

Welcome

Congratulations on purchasing your one button programmable **Sureshift SB** system with instant brightness control and user selectable low RPM warning.

Please follow these simple instructions to ensure you enjoy long and trouble free performance.

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Important/Safety Notices

This product has been designed for use in motor sport. Its aim is to help enhance driver performance by providing valuable feedback through the light display module while racing or practising. It is not a 'rev limiter' and should not be relied upon to directly prevent over-revving and possible subsequent damage to the engine.

For safety reasons, no attempt should be made by the driver to adjust settings while driving the vehicle.

The fuse should only be replaced with an anti-surge fuse of the correct rating of 160mA(T). The red lead should be connected to a switched and fused supply.

Descriptions are correct at the time of going to press, errors and omissions excepted. They are liable to alteration at any time without notice.

Manufacturers Limited Warranty

Definitions:-

| | |
|-----------------|--|
| Manufacturer | ACES (Adams Computer & Electronic Services) Ltd |
| Product | The specific product with which this warranty was supplied |
| Purchaser | The original retail customer |
| Warranty Period | 12 months commencing on the date of original retail purchase |

The Manufacturer warrants the Product to be free from defects in material and/or workmanship for the Warranty Period provided that it is correctly installed and operated in accordance with the Manufacturer's instructions.

To obtain the benefit of this limited warranty, the Purchaser must return the product prepaid to the place of purchase within the Warranty Period in its original packaging together with proof of purchase date. Upon confirmation of the defect, the Manufacturer will repair or, at its option, replace the Product.

To the maximum extent permitted by applicable law, this warranty is exclusive and is in lieu of all other warranties and representations expressed or implied, including any implied warranty of merchantability or fitness for any purpose. The Manufacturer will not be liable for any labour charges or other incidental or consequential damages.

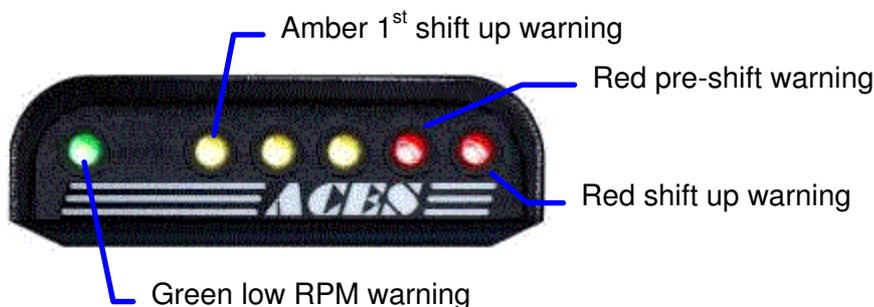
Some states/jurisdictions do not allow exclusion or limitation of incidental or consequential damages and so the above limitations may not apply to you. This warranty gives you specific legal rights. You may have other legal rights which vary from state/jurisdiction to state/jurisdiction.

General Description

The **SureShift SB** sequential shift light system is much more than just a shift light. It has been designed with the requirements of the highly demanding racing driver in mind. State of the art technology and microprocessor control complement driver skills perfectly.

The units have a professional finish and are constructed using high quality aluminium to make them lightweight and compact. Screened leads and cases offer a high level of screening against the effects of radio frequency interference into and out from the unit.

Display Module



- Series of 5 sequential ultra-bright high RPM warning lights (3 Amber, 2 Red)
- Green ultra-bright low RPM warning light
- User selectable brightness setting enabling the unit to be used in a wide range of light conditions from bright sunshine to night driving
- Attention grabbing flash when all high RPM warning lights are lit
- Screened lead with latching connector to connect to control module
- Low RPM warning light may be disabled/enabled as required

A compact dashboard-mount display module housing six ultra-bright lights gives clear and accurate feedback on engine RPM assisting the driver to enhance gear change timing and achieve maximum performance. It could help to prevent the need for expensive rebuilds due to over stressing the engine.

There is also a visual low RPM warning which can be used to detect if the engine RPM has dropped below the power band. This doubles up as an engine running indication (goes out if engine stops).

