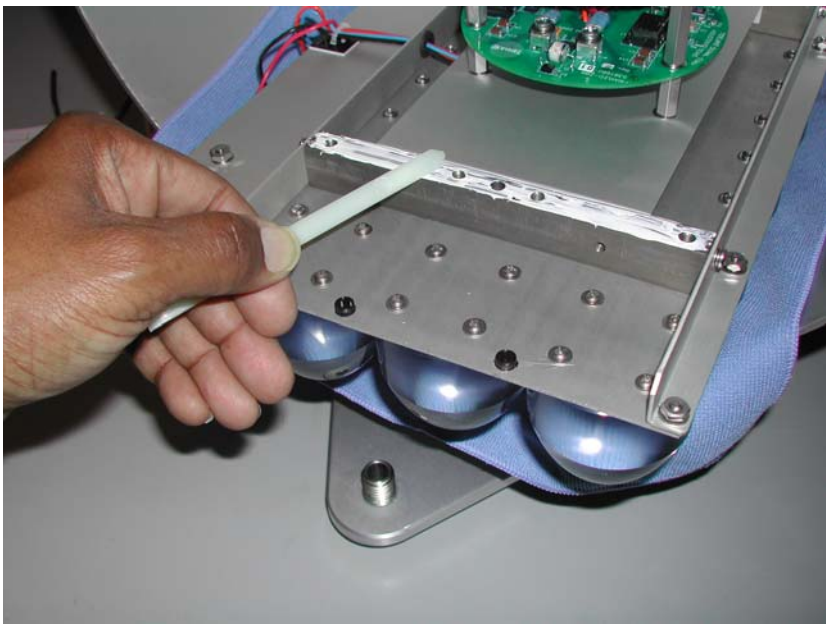
Place a soft cloth in the bottom of the drum and lay the LEDBullet face down inside the drum.



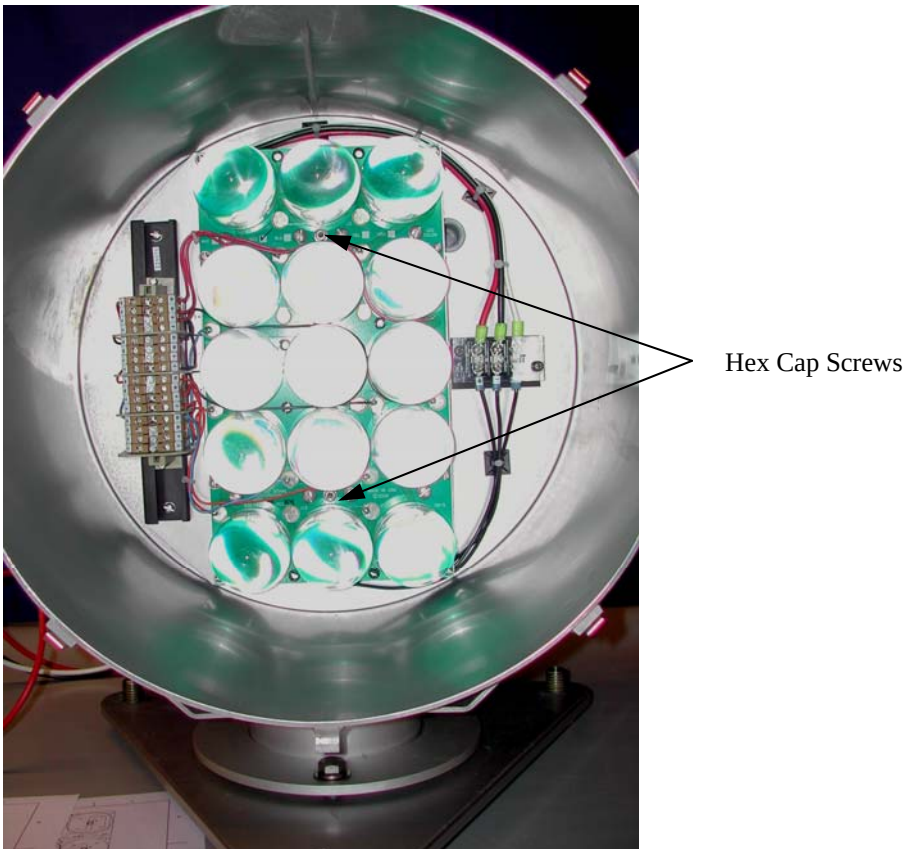
Wire the power leads from the LEDBullet to the terminal strip in the back of the drum. The leads are labeled “+”, “-“ and “sync”. The protective cover may be installed, if desired, but is not necessary for 12 VDC applications.

