







VEGA INDUSTRIES LIMITED

Vega TVIR Programmer Instruction Manual

For programming of the Vega LED lights listed below



INFRA-RED PROGRAMMER

 VLB-44 , 2.5°, 5° and 10° Single or Multi-tier LED Lantern	From serial number: VLB-44 44 – 416 VLB-48 48 - 1759 From software version: VLB-44 2.0.8 VLB-48 2.0.8 Beacon IR receiver is in the window above the photo sensor
 VLB-36 Self Contained and Stand alone Solar Marine LED Lantern	From serial Number: VLB-36 36 - 284 From software version: VLB-36 2.0.5 Some Lanterns in this number range can have a piezo-switch programmer instead
 VLS-46 , 5° LED Sector Light Projector	From serial Number: VLS-46 146-0075 From software version: VLS-46 2.0.5 With plastic rear cover and both mounting feet under the barrel
 VLL-43 Marine LED Linear Lead Light	From serial Number: VLL-43 43-0500 From software version: VLL-43 2.0.5 With second cable gland to allow any number of units to be wired together for synchronised operation.
Status:	Approved by AHT

PLEASE READ THESE INSTRUCTIONS BEFORE OPERATION

Manual revision history

Manual Version	Description of Change	Date manual released	Software version	Light Serial number
1.0.0	Remote 02 introduced	November 2008		
1.0.1	VLB-67 TVIR programming instruction	February 2010		
1.0.2	Day and Day/Night programming options removed	March 2010		
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VEGA INDUSTRIES LIMITED

21 Heriot Drive, Porirua 5022, New Zealand

Tel: +64 4 238 0200; Fax: +64 4 237 4392

E-mail: sales@vega.co.nzWeb: <http://www.vega.co.nz>**Product Warranty**

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Table of Contents

1. Introduction and programming overview.....	4
1.1. Introduction	4
1.2. Programming Syntax.....	4
1.3. Visual feedback.....	5
2. Items to Note	5
2.1. The light will not enter Programming Mode.....	5
3. Getting Started	6
3.1. Becoming familiar with the Syntax and Flash feedback.....	6
3.2. Deciding what Settings are required	8
3.3. Programming or Reading Multiple Settings.....	8
4. Programming Features	8
4.1. Flash Character.....	8
4.2. Custom Flash Character.	8
4.3. Day/Night use of the light	9
4.4. Intensity Settings.....	9
4.5. Synchronising options	10
4.6. VLB-44 Beacon Additional Sync options.....	11
4.7. Day/Night Transition Synchronisation	11
4.8. Operation Mode	11
4.9. Programming Mode.....	12
4.10. Battery Thresholds	12
4.11. System Checks	12
4.12. Security PIN number	13
User Notes	13
Appendix A Programming Syntax.....	14
Appendix B Worksheet for a Custom Character.....	16
Appendix C Light Settings	17
Appendix D Flash character table with programming codes	18
Appendix E Battery Replacement.....	24
Appendix F Specifications.....	25

1. Introduction and programming overview

1.1. Introduction

IMPORTANT

Before attempting to use the Programmer for the first time, please pull the insulating strip of plastic out of the battery holder - you do not need to remove the battery holder to do this.

The Programmer will not work if the plastic strip is left in place.

The New Vega TVIR Programmer performs all the functions of the earlier version.

The TVIR Programmer allows the user to configure/program the range of Vega LED Aids to Navigation products including:

- VLB-36 Self contained and stand alone LED Beacons
- VLL-43 Linear LED Lead Light
- VLB-44 Stand alone LED Beacons
- VLS-46 LED Sector Lanterns
- VLB-67 Self contained and stand alone LED Beacons. For computer programming please refer to the suppliment programming instructions for this option.

Each of these products comes from Vega with default settings. The Vega TVIR Programmer allows the user to set up the product for a particular application and to interrogate the product to find out what settings are already programmed.

To use the programmer you will need the product manual to obtain the codes for setting the intensity of the light and this manual for the codes of the other features. The individual product manual will indicate where the infrared sensor is located to achieve the most reliable programming results. Not all features are available in all Vega lights.

It is important that the correct product and programming manual is used for the serial number of the product being programmed. The product serial numbers that the manual applies to is detailed at the front of this manual. The difference will generally be in the intensity capability of the light and the intensity programming codes. These changes have been brought about by the rapid increase in the intensity capability of LED devices. If an intensity is attempted to be programmed that is above the capability of the light either an error message will be provided or the light will be set to the maximum programmable intensity.

1.2. Programming Syntax

All programming of the Vega LED products uses a syntax of:

`OPERATION_FEATURE_VALUE`

There are four OPERATION items

- | | |
|-------------------------------|-------------|
| • Programming | Operation 1 |
| • Creating a Custom Character | Operation 2 |
| • System Information | Operation 3 |
| • Optional PIN code | Operation 7 |
| • Read settings | Operation 9 |

The FEATURE items represent the features of the light such as flash character and intensity.

The VALUES are the actual settings or value of the various features.

The details of the Values for the intensity settings can be found in Appendix A of the individual LED product manual. Appendix A of this manual provides the programming Values for the other features. Please take the time to familiarise yourself with these tables before continuing.

Red standby key, used to enter programming mode.



Numeric key pad, used to configure the programmable features of the light.

1.3. Visual feedback

The Vega light will provide visual feedback of the programming instructions it receives from the TVIR programmer. It is important to understand the feedback that is provided to ensure the light will be programmed correctly.

Programmer Keys	Light response
Enter Programming Mode By pressing red standby key for 5 seconds	4 quick flashes (0.1sec on 0.1sec off)
Numeric key when programming	1 flash for each key pressed
When programming code recognised	The 3 or 4 digit value code is repeated using a series of flashes of 0.1sec on and 0.1 sec off with a gap of 0.5 sec between each number of the code. A zero is represented by a 2 second on flash. Proper termination of custom character programming: the feedback code will be 000
When programming code is not recognised	3 quick flashes (0.1sec on 0.1sec off) The light will remain in programming mode waiting for a new programming instruction.
Exiting Programming mode No programming activity for 10 Seconds	The light will give two quick flashes followed by a short pause followed by another two quick flashes. After this it will resume normal operation. The light will flash its character for 16 seconds while it checks the day/night settings. If it is day time and the light is set to operate at night only the light will turn off.

2. Items to Note

2.1. The light will not enter Programming Mode

If you find the light will not enter the programming mode it will be caused by one of 5 reasons:

- The battery in the TVIR Programmer is missing, or the plastic battery insulator has not been removed, or the battery has low voltage.
- There is no 12VDC supply connected to the light.
- For Products other than VLB-67, the ambient light level is too low and the light thinks it is night time. The default setting only allows programming during the day
- The light has been set to storage mode. Refer to section 4.7.
- Beacon needs a security PIN to allow programming. Refer to section 4.11.

3. Getting Started

3.1. Becoming familiar with the Syntax and Flash feedback

If you have not used the Vega TVIR Programmer before, we suggest you spend some time learning how the light will respond to the various programming actions. Make sure the light is connected to a 12VDC supply and experiment with the following.