Control Module

- Single button programming
- Wide range of supply voltage (9 - 20V)
- No loss of data while power removed
- Robust aluminium case

The control module houses the electronics to drive the LED display. A single push button is all that is required to amend the programmed settings, or to adjust brightness and enable/disable the low RPM warning.

Installation

The **SureShift SB** system is designed to simply hook up to all conventional ignition systems, HEI systems and Multi-spark systems with a dedicated Tachometer output. The system requires no special mountings or installation tools.

Mechanical Installation

The Control Module & Display Module are designed to be fixed on to any relatively flat surface using dual lock (supplied with system). Alternatively, the Display Module can be mounted using the optional mounting bracket.

If using dual lock, ensure the surface that the adhesive side of the dual lock will be adhered to is clean, dry and grease free. The dual lock strips may be cut to an appropriate size/shape to suit individual installations. Once fixed allow 24 hours for the adhesive to cure before use.

The system is designed for the motor sport environment and the modules do not require any special mounting although it is recommended that the modules are not exposed to direct water spray.

Control Module

Safety Notice:- For safety reasons, no attempt should be made by the driver to adjust settings while driving the vehicle.

The control module should be mounted so that it has some protection from direct water spray or other potentially harmful environmental conditions. If it is likely to be subjected to excessive shock/vibration, an attempt should be made to minimise this.

Sequential Shift Light Module

The Sequential Shift light module should be installed so that it is visible in the driver's peripheral vision.

If using the optional mounting bracket, remove the two screws retaining the lid. Hold the lid in place and carefully position the display between the two arms of the mounting bracket and reinsert the screws through the countersunk holes in the arms. Mount the bracket using screws or rivets through any of the five mounting holes in the base so that the LEDs point towards the driver. Small spacers may be used under the left or right side of the bracket if desired to make the display level.

Electrical Installation

Ignition & Power supply loom

The system is supplied with a ready wired and fused Power supply & Ignition loom.

Safety Notice:- The fuse should only be replaced with an anti-surge fuse of the correct rating of 160mA(T). The red lead should be connected to a switched fused supply.

Power Supply Wiring

Red and black power supply wires may be connected using the connectors supplied or re-terminated as appropriate.

The red wire should be connected to a switched and fused 12 Volt supply and the black wire to a suitable earth point.

A 9.6V Ni-Cad battery, eg as used for some remote control model cars, may be used to power the unit. Note that to ensure that the unit can detect the ignition pulses, the negative terminal must be connected to the negative side of the ignition system, usually the vehicle earth. Each charge will typically provide at least 90 - 120 minutes use.

Ignition System Connection

The white signal wire should be connected to the ignition system and routed so that there is no excessive slack.

For conventional ignition systems, connect the signal wire to the Low Tension side of the coil (Coil negative) or dedicated tachometer output from ignition system. Many users find that a convenient point to connect to is at the back of an existing 12V tachometer.

Some dedicated tachometer outputs are low voltage and may not rise high enough to be detected by the *SureShift*. A 10k Ω resistor connected between the signal wire and the 12V supply will normally overcome this problem. However, care must be taken to ensure that this will not cause damage to either the system supplying the dedicated tachometer output or any other accessory connected to this point.

For Multi-Spark ignition systems, the signal wire must be connected to a dedicated tachometer output.

If in doubt, please refer to your ignition system workshop manual for the correct connection point.

Use of Optional HT Lead Sensor

In some situations it may not be possible to obtain a suitable signal from the ignition system, eg magneto ignition systems. In this case, there is an optional HT lead sensor available which simply is strapped onto an HT lead and can be powered from the same source as the *SureShift* system.

Shift Light Wiring Loom

The shift light module is supplied with a terminated loom. Route the loom so that it does not interfere with the normal operation of the car. Fit the connector into the 7 pin socket on the control module.

If it is necessary to run the cable through a panel, a 20mm hole is required so that the 7 pin plug may be passed through. There is a large grommet already fitted to the cable which may be used to close the hole, protecting the cable and providing a neat finish.

Switch Connection

Connect the black twin cable to a suitable push button switch using push on connectors or, for a more robust connection, the wires may be soldered in place.

General notes on installing looms

Avoid running looms alongside or across High Tension wiring.

