HM Quickshifter GP
and
HM Quickshifter GP Configuration Tool

User's Guide
2013

Table of Contents

The HM Quickshifter GP

"It really is rocket science."

Introducing a Revolution in Quick Shifting

For many years the design team at the world renowned HM Quickshifter labs have been working on the next generation of quickshifter aimed at customers who want (and/or need) to squeeze the bleeding edge of power and efficiency out of their motorcycles.

Because the existing HM Quickshifter has the reputation for being the world's best and most reliable strain-gauge-based quickshifter, improving on the existing HM Quickshifter has been a tough job. After listening to riders and engineers, we set out to create the last word in quickshifter technology and are now very proud to unveil the HM Quickshifter GP.

Different Kill Times for Different Gears

As most readers will know, a quickshifter works by killing the ignition for a certain period of time in order to relieve stress on the gearbox, thus allowing the pressure on the gear lever to slip the transmission into the next gear without missing a gear, grinding or chipping gear teeth or engagement dogs. One of the features most asked for was to have different ignition kill times for different gears, and have these settings be able to be controlled by the end user. Because our current shifter technology minimizes the need for different

kill times (the technical reasons for which are both lengthy and secret), this has been a subject of intense research and discussion. The culmination of this research is that it is now clear that the need for different kill times for different gears is important in certain situations: for example, world-class racing where every additional millisecond of power to the rear wheel may make the difference between winning and losing. So we decided from the outset to incorporate this capability as a core part of our new flagship design.

Deriving Gear Position

Having different kill times for different gears as a core part of our new flagship design brought on its own challenges, in particular correctly detecting the gear position. If the shifter is going to be our flagship product, then it must operate with the same unbreakable robustness and absolute consistency that our current shifters are renowned for. The trouble is that something seemingly as simple as calculating gear position is, in fact, a very difficult challenge. The way most existing such devices work (including our HM Dash) is by computing the ratio between speed and RPM to derive gear. This is fine for a dash display but not, in our view, good enough for a high precision device that relies on perfectly correct information. Chain chatter, firing order, rev limiters, clutch slip and traction control can all fool this type of calculation.

The problem is actually worse than it initially seems. Take for example 6th gear. If the bike is in 6th gear then it would be desirable to prevent a shift from happening if the rider inadvertently tries to select a non-existent 7th gear. This is something we know many riders do – something that we have seen in data logging time and time again. The purpose, of course, is to prevent a time- and power-killing "false" shift if the rider does this. But what happens if the bike is actually in 5th and the shifter is "one off" and thinks it is in 6th? The rider will be prevented from shifting to 6th – not acceptable by any measure, and by using current techniques this is a very real danger.

Another example is the shift from 1st to 2nd. On most gearboxes the kill time required for 1st to 2nd gear changes is significantly longer than from 2nd to 3rd for example. So again, if the bike is in 1st gear but the shifter thinks it is in second gear, then a very rough or missed shift may take place, likely causing gearbox damage!

Also consider the case of short shifting or multiple fast gear changes (with or without clutch): again current calculation techniques are relatively slow, so this is yet another area that the shifter could be fooled. As the astute reader may have surmised, this is NOT just a matter of adding 1 for each up-shift, and subtracting 1 for each down-shift! The gear actually *must* be verified with no assumptions made.

Add all of this together and it is easy to see our hesitation in including this in a product where absolute consistency for professional use is paramount.

While is it true that there are ways of "smoothing over" or masking current techniques so that the effect is, on the whole, acceptable – these do not give the kind of confidence in a product that we have become used to, or as demanded (and expected) at the highest levels of racing.

After a lot of research by some very highly qualified people we put together a technical specification that demanded 100% accuracy with respect to gear position. Part of this specification was that even 99.99% was not good enough. Another requirement for gear position was that the shifter needed near instant results in real time – a big requirement! A team of mathematical engineering specialists worked on this problem for nearly two years. The answer lay in use of predictive mathematics, namely in the form of a specially-adapted non-linear time domain version of a Kalman Filter – the same type of math that predicts financial markets, tracks fast-moving military targets, and steers missiles. A sledge hammer to crack a nut? Perhaps, but it works, and it works wonderfully. When a gear change is made, the result – measured and verified without any assumptions – is accurately computed within 2-3 meters of completion of the shift.

At 250 KMH, the typical delay between the completed shift and the gear being known with certainty is measurable in milliseconds! THAT is world class, and as far as we know, hasn't been achieved anywhere else in the world. At that speed, the time required to "know" the gear position **with certainty** compares to bikes with built in analog-type rotary gear position sensors!

We have pumped hundreds of thousands of logged simulation, road, and race miles through the HM Quickshifter GP and have had a 0% failure rate on computing the correct gear.

Thus, we are very proud of what we have here – an industry first: absolutely reliable and consistent gear position whatever the circumstances.

In addition, the HM Quickshifter GP does NOT require setup – it learns the gears on its own. This completely removes the possibility of accidentally selecting or inputting incorrect ratios. It also means that in high pressure situations where, for example, internal gear ratios must be changed quickly, there is no extra demand on the engineers to reprogram the shifter – it will automatically detect the changed ratio(s) and adjust itself accordingly.

This is in keeping with our company philosophy of providing exceedingly high-tech products that are very simple to use and very hard to use incorrectly.

Having explained in detail about the gear position calculation, we hope that it has set the tone of the level of each aspect of the HM Quickshifter GP: truly a masterpiece of engineering, worthy of living in the medical or aerospace industry.

HM Seamless Shift Technology (HMSS)

The HM Quickshifter GP has programmable kill times for each gear going up and separately going down the gearbox. However on top of this we have the new revolutionary HMSS system. This system uses intensive and very advanced mathematics and digital signal processing (DSP) to identify when the actual dogs – the gear teeth – have fully engaged. This nullifies the requirement for kill times and not only ensures the shortest possible kill times it also ensures the smoothest and safest gear change. This is because regardless of the conditions, load, RPM, and gearbox characteristics, it detects when the next gear is actually engaged and then reapplies power. This is a massive step forwards in shifting technology and has made all other shifting products obsolete.

There are also safety programmable minimum and maximum kill times which override this algorithm in the rare case that the rider/bike is doing something very unusual and for some reason the shifter does not correctly detect this gear engagement in a timely fashion. Typically a kill time is a crude parameter that must be significantly longer than the actual gear change time due to the vast range of different gear changing conditions, this directly translates to slower lap times, less smooth gear changes, more wear on the gearbox and the potential for a missed gear if the rider / bike do something unusual and end up taking longer to mechanically shift than the allowed kill time.

In short, HMSS is a revolution in changing gears! Not just a gimmick – this is the culmination of thousands of hours of work by contracted specialists in their field.

Features at a Glance

Since we required heavy 32bit RISC processing horse power to perform the gear and HMSS calculations, it meant that we had a lot of horse power to perform other functions.

The following is a summary of the HM Quickshifter GP's features:

- Fully and continuously dynamic self learning, very fast and incredibly accurate gear determination
- HMSS System to beat chosen shift times to save significant accumulated time over a lap and provide seemingly seamless shifts.
- Multiple types of outputs, all easily programmable
- Built in full feature Blipper controller for down shifting (This is not a blipper, but configuration and output for an external blipper.)
- Each gear has its own kill time and its own sensitivity
- Millisecond accuracy on kill times
- Highly intelligent real-time fault analysis and configurable error strategy. Policy: never allow even a smashed shifter to cause total motorcycle failure
- Easily readable, detailed and cyclic event log
- Data logging
- Firmware updateable via USB from a Windows computer or tablet
- Highly sophisticated feedback derived kill time augmentation – unbeatable for lap time saved
- Advanced feedback derived power cutting / introduction strategies
- CAN Interface (via CAN transceiver [under development]) to allow connection to ECU's / Dashes or other Logging or Display Equipment for delivering data or recording data.
- Simple USB interface (No Drivers! Just plug into any Windows Operating System and play!)
- Professional Level Fully Programmable Traction Control using custom Kalman Algorithm (under development)
- Very Low power for a heavy weight 32bit RISC processor (30mA)
- Highly resilient power supply, able to operate up to 80v and can withstand transients far in excess of automotive standards
- Very small size
- Low Cost
- HM's 24/7 professional support
- Ultra light weight

Wiring Guide

RED: Switched 12V Power feed

BLACK: Ground (this needs a good ground path, so connect to a ground common point or a good connection to the chassis).

GREY: This is the primary output. In the HM Quickshifter GP Configuration Tool, this output is identified as "Output 1". It can be configured as one of the following:

- Shifter Signal to high power ignition coil or injector driver (like our PLUS shifters)
- Shifter Signal to low-power signal output (like our PC / MOTOx shifters)
- Blipper Signal output

BLUE: Speed Signal Input. Connect this to the Rear Wheel Speed Signal Sensor signal wire. Typically most VSS (Vehicle Speed Sensors) have three wires, 12v, ground and signal. It is the signal wire that you need to connect to.

YELLOW: RPM. This must ONLY be connected to the Crank Position Sensor (not the ECU's RPM output). This is an analog signal coming from the Crank Position Sensor in the crank case, before it reaches the ECU. Most Crank Position Sensors have two wires, ground and signal. It is the signal wire that you need. If you are not sure, try one then the other. The HM Quickshifter GP has a very high impedance input on this wire so it will not affect the running of the engine in any way.

WHITE: This is the secondary output. In the HM Quickshifter GP Configuration Tool, this output is identified as "Output 2". It can be configured as one of the following:

- to CAN Transciever
- Shifter Signal (with programmable pull up)
- Blipper Signal (with programmable pull up)

Once connected, simply run the HM Quickshifter GP Configuration Tool software to configure Output 1 and 2, and to confirm RPM and Speed are working correctly. Gear calibration is automatic.

HONDA

RPM is Yellow.

NOTE: On the CBR1000RR this is usually in a RED two way connector that resides on the main brace between the frame near to the rear shock top mount. On the CBR600RR this is usually in a back two way connector that is clipped near the rear of the airbox seam on the right hand side of the bike above the throttle bodies.

SPEED is a PINK/GREEN (VSS three pin connector)

NOTE: The connector for the SPEED sensor is usually directly on the speed sensor which is located on top of the gear box (directly under the tank) to the rear of the engine.

YAMAHA

RPM is GREY
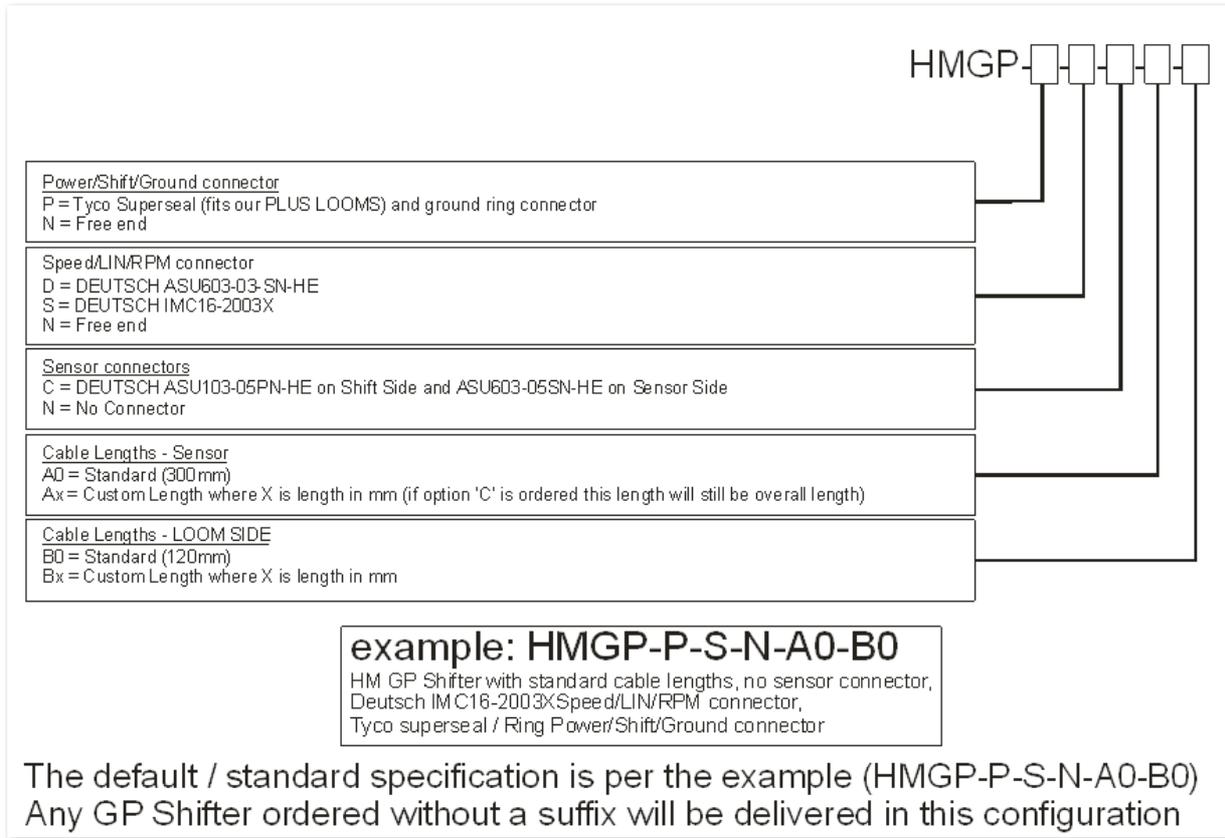
SPEED is WHITE/YELLOW trace

SUZUKI

RPM is GREEN/WHITE

SPEED is PINK

NOTE: The Suzuki usually has two pink wires, one for the gear position, the other for the speed sensor. The speed sensor wire is usually in a black flat three connector under the throttle bodies.