Enter and Exit Program mode

<p>1. Enter program mode Press the red standby button for 5 seconds</p>	<p>The light will give 4 quick flashes to indicate it has entered programming mode</p>
<p>2. Exit program mode Leave the programmer idle for 10 seconds</p>	<p>The light will give two quick flashes followed by a short pause followed by another two quick flashes. After this it will resume normal operation. The light will flash its character for 16 seconds while it checks the day/night settings. If it is day time and the light is set to operate at night only the light will turn off.</p>

Program a Flash Character with a flash character of Q 1s 0.4. (0.4 “on” 0.6 “off”)

To program this Flash Character find the three digit code from Appendix D, “Flash character table with program codes”. (Flash Q 1s 0.4 = code 602). Determine the programming Syntax from Appendix A for the setting:

Operation = Programming = 1
 Feature = Flash Character = 0
 Value = Code = 602

The programming sequence to enter this flash character is 10602

<p>0. Enter programming mode Press the red standby button for 5 seconds</p>	<p>The light will give 4 quick flashes to indicate it has entered programming mode</p>
<p>2. Enter the programming sequence for the flash character (10602)</p>	<p>The light will flash once each time a key on the programmer is operated. When the sequence is completed and accepted the light will repeat the value 602 in a series of flashes. Six quick flashes followed by a 0.5sec gap followed by a 2 second flash (for a zero) followed by a 0.5 second gap followed by two quick flashes</p>
<p>1. Exit programming mode Leave the programmer idle for 10 seconds</p>	<p>The light will give two quick flashes followed by a short pause followed by another two quick flashes. After this it will resume normal operation. The light will flash its character for 16 seconds while it checks the day/night settings. If it is day time and the light is set to operate at night only the light will turn off.</p>

Create a programming error by attempting to enter an invalid Operation Mode code 003

Determine the programming Syntax from Appendix A for the setting:

Operation = Programming = 1
 Feature = Operation Mode = 5
 Value = Code = 003

The programming sequence to enter this Operation Mode is 15003

<p>1. Enter programming mode Press the red standby button for 5 seconds</p>	<p>The light will give 4 quick flashes to indicate it has entered programming mode</p>
<p>2. Enter the programming sequence for the Operation Mode (15003)</p>	<p>The light will flash once each time a key on the programmer is operated. When the sequence is completed the value will be rejected and an error indicated by 3 quick flashes. The beacon will then return to programming mode and is ready for a new instruction.</p>
<p>3. Exit programming mode Leave the programmer idle for 10 seconds</p>	<p>The light will give two quick flashes followed by a short pause followed by another two quick flashes. After this it will resume normal operation. The light will flash its character for 16 seconds while it checks the day/night settings. If it is day time and the light is set to operate at night only the light will turn off.</p>

Read System Information

To read the current level of the battery or 12VDC supply, determine the Syntax from Appendix A:

Operation = System Checks = 3
 Feature = Battery Voltage = 1

The programming sequence to get the information is 31

<p>1. Enter programming mode Press the red standby button for 5 seconds</p>	<p>The light will give 4 quick flashes to indicate it has entered programming mode</p>
<p>2. Enter the programming sequence for the information (31)</p>	<p>The light will flash once each time a key on the programmer is operated. When the sequence is completed and accepted the light will provide the voltage level in a series of flashes (13.2VDC). One quick flash followed by a 0.5sec gap followed by 3 quick flashes followed by a 0.5 second gap followed by two quick flashes.</p>
<p>3. Exit programming mode Leave the programmer idle for 10 seconds</p>	<p>The light will give two quick flashes followed by a short pause followed by another two quick flashes. After this it will resume normal operation. The light will flash its character for 16 to 20 seconds while it checks the day/night settings. If it is day time and the light is set to operate at night only the light will turn off.</p>

3.2. Deciding what Settings are required

Appendix C contains forms for noting down the settings of the light and for determining the programming sequence for the features wanted.

The light is delivered from the factory with default settings and it is only necessary to program the settings that need to be changed. If you are unsure what settings are already programmed use the first table to note the values already programmed into the light.

Once the settings are known use the second table to determine what settings need to be reprogrammed noting the correct syntax and programming code from Appendix A in either the product manual or programmer manual.

3.3. Programming or Reading Multiple Settings

Each feature can be programmed one at a time as done in the examples given in section 3.1, by entering and exiting the program mode each time a feature is programmed. However it can be extremely time consuming to enter multiple settings in this manner as you must wait for the light to flash its character and return to normal operation before you can enter the programming mode again.

To avoid this difficulty the various settings can be programmed sequentially. Once the light has accepted a program sequence and has flashed back the value code, the next program sequence can be entered. If you delay more than 10 seconds after the confirmation flashes before entering the next program sequence the light will exit the program mode.

The use of the second table in Appendix C will allow all the programming sequences to be pre determined and allow a quick entry of all settings that have to be changed without the need to exit the programming mode.

4. Programming Features

(Refer to Appendix A for the full list).

4.1. Flash Character

Vega lights are pre-programmed with 246 standard characters and represented by a 3 digit code XYY. The first digit of the code represents a flash type such as 1YY for isophase characters. If a customer uses a set of flash characters which are not included in the standard set these can be included if advised at time of ordering the lights. These would then be available for programming under type 9YY or Custom characters.

Operation	=Program (or read)	= 1 (or 9)
Feature	=Flash character	= 0
Value	= Select from Appendix D	=XYY

4.2. Custom Flash Character.

Vega lights allow the user to create one custom character. When programmed the flash character code for the custom character is 999.

To program the non standard character the details of the on and off periods of the flash character has to be entered into the light.

The method of programming a custom character has its own Syntax and this needs to be followed correctly to be able to program the character successfully.

Operation	= Custom Character	= 2
Value	= The code for the character	

This is entered in a series of 3 digit values representing an on period or off period. Each 3 digit value is a multiple of 0.05 seconds. The three digit code for a 1 second on or off period would be 020 (20 multiplied by 0.05 seconds is 1 second).

The following restrictions apply:

- The minimum period that can be programmed is 0.1 second or the code of 002.
- The maximum period that can be programmed is 12.75 seconds or the code of 255. For longer periods than 12.75 seconds an ADD code can be entered

There are two special codes used as part of the custom character programming

- The ADD code to get on or off periods greater than 12.75 seconds 001
- The termination code to let the light know the programming sequence is finished 000

For assistance Appendix B provides a work sheet, and an example, for programming a Custom Character

If an error occurs when entering a custom character the light will flash the error code of 3 quick flashes. You will need to recommence the programming sequence within 10 seconds or the light will exit programming Mode.

Please note: Programming a custom character creates a flash character with code 999. To get the light to use the custom character the value of 999 must be entered as the flash character for the light.

4.3. Day/Night use of the light

All Vega LED products are capable of operation at night only or both day and night. The default setting when the light is shipped from the factory is to operate at night only.

