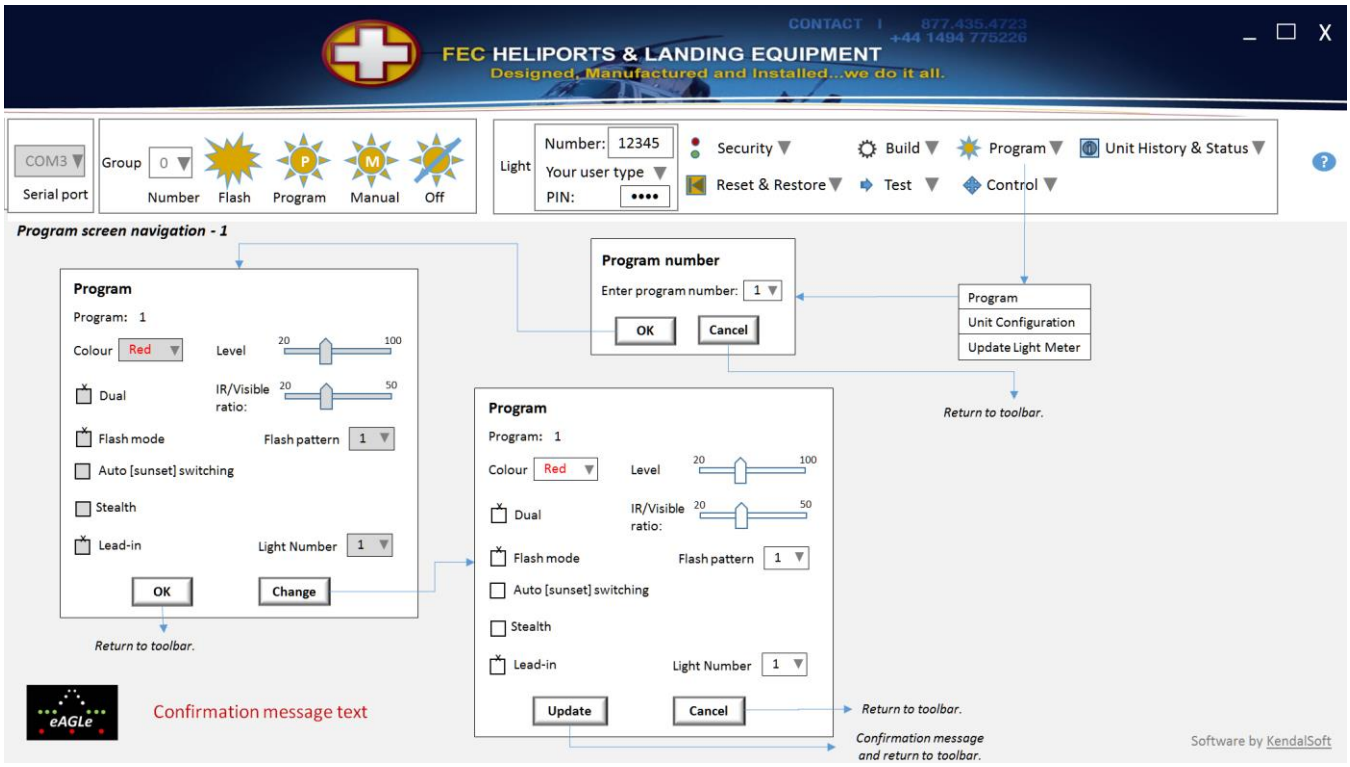
HEMS-Star®

PC Controller Software - Installation and User Manual

Issue: 1.2 27th April 2016



HEMS-Star® PC Controller Program Setting Logic

HEMS-Star®

Zulu Dongle and Antenna

® Interleader Limited

Document Revision

Issue	Date	Changes
1.0	21/02/2016	New Document
1.1	17/03/2016	Updated UHF Figures
1.2	27/04/2016	Corrected UHF table

Contents

1. Overview

The HEMS-Star® PC Controller Software (in this manual refered to as 'the software'), in conjunction with a Zulu 'Dongle', enables HEMS-Star® lights (in this manual refered to as 'the lights') to be configured and controlled, either as individual lights or as a group.

To run the software requires:

1) The software
    a. supplied on USB memory stick
    b. updates available on-line for download
2) Zulu Dongle and Antenna
    a. supplied in the carry/charging case
3) PC, Laptop or Tablet
    a. Not supplied
    b. Should be running Microsoft Windows 10 but has been shown to work on Microsoft Windows 7 or later
    c. Must have an accessible USB port
    d. Must be connected to the internet during the installation process

The *eAGLe* logo and HEMS-Star® name are copyright of Interleader Limited 2016

2. Zulu ‘Dongle’ Compliance Statements

USA

FCC Compliance WARNING

Changes or modifications to the transmitter not expressly approved by the manufacturer could void the user's authority to operate this RF device.

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause interference, and

2. This device must accept any interference, including interference that may cause undesired operation of the device.

USA-Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no ensured specification that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by tuning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the distance between the equipment and the receiver.

• Connect the equipment to outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

Europe

This device carries the CE marking showing it has been tested and shown to be in compliance with relevant EU standards.