HM Quickshifter GP Part Numbering

HMGP-☐-☐-☐-☐-☐

Power/Shift/Ground connector
P = Tyco Superseal (fits our PLUS LOOMS) and ground ring connector
N = Free end

Speed/LIN/RPM connector
D = DEUTSCH ASU603-03-SN-HE
S = DEUTSCH IMC16-2003X
N = Free end

Sensor connectors
C = DEUTSCH ASU103-05PN-HE on Shift Side and ASU603-05SN-HE on Sensor Side
N = No Connector

Cable Lengths - Sensor
A0 = Standard (300mm)
Ax = Custom Length where X is length in mm (if option 'C' is ordered this length will still be overall length)

Cable Lengths - LOOM SIDE
B0 = Standard (120mm)
Bx = Custom Length where X is length in mm

example: HMGP-P-S-N-A0-B0
HM GP Shifter with standard cable lengths, no sensor connector,
Deutsch IMC16-2003X Speed/LIN/RPM connector,
Tyco superseal / Ring Power/Shift/Ground connector

The default / standard specification is per the example (HMGP-P-S-N-A0-B0)
Any GP Shifter ordered without a suffix will be delivered in this configuration

HM Quickshifter GP Accessories / Spares

Updated 16-Oct-2013

HMGPCS	Spare Sensor with ASU103-05SN-HE
HMGPDS	Mating half to "D" option. Includes DEUTSCH ASU103-03PN-HE with 250mm free end cable.
HMGPSS	Mating half to "S" option. Includes DEUTSCH IMC11-2003X with 250mm free end cable.
HMYKLOOM	Plug and Play loom for Yamaha's and Kawasaki's with plug-top coils
HMSHLOOM	Plug and Play loom for Suzuki's and Honda's with plug-top coils
HMBMWLOOM	Plug and Play loom for BMW S1000
HMDUCATILOOM	Plug and Play loom for Ducati
HMPANLOOM	Plug and Play loom for Ducati Panigale
HMKTMLOOM	Plug and Play loom for KTM
HMKTMTSLOOM	Plug and Play loom for twin spark KTMs (RC8R and RC8 2010 and later)
HMTRILOOM	Plug and Play loom for Triumph
HMTRI2LOOM	Plug and Play loom for Triumph Daytona 2013 and later
HMMVLOOM	Plug and Play loom for MV Augusta F4
HMMVF3LOOM	Plug and Play loom for MV Augusta F3

HM Quickshifter GP Configuration Tool
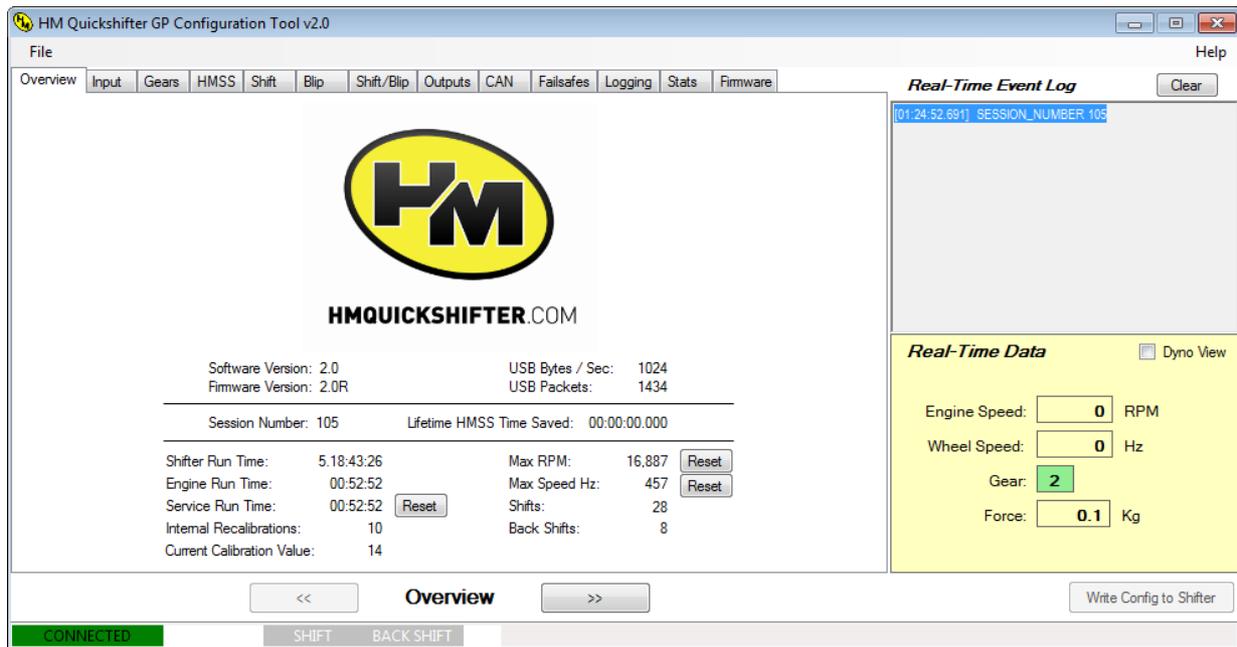
The HM Quickshifter GP Configuration Tool is the Windows application you use to:

- Configure your HM Quickshifter GP (see Input, Gears, Shift/Blip Common, Outputs, CAN, and Failsafes Tabs)

- Tune your HM Quickshifter GP to suit your specific needs (see HMSS, Shift, and Blip Tabs)

- Gather information from your HM Quickshifter GP (see Overview, Logging, and Stats Tabs)

- Update your HM Quickshifter GP's firmware (see Firmware Tab)

Software Installation

Before your HM Quickshifter GP Configuration Tool can be used, it must be installed on your Windows-based personal computer.

You can install this software by launching SETUP.EXE from the included Flash Drive or downloading the software from the HM Quickshifter UK, Ltd. website.

If you download the software from the website, you will need to extract the installation files from the downloaded ZIP file.

Finally, when you have SETUP.EXE and the "GP_Shifter_Configuration_Tool_Installer...msi" file in the same folder, launch SETUP.EXE by double-clicking it, and proceed through the installation. (Note on a Windows 7 or Windows 8 computer, you may need to right click the SETUP.EXE file and select "Run As Administrator".) The installation will proceed in the sequence of the links below.
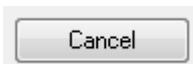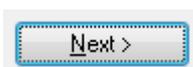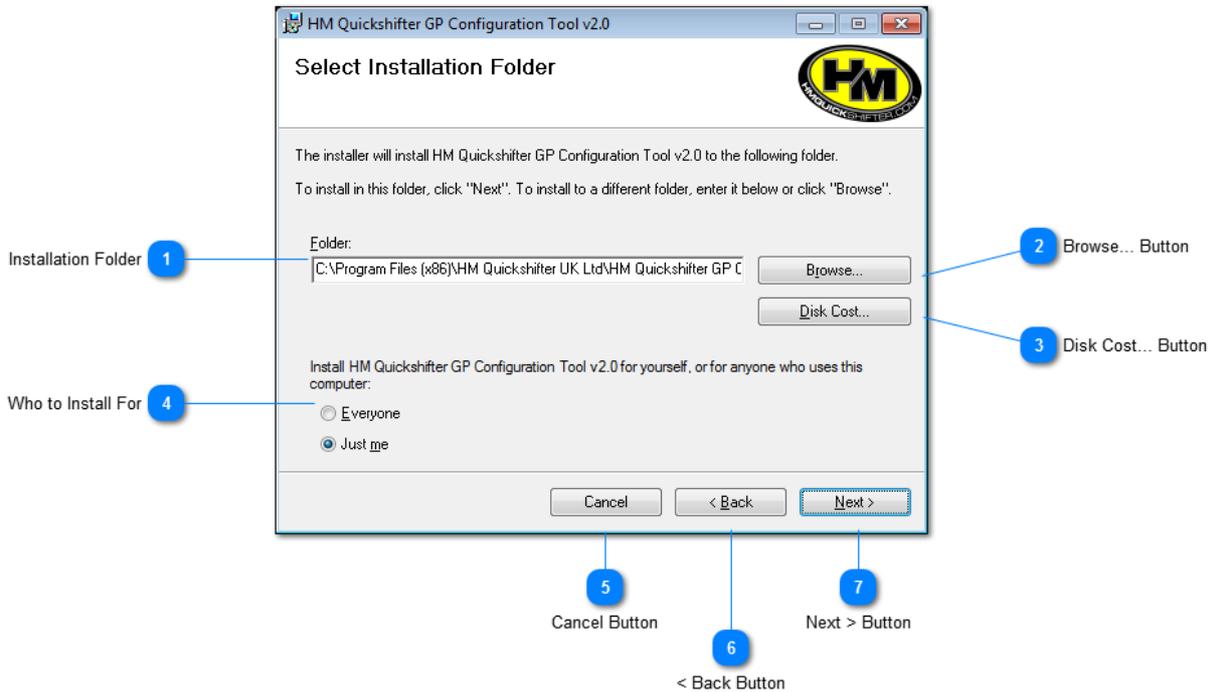
Welcome
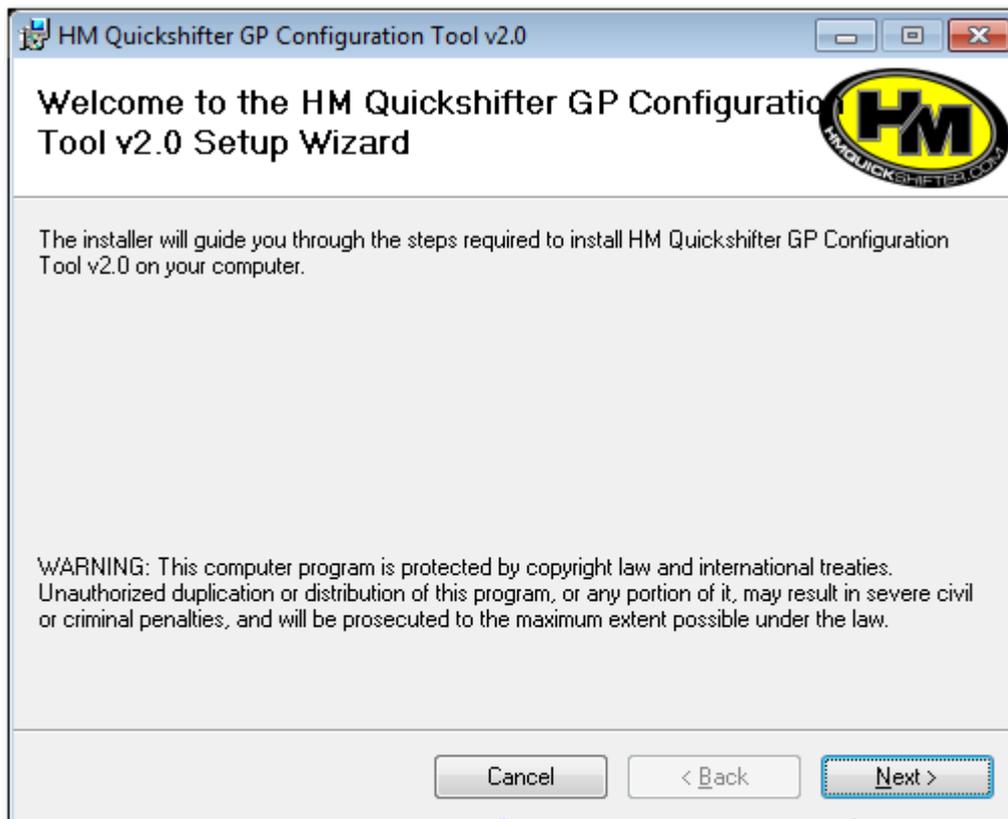
1 Cancel Button

2 Next > Button

---

1 **Cancel Button**

Click this button if you wish to cancel the installation.

---

2 **Next > Button**

Click this button to proceed with the installation.

Installation Options

Installation Folder

C:\Program Files (x86)\HM Quickshifter UK Ltd\HM Quickshifter GP C

You can edit the installation folder directly, or use the **Browse...** button to select a folder. In this example, you can see that the default "C:\..." has been changed to "D:\...". Most users will want to simply accept the default folder provided.

Browse... Button
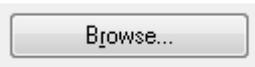
Click this button to select an installation folder.

Disk Cost... Button

Click this button to show existing disk volumes, available space, and required space. Use this if you are not sure on which disk volume you have enough available space. Since the required space for the program is well under 3 megabytes, this is usually not an issue.

4 **Who to Install For**

○ Everyone

◉ Just me   The default value for this is "Just me". If you want every user on the target computer to have access to it, select "Everyone".

5 **Cancel Button**
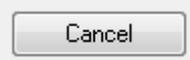
Cancel

Click to abort the installation.

6 **< Back Button**
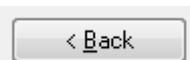
< Back

Click to return to the previous screen.

7 **Next > Button**
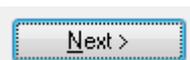
Next >

Click to proceed to next step once the Installation Options are as you want them.

