



OWNER'S MANUAL
Model M708 Solar LED Marine Lantern



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1.0 Introduction

This manual will familiarize you with the features and operation standards of Carmanah's Model M708 lantern enabling you to achieve optimum performance wherever your M708 lantern is installed.

The Model M708 lantern is self-contained, making it ideal for use as an aid-to-navigation on buoys, at marinas, on rivers, harbors, aquaculture installations, and many other applications requiring a compact, yet powerful, lantern.

The optional Global Positioning Satellite (GPS) synchronization feature enables you to set up any number of M708 lanterns to flash in perfect unison.

Your M708 lantern was likely programmed with a flash pattern (the cyclical ON/OFF timing pattern of a lantern's flash) specific to your organization prior to shipping. If not, the default flash code for the M708 lantern is 064; see section 3.3.3 *Returning the M708 Lantern to Factory Default Settings*.

An optional infrared programmer for the M708 lantern is available from Carmanah or an authorized distributor. The infrared programmer enables you to perform the following functions:

- ◆ set the flash pattern
- ◆ automatically or manually decrease light intensity for installations with low levels of sunlight
- ◆ change to a range setting of LOW, MEDIUM or HIGH (corresponding approximately to 3, 4 and 5 NM ranges)
- ◆ turn the lantern on/off at various ambient light levels
- ◆ determine usable battery charge (in 10% increments)
- ◆ place the M708 in OFF mode
- ◆ place the M708 in SLEEP mode
- ◆ reset the factory defaults

NOTE

If the M708 lantern will not be immediately deployed, please refer to section 5.0 *Preparing the M708 Lantern for Storage* and review the storage instructions to ensure the M708 lantern is ready to use when installation is required.

2.0 Component Identification

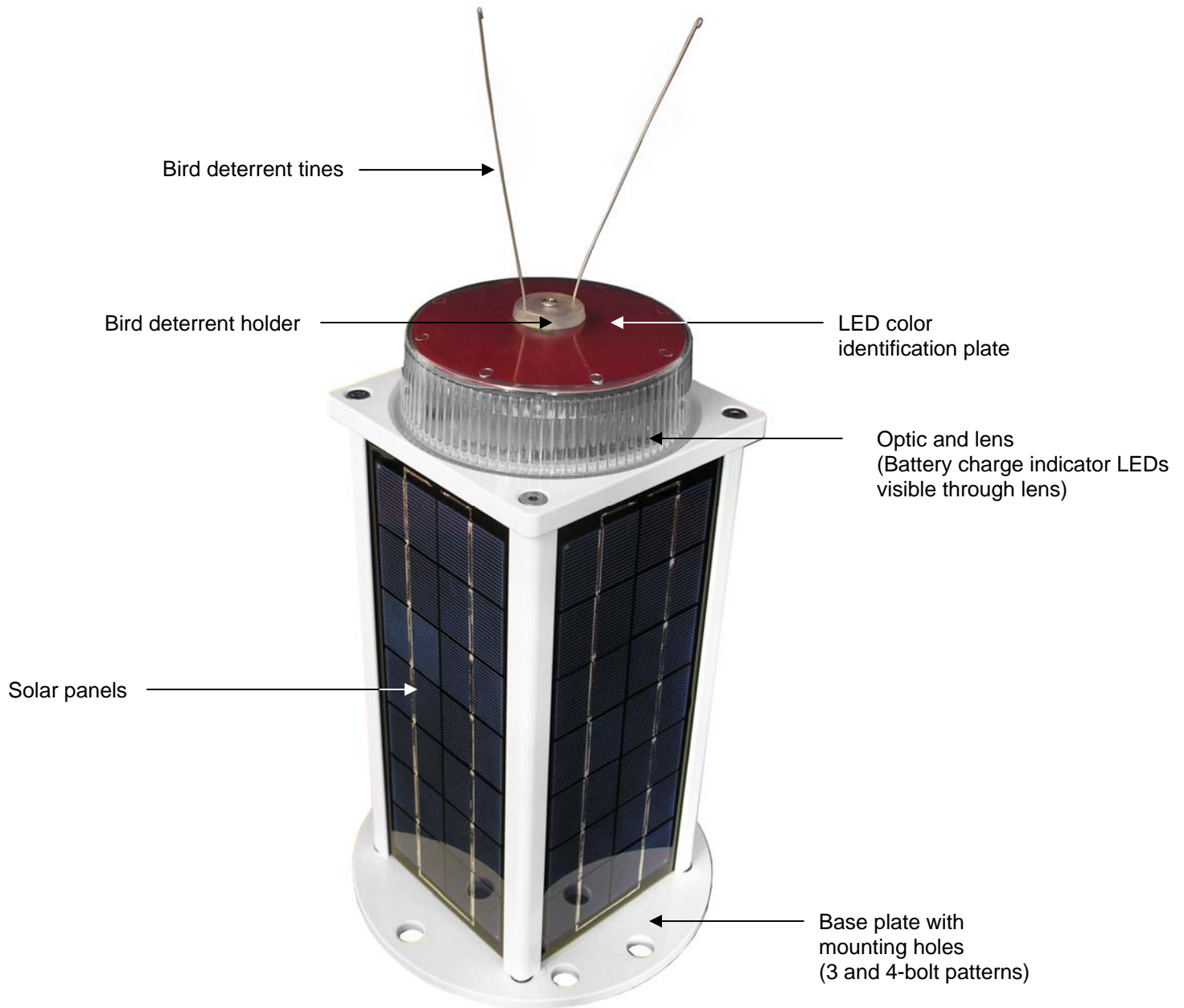


Figure 2-1: Components of the M708 lantern

3.0 Programming the M708 Lantern

NOTE

Please thoroughly read these instructions before proceeding with the installation.

3.1 Preparing the M708 Lantern for Programming

The M708 lantern has two modes for conserving power during times it is not in use; SLEEP mode and OFF mode.

If your M708 lantern was pre-programmed by either Carmanah or an authorized distributor before shipping to you, it will be in SLEEP mode. Otherwise, your M708 lantern will be shipped to you in OFF mode.

SLEEP Mode When the M708 lantern is exposed to 24 hours of darkness, it will enter SLEEP mode. While in SLEEP mode, it will draw very little power from the batteries. When the M708 lantern is removed from the box and exposed to light, it will come out of SLEEP mode and resume normal operation.

OFF Mode Infrared programmer code 0 0 0 puts the M708 lantern into OFF mode. In OFF mode, the M708 lantern uses the absolute minimum amount of power. OFF mode is typically used for storage; therefore, when the lantern is in OFF mode, exposing it to light will not return it to normal operation. The infrared programmer must be used to bring the M708 lantern out of OFF mode.

If Carmanah or one of its authorized distributors programmed the M708 lantern prior to you receiving it, it is ready to install. Otherwise, you will need the optional infrared programmer to set up the M708 lantern as outlined in this section. To obtain a Carmanah programmer, please contact Carmanah or an authorized distributor.

3.2 Infrared Programmer

All functions of the Model M708 lantern are controlled by an infrared programmer. The infrared sensor inside the lantern accepts the commands from the programmer, enabling you to customize the lantern's functions. You can set the flash pattern, adjust the intensity to suit the solar illumination, set the sensitivity level to suit the on/off requirements of a user, and test the lantern. Once the settings are programmed, the lantern can be placed in a box for storage or shipping. The lantern automatically enters sleep mode after 24 hours, and re-starts with all the previously programmed functions when taken out of the box and installed.

Table 3-1: Programmer Buttons describes the buttons on the programmer.

Table 3-1: Programmer Buttons







Button or Symbol	Description
	The START button must be pressed to initiate any programming sequence.
	The ENTER button is used to end the programming sequence.
	This symbol indicates that a number is pressed.

Table 3-2: Lantern Programming Symbols describes the symbols used in this manual to indicate the response from the M708 lantern during programming.

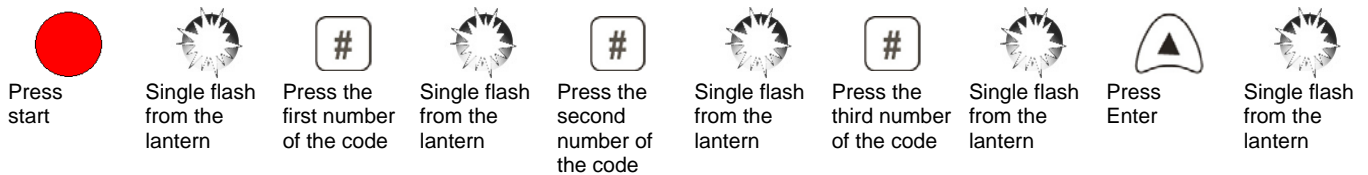
Table 3-2: Lantern Programming Symbols

Symbol	Description
	The single flash symbol represents the 80 millisecond flash from the lantern indicating an accepted button press.
	The double flash symbol represents two longer flashes from the lantern which indicates an incorrect entry. The code has not been accepted and you must restart the programming sequence.
	The triple flash symbol represents three quick flashes from the lantern indicating that the code has been accepted.

3.2.1 Programming Sequence

The programming sequence is the series of five button presses used to program a particular feature or setting into the M708 lantern. The programming sequence always follows the format shown in Figure 3-1: Programming Sequence.

Figure 3-1: Programming Sequence



NOTE Do not press the buttons on the programmer too fast and do not proceed to the next button press until you see a flash from the lantern.

One of the flash patterns described in Table 3-3: Programming Completion displays after the programming sequence is complete. The flash pattern indicates whether or not the programming was successful.

Table 3-3: Programming Completion



Programming Result	Flash Pattern	Description
Successful		Three quick consecutive flashes indicate that the code has been accepted. You will see this flash after every successful entry.
Unsuccessful		Two longer flashes indicate that the code has not been accepted. Restart the programming sequence.

Figure 3-2: Successful Programming Sequence



Figure 3-3: Unsuccessful Programming Sequence



An unsuccessful programming sequence for the M708 lantern occurs for one of the following reasons:

- ♦ the lantern does not recognize the sequence, or
- ♦ the lantern has not received the correct security code

If the programming sequence is unsuccessful, re-enter the key sequence for the required code. If the programming sequence is still unsuccessful, re-enter the security code.

NOTE

Upon successful acceptance of a programming sequence, the lantern will flash according to its new programming for one minute regardless of ambient light levels, allowing you to confirm that the M708 lantern is programmed correctly. During this time, the M708 lantern will accept programmer input, so a different flash code command sequence can be entered or other features of the M708 lantern can be programmed. After one minute, the lantern will resume normal operation.

3.3 Set up the Programmer

Install two new AAA batteries.

If the lantern does not respond to the programmer, after transitioning (see 3.3.1), remove and re-insert the batteries and repeat the programming instructions for the required function.

3.3.1 *Transitioning the M708 Lantern before Programming*

To program an M708 lantern, you must imitate either a day to night or a night to day transition or both in sequence depending on your ambient lighting conditions. Apply darkness or light for a period of about 30 seconds.

You must transition the lantern from night to day or vice versa before you can make any changes to the default or any other settings.

The M708 lantern has many built-in features for the purpose of conserving battery power. One such feature is the way the lantern accepts infrared programming; rather than constantly consuming battery power while waiting for a signal from the infrared programmer, the M708 lantern will wait for programming instructions for only one minute after a transition. After one minute from the time of transition or of the last command from the infrared programmer, the M708 lantern turns off its infrared sensor to conserve power until the next transition.

NOTE

When a lantern has transitioned and is within its one-minute window to accept infrared programming, you can confirm it has transitioned by pointing the programmer at the lantern's lens and pressing the start button. The lantern will respond with a single flash after each press.

Day to Night Transition

If a dark room is unavailable, night can be simulated by completely covering the head of the lantern with an opaque material. If the bird deterrent tines are installed, wrap the material around the lens. It is not necessary to cover the solar panels. Keep the lantern covered for about 30 seconds. Depending on your ambient light, you may need to follow with a "Night to Day" transition.

Night to Day Transition

Expose the M708 lantern head to bright sunlight or incandescent light for about 30 seconds. Depending on your ambient light, you may need to follow with a "Day to Night" transition.

3.3.2 Entering the Security Code to Unlock the Lantern

After the lantern has been transitioned, the security code must be entered before any changes can be made to the lantern's settings. The security code must be entered every time the lantern is transitioned. The security code is 7 5 3.

Follow the programming sequence format in section 3.2.1 *Programming Sequence* for the following steps:

1. Transition the M708 lantern (if required).
2. Enter the security code 7 5 3.



Ensure the programmer is pointed at the lantern's lens and then enter the programming sequence. The lantern will flash once after each correct button press and then three quick flashes to indicate the programming sequence was accepted.

NOTE

Do not proceed to the next button press until the lantern has acknowledged each button press with a single flash.

If the lantern responds to a button press with two slower flashes, indicating an invalid attempt, you must return to the start button and begin the sequence again. When your security code has been accepted, the lantern will give three quick flashes.

NOTE

If the lantern has not been unlocked, any attempts to set the lantern options will result in two slower flashes indicating an error.

3.3.3 Returning the M708 Lantern to Factory Default Settings

You can return the M708 lantern to the factory default settings. The default settings code restores the following factory default settings:

- ♦ Flash code 064 at the MED (~4 NM) range
- ♦ 100% level of intensity. See section 3.3.4.4 *Flash Pattern Duty Cycle Limiter (Intensity)*

The lantern will immediately flash the 064 flash pattern. Resetting the default settings may require re-programming the flash code, range, and intensity level settings desired for your specific application. The factory default settings code is 9 1 1.

Follow the programming sequence format in section 3.2.1 *Programming Sequence* for the following steps:

1. Transition the M708 lantern (if required).
2. Enter the security code 7 5 3 (if required).
3. Enter the factory default settings code 9 1 1.



3.3.4 Setting Lantern Options with the Infrared Programmer

After the M708 lantern has been transitioned and unlocked using the security code, it is ready to receive programming information.

Programming must commence within one minute after the M708 lantern has been transitioned or within one minute of the last valid programmer command.

NOTE

Point the infrared programmer directly at the lantern's lens to ensure the infrared signal is received. (The M708 lantern's infrared detector is located on the circuit board behind the polycarbonate lens).

3.3.4.1 Flash Code

The flash codes for the M708 lantern are listed in *Appendix A: Flash Codes*. The following terms are commonly used in relation to the flash codes.

- Flash Code:** The three-digit flash code (used for programming the lantern with the programmer).
- Duty Cycle:** The percentage of time over a cycle of the flash pattern that the lantern is on.
- Flash Character:** Abbreviated descriptor and flash sequence duration.
- FL# / EC#:** Flash and Eclipse (lantern On or Off periods).
Example:
Flash code 011
Five second repeating sequence in the following pattern:
On (1 sec) Off (1 sec) On (1 sec) Off (2 sec)

To change the flash code, follow the programming sequence format in section 3.2.1 *Programming Sequence* for the following steps:

1. Transition the M708 lantern (if required).
2. Enter the security code 7 5 3 (if required).
3. Enter a three-digit flash code; see *Appendix A: Flash Codes*.



After successfully receiving the flash code programming sequence, the M708 lantern will flash for one minute, displaying the programmed flash pattern. During this time, the M708 lantern will still accept programmer input, so if desired, a different flash code programming sequence can be entered or other features of the M708 lantern can be configured.

After one minute without any programmer input, the M708 lantern will return to its standard operation of flashing (in the dark) or non-flashing (in the daytime).

NOTE

Depending on the amount of available sunlight year round, longer ranges, higher intensity settings or larger flash pattern duty cycles may not be sustainable. Consult with Carmanah to confirm your intended settings are consistent with the amount of sunlight available in the deployment location.

3.3.4.2 GPS-equipped Lanterns

The GPS functionality of the M708 lantern is automatically activated when the lantern is initially powered-up. Once activated, GPS-equipped M708 lanterns automatically synchronize with all GPS-equipped lanterns operating with the same flash pattern; however, it can take several minutes for the lanterns to synchronize. The synchronization period is dependent upon the number of satellites overhead and any obstructions from buildings or mountainous terrain.

3.3.4.3 Lantern Range

You can set all colors of the M708 lantern to flash at a range setting of LOW (~3 NM) and MEDIUM (~4 NM). Additionally, all colors except amber can be set to flash at a range setting of HIGH (~5 NM). The range setting of the lanterns determines the amount of power required by the LEDs and affects the autonomy of the M708 lantern; see *Table 3-6 through 3-10* for more information.

Follow the programming sequence format in section 3.2.1 *Programming Sequence* to program the lantern range codes.

1. Transition the M708 lantern (if required).
2. Enter the security code 7 5 3 (if required).
3. Enter the Range code; see *Table 3-4: Range Codes*



Table 3-4: Range Codes

Range	Code	Color
LOW (~3 NM)	500	Red, green, cyan*, white, amber
MEDIUM (~4 NM)	501 (default value)	Red, green, cyan*, white, amber
HIGH (~5 NM)	598	Red, green, cyan*, white

* Required by the Canadian Coast Guard (CCG)

Table 3-5: Peak Candela (Range*) by Range Setting

	Low	Medium	High
Amber	32 cd (3.2 NM)	74 cd (4.2 NM)	Not Applicable
Red	32 cd (3.2 NM)	75 cd (4.3 NM)	156 cd (5.3 NM)
Green	30 cd (3.2 NM)	69 cd (4.1 NM)	144 cd (5.2 NM)
Cyan	29 cd (3.1 NM)	68 cd (4.1 NM)	153 cd (5.2 NM)
White	37 cd (3.4 NM)	81 cd (4.4 NM)	159 cd (5.3 NM)

* Based on 0.3 second flash Duration

3.3.4.4 Flash Pattern Duty Cycle Limiter (Intensity)

The M708 lantern features a flash pattern duty cycle limiter which controls the intensity of the light output. Each intensity level – 100%, 75%, 50%, 25%, or 12% – sets a maximum power consumption threshold for the lantern, which results in a minimum autonomy. Autonomy is the amount of time the lantern is able to operate normally without any solar charging. The purpose of the flash pattern duty cycle limiter is to ensure that the entire range of flash codes meets or exceeds the minimum autonomy requirement.

For example, if the lantern is programmed to be on for 1 second out of every 4 seconds, the duty cycle is 25% (1:4). If this duty cycle was too large for the lantern to maintain minimum autonomy, the LEDs could be strobed during the 1 second interval that they are scheduled to be on. Strobing is a special Carmanah technique of turning the lantern LEDs on and off 100 times per second in order to limit flash pattern duty cycles. The response time of the human eye is slow enough that strobed light still appears solid, although strobed flash patterns will result in some reduction of the lantern's range.

The flash pattern duty cycle limiter (intensity) setting controls the power delivered to the LEDs and therefore affects the range and autonomy of the M708 lantern. All flash duty cycles within the M708 lantern are capped at 30% (0.3). Flash duty cycles that exceed 30% are strobed to bring them back to 30%. The flash pattern duty cycle limiter (intensity) control reduces the 30% cap proportionally (e.g. 75% = 0.75 X 0.3 = 0.225).



Table 3-6 through 3-10 list the minimum number of days of operation for each of the M708 lantern colors – amber, red, green, cyan, and white.

The calculation for the minimum number of days of operation is based on a 15 hour night when the light is on and a 9 hour day when the light is off and therefore drawing little current. The days of operation are based on full battery charge (with no charging) at different duty cycles (intensity) for flash codes 064 and 129.