How the light changes from day to night mode and vice versa is determined by the programmed day and night lux levels. Vega provides the choice of 9 different day/night transition light levels allowing for a shorter or longer night.

Operation	=Program (or read)	= 1 (or 9)
Feature	=Day/Night Control	= 4
Value	= Select from Appendix A	=XYY

How the light operates is controlled by the first digit of the Day/Night Control value.

- 0YY allows night time operation only
- 1YY allows day and night operation

When the light changes from day to night operation is determined by the last two digits of the Day/Night Control Value. The lux level of each of the 9 settings is detailed in Appendix A. The default setting is YY=05 which is the IALA suggested setting. The accuracy of the light sensor is $\pm 10\%$.

The Day/Night transition can be synchronised between multiple lights when the sync wires of the lights are connected. Refer Section 4.6. This overcomes the difference in the accuracy of the light sensor in each light or their slightly different location. Each of these will influence the actual moment of day/night transition.

4.4. Intensity Settings

A different effective intensity setting can be programmed for both day and night operation. For example, Vega products such as the VLS-46 LED Sector light or VLL-43 Linear lead light may be used for day and night operation. By having different intensity settings the lights can be dimmed for night time operation. There are up to 15 effective intensity settings available and details of the codes for these settings are found in Appendix A of the individual product manuals.

It should be noted that it is the effective intensity of the light programmed. The peak intensity is controlled automatically according to the flash character (Schmidt-Clausen correction) in order to maintain the effective intensity for a flashing light.

Operation	=Program (or read)	= 1 (or 9)
Feature	=Intensity	= 1 for night intensity, 2 for day intensity
Value	=In Product manual	=XXX or XXXX

4.5. Synchronising options

The synchronisation options available with the Vega LED products are as follows

Product	Hard wired	GPS
VLB-36 Self contained LED beacon	Factory Option	Internal GPS option External GPS using Vega VSU29 If sync wire available on beacon
VLB-36 Stand Alone beacon	Yes	Internal GPS option or External GPS using Vega VSU29
VLL-43 LED linear lead light	Yes	External GPS using Vega VSU29
VLB-44 LED Beacon	Yes	External GPS using Vega VSU29
VLS-46 LED Sector Light	Yes	Internal GPS option Only required in one lantern
VLB-67 Self Contained LED beacon	Factory Option	Internal GPS option or External GPS using Vega VSU29 If sync wire available on beacon
VLB-67 Stand Alone beacon	Yes	Internal GPS option or External GPS using Vega VSU29

For Vega LED products the sync pulse has a positive to negative transition.

Each light can be set to be a sync master or sync slave.

As a master the light will put out a sync pulse at the start of the flash character. Where the lights connected are all masters the first light to send a sync pulse will control the other lights.

In slave mode the light will operate on the basis of the sync pulse received and will stop operating after one flash character if the sync pulse is lost. (For the VLB-44 LED beacon it is possible to program the number of flash cycles that the light will complete after it loses the sync pulse.)

Operation =Program (or read) = 1 (or 9)
 Feature =Synchronisation = 3
 Value =XYY (999 disables synchronisation)

The first digit of the Value determines if the light is a master or slave unit.

- 0YY Master
- 1YY Slave

The second two digits of the value YY allows for the start of the flash character to be delayed from 0.0 seconds to 9.9 seconds in 0.1 second increments. For example YY=25 would provide a delay of 2.5 seconds.

Where internal GPS units are used in the VLS46 LED sector light and VLB36 beacon the flash character will always synchronise to the GPS time pulse. Please note the GPS unit will not be accurate until it has acquired a valid time signal. Synchronising must be set to master (0YY) for the light to function properly. The flash character can be delayed as detailed above. For a VLS-46 LED sector light application only one unit in a set of lanterns needs to have the internal GPS fitted. This lantern will generate the master sync signal to the other VLS-46 lanterns in the set. The VLS-46 lanterns without a GPS unit would be set to slave mode.

Where an external GPS unit, such as the VSU-29, is used refer to the manual for this device. Vega LED products require a negative transition on the sync wire to synchronise. The VSU-29 if used is capable of working in two modes, fixed period pulsing and flash character pulsing. Refer to the VSU-29 manual for details.

4.6. VLB-44 Beacon Additional Sync options

The VLB-44 beacon has additional sync functions to allow the beacon to be used for specific applications such as a standby light. Feature 7 of the programming functions provides these features and includes:

- With the VLB-44 set to slave sync mode, the ability to set the number of flash characters to occur when the sync signal is lost. (Value 0YY where YY is the number of flash character cycles (max 99))
- The ability to turn the VLB-44 Off when the sync wire is grounded. All other sync features operate when the sync wire is not grounded (Value 998)
- The ability to set the VLB44 into FIXED character. All other sync features are disabled (including generating sync pulses) when the sync wire is not grounded (Value 987)

Value 999 in feature 7 is the disable code and causes the following actions:

- A VLB-44 beacon in slave sync mode will continue to flash on the loss of the sync pulse
- The force to off or fixed character when the sync wire is grounded will be disabled.

To program a slave VLB44 beacon unit for one of the options of feature 7

Operation	=Program (or read)	= 1 (or 9)
Feature	=VLB44 flash count	= 7
Value		=XXX as detailed above

4.7. Day/Night Transition Synchronisation

When a number of Vega lights are hard wire sync connected the Day/Night Transition is also synchronised by the connection. This ensures all the lights connected will go through the transition at a similar time. Some difference in transition would normally occur due to the different location of the lights or the tolerance in setting the threshold value in each light during manufacture. This feature is particularly important in the case of VLS-46 LED sector lights. Please note this feature only works where the lights being controlled are operating during the day and night. It will not work if the lights are set for night operation only.

4.8. Operation Mode

The Vega LED lights have different modes of operation. If batteries are already fitted and connected in the self contained solar powered lights, the units will be delivered in Storage Mode. It will be necessary to change the operating mode from Storage to Normal Mode for the Light to be useable.

Operation	=Program (or read)	= 1 (or 9)
Feature	=Operation Mode	= 5
Value		=000 is normal mode, =007 is for alarm monitor test (<i>when installed in beacon</i>), =008 is test mode, =009 is storage mode

Normal Mode allows the light to operate normally and provides access to all the programming functions.

Alarm Monitor Test allows the alarm monitor to operate while the beacon is in programming mode. The signal will revert to its normal state when the beacon exits programming mode. *This option is only available on beacons fitted with the alarm/monitor feature.*

Test Mode will override whatever Operation mode the light is set to and allow the flash character to operate for 4 minutes. The intensity used for the flash will depend on whether the light considers the ambient light level as day or night. At the end of the 4 minute test period the light goes to Normal Mode.

Storage Mode puts the light into a very low power consumption mode. In this mode the TVIR sensor in the light is only checked every minute.

To change the operation from Storage Mode to Normal mode the red standby key on the programmer must be held down for the time necessary for the light to recognise the programmer is there. This could take up to 1 minute. Once in programming mode the Operation Mode of the light can be changed to Normal operation by pressing 15000.