Confirmation
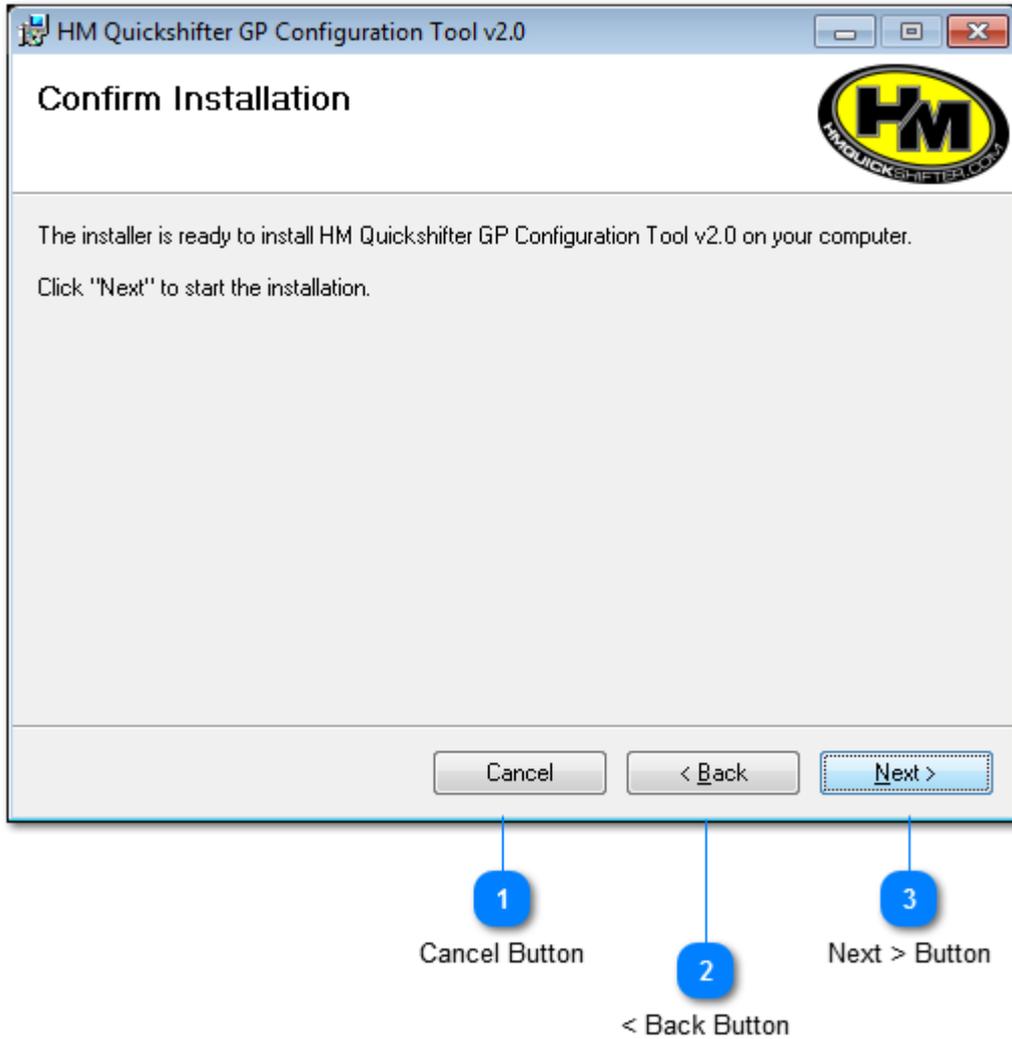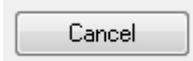
Cancel Button

Cancel

Click to abort the installation.

< Back Button

< Back

Click to return to the previous screen.

Next > Button

Next >

Click to start the installation. The installation will proceed without further intervention.

Installation Completed
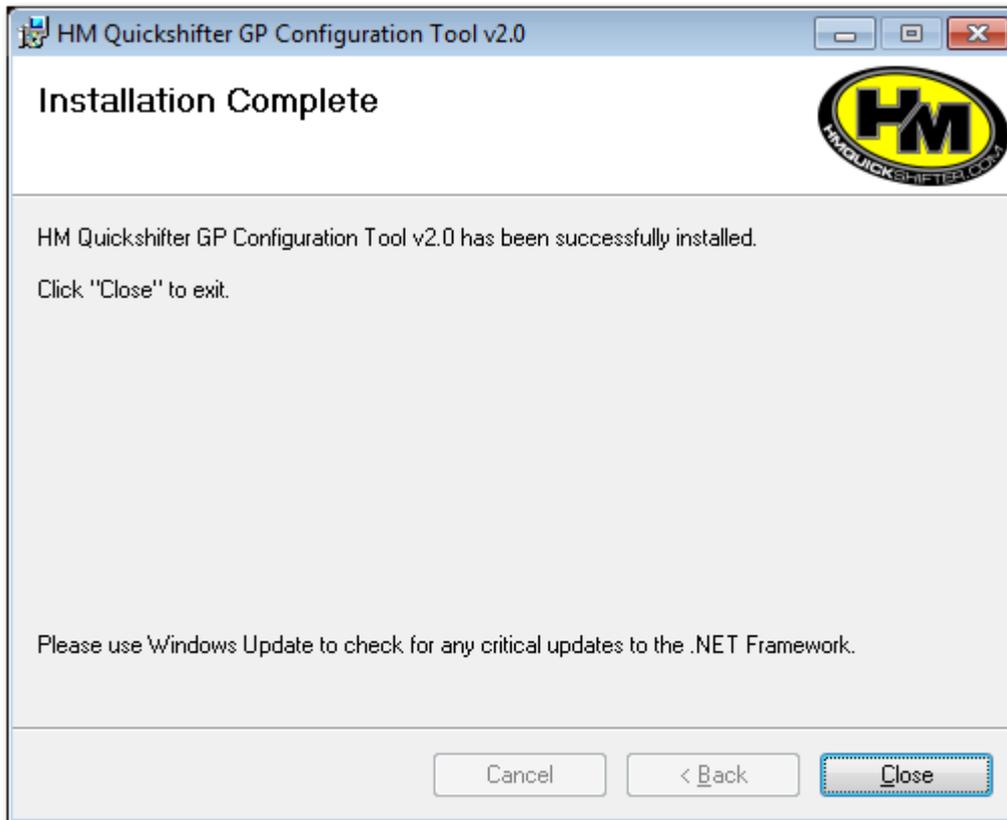
Close Button

1 **Close Button**
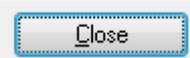
Click to close the dialog box.

Overview

The below topics provide an overview of the HM Quickshifter GP Configuration Tool application.

Important Definitions

Shift

In this application, the term "shift" ALWAYS means an up-shift -- shifting from a lower gear to a higher gear.   This is the HM Quickshifter GP's primary function, which is to assist the rider in achieving the fastest possible shifts, getting power back to the rear wheel as fast as feasible while still performing reliable, smooth shifts.

Blip

In this application, the term "blip" ALWAYS means the action the HM Quickshifter GP performs to execute a back-shift. If the hardware for it is connected, the HM Quickshifter GP is capable of assisting with back-shifts. When it is configured to do so, a second output may be used to signal throttle "blipping" hardware, which momentarily applies the throttle while decelerating in order to relieve strain on the gearbox to achieve a back-shift.

CAN

CAN stands for "Controller Area Network", and is a common and reliable data transmission network used in the automotive and other industries. (See Controller Area Network definition on Wikipedia.)

If the CAN Transceiver is connected to the HM Quickshifter GP's "Output 2" wire, the HM Quickshifter GP can be configured to transmit a wide variety of data to a CAN network. Such devices might include a dashboard, data logger, or any other device that is capable of accepting CAN data.

See CAN Tab for more information.

Connecting to the Shifter

In the lower left corner of the HM Quickshifter GP Configuration Tool application is the CONNECTED indicator. When the HM Quickshifter GP is not connected to the computer, the CONNECTED indicator has a red background and displays "NOT CONNECTED".
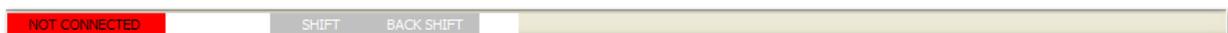
Once the Shifter is powered on and connected to the PC via USB cable, the CONNECTED indicator changes to a green background and displays "CONNECTED".
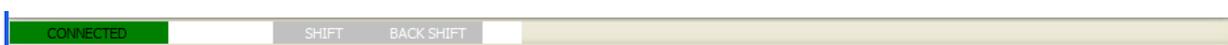
When this happens, the HM Quickshifter GP Configuration Tool automatically reads and displays the HM Quickshifter GP's configuration.

Note that if the HM Quickshifter GP is powered on AFTER the USB cable is attached, you will hear the USB device-connect tone from the PC twice. This is normal. After the second tone, you may configure and tune your HM Quickshifter GP as usual.

Navigating the Application

Tabs   Tab Navigator Buttons   Real-Time Event Log Panel

(1)   **(2)**   **(3)**

Status Bar   Real-Time Data Panel   Write Config to Shifter Button

(4)   **(5)**   **(6)**

1 **Tabs**

The Tabs are where most of your activities with HM Quickshifter GP Configuration Tool will occur. It is here that you will see your HM Quickshifter GP's status, change its configuration, tune it, retrieve its Event Log, and update its firmware. See the Tab Reference for detailed information about each Tab.

Navigation among Tabs may be done by clicking on the Tab name at the top of the Tab to go directly to that Tab, or by clicking the Tab Navigator Buttons.

2 **Tab Navigator Buttons**

Click these buttons to navigate sequentially between the Tabs. The name between the buttons (in this example "**Overview**") is the name of the Tab currently being displayed.

3 **Real-Time Event Log Panel**
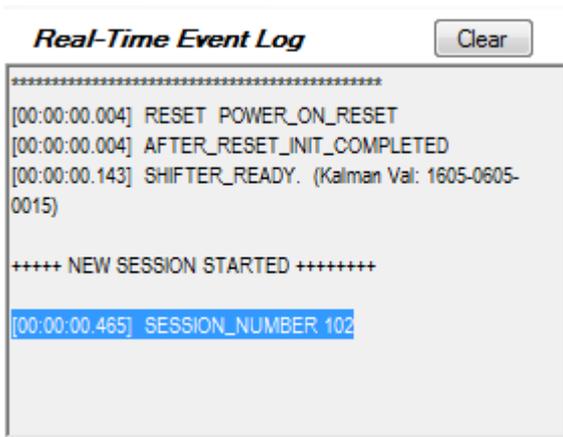
This area displays events that occur inside the HM Quickshifter GP as they happen. A time stamp is displayed on the left of each log entry indicating the amount of time that has elapsed since the HM Quickshifter GP was powered up. Its format is

<hours>:<minutes>:<seconds>.<milliseconds>

Click the **Clear** button to clear the displayed list of events.

4 **Status Bar**
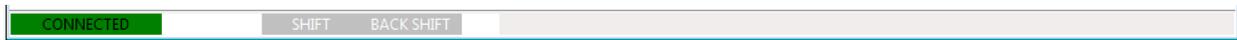
The Status Bar indicates certain statuses at any given moment:

CONNECTED Indicator: Indicates whether a powered-on HM Quickshifter GP is connected to the computer via USB cable. See Connecting to the Shifter for more information.

FAILSAFE Indicator: The white rectangle to the right of the CONNECTED indicator flashes "FAILSAFE" if the HM Quickshifter GP has entered Failsafe Mode. See Failsafes Tab for more information.

SHIFT Indicator: The white letters "SHIFT" flash red momentarily when the HM Quickshifter GP has performed a Shift.

BACK SHIFT Indicator: The white letters "BACK SHIFT" flash red momentarily when the HM Quickshifter GP has performed a Blip.

⑤ Real-Time Data Panel
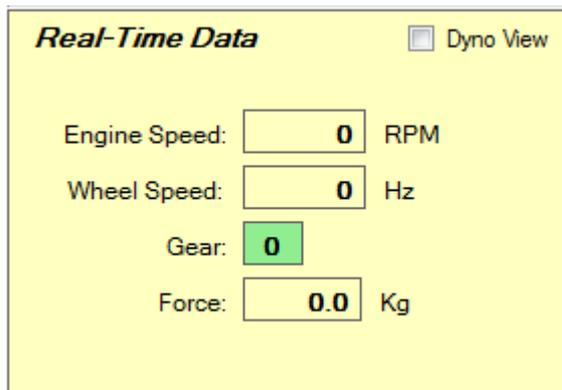
Engine Speed: Rotation of the motorcycle's crankshaft provides pulses to the HM Quickshifter GP, which the Shifter translates into RPM -- crankshaft revolutions per minute.

Wheel Speed Pulse Frequency: Rotation of the motorcycle's output shaft (front sprocket) provides pulses to the HM Quickshifter GP. This value is the number of such pulses currently being received per second.

Gear: The Shifter is able to determine what gear the motorcycle is in once it has had a chance to "listen" to the RPM and Wheel Speed pulses for a little while. Its learning how to do this is entirely automatic, except that it relies on knowing how many gears there are in the gearbox. It starts off assuming there are 6 gears. If your motorcycle is has a different number of gears, visit the Gears Tab to change the number of gears to match your motorcycle. See Training the Shifter for more information.

Force: This is the numeric representation of the HM Quickshifter GP's force measurement in kilograms on the shift linkage.

Dyno View: Checking the Dyno View checkbox opens a window which provides the Real-Time Data in a large format so it is easy to read from a distance. This is useful when the motorcycle is on a dyno since you may be having to view the computer screen from a distance.

6 **Write Config to Shifter Button**

Write Config to Shifter
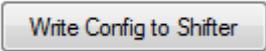
When the HM Quickshifter GP is first plugged into the computer via USB cable, the HM Quickshifter GP Configuration Tool application reads and displays its configuration information. At this time, the button is disabled (grayed out) and looks like the image above.