Ensure the looms are routed so that they do not interfere with the general operation of the vehicle.

Ensure that the looms will not chaff or become trapped during vehicle operation. Do not over tighten fixings such as tie wraps which can cut through insulation.

Do not kink or bend the wiring through a tight radius.

Operation

Modes of Operation

There are three basic modes of operation of the unit:-

- 1) Normal Running Mode:-
Lights function to give high and low RPM warnings. Brightness may be simply adjusted using a single push button switch.
- 2) Programme Mode:-
Four different Option Displays indicate the user programmable variables which may be amended. These are Shift Up RPM, 1st Up RPM, Shift Down RPM and Cylinders.
- 3) Amend Mode:-
While displaying one of the four Option Displays, press and hold the button to switch to Amend Mode to view/adjust the programmed value.

Controls

One button conveniently located enables the user to configure the system as required. The following table shows the effects that pressing the button has depending upon the operating mode.

'Click' = Press and release, 'P+H' = Press and hold

| Mode | Button | Effect |
|---|---------------|--|
| Normal | 'Click' | Display current brightness level and status of 'Low RPM' light. |
| | 'P+H' | Brightness will decrease/increase. If the button is released then 'P+H' again, the direction of decrease/increase will reverse. A 'Click' after a 'P+H' will enable/disable the 'Low RPM' light. |
| | Released | Short duration time-out to normal running. |
| | 'Click Click' | Switch to Programme mode 1 st Option Display flashing slowly. |
| Programme (Option Display flashing slowly) | 'Click' | Step to next Option Display, or if last option (Cylinders), return to Normal Running. |
| | 'P+H' | Switch to Amend mode. |
| | Released | Long duration time-out to normal running. |
| Amend (digit indicator - flashing rapidly) | 'Click' | Step to next digit, or if last digit, return to Programme Option Display. |
| | 'P+H' | No effect. |
| Amend (number - not flashing) | 'Click' | Step value up/down in same direction as previous 'Click' or 'P+H' subject to max/min values permitted. |
| | 'P+H' | Scroll value up/down in opposite direction to previous 'Click' or 'P+H' subject to max/min values permitted. |
| | Released | Long duration time-out to normal running. |

Normal Running

Initial Power Up/

When the unit is switched on for the first time, the on-board microprocessor will run through its initialisation routine. This will set up defaults for the user definable values, that is RPM settings, number of cylinders etc.

The user will enter 'Set-up' mode to customise the settings to their own requirements. These new settings will then be saved and should not require altering unless the user wishes to change anything.

The values are stored in EEPROM memory to maintain the settings after the main power is disconnected.

Adjusting the Brightness

Press and hold the button. The LEDs will immediately illuminate and after a pause will begin to decrease in brightness (unless the saved brightness setting was 0 (off) in which case they will increase in brightness).

When the desired setting is reached, release the button.

If the lights are too dim, release the button and press and hold again and the brightness will increase.

After the button has been released for approximately 3 seconds, the value will be saved and the unit will return to normal running.

Enable/Disable Low RPM Warning

Press and hold the button to change the brightness. If the downshift (far left) LED lights up, then the downshift LED is enabled.

After brightness has been adjusted and before the unit has timed out to normal running, "clicking" (a quick press and release) will toggle the downshift LED on/off. Note that the brightness must have been changed before the toggle will work, otherwise the unit will be stepped into Programme Mode. The brightness may be adjusted again to the desired level.

If the downshift LED is left in the off state, then the downshift LED will be disabled under normal running.

Programming

Brief Summary of Displays

Option Displays - Slowly Flashing (Programme Mode):-

| | |
|------------|-------|
| Shift Up | * |
| 1st Up | * |
| Shift Down | * |
| Cylinders | * * * |

Digit Identification Displays - Rapidly Flashing (Amend Mode):-

| | |
|-------------------------------|---|
| 10,000s | ✱ |
| 1,000s | ✱ |
| 100s | ✱ |
| 10s | ✱ |
| 1s (cylinders only) | ✱ |

Number Displays - Not Flashing (Amend Mode):-

| | |
|----------------------------|--|
| 0 | |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| and for cylinders:- | |
| 10 | |
| 11 | |
| 12 | |