4.9. Programming Mode

This feature is currently only available for the VLB-67 Beacon.

At present the IRDA and RS232 features are only available on the VLB-67 LED Beacon.

These programming mode options are used only for beacons with the capability to support IRDA 2 way IR communication or have been fitted with a data port option. The feature allows the operation of the IRDA and RS232 (or RS485) data port to be defined. The IRDA and the RS232 port cannot be used at the same time and which port is being used must be selected by the Remote TVIR programmer. Operation of the IRDA or RS232 port can be continuous or on demand. Use of the on demand option reduces the power requirement of the beacon. The IRDA option allows computer programming of the beacon. Information on the IRDA operation is provided in a supplementary programming manual. The protocol for the RS232 port is provided in the beacon product manual.

Operation	=Program (or read)	= 1 (or 9)
Feature	=Operation Mode	= 6
Value		=000 has both IRDA and RS232 port disabled (default setting), See Appendix A for other settings

4.10. Battery Thresholds

All Vega LED lights have programmable battery threshold settings which are designed to protect a battery from damage by being over discharged. The default settings are: Low threshold = 11VDC, High threshold 12.8VDC. If the low threshold is reached the light will turn off until the battery voltage is above the high threshold. The threshold settings are programmable to allow some adjustment for long cabling etc. Where no batteries are used the low voltage threshold can be disabled.

Operation	=Program (or read)	= 1 (or 9)
Feature	=Operation Mode	= 8 Low battery threshold (9 High battery threshold)
Value		=YYY in tenths of Volts

The value range for the Low Threshold is 000 to 119 (999 disables the Low voltage check). Default is 110

The value range for the High Threshold is 121 to 998 (999 sets the default setting). Default setting is 128. Take care in setting the high threshold to ensure the voltage of the battery will reach this voltage during charging. If set too high, the light may not resume operation after a low voltage threshold shutdown. Note that the high voltage threshold restart can be bypassed by disconnecting and reconnecting the battery or putting the light into programming mode. (Battery voltage must be above the low voltage threshold).

4.11. System Checks

The Vega LED lights contain details of their manufacture including calibration details, firmware version, and LED type used. This information is useful should there either be a problem with the light or where it is necessary to locate the correct manual for the product.

The supply voltage to the light can also be read as a quick means of checking battery voltage.

Operation	=Read Only	= 3
Feature	=Operation Mode	= 1 for battery voltage, (others detailed in Appendix A)
Value		=series of flashes to provide measured value or information.

All information is in numeric format and represented by a series of flashes 0.1 sec on, 0.1 sec off, separated by 0.5 sec gap between numbers. The Voltage level is provided in tenths of a volt.

4.12. Security PIN number

The Vega lights are shipped from the factory without any security protection. If there is concern about unauthorised programming it is possible to have a 3 digit PIN number for security access. The PIN code is only necessary to change settings. It is possible to read settings without using the PIN code

For setting a Security PIN

Enter programming mode by operating the standby button for 5 seconds.

Operation	=7	=PIN
Feature	=1	=Set PIN
Value	=XXX	=PIN Code (Value 000 will disable programming requiring a PIN)

The beacon will then flash back the three numbers in a series of flashes.

To change settings when a Security PIN is used.

Enter programming mode by operating the standby button for 5 seconds.

Operation	=7	=PIN
Feature	=7	=Check PIN
Value	=XXX	=PIN Code

The beacon will flash back the number using a series of flashes. You can then continue onto programming your beacon.

Note: Where a PIN has been set, and a user attempts changing any settings, an error message will be generated and no changes will actually occur.

If you lose your PIN number, please contact Vega for further instruction.

User Notes

Appendix A Programming Syntax

Operation	Feature	Value
1 = Program Mode 9 = Read Settings	0 = Flash Character	000 – Fixed character 1YY – Iso phase (ISO) 2YY – Occulting (OC) 3YY – Flash (FI) 4YY - Multiple Flash (FI(x)) 5YY - Very Quick (VQ) 6YY - Quick (Q) 7YY – Long (LF) 8YY – Morse (MO) 9YY – Custom (CCG Codes)
	1 = Night Effective Intensity	See individual product manuals for a table of available settings and programming formats. Automatic Schmidt Clausen correction
	2 = Day Effective Intensity	See individual product manuals for a table of available settings and programming formats. Automatic Schmidt Clausen correction
	3 = Synchronisation	999 – Disable Synchronisation 0YY Light in master mode 1YY Light in slave mode YY=sync delay seconds (0.0 to 9.9 seconds)
	4 = Day/Night Control	0YY Light operates night only 1YY Light operates day and night YY= Day/Night transition Lux Level <u>Night Lux.</u> <u>Day Lux</u> YY=01 40 100 shortest night YY=02 50 150 YY=03 75 100 CCG YY=04 75 150 YY=05 75 175 IALA suggested YY=06 100 175 YY=07 100 200 YY=08 150 250 YY=09 250 320 longest night USCG
	5 = Operation Mode	000 – Normal 007 – Alarm monitor test (alarm operates until beacon leaves program mode) Feature has to be fitted in beacon 008 – Test Mode for 4 minutes. 009 – Storage Mode
	6 = Programming Mode (VLB67 only) Used on beacons fitted with IRDA or RS232 ports	000 – IRDA and RS232 disabled (default setting) 001 – IRDA enabled, no monitoring 002 – IRDA enabled, on demand monitoring 003 – IRDA enabled, continuous monitoring 004 – RS232 enabled, on demand monitoring 005 – RS232 enabled, continuous monitoring

Operation	Feature	Value
1 = Program Mode 9 = Read Settings	7 = VLB44 Additional Sync Options	0YY – Continue “Y” number of cycles (0-99) 999 – Disable feature 7 items, Slave VLB44 continues flashing on loss of sync signal 998 – Off when sync wire grounded Normal sync function when not grounded 987 – FIXED character when sync wire grounded Disables all other sync functions.
	8 = Low battery threshold	YYY – Battery low threshold. (00.0 to 11.9VDC) 999 – Disabled, No battery low cut off
	9 = High battery threshold	YYY – Battery high threshold. (12.0 to 18.0VDC) 999 – Default setting (12.8VDC)
2 – Custom Character Setting	Custom flash character segments	000 – End command
3 – System Checks	0 = Software version	Version Y.Y.Y (i.e. 1.9.2 or 1.7)
	1 – Battery voltage	YY.Y Volts (i.e. 11.7 volts) Last voltage prior to entering programming mode
	2 – Temp sensor reading VLB-67 only	Temperature in degrees Kelvin (C=Kelvin-273)
	3 – Current adjustment	Percentage output adjust (080% to 120%)
	4 – Serial Number	Displays beacon serial number as a series of flashes
	5 – LED version number	Displays LED version number identifier
	6 – Characterisation number	Displays LED characterisation identifier
7 - Pin	1-Set PIN	XXX (000 clears the PIN)
	7 – Enter PIN	XXX

Appendix B Worksheet for a Custom Character

Fill out the table below for the values required to program a custom character.