Table 3-6: Minimum Days of Operation – Amber

Duty Cycle (DC)			3 NM		4 NM	
Limiter Code	Limiter Setting %	Actual Limit	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)
399	100 (default)	0.30	91	38	36	15
375	75	0.225	91	51	36	20
350	50	0.15	91	76	36	30
325	25	0.075	151	151	59	59
312	12	0.035	317	317	126	126

Table 3-7: Minimum Days of Operation – Red

Duty Cycle (DC)			3 NM		4 NM		5 NM	
Limiter Code	Limiter Setting %	Actual Limit	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)
399	100 (default)	0.30	77	32	30	12	12	5
375	75	0.225	77	43	30	17	12	7
350	50	0.15	77	64	30	25	12	10
325	25	0.075	127	127	50	50	20	20
312	12	0.035	268	268	106	106	43	43

Table 3-8: Minimum Days of Operation – Green

Duty Cycle (DC)			3 NM		4 NM		5 NM	
Limiter Code	Limiter Setting %	Actual Limit	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)
399	100 (default)	0.30	118	50	43	18	16	6
375	75	0.225	118	66	43	24	16	9
350	50	0.15	118	99	43	36	16	13
325	25	0.075	195	195	71	71	26	26
312	12	0.035	408	408	150	150	55	55

Table 3-9: Minimum Days of Operation – Cyan*

Duty Cycle (DC)			3 NM		4 NM		5 NM	
Limiter Code	Limiter Setting %	Actual Limit	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)
399	100 (default)	0.30	135	57	49	20	17	7
375	75	0.225	135	76	49	27	17	10
350	50	0.15	135	113	49	41	17	14
325	25	0.075	222	222	81	81	28	28
312	12	0.035	463	463	171	171	61	61

* Required by the Canadian Coast Guard (CCG)

Table 3-10: Minimum Days of Operation – White

Duty Cycle (DC)			3 NM		4 NM		5 NM	
Limiter Code	Limiter Setting %	Actual Limit	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)	Flash Code 064 12.5% DC (Days)	Flash Code 129 30% DC (Days)
399	100 (default)	0.30	63	26	30	12	14	6
375	75	0.225	63	35	30	17	14	8
350	50	0.15	63	52	30	25	14	12
325	25	0.075	104	104	50	50	23	23
312	12	0.035	220	220	106	106	50	50

NOTE

In *Table 3-6 through 3-10: Minimum Hours of Operation*, column entries of the same value are instances where the duty cycle of the flash pattern is below the duty cycle limit. When the duty cycle limit drops below the duty cycle of the flash pattern, strobing begins and autonomy figures begin to increase.

3.3.4.5 Automatic Light Control (ALC)

The M708 lantern's proprietary Automatic Light Control (ALC) software monitors the battery voltage and amount of solar charge. ALC determines if the M708 lantern can continue to operate at the programmed intensity level under current solar charging conditions. If required, ALC function automatically reduces the duty cycle limit so the M708 lantern will continue to operate. ALC is ideal for installations where there may be plenty of sunlight in the summer, but only marginal sunlight in the winter. In this case, the M708 lantern will be bright during the summer, grow dimmer through the winter as the ALC adjusts the intensity, and brighten again in the spring.

To switch the ALC feature on or off, follow the programming sequence format shown in section 3.2.1 *Programming Sequence* to program the ALC codes in *Table 3-11: ALC Codes*.

Table 3-11: ALC Codes

Setting	Code
ALC On	801 (default value)
ALC Off	800

NOTE

If ALC is turned off, careful consideration of range settings and intensity levels is required to ensure that the M708 lantern is capable of sustainable operation.

4.0 Installing the M708 Lantern

4.1 Choosing a Suitable Location

Adequate sunlight and suitable ambient temperature are the two most important factors to consider when choosing a location for Carmanah Marine Lanterns.

4.1.1 Adequate Sunlight

A Carmanah Marine Lantern is powered by solar energy stored inside the rechargeable batteries of the lantern; therefore, to operate each night it requires an adequate amount of sunlight to recharge its batteries. The following factors should be considered when installing the M708 lantern:

- ♦ the amount of sunlight available in the region
- ♦ an unobstructed view of the sun (the M708 lantern should not be shaded)
- ♦ seasonal changes in sun angle

4.1.2 Ambient Temperature

The temperature range of the lantern location must be between -22 to 122 °F (-30 to 50 °C).

4.2 Securing the M708 Lantern



Physically modifying the M708 lantern will void the warranty. This includes drilling additional holes in the base or re-drilling the existing mounting holes to a larger diameter.

The M708 lantern base plate has mounting holes for three or four point mounting. The use of security fasteners is recommended to prevent theft. Use 18-8 stainless steel hex head fasteners with $\frac{1}{2}$ -13 UNC thread. Install stainless steel washers between the mounting surface and the base plate and between the fastener head and the base plate. Tighten the fasteners to 40 to 44 lbf·ft (4.5 to 5.0 N·m).

4.3 Bird Deterrent

The bird deterrent is a component that you can optionally install on your M708 lantern. The plastic bird deterrent holder is installed when the lantern is shipped and should not be removed unless you are installing the tines of the bird deterrent. The metal tines of the bird deterrent are packaged separately in the product box.



The pointed tines of the bird deterrent pose a risk of injury to eyes.

Use eye protection when installing or working around the Carmanah Bird Deterrent.

4.3.1 Installing the Bird Deterrent

To install the bird spike, perform the following steps:

1. Unscrew the plastic bird deterrent holder (see Figure 2-1) from the top of the lantern.
2. Insert the bird deterrent tines into the holder from underneath.
3. Re-install the assembled bird deterrent on to the top of the lantern.
4. Hand-tighten the holder screw until it is snug; do not overtighten.

5.0 Preparing the M708 Lantern for Storage

NOTE

It is important to have a full battery charge when placing the M708 lantern into storage. A fully charged battery ensures maximum shelf life and minimizes the possibility of battery damage due to low-charge states. Even though the M708 lantern will be stored in the OFF mode, it will continue to consume a small amount of power.

5.1 Determining Battery State of Charge

You should check the battery charge levels before storing a lantern and prior to deploying the lantern to ensure it will be fully operational in the field. The battery status code is 8 1 0.

To determine the battery state of the M708 lantern, follow the programming sequence format shown in section 3.2.1 *Programming Sequence* for the following steps:

1. Transition the M708 lantern (if required).
2. Enter the security code 7 5 3 (if required).
3. Enter the battery status code 8 1 0.

The M708 lantern will emit a series of flashes. Each flash indicates a 10% usable charge; therefore, three flashes would indicate a 30% usable charge while 10 flashes would indicate a full charge of 100%.

After approximately three seconds, the M708 lantern repeats the battery charge status flashes for a second time for verification. The M708 lantern then returns to the programmed flash code for one minute allowing you to confirm that the correct flash code is programmed. The M708 lantern accepts programmer input during this minute. After one minute, the lantern resumes normal operation.

5.1.1 Battery Charge

There are three small indicator LEDs on the outer edge of the circuit board and are visible through the lens when they are lit. The indicator LEDs on the M708 lantern flash as follows to indicate the state of the battery charge:

- ♦ **Good charge:** The green indicator LED flashes once every 5 seconds for a duration of approximately 0.5 to 1 second; the lantern continues to operate normally in this mode.
- ♦ **Low charge:** The amber indicator LED flashes once every 5 seconds for a duration of approximately 0.5 to 1 second as a low charge alert; normal operation will be overridden and instead the main LEDs will flash once per minute.
- ♦ **Critical low charge:** The red indicator LED flashes once every 5 seconds for a duration of approximately 0.5 to 1 second; the lantern's main LEDs will be off to preserve what is left of the battery charge.

See section 5.2 *Charging the M708 Lantern* for information and instructions on charging the lantern.

5.2 Charging the M708 Lantern

If the M708 lantern batteries have a charge of less than 80%, they will require charging. It is recommended that you place the M708 lantern in OFF mode for charging. When it is in OFF mode, the M708 lantern continues to charge using light on the solar panels, but does not turn on in darkness and thereby expend energy flashing. The code to turn the lantern off is 0 0 0.

To place the M708 lantern into OFF mode, follow the programming sequence format shown in section 3.2.1 *Programming Sequence*.

5.2.1 Sunlight

If available, sunlight is the safest and easiest way to charge multiple M708 lanterns. As recommended in section 5.2 *Charging the M708 Lantern*, place the M708 lantern in OFF mode to ensure it can continue to charge by sunlight, but does not flash during the night. An M708 lantern will typically require about five days to fully charge.

5.2.2 Artificial Light

Artificial light is capable of charging the M708 lantern if sunlight is unavailable or inconvenient; however it is less efficient than sunlight and takes proportionally longer to fully charge the lantern. Use a high-intensity incandescent (ordinary bulb or halogen). Set up the charging light so that it is at least 24 inches (60 cm) away from the M708 lantern to prevent the M708 lantern from being damaged due to overheating. Position the charging light so it casts as much illumination as possible onto the solar panels of the M708 lantern. Use multiple charging lights to reduce the charging time.



The heat generated by incandescent lights is capable of causing the special plastic in the M708 lantern's solar panels to crack or bubble. Maintain a distance of 24 inches (60 cm) between the lantern and the artificial light source.

5.3 M708 Lantern Storage or Shipment

The recommended method of storing a lantern is in OFF mode rather than SLEEP mode. When the M708 lantern is turned off, it remains off until it is transitioned and is activated by input from the programmer. The code to turn the lantern off is 0 0 0. Use the OFF code if:

- the M708 lantern is being shipped to a location with an available programmer; if the recipient of the M708 lantern does not have a programmer, you will need to put the M708 lantern in SLEEP mode so it can awaken automatically upon exposure to light without the need of a programmer. See section 3.1 *Preparing the M708 Lantern for Programming*.
- the M708 lantern will be exposed to intermittent light (not sealed in a box)
- the M708 lantern is being recharged using daylight (turning the lantern off will prevent the M708 lantern from turning on at night and will deplete the charge gained during the day)

5.4 Storage Maintenance/Duration

Elevated storage temperatures increase the rate of battery self-discharge. The optimum storage temperature for the M708 lantern is 68 °F (20 °C) or cooler.

Ensure that you have fully charged your M708 lantern and placed it in OFF mode before placing it in storage; see section 5.2 *Charging the M708 Lantern*.

Table 5-1: Storage Temperature and Check/Recharge Intervals

Storage Temperature	Check/Recharge Interval
68 °F or lower (20 °C or lower)	12 months
77 °F (25 °C)	6 months
86 °F (30 °C)	6 months
95 °F (35 °C)	3 months
104 °F (40 °C)	3 months
113 °F (45 °C)	1 month
122 °F (50 °C)	1 month
122 °F or higher (50 °C or higher)	Weekly audit

6.0 Warranty and Customer Service

6.1 Warranty

This product is covered by the Carmanah warranty. For further information please contact an authorized Carmanah distributor.

6.2 Customer Service

Before contacting Carmanah's customer service department, please have the serial number available (located on the top of the M708 light on the color indicator), a brief description of the problem, as well as all details of installation and recharging efforts.

To contact Carmanah's Customer Service Department:

Mail: Carmanah Technologies Corporation
250 Bay Street
Victoria, BC Canada V9A 3K5

Phone: 1.250.380.0052
877.722.8877 (Toll Free in U.S. and Canada)

Fax: 1.250.380.0062

Email: customerservice@carmanah.com

Website: carmanah.com

6.3 Additional Products

Carmanah offers a variety of solar powered and energy-efficient LED lighting products. For marine applications, the 600 and 700 series solar-powered LED lanterns enhance visibility for navigation and safety during nighttime hours and inclement weather. For more information, visit solarmarinelights.com.

7.0 Appendices

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
001	100	Fixed																		
002	10.0	FI (2) 10s	0.5	1	0.5	8														
003	10.0	FI (2) 10s	0.5	1.5	0.5	7.5														
004	16.0	FI (2) 10s	0.8	1.2	0.8	7.2														
005	20.0	FI (2) 10s	1	1	1	7														
006	20.0	FI (2) 10s	1	1.5	1	6.5														
007	8.3	FI (2) 12s	0.5	1	0.5	10														
008	25.0	FI (2) 12s	1.5	2	1.5	7														
009	13.3	FI (2) 15s	1	2	1	11														
010	20.0	FI (2) 5s	0.5	1	0.5	3														
011	40.0	FI (2) 5s	1	1	1	2														
012	16.7	FI (2) 6s	0.5	1	0.5	4														
013	26.7	FI (2) 6s	0.8	1.2	0.8	3.2														
014	33.3	FI (2) 6s	1	1	1	3														
015	28.6	FI (2) 7s	1	1	1	4														
016	12.5	FI (2) 8s	0.5	1	0.5	6														
017	25.0	FI (2) 8s	1	1	1	5														
018	15.0	FI (2+1) 10s	0.5	0.7	0.5	2.1	0.5	5.7												
019	20.0	FI (2+1) 12s	0.8	1.2	0.8	2.4	0.8	6												
020	25.0	FI (2+1) 12s	1	1	1	4	1	4												
021	20.0	FI (2+1) 15s	1	2	1	5	1	5												
022	15.0	FI (2+1) 6s	0.3	0.4	0.3	1.2	0.3	3.5												
023	12.5	FI (3) 12s	0.5	2	0.5	2	0.5	6.5												
024	15.0	FI (3) 10s	0.5	1.5	0.5	1.5	0.5	5.5												
025	30.0	FI (3) 10s	1	1	1	1	1	5												
026	20.0	FI (3) 12s	0.8	1.2	0.8	1.2	0.8	7.2												
027	6.0	FI (3) 15s	0.3	1.7	0.3	1.7	0.3	11												
028	10.0	FI (3) 15s	0.5	1.5	0.5	1.5	0.5	11												

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
029	7.5	FI (3) 20s	0.5	3	0.5	3	0.5	13												
030	26.7	FI (3) 9s	0.8	1.2	0.8	1.2	0.8	4.2												
031	20.0	FI (4) 10s	0.5	1	0.5	1	0.5	1	0.5	5										
032	32.0	FI (4) 10s	0.8	1.2	0.8	1.2	0.8	1.2	0.8	3.2										
033	26.7	FI (4) 12s	0.8	1.2	0.8	1.2	0.8	1.2	0.8	5.2										
034	13.3	FI (4) 15s	0.5	1.5	0.5	1.5	0.5	1.5	0.5	8.5										
035	26.7	FI (4) 15s	1	1	1	1	1	1	1	8										
036	10.0	FI (4) 20s	0.5	1.5	0.5	1.5	0.5	1.5	0.5	14										
037	20.0	FI (5) 20s	0.8	1.2	0.8	1.2	0.8	1.2	0.8	1.2	0.8	11								
038	25.0	FI (5) 20s	1	1	1	1	1	1	1	1	1	11								
039	20.0	FI (6) 15s	0.5	1	0.5	1	0.5	1	0.5	1	0.5	1	0.5	7						
040	75.0	FI-	5	1	1	1														
041	70.0	FI-	5	1	1	1	1	1												
042	20.0	FI 1.5s	0.3	1.2																
043	33.3	FI 1.5s	0.5	1																
044	5.0	FI 10s	0.5	9.5																
045	10.0	FI 10s	1	9																
046	15.0	FI 10s	1.5	8.5																
047	10.0	FI 12s	1.2	11																
048	6.7	FI 15s	1	14																
049	12.0	FI 2.5s	0.3	2.2																
050	20.0	FI 2.5s	0.5	2																
051	10.7	FI 2.8s	0.3	2.5																
052	10.0	FI 2s	0.2	1.8																
053	15.0	FI 2s	0.3	1.7																
054	20.0	FI 2s	0.4	1.6																
055	25.0	FI 2s	0.5	1.5																
056	35.0	FI 2s	0.7	1.3																
057	40.0	FI 2s	0.8	1.2																
058	10.0	FI 3s	0.3	2.7																

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
059	16.7	Fl 3s	0.5	2.5																
060	23.3	Fl 3s	0.7	2.3																
061	33.3	Fl 3s	1	2																
062	30.2	Fl 4.3s	1.3	3																
063	9.1	Fl 4.4s	0.4	4																
064	12.5	Fl 4s	0.5	3.5																
065	20.0	Fl 4s	0.8	3.2																
066	25.0	Fl 4s	1	3																
067	37.5	Fl 4s	1.5	2.5																
068	6.0	Fl 5s	0.3	4.7																
069	10.0	Fl 5s	0.5	4.5																
070	20.0	Fl 5s	1	4																
071	25.0	Fl 6s	1.5	4.5																
072	8.3	Fl 6s	0.5	5.5																
073	10.0	Fl 6s	0.6	5.4																
074	16.7	Fl 6s	1	5																
075	30.0	Fl 5s	1.5	3.5																
076	10.7	Fl 7.5s	0.8	6.7																
077	50.0	Iso 10s	5	5																
078	50.0	Iso 2s	1	1																
079	50.0	Iso 4s	2	2																
080	50.0	Iso 5s	2.5	2.5																
081	50.0	Iso 6s	3	3																
082	50.0	Iso 8s	4	4																
083	50.0	Iso 3s	1.5	1.5																
084	20.0	LFI 10s	2	8																
085	30.0	LFI 10s	3	7																
086	40.0	LFI 10s	4	6																
087	16.7	LFI 12s	2	10																
088	26.7	LFI 15s	4	11																

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
089	40.0	LFI 5s	2	3																
090	33.3	LFI 6s	2	4																
091	25.0	LFI 8s	2	6																
092	37.5	LFI 8s	3	5																
093	20.0	Mo (A) 10s	0.5	0.5	1.5	7.5														
094	16.7	Mo (A) 15s	0.5	1.5	2	11														
095	21.7	Mo (A) 6s	0.3	0.6	1	4.1														
096	40.0	Mo (A) 8s	0.8	1.2	2.4	3.6														
097	20.0	Mo (B) 15s	1.5	0.5	0.5	0.5	0.5	0.5	0.5	11										
098	15.0	Mo (U) 10s	0.3	0.7	0.3	0.7	0.9	7.1												
099	20.0	Mo (U) 10s	0.4	0.6	0.4	0.6	1.2	6.8												
100	25.0	Mo (U) 10s	0.5	0.5	0.5	0.5	1.5	6.5												
101	16.7	Mo (U) 15s	0.5	0.5	0.5	0.5	1.5	12												
102	17.3	Mo (U) 15s	0.6	0.3	0.6	0.3	1.4	12												
103	22.0	Mo (U) 15s	0.7	0.5	0.7	0.5	1.9	11												
104	23.3	Mo (U) 15s	0.7	0.7	0.7	0.7	2.1	10												
105	23.3	Mo (U) 15s	0.8	0.5	0.75	0.5	2	11												
106	35.5	Mo (U) 15s	1.2	0.7	1.15	0.7	3	8.2												
107	39.3	Mo (U) 15s	1.3	0.7	1.3	0.7	3.3	7.7												
108	21.0	Mo (U) 15s	0.8	0.2	0.75	0.2	1.7	12												
109	15.0	Mo (U) 15s	0.5	0.5	0.45	0.5	1.4	12												
110	17.0	Mo (U) 15s	0.6	0.4	0.55	0.4	1.5	12												
111	18.0	Mo (U) 15s	0.6	0.3	0.6	0.3	1.5	12												
112	10.0	Mo (U) 10s	0.2	0.8	0.2	0.8	0.6	7.4												
113	70.0	Oc 10s	7	3																
114	75.0	Oc 10s	7.5	2.5																
115	66.7	Oc 15s	10	5																
116	66.7	Oc 3s	2	1																
117	83.3	Oc 3s	2.5	0.5																
118	75.0	Oc 4s	3	1																

