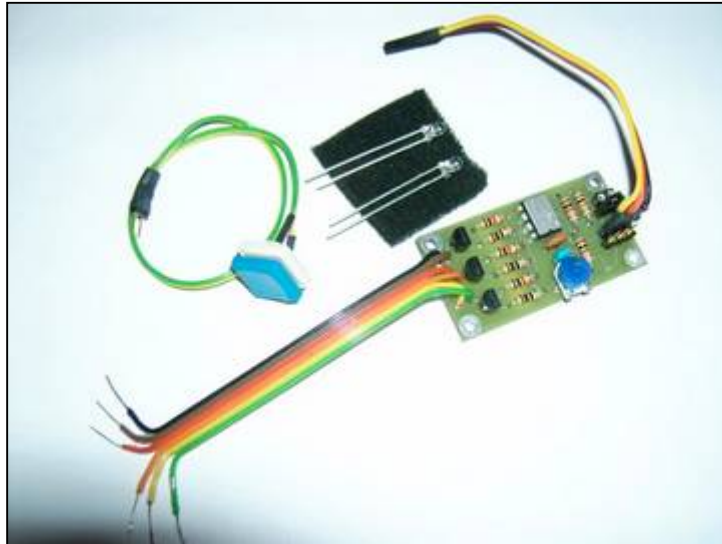


LCS-SM0701 Strobe Module Instructions



(Document Version 0.3)

IMPORTANT!

PLEASE READ THESE INSTRUCTIONS PRIOR TO USE!

Document Revision History:

Date	Version	Description
06/01/07	0.1	Initial draft version
13/02/07	0.2	Minor updates
20/03/08	0.3	Updated current consumption and minor updates

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1. Description

The LCS-SM0701 Strobe Module is a low cost, simple to use and yet very versatile model strobe lighting system that does not rely on fragile miniature bulbs or expensive and problematic strobe technology.

The LCS-SM0701 uses ultra bright LED's to safely simulate anti collision strobe lighting that is found on today's modern civil and military aircraft.

The Strobe module can be controlled from a receiver output that allows the module to be activated or deactivated remotely. It can also be used in a 'stand-alone' mode requiring no Rx input. In this mode the Strobe Module is free running.

The LCS-SM0701 Strobe Module can be powered by an external 4.8V to 6.0V battery pack or directly from the receiver via the Strobe control input lead.

The Strobe module provides 3 separate ultra bright LED outputs. These outputs can be used as required but have been designed as dorsal, ventral and wingtip anti collision strobe lighting in mind.

When used with the 'Strobe Mode Select Switch', the strobe module allows the user to select any one of four possible strobe patterns each with two speeds. An adjustable potentiometer allows the control of the repetition rate of the strobe effect i.e. the delay before the strobe cycle is repeated.

Once the desired strobe mode has been selected this is maintained in non-volatile memory and is recalled on power-up of the module and this is retained even when battery power is removed.

The LCS-SM0701 Strobe Module can be easily reset to the default strobe sequence by the use of the 'Strobe Mode Select Switch' accessory.



Figure 1. The LCS-SM0701 Strobe Module

2. Package Contents

- 1 x LCS-SM0701 Strobe Module
- 2 x Ultra bright white LED's (~5000mcDs)

Note: The Strobe Module Mode Select Switch can be purchased as a separate item. See section 9.

3. Strobe Module Specification

Parameter	Value	Comments
Dimensions (W x L x H)	1 7/8" x 1" x 3/4" (48mm x 25mm x 20mm)	
Weight	10g	
Operating voltage	+4.8V to +6.0V	Standard Rx supply
Baseline current consumption	1.16mA	No LED's connected
Avg. Current	See Note 1	
Rx Input	On/Off control	JR connector

Table 1. Specifications

Notes;

- 1) Power consumption is as follows:-
Module powered up but with no LED's being driven (i.e. not connected) = 1.16mA. This is the baseline current. Total actual average current drawn will depend on the number and type of LED's connected and the strobe pattern and speed selected.
Typically with 2 x 3mm Ultrabright white LED's the current peaks at 65.9mA. Ultrabright LED's draw around 32mA. The LED's are only on for a fraction of the time, so, even with a duty cycle of 50% the current drawn would be halved. Typically the LED's will be on for no more than 10% of the time. So, this equates to 1/10th the current, so no more than 7mA worst case would be drawn.

