

# **Shift-I<sup>TM</sup>**

## **User Manual**

**V1.02**

**Ecliptech Innovations Pty. Ltd.**

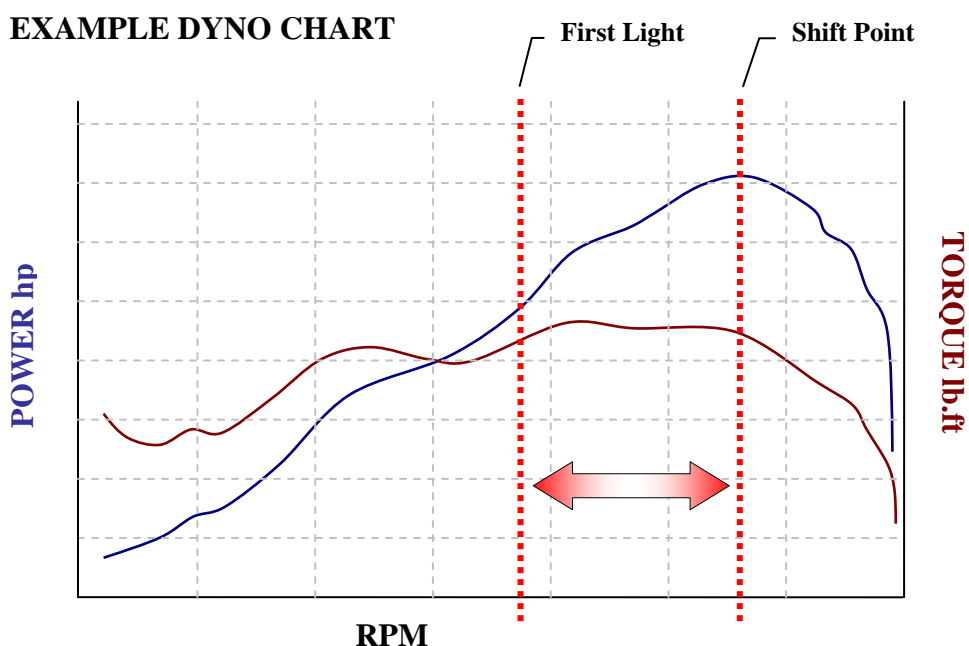
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## INTRODUCTION

Shift-I™ is a gear shift and RPM range indicator. The seven lights are used to indicate a section of your RPM, the first light turning on at your programmed low RPM point, and depending on the display mode, all lights flashing at your programmed high RPM point.

Typically the low RPM is set where the power starts to kick in, and the high RPM point is set at the shift point. The example dyno chart below illustrates useful RPM set-points. Straight line gear shifting can become more consistent, not only from the flashing display indicating when to shift, but the incremental display allows the rider to anticipate the shift.



Knowing the optimal RPM range can be particularly useful for both circuit and street riding. It can indicate if your entry RPM is below the start of the power curve, and also indicates if your RPM is too high to accelerate out of the turn without requiring a higher gear selection.

The Shift-I can be used to optimize launch control by keeping the RPM in the ideal range, and shifting consistently. Break out of old habits by setting optimal RPM set-points; form better riding habits and control.

Why seven lights? At a glance, you can instantly and easily recognize how many of the seven lights are on. With more lights, concentration is required, and less lights are not as informative. Trials determined seven was the optimal number.

The first light on the left can be easily programmed to turn on at a RPM value you choose, and so can the last. This ensures your Shift-I™ is customized to your bike and riding style. The lights in-between are automatically set to turn on at equal divisions.

## BASIC FEATURES

Read this section to find out how to get up and running.  
Read the advanced functions when you want to know more.

### Calibration Value

The RPM signal varies between different bike manufacturers and models, therefore a “Calibration Value” setting is provided. Using the correct setting is **VERY** important, as many of the functions are dependant on the RPM value. Most functions are locked out if the RPM is above 2,200!

The easiest way to determine your setting is to just to try it! The unit is pre-programmed for the first light on the left to turn on when it believes the RPM is 1,000. Start your bike and rev to see if the first light comes on at 1,000rpm, the second at 2,000rpm etc... If the light comes on too soon, then the calibration value must be increased. If it comes on too late, then it must be decreased.

To calibrate Shift-I™ to you bike, turn ignition off, press and hold both buttons, turn ignition on and then release the buttons.