CE

3. Installation

Before beginning installation make sure you have:

1) Fully charged lights
2) PC with Windows 10 (has been shown to work on Windows 7 or later ***(The software will not run on any earlier version of Windows, Apple iOS or Android devices)***
3) Access to the internet with a fast connection

Installing the Zulu Dongle

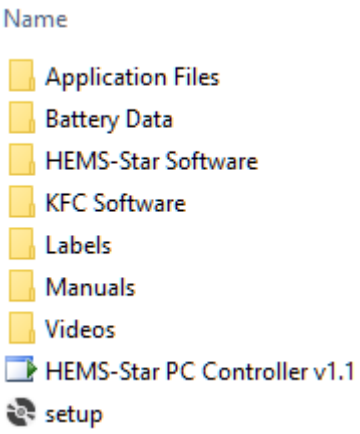
Make sure that the PC is working and has access to the internet. Carefully extract the dongle and antenna from the foam of the carry case by gently pulling vertically. Do not provide any lateral force as this may damage either unit. Screw the antenna to the dongle (finger tight only).

Plug the dongle into an appropriate USB socket with the antenna pointing upwards. Windows will detect that new hardware has been detected (and advise this in a pop-up window) and will install the relevant drivers for the dongle automatically (again advised in a pop-up window). When the dongle software is ready for use, proceed to installing the software.

Material on the USB Memory Stick

There are a number of folders and files on the USB Memory Stick containing:

Application Files	The executable code.
Battery Data	Manufacturers declaration about the battery
HEMS-Star Software	Software running the lights
KFC Software	Software for the optional Key Fob Controller
Labels	Battery shipping labels
Manuals	HEMS-Star summary (flier in case) HEMS-Star manual (this document) HEMS-Star PC Controller manual Key Fob Controller manual
Videos	Short videos showing basic operations
HEMS-Star PC Controller V1.1	A manifest containing information about the software.
Setup	Setup file for PC Controller Software



It is recommended that you copy all of the files on the USB memory stick to your PC's hard drive

However you organise the copied files, ensure that the following are all together, at the same level, in the same directory (C:\Downloads recommended):

Folder: Application Files

Manifest File: PC Controller Software V1.01

Setup File: Setup.exe

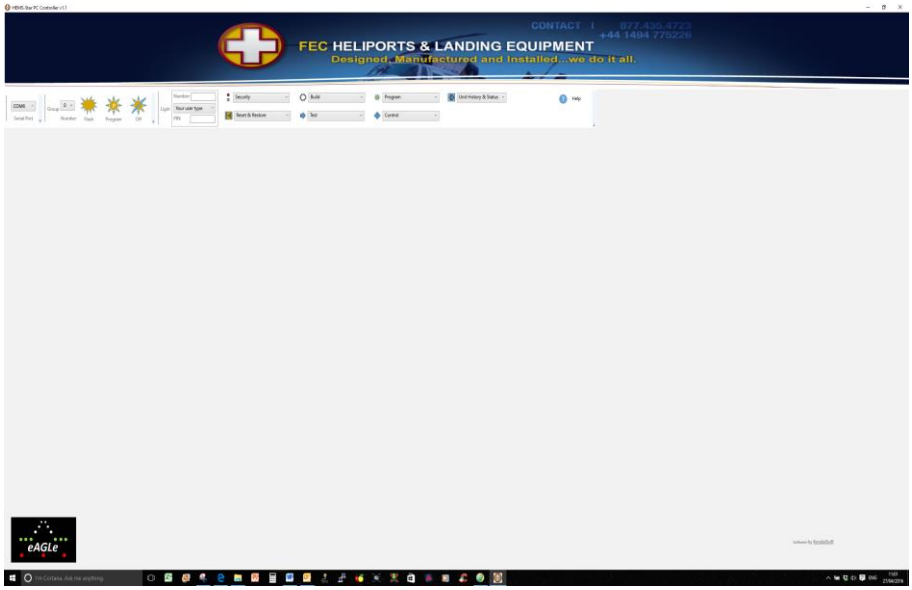
Installing PC Controller Software

The software uses Microsoft .Net Framework v4.6 components which are included with Windows 10.

If you are running an earlier version of Windows, at the time of installation, these components may download automatically but if not you will need to download them manually. Note that this is a large download and even with a fast internet connection will take some tens of minutes and will require a re-start of the PC to take effect.

To install the software:

1) Shut down all other applications running on your PC
2) Uninstall any previous version of the PC Controller application
    a. Select: Windows key, All apps, double click on HEMS Star PC Controller and select uninstall
3) Plug in your dongle and switch on a light
4) Switch off protection software such as Avast, McAfee completely
5) Run the setup.exe file
    a. This can either be from the memory stick or from the location you copied the files to
    b. If you get a screen displayed saying this is risky software and a 'Don't install' button then select 'More Info' and then press 'Install anyway'.
6) A 'Publisher cannot be verified' screen will be displayed – select 'Install'.
7) The software will install and appear thus:



If it does not appear at all, repeat the process above ensuring that all steps are followed exactly.

On narrower screens, the menu area may appear trunctacted from the right (for example the Help area may not be visible). This is quite normal and is managed by use of the drop-down menus (see later sections).