So, for every LED added you need to add around 32mA.
Therefore, worst case current in theory would be;

$$1.16 + ((\# \text{ of LED's} \times 32) \times 0.1) \text{ mA.}$$

4. Connections

When looking at the various connections in the following section, please also use Figure 2 below as a reference.

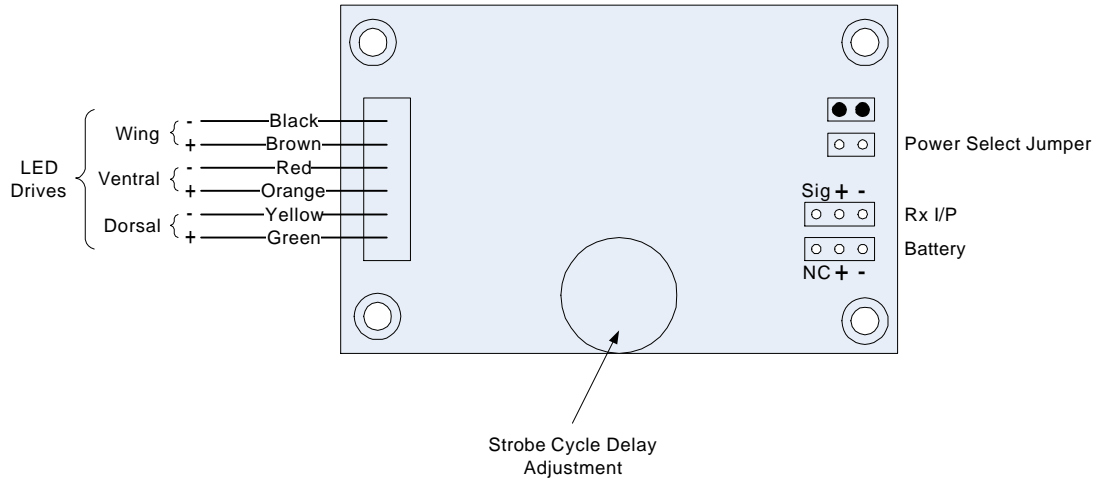


Figure 2. LCS-SM0701 Strobe Module Connections

LED Driver Wires:

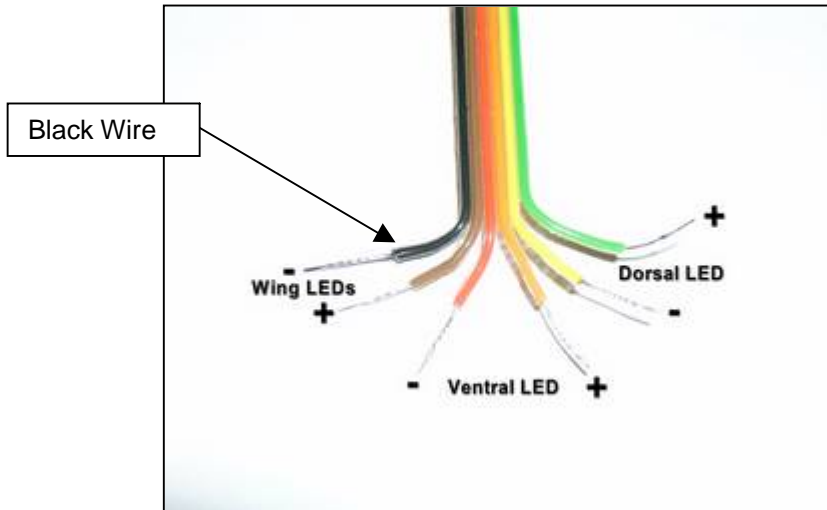


Figure 3. LED Driver Wires

Strobe Position	Wire	Description
WING	Black	- (Ground)
	Brown	+ (Signal)
VENTRAL	Red	- (Ground)
	Orange	+ (Signal)
DORSAL	Yellow	- (Ground)
	Green	+ (Signal)