Clip the spade lugs from the daylight control, strip ¼” of insulation from both leads and connect the daylight control leads to terminal strip J5 on the LED flasher/driver. Be sure all wire strands go into the terminal block (to prevent shorting).

Place several drops of thermal paste on the rear of the <u>two</u> mounting brackets and spread evenly over the rear surface, as shown below.



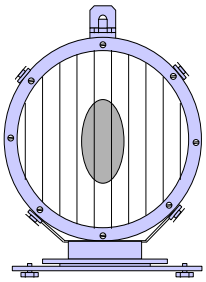
Locate the LED Conversion Kit on the back plane of the RL-14 Lantern, secure with the two Hex Cap Screws with Flat Washers in the holes at the back of the lantern (where the spacer blocks were), and tighten.

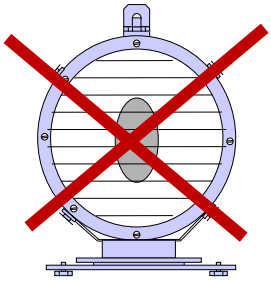


Cover the daylight control and ensure that the LEDs turn on (**Do not look into the LEDs**).

Close the cover and latch it into place. The LEDs should project small beams of light on the lens of the lantern. Check the two spirit levels on top of the beacon to ensure that the lantern is level. Adjust, if necessary, by loosening the mounting bolts and turning the threaded sleeves in the base, then retightening the mounting bolts.

Note the orientation of the spread lens. The “lines” in the lens should go up and down, as shown below:





Verify beam realignment with a boat crew observing the range at distance. Remove tape from daylight control prior to departure.

Installation – FA-240

The LED assembly replaces the existing flasher, lampchanger, lamps, spider bracket, standoffs and mirror in the FA-240. The existing color spread lens will remain in the lantern.

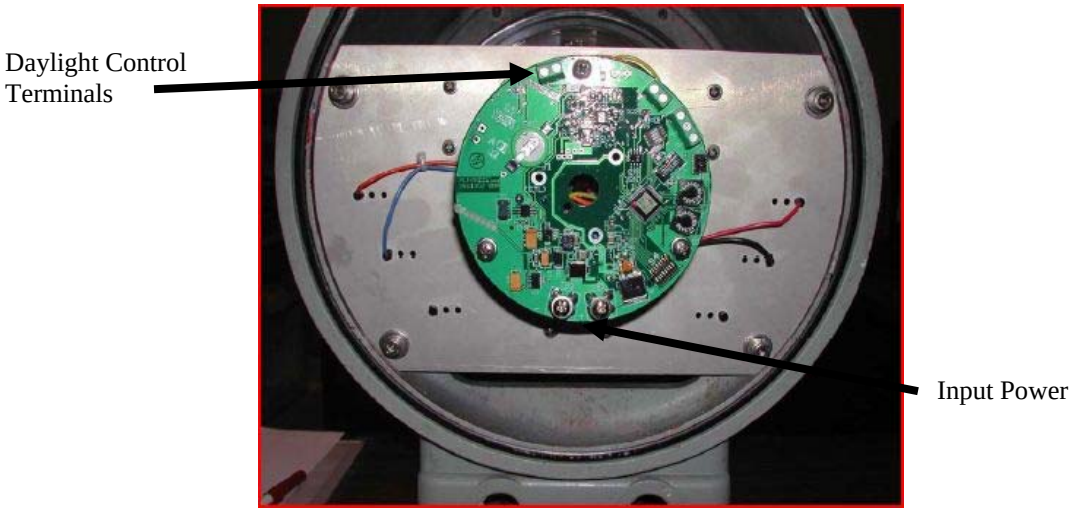
Secure power to the lantern and remove the V-band retaining the rear cover. Disconnect the power and daylight control leads from the flasher (if power is not secured ensure that the power leads do not short). Remove the 4 screws securing the flasher/lampchanger spider to the lantern. It can be removed as one assembly with the flasher and lampchanger attached. Retain the screws for installation of the LEDBullet. Using an adjustable wrench, remove all four standoffs that located the spider bracket.

Remove the 3 screws securing the mirror inside the lantern. Remove the mirror, but leave the mirror standoffs inside the lantern (they are not used).

Remove the lugs from the two daylight control leads and strip ¼" of the insulation off each wire.

Remove the lugs from the power leads and strip ¼" of the insulation off each wire. Route the power and daylight control leads out the back of the lantern so they can be connected to the LEDBullet flasher

Install the LEDBullet on the mounts in the drum using the 4 screws that secured the spider bracket, as shown below, with the power leads and daylight control wires through the bottom access.



Connect the power leads to the terminals located at the bottom of the circuit board and the daylight control terminals to the terminals at the top of the circuit board.

Cover the daylight control, apply power and note if the LEDs turn on. There will be small round projections on the spread lens when viewed from the front of the lantern.