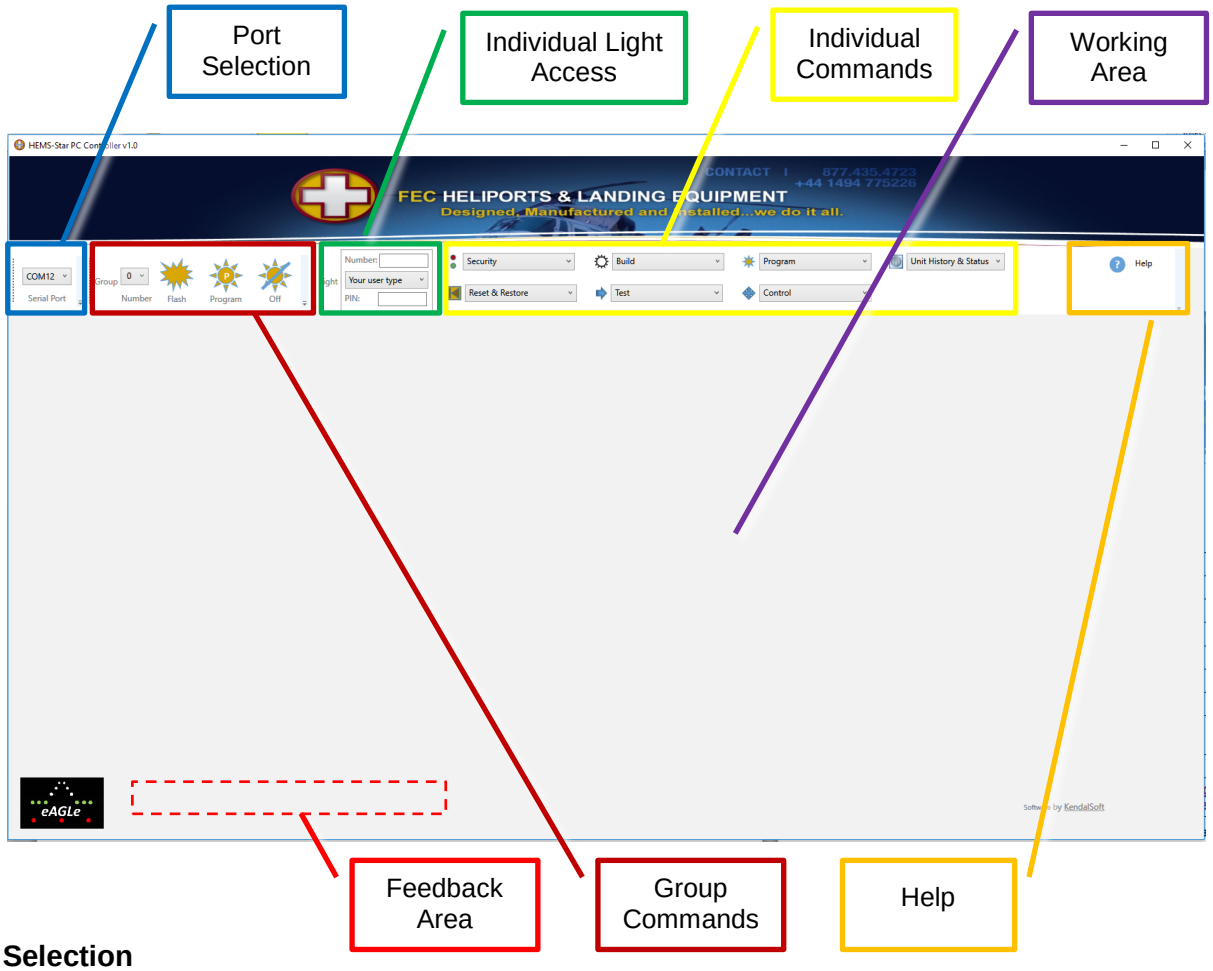
Operational Note:

Check that you have the correct serial number, the battery is properly charged and the light switched on before running the software or you will receive various failure and time-out messages.

Also, this version of the software can experience time-outs when communicating with the lights. This is being addressed for future releases of the software.

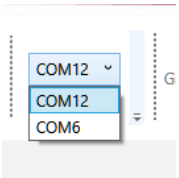
4. Software Screen Sections

The screen of the software is divided into a number of sections as described below:



Port Selection

When the dongle was installed on you PC, Windows allocated it the next availlable COM port. The first thing to do is to select the correct port for the Zulu dongle. Use the drop down menu to see what ports are available. In this example COM12 and COM6 are available. If unsure which is the correct one, select each in turn and issue a Group Command (see later section).



Group and Individual Light Commands

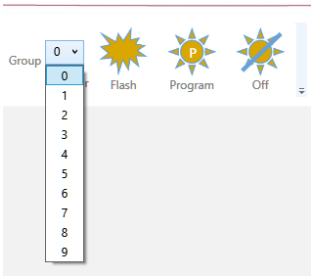
Lights respond to both

1) Group Commands (All lights of the same group do the same thing e.g. run program 3), and
2) Individual Commands (Only the correctly addressed light responds to a specific command)

The following sections deal with each of these.

5. Group Commands

The Group Commands are the simplest and, once the lights are set as you want them, the only commands you are likely to use. It is essential to first select the group of lights to be controlled.

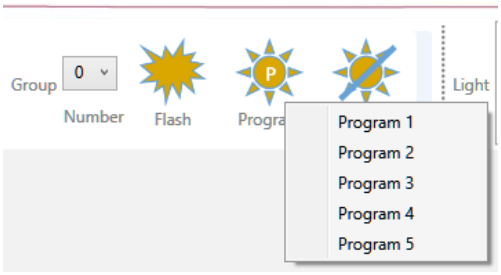


Use the drop down menu to view and select the group required.

Note that all lights are shipped with Group 0 as the default. If you have not changed this then the default selection may be left as it is.