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
119	60.0	Oc 5s	3	2																
120	80.0	Oc 5s	4	1																
121	90.0	Oc 5s	4.5	0.5																
122	66.7	Oc 6s	4	2																
123	75.0	Oc 6s	4.5	1.5																
124	83.3	Oc 6s	5	1																
125	25.0	Q 1.2s	0.3	0.9																
126	41.7	Q 1.2s	0.5	0.7																
127	50.0	Q 1.2s	0.6	0.6																
128	20.0	Q 1s	0.2	0.8																
129	30.0	Q 1s	0.3	0.7																
130	40.0	Q 1s	0.4	0.6																
131	50.0	Q 1s	0.5	0.5																
132	80.0	Q 1s	0.8	0.2																
133	10.0	Q (2) 10s	0.5	1.5	0.5	7.5														
134	12.0	Q (2) 10s	0.6	0.4	0.6	8.4														
135	12.0	Q (2) 5s	0.3	0.7	0.3	3.7														
136	10.0	Q (2) 6s	0.3	0.7	0.3	4.7														
137	11.7	Q (2) 6s	0.4	0.7	0.35	4.6														
138	9.0	Q (3) 10s	0.3	0.7	0.3	0.7	0.3	7.7												
139	10.5	Q (3) 10s	0.4	0.7	0.35	0.7	0.4	7.7												
140	18.0	Q (3) 10s	0.6	0.6	0.6	0.6	0.6	7												
141	12.0	Q (4) 10s	0.3	0.7	0.3	0.7	0.3	0.7	0.3	6.7										
142	10.0	Q (4) 12s	0.3	0.7	0.3	0.7	0.3	0.7	0.3	8.7										
143	9.3	Q (4) 15s	0.4	0.7	0.35	0.7	0.4	0.7	0.4	12										
144	10.0	Q (4) 20s	0.5	0.5	0.5	0.5	0.5	0.5	0.5	17										
145	26.7	Q (4) 6s	0.4	0.6	0.4	0.6	0.4	0.6	0.4	2.6										
146	15.0	Q (5) 10s	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	5.7								
147	7.5	Q (5) 20s	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	16								
148	12.5	Q (5) 20s	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	16									

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
149	21.4	Q (5) 7s	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	2.7								
150	18.0	Q (6) 10s	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	4.7						
151	25.3	Q (6)+LFI 15s	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	2	7				
152	21.0	Q (6)+LFI 15s	0.4	0.7	0.35	0.7	0.4	0.7	0.4	0.7	0.4	0.7	0.4	0.7	1.1	8				
153	37.3	Q (6)+LFI 15s	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	2	5.8				
154	18.0	Q (9) 15s	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	6.7
155	21.0	Q (9) 15s	0.4	0.7	0.35	0.7	0.4	0.7	0.4	0.7	0.4	0.7	0.4	0.7	0.4	0.7	0.4	0.7	0.4	6.7
156	36.0	Q (9) 15s	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.8
157	30.0	VQ 0.5s	0.2	0.4																
158	40.0	VQ 0.5s	0.2	0.3																
159	33.3	VQ 0.6s	0.2	0.4																
160	50.0	VQ 0.6s	0.3	0.3																
161	9.0	VQ (3) 5s	0.2	0.4	0.15	0.4	0.2	3.9												
162	12.0	VQ (3) 5s	0.2	0.3	0.2	0.3	0.2	3.8												
163	18.0	VQ (3) 5s	0.3	0.3	0.3	0.3	0.3	3.5												
164	32.0	VQ (6)+LFI 10s	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	2	5				
165	38.0	VQ (6)+LFI 10s	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2	4.4				
166	13.5	VQ (9) 10s	0.2	0.4	0.15	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	5.9
167	18.0	VQ (9) 10s	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.2	5.8
168	27.0	VQ (9) 10s	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	4.9
169	14.3	Q (2) 7s	0.5	1	0.5	5														
170	12.0	FI (2) 5s	0.3	0.4	0.3	4														
171	10.0	FI (2) 10s	0.5	0.7	0.5	8.3														
172	12.5	FI (5) 20s	0.5	1	0.5	1	0.5	1	0.5	1	0.5	14								
173	20.0	FI (2) 10s	1	2	1	6														
174	10.0	FI 4s	0.4	3.6																
175	16.0	FI (2) 5s	0.4	0.6	0.4	3.6														
176	30.0	Mo(A) 8s	0.4	0.6	2	5														
177	40.0	FI 2.5s	1	1.5																

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
178	10.0	FI (3+1) 20 s	0.5	1.5	0.5	1.5	0.5	4.5	0.5	11										
179	12.0	FI (3+1) 20 s	0.6	1.4	0.6	1.4	0.6	4.4	0.6	10										
180	13.0	FI (3+1) 20 s	0.7	1.4	0.65	1.4	0.7	4.4	0.7	10										
181	14.0	FI (3+1) 20 s	0.7	1.3	0.7	1.3	0.7	4.3	0.7	10										
182	16.0	FI (3+1) 20 s	0.8	1.2	0.8	1.2	0.8	4.2	0.8	10										
183	14.3	FI (2) 7s	0.5	1.5	0.5	4.5														
184	16.7	FI (3) 9s	0.5	1.5	0.5	1.5	0.5	4.5												
185	18.2	LFI 11s	2	9																
186	33.3	FI (6+1) 15s	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2	7				
187	37.5	Mo (0) 12s	1.5	0.5	1.5	0.5	1.5	6.5												
188	30.0	Mo (0) 15s	1.5	0.5	1.5	0.5	1.5	9.5												
189	25.0	Q 1s	0.3	0.8																
190	19.6	Q (3) 4.6s	0.3	0.7	0.3	2	0.3	1												
191	6.7	FI 7.5s	0.5	7																
192	18.2	FI (4) 11s	0.5	1.5	0.5	1.5	0.5	1.5	0.5	4.5										
193	7.1	FL (3) 21s	0.5	1.5	0.5	4.5	0.5	14												
194	25.0	FL (3) 6s	0.5	0.5	0.5	0.5	0.5	3.5												
195	15.0	FI (3)10s	0.5	0.5	0.5	0.5	0.5	7.5												
196	30.0	FI (9)15s	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	6.5
197	66.7	Oc (2)6s	3	1	1	1														
198	62.5	Oc (3)8s	3	1	1	1	1	1												
199	60.0	Oc (4)10s	3	1	1	1	1	1	1	1										
200	16.7	FI (2)6s	0.5	1.5	0.5	3.5														
201	6.3	FI (1)8s	0.5	7.5																
202	6.0	FI (3)15s	0.3	1.7	0.3	1.7	0.3	11												
203	8.0	FI (2)5s	0.2	0.8	0.2	3.8														
204	25.0	FI (2)4s	0.5	1	0.5	2														
205	13.3	FI (2)4.5s	0.3	1	0.3	2.9														
206	15.0	FI (3)10s	0.5	1.5	0.5	1.5	0.5	5.5												
207	10.0	FI (3)15s	0.5	1.5	0.5	1.5	0.5	11												

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
208	25.0	Mo(B)16s	1.5	0.5	0.5	0.5	1.5	0.5	0.5	11										
209	15.0	Q 1s	0.2	0.9																
210	18.0	FI (2+1) 10s	0.6	0.6	0.6	1.8	0.6	5.8												
211	13.3	Mo (U)	0.4	0.5	0.4	0.5	1.2	12												
212	16.7	Q 1.2s	0.2	1																
213	6.0	Q (3) 10s	0.2	1	0.2	1	0.2	7.4												
214	44.0	Q (6)+LFI 15s	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	3	4.8				
215	12.0	VQ (3) 5s	0.2	0.4	0.2	0.4	0.2	3.6												
216	48.0	VQ (6)+LFI 10s	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	3	3.4				
217	18.0	VQ (9) 10s	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	5
218	62.5	Oc (3) 12s	4.5	1.5	1.5	1.5	1.5	1.5												
219	66.7	Oc (4) 12s	5	1	1	1	1	1	1	1										
220	25.0	FI (3) 12s	1	1.5	1	1.5	1	6												
221	26.7	FI (4) 15s	1	1.5	1	1.5	1	1.5	1	6.5										
222	25.0	FI (5) 20s	1	1.5	1	1.5	1	1.5	1	1.5	1	9								
223	33.3	Mo (A)	1	1	3	7														
224	12.5	FI (5) 20s sADO	0.5	1.5	0.5	1.5	0.5	1.5	0.5	1.5	0.5	12								
225	13.3	FI (4) 15s	0.5	2	0.5	2	0.5	2	0.5	7										
226	12.5	FI (5) 20s	0.5	2	0.5	2	0.5	2	0.5	2	0.5	9.5								
227	28.0	Q (6)+LFI 15s	0.2	1	0.2	1	0.2	1	0.2	1	0.2	1	0.2	1	3	4.8				
228	12.0	Q (9) 15s	0.2	1	0.2	1	0.2	1	0.2	1	0.2	1	0.2	1	0.2	1	0.2	1	0.2	5.2
229	42.0	VQ (6)+LFI 10s	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	3	3.4				
230	20.8	CST 1	3.3	1.1	1.091	1.1	3.3	1.1	1.1	30										
231	28.6	CST 2	6	15																
232	37.5	CST 3	9	15																
233	23.1	CST 4	3	10																
234	18.8	CST 5	0.5	1	0.5	1	0.5	4.5												
235	8.0	CST 6	0.4	0.7	0.4	0.7	0.4	0.7	0.4	0.7	0.4	20								

Appendix A: Flash Codes

Flash Code	Duty Cycle	Flash Character	FL1	EC1	FL2	EC2	FL3	EC3	FL4	EC4	FL5	EC5	FL6	EC6	FL7	EC7	FL8	EC8	FL9	EC9
236	75.0	CST 7	1.5	0.5																
237	10.0	CST 8	0.5	2.5	0.5	2.5	0.5	2.5	0.5	11										
238	4.5	CST 9	0.6	0.3	0.6	0.3	1.5	57												
239	20.0	CST 10	0.5	1.5	0.5	2.5														
240	15.0	CST 11	0.3	0.7	0.3	2.7														
241	50.0	CST 12	6	6																
242	77.8	CST 13	2	1	5	1														
243	24.0	CST 14	0.4	0.6	0.4	0.6	0.4	2.6												
244	40.0	CST 15	0.8	1	0.8	1	0.8	1	0.8	1	0.8	2								
245	32.0	CST 16	0.8	1	0.8	1	0.8	1	0.8	3.8										
246	18.8	CST 17	0.5	0.5	0.5	0.5	0.5	5.5												
247	10.0	CST 18	0.5	2.5	0.5	2.5	0.5	2.5	0.5	11										
248	13.3	CST 19	0.8	5.2																
249	11.4	CST 20	0.8	6.2																
250	12.5		0.5	2	0.5	2	0.5	2	0.5											
251	20.0		0.7	2.8																
252	19.4		0.7	2.9																
253	12.7		0.7	4.8																

Appendix B: Candela and Range Tables

NOTE

Candela figures are derived from IALA-compliant measurements over a 360° output.

Table B-1: Candela and Range - LOW

Flash Code	Duty Cycle	Flash Character	Range(NM) Low 100%	Effective Candela Low 100%	Range(NM) Low 75%	Effective Candela Low 75%	Range(NM) Low 50%	Effective Candela Low 50%	Range(NM) Low 25%	Effective Candela Low 25%	Range(NM) Low 12%	Effective Candela Low 12%
001	100	fixed	2.5	9.0	2.3	6.8	1.9	4.5	1.5	2.3	1.1	1.1
002	10.0	FI(2) 10s	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
003	10.0	FI(2) 10s	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
004	16.0	FI(2) 10s	3.5	24.0	3.5	24.0	3.5	22.5	2.7	11.3	2.1	5.3
005	20.0	FI(2) 10s	3.6	25.0	3.6	25.0	3.3	18.8	2.6	9.4	1.9	4.4
006	20.0	FI(2) 10s	3.6	25.0	3.6	25.0	3.3	18.8	2.6	9.4	1.9	4.4
007	8.3	FI(2) 12s	3.4	21.4	3.4	21.4	3.4	21.4	3.3	19.3	2.5	9.0
008	25.0	FI(2) 12s	3.6	26.5	3.5	23.8	3.1	15.9	2.4	7.9	1.8	3.7
009	13.3	FI(2) 15s	3.6	25.0	3.6	25.0	3.6	25.0	2.9	14.1	2.2	6.6
010	20.0	FI(2) 5s	3.4	21.4	3.4	21.4	3.1	16.1	2.4	8.0	1.8	3.8
011	40.0	FI(2) 5s	3.3	18.8	2.9	14.1	2.6	9.4	2.0	4.7	1.5	2.2
012	16.7	FI(2) 6s	3.4	21.4	3.4	21.4	3.3	19.3	2.6	9.6	1.9	4.5
013	26.7	FI(2) 6s	3.5	24.0	3.3	20.3	2.9	13.5	2.3	6.8	1.7	3.2
014	33.3	FI(2) 6s	3.5	22.5	3.1	16.9	2.7	11.3	2.1	5.6	1.6	2.6
015	28.6	FI(2) 7s	3.6	25.0	3.3	19.7	2.9	13.1	2.2	6.6	1.7	3.1
016	12.5	FI(2) 8s	3.4	21.4	3.4	21.4	3.4	21.4	2.9	12.9	2.2	6.0
017	25.0	FI(2) 8s	3.6	25.0	3.5	22.5	3.0	15.0	2.4	7.5	1.8	3.5
018	15.0	FI(2+1) 10s	3.4	21.4	3.4	21.4	3.4	21.4	2.7	10.7	2.0	5.0
019	20.0	FI(2+1) 12s	3.5	24.0	3.5	24.0	3.2	18.0	2.5	9.0	1.9	4.2
020	25.0	FI(2+1) 12s	3.6	25.0	3.5	22.5	3.0	15.0	2.4	7.5	1.8	3.5
021	20.0	FI(2+1) 15s	3.6	25.0	3.6	25.0	3.3	18.8	2.6	9.4	1.9	4.4
022	15.0	FI(2+1) 6s	3.2	18.0	3.2	18.0	3.2	18.0	2.5	9.0	1.9	4.2
023	12.5	FI(3) 12S	3.4	21.4	3.4	21.4	3.4	21.4	2.9	12.9	2.2	6.0
024	15.0	FI(3) 10s	3.4	21.4	3.4	21.4	3.4	21.4	2.7	10.7	2.0	5.0
025	30.0	FI(3) 10s	3.6	25.0	3.3	18.8	2.8	12.5	2.2	6.3	1.6	2.9
026	20.0	FI(3) 12s	3.5	24.0	3.5	24.0	3.2	18.0	2.5	9.0	1.9	4.2
027	6.0	FI(3) 15s	3.2	18.0	3.2	18.0	3.2	18.0	3.2	18.0	2.7	10.5
028	10.0	FI(3) 15s	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
029	7.5	FI(3) 20s	3.4	21.4	3.4	21.4	3.4	21.4	3.4	21.4	2.6	10.0

Table B-1: Candela and Range - LOW

Flash Code	Duty Cycle	Flash Character	Range(NM) Low 100%	Effective Candela Low 100%	Range(NM) Low 75%	Effective Candela Low 75%	Range(NM) Low 50%	Effective Candela Low 50%	Range(NM) Low 25%	Effective Candela Low 25%	Range(NM) Low 12%	Effective Candela Low 12%
030	26.7	FI(3) 9s	3.5	24.0	3.3	20.3	2.9	13.5	2.3	6.8	1.7	3.2
031	20.0	FI(4) 10s	3.4	21.4	3.4	21.4	3.1	16.1	2.4	8.0	1.8	3.8
032	32.0	FI(4) 10s	3.5	22.5	3.1	16.9	2.7	11.3	2.1	5.6	1.6	2.6
033	26.7	FI(4) 12s	3.5	24.0	3.3	20.3	2.9	13.5	2.3	6.8	1.7	3.2
034	13.3	FI(4) 15s	3.4	21.4	3.4	21.4	3.4	21.4	2.8	12.1	2.1	5.6
035	26.7	FI(4) 15s	3.6	25.0	3.4	21.1	2.9	14.1	2.3	7.0	1.7	3.3
036	10.0	FI(4) 20s	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
037	20.0	FI(5) 20s	3.5	24.0	3.5	24.0	3.2	18.0	2.5	9.0	1.9	4.2
038	25.0	FI(5) 20s	3.6	25.0	3.5	22.5	3.0	15.0	2.4	7.5	1.8	3.5
039	20.0	FI(6) 15s	3.4	21.4	3.4	21.4	3.1	16.1	2.4	8.0	1.8	3.8
040	75.0	FL-	2.6	10.0	2.4	7.5	2.0	5.0	1.5	2.5	1.1	1.2
041	70.0	FL-	2.7	10.7	2.4	8.0	2.1	5.4	1.6	2.7	1.1	1.3
042	20.0	FI 1.5s	3.2	18.0	3.2	18.0	2.9	13.5	2.3	6.8	1.7	3.2
043	33.3	FI 1.5s	3.3	19.3	3.0	14.5	2.6	9.6	2.0	4.8	1.5	2.3
044	5.0	FI 10s	3.4	21.4	3.4	21.4	3.4	21.4	3.4	21.4	3.0	15.0
045	10.0	FI 10s	3.6	25.0	3.6	25.0	3.6	25.0	3.3	18.8	2.5	8.8
046	15.0	FI 10s	3.6	26.5	3.6	26.5	3.6	26.5	2.9	13.2	2.2	6.2
047	10.0	FI 12s	3.6	25.7	3.6	25.7	3.6	25.7	3.3	19.3	2.5	9.0
048	6.7	FI 15s	3.6	25.0	3.6	25.0	3.6	25.0	3.6	25.0	2.9	13.1
049	12.0	FI 2.5s	3.2	18.0	3.2	18.0	3.2	18.0	2.7	11.3	2.1	5.3
050	20.0	FI 2.5s	3.4	21.4	3.4	21.4	3.1	16.1	2.4	8.0	1.8	3.8
051	10.7	FI 2.8s	3.2	18.0	3.2	18.0	3.2	18.0	2.8	12.6	2.1	5.9
052	10.0	FI 2s	3.0	15.0	3.0	15.0	3.0	15.0	2.7	11.3	2.1	5.3
053	15.0	FI 2s	3.2	18.0	3.2	18.0	3.2	18.0	2.5	9.0	1.9	4.2
054	20.0	FI 2s	3.3	20.0	3.3	20.0	3.0	15.0	2.4	7.5	1.8	3.5
055	25.0	FI 2s	3.4	21.4	3.3	19.3	2.9	12.9	2.2	6.4	1.7	3.0
056	35.0	FI 2s	3.3	20.0	3.0	15.0	2.6	10.0	2.0	5.0	1.5	2.3
057	40.0	FI 2s	3.2	18.0	2.9	13.5	2.5	9.0	1.9	4.5	1.4	2.1
058	10.0	FI 3s	3.2	18.0	3.2	18.0	3.2	18.0	2.9	13.5	2.2	6.3
059	16.7	FI 3s	3.4	21.4	3.4	21.4	3.3	19.3	2.6	9.6	1.9	4.5
060	23.3	FI 3s	3.5	23.3	3.5	22.5	3.0	15.0	2.4	7.5	1.8	3.5
061	33.3	FI 3s	3.5	22.5	3.1	16.9	2.7	11.3	2.1	5.6	1.6	2.6
062	30.2	FI 4.3s	3.6	25.8	3.3	19.4	2.9	12.9	2.2	6.5	1.7	3.0