The steps to program a custom character is as follows

Example given for FI (2) 38.5sec (0.5sec on 2sec off 16sec on 20sec off)

Step		Example	Required Character
Enter programming mode	The light will flash 4 times to indicate it is in programming mode	Press standby button for 5 seconds	Press standby button for 5 seconds
Enter Operation and Class syntax	Light will flash each time button is pressed	2	2
Enter ON time If greater than 12.75 seconds use ADD code 001	Value is multiple of 0.05 seconds max value 255	On time of 0.5 sec 010	
Enter OFF time If greater than 12.75 seconds use ADD code 001	Value is multiple of 0.05 seconds max value 255	Off time of 2 sec 040	
Enter ON time If greater than 12.75 seconds use ADD code 001		On time 16 seconds. Need to program 8 sec plus 8 sec using ADD 160 001 160	
Enter OFF time If greater than 12.75 seconds use ADD code 001		Off time 20 seconds Need to program 10 sec plus 10 sec using ADD 200 001 200	
Enter ON time If greater than 12.75 seconds use ADD code 001			
Enter OFF time If greater than 12.75 seconds use ADD code 001			
FINISHED code	Light will flash 3 long flashes to indicate the instruction has been accepted	000	000

When the light exits the programming mode it will flash the character that is currently selected. To use the custom character, you must select character 999 (enter programming mode then press 1 0 999).

If an error is made when programming the custom character, the light will flash 3 times and exit the programming mode

Appendix C Light Settings

Complete the table for the settings required for the light. It is only necessary to program the specific settings where they are different to the settings already in the light.

The programming can be done sequentially without leaving the program mode. After the light has flashed back the setting enter the next setting within 10 seconds or the light will exit the programming mode

To read the settings already programmed

Setting	Key sequence	Value
Flash Character	90	
Night Effective Intensity	91	
Day Effective Intensity	92	
Synchronisation	93	
Day/Night Control	94	
Operation mode	95	
Programming mode	96	
VLB44 Slave Mode Flash count on loss of sync	97	
Battery Low Threshold	98	
Battery High Threshold	99	

To enter new settings

Setting	Default	Settings required
Flash Character	VLB-36 Fl 3s 1_0_316 VLL-43 Fixed 1_0_000 VLB-44 Fl 3s 1_0_316 VLB-46 Fixed 1_0_000	10 _____
Night Effective Intensity	Refer product manual	11 _____
Day Effective Intensity	Refer product manual	12 _____
Synchronisation	Disabled 1_3_999	13 _____
Day/Night Control	Night only operation Lux setting 1_4_005	14 _____
Operation mode	Normal 1_5_000	15 _____
Programming mode	Day program 1_6_000	16 _____
VLB44 Slave Mode Flash count on loss of sync	Turn of after 5 cycles 1_7_005	17 _____
Battery Low Threshold	11.0 Volts 1_8_110	18 _____
Battery High Threshold	13.0 Volts 1_9_130	19 _____

Appendix D Flash character table with programming codes

<u>Code</u>	<u>Description</u>	<u>Duty Cycle</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>
FIXED CHARACTER CODE										
000	Fixed	1.00								
00Y	Fixed – 0.Y sec SC Correction		<i>FOR LAB TESTING ONLY – DO NOT USE IN THE FIELD</i>							
ISOPHASE CODES										
100	ISO 2s	0.50	1.00	1.00						
101	ISO 3s	0.50	1.50	1.50						
102	ISO 4s	0.50	2.00	2.00						
103	ISO 5s	0.50	2.50	2.50						
104	ISO 6s	0.50	3.00	3.00						
105	ISO 8s	0.50	4.00	4.00						
106	ISO 10s	0.50	5.00	5.00						
OCCULTING CODES										
200	OC 1.25s 0.75	0.60	0.75	0.50						
201	OC 3s 2.0	0.67	2.00	1.00						
202	OC 3s 2.5	0.83	2.50	0.50						
203	OC 3.5s 2.5	0.71	2.50	1.00						
204	OC 4s 2.5	0.63	2.50	1.50						
205	OC 4s 3.0	0.75	3.00	1.00						
206	OC 5s 3.0	0.60	3.00	2.00						
207	OC 5s 4.0	0.80	4.00	1.00						
208	OC 5s 4.5	0.90	4.50	0.50						
209	OC 6s 4.0	0.67	4.00	2.00						
210	OC 6s 4.5	0.75	4.50	1.50						
211	OC 6s 5.0	0.83	5.00	1.00						
212	OC 7s 4.5	0.64	4.50	2.50						
213	OC 8s 5.0	0.63	5.00	3.00						
214	OC 8s 6.0	0.75	6.00	2.00						
215	OC 9s 6.0	0.67	6.00	3.00						
216	OC 10s 6.0	0.60	6.00	4.00						
217	OC 10s 7.0	0.70	7.00	3.00						
218	OC 10s 7.5	0.75	7.50	2.50						
219	OC 12s 8.0	0.67	8.00	4.00						
220	OC 15s 10.0	0.67	10.00	5.00						
221	OC(2) 8s 3.0 2.0	0.50	3.00	2.00	1.00	2.00				
222	OC(2) 8s 5.0 1.0	0.75	5.00	1.00	1.00	1.00				
FLASH CODES										
300	FI 1.5s 0.2	0.13	0.20	1.30						
301	FI 1.5s 0.3	0.20	0.30	1.20						
302	FI 1.5s 0.4	0.27	0.40	1.10						
303	FI 1.5s 0.5	0.33	0.50	1.00						
304	FI 2s 0.2	0.10	0.20	1.80						
305	FI 2s 0.3	0.15	0.30	1.70						
306	FI 2s 0.4	0.20	0.40	1.60						
307	FI 2s 0.5	0.25	0.50	1.50						
308	FI 2s 0.7	0.35	0.70	1.30						
309	FI 2s 0.8	0.40	0.80	1.20						
310	FI 2.5s 0.3	0.12	0.30	2.20						
311	FI 2.5s 0.5	0.20	0.50	2.00						
312	FI 2.5s 1.0	0.40	1.00	1.50						
313	FI 3s 0.2	0.07	0.20	2.80						
314	FI 3s 0.3	0.10	0.30	2.70						