Basic Group Commands

There are three basic group commands:



1) Flash the lights (each time the icon is pressed)
2) Select and turn on a program
    a. Click the program icon and the drop-down menu will appear
    b. Select the desired program
3) Turn the light off (puts it in wireless 'Standby' mode)

Note: For any of the above to work, the lights must already have been turned on with the magnetic key (see main manual). Turning the lights off through group commands puts them in wireless Standby mode. To turn them off, use the magnetic key.

Default Program Settings

The default program settings are (see Appendix A for flash patterns):

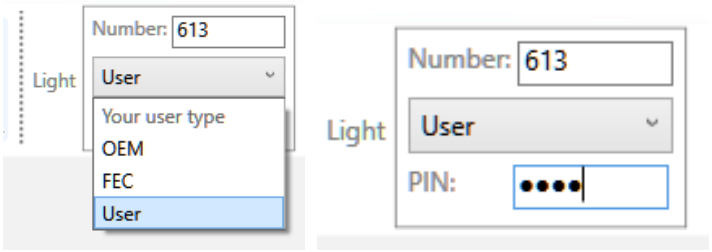
Program	1	2	3	4	5
Colour	Green	Green	Green	Red	White
Level	60%	60%	60%	80%	100%
Single/Dual	Single	Single	Dual	Single	Single
Dual Ratio	30%	30%	50%	30%	30%
Mode	Steady	Steady	Steady	Flash	Flash
Flash Pattern	1:3	ID Single	ID Dual	ID Dual	Morse 'H'
Normal/Sunset Switching	Normal	Sunset	Normal	Normal	Normal
Stealth	Normal	Normal	Normal	Normal	Normal
Comment	Shipping setting		**Warning IR Emitted**		

Note that greyed-out figures above mean that these are set in the program memory but ignored because of the other settings. e.g. in program 1 the dual ratio is set at 30% but is ignored because program 1 is set to Single Mode.

6. Individual Commands

Individual Commands will usually only be used during setup or testing activities and are specific to one light at a time.

Accessing a Light



First enter the light Serial Number (printed on the label inside each light). In this example it is 613.

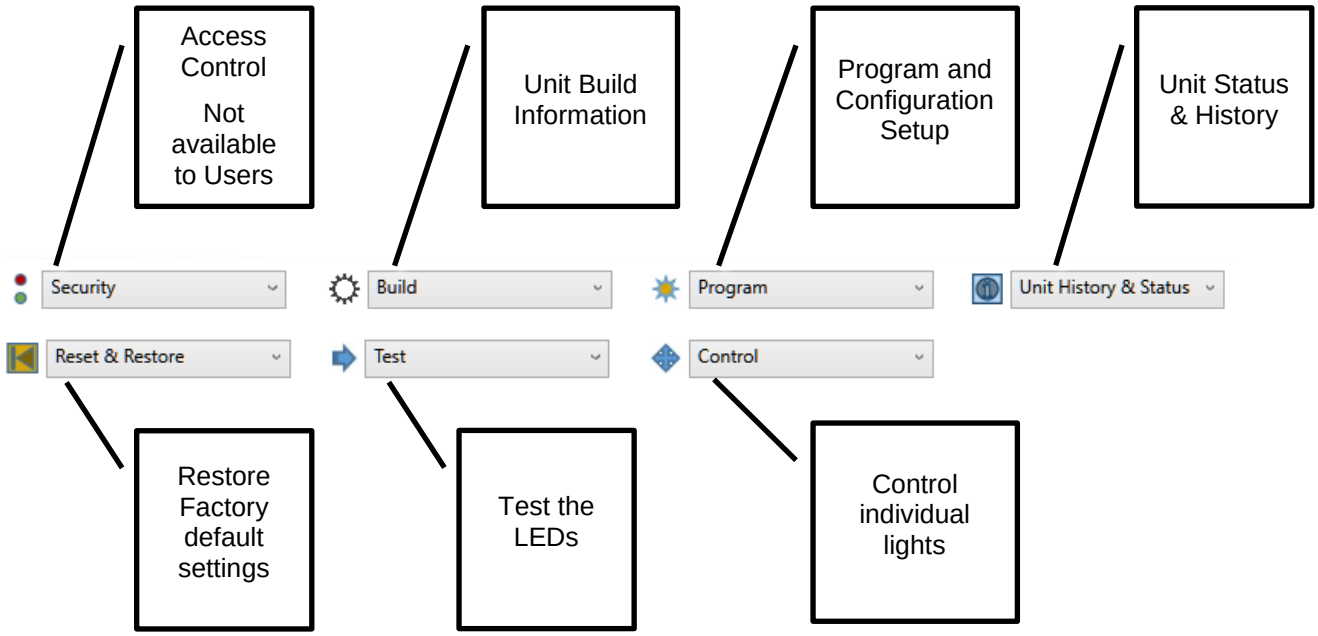
Select the User Type from the drop-down menu. In this case: User

Then enter the User PIN number. The default PIN number is 0000. FEC can change this PIN number and in future releases of software this will also be a user changeable item.

Once the correct credentials are entered they are maintained until changed allowing all of the Individual Commands for a light to be used. Only the light number needs to be changed to move to another light.