If it is the first time you have entered this mode, then the left two lights will be on, indicating the default value of 2. For a value of 2.5, the first two lights will be on and the third will be flashing to represent the 0.5.



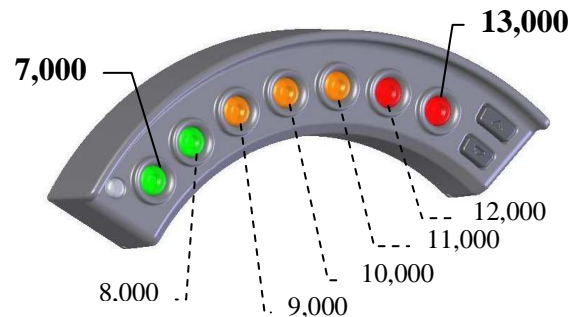
To increment the calibration value, press the up button, and to decrement press the down button. You can use the table below to work out what the calibration value should be, given the factory default settings are set. If you want to restore these default settings, refer to advanced section, “System Reset”.

		First light turns on at (RPM)	New Calibration Value	
<b>Factory Default Settings</b>  <b>Lower Set-Point = 1,000 RPM</b>  <b>Calibration Value = 2</b>	<b>Rev Engine</b>  ↓ <b>When does first light come on?</b>	4,000	8	
		3,000	6	
		2,500	5	
		2,000	4	→ Increase Value to 4
		1,500	3	
		1,250	2.5	
		1,000	2	→ No Change
		750	1.5	
		500	1	
		250	0.5	

If you don't want to save the changes, just turn off the ignition. The settings will only be saved if you press both buttons simultaneously. It doesn't matter if you press one, wait a year, and press the other, as long as they both get pressed simultaneously. You can re-enter this mode to verify your setting.

## Setting Your Shift-Points

You can change at what RPM value the sequence starts and ends to suit your riding style and bike. For example, setting the lower RPM set-point to 7,000 will result in the first light turning on at 7,000rpm. Setting the upper RPM set-point to 13,000rpm will result in the sequence ending at 13,000rpm. The lights in-between are evenly spaced between the lower and upper set-points.



These set-points can be changed with the engine off, or when the RPM is below 2,200. To enter the mode to set the lower RPM set-point, with ignition turned on, press and hold the down button. After a couple of seconds, the display will change as the mode is entered, and you can release the button.

The five lights on the left are used to represent the value of the low RPM set-point. To read the value, just count how many times each light flashes, which represents the number. For example, a value of 12,500rpm would flash the left most light once, the next one twice and the third one 5 times.

It may take a little practice to read, however you can easily do this with a couple of tips. The light representing units on the right is always zero, and until you venture into the advanced section, the tens and hundreds will also be zero. So you only have to count two lights... thousands & tens of thousands, of which you will probably only see a one or a zero for the first light, so you only need to really count one light! Much easier than you would initial expect. The sequence repeats after a short pause.

You can now press the up or down button to increment or decrement the set-point. By default, it will step 1,000rpm at a time. Refer to the advanced section “*RPM Threshold Resolution*” if you want to change this to a smaller step adjustment.

To set the upper RPM set-point, use the up button instead to enter the mode with the same method as described above. This time, the five lights on the ‘right’ are used to represent the set point value.

To exit the mode and save your settings, depress both buttons simultaneously or if the engine is running, you can just blip the revs over 2,200rpm and it will automatically exit and save for you. If you don’t want to save the changes, just turn the ignition off before exiting the mode.

## Display Mode

Shift-I™ has multiple display modes to choose from.