<u>Code</u>	<u>Description</u>	<u>Duty Cycle</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>
315	FI 3s 0.4	0.13	0.40	2.60						
316	FI 3s 0.5	0.17	0.50	2.50						
317	FI 3s 0.6	0.20	0.60	2.40						
318	FI 3s 1.0	0.33	1.00	2.00						
319	FI 4s 0.2	0.05	0.20	3.80						
320	FI 4s 0.3	0.08	0.30	3.70						
321	FI 4s 0.4	0.10	0.40	3.60						
322	FI 4s 0.5	0.13	0.50	3.50						
323	FI 4s 0.6	0.15	0.60	3.40						
324	FI 4s 0.8	0.20	0.80	3.20						
325	FI 4s 1.0	0.25	1.00	3.00						
326	FI 4s 1.5	0.38	1.50	2.50						
327	FI 5s 0.2	0.04	0.20	4.80						
328	FI 5s 0.3	0.06	0.30	4.70						
329	FI 5s 0.5	0.10	0.50	4.50						
330	FI 5s 0.9	0.18	0.90	4.10						
331	FI 5s 1.0	0.20	1.00	4.00						
332	FI 5s 1.5	0.30	1.50	3.50						
333	FI 6s 0.2	0.03	0.20	5.80						
334	FI 6s 0.3	0.05	0.30	5.70						
335	FI 6s 0.4	0.07	0.40	5.60						
336	FI 6s 0.5	0.08	0.50	5.50						
337	FI 6s 0.6	0.10	0.60	5.40						
338	FI 6s 1.0	0.17	1.00	5.00						
339	FI 6s 1.5	0.25	1.50	4.50						
340	FI 7s 1.0	0.14	1.00	6.00						
341	FI 7s 2.0	0.29	2.00	5.00						
342	FI 7.5s 0.5	0.07	0.50	7.00						
343	FI 7.5s 0.8	0.11	0.80	6.70						
344	FI 8s 0.5	0.06	0.50	7.50						
345	FI 9s 0.9	0.10	0.90	8.10						
346	FI 10s 0.2	0.02	0.20	9.80						
347	FI 10s 0.3	0.03	0.30	9.70						
348	FI 10s 0.5	0.05	0.50	9.50						
349	FI 10s 0.8	0.08	0.80	9.20						
350	FI 10s 1.0	0.10	1.00	9.00						
351	FI 10s 1.5	0.15	1.50	8.50						
352	FI 12s 1.2	0.10	1.20	10.80						
353	FI 12s 2.5	0.21	2.50	9.50						
354	FI 15s 1.0	0.07	1.00	14.00						

MULTIPLE FLASH CODES

400	FI(2) 4s 0.5	0.25	0.50	1.00	0.50	2.00
401	FI(2) 4.5s 0.3	0.13	0.30	1.00	0.30	2.90
402	FI(2) 4.5s 0.4	0.18	0.40	1.00	0.40	2.70
403	FI(2) 4.5s 0.5	0.22	0.50	1.00	0.50	2.50
404	FI(2) 5s 0.2 0.8	0.08	0.20	0.80	0.20	3.80
405	FI(2) 5s 0.2 1.2	0.08	0.20	1.20	0.20	3.40
406	FI(2) 5s 0.4	0.16	0.40	0.60	0.40	3.60
407	FI(2) 5s 0.5	0.20	0.50	1.00	0.50	3.00
408	FI(2) 5s 1.0	0.40	1.00	1.00	1.00	2.00
409	FI(2) 5.5s 0.4	0.15	0.40	1.40	0.40	3.30
410	FI(2) 6s 0.2 1.4	0.07	0.20	1.40	0.20	4.20
411	FI(2) 6s 0.3	0.10	0.30	1.00	0.30	4.40

<u>Code</u>	<u>Description</u>	<u>Duty Cycle</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>
412	FI(2) 6s 0.4	0.13	0.40	1.00	0.40	4.20				
413	FI(2) 6s 0.5	0.17	0.50	1.00	0.50	4.00				
414	FI(2) 6s 0.5 1.5	0.17	0.50	1.50	0.50	3.50				
415	FI(2) 6s 0.8	0.27	0.80	1.20	0.80	3.20				
416	FI(2) 6s 1.0	0.33	1.00	1.00	1.00	3.00				
417	FI(2) 6s 3.0	0.67	3.00	1.00	1.00	1.00				
418	FI(2) 7s 1.0	0.29	1.00	1.00	1.00	4.00				
419	FI(2) 8s 0.4	0.10	0.40	1.00	0.40	6.20				
420	FI(2) 8s 0.5	0.13	0.50	1.00	0.50	6.00				
421	FI(2) 8s 1.0	0.25	1.00	1.00	1.00	5.00				
422	FI(2) 10s 0.4	0.08	0.40	1.60	0.40	7.60				
423	FI(2) 10s 0.5 1.0	0.10	0.50	1.00	0.50	8.00				
424	FI(2) 10s 0.5 1.5	0.10	0.50	1.50	0.50	7.50				
425	FI(2) 10s 0.5 2.0	0.10	0.50	2.00	0.50	7.00				
426	FI(2) 10s 0.6 2.4	0.12	0.60	2.40	0.60	6.40				
427	FI(2) 10s 0.8 1.2	0.16	0.80	1.20	0.80	7.20				
428	FI(2) 10s 1.0 1.0	0.20	1.00	1.00	1.00	7.00				
429	FI(2) 10s 1.0 1.5	0.20	1.00	1.50	1.00	6.50				
430	FI(2) 10s 3.0 1.0	0.80	3.00	1.00	5.00	1.00				
431	FI(2) 12s 0.4 1.0	0.07	0.40	1.00	0.40	10.20				
432	FI(2) 12s 0.5 1.0	0.08	0.50	1.00	0.50	10.00				
433	FI(2) 12s 1.0 2.0	0.17	1.00	2.00	1.00	8.00				
434	FI(2) 12s 1.5 2.0	0.25	1.50	2.00	1.50	7.00				
435	FI(2) 15s 1.0 2.0	0.13	1.00	2.00	1.00	11.00				
436	FI(2) 20s 1.0 3.0	0.10	1.00	3.00	1.00	15.00				
437	FI(2) 25s 1.0 1.0	0.08	1.00	1.00	1.00	22.00				
438	FI(3) 6s 0.5	0.25	0.50	1.00	0.50	1.00	0.50	2.50		
439	FI(3) 6.1s 0.4	0.20	0.40	1.00	0.40	1.00	0.40	2.90		
440	FI(3) 8s 0.5	0.19	0.50	1.00	0.50	1.00	0.50	4.50		
441	FI(3) 9s 0.3	0.10	0.30	1.00	0.30	1.00	0.30	6.10		
442	FI(3) 9s 0.8	0.27	0.80	1.20	0.80	1.20	0.80	4.20		
443	FI(3) 10s 0.5	0.15	0.50	1.50	0.50	1.50	0.50	5.50		
444	FI(3) 10s 1.0	0.30	1.00	1.00	1.00	1.00	1.00	5.00		
445	FI(3) 12s 0.5 1.5	0.13	0.50	1.50	0.50	1.50	0.50	7.50		
446	FI(3) 12s 0.5 2.0	0.13	0.50	2.00	0.50	2.00	0.50	6.50		
447	FI(3) 12s 0.8 1.2	0.20	0.80	1.20	0.80	1.20	0.80	7.20		
448	FI(3) 12s 1.0 2.0	0.25	1.00	2.00	1.00	2.00	1.00	5.00		
449	FI(3) 15s 0.3	0.06	0.30	1.70	0.30	1.70	0.30	10.70		
450	FI(3) 15s 0.4	0.08	0.40	1.00	0.40	1.00	0.40	11.80		
451	FI(3) 15s 0.5	0.10	0.50	1.50	0.50	1.50	0.50	10.50		
452	FI(3) 20s 0.5 1.5	0.08	0.50	1.50	0.50	1.50	0.50	15.50		
453	FI(3) 20s 0.5 3.0	0.08	0.50	3.00	0.50	3.00	0.50	12.50		
454	FI(3) 20s 0.8 1.2	0.12	0.80	1.20	0.80	1.20	0.80	15.20		
455	FI(3) 20s 1.0 1.0	0.15	1.00	1.00	1.00	1.00	1.00	15.00		
456	FI(3) 30s 1.0 4.0	0.10	1.00	4.00	1.00	4.00	1.00	19.00		
457	FI(4) 10s 0.5 1.0	0.20	0.50	1.00	0.50	1.00	0.50	1.00	0.50	5.00
458	FI(4) 10s 0.5 0.5	0.20	0.50	0.50	0.50	0.50	0.50	0.50	0.50	6.50
459	FI(4) 10s 0.8	0.32	0.80	1.20	0.80	1.20	0.80	1.20	0.80	3.20
460	FI(4) 12s 0.3	0.10	0.30	1.70	0.30	1.70	0.30	1.70	0.30	5.70
461	FI(4) 12s 0.5	0.17	0.50	1.50	0.50	1.50	0.50	1.50	0.50	5.50
462	FI(4) 12s 0.8	0.27	0.80	1.20	0.80	1.20	0.80	1.20	0.80	5.20
463	FI(4) 15s 0.5	0.13	0.50	1.50	0.50	1.50	0.50	1.50	0.50	8.50
464	FI(4) 15s 1.0	0.27	1.00	1.00	1.00	1.00	1.00	1.00	1.00	8.00
465	FI(4) 16s 0.5	0.13	0.50	1.50	0.50	1.50	0.50	1.50	0.50	9.50