Individual Command Functions

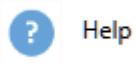
The functions that can be performed are grouped as follows (details in later sections):

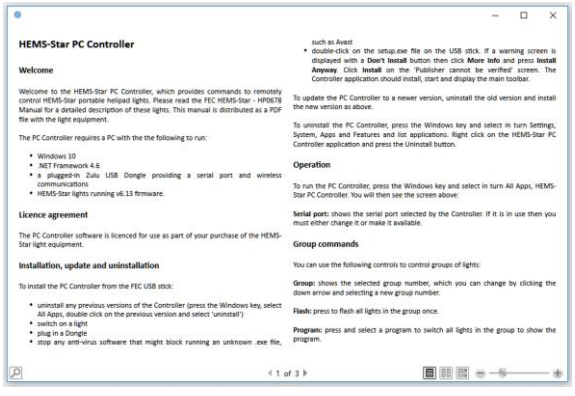


Help

Pressing the Help key brings up simple text based help.

This will be expanded in subsequent releases of the software.




HEMS-Star PC Controller

Welcome

Welcome to the HEMS-Star PC Controller, which provides commands to remotely control HEMS-Star portable helipad lights. Please read the FEC HEMS-Star - HP0678 Manual for a detailed description of these lights. This manual is distributed as a PDF file with the light equipment.

The PC Controller requires a PC with the the following to run:

- Windows 10
- .NET Framework 4.6
- a plugged-in Zulu USB Dongle providing a serial port and wireless communications
- HEMS-Star lights running v6.13 firmware.

Licence agreement

The PC Controller software is licenced for use as part of your purchase of the HEMS-Star light equipment.

Installation, update and uninstallation

To install the PC Controller from the FEC USB stick:

- uninstall any previous versions of the Controller (press the Windows key, select All Apps, double click on the previous version and select 'uninstall')
- switch on a light
- plug in a Dongle
- stop any anti-virus software that might block running an unknown .exe file, such as Avast
- double-click on the setup.exe file on the USB stick. If a warning screen is displayed with a **Don't Install** button then click **More Info** and press **Install Anyway**. Click **Install** on the 'Publisher cannot be verified' screen. The Controller application should install, start and display the main toolbar.

To update the PC Controller to a newer version, uninstall the old version and install the new version as above.

To uninstall the PC Controller, press the Windows key and select in turn Settings, System, Apps and Features and list applications. Right click on the HEMS-Star PC Controller application and press the Uninstall button.

Operation

To run the PC Controller, press the Windows key and select in turn All Apps, HEMS-Star PC Controller. You will then see the screen above:

Serial port: shows the serial port selected by the Controller. If it is in use then you must either change it or make it available.

Group commands

You can use the following controls to control groups of lights:

Group: shows the selected group number, which you can change by clicking the down arrow and selecting a new group number.

Flash: press to flash all lights in the group once.

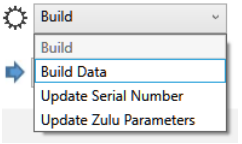
Program: press and select a program to switch all lights in the group to show the program.

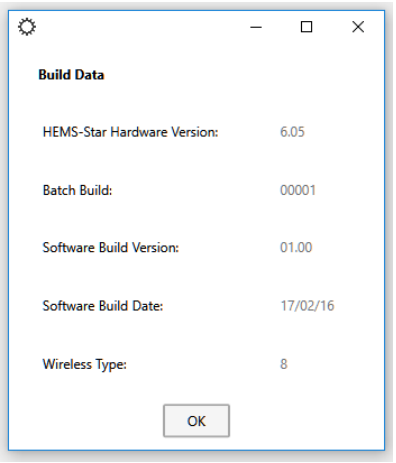
6.1 Security

This option is not currently available to Users.

6.2 Unit Build Information

The only option available to Users is the Build Data option which returns details of the unit (useful for diagnostic purposes)





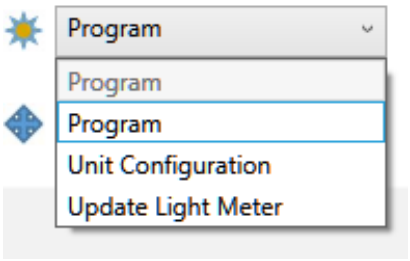
6.3 Program

The Program menu has further options:

Program: To check the current settings of the programs (1-5) and to make changes.

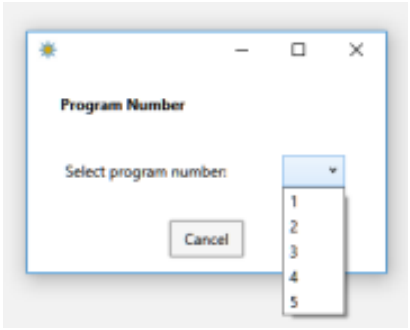
Unit Configuration: To check and make to the configuration settings which are common to all programs, and

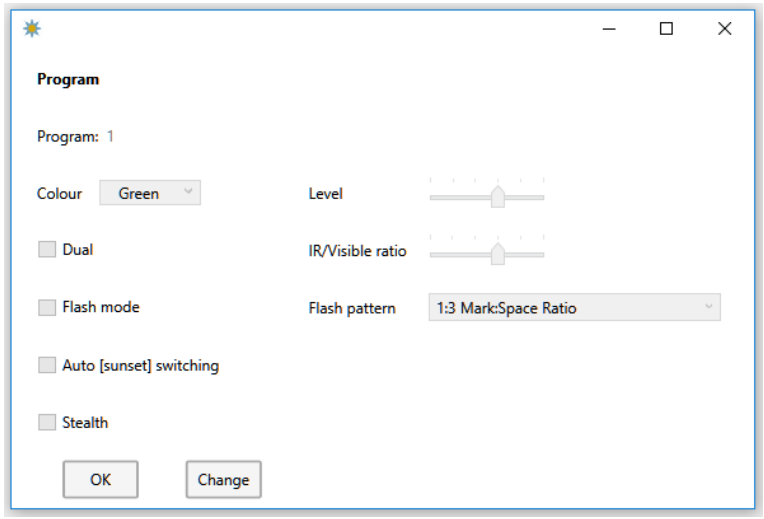
Update Light Meter: To calibrate the internal light meter