Table B-1: Candela and Range - LOW

Flash Code	Duty Cycle	Flash Character	Range(NM) Low 100%	Effective Candela Low 100%	Range(NM) Low 75%	Effective Candela Low 75%	Range(NM) Low 50%	Effective Candela Low 50%	Range(NM) Low 25%	Effective Candela Low 25%	Range(NM) Low 12%	Effective Candela Low 12%
063	9.1	FI 4.4s	3.3	20.0	3.3	20.0	3.3	20.0	3.1	16.5	2.4	7.7
064	12.5	FI 4s	3.4	21.4	3.4	21.4	3.4	21.4	2.9	12.9	2.2	6.0
065	20.0	FI 4s	3.5	24.0	3.5	24.0	3.2	18.0	2.5	9.0	1.9	4.2
066	25.0	FI 4s	3.6	25.0	3.5	22.5	3.0	15.0	2.4	7.5	1.8	3.5
067	37.5	FI 4s	3.4	21.2	3.1	15.9	2.7	10.6	2.1	5.3	1.5	2.5
068	6.0	FI 5s	3.2	18.0	3.2	18.0	3.2	18.0	3.2	18.0	2.7	10.5
069	10.0	FI 5s	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
070	20.0	FI 5s	3.6	25.0	3.6	25.0	3.3	18.8	2.6	9.4	1.9	4.4
071	25.0	FI 6s	3.6	26.5	3.5	23.8	3.1	15.9	2.4	7.9	1.8	3.7
072	8.3	FI 6s	3.4	21.4	3.4	21.4	3.4	21.4	3.3	19.3	2.5	9.0
073	10.0	FI 6s	3.5	22.5	3.5	22.5	3.5	22.5	3.1	16.9	2.4	7.9
074	16.7	FI 6s	3.6	25.0	3.6	25.0	3.5	22.5	2.7	11.3	2.1	5.3
075	30.0	FI 5s	3.6	26.5	3.3	19.9	2.9	13.2	2.2	6.6	1.7	3.1
076	10.7	FI 7.5s	3.5	24.0	3.5	24.0	3.5	24.0	3.1	16.9	2.4	7.9
077	50.0	ISO 10S	3.2	17.3	2.9	13.0	2.5	8.7	1.9	4.3	1.4	2.0
078	50.0	ISO 2S	3.0	15.0	2.7	11.3	2.4	7.5	1.8	3.8	1.3	1.8
079	50.0	ISO 4S	3.1	16.4	2.8	12.3	2.4	8.2	1.9	4.1	1.4	1.9
080	50.0	ISO 5S	3.1	16.7	2.8	12.5	2.4	8.3	1.9	4.2	1.4	1.9
081	50.0	ISO 6S	3.1	16.9	2.8	12.7	2.5	8.4	1.9	4.2	1.4	2.0
082	50.0	ISO 8S	3.2	17.1	2.9	12.9	2.5	8.6	1.9	4.3	1.4	2.0
083	50.0	ISO 3S	3.1	15.9	2.8	11.9	2.4	7.9	1.8	4.0	1.4	1.9
084	20.0	LFL 10S	3.7	27.3	3.7	27.3	3.3	20.5	2.6	10.2	2.0	4.8
085	30.0	LFL 10S	3.7	28.1	3.4	21.1	2.9	14.1	2.3	7.0	1.7	3.3
086	40.0	LFL 10S	3.4	21.4	3.1	16.1	2.7	10.7	2.1	5.4	1.5	2.5
087	16.7	LFL 12S	3.7	27.3	3.7	27.3	3.6	24.5	2.8	12.3	2.1	5.7
088	26.7	LFL 15S	3.7	28.6	3.5	24.1	3.1	16.1	2.4	8.0	1.8	3.8
089	40.0	LFL 5S	3.3	20.5	3.0	15.3	2.6	10.2	2.0	5.1	1.5	2.4
090	33.3	LFL 6S	3.6	24.5	3.2	18.4	2.8	12.3	2.2	6.1	1.6	2.9
091	25.0	LFL 8S	3.7	27.3	3.6	24.5	3.1	16.4	2.4	8.2	1.8	3.8
092	37.5	LFL 8S	3.5	22.5	3.1	16.9	2.7	11.3	2.1	5.6	1.6	2.6
093	20.0	MO(A) 10S	3.4	21.4	3.4	21.4	3.1	16.1	2.4	8.0	1.8	3.8
094	16.7	MO(A) 15s	3.4	21.4	3.4	21.4	3.3	19.3	2.6	9.6	1.9	4.5
095	21.7	MO(A) 6s	3.2	18.0	3.2	18.0	2.8	12.5	2.2	6.2	1.6	2.9

Table B-1: Candela and Range - LOW

Flash Code	Duty Cycle	Flash Character	Range(NM) Low 100%	Effective Candela Low 100%	Range(NM) Low 75%	Effective Candela Low 75%	Range(NM) Low 50%	Effective Candela Low 50%	Range(NM) Low 25%	Effective Candela Low 25%	Range(NM) Low 12%	Effective Candela Low 12%
096	40.0	MO(A) 8s	3.2	18.0	2.9	13.5	2.5	9.0	1.9	4.5	1.4	2.1
097	20.0	MO(B) 15S	3.4	21.4	3.4	21.4	3.1	16.1	2.4	8.0	1.8	3.8
098	15.0	MO(U) 10S	3.2	18.0	3.2	18.0	3.2	18.0	2.5	9.0	1.9	4.2
099	20.0	MO(U) 10S	3.3	20.0	3.3	20.0	3.0	15.0	2.4	7.5	1.8	3.5
100	25.0	MO(U) 10S	3.4	21.4	3.3	19.3	2.9	12.9	2.2	6.4	1.7	3.0
101	16.7	MO(U) 15S	3.4	21.4	3.4	21.4	3.3	19.3	2.6	9.6	1.9	4.5
102	17.3	MO(U) 15S	3.5	22.5	3.5	22.5	3.3	19.5	2.6	9.7	1.9	4.5
103	22.0	MO(U) 15S	3.5	23.3	3.5	23.3	3.1	15.9	2.4	8.0	1.8	3.7
104	23.3	MO(U) 15S	3.5	23.3	3.5	22.5	3.0	15.0	2.4	7.5	1.8	3.5
105	23.3	MO(U) 15S	3.5	23.7	3.5	22.8	3.0	15.2	2.4	7.6	1.8	3.6
106	35.5	MO(U) 15S	3.4	21.6	3.1	16.2	2.7	10.8	2.1	5.4	1.5	2.5
107	39.3	MO(U) 15S	3.3	19.8	3.0	14.9	2.6	9.9	2.0	5.0	1.5	2.3
108	21.0	MO(U) 15S	3.5	23.7	3.5	23.7	3.1	16.9	2.5	8.5	1.8	3.9
109	15.0	MO(U) 15S	3.4	20.8	3.4	20.8	3.4	20.8	2.6	10.4	2.0	4.8
110	17.0	MO(U) 15S	3.4	22.0	3.4	22.0	3.3	19.4	2.6	9.7	1.9	4.5
111	18.0	MO(U) 15S	3.5	22.5	3.5	22.5	3.3	18.8	2.6	9.4	1.9	4.4
112	10.0	MO(U) 10S	3.0	15.0	3.0	15.0	3.0	15.0	2.7	11.3	2.1	5.3
113	70.0	OC 10S	2.8	12.5	2.6	9.4	2.2	6.3	1.7	3.1	1.2	1.5
114	75.0	OC 10S	2.8	11.7	2.5	8.8	2.1	5.8	1.6	2.9	1.2	1.4
115	66.7	OC 15S	2.9	13.2	2.6	9.9	2.2	6.6	1.7	3.3	1.3	1.5
116	66.7	OC 3S	2.8	12.3	2.5	9.2	2.2	6.1	1.7	3.1	1.2	1.4
117	83.3	OC 3S	2.6	10.0	2.4	7.5	2.0	5.0	1.5	2.5	1.1	1.2
118	75.0	OC 4S	2.7	11.3	2.5	8.4	2.1	5.6	1.6	2.8	1.2	1.3
119	60.0	OC 5S	2.9	14.1	2.7	10.5	2.3	7.0	1.8	3.5	1.3	1.6
120	80.0	OC 5S	2.7	10.7	2.4	8.0	2.1	5.4	1.6	2.7	1.1	1.3
121	90.0	OC 5S	2.6	9.6	2.3	7.2	2.0	4.8	1.5	2.4	1.1	1.1
122	66.7	OC 6S	2.9	12.9	2.6	9.6	2.2	6.4	1.7	3.2	1.2	1.5
123	75.0	OC 6S	2.7	11.5	2.5	8.6	2.1	5.7	1.6	2.9	1.2	1.3
124	83.3	OC 6S	2.6	10.4	2.4	7.8	2.0	5.2	1.6	2.6	1.1	1.2
125	25.0	Q 1.2S	3.2	18.0	3.1	16.2	2.7	10.8	2.1	5.4	1.5	2.5
126	41.7	Q 1.2S	3.0	15.4	2.8	11.6	2.4	7.7	1.8	3.9	1.3	1.8
127	50.0	Q 1.2S	2.9	13.5	2.6	10.1	2.3	6.8	1.7	3.4	1.3	1.6
128	20.0	Q 1S	3.0	15.0	3.0	15.0	2.7	11.3	2.1	5.6	1.6	2.6

Table B-1: Candela and Range - LOW

Flash Code	Duty Cycle	Flash Character	Range(NM) Low 100%	Effective Candela Low 100%	Range(NM) Low 75%	Effective Candela Low 75%	Range(NM) Low 50%	Effective Candela Low 50%	Range(NM) Low 25%	Effective Candela Low 25%	Range(NM) Low 12%	Effective Candela Low 12%
129	30.0	Q 1S	3.2	18.0	2.9	13.5	2.5	9.0	1.9	4.5	1.4	2.1
130	40.0	Q 1S	3.0	15.0	2.7	11.3	2.4	7.5	1.8	3.8	1.3	1.8
131	50.0	Q 1S	2.9	12.9	2.6	9.6	2.2	6.4	1.7	3.2	1.2	1.5
132	80.0	Q 1S	2.5	9.0	2.3	6.8	1.9	4.5	1.5	2.3	1.1	1.1
133	10.0	Q(2) 10S	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
134	12.0	Q(2) 10S	3.5	22.5	3.5	22.5	3.5	22.5	2.9	14.1	2.2	6.6
135	12.0	Q(2) 5S	3.2	18.0	3.2	18.0	3.2	18.0	2.7	11.3	2.1	5.3
136	10.0	Q(2) 6S	3.2	18.0	3.2	18.0	3.2	18.0	2.9	13.5	2.2	6.3
137	11.7	Q(2) 6S	3.3	19.1	3.3	19.1	3.3	19.1	2.8	12.3	2.1	5.7
138	9.0	Q(3) 10S	3.2	18.0	3.2	18.0	3.2	18.0	3.0	15.0	2.3	7.0
139	10.5	Q(3) 10S	3.3	19.1	3.3	19.1	3.3	19.1	2.9	13.6	2.2	6.4
140	18.0	Q(3) 10S	3.5	22.5	3.5	22.5	3.3	18.8	2.6	9.4	1.9	4.4
141	12.0	Q(4) 10S	3.2	18.0	3.2	18.0	3.2	18.0	2.7	11.3	2.1	5.3
142	10.0	Q(4) 12S	3.2	18.0	3.2	18.0	3.2	18.0	2.9	13.5	2.2	6.3
143	9.3	Q(4) 15S	3.3	19.1	3.3	19.1	3.3	19.1	3.0	15.3	2.3	7.2
144	10.0	Q(4) 20S	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
145	26.7	Q(4) 6S	3.3	20.0	3.1	16.9	2.7	11.3	2.1	5.6	1.6	2.6
146	15.0	Q(5) 10S	3.2	18.0	3.2	18.0	3.2	18.0	2.5	9.0	1.9	4.2
147	7.5	Q(5) 20S	3.2	18.0	3.2	18.0	3.2	18.0	3.2	18.0	2.5	8.4
148	12.5	Q(5) 20S	3.4	21.4	3.4	21.4	3.4	21.4	2.9	12.9	2.2	6.0
149	21.4	Q(5) 7S	3.2	18.0	3.2	18.0	2.8	12.6	2.2	6.3	1.6	2.9
150	18.0	Q(6) 10S	3.2	18.0	3.2	18.0	3.0	15.0	2.4	7.5	1.8	3.5
151	25.3	Q(6)+LFL 15S	3.2	18.0	3.1	16.0	2.7	10.7	2.1	5.3	1.5	2.5
152	21.0	Q(6)+LFL 15S	3.3	19.1	3.3	19.1	2.9	13.6	2.3	6.8	1.7	3.2
153	37.3	Q(6)+LFL 15S	3.2	18.1	2.9	13.6	2.5	9.0	1.9	4.5	1.4	2.1
154	18.0	Q(9) 15S	3.2	18.0	3.2	18.0	3.0	15.0	2.4	7.5	1.8	3.5
155	21.0	Q(9) 15S	3.3	19.1	3.3	19.1	2.9	13.6	2.3	6.8	1.7	3.2
156	36.0	Q(9) 15S	3.3	18.8	2.9	14.1	2.6	9.4	2.0	4.7	1.5	2.2
157	30.0	VQ 0.5S	2.9	12.9	2.6	9.6	2.2	6.4	1.7	3.2	1.2	1.5
158	40.0	VQ 0.5S	2.7	11.3	2.5	8.4	2.1	5.6	1.6	2.8	1.2	1.3
159	33.3	VQ 0.6S	2.9	13.5	2.6	10.1	2.3	6.8	1.7	3.4	1.3	1.6
160	50.0	VQ 0.6S	2.7	10.8	2.4	8.1	2.1	5.4	1.6	2.7	1.2	1.3
161	9.0	VQ(3) 5S	2.9	12.9	2.9	12.9	2.9	12.9	2.7	10.7	2.0	5.0

Table B-1: Candela and Range - LOW

Flash Code	Duty Cycle	Flash Character	Range(NM) Low 100%	Effective Candela Low 100%	Range(NM) Low 75%	Effective Candela Low 75%	Range(NM) Low 50%	Effective Candela Low 50%	Range(NM) Low 25%	Effective Candela Low 25%	Range(NM) Low 12%	Effective Candela Low 12%
162	12.0	VQ(3) 5S	3.0	15.0	3.0	15.0	3.0	15.0	2.6	9.4	1.9	4.4
163	18.0	VQ(3) 5S	3.2	18.0	3.2	18.0	3.0	15.0	2.4	7.5	1.8	3.5
164	32.0	VQ(6)+LFL 10S	2.9	14.1	2.7	10.5	2.3	7.0	1.8	3.5	1.3	1.6
165	38.0	VQ(6)+LFL 10S	3.0	14.2	2.7	10.7	2.3	7.1	1.8	3.6	1.3	1.7
166	13.5	VQ(9) 10S	2.9	12.9	2.9	12.9	2.9	12.9	2.3	7.1	1.7	3.3
167	18.0	VQ(9) 10S	3.0	15.0	3.0	15.0	2.8	12.5	2.2	6.3	1.6	2.9
168	27.0	VQ(9) 10S	3.2	18.0	3.0	15.0	2.6	10.0	2.0	5.0	1.5	2.3
169	14.3	Q(2) 7S	3.4	21.4	3.4	21.4	3.4	21.4	2.7	11.3	2.1	5.3
170	12.0	FI(2) 5s	3.2	18.0	3.2	18.0	3.2	18.0	2.7	11.3	2.1	5.3
171	10.0	FI(2) 10s	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
172	12.5	FI(5) 20s	3.4	21.4	3.4	21.4	3.4	21.4	2.9	12.9	2.2	6.0
173	20.0	FI(2) 10s	3.6	25.0	3.6	25.0	3.3	18.8	2.6	9.4	1.9	4.4
174	10.0	FI 4s	3.3	20.0	3.3	20.0	3.3	20.0	3.0	15.0	2.3	7.0
175	16.0	FI(2) 5s	3.3	20.0	3.3	20.0	3.3	18.8	2.6	9.4	1.9	4.4
176	30.0	Mo(A) 8s	3.3	20.0	3.0	15.0	2.6	10.0	2.0	5.0	1.5	2.3
177	40.0	FI 2.5s	3.3	18.8	2.9	14.1	2.6	9.4	2.0	4.7	1.5	2.2
178	10.0	FI(3+1) 20 s	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
179	12.0	FI(3+1) 20 s	3.5	22.5	3.5	22.5	3.5	22.5	2.9	14.1	2.2	6.6
180	13.0	FI(3+1) 20 s	3.5	22.9	3.5	22.9	3.5	22.9	2.9	13.2	2.2	6.2
181	14.0	FI(3+1) 20 s	3.5	23.3	3.5	23.3	3.5	23.3	2.8	12.5	2.1	5.8
182	16.0	FI(3+1) 20 s	3.5	24.0	3.5	24.0	3.5	22.5	2.7	11.3	2.1	5.3
183	14.3	FI(2) 7s	3.4	21.4	3.4	21.4	3.4	21.4	2.7	11.3	2.1	5.3
184	16.7	FI(3) 9s	3.4	21.4	3.4	21.4	3.3	19.3	2.6	9.6	1.9	4.5
185	18.2	LFL 11s	3.7	27.3	3.7	27.3	3.5	22.5	2.7	11.3	2.1	5.3
186	33.3	FI(6+1) 15s	3.3	19.3	3.0	14.5	2.6	9.6	2.0	4.8	1.5	2.3
187	37.5	Mo (0) 12s	3.4	21.2	3.1	15.9	2.7	10.6	2.1	5.3	1.5	2.5
188	30.0	Mo (0) 15s	3.6	26.5	3.3	19.9	2.9	13.2	2.2	6.6	1.7	3.1
189	25.0	Q 1S	3.1	16.7	3.0	15.0	2.6	10.0	2.0	5.0	1.5	2.3
190	19.6	Q (3) 4.6s	3.2	18.0	3.2	18.0	2.9	13.8	2.3	6.9	1.7	3.2
191	6.7	FI 7.5s	3.4	21.4	3.4	21.4	3.4	21.4	3.4	21.4	2.7	11.3
192	18.2	FI (4) 11s	3.4	21.4	3.4	21.4	3.2	17.7	2.5	8.8	1.9	4.1
193	7.1	FL (3) 21s	3.4	21.4	3.4	21.4	3.4	21.4	3.4	21.4	2.7	10.5
194	25.0	FL (3) 6s	3.4	21.4	3.3	19.3	2.9	12.9	2.2	6.4	1.7	3.0