When any configuration changes are made, an asterisk ("*") appears in the application's title bar, and this button is enabled, taking on a black boarder and text like this:

Write Config to Shifter

When you are happy with any changes you have made to the configuration, click this button and the displayed configuration will be written to the Shifter. Once written, this button returns to its disabled state, the asterisk in the title bar goes away, and the HM Quickshifter GP Configuration Tool *reads back and displays the Shifter's current configuration*, to permit visual confirmation that the new configuration was accepted by the Shifter.

Saving Configuration to a File

Save Configuration File Option

Save Config File

Once you have the HM Quickshifter GP's configuration the way you want it, you can save it to a file on your PC by selecting the **Save Config File** option from the File menu. This is useful if, for example, the rider and/or engineer/mechanic wants to save configurations used at different tracks. The file saved will have a ".gpcfg" file extension.

Open Configuration File Option

Open Config File

Once you have a saved configuration file, you can load it back into the HM Quickshifter GP Configuration Tool by selecting the Open Configuration File option from the File menu, and selecting the configuration file you want to load. By default, the Open File dialog box looks for files with the ".gpcfg" file extension. Upon clicking **OK**, the selected configuration is loaded and displayed on the PC only. It is not yet written to the Shifter. If you want to write the just-loaded configuration to the Shifter, click the Write Config to Shifter button. See Write Config to Shifter Button for more details.

Tab Reference
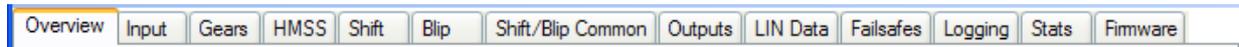
The following topics contain detailed information about the HM Quickshifter GP Configuration Tool's Tabs.

To see a general overview of the application's major parts, see Navigating the Application.

Overview Tab

Service Run Time Reset Button
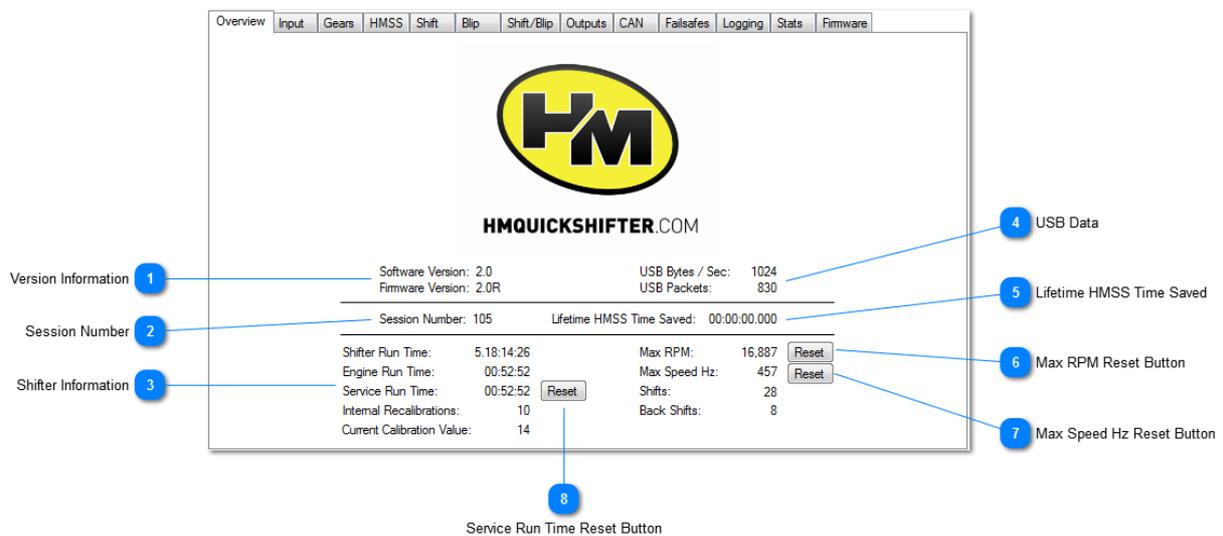
1 Version Information

Software Version: 2.0
Firmware Version: 2.0R

Software Version: The version of the HM Quickshifter GP Configuration Tool application.

Firmware Version: The version of firmware inside the HM Quickshifter GP. This information is displayed when your HM Quickshifter GP is connected to the application via USB cable.

2 Session Number

Session Number: 105

A session is a period during which the Shifter is powered on. Each time it is powered on, this number advances by one. This number appears in the Shifter's stored Event Log, and is used as a reference to identify which session a group of Event Log entries belongs to.

Shifter Information

Shifter Run Time:	5.18:14:26		Max RPM:	16,887 [Reset]
Engine Run Time:	00:52:52		Max Speed Hz:	457 [Reset]
Service Run Time:	00:52:52 [Reset]		Shifts:	28
Internal Recalibrations:	10		Back Shifts:	8
Current Calibration Value:	14			

Shifter Run Time: Total ON time for the life of the HM Quickshifter GP expressed in <days>.<hours>:<minutes>:<seconds>.

Engine Run Time: Total time that motorcycle's engine has been running while the HM Quickshifter GP was installed.

Service Run Time: Engine Run Time elapsed since this value was last reset.

Internal Recalibrations: As conditions such as temperature and shift-linkage metal fatigue changes, the HM Quickshifter GP re-calibrates itself internally. This value changes periodically.

Current Calibration Value: This is the HM Quickshifter GP's force measurement on the shift linkage when the shift lever is at rest.

Max RPM: Max RPM since this value was last reset.

Max Speed Hz: Max Wheel Speed Pulse Frequency since this value was last reset.

Shifts: Number of Shifts performed by Shifter in its lifetime.

Back Shifts: Number of Blips performed by Shifter in its lifetime.

USB Data

USB Bytes / Sec:	1024
USB Packets:	830

USB Bytes/Second: This is the most recently measured data rate between the VARDEVICENAME and the VARPCAPPNAME application. Its units are in bytes per second (characters per second).

USB Packets: This is the total number of USB data packets received by the application since the application was started. This value changing is an indicator that the HM Quickshifter GP is connected and exchanging data with the HM Quickshifter GP Configuration Tool.

Lifetime HMSS Time Saved

Lifetime HMSS Time Saved:	00:00:00.000

Total Time Saved (with power to the rear wheel) using HMSS shift technology, for the lifetime of the Shifter. See HM Seamless Shift Technology and HMSS Technology Option for more information.

6

Max RPM Reset Button

Reset

Click to reset the Max RPM value.

7

Max Speed Hz Reset Button

Reset

Click to reset the Max Speed Hz value.

8

Service Run Time Reset Button

Reset

Click to reset the Service Run Time.

Input Tab
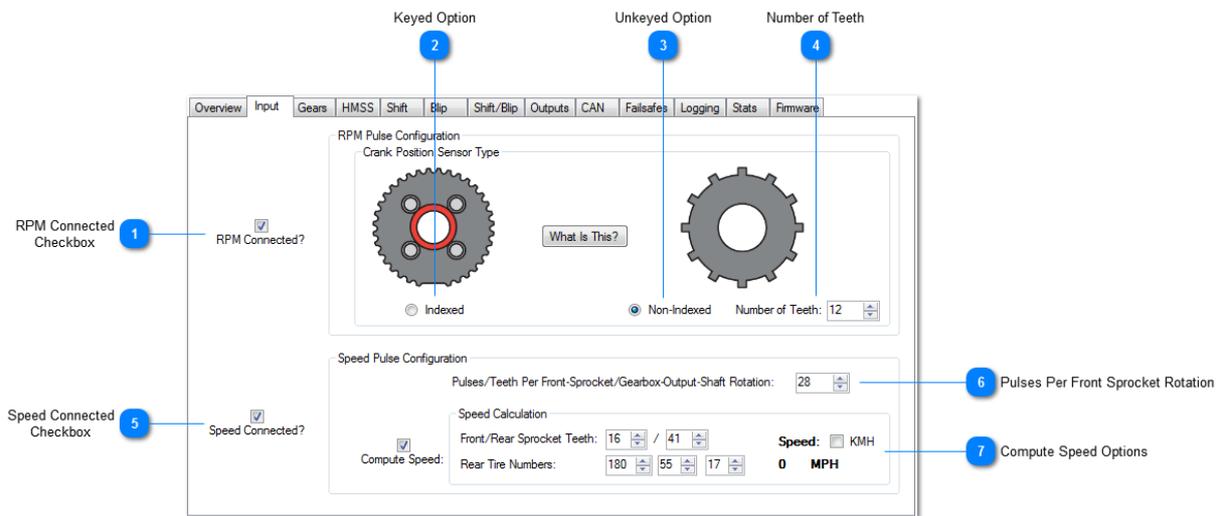
1

RPM Connected Checkbox

☑
RPM Connected?

By default, this checkbox is checked, assuming your HM Quickshifter GP was installed with RPM Pulses connected. This connection is necessary for the shifter to compute gear. However, the Shifter can also function without this connection, and in some cases this pulse signal may not even be available on some motorcycles. Uncheck it to indicate the HM Quickshifter GP is not in fact connected to the motorcycle's output (front sprocket) shaft pulse output. The accuracy of this setting is very important to the "No Shift or Blip Below..." feature on the "Shift/Blip Common" Tab.

2 Keyed Option

○ Indexed

Select this option when your motorcycle's RPM pulse wheel is keyed. This can be one or more missing teeth, an odd-sized tooth, or a wide tooth. Whenever this is changed, the shifter will be forced to re-learn the gear ratios before gear can be determined.

3 Unkeyed Option

◉ Non-Indexed

Select this option when your motorcycle's RPM pulse wheel is unkeyed. When this option is selected, the Number of Teeth control is enabled. Whenever this is changed, the shifter will be forced to re-learn the gear ratios before gear can be determined.

4 Number of Teeth

Number of Teeth: 12

When your motorcycle's RPM pulse wheel is unkeyed, use this control to indicate the number of teeth on the pulse wheel. Whenever this value is changed, the shifter will be forced to re-learn the gear ratios before gear can be determined.

5 Speed Connected Checkbox

☑
Speed Connected?

By default, this checkbox is checked, assuming your HM Quickshifter GP was installed with Speed Pulses connected. This connection is necessary for the shifter to compute gear. However, the Shifter can also function without this connection, and in some cases this pulse signal may not even be available on some motorcycles. Uncheck it to indicate the HM Quickshifter GP is not in fact connected to the motorcycle's output (front sprocket) shaft pulse output. The accuracy of this setting is very important to the "No Shift or Blip Below..." feature on the "Shift/Blip Common" Tab.

6 Pulses Per Front Sprocket Rotation

Pulses/Teeth Per Front-Sprocket/Gearbox-Output-Shaft Rotation: 28

Set this value to match the number of pulses emitted by your motorcycle for each single rotation of the front sprocket shaft. If this value is inaccurate, it can adversely affect the Shifter's ability to learn gear ratios and cause HMSS behavior to be unpredictable.

7 **Compute Speed Options**

If you do not know how many speed pulses are delivered to the Shifter for each revolution of the front sprocket shaft, and have no easy way of finding out, these controls provide an alternative solution to working out the correct number for the **Pulses Per Front Sprocket Rotation**. Start by checking the **Compute Speed** checkbox. This enables the other controls in this display, and simultaneously has the application compute and display speed.

Next, set these 5 displayed values to match your motorcycle:

Front/Rear Sprocket Teeth: Set these values to match the number of teeth on your front and rear sprocket respectively.

Rear Tire Numbers: If numbers on your rear tire look like this: "180/55ZR-17", enter 180, 55, and 17 respectively into these three controls.

Finally, run the motorcycle on a paddock stand or dyno, and adjust the **Pulses Per Front Sprocket Rotation** value until the displayed speed matches the speed of the motorcycle. Don't forget to click the **Write Config to Shifter** button after each adjustment so that the Shifter is using the new value. Note that some motorcycle speedometers can read a speed higher than actual speed by as much as 25%. While adjusting this value, you want the displayed speed to be the *actual* speed, not the speed displayed on the speedometer.

KMH Checkbox: Check this checkbox if you wish to see the speed in Kilometers Per Hour instead of Miles Per Hour.

Speed: When the rear tire of the motorcycle is rotating, the speed will be displayed under the Speed label. In this example, it is reading "0".

Gears Tab

Number of Gears

1

Ratio Learning Status

2

Re-Learn Ratios Button

3

What Is This? Button

4

| Overview | Input | Gears | HMSS | Shift | Blip | Shift/Blip | Outputs | CAN | Failsafes | Logging | Stats | Firmware |

Number of Gears: 6

Ratio Learning Status

Phase: 0 Normal Operating Mode

Data Stable: Y

Tolerance: 0.0099

Re-Learn Ratios | What Is This?

Current Ratios

Ratio for 1st Gear:	0.81367	1701	Sample Count
Ratio for 2nd Gear:	1.10609	3066	Sample Count
Ratio for 3rd Gear:	1.32425	3843	Sample Count
Ratio for 4th Gear:	1.51341	2000	Sample Count
Ratio for 5th Gear:	1.68429	2000	Sample Count
Ratio for 6th Gear:	1.87868	2000	Sample Count

5

6

Ratio Values   Sample Counts

1 **Number of Gears**

6

This value tells the shifter how many gears the motorcycle has. It is crucial that this be accurate. The default value is 6.