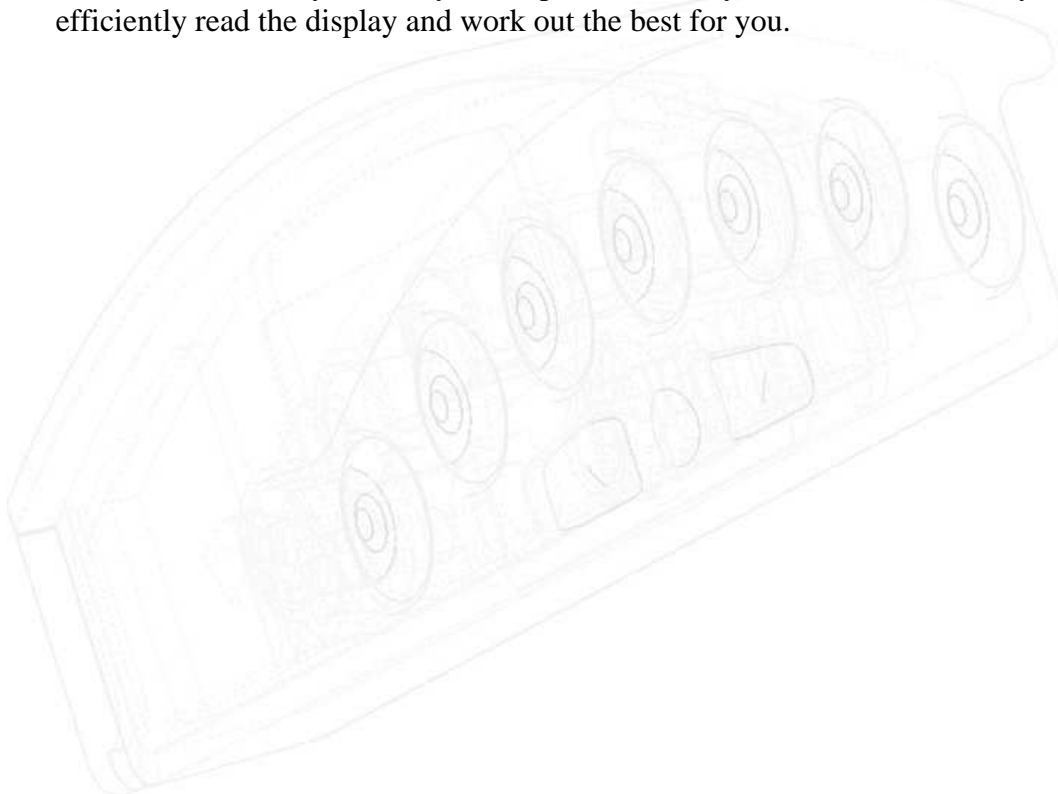
Mode	Description
Off	Lights do not respond to RPM
Cumulative	The lights turn on and stay on as the RPM increases
Dot	Only one light on at a time
Shift Only	Lights flash at shift set-point only, made for track racers.
Special	Just for bling!

There are variations to some of these modes, whereby at the upper RPM set-point the display will flash the last light or all lights.

You can cycle through these modes by using the up and down buttons. The display will demonstrate the selected mode with a quick animation, and then automatically save your selection. If the RPM is above 2,200, any button press will only turn off the display, or restore the display to the last display mode. You should never operate this product moving and/or when it is not safe to do so.

If you cycle down to the first display mode, you will see a very quick animation of the lights turning off. This mode turns off the RPM display.

The display mode used is personal preference. Some prefer the cumulative modes, others may find the shift only mode useful. It is recommended to give several of the modes a serious try, as only with practice will you be able to train yourself to efficiently read the display and work out the best for you.



## Automatic Battery Voltage Indication

Shift-I™ also provides a battery voltage indication. This feature is an aid to evaluating the state of the battery and detecting problems with the bikes voltage regulation.

The seven lights represent 9 to 15 volts. The first light on the left will turn on when the voltage is 9 or greater, the second light 10 volts or greater etc...

The battery voltage display will automatically turn on a short period after ignition is turned on (without starting the engine). You can identify this mode by the lights starting quite dim, and then ramping up in brightness.

With the engine off, a battery in good condition and well charged will typically register ~12.5V. However, this is dependant on many factors, such as the temperature of the battery and if it is supplying current (such as to headlights).

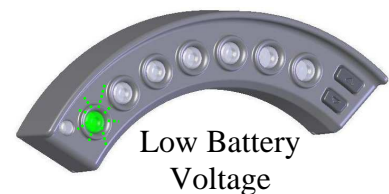
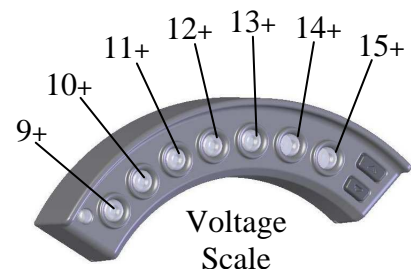
Assuming a battery voltage of 12.5V, four of the lights will be on. As you start the engine, the starter motor draws a lot of current from the battery and its voltage will temporarily drop 1 or 2 volts, which you will see on the display. If the battery is not in good condition, and/or low on charge, you will notice when the starter motor cranks the engine the voltage will drop further.