Table B-1: Candela and Range - LOW

Flash Code	Duty Cycle	Flash Character	Range(NM) Low 100%	Effective Candela Low 100%	Range(NM) Low 75%	Effective Candela Low 75%	Range(NM) Low 50%	Effective Candela Low 50%	Range(NM) Low 25%	Effective Candela Low 25%	Range(NM) Low 12%	Effective Candela Low 12%
195	15.0	FL(3)10s	3.4	21.4	3.4	21.4	3.4	21.4	2.7	10.7	2.0	5.0
196	30.0	FL(9)15s	3.4	21.4	3.1	16.1	2.7	10.7	2.1	5.4	1.5	2.5
197	66.7	OC(2)6s	2.7	11.3	2.5	8.4	2.1	5.6	1.6	2.8	1.2	1.3
198	62.5	OC(3)8s	2.8	12.0	2.5	9.0	2.2	6.0	1.7	3.0	1.2	1.4
199	60.0	OC(4)10s	2.8	12.5	2.6	9.4	2.2	6.3	1.7	3.1	1.2	1.5
200	16.7	FL(2)6s	3.4	21.4	3.4	21.4	3.3	19.3	2.6	9.6	1.9	4.5
201	6.3	FL(1)8s	3.4	21.4	3.4	21.4	3.4	21.4	3.4	21.4	2.8	12.0
202	6.0	FL(3)15s	3.2	18.0	3.2	18.0	3.2	18.0	3.2	18.0	2.7	10.5
203	8.0	FL(2)5s	3.0	15.0	3.0	15.0	3.0	15.0	2.9	14.1	2.2	6.6
204	25.0	FL(2)4s	3.4	21.4	3.3	19.3	2.9	12.9	2.2	6.4	1.7	3.0
205	13.3	FL(2)4.5s	3.2	18.0	3.2	18.0	3.2	18.0	2.6	10.1	2.0	4.7
206	15.0	FL(3)10s	3.4	21.4	3.4	21.4	3.4	21.4	2.7	10.7	2.0	5.0
207	10.0	FL(3)15s	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
208	25.0	Mo(B)16s	3.4	21.4	3.3	19.3	2.9	12.9	2.2	6.4	1.7	3.0
209	15.0	Q 1s	2.9	12.9	2.9	12.9	2.9	12.9	2.2	6.4	1.7	3.0
210	18.0	Fl(2+1) 10s	3.5	22.5	3.5	22.5	3.3	18.8	2.6	9.4	1.9	4.4
211	13.3	MO(U)	3.3	20.0	3.3	20.0	3.3	20.0	2.7	11.3	2.1	5.3
212	16.7	Q 1.2S	3.0	15.0	3.0	15.0	2.9	13.5	2.3	6.8	1.7	3.2
213	6.0	Q(3) 10S	3.0	15.0	3.0	15.0	3.0	15.0	3.0	15.0	2.5	8.8
214	44.0	Q(6)+LFL 15S	3.0	15.3	2.7	11.5	2.4	7.7	1.8	3.8	1.3	1.8
215	12.0	VQ(3) 5S	3.0	15.0	3.0	15.0	3.0	15.0	2.6	9.4	1.9	4.4
216	48.0	VQ(6)+LFL 10S	2.7	11.3	2.5	8.4	2.1	5.6	1.6	2.8	1.2	1.3
217	18.0	VQ(9) 10S	3.0	15.0	3.0	15.0	2.8	12.5	2.2	6.3	1.6	2.9
218	62.5	OC (3) 12S	2.8	12.7	2.6	9.5	2.2	6.4	1.7	3.2	1.2	1.5
219	66.7	OC(4) 12S	2.7	11.3	2.5	8.4	2.1	5.6	1.6	2.8	1.2	1.3
220	25.0	FL(3) 12S	3.6	25.0	3.5	22.5	3.0	15.0	2.4	7.5	1.8	3.5
221	26.7	FL(4) 15S	3.6	25.0	3.4	21.1	2.9	14.1	2.3	7.0	1.7	3.3
222	25.0	FL(5) 20S	3.6	25.0	3.5	22.5	3.0	15.0	2.4	7.5	1.8	3.5
223	33.3	MO(A)	3.5	22.5	3.1	16.9	2.7	11.3	2.1	5.6	1.6	2.6
224	12.5	FL(5) 20S SADO	3.4	21.4	3.4	21.4	3.4	21.4	2.9	12.9	2.2	6.0
225	13.3	FL(4) 15S	3.4	21.4	3.4	21.4	3.4	21.4	2.8	12.1	2.1	5.6
226	12.5	FL(5) 20S	3.4	21.4	3.4	21.4	3.4	21.4	2.9	12.9	2.2	6.0
227	28.0	Q(6)+LFL 15S	3.0	15.0	2.8	12.1	2.4	8.0	1.9	4.0	1.4	1.9

Table B-1: Candela and Range - LOW

Flash Code	Duty Cycle	Flash Character	Range(NM) Low 100%	Effective Candela Low 100%	Range(NM) Low 75%	Effective Candela Low 75%	Range(NM) Low 50%	Effective Candela Low 50%	Range(NM) Low 25%	Effective Candela Low 25%	Range(NM) Low 12%	Effective Candela Low 12%
228	12.0	Q(9) 15S	3.0	15.0	3.0	15.0	3.0	15.0	2.6	9.4	1.9	4.4
229	42.0	VQ(6)+LFL 10S	2.7	10.7	2.4	8.0	2.1	5.4	1.6	2.7	1.1	1.3
230	20.8	CST1	3.6	25.4	3.6	25.4	3.2	18.3	2.5	9.2	1.9	4.3
231	28.6	CST2	3.8	29.0	3.5	22.9	3.0	15.2	2.4	7.6	1.8	3.6
232	37.5	CST3	3.5	23.5	3.2	17.6	2.8	11.7	2.1	5.9	1.6	2.7
233	23.1	CST4	3.7	28.1	3.7	27.4	3.2	18.3	2.5	9.1	1.9	4.3
234	18.8	CST5	3.4	21.4	3.4	21.4	3.2	17.1	2.5	8.6	1.9	4.0
235	8.0	CST6	3.3	20.0	3.3	20.0	3.3	20.0	3.3	18.8	2.5	8.8
236	75.0	CST7	2.7	10.6	2.4	7.9	2.1	5.3	1.6	2.6	1.1	1.2
237	10.0	CST8	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
238	4.5	CST9	3.5	22.5	3.5	22.5	3.5	22.5	3.5	22.5	3.2	17.5
239	20.0	CST10	3.4	21.4	3.4	21.4	3.1	16.1	2.4	8.0	1.8	3.8
240	15.0	CST11	3.2	18.0	3.2	18.0	3.2	18.0	2.5	9.0	1.9	4.2
241	50.0	CST12	3.2	17.4	2.9	13.1	2.5	8.7	1.9	4.4	1.4	2.0
242	77.8	CST13	2.7	10.5	2.4	7.9	2.1	5.3	1.6	2.6	1.1	1.2
243	24.0	CST14	3.3	20.0	3.3	18.8	2.8	12.5	2.2	6.3	1.6	2.9
244	40.0	CST15	3.2	18.0	2.9	13.5	2.5	9.0	1.9	4.5	1.4	2.1
245	32.0	CST16	3.5	22.5	3.1	16.9	2.7	11.3	2.1	5.6	1.6	2.6
246	18.8	CST17	3.4	21.4	3.4	21.4	3.2	17.1	2.5	8.6	1.9	4.0
247	10.0	CST18	3.4	21.4	3.4	21.4	3.4	21.4	3.1	16.1	2.4	7.5
248	13.3	CST19	3.5	24.0	3.5	24.0	3.5	24.0	2.9	13.5	2.2	6.3
249	11.4	CST20	3.5	24.0	3.5	24.0	3.5	24.0	3.1	15.8	2.3	7.4
250	12.5	CST21	3.4	21.4	3.4	21.4	3.4	21.4	2.9	12.9	2.2	6.0
251	20.0	CST22	3.5	23.3	3.5	23.3	3.2	17.5	2.5	8.8	1.9	4.1
252	19.4	CST23	3.5	23.3	3.5	23.3	3.2	18.0	2.5	9.0	1.9	4.2
253	12.7	CST24	3.5	23.3	3.5	23.3	3.5	23.3	2.9	13.8	2.2	6.4

Table B-2: Candela and Range - MEDIUM

Flash Code	Duty Cycle	Flash Character	Range(NIM) Medium 100%	Effective Candela Medium 100%	Range(NIM) Medium 75%	Effective Candela Medium 75%	Range(NIM) Medium 50%	Effective Candela Medium 50%	Range(NIM) Medium 25%	Effective Candela Medium 25%	Range(NIM) Medium 12%	Effective Candela Medium 12%
001	100	fixed	3.4	20.7	3.0	15.5	2.6	10.4	2.0	5.2	1.5	2.4
002	10.0	FI(2) 10s	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
003	10.0	FI(2) 10s	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
004	16.0	FI(2) 10s	4.6	55.2	4.6	55.2	4.5	51.8	3.6	25.9	2.8	12.1
005	20.0	FI(2) 10s	4.6	57.5	4.6	57.5	4.2	43.1	3.4	21.6	2.6	10.1
006	20.0	FI(2) 10s	4.6	57.5	4.6	57.5	4.2	43.1	3.4	21.6	2.6	10.1
007	8.3	FI(2) 12s	4.4	49.3	4.4	49.3	4.4	49.3	4.3	44.4	3.4	20.7
008	25.0	FI(2) 12s	4.7	60.9	4.6	54.8	4.0	36.5	3.2	18.3	2.5	8.5
009	13.3	FI(2) 15s	4.6	57.5	4.6	57.5	4.6	57.5	3.9	32.3	3.0	15.1
010	20.0	FI(2) 5s	4.4	49.3	4.4	49.3	4.0	37.0	3.2	18.5	2.5	8.6
011	40.0	FI(2) 5s	4.2	43.1	3.9	32.3	3.4	21.6	2.7	10.8	2.0	5.0
012	16.7	FI(2) 6s	4.4	49.3	4.4	49.3	4.3	44.4	3.4	22.2	2.6	10.4
013	26.7	FI(2) 6s	4.6	55.2	4.3	46.6	3.8	31.1	3.0	15.5	2.3	7.2
014	33.3	FI(2) 6s	4.5	51.8	4.1	38.8	3.6	25.9	2.9	12.9	2.2	6.0
015	28.6	FI(2) 7s	4.6	57.5	4.3	45.3	3.8	30.2	3.0	15.1	2.3	7.0
016	12.5	FI(2) 8s	4.4	49.3	4.4	49.3	4.4	49.3	3.8	29.6	2.9	13.8
017	25.0	FI(2) 8s	4.6	57.5	4.5	51.8	4.0	34.5	3.2	17.3	2.4	8.1
018	15.0	FI(2+1) 10s	4.4	49.3	4.4	49.3	4.4	49.3	3.6	24.6	2.7	11.5
019	20.0	FI(2+1) 12s	4.6	55.2	4.6	55.2	4.2	41.4	3.4	20.7	2.6	9.7
020	25.0	FI(2+1) 12s	4.6	57.5	4.5	51.8	4.0	34.5	3.2	17.3	2.4	8.1
021	20.0	FI(2+1) 15s	4.6	57.5	4.6	57.5	4.2	43.1	3.4	21.6	2.6	10.1
022	15.0	FI(2+1) 6s	4.2	41.4	4.2	41.4	4.2	41.4	3.4	20.7	2.6	9.7
023	12.5	FI(3) 12S	4.4	49.3	4.4	49.3	4.4	49.3	3.8	29.6	2.9	13.8
024	15.0	FI(3) 10s	4.4	49.3	4.4	49.3	4.4	49.3	3.6	24.6	2.7	11.5
025	30.0	FI(3) 10s	4.6	57.5	4.2	43.1	3.7	28.8	3.0	14.4	2.3	6.7
026	20.0	FI(3) 12s	4.6	55.2	4.6	55.2	4.2	41.4	3.4	20.7	2.6	9.7
027	6.0	FI(3) 15s	4.2	41.4	4.2	41.4	4.2	41.4	4.2	41.4	3.5	24.2
028	10.0	FI(3) 15s	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
029	7.5	FI(3) 20s	4.4	49.3	4.4	49.3	4.4	49.3	4.4	49.3	3.5	23.0
030	26.7	FI(3) 9s	4.6	55.2	4.3	46.6	3.8	31.1	3.0	15.5	2.3	7.2
031	20.0	FI(4) 10s	4.4	49.3	4.4	49.3	4.0	37.0	3.2	18.5	2.5	8.6
032	32.0	FI(4) 10s	4.5	51.8	4.1	38.8	3.6	25.9	2.9	12.9	2.2	6.0

Table B-2: Candela and Range - MEDIUM

Flash Code	Duty Cycle	Flash Character	Range(NIM) Medium 100%	Effective Candela Medium 100%	Range(NIM) Medium 75%	Effective Candela Medium 75%	Range(NIM) Medium 50%	Effective Candela Medium 50%	Range(NIM) Medium 25%	Effective Candela Medium 25%	Range(NIM) Medium 12%	Effective Candela Medium 12%
033	26.7	FI(4) 12s	4.6	55.2	4.3	46.6	3.8	31.1	3.0	15.5	2.3	7.2
034	13.3	FI(4) 15s	4.4	49.3	4.4	49.3	4.4	49.3	3.7	27.7	2.9	12.9
035	26.7	FI(4) 15s	4.6	57.5	4.4	48.5	3.9	32.3	3.1	16.2	2.4	7.5
036	10.0	FI(4) 20s	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
037	20.0	FI(5) 20s	4.6	55.2	4.6	55.2	4.2	41.4	3.4	20.7	2.6	9.7
038	25.0	FI(5) 20s	4.6	57.5	4.5	51.8	4.0	34.5	3.2	17.3	2.4	8.1
039	20.0	FI(6) 15s	4.4	49.3	4.4	49.3	4.0	37.0	3.2	18.5	2.5	8.6
040	75.0	FL-	3.5	23.0	3.2	17.3	2.7	11.5	2.1	5.8	1.6	2.7
041	70.0	FL-	3.6	24.6	3.2	18.5	2.8	12.3	2.2	6.2	1.6	2.9
042	20.0	FI 1.5s	4.2	41.4	4.2	41.4	3.8	31.1	3.0	15.5	2.3	7.2
043	33.3	FI 1.5s	4.3	44.4	3.9	33.3	3.4	22.2	2.7	11.1	2.0	5.2
044	5.0	FI 10s	4.4	49.3	4.4	49.3	4.4	49.3	4.4	49.3	4.0	34.5
045	10.0	FI 10s	4.6	57.5	4.6	57.5	4.6	57.5	4.2	43.1	3.3	20.1
046	15.0	FI 10s	4.7	60.9	4.7	60.9	4.7	60.9	3.8	30.4	3.0	14.2
047	10.0	FI 12s	4.7	59.1	4.7	59.1	4.7	59.1	4.3	44.4	3.4	20.7
048	6.7	FI 15s	4.6	57.5	4.6	57.5	4.6	57.5	4.6	57.5	3.8	30.2
049	12.0	FI 2.5s	4.2	41.4	4.2	41.4	4.2	41.4	3.6	25.9	2.8	12.1
050	20.0	FI 2.5s	4.4	49.3	4.4	49.3	4.0	37.0	3.2	18.5	2.5	8.6
051	10.7	FI 2.8s	4.2	41.4	4.2	41.4	4.2	41.4	3.8	29.0	2.9	13.5
052	10.0	FI 2s	4.0	34.5	4.0	34.5	4.0	34.5	3.6	25.9	2.8	12.1
053	15.0	FI 2s	4.2	41.4	4.2	41.4	4.2	41.4	3.4	20.7	2.6	9.7
054	20.0	FI 2s	4.3	46.0	4.3	46.0	4.0	34.5	3.2	17.3	2.4	8.1
055	25.0	FI 2s	4.4	49.3	4.3	44.4	3.8	29.6	3.0	14.8	2.3	6.9
056	35.0	FI 2s	4.3	46.0	4.0	34.5	3.5	23.0	2.7	11.5	2.1	5.4
057	40.0	FI 2s	4.2	41.4	3.8	31.1	3.4	20.7	2.6	10.4	2.0	4.8
058	10.0	FI 3s	4.2	41.4	4.2	41.4	4.2	41.4	3.8	31.1	3.0	14.5
059	16.7	FI 3s	4.4	49.3	4.4	49.3	4.3	44.4	3.4	22.2	2.6	10.4
060	23.3	FI 3s	4.5	53.7	4.5	51.8	4.0	34.5	3.2	17.3	2.4	8.1
061	33.3	FI 3s	4.5	51.8	4.1	38.8	3.6	25.9	2.9	12.9	2.2	6.0
062	30.2	FI 4.3s	4.7	59.3	4.3	44.5	3.8	29.7	3.0	14.8	2.3	6.9
063	9.1	FI 4.4s	4.3	46.0	4.3	46.0	4.3	46.0	4.1	38.0	3.2	17.7
064	12.5	FI 4s	4.4	49.3	4.4	49.3	4.4	49.3	3.8	29.6	2.9	13.8

Table B-2: Candela and Range - MEDIUM

Flash Code	Duty Cycle	Flash Character	Range(NIM) Medium 100%	Effective Candela Medium 100%	Range(NIM) Medium 75%	Effective Candela Medium 75%	Range(NIM) Medium 50%	Effective Candela Medium 50%	Range(NIM) Medium 25%	Effective Candela Medium 25%	Range(NIM) Medium 12%	Effective Candela Medium 12%
065	20.0	FI 4s	4.6	55.2	4.6	55.2	4.2	41.4	3.4	20.7	2.6	9.7
066	25.0	FI 4s	4.6	57.5	4.5	51.8	4.0	34.5	3.2	17.3	2.4	8.1
067	37.5	FI 4s	4.4	48.7	4.0	36.5	3.5	24.4	2.8	12.2	2.1	5.7
068	6.0	FI 5s	4.2	41.4	4.2	41.4	4.2	41.4	4.2	41.4	3.5	24.2
069	10.0	FI 5s	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
070	20.0	FI 5s	4.6	57.5	4.6	57.5	4.2	43.1	3.4	21.6	2.6	10.1
071	25.0	FI 6s	4.7	60.9	4.6	54.8	4.0	36.5	3.2	18.3	2.5	8.5
072	8.3	FI 6s	4.4	49.3	4.4	49.3	4.4	49.3	4.3	44.4	3.4	20.7
073	10.0	FI 6s	4.5	51.8	4.5	51.8	4.5	51.8	4.1	38.8	3.2	18.1
074	16.7	FI 6s	4.6	57.5	4.6	57.5	4.5	51.8	3.6	25.9	2.8	12.1
075	30.0	FI 5s	4.7	60.9	4.3	45.7	3.8	30.4	3.0	15.2	2.3	7.1
076	10.7	FI 7.5s	4.6	55.2	4.6	55.2	4.6	55.2	4.1	38.8	3.2	18.1
077	50.0	ISO 10S	4.1	39.8	3.8	29.9	3.3	19.9	2.6	10.0	2.0	4.6
078	50.0	ISO 2S	4.0	34.5	3.6	25.9	3.2	17.3	2.5	8.6	1.9	4.0
079	50.0	ISO 4S	4.1	37.6	3.7	28.2	3.3	18.8	2.6	9.4	1.9	4.4
080	50.0	ISO 5S	4.1	38.3	3.7	28.8	3.3	19.2	2.6	9.6	1.9	4.5
081	50.0	ISO 6S	4.1	38.8	3.8	29.1	3.3	19.4	2.6	9.7	1.9	4.5
082	50.0	ISO 8S	4.1	39.4	3.8	29.6	3.3	19.7	2.6	9.9	2.0	4.6
083	50.0	ISO 3S	4.0	36.5	3.7	27.4	3.2	18.3	2.5	9.1	1.9	4.3
084	20.0	LFL 10S	4.8	62.7	4.8	62.7	4.4	47.0	3.5	23.5	2.7	11.0
085	30.0	LFL 10S	4.8	64.7	4.4	48.5	3.9	32.3	3.1	16.2	2.4	7.5
086	40.0	LFL 10S	4.4	49.3	4.0	37.0	3.6	24.6	2.8	12.3	2.1	5.8
087	16.7	LFL 12S	4.8	62.7	4.8	62.7	4.6	56.5	3.7	28.2	2.9	13.2
088	26.7	LFL 15S	4.8	65.7	4.6	55.4	4.0	37.0	3.2	18.5	2.5	8.6
089	40.0	LFL 5S	4.4	47.0	4.0	35.3	3.5	23.5	2.8	11.8	2.1	5.5
090	33.3	LFL 6S	4.6	56.5	4.2	42.3	3.7	28.2	3.0	14.1	2.2	6.6
091	25.0	LFL 8S	4.8	62.7	4.6	56.5	4.1	37.6	3.3	18.8	2.5	8.8
092	37.5	LFL 8S	4.5	51.8	4.1	38.8	3.6	25.9	2.9	12.9	2.2	6.0
093	20.0	MO(A) 10S	4.4	49.3	4.4	49.3	4.0	37.0	3.2	18.5	2.5	8.6
094	16.7	MO(A) 15s	4.4	49.3	4.4	49.3	4.3	44.4	3.4	22.2	2.6	10.4
095	21.7	MO(A) 6s	4.2	41.4	4.2	41.4	3.7	28.7	3.0	14.3	2.3	6.7
096	40.0	MO(A) 8s	4.2	41.4	3.8	31.1	3.4	20.7	2.6	10.4	2.0	4.8