2 **Ratio Learning Status**

Ratio Learning Status

Phase: 0   Normal Operating Mode
Data Stable: Y
Tolerance: 0.0099   [Re-Learn Ratios]   [What Is This?]
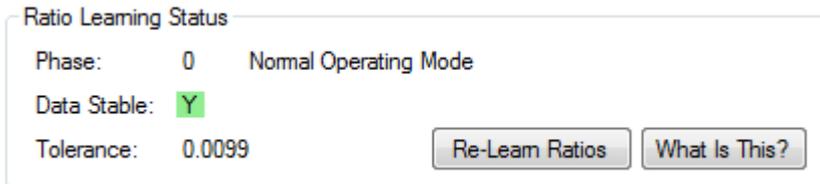
This is the indicator for which phase the training process is in. See Training the Shifter for more information.

3 **Re-Learn Ratios Button**
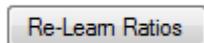
[Re-Learn Ratios]

Click to tell the HM Quickshifter GP to dispose of its current ratios and re-learn them from scratch. See the What Is This? button for more information.

4 **What Is This? Button**

[What Is This?]

Click this button as a reminder of the purpose of the Re-Learn Ratios Button. It displays a message box like this:

HM GP Shifter Configuration Tool v1.1

Purpose of "Re-Learn Ratios" button:

If you know a gear ratio has changed, or if the shifter has been installed on another motorcycle, this button enables you to save a short amount of time by forcing the shifter to start re-learning the ratios immediately rather than wait until the the shifter detects the change and makes its own adjustments. This may be advisable if, for example, the gear ratios of 5th and 6th gear have changed, but you don't want to run the motorcycle in 5th or 6th gear in order to get the shifter to detect the change, but rather you want to force the shifter to re-start learning the ratios immediately.

This may also be used to speed up the process of getting the shifter's ratios established (needed for determining gear) on a paddock stand or dyno rather than allow this learning to take place while the motorcycle is being ridden.

Note that this is optional and is provided as a convenience, since the shifter will see the change and re-learn or adjust the ratios on its own.

[OK]

5 **Ratio Values**

Ratio for 1st Gear:	0.81367
Ratio for 2nd Gear:	1.10609
Ratio for 3rd Gear:	1.32425
Ratio for 4th Gear:	1.51341
Ratio for 5th Gear:	1.68429
Ratio for 6th Gear:	1.87868

These are values determined by comparing the RPM and Wheel Speed pulse frequencies while the motorcycle engine is driving the rear wheel. These are for information only, and are determined automatically by the Shifter during its training period, and are continually refined over the life of the Shifter on that motorcycle.

When the Shifter is installed on a new motorcycle, or if the rider and/or engineer/mechanic has changed one or more gear ratios in the gearbox, the Shifter recognizes the ratio differences, and re-learns these numbers as needed. If and when the Shifter determines it needs a whole new set of these numbers (e.g. immediately after installing the Shifter on a new motorcycle), the Shifter enters the training phase again until these numbers have been re-established for the new motorcycle. Again, during the its training phase, the Shifter will use the user-configurable default values for durations and trigger forces while shifting and blipping.

6 **Sample Counts**

1701	Sample Count
3066	Sample Count
3843	Sample Count
2000	Sample Count
2000	Sample Count
2000	Sample Count

Sample Count is the number of data samples taken for each gear. These are for information only. The Shifter updates these values automatically during its training period, and throughout the life of the Shifter as the ratio values are refined.

HMSS Tab

Kill Time Selection Method — 3

HMSS Technology Options — 1

Rider Style Setting — 5

Minimum Kill Time — 2

Additional Kill Time — 4

HMSS stands for HM Seamless Shift Technology

What Is HMSS?

Minimum Kill Time Selection Method
Use one minimum kill time for all gears?

Hmss Characteristics

	Use?	Minimum Kill Time	Additional Kill Time
1st to 2nd Gear:	✓	32 ms	0 ms
2nd to 3rd Gear:	✓	32 ms	0 ms
3rd to 4th Gear:	✓	32 ms	0 ms
4th to 5th Gear:	✓	32 ms	0 ms
5th to 6th Gear:	✓	32 ms	0 ms
When Gear Unknown:		32 ms	0 ms

Note: Maximum Kill Times are the durations set in the Shift Tab.

Use HMSS? ✓

Rider Shift Style
Soft — Hard

What Is This?

1 **HMSS Technology Options**

	Use?
1st to 2nd Gear:	☑
2nd to 3rd Gear:	☑
3rd to 4th Gear:	☑
4th to 5th Gear:	☑
5th to 6th Gear:	☑

☑
Use HMSS?

When the "Use HMSS?" checkbox is checked, in addition to providing normal shifts timed by gear, it watches the RPM and Wheel Speed pulses for signs that the new gear has already engaged in the gearbox. Upon detecting a positive indication that the gear has indeed engaged, the Shifter re-applies power to the back wheel, often sooner than the normal timed shift would achieve.

If it does not get a positive indication that the gear has engaged before the normal shift duration has elapsed (this can happen since the incoming RPM and Wheel Speed pulse data often has a great deal of "noise" in it), then the Shifter re-applies power to the rear wheel in the same way as the Normal setting.

Normally, the checkboxes to the right (labeled "Use?", and labeled by gear) would all be checked.   However, occasionally racing teams may want to fine tune this for a particular motorcycle, and unchecking any of these checkboxes gives them the option to have HMSS turned ON or OFF by gear.

When the Shifter, using HMSS Technology, has been able to get power back to the rear wheel sooner than the "normal" shift, it tracks this time savings both for the current session, and for the life of the Shifter. The time saved for the current riding session is recorded and reported in the Shifter's Event Log (see Logging Tab for more information), and the lifetime total of time saved is reported on the Overview Tab of the HM Quickshifter GP Configuration Tool.

When "Use HM Seamless Shift (HMSS) Technology" has been selected as the Shift Type, the "HM Seamless Shift Technology Configuration" control group is enabled (no longer grayed out). That enables you to change either or both of the following values:

Minimum Kill Time

Minimum Kill Time

32	ms
32	ms
32	ms
32	ms
32	ms

| 32 | ms |

Kill Time is the time during which the rear wheel is denied power from the engine in order to relieve strain on the gearbox during the shift.

Because RPM and Wheel Speed pulse information can contain a great deal of noise during the shift, this time is set to tell the Shifter not to start looking for the signs of gear engagement until AT LEAST this amount of time has elapsed after the shift has started.

Its default value is 35 milliseconds. If this value is not working well for any reason, it may be adjusted by the rider and/or engineer/mechanic in the range of 28 to 60 milliseconds. The purpose of this is to accommodate variations in incoming data "noise" among different makes and models of motorcycles.

Kill Time Selection Method

Minimum Kill Time Selection Method

☐ Use one minimum kill time for all gears?

Since a typical configuration uses the same Minimum Kill Times all gears, checking this box enables you to change the Minimum Kill Times for all gears with one control. Unchecking it enables you to specify a different Minimum Kill Time for each gear.

4 **Additional Kill Time**

Additional Kill Time

0 ms

0 ms

0 ms

0 ms

0 ms

0 ms

Along with the Minimum Kill Time, the rider and/or engineer/mechanic may use this value to tell the Shifter to add a small amount of time (in terms of milliseconds) after seeing the indications that the gear has engaged, before re-applying power to the rear wheel. The purpose of this is to provide the end user with the maximum amount of flexibility in tuning HMSS to get the best possible shift times, while still maintaining a smooth shift.

5 **Rider Style Setting**

Rider Shift Style

Soft | | | | | | | Hard   What Is This?

While HMSS is looking for opportunities to safely re-apply power to the rear wheel before the normal shift time has expired, it is helpful for it to know the rider's shift style. If the rider applies an extremely quick and powerful force to the shift lever during a shift, then this calls for a setting on the higher (hard) side of the scale. Hard boots, very tight rearsets (e.g. inflexible and with ball bearings), and very fast motion with the shift lever all call for settings on the higher (hard) end of the scale.

Clicking the **What Is This?** button displays this information for easy reference while tuning the Shifter.

Setting Tip:

In general, HMSS is made more effective and faster by using more assertive and faster shift lever movement. This is generally improved by having higher shift trigger forces set.

Start HMSS Minimum Kill Time relatively high and work backwards gradually. Once you are seeing the HMSS shift times stabilize, you have achieved an optimum setting. Do not reduce HMSS Minimum Kill Time beyond that point.

In extreme cases, too short an HMSS Minimum Kill Time combined with too "soft" a setting of the Rider Style, can result in what "feels like" a shift refusal when the ignition is in fact being cut, but is being restored before the gearbox has let go of the current gear. If this is happening, then first ensure the rider is actually letting go of the shift lever between shifts. Once this is certain (or if it is already certain), and it is still happening, increase HMSS Minimum Kill Time significantly. If still unresolved, increase "hardness" setting of Rider Style.

Shift -- Basic Settings Tab
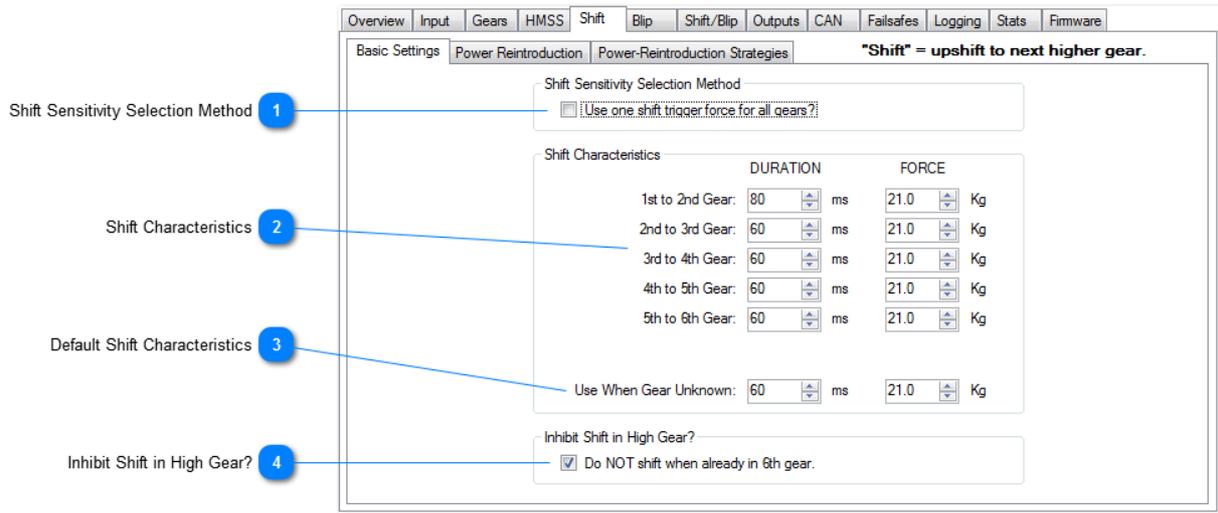
Shift Sensitivity Selection Method

☐ Use one shift trigger force for all gears?

Since a typical configuration uses the same shift trigger force for all gears, checking this box enables you to change the trigger forces for all gears with one control. Unchecking it enables you to specify a different shift trigger force for each gear.

Shift Characteristics

	DURATION		FORCE	
1st to 2nd Gear:	80	ms	21.0	Kg
2nd to 3rd Gear:	60	ms	21.0	Kg
3rd to 4th Gear:	60	ms	21.0	Kg
4th to 5th Gear:	60	ms	21.0	Kg
5th to 6th Gear:	60	ms	21.0	Kg

Duration: This is the amount of time (in milliseconds) that the Shifter denies power to the rear wheel in order to relieve strain on the gearbox during the shift. This is tunable for each gear.

Force: This is the trigger force (in kilograms as measured in the shift linkage) that triggers a shift. This is tunable for each gear.

3 **Default Shift Characteristics**

Use When Gear Unknown: 60 ms   21.0 Kg

If for any reason the HM Quickshifter GP does not know the motorcycle's current gear when a Shift is requested (for example while still in its training phase), the Shifter uses these values for Duration and Trigger Force. This will happen during the Shifter's training phase just after you install your HM Quickshifter GP on its first motorcycle, or on a different motorcycle. These values will remain in use until the Shifter has gathered enough information to determine which gear the motorcycle is in. In order to gather this information, the Shifter will need to analyze RPM and Wheel Speed pulses for a small amount of time in each gear. See Training the Shifter for more information.

4 **Inhibit Shift in High Gear?**

☑ Do NOT shift when already in 6th gear.

Checking this tells the Shifter NOT to perform a shift when the motorcycle is known to be in high gear. This is here because many riders TRY to shift when the motorcycle is in high gear, just to confirm the motorcycle is in its top gear, or to grab the next gear if there is one.

Having this setting turned on helps a serious racer by keeping power applied to the rear wheel when there are no more gears to shift into.

Shift -- Power Reintroduction Tab

Power Reintroduction settings enable you to "tune" how power is reintroduced at the end of a shift. You may want to use this to "soften" the impact of a particular shift. After the shifts from 1st to 2nd, and 2nd to 3rd gear, for example, when ignition is fully restored immediately, this can create a considerable "lurch" in the motorcycle because the jump from 1st to 2nd, and 2nd to 3rd gear usually represents the largest of RPM changes for all the different shifts. The inertia of the crankshaft coupled suddenly with full power (if the throttle is wide open), translates through the front sprocket, through the chain, and to the rear wheel suddenly and forcefully, and this may be more than you are comfortable dealing with, especially if you are in the middle of any situation in which maintaining the equilibrium of the motorcycle is important. These settings enable you to further tune the HM Quickshifter GP so that each shift behaves like you want.