<u>Code</u>	<u>Description</u>	<u>Duty Cycle</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>
466	FI(4) 20s 0.3	0.06	0.30	3.00	0.30	3.00	0.30	3.00	0.30	9.80
467	FI(4) 20s 0.5	0.10	0.50	1.50	0.50	1.50	0.50	1.50	0.50	13.50
468	FI(4) 20s 1.5	0.30	1.50	1.50	1.50	1.50	1.50	1.50	1.50	9.50
469	FI(4) 30s 0.5	0.07	0.50	0.50	0.50	0.50	0.50	0.50	0.50	26.50
470	FI(5) 20s 0.5 1.5	0.13	0.50	1.50	[x 4]				0.50	11.50
471	FI(5) 20s 0.80	0.20	0.80	1.20	[x 4]				0.80	11.20
472	FI(2+1) 6s 0.3	0.15	0.30	0.40	0.30	1.20	0.30	3.50		
473	FI(2+1) 10s 0.5	0.15	0.50	0.70	0.50	2.10	0.50	5.70		
474	FI(2+1) 12s 0.8	0.20	0.80	1.20	0.80	2.40	0.80	6.00		
475	FI(2+1) 12s 1.0	0.25	1.00	1.00	1.00	4.00	1.00	4.00		
476	FI(2+1) 15s 1.0	0.20	1.00	2.00	1.00	5.00	1.00	5.00		

VERY QUICK CODES

500	VQ 0.5s 0.15	0.30	0.15	0.35						
501	VQ 0.5s 0.20	0.40	0.20	0.30						
502	VQ 0.6s 0.20	0.33	0.20	0.40						
503	VQ 0.6s 0.30	0.50	0.30	0.30						
504	VQ(2) 4s 0.20	0.10	0.20	1.00	0.20	2.60				
505	VQ(2) 8s 0.20	0.05	0.20	1.00	0.20	6.60				
506	VQ(3) 5s 0.15	0.09	0.15	0.35	0.15	0.35	0.15	3.85		
507	VQ(3) 5s 0.20	0.12	0.20	0.30	0.20	0.30	0.20	3.80		
508	VQ(3) 5s 0.3 0.2	0.18	0.30	0.20	0.30	0.20	0.30	3.70		
509	VQ(3) 5s 0.3 0.3	0.18	0.30	0.30	0.30	0.30	0.30	3.50		
510	VQ(3) 15s 0.10	0.02	0.10	0.50	0.10	0.50	0.10	13.70		
511	VQ(9) 10s 0.15	0.14	0.15	0.35	[x 8]				0.15	5.85
512	VQ(9) 10s 0.20	0.18	0.20	0.30	[x 8]				0.20	5.80
513	VQ(9) 10s 0.30	0.27	0.30	0.30	[x 8]				0.30	4.90
514	VQ(6)+LFI 10s 0.15	0.29	0.15	0.35	[x 6]				2.00	5.00
515	VQ(6)+LFI 10s 0.2	0.32	0.20	0.30	[x 6]				2.00	5.00
516	VQ(6)+LFI 10s 0.3	0.38	0.30	0.30	[x 6]				2.00	4.40

QUICK CODES

600	Q 1s 0.2	0.20	0.20	0.80						
601	Q 1s 0.3	0.30	0.30	0.70						
602	Q 1s 0.4	0.40	0.40	0.60						
603	Q 1s 0.5	0.50	0.50	0.50						
604	Q 1s 0.8	0.80	0.80	0.20						
605	Q 1.2s 0.3	0.25	0.30	0.90						
606	Q 1.2s 0.5	0.42	0.50	0.70						
607	Q 1.2s 0.6	0.50	0.60	0.60						
608	Q(2) 5s 0.3	0.12	0.30	0.70	0.30	3.70				
609	Q(2) 5s 0.5	0.20	0.50	0.50	0.50	3.50				
610	Q(2) 6s 0.30	0.10	0.30	0.70	0.30	4.70				
611	Q(2) 6s 0.35	0.12	0.35	0.70	0.35	4.60				
612	Q(2) 10s 0.6	0.12	0.60	0.40	0.60	8.40				
613	Q(2) 15s 0.2	0.03	0.20	0.80	0.20	13.80				
614	Q(3) 5s 0.5	0.30	0.50	0.50	0.50	0.50	0.50	2.50		
615	Q(3) 6s 0.3	0.15	0.30	0.70	0.30	0.70	0.30	3.70		
616	Q(3) 10s 0.30	0.09	0.30	0.70	0.30	0.70	0.30	7.70		
617	Q(3) 10s 0.35	0.11	0.35	0.65	0.35	0.65	0.35	7.65		
618	Q(3) 10s 0.50	0.15	0.50	0.50	0.50	0.50	0.50	7.50		
619	Q(3) 10s 0.60	0.18	0.60	0.60	0.60	0.60	0.60	7.00		
620	Q(3) 30s 0.4	0.04	0.40	4.60	0.40	4.60	0.40	19.60		
621	Q(4) 6s 0.3	0.20	0.30	0.70	0.30	0.70	0.30	0.70	0.30	2.70
622	Q(4) 6s 0.4	0.27	0.40	0.60	0.40	0.60	0.40	0.60	0.40	2.60