Table 2. LED Driver Wire Description

Dedicated Power Input & Rx Control Input Fly Lead:

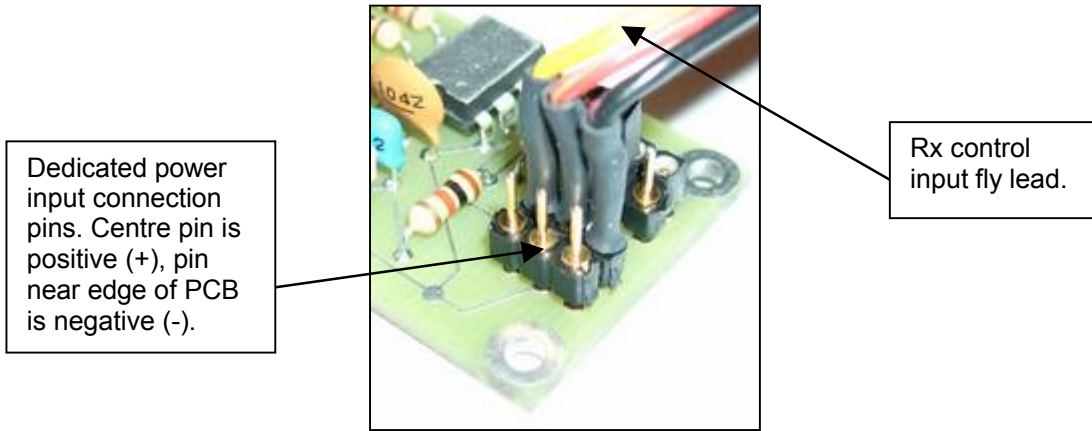


Figure 4. Dedicated Power Input Connection & Rx Control Input Fly Lead

Power Select Jumper & Strobe Pattern Select Switch Input:

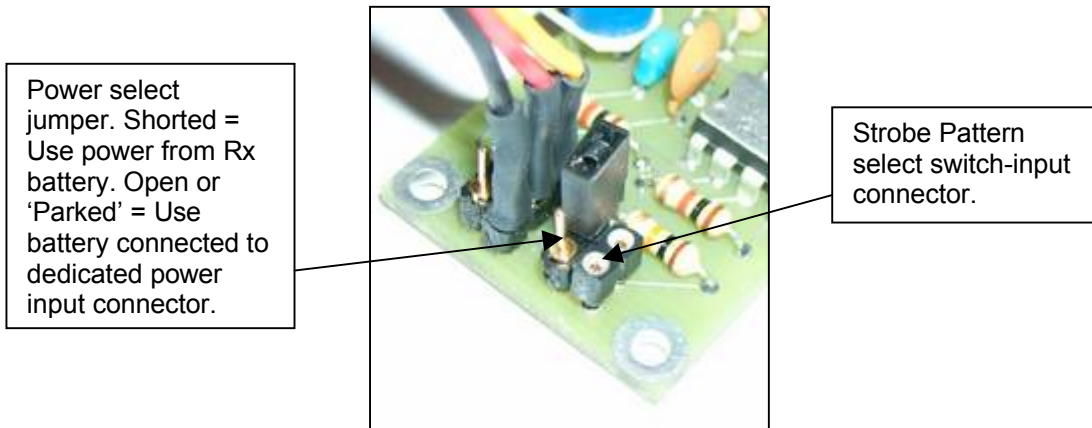


Figure 5. Power Select Jumper & Mode Select Switch Input

NOTE: Figure 5 shows the jumper in the 'parked' position. In this position the module must be powered by a separate dedicated battery pack.