Program

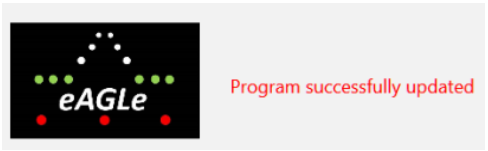
Selecting Program brings up a screen requesting the program to be accessed. Use the pull-down menu to select. In this example we are going to select program 1.

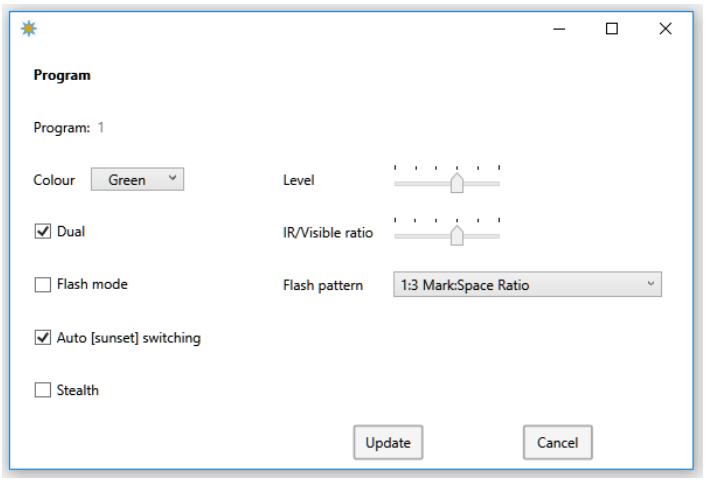




The software reads the setup of program 1 from the light and displays it. This is the default setting for program 1: Steady Green, 60% with no other attributes selected. Note that all of the settings, even if not active are visible (see earlier comment. Click OK if no changes are required or Change to do so.

If it is required to set program 1 to Dual mode (both the visible and IR LEDs on at once) and for the light to perform automatic switch on at sunset, then check the relevant boxes as shown below and click Update.





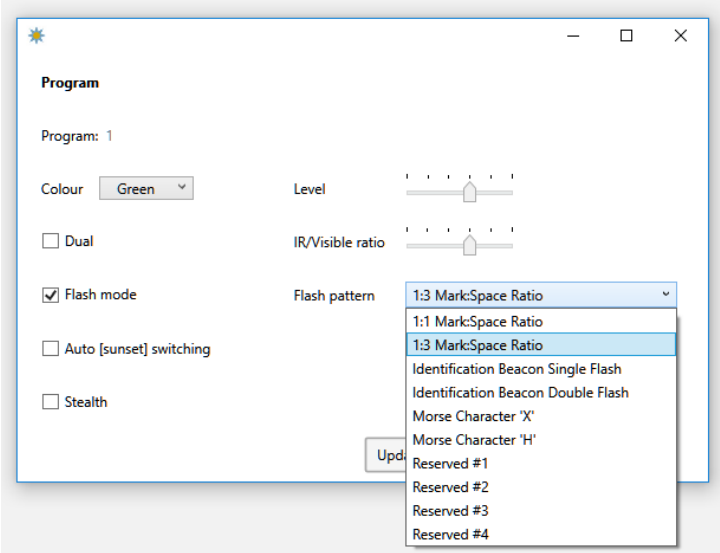
Confirmation (or not) that the change has happened is provided at the bottom left hand side of the screen (above left).

Notes:

1) Setting the visible light level to its lowest two levels sets the level to 20%. This will corrected in later releases
2) Some combinations (e.g. IR selected as the Colour with Dual Mode) make no logical sense and will be rejected.
3) Once the change has been made it is stored permanently in the light until changed again.
4) If the light is being programed in Standby mode, it will turn on the currently selected program after the update.

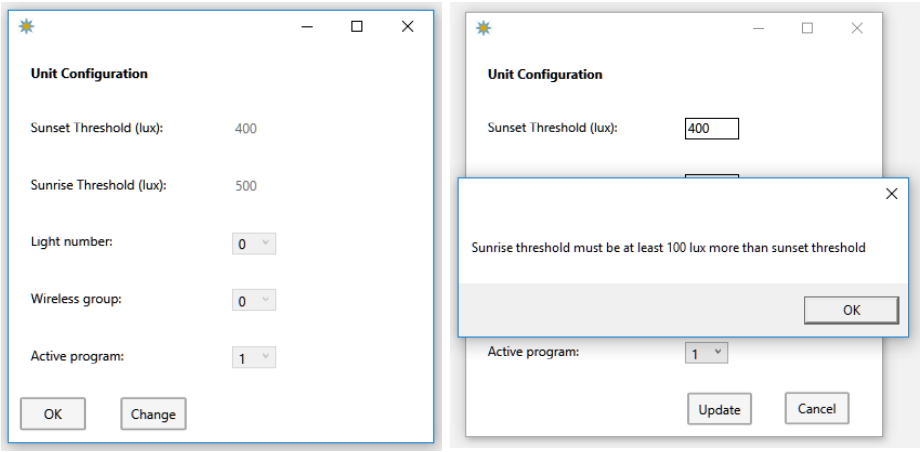
Flash Patterns

Selecting flash mode will allow the drop down menu of patterns available:



Configuration

Sunset & Sunrise



From the main Program menu, clicking Configuration will bring back the lights configuration settings common to all programs:

The light level at which the light will autmatically switch on or off are defined by the Sunset and Sunrise Threshold settings.