<u>Code</u>	<u>Description</u>	<u>Duty Cycle</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>
623	Q(4) 10s 0.3	0.12	0.30	0.70	0.30	0.70	0.30	0.70	0.30	6.70
624	Q(4) 12s 0.3	0.10	0.30	0.70	0.30	0.70	0.30	0.70	0.30	8.70
625	Q(4) 15s 0.35	0.09	0.35	0.70	0.35	0.70	0.35	0.70	0.35	11.50
626	Q(4) 20s 0.5	0.10	0.50	0.50	0.50	0.50	0.50	0.50	0.50	16.50
627	Q(9) 15s 0.3	0.18	0.30	0.70	[x 8]				0.30	6.70
628	Q(9) 15s 0.35	0.21	0.35	0.65	[x 8]				0.35	6.65
629	Q(9) 15s 0.6	0.36	0.60	0.60	[x 8]				0.60	4.80
630	Q(6)+LFI 15s 0.2	0.21	0.20	0.80	[x 6]				2.00	7.00
631	Q(6)+LFI 15s 0.3	0.25	0.30	0.70	[x 6]				2.00	7.00
632	Q(6)+LFI 15s 0.35	0.21	0.35	0.65	[x 6]				1.05	7.95
633	Q(6)+LFI 15s 0.6	0.37	0.60	0.60	[x 6]				2.00	5.80

LONG FLASH CODES

700	LFI 5s 2.0	0.40	2.00	3.00						
701	LFI 6s 2.0	0.33	2.00	4.00						
702	LFI 8s 2.0	0.25	2.00	6.00						
703	LFI 8s 3.0	0.38	3.00	5.00						
704	LFI 10s 2.0	0.20	2.00	8.00						
705	LFI 10s 3.0	0.30	3.00	7.00						
706	LFI 10s 4.0	0.40	4.00	6.00						
707	LFI 12s 2.0	0.17	2.00	10.00						
708	LFI 15s 4.0	0.27	4.00	11.00						

MORSE CODES

800	MO(A) 6s 0.3	0.22	0.30	0.60	1.00	4.10				
801	MO(A) 8s 0.4	0.30	0.40	0.60	2.00	5.00				
802	MO(A) 8s 0.8	0.40	0.80	1.20	2.40	3.60				
803	MO(A) 10s 0.5	0.20	0.50	0.50	1.50	7.50				
804	MO(A) 12s	0.33	1.00	1.00	3.00	7.00				
805	MO(A) 15s 0.5	0.17	0.50	1.50	2.00	11.00				
806	MO(B) 15s 1.5	0.20	1.50	0.50	0.50	0.50	0.50	0.50	0.50	10.50
807	MO(D) 10s 5.0	0.70	5.00	1.00	1.00	1.00	1.00	1.00		
808	MO(N) 8s 5.0	0.75	5.00	1.00	1.00	1.00				
809	MO(U) 10s 0.2	0.10	0.20	0.80	0.20	0.80	0.60	7.40		
810	MO(U) 10s 0.3	0.15	0.30	0.70	0.30	0.70	0.90	7.10		
811	MO(U) 10s 0.4	0.20	0.40	0.60	0.40	0.60	1.20	6.80		
812	MO(U) 10s 0.5	0.25	0.50	0.50	0.50	0.50	1.50	6.50		
813	MO(U) 15s	0.13	0.40	0.50	0.40	0.50	1.20	12.00		
814	MO(U) 15s 0.45	0.15	0.45	0.45	0.45	0.45	1.35	11.85		
815	MO(U) 15s 0.50	0.17	0.50	0.50	0.50	0.50	1.50	11.50		
816	MO(U) 15s 0.55	0.17	0.55	0.35	0.55	0.35	1.45	11.75		
817	MO(U) 15s 0.60	0.17	0.60	0.30	0.60	0.30	1.40	11.80		
818	MO(U) 15s 0.7 0.5	0.22	0.70	0.50	0.70	0.50	1.90	10.70		
819	MO(U) 15s 0.7 0.7	0.23	0.70	0.70	0.70	0.70	2.10	10.10		
820	MO(U) 15s 0.75 0.15	0.21	0.75	0.15	0.75	0.15	1.65	11.55		
821	MO(U) 15s 0.75 0.45	0.23	0.75	0.45	0.75	0.45	2.00	10.60		
822	MO(U) 15s 1.15	0.35	1.15	0.75	1.15	0.75	3.00	8.20		
823	MO(U) 15s 1.30	0.39	1.30	0.70	1.30	0.70	3.30	7.70		

CUSTOM CODES

900 | Can be inserted at factory at time of order (up to 50, memory limited)
 See next page if special characters have been added.

999	Custom flash character programmed by user (see section 6) [insert]
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<u>Code</u>	<u>Custom Character Description</u>	<u>Duty Cycle</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>	<u>On</u>	<u>Off</u>
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SPECIAL CHARACTER CODE

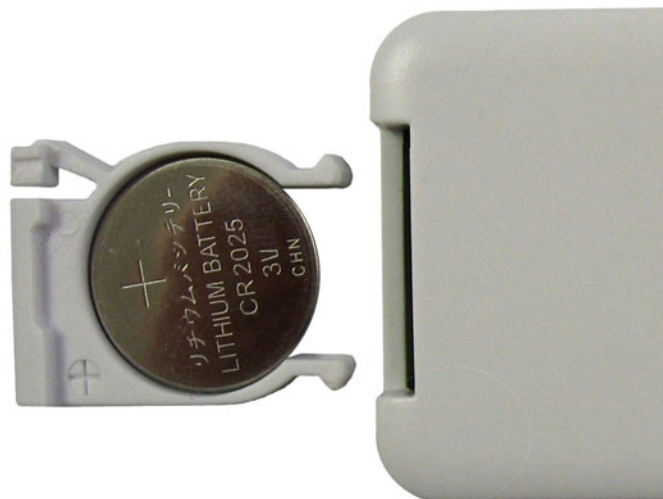
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Appendix E Battery Replacement

- The programmer requires one 3V lithium battery type CR2025.
- Place the remote face down, and push the latch on the battery holder towards the centre of the programmer case, while at the same time levering the slot on the battery holder outward as shown in the illustration below.
- Pull the battery holder out of the case.



- Remove the old battery and insert a new one, ensuring that the + side of the battery is facing upwards as shown.



- Insert the battery holder into the programmer case, and press it until the latch clicks into place.

Appendix F Specifications

Coding Scheme: RC5 code with centre frequency 36.7 kHz

Programming options:

- Flash Character
- Individual day / night Intensity
- Synchronisation
- Day / Night sensitivity control
- Operation mode
- Battery low threshold
- Slave sync flash cycle disable count
- Custom flash character

Dimensions: 87mm x 41mm x 6.5mm

Weight: 18g

Power Supply: 1 x 3V lithium coin cell battery, CR2025 type

Part Number: Remote 02