Once the engine is started, the bike will typically generate ~13V at idle and up to ~15V at higher RPMs. For normal operation, the bike will usually generate no more than 15.5V. Refer to your bike specifications for more accurate expectations. Higher voltages may indicate a failure of the bikes charging circuit, and prolonged exposure can cause damage to the bike.

The battery voltage display is for general use only, and not to be relied on for fault detection and diagnosis. The accuracy of the indicated voltage may not be accurate, and the voltage at Shift-I™ may be different to the voltage at the battery.

Please refer to the advanced section for more detailed information about this feature and how its calibrated.

This mode will automatically exit around 3 seconds after an attempt to start the engine is made, or if a button is pressed.



## ADVANCED FEATURES

### ***Brightness Control***



The brightness of the lights changes with the ambient light, which maintains visibility. When dark, they go dim, when light they go bright. However, you can customize how bright they are to suit you.

To set the brightness, ensure ignition is on and press both buttons at once. If you are in another mode, such as adjusting RPM set-points or battery watch, you must first exit those modes. On entering the mode, all 7 lights will turn on. Use the up and down buttons to change the brightness. Each time an adjustment is made, the display will blink, except if it is already at the minimum or maximum brightness setting. Press and hold either the up or down button to adjust quickly.

To exit the mode and save the changes, press both buttons at once. Alternatively, if no adjustment is made for 4 seconds, Shift-I™ will automatically save your current settings and exit.

Shift-I™ maintains a smart brightness map, which translates the ambient light to the requested display brightness. When you set the brightness, you are setting the brightness for a particular ambient light. So if the sun is shining bright and you adjust the brightness, it won't affect the setting you previously made when it was darker.

This is factory programmed with a default map, but you have the option to change it.

This feature can be used to set the display to full brightness all the time, or perhaps the lowest level in the dark and only ½ brightness at daylight. You cannot however set the display to be brighter in the dark than it is in the light. Shift-I™ will automatically adjust the map to maintain this rule.

Note: When adjusting the brightness, do not cover up or obscure the light sensor. Doing so could cause an unexpected adjustment. The brightness of the display should be checked in all light conditions to ensure it does not blind or obscure your view before use. Do not expect the unit to transition between dark and light areas quickly, such as going through an unlit tunnel on a bright day. The brightness level will take a few seconds to adjust to the light conditions, which is also dependant on its location and the light on the light sensor. Vehicles headlights from behind can also trick the light sensor, and therefore its placement should be appropriately selected. Disconnect the unit if any malfunction occurs or is suspected.

## ***RPM Set-Point Interval***

The upper and lower RPM set-points can be incremented or decremented at 1,000rpm intervals, the factory default setting, however this can be changed. You can change this interval to...

### **Available RPM Intervals**

4,000  
2,000  
1,000  
500  
250  
100  
50

To change the set-point interval, press and hold the up button and turn ignition on. The display will show the interval value in the same format as setting your lower shift point. To save the new setting and exit, press both buttons simultaneously. If you don't want to save changes, turn ignition off when safe to do so.

For engines with a lower redline <10,000rpm, 250 or 500rpm is a good practical setting. If the interval is set too small, it becomes time consuming to change the upper and lower RPM set-points. For example, for commuting you may set the RPM range at 1,500 to 5,500rpm, however for racing on the track a more useful setting may be 3,500rpm to 6,250rpm. For this example, 250rpm intervals is convenient, 50rpm intervals is over kill requiring lots of button presses to change between settings. Using an interval of 50rpm becomes useful when fine tuning of the set-points is required.

The RPM interval can be changed without affecting your current upper and lower RPM set-points. However, when you increment or decrement a set-point, it will automatically align to the next multiple. For example, if you have your upper set-point at 10,250rpm, and then set the interval to 100rpm, the next increment will go the next highest multiple, 10,300rpm. This automatic interval alignment makes changing the set-point much easier, as you know what number to expect while incrementing or decrementing.

The interval has NO effect on the accuracy or RPM value needed to turn a light on. If the third light comes on at 6,286rpm, then no change to the interval value will change this.

## ***Running in Battery Mode***

This mode provides battery voltage to be continuously monitored, instead of RPM. To enter this mode, press and hold the down button and turn ignition on. To exit the mode, either press a button or turn ignition off when safe to do so.