Replace the rear cover and secure with the V-band.

Verify that the lantern is level. Adjust, if necessary, by loosening the mounting bolts and turning the threaded sleeves in the base, then retightening the mounting bolts.

Verify beam realignment with a boat crew observing the range at distance. Remove tape from daylight control prior to departure.

Service Life

The maximum service life is determined by the operational hours of the LEDs, the intensity setting and the ability to maintain the advertised intensity over that term, limited by the durability of the lens and lantern housing. Service life will be longer at less than the maximum intensity setting. Replace the LEDBullet when it can no longer provide an acceptable signal to the mariner.

Fixed/Oc4 **10** years (at maximum intensity)
FL/Q/Iso rhythms **20** years (at maximum intensity)

Servicing

- The lantern shall not be opened unnecessarily on-station as doing so introduces salt air inside it (visual inspection can be accomplished by looking through the spread lens to check for proper rhythm and that the required LEDs are lit).
- The service interval for these LED based aids is three years.
- The service life of the lantern depends on the operational duty cycle and durability of the lantern, discussed above. The LEDs will not burn out, but intensity degrades over time.
- Ensure that the lens is clean, not discolored or crazing. Wipe with a cloth dampened with mild soap and water, if necessary. Replace if not clear, otherwise cracks could compromise its strength or light transmission (note: only a small portion of the actual lens is used with the new LED system).
- Inspect the wiring and power system in accordance with the Short Range Aids to Navigation Servicing Guide. Load test the battery.
- Cover the daylight control to ensure that the lantern flashes on rhythm. Observe the LEDs through the lens. If one or more LEDs are out the LED assembly should be replaced at the earliest convenience after posting a local notice to mariners (Note: on some installations not all LEDs are lit)..
- If the lantern fails for any reason, replace it with another LED assembly or reinstall the mirror, a conventional programmable flasher, lampchanger, DLC and lamps. Do not mix and match parts if replacing the LED assembly. The flasher/LED driver is matched to each LED head assembly. Contact the SILC ATON/MER Product Line for hardware disposal/disposition.

Troubleshooting

No light.

-Check voltage at the battery terminals. Minimum voltage is 10-volts to operate (10.5 or less indicates a dead battery). No reduction in LED intensity will occur at this voltage. Replace battery, if necessary.
-Check voltage at LED flasher input terminals at the back of the lantern ("+" and "-"). If low voltage at the flasher but battery voltage is good, replace/meg power cable.
-Disconnect external daylight control. If light operates, replace the Type-L daylight.
-If light fails to operate with daylight control removed, replace the LED assembly.

Improper rhythm

-Check the position of the code selection switch.
-Disconnect one lead from the battery, wait 10 seconds, then reconnect. This reboots the processor.
-If the LED still has an improper rhythm, replace the LED assembly.

Various LEDs out (note: not all LEDs are lit in some applications)

- If one or more LEDs do not light (note aid file or FID to determine how many LEDs *should* be lit), replace the LED assembly. If a replacement is not immediately available, continue using the LED assembly until a replacement can be secured. If two or more LEDs fail, replace the assembly. Note: All LEDBullets are equipped with dual power supplies so failure of half of the programmed LEDs is possible. This is a failsafe condition to prevent total loss of light. The range will still be serviceable at this reduced intensity, but the LEDBullet should be replaced when feasible.

Light will not turn off

Be sure that the daylight control is connected to the **"SS"** terminals on the LED Flasher/Driver.
Apply a jumper between the "SS" terminals. If the light turns off, replace the daylight control.
If the light does not turn off with the jumper in place, replace the entire LEDBullet assembly.

Replacement

The LED flasher and LED head are matched sets. Do not mix and match components when troubleshooting. Replace the entire assembly.

Contact Tideland Signal for a Return Authorization (RA) number and ship failed LED assemblies the following address:

Tideland Signal Corporation
4310 Directors Row
Houston, TX 77092
713-681-6101
Attn: Jody Sturtz

Please report all problems to the SILC ATON/MER Product Line

Reporting Requirements

Units and Cutters shall enter the following information into IATONIS so that your district and CG Headquarters can monitor these lanterns. In the LAMP TYPE field select LED

For the LANTERN field enter the appropriate nomenclature, i.e., RL14. In the DEGREE field enter the spread lens, i.e., 3 Deg (note this field will be added to IATONIS this spring).

In the NOTES section, enter the intensity setting, number of LEDs and power setting. Future revisions of IATONIS will have fields added for these LEDBullets.

In addition, specific problems, concerns, observations and questions may be directed to anyone on the SILC ATON/MER Product Line staff via the website http://www.uscg.mil/hq/cg4/cg432/organization.asp.