Table B-2: Candela and Range - MEDIUM

Flash Code	Duty Cycle	Flash Character	Range(NIM) Medium 100%	Effective Candela Medium 100%	Range(NIM) Medium 75%	Effective Candela Medium 75%	Range(NIM) Medium 50%	Effective Candela Medium 50%	Range(NIM) Medium 25%	Effective Candela Medium 25%	Range(NIM) Medium 12%	Effective Candela Medium 12%
097	20.0	MO(B) 15S	4.4	49.3	4.4	49.3	4.0	37.0	3.2	18.5	2.5	8.6
098	15.0	MO(U) 10S	4.2	41.4	4.2	41.4	4.2	41.4	3.4	20.7	2.6	9.7
099	20.0	MO(U) 10S	4.3	46.0	4.3	46.0	4.0	34.5	3.2	17.3	2.4	8.1
100	25.0	MO(U) 10S	4.4	49.3	4.3	44.4	3.8	29.6	3.0	14.8	2.3	6.9
101	16.7	MO(U) 15S	4.4	49.3	4.4	49.3	4.3	44.4	3.4	22.2	2.6	10.4
102	17.3	MO(U) 15S	4.5	51.8	4.5	51.8	4.3	44.8	3.4	22.4	2.7	10.4
103	22.0	MO(U) 15S	4.5	53.7	4.5	53.7	4.0	36.6	3.2	18.3	2.5	8.5
104	23.3	MO(U) 15S	4.5	53.7	4.5	51.8	4.0	34.5	3.2	17.3	2.4	8.1
105	23.3	MO(U) 15S	4.6	54.5	4.5	52.5	4.0	35.0	3.2	17.5	2.4	8.2
106	35.5	MO(U) 15S	4.4	49.6	4.1	37.2	3.6	24.8	2.8	12.4	2.1	5.8
107	39.3	MO(U) 15S	4.3	45.6	4.0	34.2	3.5	22.8	2.7	11.4	2.1	5.3
108	21.0	MO(U) 15S	4.6	54.5	4.6	54.5	4.1	38.9	3.3	19.5	2.5	9.1
109	15.0	MO(U) 15S	4.4	47.8	4.4	47.8	4.4	47.8	3.5	23.9	2.7	11.1
110	17.0	MO(U) 15S	4.5	50.6	4.5	50.6	4.3	44.6	3.4	22.3	2.7	10.4
111	18.0	MO(U) 15S	4.5	51.8	4.5	51.8	4.2	43.1	3.4	21.6	2.6	10.1
112	10.0	MO(U) 10S	4.0	34.5	4.0	34.5	4.0	34.5	3.6	25.9	2.8	12.1
113	70.0	OC 10S	3.7	28.8	3.4	21.6	3.0	14.4	2.3	7.2	1.7	3.4
114	75.0	OC 10S	3.7	26.9	3.3	20.2	2.9	13.4	2.3	6.7	1.7	3.1
115	66.7	OC 15S	3.8	30.4	3.5	22.8	3.0	15.2	2.4	7.6	1.8	3.6
116	66.7	OC 3S	3.7	28.2	3.4	21.2	3.0	14.1	2.3	7.1	1.7	3.3
117	83.3	OC 3S	3.5	23.0	3.2	17.3	2.7	11.5	2.1	5.8	1.6	2.7
118	75.0	OC 4S	3.6	25.9	3.3	19.4	2.9	12.9	2.2	6.5	1.7	3.0
119	60.0	OC 5S	3.9	32.3	3.5	24.3	3.1	16.2	2.4	8.1	1.8	3.8
120	80.0	OC 5S	3.6	24.6	3.2	18.5	2.8	12.3	2.2	6.2	1.6	2.9
121	90.0	OC 5S	3.4	22.0	3.1	16.5	2.7	11.0	2.1	5.5	1.6	2.6
122	66.7	OC 6S	3.8	29.6	3.4	22.2	3.0	14.8	2.3	7.4	1.7	3.5
123	75.0	OC 6S	3.6	26.4	3.3	19.8	2.9	13.2	2.2	6.6	1.7	3.1
124	83.3	OC 6S	3.5	23.9	3.2	17.9	2.8	11.9	2.2	6.0	1.6	2.8
125	25.0	Q 1.2S	4.2	41.4	4.1	37.3	3.6	24.8	2.8	12.4	2.1	5.8
126	41.7	Q 1.2S	4.0	35.5	3.6	26.6	3.2	17.7	2.5	8.9	1.9	4.1
127	50.0	Q 1.2S	3.8	31.1	3.5	23.3	3.0	15.5	2.4	7.8	1.8	3.6
128	20.0	Q 1S	4.0	34.5	4.0	34.5	3.6	25.9	2.9	12.9	2.2	6.0

Table B-2: Candela and Range - MEDIUM

Flash Code	Duty Cycle	Flash Character	Range(NIM) Medium 100%	Effective Candela Medium 100%	Range(NIM) Medium 75%	Effective Candela Medium 75%	Range(NIM) Medium 50%	Effective Candela Medium 50%	Range(NIM) Medium 25%	Effective Candela Medium 25%	Range(NIM) Medium 12%	Effective Candela Medium 12%
129	30.0	Q 1S	4.2	41.4	3.8	31.1	3.4	20.7	2.6	10.4	2.0	4.8
130	40.0	Q 1S	4.0	34.5	3.6	25.9	3.2	17.3	2.5	8.6	1.9	4.0
131	50.0	Q 1S	3.8	29.6	3.4	22.2	3.0	14.8	2.3	7.4	1.7	3.5
132	80.0	Q 1S	3.4	20.7	3.0	15.5	2.6	10.4	2.0	5.2	1.5	2.4
133	10.0	Q(2) 10S	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
134	12.0	Q(2) 10S	4.5	51.8	4.5	51.8	4.5	51.8	3.9	32.3	3.0	15.1
135	12.0	Q(2) 5S	4.2	41.4	4.2	41.4	4.2	41.4	3.6	25.9	2.8	12.1
136	10.0	Q(2) 6S	4.2	41.4	4.2	41.4	4.2	41.4	3.8	31.1	3.0	14.5
137	11.7	Q(2) 6S	4.3	43.9	4.3	43.9	4.3	43.9	3.7	28.2	2.9	13.2
138	9.0	Q(3) 10S	4.2	41.4	4.2	41.4	4.2	41.4	4.0	34.5	3.1	16.1
139	10.5	Q(3) 10S	4.3	43.9	4.3	43.9	4.3	43.9	3.8	31.4	3.0	14.6
140	18.0	Q(3) 10S	4.5	51.8	4.5	51.8	4.2	43.1	3.4	21.6	2.6	10.1
141	12.0	Q(4) 10S	4.2	41.4	4.2	41.4	4.2	41.4	3.6	25.9	2.8	12.1
142	10.0	Q(4) 12S	4.2	41.4	4.2	41.4	4.2	41.4	3.8	31.1	3.0	14.5
143	9.3	Q(4) 15S	4.3	43.9	4.3	43.9	4.3	43.9	4.0	35.3	3.1	16.5
144	10.0	Q(4) 20S	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
145	26.7	Q(4) 6S	4.3	46.0	4.1	38.8	3.6	25.9	2.9	12.9	2.2	6.0
146	15.0	Q(5) 10S	4.2	41.4	4.2	41.4	4.2	41.4	3.4	20.7	2.6	9.7
147	7.5	Q(5) 20S	4.2	41.4	4.2	41.4	4.2	41.4	4.2	41.4	3.3	19.3
148	12.5	Q(5) 20S	4.4	49.3	4.4	49.3	4.4	49.3	3.8	29.6	2.9	13.8
149	21.4	Q(5) 7S	4.2	41.4	4.2	41.4	3.8	29.0	3.0	14.5	2.3	6.8
150	18.0	Q(6) 10S	4.2	41.4	4.2	41.4	4.0	34.5	3.2	17.3	2.4	8.1
151	25.3	Q(6)+LFL 15S	4.2	41.4	4.0	36.8	3.6	24.5	2.8	12.3	2.1	5.7
152	21.0	Q(6)+LFL 15S	4.3	43.9	4.3	43.9	3.8	31.4	3.1	15.7	2.3	7.3
153	37.3	Q(6)+LFL 15S	4.2	41.6	3.8	31.2	3.4	20.8	2.6	10.4	2.0	4.9
154	18.0	Q(9) 15S	4.2	41.4	4.2	41.4	4.0	34.5	3.2	17.3	2.4	8.1
155	21.0	Q(9) 15S	4.3	43.9	4.3	43.9	3.8	31.4	3.1	15.7	2.3	7.3
156	36.0	Q(9) 15S	4.2	43.1	3.9	32.3	3.4	21.6	2.7	10.8	2.0	5.0
157	30.0	VQ 0.5S	3.8	29.6	3.4	22.2	3.0	14.8	2.3	7.4	1.7	3.5
158	40.0	VQ 0.5S	3.6	25.9	3.3	19.4	2.9	12.9	2.2	6.5	1.7	3.0
159	33.3	VQ 0.6S	3.8	31.1	3.5	23.3	3.0	15.5	2.4	7.8	1.8	3.6
160	50.0	VQ 0.6S	3.6	24.8	3.2	18.6	2.8	12.4	2.2	6.2	1.6	2.9

Table B-2: Candela and Range - MEDIUM

Flash Code	Duty Cycle	Flash Character	Range(NIM) Medium 100%	Effective Candela Medium 100%	Range(NIM) Medium 75%	Effective Candela Medium 75%	Range(NIM) Medium 50%	Effective Candela Medium 50%	Range(NIM) Medium 25%	Effective Candela Medium 25%	Range(NIM) Medium 12%	Effective Candela Medium 12%
161	9.0	VQ(3) 5S	3.8	29.6	3.8	29.6	3.8	29.6	3.6	24.6	2.7	11.5
162	12.0	VQ(3) 5S	4.0	34.5	4.0	34.5	4.0	34.5	3.4	21.6	2.6	10.1
163	18.0	VQ(3) 5S	4.2	41.4	4.2	41.4	4.0	34.5	3.2	17.3	2.4	8.1
164	32.0	VQ(6)+LFL 10S	3.9	32.3	3.5	24.3	3.1	16.2	2.4	8.1	1.8	3.8
165	38.0	VQ(6)+LFL 10S	3.9	32.7	3.6	24.5	3.1	16.3	2.4	8.2	1.8	3.8
166	13.5	VQ(9) 10S	3.8	29.6	3.8	29.6	3.8	29.6	3.1	16.4	2.4	7.7
167	18.0	VQ(9) 10S	4.0	34.5	4.0	34.5	3.7	28.8	3.0	14.4	2.3	6.7
168	27.0	VQ(9) 10S	4.2	41.4	4.0	34.5	3.5	23.0	2.7	11.5	2.1	5.4
169	14.3	Q(2) 7S	4.4	49.3	4.4	49.3	4.4	49.3	3.6	25.9	2.8	12.1
170	12.0	FI(2) 5s	4.2	41.4	4.2	41.4	4.2	41.4	3.6	25.9	2.8	12.1
171	10.0	FI(2) 10s	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
172	12.5	FI(5) 20s	4.4	49.3	4.4	49.3	4.4	49.3	3.8	29.6	2.9	13.8
173	20.0	FI(2) 10s	4.6	57.5	4.6	57.5	4.2	43.1	3.4	21.6	2.6	10.1
174	10.0	FI 4s	4.3	46.0	4.3	46.0	4.3	46.0	4.0	34.5	3.1	16.1
175	16.0	FI(2) 5s	4.3	46.0	4.3	46.0	4.2	43.1	3.4	21.6	2.6	10.1
176	30.0	Mo(A) 8s	4.3	46.0	4.0	34.5	3.5	23.0	2.7	11.5	2.1	5.4
177	40.0	FI 2.5s	4.2	43.1	3.9	32.3	3.4	21.6	2.7	10.8	2.0	5.0
178	10.0	FI(3+1) 20 s	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
179	12.0	FI(3+1) 20 s	4.5	51.8	4.5	51.8	4.5	51.8	3.9	32.3	3.0	15.1
180	13.0	FI(3+1) 20 s	4.5	52.8	4.5	52.8	4.5	52.8	3.8	30.4	3.0	14.2
181	14.0	FI(3+1) 20 s	4.5	53.7	4.5	53.7	4.5	53.7	3.7	28.8	2.9	13.4
182	16.0	FI(3+1) 20 s	4.6	55.2	4.6	55.2	4.5	51.8	3.6	25.9	2.8	12.1
183	14.3	FI(2) 7s	4.4	49.3	4.4	49.3	4.4	49.3	3.6	25.9	2.8	12.1
184	16.7	FI(3) 9s	4.4	49.3	4.4	49.3	4.3	44.4	3.4	22.2	2.6	10.4
185	18.2	LFL 11s	4.8	62.7	4.8	62.7	4.5	51.8	3.6	25.9	2.8	12.1
186	33.3	FI(6+1) 15s	4.3	44.4	3.9	33.3	3.4	22.2	2.7	11.1	2.0	5.2
187	37.5	Mo (0) 12s	4.4	48.7	4.0	36.5	3.5	24.4	2.8	12.2	2.1	5.7
188	30.0	Mo (0) 15s	4.7	60.9	4.3	45.7	3.8	30.4	3.0	15.2	2.3	7.1
189	25.0	Q 1S	4.1	38.3	4.0	34.5	3.5	23.0	2.7	11.5	2.1	5.4
190	19.6	Q (3) 4.6s	4.2	41.4	4.2	41.4	3.9	31.7	3.1	15.9	2.3	7.4
191	6.7	FI 7.5s	4.4	49.3	4.4	49.3	4.4	49.3	4.4	49.3	3.6	25.9
192	18.2	FI (4) 11s	4.4	49.3	4.4	49.3	4.2	40.7	3.3	20.3	2.6	9.5

Table B-2: Candela and Range - MEDIUM

Flash Code	Duty Cycle	Flash Character	Range(NIM) Medium 100%	Effective Candela Medium 100%	Range(NIM) Medium 75%	Effective Candela Medium 75%	Range(NIM) Medium 50%	Effective Candela Medium 50%	Range(NIM) Medium 25%	Effective Candela Medium 25%	Range(NIM) Medium 12%	Effective Candela Medium 12%
193	7.1	FL (3) 21s	4.4	49.3	4.4	49.3	4.4	49.3	4.4	49.3	3.5	24.2
194	25.0	FL (3) 6s	4.4	49.3	4.3	44.4	3.8	29.6	3.0	14.8	2.3	6.9
195	15.0	FL(3)10s	4.4	49.3	4.4	49.3	4.4	49.3	3.6	24.6	2.7	11.5
196	30.0	FL(9)15s	4.4	49.3	4.0	37.0	3.6	24.6	2.8	12.3	2.1	5.8
197	66.7	OC(2)6s	3.6	25.9	3.3	19.4	2.9	12.9	2.2	6.5	1.7	3.0
198	62.5	OC(3)8s	3.7	27.6	3.4	20.7	2.9	13.8	2.3	6.9	1.7	3.2
199	60.0	OC(4)10s	3.7	28.8	3.4	21.6	3.0	14.4	2.3	7.2	1.7	3.4
200	16.7	FL(2)6s	4.4	49.3	4.4	49.3	4.3	44.4	3.4	22.2	2.6	10.4
201	6.3	FL(1)8s	4.4	49.3	4.4	49.3	4.4	49.3	4.4	49.3	3.7	27.6
202	6.0	FL(3)15s	4.2	41.4	4.2	41.4	4.2	41.4	4.2	41.4	3.5	24.2
203	8.0	FL(2)5s	4.0	34.5	4.0	34.5	4.0	34.5	3.9	32.3	3.0	15.1
204	25.0	FL(2)4s	4.4	49.3	4.3	44.4	3.8	29.6	3.0	14.8	2.3	6.9
205	13.3	FL(2)4.5s	4.2	41.4	4.2	41.4	4.2	41.4	3.5	23.3	2.7	10.9
206	15.0	FL(3)10s	4.4	49.3	4.4	49.3	4.4	49.3	3.6	24.6	2.7	11.5
207	10.0	FL(3)15s	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
208	25.0	Mo(B)16s	4.4	49.3	4.3	44.4	3.8	29.6	3.0	14.8	2.3	6.9
209	15.0	Q 1s	3.8	29.6	3.8	29.6	3.8	29.6	3.0	14.8	2.3	6.9
210	18.0	FI(2+1) 10s	4.5	51.8	4.5	51.8	4.2	43.1	3.4	21.6	2.6	10.1
211	13.3	MO(U)	4.3	46.0	4.3	46.0	4.3	46.0	3.6	25.9	2.8	12.1
212	16.7	Q 1.2S	4.0	34.5	4.0	34.5	3.8	31.1	3.0	15.5	2.3	7.2
213	6.0	Q(3) 10S	4.0	34.5	4.0	34.5	4.0	34.5	4.0	34.5	3.3	20.1
214	44.0	Q(6)+LFL 15S	4.0	35.3	3.6	26.5	3.2	17.6	2.5	8.8	1.9	4.1
215	12.0	VQ(3) 5S	4.0	34.5	4.0	34.5	4.0	34.5	3.4	21.6	2.6	10.1
216	48.0	VQ(6)+LFL 10S	3.6	25.9	3.3	19.4	2.9	12.9	2.2	6.5	1.7	3.0
217	18.0	VQ(9) 10S	4.0	34.5	4.0	34.5	3.7	28.8	3.0	14.4	2.3	6.7
218	62.5	OC (3) 12S	3.8	29.2	3.4	21.9	3.0	14.6	2.3	7.3	1.7	3.4
219	66.7	OC(4) 12S	3.6	25.9	3.3	19.4	2.9	12.9	2.2	6.5	1.7	3.0
220	25.0	FL(3) 12S	4.6	57.5	4.5	51.8	4.0	34.5	3.2	17.3	2.4	8.1
221	26.7	FL(4) 15S	4.6	57.5	4.4	48.5	3.9	32.3	3.1	16.2	2.4	7.5
222	25.0	FL(5) 20S	4.6	57.5	4.5	51.8	4.0	34.5	3.2	17.3	2.4	8.1
223	33.3	MO(A)	4.5	51.8	4.1	38.8	3.6	25.9	2.9	12.9	2.2	6.0
224	12.5	FL(5) 20S SADO	4.4	49.3	4.4	49.3	4.4	49.3	3.8	29.6	2.9	13.8