As with the “*Automatic Battery Voltage Indication*”, the 7 lights represent 9 to 15V. In addition, if the voltage goes above 16V the light on the far right will flash immediately, or if the voltage goes below 9V, the light on the far left will flash immediately. This mode may be useful to see how the bikes charging and regulation circuitry is functioning. This feature may not be relied upon for detecting a fault.

## ***Battery Voltage Calibration***

The ignition voltage supplied to the Shift-I™ unit may be lower than the actual voltage at the battery. This is often the case when the same ignition circuit also powers something like the headlights, where large currents cause larger voltage drops in the wires. The “*Battery Voltage Calibration*” can be used to offset the difference.

Calibration allows for correcting up to a  $\pm 2.00V$ , in 0.1V intervals. To perform the calibration, you will need a voltage meter. With ignition on, measure the voltage at the battery and at the Shift-I™. As an example, you may get 12.54V and 12.12V respectively. This example has a 0.42V drop.

Use the following method to adjust the calibration..

1. Enter *Running in Battery Mode* described above (press & hold the down button and turn ignition on).
2. First, reset the calibration to zero by pressing and holding both buttons until you see a quick flash of the lights, then release.
3. To add a 0.1V offset, press & hold the up button until you see a quick flash of the lights, then release. To subtract 0.1V, use the down button instead.
4. Repeat step 3 until the desired offset is reached. In the previous example, with a 0.42V drop you would add four 0.1V offsets.
5. To save the results, press and release either button. If you don't want to save the setting, turn ignition off.

Verifying the setting is accurate is difficult without a variable power supply. However, you may find as the RPM is increased from idle the voltage will increase, which you can compare when each light turns on to the corresponding reading from the voltage meter.

If a more accurate reading is desired, install a wire directly from the battery via a relay switched with ignition. Incorrect usage of this feature could result in the over voltage warning being triggered falsely.

## ***Cruise Mode Dimming***

If the RPM has remained relatively steady for 1 minute, the display will automatically dim for you. The primary reason for including this feature is to prevent becoming too accustomed to the lights (being desensitized) during periods of cruising. When this activates, the display will slowly dim and you may not even notice it has happened. However, when a significant change in RPM is detected, the display will immediately return to the set brightness. In general, cruise mode is usually only seen when traveling on motorways.

‘Waking up’ from cruise mode typically requires the display state to change twice in the same direction, either by increasing or decrease the RPM. For example, if running cumulative mode with 4 lights showing, wakeup would occur when either 2 or 6 lights are reached.

## ***Over Voltage Alert***

If the voltage registered at Shift-I™ exceeds 16V for more than 3 seconds, an over voltage warning is displayed. When this occurs, the display mode is overridden, and the two lights on the far right are flashed. This will still occur if the display is in the off mode. After 1 minute, this warning light will continue although the brightness will automatically dim. Normal operation is restored if the voltage falls back below 16V.



Over voltage alert!

This feature will not be triggered if the voltage does not continuously remain above 16V for 3 seconds. It is also dependant on the accuracy of the “*Battery Voltage Calibration*”. To detect intermittent voltage fluctuations, use the “*Running in Battery Mode*”.

## ***Temperature Protection***

If Shift-I™ is operated in a hot environment, it will automatically protect itself by dimming the display. It will automatically re-enable when the temperature is reduced. This is for protection only, and under normal operation this would never be observed.

## ***System Reset***

Performing a system reset will safely restore ALL factory default settings. To perform the reset, turn ignition off, press and keep held both buttons, turn ignition on and four seconds later a rapid flashing sequence will acknowledge the reset is complete.

## DISCLAIMER

This product may not be suitable or safe for road usage. The owner accepts ALL responsibility for its use and installation. The product must not be used if malfunction occurs, a suspected malfunction occurs and/or not configured correctly. If inappropriately placed, the headlights from another vehicle could cause the brightness to increase. It must not be used where it could obstruct the view of the operator or impair the vision. The owner/rider must test before use in all ambient light conditions to ensure any malfunction or display mode, such as all lights on at maximum brightness, does not impair the ability to safely operate the vehicle. The button controls must not be used while operating the vehicle. The product must be appropriately fused, or connected to an existing appropriately fused circuit. This product must not be used for medical purposes.

90 day warranty is provided on manufacturing defects, which is void if the product is opened, disassembled, visibly damaged, or inappropriately used.

*Only use if safe to do so and at your own risk.*