Note: Power Reintroduction settings are only applicable if:

1. the RPM Input wire is connected properly (see Wiring Guide and Input Tab);

2. the Output 1 "Function" setting is "Shift" (see Outputs Tab);

3. the Output 1 "Output Type" setting is "High Current (PLUS): Normally 12v, float during shift" (see Outputs Tab).

If any of 1-3 above are not true, then the Power Reintroduction controls on this tab and the subsequent tab will be disabled.

Power Reintroduction Threshold RPM   Cylinders   Power Reintroduction Strategy by Shift

Preserve Whole Power Strokes at Shift Start Checkbox   Power Reintroduction Strategy When Gear is Not Known

1 Cylinders

Cylinders: 4

Ensure the correct number of cylinders for your motorcycle is entered here. It is crucial for Power Reintroduction operations that this number be correct.

2 Power Reintroduction Threshold RPM

Do Not Apply Below this RPM:

8000

This value limits the times when Power-Reintroduction Strategies are used. If, at the start of the shift, the RPM was below this value, the chosen Power Reintroduction Strategy for that gear will not be used. The reason you may want to change this is that if you tune your Power-Reintroduction settings to be optimum for very high RPM shifts, then those settings can feel "rough" at lower RPMs. If this is the case, set this value accordingly.

3 Preserve Whole Power Strokes at Shift Start Checkbox

Preserve Whole Power Strokes at Shift Start

Normally a shift is started (ignition is cut) immediately once the HM Quickshifter GP has detected the trigger force for a shift for the current gear. This can cause the ignition to be cut in a way that weakens a power stroke at that moment. Checking this checkbox will instead cause the HM Quickshifter GP to wait until any pending power stroke has completed before cutting the ignition.

4 Power Reintroduction Strategy by Shift

1st-2nd Very Soft

2nd-3rd Soft

3rd-4th Medium

4th-5th Fast

5th-6th Very Fast

Use these settings to control which Power-Reintroduction Strategy is applied for which shift. The Power Reintroduction Strategies Tab enables you to fine tune each strategy.

5 **Power Reintroduction Strategy When Gear is Not Known**

Unknown [Fast ▼]

Use this setting to control which Power-Reintroduction Strategy is applied when the gear is not known. (This can occur, for example, before the HM Quickshifter GP has learned your motorcycle's gears.)

Shift -- Power Reintroduction Strategies Tab

Each Power-Reintroduction Strategy is a "map" that is applied at the end of a shift, proceeding from left to right, indicating which sparks are to be fired (the checkbox is checked) and which sparks are to be suppressed (the checkbox is unchecked).
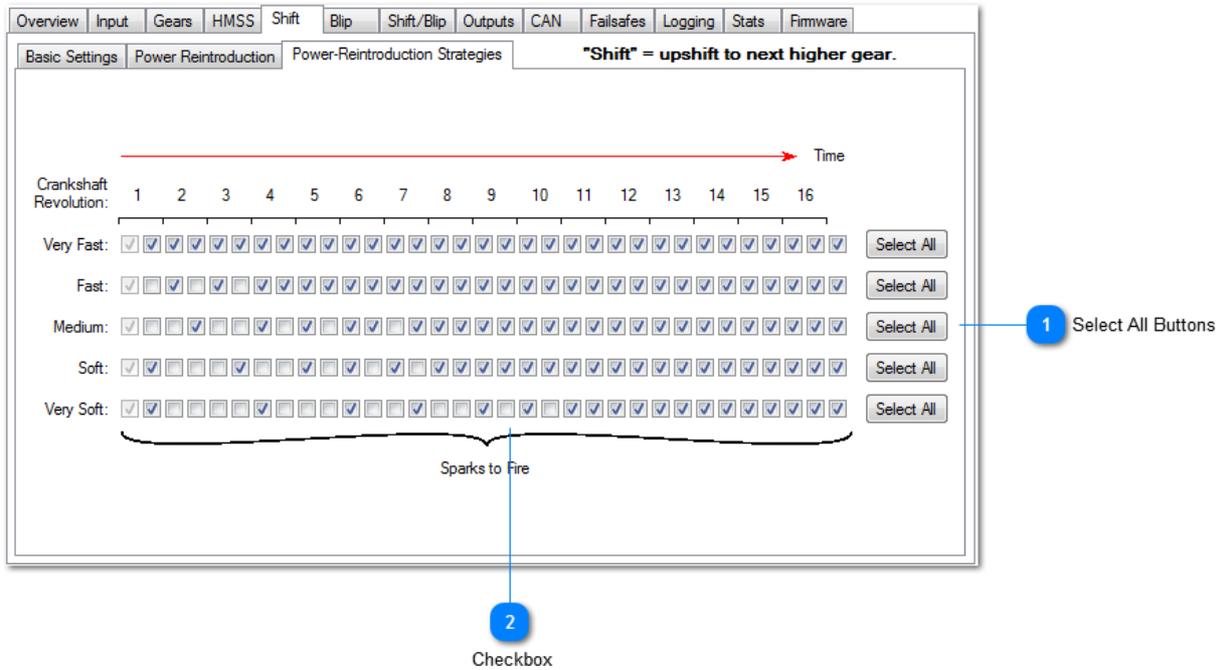
Select All Buttons

Click a [Select All] button to place checkmarks in all the checkboxes on the corresponding row. This signifies "suppress no sparks" for the given Power-Reintroduction Strategy, and gives you an easy "starting point" for customizing that strategy's spark-suppression behavior.

Checkbox

Very Fast: ☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑

Fast: ☑☐☑☐☑☐☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑

Medium: ☑☐☐☑☐☐☑☐☑☑☐☐☑☑☑☑☑☐☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑

Soft: ☑☑☐☐☑☐☐☑☐☑☐☐☑☑☑☑☑☑☐☑☑☑☑☑☑☑☑☑☑☑☑☑☑

Very Soft: ☑☑☐☐☐☑☐☐☑☐☐☑☐☐☑☐☑☐☑☑☑☑☑☑☑☑☑☑☑☑☑☑☑

Each row of checkboxes represents one strategy. The names of each strategy are at the left of its row.

After a shift where a given strategy should be applied, the HM Quickshifter GP starts from the left of the list and enforces each subsequent spark where the checkbox is checked, and suppresses each spark where the checkbox is unchecked. Note that the left-most checkbox is always checked and cannot be changed. This is the first spark to be fired at the end of the "ignition-cut" period that causes the shift to take place. After that, depending on how many cylinders your motorcycle has, you can control (suppress or enforce) up to 32 sparks after the shift has completed.

In this example, the "Very Fast" strategy in fact suppresses no sparks, introducing full power immediately at the end of the shift. This is desirable for any gear for which this type of shift is already very smooth.

In the above example, the "Fast" strategy proceeds as follows at the end of the shift:

1. The first spark at the end of the shift fires (this is the leftmost checkbox).
2. The next spark is suppressed.
3. The next spark fires.
4. The next spark is suppressed.
5. The next spark fires.
6. The next spark is suppressed.
7. All subsequent sparks are fired until the next shift.

You can experiment with each strategy to discover what works best for your motorcycle for any particular shift.

Blip Tab

Blip Sensitivity Selection Method

☐ Use one blip trigger force for all gears?

Since a typical configuration uses the same blip trigger force for all gears, checking this box enables you to change the blip trigger forces for all gears with one control. Unchecking it enables you to specify a different blip trigger force for each gear.

Blip Characteristics

	DURATION		FORCE	
2nd to 1st Gear:	80	ms	6.0	Kg
3rd to 2nd Gear:	60	ms	6.0	Kg
4th to 3rd Gear:	60	ms	6.0	Kg
5th to 4th Gear:	60	ms	6.0	Kg
6th to 5th Gear:	60	ms	6.0	Kg

Duration: This is the amount of time (in milliseconds) that the Shifter applies momentary throttle to the engine (while decelerating) in order to relieve strain on the gearbox during the back shift. This is tunable for each gear.

Force: This is the trigger force (in kilograms as measured in the shift linkage) that triggers a blip. This is tunable for each gear.

3 ## Default Blip Characteristics

Use When Gear Unknown: 60 ms   6.0 Kg

If for any reason the HM Quickshifter GP does not know the motorcycle's current gear when a Blip is requested (for example while still in its training phase), the Shifter uses these values for Duration and Trigger Force. This will happen during the Shifter's training phase just after you install your HM Quickshifter GP on its first motorcycle, or on a different motorcycle. These values will remain in use until the Shifter has gathered enough information to determine which gear the motorcycle is in. In order to gather this information, the Shifter will need to analyze RPM and Wheel Speed pulses for a small amount of time in each gear. See Training the Shifter for more information.

4 ## Inhibit Blip in 1st Gear?

☐ Do NOT back shift / blip when in 1st gear.

Checking this tells the Shifter NOT to perform a blip when the motorcycle is known to be in 1st gear. This is here because many riders TRY to back shift when the motorcycle is in 1st gear, just to confirm the motorcycle is in 1st gear, or to grab the next lower gear if there is one.

Having this setting turned on helps a serious racer by NOT blipping the throttle when there are no more gears to back-shift into.

Shift/Blip Common Tab

Restore Shifter Factory Settings Button
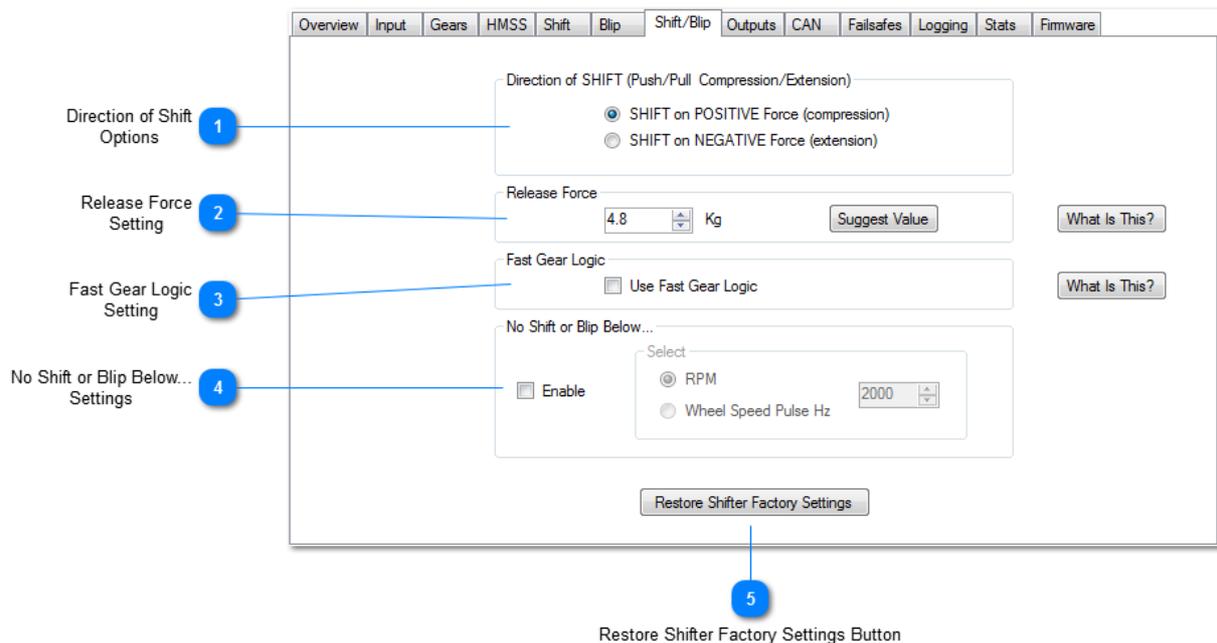
1 Direction of Shift Options

- ◉ SHIFT on POSITIVE Force (compression)
- ○ SHIFT on NEGATIVE Force (extension)

This setting tells the Shifter when the shift linkage is being compressed, whether the Shifter should perform a Shift (up-shift) or a Blip (back shift). The purpose of this is to permit the HM Quickshifter GP to accommodate all types of shift linkages.

2 Release Force Setting

4.8 ⇅ Kg   Suggest Value

Once a Shift or Blip has been performed, the shifter will not perform another Shift or Blip until the shift lever has been released below this force level.

Clicking the **Suggest Value** button computes and enters a "typical" Release Force value based on all the Shift Trigger Forces. (If any of the Shifter's outputs are set to function as Blip signals, then the Blip Trigger Forces are also included in this calculation.)

Adjustment Tip: If this value is too low, and the rider leaves some force on the shift lever after a Shift or Blip, it will "seem" like it is refusing to shift, when in fact this value needs to be increased.

Note: the valid range for this control is changed every time a Shift or Blip Force is changed. Therefore, if you are going to tune this value, do so after Shift and Blip forces have been tuned.

Clicking the **What Is This?** button pops up a technical description of this feature for easy reference while tuning the Shifter.

3 **Fast Gear Logic Setting**

☐ Use Fast Gear Logic

The **What Is This?** button provides a quick reference as to the purpose and details of the Fast Gear Logic feature.

If the HM Quickshifter GP's Output 2 is 1) set to CAN, 2) connected to external equipment, 3) set to communicate the current gear to that equipment, and 4) that equipment needs updated gear data IMMEDIATELY after a Shift or Blip (as opposed to after a very short period of time, after new RPM and SPEED pulse data have permitted confirmation of the new gear), then this feature can be turned on to increase the immediacy with which the unconfirmed new gear data is transmitted to the external equipment.