The default figures shown have proven to be suitable for most applications but if local conditions dictate a change, click update and then enter new figures to either or both.

Note that if an attempt is made to set figures that are less than 100Lux apart (Sunrise being higher than Sunset) the software will warn you about this and prevent the setting (upper right).

This is to ensure that the lights do not 'hunt' on and off due to the inevitable small changes in light level that occur.

Light Number

Note that the Light Number is NOT the serial (identification) number of the light but the position at which the light will flash when it receives a 'Flash' command as part of a series of lights.

All lights are shipped with the light number 0, meaning that the instant they receive a flash command they will flash. If a lead-in light pattern is required (sequence of 'running' lights) then set the required number of lights to a series (e.g. 0, 1, 2, 3, 4) for a sequence of 5 lights.

Wireless Group

All lights belong to a Group and respond to group commands addressed to that group. All lights are shipped set to Group Group 0. If multiple sets of lights are to be independently controlled, then set each group to a different group number and remember to change the group number in the Group Command area to the group to be controlled.

Active Program

Active program indicates the program that is currently selected and which the light will come on at when turned on from sleep with the magnetic key. Programs 1-5 can be selected.

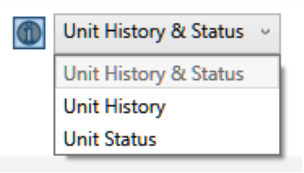
Update Light Meter

This command should be used with caution.

The light's internal light meter can be calibrated. To do this place the light and a precision light meter in the lit area (at around 400Lux). Note the reading on the light meter and enter it into the box and click update. The light will use the provided value to calibrate its internal meter. The value can be checked using the the Unit Status command (next section).

7. Unit History and Status

The Unit History and Status can be accessed from the top menu:

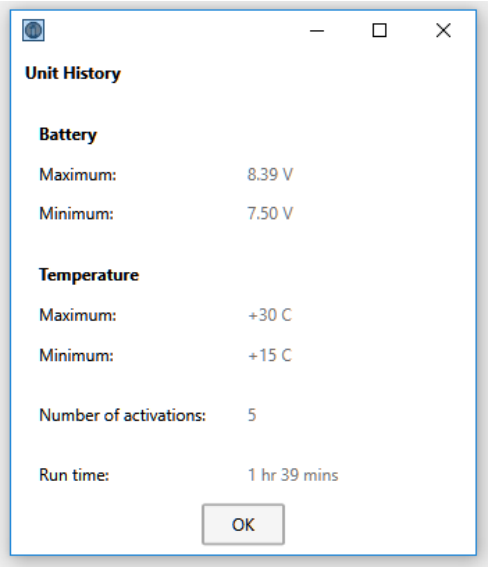


Unit History

HEMS-Stars build a history log for diagnostic purposes and is a read-only function.

The data returned includes:

1) the maximum and minimum battery voltage detected
2) the maximum and minimum temperature of the unit
3) the number of times the light has been activated (turned on with the magentic key), and
4) the total running time of the light in hours and minutes



Unit Status

The current status of the light can be accessed.

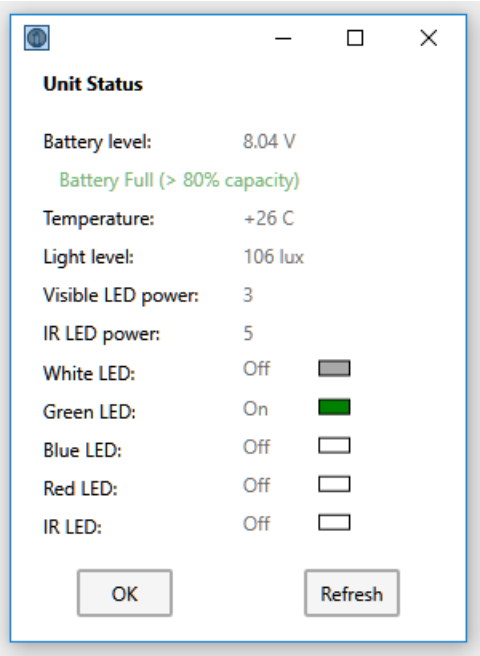
This light is showing that the battery is nearly fully charged, the temperature inside the case is 26C and the light level 103Lux.

The Visible and IR power levels are shown as 3 (60%) and 5 (50% if Visible level) respectively. (Note future versions of software will show the decoded percentage figures).

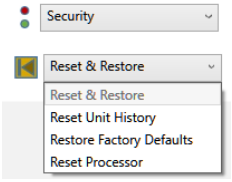
Only the Green LEDs are On indicated by the text ‘On’ and the colour filled box.

Note the status can be obtained at any time but because ii is an instantaneous reading, if the light is in standby or between flashes then the LED status will show Off (since at that instant they are).