Setting the Shift Up RPM

Max 24,000 RPM
Min 1st Up RPM

Click the button, five or six LEDs will illuminate. Before the unit times out to normal running, click again. The far right LED will flash slowly indicating that the Shift Up RPM can be set.

| | | |
|-----------------|---|------------|
| Shift Up | ✱ | Slow flash |
|-----------------|---|------------|

Note that the 'Shift Up' RPM value is limited to a maximum of 24,000 RPM and a minimum not less than the value stored for the first shift up light in the sequence. If a lower value is required, the RPM for the first shift up light must be set to a lower value before setting the 'Shift Up' RPM.

Switch to Amend Mode

While Option Display is flashing slowly, press and hold and the first Up LED will begin to flash rapidly to indicate that you are adjusting in steps of 10,000 RPM.

| | | |
|----------------|---|-------------|
| 10,000s | ✱ | Rapid flash |
|----------------|---|-------------|

Release the button and the display will toggle every two seconds between the LED flashing rapidly to indicate the digit being adjusted and a static display to indicate the numerical value of that digit.

When displaying the number the downshift LED indicates a value of 0, the first Up LED indicates a number 1, the second, a number 2 and so on up to 5. For numbers

above five, the fifth LED remains on to indicate that five should be added to the value indicated by a second LED which will also be on eg if the third and fifth Up LEDs are on, a value of 3+5=8 is indicated.

Amending a Numerical Value

To amend the numerical value, either press and hold or click while the number is being displayed. This will cause the number to either increase or decrease. A new press and hold will always reverse the direction (increase to decrease and vice versa). When the display toggles from digit indication to number the default is that a click will mean decrease, a press and hold will switch to increase. A click will always try to step in the same direction as a previous click or press and hold.

Note that the number will only increase to the maximum permitted value ie when adjusting in steps of 10,000, the number will not go above 2 (24,000 RPM is the maximum permissible value) and if amending 1st Up RPM, it will not be possible to increase the value higher than the Shift Up RPM.

If an attempt is made to increase above the maximum, the value will be set equal to the maximum, eg if the current setting is 9,000 and the 10,000s digit is incremented the value will step to 19,000, if another increment is attempted (trying to step to 29,000), the value will step to 24,000. Decreasing the value from here would step down in 10,000 RPM steps until reaching the minimum value. When a maximum/minimum is reached or a digit gets to 9 or 0, no further increase or decrease will be possible unless the button is released and then pressed and held to reverse the direction.

Stepping to the Next Digit

To step from one digit to the next, click the button while the digit indicator is flashing rapidly. Eg if the button is clicked while 10,000s digit indicator is flashing the 1,000s digit will start to flash and so on.

After viewing/adjusting the fourth digit (10' s) clicking again will return to the slowly flashing Option Display eg for the Shift Up RPM, the far right LED will flash slowly. Clicking here will step to the next Option Display eg to the First Up RPM option indicated by the 1st Up LED flashing slowly.

Setting the First Up RPM

Max Shift Up RPM
Min 120 RPM

Note that this RPM value is limited to a maximum not greater than the value stored for the 'Shift Up' RPM and a minimum of 120 RPM. The RPM values at which the intermediate lights will come on will be calculated automatically to be as close as possible to equal RPM spacing between the first light RPM and the 'Shift Up' RPM.

From Normal Running, click the button repeatedly until the First Up RPM option is displayed indicated by the first Up LED flashing slowly.

| | | |
|--------|---|------------|
| 1st Up | * | Slow flash |
|--------|---|------------|

Press and hold to switch to amend mode and continue as above.

If an attempt is made to increase above the UpShift RPM, the value will be set to equal the UpShift RPM and no further increments will be possible.

Setting the Down Shift RPM

Max 24,000 RPM
Min 120 RPM

The RPM value indicated may be set to work as an indication that the user should be changing down a gear. The light to the left of the display module will be on at RPM values below this setting.

Note that this RPM value is limited to a maximum of 24,000 RPM and a minimum of 120 RPM.

From Normal Running, click the button repeatedly until the Downshift RPM option is displayed indicated by the Downshift LED flashing slowly.

| | | |
|------------|---|------------|
| Shift Down | * | Slow flash |
|------------|---|------------|

Press and hold to switch to amend mode and continue as above.