What the Fast Gear Logic does is increase or decrease the gear number internally at the completion of a Shift or Blip operation, BEFORE it has been confirmed by RPM and SPEED pulses that the gearbox actually changed gears. If the Shifter's Output 2 is set to transmit gear, and "Fast Gear Logic" is turned ON, this new gear data is automatically placed ahead of all other data waiting to be transmitted. Under normal riding and shifting conditions, this information will be correct most of the time.

Precaution: note that at the precise moment after the Shift (ignition cut) or Blip operation has been executed by the Shifter, the Shifter only knows that the Shift (ignition cut) or Blip operation has taken place, but does not know with certainty whether the up-shift or down-shift in the gearbox actually took place yet. At this moment, it is only a high probability that it has, and has not been confirmed yet by RPM and SPEED pulses. If the rider does something unusual with the shift lever, causing the Shifter to perform a Shift (ignition cut) or Blip operation, but the gearbox does not actually change gears, this information will be incorrect for a very short period, and will be corrected once the RPM and SPEED pulses have permitted the Shifter to confirm the gear. The corrected gear will be transmitted at that point. If "Fast Gear Logic" is ON, the gear data will be placed ahead of all other data waiting to be transmitted.

Clicking the **What Is This?** button pops up a technical description of this feature for easy reference while tuning the Shifter.

4 **No Shift or Blip Below... Settings**

Select
- ⦿ RPM
- ○ Wheel Speed Pulse Hz

☐ Enable   2000

This feature prevents Shift (ignition cut) or Blips from being executed while motorcycle's engine RPM is below a certain level, or the motorcycle's speed is below a certain point. The default settings inhibit Shifts and Blips while the motorcycle is idling or not moving.

If either the RPM or Speed Pulse inputs are not connected to the HM Quickshifter GP, the unconnected input MUST NOT be used as a criterion for this feature, or else the HM Quickshifter GP would perpetually think that the motorcycle is idling or not moving, and this feature would prevent Shifts and Blips from occurring. As a safety feature, if the HM Quickshifter GP Configuration Tool is aware of the unconnected input (via the settings in the Input Tab), then that input will be disabled here.

If neither the RPM nor Speed Pulse inputs are connected, then this feature cannot be used at all, and is disabled in the HM Quickshifter GP Configuration Tool until at least one of them is connected.

5 **Restore Shifter Factory Settings Button**

Restore Shifter Factory Settings

Click to restore your HM Quickshifter GP back to Factory Settings.

Outputs Tab
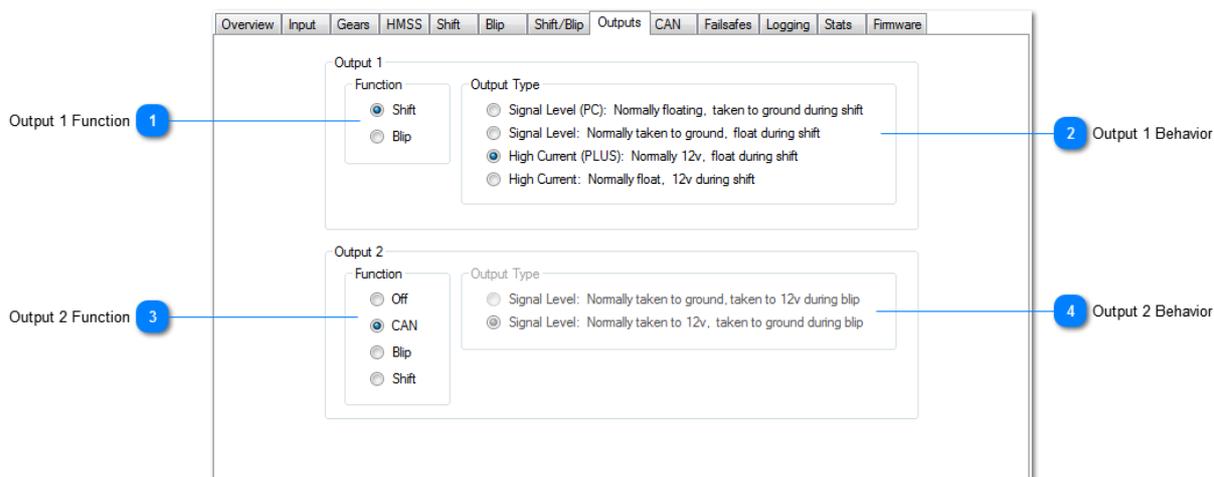
1 Output 1 Function

○ Shift

○ Blip

This setting determines whether the Output 1 connector will function to signal a Shift or a Blip.

2 Output 1 Behavior

○ Signal Level (PC): Normally floating, taken to ground during shift

○ Signal Level: Normally taken to ground, float during shift

● High Current (PLUS): Normally 12v, float during shift

○ High Current: Normally float, 12v during shift

This setting determines the characteristics of an Output 1 "event" when it happens.

"PC" refers to the HM Quickshifter PC -- this setting causes the Shifter to match the behavior of that HM Quickshifter model.

"PLUS" refers to the HM Quickshifter PLUS -- this setting causes the Shifter to match the behavior of that HM Quickshifter model.

3 Output 2 Function

○ Off

● CAN

○ Blip

○ Shift

This setting determines whether the Output 2 connector will be inactive, transmit data to a CAN network, or function to or signal a Blip or a Shift.

4 **Output 2 Behavior**

○ Signal Level: Normally taken to ground, taken to 12v during blip

◉ Signal Level: Normally taken to 12v, taken to ground during blip

If Output 2 is being used to signal Shifts or Blips, this setting determines the characteristics of that output when it happens. (If the Output 2 Function is set to CAN, Output 2 will transmit data to a CAN Transceiver, which can be configured via the CAN Tab.)

CAN Tab

CAN stands for "Controller Area Network", and is a common and reliable data transmission network used in the automotive and other industries. (See Controller Area Network definition on Wikipedia.)

If on the Outputs Tab Output 2's "Function" is set to "CAN", the Output 2 wire (white wire -- see Wiring Guide) will transmit data to another device (purchasable at the HM Quickshifter website) that will, in turn, relay that data to a CAN network, which can host any CAN device you connect to it. This might be a dash board, a data logger, or any other device that can receive and process CAN data.

Note: If on the Outputs Tab Output 2's "Function" is set to anything other than "CAN", these controls will be disabled.
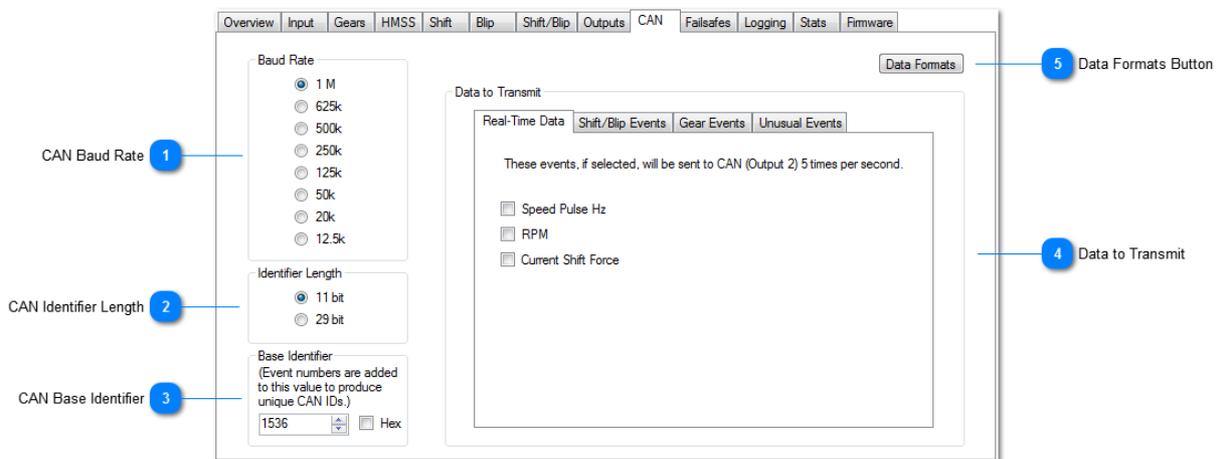
1 CAN Baud Rate

Select the CAN Baud Rate to match your CAN network.

CAN Identifier Length

Select the identifier length that matches the setting that will be used in receiving CAN device (dash board, data logger, etc.) that will receive data from the HM Quickshifter GP.

CAN Base Identifier

The transmitted CAN IDs for each datum will be this Base Identifier plus the CAN ID Offset value assigned to that datum. See the Data Formats Button section below for a list of which CAN ID Offset values are assigned to which data.

In the example here (Base Identifier = 1536), if you selected RPM as data you wanted to be transmitted to the CAN network, the CAN ID used to transmit RPM would be 1537 (Base Identifier 1536 + 1, which is the CAN ID Offset assigned to RPM). See the Data Formats Button section below for more information.

4 **Data to Transmit**

Use this group of checkboxes to select which data you would like to have transmitted to the CAN network. In addition to the checkboxes shown in the display above, the "Shift/Blip Events", "Gear Events" and "Unusual Events" tabs host a wide variety of different "event" data you might want the HM Quickshifter GP to transmit to the CAN network. Each selected event is transmitted *each time it happens,* whereas each datum on the "Real-Time Data" if selected will be transmitted to the CAN network 5 times per second.

Data Formats Button

Data Formats

Click this button to display a quick reference about the data formats that will be transmitted to the CAN netw
the receiving CAN device (dash board, data logger, etc.) will need this information to extract specific informa
convenience, the information from that display is listed below.

```
CAN IDs:

        The transmitted CAN IDs will be the user-selected Base Identifier plus the CAN ID Offset value below.

Definitions:

        Data Bytes are listed as letters A through H indicating whole byte values corresponding to CAN data b

        When using Bit-Encoded-Notation, quantities like C4 means bit 4 from data byte C.  Each bit is number
        the most significant bit, and bit 0 is the least significant bit.  A range of bits is indicated with
        [C4..C0].  This example means the unsigned integer value derived from the least-significant 5 bits i
        byte boundaries like this:  [B7..C0] means the unsigned 16-bit integer spanning bytes B and C where b
         Any signed values are explicitly noted as such, and use the most significant bit as the sign bit.


     +------------------------------------+------------------------------------+-----------
     |                 A                  |                 B                  | ...  etc.
     +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+-----------
     | A7 | A6 | A5 | A4 | A3 | A2 | A1 | A0 | B7 | B6 | B5 | B4 | B3 | B2 | B1 | B0 | ...  etc.
     +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+------------
```

```
===============================================================================================================
CAN ID  Data                         Min    Max
Offset  Bytes  Description           Value  Value  Units     Formula
===============================================================================================================
0       2      Speed Hz                 0   65535  Pulse Hz  (A*256) + B
---------------------------------------------------------------------------------------------------------------
1       2      RPM                      0   65535  RPM       (A*256) + B
---------------------------------------------------------------------------------------------------------------
2       2      Current Force        -2550    2550  0.1 Kg    Bit-encoded two's complement signed value [A
---------------------------------------------------------------------------------------------------------------
3       8      Shift/Blip Started       0       9  Type      A  Event Type  (See Table of Shift/Blip Even
                                        0       7  Gear      B  Last Known Gear prior to start (0 = unkno
                                        0   65535  RPM       RPM at start: (C*256)+D
                                                   ms        [E7..H0]  Timestamp bit encoded.  (See Times
---------------------------------------------------------------------------------------------------------------
4       8      Shift/Blip Ended         0       9  Type      A  Event Type (Min: 0, Max: 9)  (See Table o
                                       32     127  ms        B  Max Duration in Milliseconds.
                                       60    2550  0.1 Kg    (C*256) + D  Triggering Force.  Kg = ((C*256
                                                   ms        [E7..H0]  Timestamp bit encoded.  (See Times
---------------------------------------------------------------------------------------------------------------
5       6      Shift/Blip Info          0       5  Type      A  Type  (See Table of Shift/Blip Event Type
                                       28     127  ms        B  Actual Duration in Milliseconds (can be s
```

```
                                   60    2550   0.1 Kg   (C*256)+D  Triggering Force
                                   60    2550   0.1 Kg   (E*256)+F  Peak Force
------------------------------------------------------------------------------------------
6      5    New Gear Confirmed     0      7    Gear     A
                                                ms       [B7..E0]  Timestamp bit encoded.  (See Times
------------------------------------------------------------------------------------------
7      5    New Gear Predicted     0      0    Gear     A
                                                ms       [B7..E0]  Timestamp bit encoded.  (See Times
------------------------------------------------------------------------------------------
8      5    Gear Learning Started  0      7    Reason   A  (See Table of Gear-Learning-Started Reason
                                                ms       [B7..E0]  Timestamp bit encoded.  (See Times
------------------------------------------------------------------------------------------
9      5    Gear Learning Phase    0      2    New Phase A  (See Table of Gear-Learning-Phases below.
            Change                              ms       [B7..E0]  Timestamp bit encoded.  (See Times
------------------------------------------------------------------------------------------
10     5    Gear Learning --       0     100   Percent  A
            Percent Done with                   ms       [B7..E0]  Timestamp bit encoded.  (See Times
            Phase 1
------------------------------------------------------------------------------------------
11     5    Gear Learning --       0     100   Percent  A
            Phase 2:  Percent                   ms       [B7..E0]  Timestamp bit encoded.  (See Times
            Done with Current
            Gear
------------------------------------------------------------------------------------------
12     5    Reset                  0      7    Reason   A  (See Table of Reset Reasons below.)
                                                ms       [B7..E0]  Timestamp bit encoded.  (See Times
------------------------------------------------------------------------------------------
14     5    Entered Failsafe Mode  0      8    Reason   A  (See Table of Failsafe Mode Reasons below
                                                ms       [B7..E0]  Timestamp bit encoded.  (See Times
------------------------------------------------------------------------------------------
15     7    Continuous Self-Check  0     255   File ID  A  Self-Check File ID  (Report this value to
            Report                 0    65535  Line No  (B*256)+C  Self-Check Line Number  (Report t
Support.)
                                                ms       [D7..G0]  Timestamp bit encoded.  (See Times
------------------------------------------------------------------------------------------


Definition:  Timestamp is the number of ms since the Shifter was powered on.
    Timestamp bit encoded [E7..H0], means that the value can be read
    as a 32-bit unsigned integer, or be translated thus:
      milliseconds = (E*16777216) + (F*65536) + (G*256) + H.



Table of Shift/Blip Event Types
----------------------------------------------------------------
CAN Shift/Blip Types:
 0 = Shift
 1 = Blip
 2 = Shift (no output)
 3 = Blip (no output)
 4 = Shift (inhibited by gear)
 5 = Blip (inhibited by gear)
```

```
 6 = Shift (inhibited by RPM below user-specified threshold)
 7 = Blip (inhibited by RPM below user-specified threshold)
 8 = Shift (inhibited by Speed Hz below user-specified threshold)
 9 = Blip (inhibited by Speed Hz below user-specified threshold)
16 = Shift ended by HMSS
18 = Shift ended by HMSS (no output)
```

```
Table of Gear-Learning-Started Reasons
----------------------------------------------------------------
0 = Too many consecutive gear misses while data stable
1 = Too many wide departures from known ratio within 10 seconds
2 = Ratio count greater than gear count
3 = Power up found learning mode in Phase 1
4 = Ratio data retrieved from storage invalid
5 = Ratio data corrupted in storage
6 = User requested shifter re-learn ratios
7 = First power-up
```

```
Table of Gear-Learning-Phases
----------------------------------------------------
1 = Learning Noise Characteristics of Input Signals
2 = Learning Individual Gears
0 = Normal Operation
```

```
Table of Reset Reasons
----------------------------------
0 = Normal Power-On
1 = Brown-Out
2 = Master-Clear Pin Activated
3 = Intentional Software Reset
4 = Watchdog Timer Alert
5 = Chip Configuration Error
6 = Watchdog Timer Wake from Sleep
7 = Watchdog Timer Wake from Idle
```

```
Table of Failsafe Mode Reasons
----------------------------------------
0 = More than 10 Shifts in 5 Seconds
1 = More than 10 Blips in 5 Seconds
2-6 = Unexpected Reset
    2 = Brown-Out Reset
    3 = Master-Clear Pin Reset
    4 = Not Used
    5 = Microcontroller Configuration Error Reset
    6 = Watchdog Timer Reset
7-8 = Internal Error:
    7 = Continuous Self-Check Report
    8 = CPU Exception
```