Table B-2: Candela and Range - MEDIUM

Flash Code	Duty Cycle	Flash Character	Range(NIM) Medium 100%	Effective Candela Medium 100%	Range(NIM) Medium 75%	Effective Candela Medium 75%	Range(NIM) Medium 50%	Effective Candela Medium 50%	Range(NIM) Medium 25%	Effective Candela Medium 25%	Range(NIM) Medium 12%	Effective Candela Medium 12%
225	13.3	FL(4) 15S	4.4	49.3	4.4	49.3	4.4	49.3	3.7	27.7	2.9	12.9
226	12.5	FL(5) 20S	4.4	49.3	4.4	49.3	4.4	49.3	3.8	29.6	2.9	13.8
227	28.0	Q(6)+LFL 15S	4.0	34.5	3.7	27.7	3.2	18.5	2.5	9.2	1.9	4.3
228	12.0	Q(9) 15S	4.0	34.5	4.0	34.5	4.0	34.5	3.4	21.6	2.6	10.1
229	42.0	VQ(6)+LFL 10S	3.6	24.6	3.2	18.5	2.8	12.3	2.2	6.2	1.6	2.9
230	20.8	CST1	4.6	58.3	4.6	58.3	4.2	42.1	3.4	21.0	2.6	9.8
231	28.6	CST2	4.8	66.8	4.5	52.6	4.0	35.1	3.2	17.5	2.4	8.2
232	37.5	CST3	4.5	54.0	4.2	40.5	3.7	27.0	2.9	13.5	2.2	6.3
233	23.1	CST4	4.8	64.7	4.8	63.1	4.2	42.0	3.4	21.0	2.6	9.8
234	18.8	CST5	4.4	49.3	4.4	49.3	4.1	39.4	3.3	19.7	2.5	9.2
235	8.0	CST6	4.3	46.0	4.3	46.0	4.3	46.0	4.2	43.1	3.3	20.1
236	75.0	CST7	3.5	24.4	3.2	18.3	2.8	12.2	2.2	6.1	1.6	2.8
237	10.0	CST8	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
238	4.5	CST9	4.5	51.8	4.5	51.8	4.5	51.8	4.5	51.8	4.2	40.3
239	20.0	CST10	4.4	49.3	4.4	49.3	4.0	37.0	3.2	18.5	2.5	8.6
240	15.0	CST11	4.2	41.4	4.2	41.4	4.2	41.4	3.4	20.7	2.6	9.7
241	50.0	CST12	4.2	40.1	3.8	30.0	3.3	20.0	2.6	10.0	2.0	4.7
242	77.8	CST13	3.5	24.2	3.2	18.1	2.8	12.1	2.2	6.0	1.6	2.8
243	24.0	CST14	4.3	46.0	4.2	43.1	3.7	28.8	3.0	14.4	2.3	6.7
244	40.0	CST15	4.2	41.4	3.8	31.1	3.4	20.7	2.6	10.4	2.0	4.8
245	32.0	CST16	4.5	51.8	4.1	38.8	3.6	25.9	2.9	12.9	2.2	6.0
246	18.8	CST17	4.4	49.3	4.4	49.3	4.1	39.4	3.3	19.7	2.5	9.2
247	10.0	CST18	4.4	49.3	4.4	49.3	4.4	49.3	4.0	37.0	3.2	17.3
248	13.3	CST19	4.6	55.2	4.6	55.2	4.6	55.2	3.8	31.1	3.0	14.5
249	11.4	CST20	4.6	55.2	4.6	55.2	4.6	55.2	4.0	36.2	3.1	16.9
250	12.5	CST21	4.4	49.3	4.4	49.3	4.4	49.3	3.8	29.6	2.9	13.8
251	20.0	CST22	4.5	53.7	4.5	53.7	4.2	40.3	3.3	20.1	2.6	9.4
252	19.4	CST23	4.5	53.7	4.5	53.7	4.2	41.4	3.4	20.7	2.6	9.7
253	12.7	CST24	4.5	53.7	4.5	53.7	4.5	53.7	3.9	31.6	3.0	14.8

Table B-3: Range and Candela – HIGH

Flash Code	Duty Cycle	Flash Character	Range(NM) High 100%	Effective Candela High 100%	Range(NM) High 75%	Effective Candela High 75%	Range(NM) High 50%	Effective Candela High 50%	Range(NM) High 25%	Effective Candela High 25%	Range(NM) High 12%	Effective Candela High 12%
001	100	fixed	4.2	43.2	3.9	32.4	3.4	21.6	2.7	10.8	2.0	5.0
002	10.0	FI(2) 10s	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
003	10.0	FI(2) 10s	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
004	16.0	FI(2) 10s	5.6	115.2	5.6	115.2	5.5	108.0	4.5	54.0	3.6	25.2
005	20.0	FI(2) 10s	5.7	120.0	5.7	120.0	5.3	90.0	4.3	45.0	3.4	21.0
006	20.0	FI(2) 10s	5.7	120.0	5.7	120.0	5.3	90.0	4.3	45.0	3.4	21.0
007	8.3	FI(2) 12s	5.5	102.9	5.5	102.9	5.5	102.9	5.3	92.6	4.2	43.2
008	25.0	FI(2) 12s	5.8	127.1	5.6	114.4	5.0	76.2	4.1	38.1	3.2	17.8
009	13.3	FI(2) 15s	5.7	120.0	5.7	120.0	5.7	120.0	4.9	67.5	3.9	31.5
010	20.0	FI(2) 5s	5.5	102.9	5.5	102.9	5.0	77.1	4.1	38.6	3.2	18.0
011	40.0	FI(2) 5s	5.3	90.0	4.9	67.5	4.3	45.0	3.5	22.5	2.7	10.5
012	16.7	FI(2) 6s	5.5	102.9	5.5	102.9	5.3	92.6	4.3	46.3	3.4	21.6
013	26.7	FI(2) 6s	5.6	115.2	5.4	97.2	4.8	64.8	3.9	32.4	3.0	15.1
014	33.3	FI(2) 6s	5.5	108.0	5.1	81.0	4.5	54.0	3.7	27.0	2.8	12.6
015	28.6	FI(2) 7s	5.7	120.0	5.3	94.5	4.8	63.0	3.9	31.5	3.0	14.7
016	12.5	FI(2) 8s	5.5	102.9	5.5	102.9	5.5	102.9	4.7	61.7	3.7	28.8
017	25.0	FI(2) 8s	5.7	120.0	5.5	108.0	4.9	72.0	4.0	36.0	3.1	16.8
018	15.0	FI(2+1) 10s	5.5	102.9	5.5	102.9	5.5	102.9	4.5	51.4	3.5	24.0
019	20.0	FI(2+1) 12s	5.6	115.2	5.6	115.2	5.2	86.4	4.2	43.2	3.3	20.2
020	25.0	FI(2+1) 12s	5.7	120.0	5.5	108.0	4.9	72.0	4.0	36.0	3.1	16.8
021	20.0	FI(2+1) 15s	5.7	120.0	5.7	120.0	5.3	90.0	4.3	45.0	3.4	21.0
022	15.0	FI(2+1) 6s	5.2	86.4	5.2	86.4	5.2	86.4	4.2	43.2	3.3	20.2
023	12.5	FI(3) 12S	5.5	102.9	5.5	102.9	5.5	102.9	4.7	61.7	3.7	28.8
024	15.0	FI(3) 10s	5.5	102.9	5.5	102.9	5.5	102.9	4.5	51.4	3.5	24.0
025	30.0	FI(3) 10s	5.7	120.0	5.3	90.0	4.7	60.0	3.8	30.0	2.9	14.0
026	20.0	FI(3) 12s	5.6	115.2	5.6	115.2	5.2	86.4	4.2	43.2	3.3	20.2
027	6.0	FI(3) 15s	5.2	86.4	5.2	86.4	5.2	86.4	5.2	86.4	4.5	50.4
028	10.0	FI(3) 15s	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
029	7.5	FI(3) 20s	5.5	102.9	5.5	102.9	5.5	102.9	5.5	102.9	4.4	48.0
030	26.7	FI(3) 9s	5.6	115.2	5.4	97.2	4.8	64.8	3.9	32.4	3.0	15.1
031	20.0	FI(4) 10s	5.5	102.9	5.5	102.9	5.0	77.1	4.1	38.6	3.2	18.0
032	32.0	FI(4) 10s	5.5	108.0	5.1	81.0	4.5	54.0	3.7	27.0	2.8	12.6
033	26.7	FI(4) 12s	5.6	115.2	5.4	97.2	4.8	64.8	3.9	32.4	3.0	15.1

Table B-3: Range and Candela – HIGH

Flash Code	Duty Cycle	Flash Character	Range(NM) High 100%	Effective Candela High 100%	Range(NM) High 75%	Effective Candela High 75%	Range(NM) High 50%	Effective Candela High 50%	Range(NM) High 25%	Effective Candela High 25%	Range(NM) High 12%	Effective Candela High 12%
034	13.3	FI(4) 15s	5.5	102.9	5.5	102.9	5.5	102.9	4.6	57.9	3.7	27.0
035	26.7	FI(4) 15s	5.7	120.0	5.4	101.3	4.9	67.5	3.9	33.8	3.1	15.8
036	10.0	FI(4) 20s	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
037	20.0	FI(5) 20s	5.6	115.2	5.6	115.2	5.2	86.4	4.2	43.2	3.3	20.2
038	25.0	FI(5) 20s	5.7	120.0	5.5	108.0	4.9	72.0	4.0	36.0	3.1	16.8
039	20.0	FI(6) 15s	5.5	102.9	5.5	102.9	5.0	77.1	4.1	38.6	3.2	18.0
040	75.0	FL-	4.4	48.0	4.0	36.0	3.5	24.0	2.8	12.0	2.1	5.6
041	70.0	FL-	4.5	51.4	4.1	38.6	3.6	25.7	2.9	12.9	2.2	6.0
042	20.0	FI 1.5s	5.2	86.4	5.2	86.4	4.8	64.8	3.9	32.4	3.0	15.1
043	33.3	FI 1.5s	5.3	92.6	4.9	69.4	4.3	46.3	3.5	23.1	2.7	10.8
044	5.0	FI 10s	5.5	102.9	5.5	102.9	5.5	102.9	5.5	102.9	4.9	72.0
045	10.0	FI 10s	5.7	120.0	5.7	120.0	5.7	120.0	5.3	90.0	4.2	42.0
046	15.0	FI 10s	5.8	127.1	5.8	127.1	5.8	127.1	4.8	63.5	3.8	29.6
047	10.0	FI 12s	5.7	123.4	5.7	123.4	5.7	123.4	5.3	92.6	4.2	43.2
048	6.7	FI 15s	5.7	120.0	5.7	120.0	5.7	120.0	5.7	120.0	4.8	63.0
049	12.0	FI 2.5s	5.2	86.4	5.2	86.4	5.2	86.4	4.5	54.0	3.6	25.2
050	20.0	FI 2.5s	5.5	102.9	5.5	102.9	5.0	77.1	4.1	38.6	3.2	18.0
051	10.7	FI 2.8s	5.2	86.4	5.2	86.4	5.2	86.4	4.7	60.5	3.7	28.2
052	10.0	FI 2s	4.9	72.0	4.9	72.0	4.9	72.0	4.5	54.0	3.6	25.2
053	15.0	FI 2s	5.2	86.4	5.2	86.4	5.2	86.4	4.2	43.2	3.3	20.2
054	20.0	FI 2s	5.4	96.0	5.4	96.0	4.9	72.0	4.0	36.0	3.1	16.8
055	25.0	FI 2s	5.5	102.9	5.3	92.6	4.7	61.7	3.8	30.9	3.0	14.4
056	35.0	FI 2s	5.4	96.0	4.9	72.0	4.4	48.0	3.5	24.0	2.7	11.2
057	40.0	FI 2s	5.2	86.4	4.8	64.8	4.2	43.2	3.4	21.6	2.6	10.1
058	10.0	FI 3s	5.2	86.4	5.2	86.4	5.2	86.4	4.8	64.8	3.8	30.2
059	16.7	FI 3s	5.5	102.9	5.5	102.9	5.3	92.6	4.3	46.3	3.4	21.6
060	23.3	FI 3s	5.6	112.0	5.5	108.0	4.9	72.0	4.0	36.0	3.1	16.8
061	33.3	FI 3s	5.5	108.0	5.1	81.0	4.5	54.0	3.7	27.0	2.8	12.6
062	30.2	FI 4.3s	5.7	123.8	5.3	92.9	4.7	61.9	3.8	31.0	3.0	14.4
063	9.1	FI 4.4s	5.4	96.0	5.4	96.0	5.4	96.0	5.1	79.2	4.0	37.0
064	12.5	FI 4s	5.5	102.9	5.5	102.9	5.5	102.9	4.7	61.7	3.7	28.8
065	20.0	FI 4s	5.6	115.2	5.6	115.2	5.2	86.4	4.2	43.2	3.3	20.2

Table B-3: Range and Candela – HIGH

Flash Code	Duty Cycle	Flash Character	Range(NM) High 100%	Effective Candela High 100%	Range(NM) High 75%	Effective Candela High 75%	Range(NM) High 50%	Effective Candela High 50%	Range(NM) High 25%	Effective Candela High 25%	Range(NM) High 12%	Effective Candela High 12%
066	25.0	FI 4s	5.7	120.0	5.5	108.0	4.9	72.0	4.0	36.0	3.1	16.8
067	37.5	FI 4s	5.4	101.6	5.0	76.2	4.5	50.8	3.6	25.4	2.8	11.9
068	6.0	FI 5s	5.2	86.4	5.2	86.4	5.2	86.4	5.2	86.4	4.5	50.4
069	10.0	FI 5s	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
070	20.0	FI 5s	5.7	120.0	5.7	120.0	5.3	90.0	4.3	45.0	3.4	21.0
071	25.0	FI 6s	5.8	127.1	5.6	114.4	5.0	76.2	4.1	38.1	3.2	17.8
072	8.3	FI 6s	5.5	102.9	5.5	102.9	5.5	102.9	5.3	92.6	4.2	43.2
073	10.0	FI 6s	5.5	108.0	5.5	108.0	5.5	108.0	5.1	81.0	4.1	37.8
074	16.7	FI 6s	5.7	120.0	5.7	120.0	5.5	108.0	4.5	54.0	3.6	25.2
075	30.0	FI 5s	5.8	127.1	5.4	95.3	4.8	63.5	3.9	31.8	3.0	14.8
076	10.7	FI 7.5s	5.6	115.2	5.6	115.2	5.6	115.2	5.1	81.0	4.1	37.8
077	50.0	ISO 10S	5.1	83.1	4.7	62.3	4.2	41.5	3.4	20.8	2.6	9.7
078	50.0	ISO 2S	4.9	72.0	4.5	54.0	4.0	36.0	3.2	18.0	2.5	8.4
079	50.0	ISO 4S	5.1	78.5	4.7	58.9	4.1	39.3	3.3	19.6	2.5	9.2
080	50.0	ISO 5S	5.1	80.0	4.7	60.0	4.1	40.0	3.3	20.0	2.5	9.3
081	50.0	ISO 6S	5.1	81.0	4.7	60.8	4.2	40.5	3.3	20.3	2.6	9.5
082	50.0	ISO 8S	5.1	82.3	4.7	61.7	4.2	41.1	3.4	20.6	2.6	9.6
083	50.0	ISO 3S	5.0	76.2	4.6	57.2	4.1	38.1	3.3	19.1	2.5	8.9
084	20.0	LFL 10S	5.8	130.9	5.8	130.9	5.4	98.2	4.4	49.1	3.5	22.9
085	30.0	LFL 10S	5.9	135.0	5.4	101.3	4.9	67.5	3.9	33.8	3.1	15.8
086	40.0	LFL 10S	5.5	102.9	5.0	77.1	4.5	51.4	3.6	25.7	2.8	12.0
087	16.7	LFL 12S	5.8	130.9	5.8	130.9	5.7	117.8	4.7	58.9	3.7	27.5
088	26.7	LFL 15S	5.9	137.1	5.6	115.7	5.0	77.1	4.1	38.6	3.2	18.0
089	40.0	LFL 5S	5.4	98.2	5.0	73.6	4.4	49.1	3.6	24.5	2.7	11.5
090	33.3	LFL 6S	5.7	117.8	5.2	88.4	4.7	58.9	3.8	29.5	2.9	13.7
091	25.0	LFL 8S	5.8	130.9	5.7	117.8	5.1	78.5	4.1	39.3	3.2	18.3
092	37.5	LFL 8S	5.5	108.0	5.1	81.0	4.5	54.0	3.7	27.0	2.8	12.6
093	20.0	MO(A) 10S	5.5	102.9	5.5	102.9	5.0	77.1	4.1	38.6	3.2	18.0
094	16.7	MO(A) 15s	5.5	102.9	5.5	102.9	5.3	92.6	4.3	46.3	3.4	21.6
095	21.7	MO(A) 6s	5.2	86.4	5.2	86.4	4.7	59.8	3.8	29.9	2.9	14.0
096	40.0	MO(A) 8s	5.2	86.4	4.8	64.8	4.2	43.2	3.4	21.6	2.6	10.1
097	20.0	MO(B) 15S	5.5	102.9	5.5	102.9	5.0	77.1	4.1	38.6	3.2	18.0
098	15.0	MO(U) 10S	5.2	86.4	5.2	86.4	5.2	86.4	4.2	43.2	3.3	20.2

Table B-3: Range and Candela – HIGH

Flash Code	Duty Cycle	Flash Character	Range(NM) High 100%	Effective Candela High 100%	Range(NM) High 75%	Effective Candela High 75%	Range(NM) High 50%	Effective Candela High 50%	Range(NM) High 25%	Effective Candela High 25%	Range(NM) High 12%	Effective Candela High 12%
099	20.0	MO(U) 10S	5.4	96.0	5.4	96.0	4.9	72.0	4.0	36.0	3.1	16.8
100	25.0	MO(U) 10S	5.5	102.9	5.3	92.6	4.7	61.7	3.8	30.9	3.0	14.4
101	16.7	MO(U) 15S	5.5	102.9	5.5	102.9	5.3	92.6	4.3	46.3	3.4	21.6
102	17.3	MO(U) 15S	5.5	108.0	5.5	108.0	5.3	93.5	4.4	46.7	3.4	21.8
103	22.0	MO(U) 15S	5.6	112.0	5.6	112.0	5.0	76.4	4.1	38.2	3.2	17.8
104	23.3	MO(U) 15S	5.6	112.0	5.5	108.0	4.9	72.0	4.0	36.0	3.1	16.8
105	23.3	MO(U) 15S	5.6	113.7	5.6	109.6	5.0	73.1	4.0	36.5	3.1	17.1
106	35.5	MO(U) 15S	5.5	103.6	5.1	77.7	4.5	51.8	3.6	25.9	2.8	12.1
107	39.3	MO(U) 15S	5.3	95.2	4.9	71.4	4.4	47.6	3.5	23.8	2.7	11.1
108	21.0	MO(U) 15S	5.6	113.7	5.6	113.7	5.1	81.2	4.2	40.6	3.3	18.9
109	15.0	MO(U) 15S	5.4	99.7	5.4	99.7	5.4	99.7	4.4	49.8	3.5	23.3
110	17.0	MO(U) 15S	5.5	105.6	5.5	105.6	5.3	93.2	4.3	46.6	3.4	21.7
111	18.0	MO(U) 15S	5.5	108.0	5.5	108.0	5.3	90.0	4.3	45.0	3.4	21.0
112	10.0	MO(U) 10S	4.9	72.0	4.9	72.0	4.9	72.0	4.5	54.0	3.6	25.2
113	70.0	OC 10S	4.7	60.0	4.3	45.0	3.8	30.0	3.0	15.0	2.3	7.0
114	75.0	OC 10S	4.6	56.1	4.2	42.1	3.7	28.1	2.9	14.0	2.2	6.5
115	66.7	OC 15S	4.8	63.5	4.4	47.6	3.9	31.8	3.1	15.9	2.3	7.4
116	66.7	OC 3S	4.7	58.9	4.3	44.2	3.8	29.5	3.0	14.7	2.3	6.9
117	83.3	OC 3S	4.4	48.0	4.0	36.0	3.5	24.0	2.8	12.0	2.1	5.6
118	75.0	OC 4S	4.5	54.0	4.2	40.5	3.7	27.0	2.9	13.5	2.2	6.3
119	60.0	OC 5S	4.9	67.5	4.5	50.6	3.9	33.8	3.1	16.9	2.4	7.9
120	80.0	OC 5S	4.5	51.4	4.1	38.6	3.6	25.7	2.9	12.9	2.2	6.0
121	90.0	OC 5S	4.3	46.0	4.0	34.5	3.5	23.0	2.7	11.5	2.1	5.4
122	66.7	OC 6S	4.7	61.7	4.3	46.3	3.8	30.9	3.0	15.4	2.3	7.2
123	75.0	OC 6S	4.6	55.1	4.2	41.4	3.7	27.6	2.9	13.8	2.2	6.4
124	83.3	OC 6S	4.4	49.8	4.1	37.4	3.6	24.9	2.8	12.5	2.1	5.8
125	25.0	Q 1.2S	5.2	86.4	5.1	77.8	4.5	51.8	3.6	25.9	2.8	12.1
126	41.7	Q 1.2S	5.0	74.1	4.6	55.5	4.1	37.0	3.2	18.5	2.5	8.6
127	50.0	Q 1.2S	4.8	64.8	4.4	48.6	3.9	32.4	3.1	16.2	2.4	7.6
128	20.0	Q 1S	4.9	72.0	4.9	72.0	4.5	54.0	3.7	27.0	2.8	12.6
129	30.0	Q 1S	5.2	86.4	4.8	64.8	4.2	43.2	3.4	21.6	2.6	10.1
130	40.0	Q 1S	4.9	72.0	4.5	54.0	4.0	36.0	3.2	18.0	2.5	8.4