5. Installation

Tools and materials required:

- Wire strippers.
- Wire cutters.
- Soldering Iron.
- Solder.
- Suitable lengths of multi-strand small gauge cable.
- Heat-shrink or electrical tape.
- 4 x Suitable Screws/Nuts & bolts or Velcro for mounting the Strobe module.

Optional:

- Small terminal block or suitable connector e.g. a 9 pin D-Type male & female plug/socket.

Procedure:

Decide what anti-collision lights are going to be fitted to the model in question. The pack contains two ultra bright white LED's that are ideal for ventral and dorsal anti collision strobe lamps or using them as wingtip anti collision strobe lamps that can both be driven from the single 'WING' LED driver output. If you decide to fit ganged wingtip anti collision lamps as well as the ventral and dorsal lamps then extra LED's can be purchased (See section 10 for details).

Any of the three LED driver wire pairs maybe used to drive your LED's but the system has been designed with particular outputs targeted at certain strobe positions (see Table 2 and Figure 7). Be sure that any unused LED driver wires are safely terminated such that the two unused wires are unable to short together. Do this by removing the tinned bare wire ends and cutting one wire shorter than the other or feed them into a small terminal block. The later method allows you to use them later if desired.

Fit your LED's to your aircraft/vehicle and use some light gauge multi-strand wire to run from each LED to the LCS-SM0701 Strobe Module. It is recommended that the wire on each leg uses a different colour to aid in identification (Black for the negatives (-) and white for the positives (+)) and these 'paired' wires be twisted together. This can be done easily by clamping one end of the wire pairs using a bench vice and then placing the other end of the paired wires into the chuck of a hand drill and slowly wind the wires up until they are twisted together along their length.

Strip and tin each wire pair for each LED. Solder a single wire to each of the two LED wire legs. The legs can be cut down as required and it is suggested that suitable heat-shrink or electrical tape be used to safely cover the soldered

'lap' joint connections. This will help prevent the two LED legs shorting together and also provide a more durable connection.

NOTE: If bending the LED wire legs be sure to support across the legs with narrow nosed pliers such that the wires are not bent too close to the LED plastic body. Doing so may damage the LED.

The positive and negative legs of the LED's can be identified as show in Figure 6. Take note of which wire runs to the negative LED leg and also to the positive LED leg.

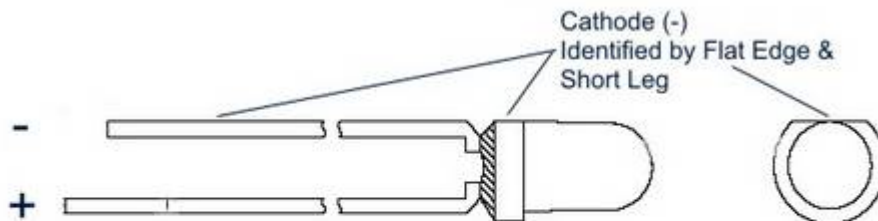


Figure 6. LED Positive & Negative Terminal Identification

Don't worry about connecting the LED's the wrong way. If you do, the worst that will happen is that they will simply not flash. Just transpose the connections to the LED in question and all will be ok.

Terminate the LED 'paired' wires at the required LED output driver wires on the LCS-SM0701 Strobe Module. This can be done via a suitable terminal block or repeat the process that was done for connecting the wires to the LED's. If this method is chosen, be sure to use heat-shrink or electrical tape to insulate each connection.