This option is useful for checking that the light meter calibration cycle in the previous section has been successful. If it has, the reading returned from the light and the calibration light meter reading will be the same. Note that the light meter in the light is only accurate around the set value (approx 400Lux).



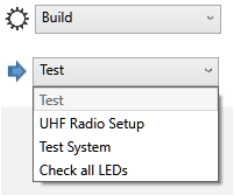
8. Reset & Restore



Of the menu options, only the Reset Factory Defaults option is available to Users.

The program settings as shown earlier are applied along with all of the configuration and calibration data. All user settings are lost.

9. Test



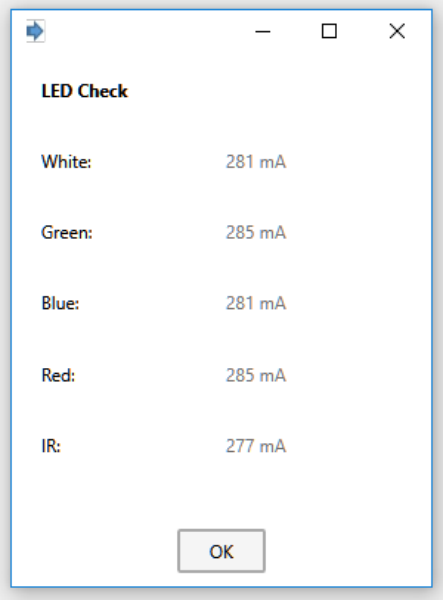
Of the menu options, only Check the LEDs option is available to users.

WARNING – clicking this option will cycle all of the LEDs (including IR) through a test routine that drives the LEDs harder than the normal 100% setting.

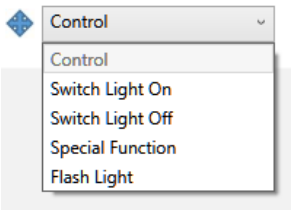
Do not look at the LEDs during this test and note that this test takes a number of seconds to perform – this is quite normal and to be expected.

All of the LEDs light in turn (White, Green, Blue, Red, Infra Red) and then the results will be returned.

The normal range of currents is between 260 and 290mA for the visible LEDs (and be similar for all of them) and between 10 and 20mA lower for the Infra-Red.



10. Control



It is possible to control individual lights with the same functions as the group commands.

Selecting Switch Light On will ask which program to set on (as per the Group Command).

Special Function is a reserved command for future use.

11. Appendix A: Flash Patterns

The following flash patterns are available:

Mode	Description	Timing	Flash Rate
0	1:1 Mark:Space Ratio	On – 250mS Off - 250ms	120 Flashes / Minute
1	!:3 Mark:Space Ratio	On - 250mS Off - 750mS	60 Flashes / Minute
2	Identification Beacon Single Flash	On – 250mS Off – 1750mS	30 Flashes / Minute
3	Identification Beacon Double Flash	On – 250mS Off – 100mS On – 250mS Off – 1400mS	30 Frames (of two flashes) / Minute
4	Morse Character ‘X’	On – 300mS Off – 100mS On – 100mS Off – 100mS On – 100mS Off – 100mS On – 300mS Off – 900mS	30 Characters / Minute
5	Morse Character ‘H’	On – 100mS Off – 100mS On – 100mS Off – 100mS On – 100mS Off – 100mS On – 100mS Off – 1300mS	30 Characters / Minute
6	Reserved #1		
7	Reserved #2		
8	Reserved #3		
9	Reserved #4		

12. Appendix B: UHF Radio Modem Specification

The Modem has the following specification.

Parameter	**Value**	
	UK/EU/ROW 868MHz	USA 915MHz
Manufacturer:	RF Solutions Ltd. UK	RF Solutions Ltd. UK
Modem Type:	ZULU-2-M868-SO	ZULU-2-M915-SO
Nominal Frequency Band:	868MHz	915MHz
Frequency Options:	868.400, 868.900, **869.450**, 869.600 & 869.800MHz	915.00, 915.09, 915.18 & 915.27MHz
Frequency Set to:	869.450MHz	915.00 – 915.27MHz
Bandwidth per Channel:	100kHz	90kHz
Deviation:	45kHz	45kHz
Power Output Set	100mW (20dBm)	0.74mW (-1.3dBm)
Receiver sensitivity:	Max –121dBm (-102dBm (Max) to -109dBM (Min) at 56kbps)	Max –121dBm (-102dBm (Max) to -109dBM (Min) at 56kbps)
PC Controller Range:	Up to 2km depending on RLC aerial positioning and terrain	TBC
Addressing:	24bit secure data protocol	24bit secure data protocol
Addressing Schema:	One to Many	One to Many
RF Baud Rate:	56kbps	56kbps
Modem Data Rate:	19.2kbps	19.2kbps
Modulation:	Frequency Shift Keying (FSK)	Frequency Shift Keying (FSK)
Operating Temperature:	-40C to +85C	-40C to +85C
Compliance:	CE (see table below)	FCC Compliance is to 47 CFR part 15.249

RF Channel Selection

The EU standard sets maximum power transmission limits dependent on frequency, bandwidth and application. A rough guidance applicable to the ZULU channel numbers is given below

Channel Number	Frequency Centre (MHz)	EU Power Allowance mW/dBm	Notes
0	868.400	25/14	Applicable standard - EN300-220
1	868.900	25/14	
2	**869.450**	**100/20**	
3	869.600	100/20	
4	869.800	25/14	

All specifications are manufacturer's data

End of Document