Table B-3: Range and Candela – HIGH

Flash Code	Duty Cycle	Flash Character	Range(NM) High 100%	Effective Candela High 100%	Range(NM) High 75%	Effective Candela High 75%	Range(NM) High 50%	Effective Candela High 50%	Range(NM) High 25%	Effective Candela High 25%	Range(NM) High 12%	Effective Candela High 12%
131	50.0	Q 1S	4.7	61.7	4.3	46.3	3.8	30.9	3.0	15.4	2.3	7.2
132	80.0	Q 1S	4.2	43.2	3.9	32.4	3.4	21.6	2.7	10.8	2.0	5.0
133	10.0	Q(2) 10S	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
134	12.0	Q(2) 10S	5.5	108.0	5.5	108.0	5.5	108.0	4.9	67.5	3.9	31.5
135	12.0	Q(2) 5S	5.2	86.4	5.2	86.4	5.2	86.4	4.5	54.0	3.6	25.2
136	10.0	Q(2) 6S	5.2	86.4	5.2	86.4	5.2	86.4	4.8	64.8	3.8	30.2
137	11.7	Q(2) 6S	5.3	91.6	5.3	91.6	5.3	91.6	4.7	58.9	3.7	27.5
138	9.0	Q(3) 10S	5.2	86.4	5.2	86.4	5.2	86.4	4.9	72.0	3.9	33.6
139	10.5	Q(3) 10S	5.3	91.6	5.3	91.6	5.3	91.6	4.8	65.5	3.8	30.5
140	18.0	Q(3) 10S	5.5	108.0	5.5	108.0	5.3	90.0	4.3	45.0	3.4	21.0
141	12.0	Q(4) 10S	5.2	86.4	5.2	86.4	5.2	86.4	4.5	54.0	3.6	25.2
142	10.0	Q(4) 12S	5.2	86.4	5.2	86.4	5.2	86.4	4.8	64.8	3.8	30.2
143	9.3	Q(4) 15S	5.3	91.6	5.3	91.6	5.3	91.6	5.0	73.6	4.0	34.4
144	10.0	Q(4) 20S	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
145	26.7	Q(4) 6S	5.4	96.0	5.1	81.0	4.5	54.0	3.7	27.0	2.8	12.6
146	15.0	Q(5) 10S	5.2	86.4	5.2	86.4	5.2	86.4	4.2	43.2	3.3	20.2
147	7.5	Q(5) 20S	5.2	86.4	5.2	86.4	5.2	86.4	5.2	86.4	4.2	40.3
148	12.5	Q(5) 20S	5.5	102.9	5.5	102.9	5.5	102.9	4.7	61.7	3.7	28.8
149	21.4	Q(5) 7S	5.2	86.4	5.2	86.4	4.7	60.5	3.8	30.2	3.0	14.1
150	18.0	Q(6) 10S	5.2	86.4	5.2	86.4	4.9	72.0	4.0	36.0	3.1	16.8
151	25.3	Q(6)+LFL 15S	5.2	86.4	5.0	76.7	4.5	51.2	3.6	25.6	2.8	11.9
152	21.0	Q(6)+LFL 15S	5.3	91.6	5.3	91.6	4.8	65.5	3.9	32.7	3.0	15.3
153	37.3	Q(6)+LFL 15S	5.2	86.8	4.8	65.1	4.3	43.4	3.4	21.7	2.6	10.1
154	18.0	Q(9) 15S	5.2	86.4	5.2	86.4	4.9	72.0	4.0	36.0	3.1	16.8
155	21.0	Q(9) 15S	5.3	91.6	5.3	91.6	4.8	65.5	3.9	32.7	3.0	15.3
156	36.0	Q(9) 15S	5.3	90.0	4.9	67.5	4.3	45.0	3.5	22.5	2.7	10.5
157	30.0	VQ 0.5S	4.7	61.7	4.3	46.3	3.8	30.9	3.0	15.4	2.3	7.2
158	40.0	VQ 0.5S	4.5	54.0	4.2	40.5	3.7	27.0	2.9	13.5	2.2	6.3
159	33.3	VQ 0.6S	4.8	64.8	4.4	48.6	3.9	32.4	3.1	16.2	2.4	7.6
160	50.0	VQ 0.6S	4.5	51.8	4.1	38.9	3.6	25.9	2.9	13.0	2.2	6.0
161	9.0	VQ(3) 5S	4.7	61.7	4.7	61.7	4.7	61.7	4.5	51.4	3.5	24.0
162	12.0	VQ(3) 5S	4.9	72.0	4.9	72.0	4.9	72.0	4.3	45.0	3.4	21.0
163	18.0	VQ(3) 5S	5.2	86.4	5.2	86.4	4.9	72.0	4.0	36.0	3.1	16.8

Table B-3: Range and Candela – HIGH

Flash Code	Duty Cycle	Flash Character	Range(NM) High 100%	Effective Candela High 100%	Range(NM) High 75%	Effective Candela High 75%	Range(NM) High 50%	Effective Candela High 50%	Range(NM) High 25%	Effective Candela High 25%	Range(NM) High 12%	Effective Candela High 12%
164	32.0	VQ(6)+LFL 10S	4.9	67.5	4.5	50.6	3.9	33.8	3.1	16.9	2.4	7.9
165	38.0	VQ(6)+LFL 10S	4.9	68.2	4.5	51.2	3.9	34.1	3.1	17.1	2.4	8.0
166	13.5	VQ(9) 10S	4.7	61.7	4.7	61.7	4.7	61.7	4.0	34.3	3.1	16.0
167	18.0	VQ(9) 10S	4.9	72.0	4.9	72.0	4.7	60.0	3.8	30.0	2.9	14.0
168	27.0	VQ(9) 10S	5.2	86.4	4.9	72.0	4.4	48.0	3.5	24.0	2.7	11.2
169	14.3	Q(2) 7S	5.5	102.9	5.5	102.9	5.5	102.9	4.5	54.0	3.6	25.2
170	12.0	FI(2) 5s	5.2	86.4	5.2	86.4	5.2	86.4	4.5	54.0	3.6	25.2
171	10.0	FI(2) 10s	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
172	12.5	FI(5) 20s	5.5	102.9	5.5	102.9	5.5	102.9	4.7	61.7	3.7	28.8
173	20.0	FI(2) 10s	5.7	120.0	5.7	120.0	5.3	90.0	4.3	45.0	3.4	21.0
174	10.0	FI 4s	5.4	96.0	5.4	96.0	5.4	96.0	4.9	72.0	3.9	33.6
175	16.0	FI(2) 5s	5.4	96.0	5.4	96.0	5.3	90.0	4.3	45.0	3.4	21.0
176	30.0	Mo(A) 8s	5.4	96.0	4.9	72.0	4.4	48.0	3.5	24.0	2.7	11.2
177	40.0	FI 2.5s	5.3	90.0	4.9	67.5	4.3	45.0	3.5	22.5	2.7	10.5
178	10.0	FI(3+1) 20 s	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
179	12.0	FI(3+1) 20 s	5.5	108.0	5.5	108.0	5.5	108.0	4.9	67.5	3.9	31.5
180	13.0	FI(3+1) 20 s	5.6	110.1	5.6	110.1	5.6	110.1	4.8	63.5	3.8	29.6
181	14.0	FI(3+1) 20 s	5.6	112.0	5.6	112.0	5.6	112.0	4.7	60.0	3.7	28.0
182	16.0	FI(3+1) 20 s	5.6	115.2	5.6	115.2	5.5	108.0	4.5	54.0	3.6	25.2
183	14.3	FI(2) 7s	5.5	102.9	5.5	102.9	5.5	102.9	4.5	54.0	3.6	25.2
184	16.7	FI(3) 9s	5.5	102.9	5.5	102.9	5.3	92.6	4.3	46.3	3.4	21.6
185	18.2	LFL 11s	5.8	130.9	5.8	130.9	5.5	108.0	4.5	54.0	3.6	25.2
186	33.3	FI(6+1) 15s	5.3	92.6	4.9	69.4	4.3	46.3	3.5	23.1	2.7	10.8
187	37.5	Mo (0) 12s	5.4	101.6	5.0	76.2	4.5	50.8	3.6	25.4	2.8	11.9
188	30.0	Mo (0) 15s	5.8	127.1	5.4	95.3	4.8	63.5	3.9	31.8	3.0	14.8
189	25.0	Q 1S	5.1	80.0	4.9	72.0	4.4	48.0	3.5	24.0	2.7	11.2
190	19.6	Q (3) 4.6s	5.2	86.4	5.2	86.4	4.8	66.2	3.9	33.1	3.0	15.5
191	6.7	FI 7.5s	5.5	102.9	5.5	102.9	5.5	102.9	5.5	102.9	4.5	54.0
192	18.2	FI (4) 11s	5.5	102.9	5.5	102.9	5.2	84.9	4.2	42.4	3.3	19.8
193	7.1	FL (3) 21s	5.5	102.9	5.5	102.9	5.5	102.9	5.5	102.9	4.5	50.4
194	25.0	FL (3) 6s	5.5	102.9	5.3	92.6	4.7	61.7	3.8	30.9	3.0	14.4
195	15.0	FL(3)10s	5.5	102.9	5.5	102.9	5.5	102.9	4.5	51.4	3.5	24.0

Table B-3: Range and Candela – HIGH

Flash Code	Duty Cycle	Flash Character	Range(NM) High 100%	Effective Candela High 100%	Range(NM) High 75%	Effective Candela High 75%	Range(NM) High 50%	Effective Candela High 50%	Range(NM) High 25%	Effective Candela High 25%	Range(NM) High 12%	Effective Candela High 12%
196	30.0	FL(9)15s	5.5	102.9	5.0	77.1	4.5	51.4	3.6	25.7	2.8	12.0
197	66.7	OC(2)6s	4.5	54.0	4.2	40.5	3.7	27.0	2.9	13.5	2.2	6.3
198	62.5	OC(3)8s	4.6	57.6	4.2	43.2	3.7	28.8	3.0	14.4	2.3	6.7
199	60.0	OC(4)10s	4.7	60.0	4.3	45.0	3.8	30.0	3.0	15.0	2.3	7.0
200	16.7	FL(2)6s	5.5	102.9	5.5	102.9	5.3	92.6	4.3	46.3	3.4	21.6
201	6.3	FL(1)8s	5.5	102.9	5.5	102.9	5.5	102.9	5.5	102.9	4.6	57.6
202	6.0	FL(3)15s	5.2	86.4	5.2	86.4	5.2	86.4	5.2	86.4	4.5	50.4
203	8.0	FL(2)5s	4.9	72.0	4.9	72.0	4.9	72.0	4.9	67.5	3.9	31.5
204	25.0	FL(2)4s	5.5	102.9	5.3	92.6	4.7	61.7	3.8	30.9	3.0	14.4
205	13.3	FL(2)4.5s	5.2	86.4	5.2	86.4	5.2	86.4	4.4	48.6	3.5	22.7
206	15.0	FL(3)10s	5.5	102.9	5.5	102.9	5.5	102.9	4.5	51.4	3.5	24.0
207	10.0	FL(3)15s	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
208	25.0	Mo(B)16s	5.5	102.9	5.3	92.6	4.7	61.7	3.8	30.9	3.0	14.4
209	15.0	Q 1s	4.7	61.7	4.7	61.7	4.7	61.7	3.8	30.9	3.0	14.4
210	18.0	FI(2+1) 10s	5.5	108.0	5.5	108.0	5.3	90.0	4.3	45.0	3.4	21.0
211	13.3	MO(U)	5.4	96.0	5.4	96.0	5.4	96.0	4.5	54.0	3.6	25.2
212	16.7	Q 1.2S	4.9	72.0	4.9	72.0	4.8	64.8	3.9	32.4	3.0	15.1
213	6.0	Q(3) 10S	4.9	72.0	4.9	72.0	4.9	72.0	4.9	72.0	4.2	42.0
214	44.0	Q(6)+LFL 15S	5.0	73.6	4.6	55.2	4.0	36.8	3.2	18.4	2.5	8.6
215	12.0	VQ(3) 5S	4.9	72.0	4.9	72.0	4.9	72.0	4.3	45.0	3.4	21.0
216	48.0	VQ(6)+LFL 10S	4.5	54.0	4.2	40.5	3.7	27.0	2.9	13.5	2.2	6.3
217	18.0	VQ(9) 10S	4.9	72.0	4.9	72.0	4.7	60.0	3.8	30.0	2.9	14.0
218	62.5	OC (3) 12S	4.7	61.0	4.3	45.7	3.8	30.5	3.0	15.2	2.3	7.1
219	66.7	OC(4) 12S	4.5	54.0	4.2	40.5	3.7	27.0	2.9	13.5	2.2	6.3
220	25.0	FL(3) 12S	5.7	120.0	5.5	108.0	4.9	72.0	4.0	36.0	3.1	16.8
221	26.7	FL(4) 15S	5.7	120.0	5.4	101.3	4.9	67.5	3.9	33.8	3.1	15.8
222	25.0	FL(5) 20S	5.7	120.0	5.5	108.0	4.9	72.0	4.0	36.0	3.1	16.8
223	33.3	MO(A)	5.5	108.0	5.1	81.0	4.5	54.0	3.7	27.0	2.8	12.6
224	12.5	FL(5) 20S SADO	5.5	102.9	5.5	102.9	5.5	102.9	4.7	61.7	3.7	28.8
225	13.3	FL(4) 15S	5.5	102.9	5.5	102.9	5.5	102.9	4.6	57.9	3.7	27.0
226	12.5	FL(5) 20S	5.5	102.9	5.5	102.9	5.5	102.9	4.7	61.7	3.7	28.8
227	28.0	Q(6)+LFL 15S	4.9	72.0	4.6	57.9	4.1	38.6	3.3	19.3	2.5	9.0
228	12.0	Q(9) 15S	4.9	72.0	4.9	72.0	4.9	72.0	4.3	45.0	3.4	21.0

Table B-3: Range and Candela – HIGH

Flash Code	Duty Cycle	Flash Character	Range(NM) High 100%	Effective Candela High 100%	Range(NM) High 75%	Effective Candela High 75%	Range(NM) High 50%	Effective Candela High 50%	Range(NM) High 25%	Effective Candela High 25%	Range(NM) High 12%	Effective Candela High 12%
229	42.0	VQ(6)+LFL 10S	4.5	51.4	4.1	38.6	3.6	25.7	2.9	12.9	2.2	6.0
230	20.8	CST1	5.7	121.7	5.7	121.7	5.2	87.8	4.3	43.9	3.3	20.5
231	28.6	CST2	5.9	139.4	5.6	109.7	5.0	73.2	4.0	36.6	3.1	17.1
232	37.5	CST3	5.6	112.7	5.2	84.5	4.6	56.3	3.7	28.2	2.9	13.1
233	23.1	CST4	5.9	135.0	5.8	131.6	5.2	87.8	4.3	43.9	3.3	20.5
234	18.8	CST5	5.5	102.9	5.5	102.9	5.1	82.3	4.2	41.1	3.3	19.2
235	8.0	CST6	5.4	96.0	5.4	96.0	5.4	96.0	5.3	90.0	4.2	42.0
236	75.0	CST7	4.5	50.8	4.1	38.1	3.6	25.4	2.8	12.7	2.2	5.9
237	10.0	CST8	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
238	4.5	CST9	5.5	108.0	5.5	108.0	5.5	108.0	5.5	108.0	5.2	84.0
239	20.0	CST10	5.5	102.9	5.5	102.9	5.0	77.1	4.1	38.6	3.2	18.0
240	15.0	CST11	5.2	86.4	5.2	86.4	5.2	86.4	4.2	43.2	3.3	20.2
241	50.0	CST12	5.2	83.6	4.7	62.7	4.2	41.8	3.4	20.9	2.6	9.8
242	77.8	CST13	4.5	50.5	4.1	37.9	3.6	25.2	2.8	12.6	2.1	5.9
243	24.0	CST14	5.4	96.0	5.3	90.0	4.7	60.0	3.8	30.0	2.9	14.0
244	40.0	CST15	5.2	86.4	4.8	64.8	4.2	43.2	3.4	21.6	2.6	10.1
245	32.0	CST16	5.5	108.0	5.1	81.0	4.5	54.0	3.7	27.0	2.8	12.6
246	18.8	CST17	5.5	102.9	5.5	102.9	5.1	82.3	4.2	41.1	3.3	19.2
247	10.0	CST18	5.5	102.9	5.5	102.9	5.5	102.9	5.0	77.1	4.0	36.0
248	13.3	CST19	5.6	115.2	5.6	115.2	5.6	115.2	4.8	64.8	3.8	30.2
249	11.4	CST20	5.6	115.2	5.6	115.2	5.6	115.2	5.0	75.6	4.0	35.3
250	12.5	CST21	5.5	102.9	5.5	102.9	5.5	102.9	4.7	61.7	3.7	28.8
251	20.0	CST22	5.6	112.0	5.6	112.0	5.2	84.0	4.2	42.0	3.3	19.6
252	19.4	CST23	5.6	112.0	5.6	112.0	5.2	86.4	4.2	43.2	3.3	20.2
253	12.7	CST24	5.6	112.0	5.6	112.0	5.6	112.0	4.8	66.0	3.8	30.8

Appendix C: Troubleshooting

Problem	Possible Cause	Recommendation
The M708 lantern does not turn on.	The ambient environmental light is too bright.	The M708 lantern automatically turns on in the dark. Test it in a dark environment or by covering the head of the M708 with an opaque cloth.
	The M708 lantern has been turned off by using flash code 000.	Transition the lantern and turn it on with the programmer. See section 3.1 <i>Preparing the M708 Lantern for Programming</i> .
	The M708 battery is discharged.	<p>If none of the three battery indicator LEDs (red, amber or green) inside the lens are illuminated, follow the charging instructions as described in section 5.2 <i>Charging the M708 Lantern</i>.</p> <p>If the M708 lantern has been stored in darkness too long and has not received regular recharging, the batteries may be damaged by sulphation and may not accept a charge.</p>
The M708 lantern does not respond to the infrared programmer.	The M708 lantern has not been transitioned.	Transition the M708 lantern by following the directions in Section 3.3.1 <i>Transitioning the M708 Lantern Before Programming</i> . The M708 requires approximately 60 to 90 seconds to transition.
	The infrared programmer is not operating.	Ensure the programmer batteries are charged and installed correctly in the programmer.
	Weak infrared signal and/or interference from other infrared sources.	Operate the programmer with it close to and pointed directly at the lens.
M708 lantern is dim	The ALC (Automatic Light Control) function is active.	Activation of ALC is an indication that the M708 lantern settings are unsustainable for the amount of sunlight in the deployment location. Charge as described in section 5.2 <i>Charging the M708 Lantern</i> and then configure the M708 with different settings. Contact Carmanah for assistance.
	Peak power and intensity levels are set low.	The brightness of the M708 lantern is controlled by the range setting, intensity setting and flash code. Refer to <i>Appendix B: Candela and Range Tables</i> to verify the level settings for the desired flash code and range. Increasing the brightness of the M708 should only be done with approval by Carmanah after Carmanah has verified by solar simulation that the new settings are sustainable.



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