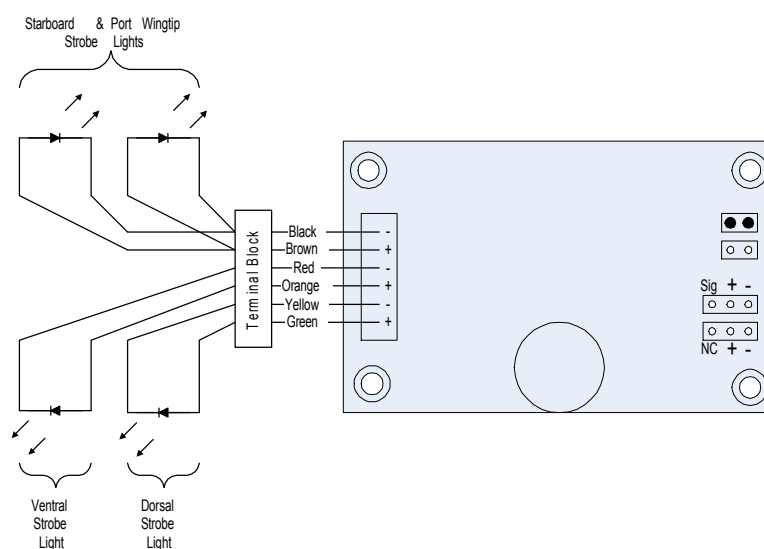


Figure 6. Typical LED Connections

Mounting the LCS-SM0701 Strobe Module

For a more permanent and tidier installation it is suggested that the four 2mm diameter mounting holes are used to secure the Strobe module to a suitable mounting plate within the model. Self-tapers can be used or suitable nuts and bolts. In both cases it is suggested that the module is raised off of the mounting surface by the use of spacers to avoid flexing the Strobe module when tightening the screws/bolts and also to avoid possible shorting of the Strobe module if the mounting plate is conductive.

If the module is to be used in other models then using Velcro will allow the quick removal and re-installation of the module as and when required.

It is important however that the module is not able to come loose during the operation of the model.

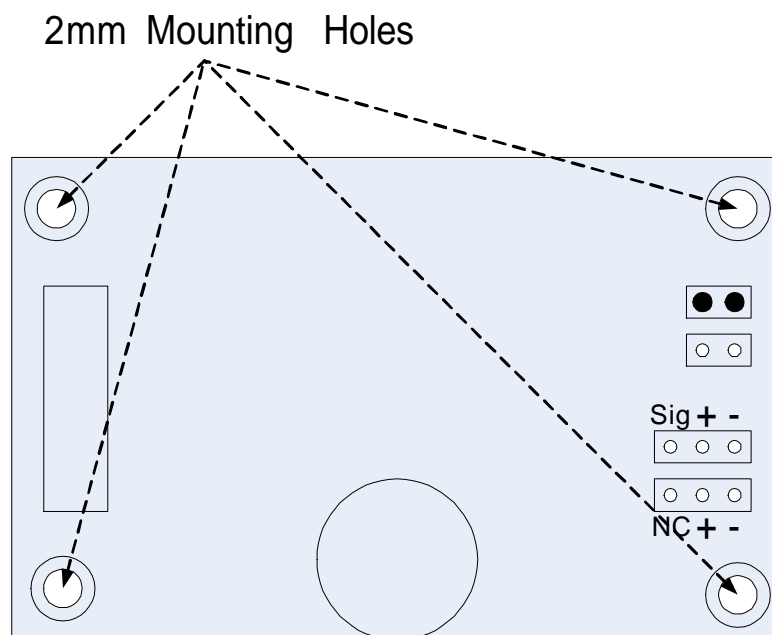


Figure 8. LCS-SM0701 Mounting Holes

6. Setting-up

Power Options:

Choose how you intend to power the Strobe module I.e. Either from a dedicated 4.8V to 6.0V battery pack or from your Rx battery pack via the Rx control input lead. If you intend to use the Strobe Module in the 'stand-alone' mode then the module will need to be powered by a dedicated battery pack.

Jumper Position	Strobe Module Supply
ON	Power supplied via the receiver (Rx).
OFF or 'Parked'	Power supplied via dedicated battery pack. Also required in 'stand-alone' mode.