Adjusting the Number of Cylinders

Max 12
Min 1

Note that the number of cylinders should be set to the number of sparks which will be delivered by the coil from which the signal is being taken during two complete revolutions of the crankshaft. Many engines use a multiple coil or multiple distributor systems, in which case, the number of cylinders should be set to the number which are fed by one coil, eg for a four cylinder engine using two coils, the system should be set up as if on a two cylinder engine because each coil delivers two sparks every two complete crankshaft revolutions. Likewise, for a V12 engine using two coils and two distributors, the unit should be set up as if working on a 6 cylinder engine.

A similar principle applies if a coil feeds one two stroke cylinder, or four stroke using a 'wasted spark' (spark plug fires on every cylinder revolution). The coil will deliver two sparks for every two revolutions and so should be treated as a two cylinder engine.

From Normal Running, click the button repeatedly until the cylinders option is displayed indicated by the first, third and fifth Up LEDs flashing slowly.

| | | |
|-----------|-------|------------|
| Cylinders | * * * | Slow flash |
|-----------|-------|------------|

Press and hold to switch to edit mode, then release. The far right LED will flash rapidly to indicate that this time, the value is increased/decreased in steps of 1.

To amend a value see Amending a Numerical Value above.

The maximum value of cylinders is 12. For numbers greater than 9, LED 4 and LED 5 remain lit (4+5=9) and the third LED will light to indicate an extra value to add, eg for 12 cylinders the third, fourth and fifth LEDs will be lit (3+4+5=12).

Clicking while the far right LED is flashing rapidly will return the unit to Option Display (first, third and fifth LED flashing slowly) and clicking again will return the unit to normal running.

Technical Specifications

Made in the United Kingdom.

DISPLAY

Display Module 6 Superbright LEDs

Connectorised screened lead to strip of high intensity LEDs, 3 amber and two red LEDs to the right, plus 1 green LED at far left for shift down.

1st amber LED lights when above low rev limit for shift up. Progressively more light to the right as revs increase until at shift point, all up LEDs flash.

Left most LED lights when below minimum revs (shift down RPM). Goes out if engine stops.

CONTROLS

One SPNO Push Button

SETTING RANGES

| | |
|------------|------------------------|
| Shift Up | 1st Up RPM - 24000 RPM |
| 1st Up RPM | 120 - Shift Up RPM |
| Shift Down | 120 - 24000 RPM |
| Cylinders | 1 - 12 |
| Brightness | 0 - 6 |

Note that the unit can detect up to 30,000 ignition pulses per minute, based on a minimum spark interval of 2ms. This is equivalent to 60,000 RPM on a single cylinder four stroke engine, or 30,000 RPM on a twin, 15,000 RPM on a four and so on. Higher revving engines, or engines with more cylinders will most likely use a multiple coil arrangement. This means that the unit should be set to a smaller number of cylinders and hence this limitation will not present a problem.

ACCURACY/RESOLUTION

| | |
|----------------|---|
| Shift up RPM | 120 - 24000 RPM |
| Resolution | 10 RPM |
| Accuracy | better than +/- 10 RPM |
| Shift down RPM | 120 - 24000 RPM |
| Resolution | 10 RPM |
| Accuracy | better than +/- 10 RPM |
| Running RPM | 120 - 24000 RPM |
| Resolution | 10 RPM |
| Accuracy | better than +/- 10 RPM @ < 24000 RPM better than +/- 5 RPM @ < 18000 RPM |

POWER SUPPLY

9.0 - 20V dc @ <0.16A, reverse voltage protected and fused.

Safety Notice:- The fuse should only be replaced with an anti-surge fuse of the correct rating of 160mA(T). The red lead should be connected to a switched and fused supply.

ENVIRONMENTAL

| | |
|-------------|---|
| Temperature | Operating, 0 - 50°C Storage, -10 - 70°C |
| Humidity | Ta < 40°C 95% RH or less Ta >= 40°C Below max absolute humidity of 40°C 95% RH |
| EMC | Screened leads and cases offer high level of immunity |