Table 3. Jumper Positions

Connection to the Rx:

If you wish to control the Strobe Module in flight then you can connect the module to your Rx via the Rx Control Input fly lead. The lead comes with a JR connector as standard. If using Futaba or other system then use an extension to interface with the module. If you decide not to connect the strobe module to your Rx then the module will happily work without any input from the Rx. If used in this mode then be sure to use a separate battery to power the module.

Mode Select Switch Connection and Operation:

By using the optional LCS-SSW001 Mode Select Switch plugged into the 'Pattern Select I/P' socket (see Figure 5), it is possible to cycle through up to 4 possible strobe sequences each having two speeds. See table 4 below. Each time the mode switch is pressed the strobe module will step to the next strobe pattern/speed. Once you have selected a pattern the mode select switch can be removed. The strobe module remembers the pattern you selected each time the module is powered up.

The module can be reset to the default strobe pattern by connecting the Mode Select Switch to the module and holding the switch 'on' while power to the module is applied. Nothing further will happen until the Mode Select Switch is released. Once released, the module will have been reset to the default strobe pattern.

Strobe Patterns Table:

Mode	Speed	Direction of Pattern →			Short Delay	Wing	Repetition Delay set by Trimmer
		Dorsal	Ventral				
1	Fast	Double Flash	Double Flash		Double Flash	Repetition Delay set by Trimmer	
2	Slow						
3	Fast	Single Flash	Single Flash		Single Flash		
4	Slow						
5	Fast	Double Flash	Double Flash		Single Flash		
6	Slow						
7	Fast	ALL		ALL (Single Flash)			
8	Slow	(Double Flash)					

Table 4. Strobe Patterns

NOTE:

For modes 1 to 6 each LED flashes in turn. The Dorsal LED is followed almost immediately by the Ventral LED. A short delay then occurs before the Wing LED's flash.

For modes 7 & 8, ALL LED's flash together in the sequence described in Table 4.

Strobe Cycle Repetition Rate Adjustment:

Strobe cycle repetition rate adjustment trimmer.

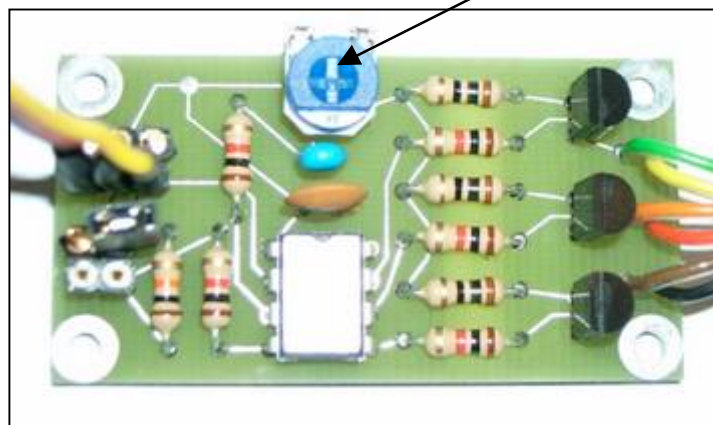


Figure 9. Top View

Using a small blade screwdriver, adjust the position of the Strobe Cycle Repetition Rate trimmer (as shown in Figure 9) until the desired delay between the end and the start of the next strobe sequence is found. By using a combination of the trimmer and the two speed selection for each strobe pattern (See Table 4), a suitable strobe speed can be found.

7. Trouble Shooting

Symptom	Possible Problem	Solution
LED's don't flash	LED's connected the wrong way around.	Check and re-wire if required.
	Dedicated battery supply connected the wrong way around.	Fit battery taking care of polarity of connector.
	Jumper not fitted across both pins if using Rx supply to power the module.	Fit jumper across both pins.
	Rx or dedicated supply battery is flat.	Use charged battery.
LED's repeat too slowly or too quickly	Trimmer set to extreme position.	Adjust trimmer to set the desired strobe cycle repetition rate.
Can't control LED's on or off	Strobe module not connected to Rx.	Connect Strobe module to an appropriate Rx channel and power cycle the Strobe module.
	Tx and/or Rx not turned on.	Turn on Tx and/or Rx
LED's remain on/off permanently	Module may be in a 'latched' state.	Power-cycle the module.

Table 5. Trouble Shooting

Recommendations

Where possible, use a separate 4.8V or 6.0V battery pack to drive the module. This will ensure that any malfunction with the module will not drain the receiver pack in the unlikely event that a short circuit may occur. It is suggested that this is done in large models and gas turbine aircraft. Be sure that when using a separate battery pack to drive the strobe module that the 'Supply Select Jumper' is in the 'Parked' position or is completely removed. The jumper **must not** be connecting the two pins together. See Figure 5 for details.

If possible, it is suggested that if the Rx input is used to control the Strobe module that this channel is also set such that if a fail-safe condition occurs it disables the strobe module.

8. Accessories

Description
Strobe Mode Select Switch
Ultra bright white LED's (clear lens)
Ultra bright red LED's (clear lens)
Ultra bright green LED's (clear lens)
SuperFlux white LED (clear lens)

Please use this link to order <http://homepage.ntlworld.com/lee.sinton/>
Or email me direct with your order items and quantities via
lcs.systems@ntlworld.com

Note: When ordering LED's, please specify 3mm or 5mm diameter.

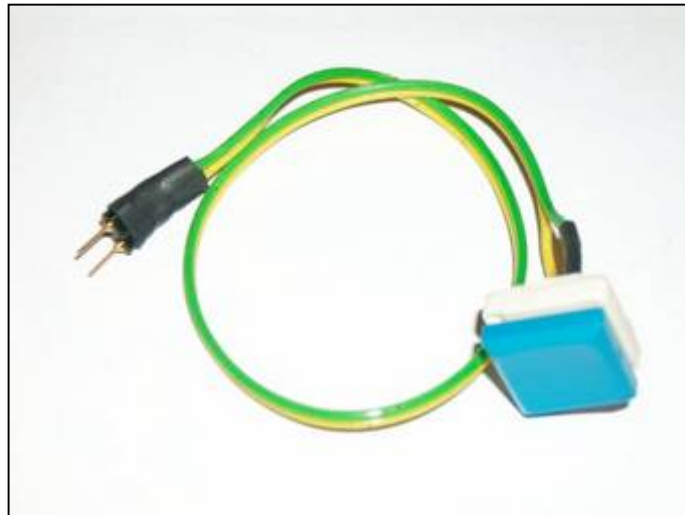


Figure 10. Optional Mode Select Switch

9. Safety

- Don't look directly at the LED's! They are very bright (~5000mcDs). YOU HAVE BEEN WARNED!
- Always perform a range check when installing in a new model prior to its first flight with and without the Strobe module running E.g. When controlled on/off from the Rx.
- Periodically perform range checks (especially if ANY configuration has been changed). E.g. position of module in aircraft, number of outputs used, position of strobe LED's or change of Strobe mode/pattern.
- Ensure any unused LED outputs are correctly terminated and not shorting to each other or other metal parts.
- Ensure the module is securely mounted.

10. Disclaimers

The use of this device indicates you have read and understood the instructions and that you are satisfied with the performance of the device prior to and during the use of the device within a model aircraft (or any other radio-controlled vehicle). In doing so you have accepted responsibility should any catastrophic failure occur that may cause damage, injury or even death to you or any other persons. LCS Systems take no responsibility in any damage caused to property, injury or death to any persons caused by the use of this device. It is the user's responsibility to ensure that it has been installed correctly and that it causes no interference to the radio controlled vehicle it is installed within or to any other nearby radio controlled vehicle.

Please note that the specification, appearance, components used and performance of the LCS-SM0701 Strobe Module and its accessories (including these instructions) may change without prior notice.

11. Contact Information

THANK YOU for purchasing your Strobe module. We hope that you enjoy using it to enhance your models scale appearance.
Be safe and happy landings!

For any questions or further enquiries then please send an email to...

lcs.systems@ntlworld.com