Failsafes Tab
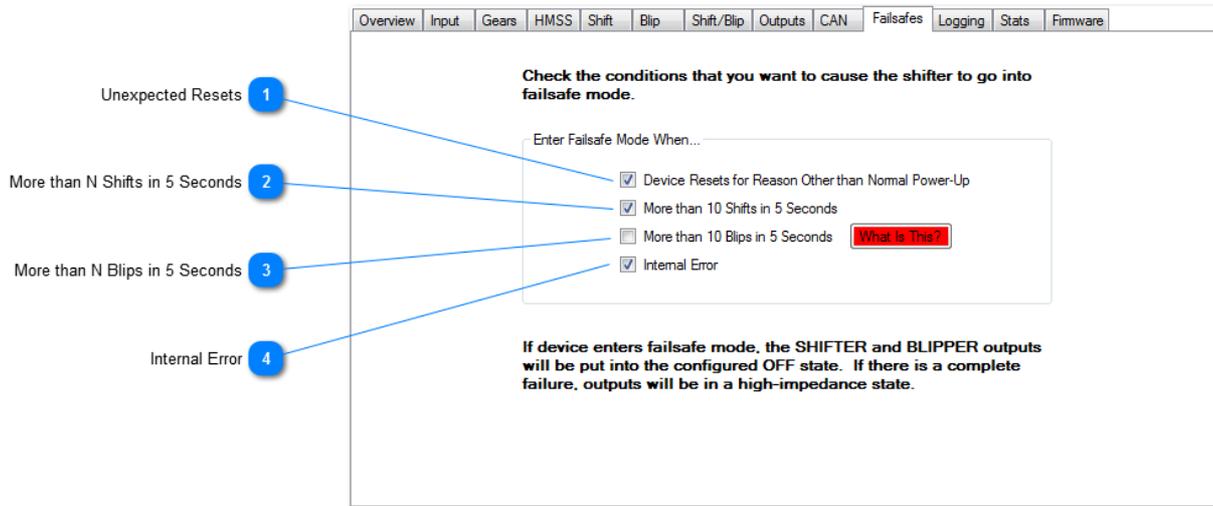
If the HM Quickshifter GP has any kind of significant failure, you do not want it interfering with your shifting. These options allow you to tell the Shifter under what circumstances to "back out" of the shifting and blipping operations during the current riding session. This is called "Failsafe Mode". If this ever happens, the Event Log will contain entries indicating what triggered going into Failsafe Mode. (See Logging Tab for more information.)

1 Unexpected Resets

☑ Device Resets for Reason Other than Normal Power-Up

As with any digital device controlled by a microcontroller, very unusual events such as electrostatic discharge (e.g. a nearby lightning strike), serious wiring problems (e.g. short), or other unusual events can cause the processor to go through a reset sequence.

When the device is powered up, the processor ALSO goes through a reset sequence. This is normal and expected.

If a reset has occurred and the reason for the reset was *not* a normal power up, it is possible that there is a significant problem.

Turning this setting ON will cause an unexpected reset to force the Shifter to go into Failsafe Mode.

Turning this setting OFF will cause the processor to attempt to continue to function and provide service despite the reset.

2 **More than N Shifts in 5 Seconds**

☑ More than 10 Shifts in 5 Seconds

This setting causes the Shifter to detect when it has performed more than "N" shifts within 5 seconds. N = the number of gears plus four. Thus, if your transmission has 6 gears, then turning this setting ON will cause the Shifter to go into Failsafe Mode if the Shifter, for any reason, performs more than 10 shifts within 5 seconds. (This includes if the rider performs more than "N" shifts within 5 seconds.)

Turning this setting ON will cause such an event to be interpreted as an error, and force the Shifter into Failsafe Mode.

Turning this setting OFF will cause such an event to be ignored, and the Shifter will to attempt to continue to function and provide service despite the unusual number of shifts inside a short space of time.

3 **More than N Blips in 5 Seconds**

☐ More than 10 Blips in 5 Seconds   [What Is This?]

This setting causes the Shifter to detect when it has performed more than "N" blips within 5 seconds. N = the number of gears plus four. Thus, if your transmission has 6 gears, then turning this setting ON will cause the Shifter to go into Failsafe Mode if the Shifter, for any reason, performs more than 10 blips within 5 seconds.

Caution: many riders bounce their left foot on the shift lever several times to ensure the bike is in 1st gear. If you do this, it may be better to leave this setting OFF so that the rider does not inadvertently cause the Shifter to go into Failsafe Mode.

Turning this setting ON will cause the Shifter to interpret more than "N" Blips within 5 seconds as an error, and it will enter Failsafe Mode.

Turning this setting OFF will cause such an event to be ignored, and the Shifter will to attempt to continue to function and provide service despite the unusual number of blips inside a short space of time.

What Is This? Button: Click this button for a reminder of what this feature does, and precautions about using it.

4 **Internal Error**

☑ Internal Error

A large number of internal self-checks are in full-time operation within the Shifter. If one of these detects something is not as it should be, then an internal error is deemed to have occurred, and further information about it is logged in the Shifter's Event Log (translatable by HM Quickshifter UK, Ltd. Tech Support staff).

Turning this setting ON will cause the Shifter to go into Failsafe Mode if any such event occurs.

Turning this setting OFF will cause such an event to be ignored, and the Shifter will to attempt to continue to function and provide service despite the internal error.

Logging Tab
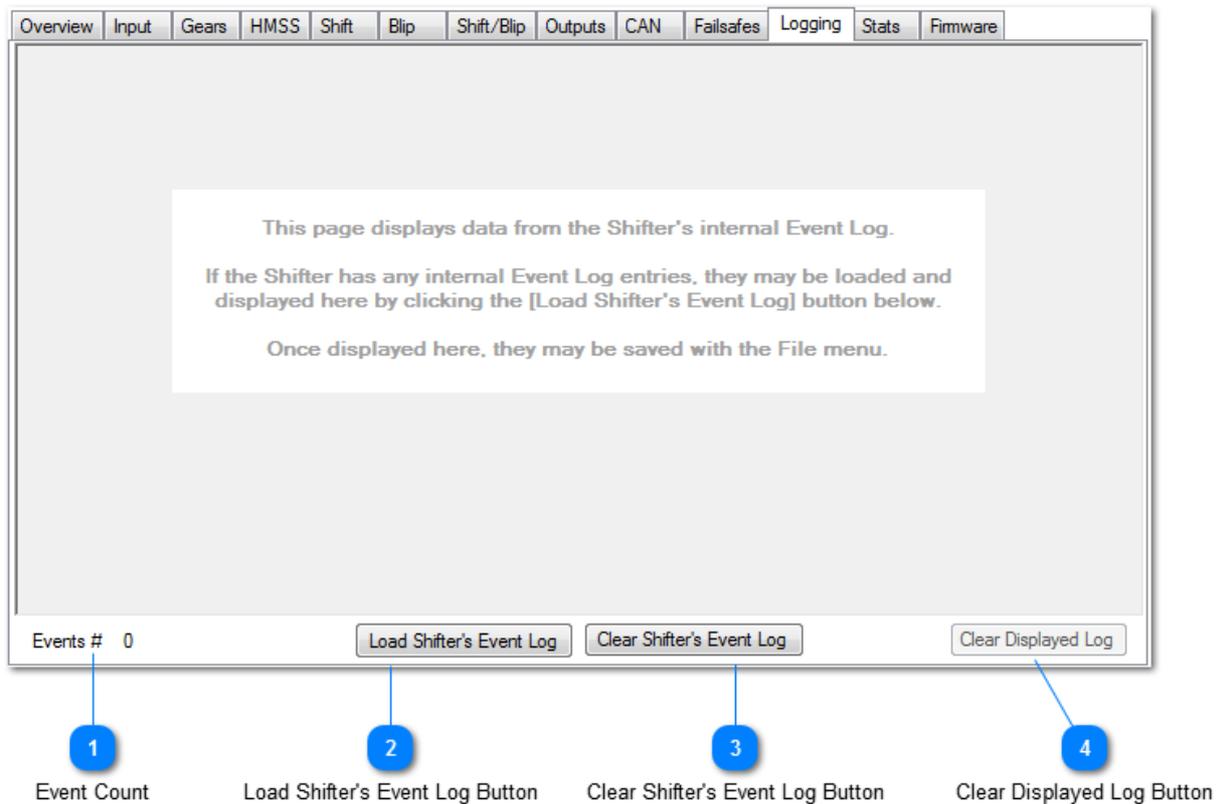
The HM Quickshifter GP records a running list of events that it has detected and/or acted upon. These events are stored in the Shifter's Event Log. The Logging Tab enables you to retrieve and/or erase the Shifter's Event Log.

The display above is how the Logging Tab looks before the Shifter's Event Log has been loaded.

Note that when the Shifter's Event Log gets full (at this writing, this happens after 15,488 Event Log entries have been stored), then the oldest Event Log entries will begin to be overwritten.

Loading the Shifter's Event Log retrieves and displays each event stored in the Shifter, from the oldest available to the newest, in that sequence.

1 Event Count

Events # 0

Total number of events. This value is valid after the Shifter's Event Log begins to load.

2 **Load Shifter's Event Log Button**
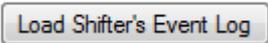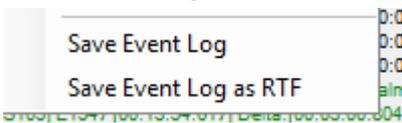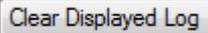
Load Shifter's Event Log

If the Shifter has any internal Event Log entries, they may be loaded and displayed by clicking this button. Once loaded, they may be saved with the File menu.

3 **Clear Shifter's Event Log Button**
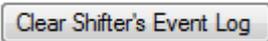
Clear Shifter's Event Log

Click this button to erase the Event Log stored in the Shifter.

4 **Clear Displayed Log Button**

Clear Displayed Log

Click this button to clear ONLY the displayed log data WITHOUT erasing the Shifter's Event Log. This leaves the Shifter's Event Log intact, enabling it to be retrieved at a later time.

After Event Log Is Loaded

Load Shifter's Event Log Button

If the Shifter has any internal Event Log entries, they may be loaded and displayed by clicking this button. Once loaded, they may be saved with the File menu.

Displayed Event Log

This is an example of what the display might look like after your HM Quickshifter GP's Event Log has been loaded. Note that by design, the display initially shows the most recent Event Log entries. (Of course, your events will be different than those displayed.) You can use the scroll bar on the right to review the entire log in the display.

Save Event Log Options

Once the Shifter's Event Log is loaded, you can choose either of these two options from the File menu to save the Event Log on your PC.

The **Save Event Log** option saves the displayed Event Log as a .TXT file, which can be edited with any text editor, such as Notepad.

The **Save Event Log as RTF** option saves the displayed Event Log as an .RTF file (RTF stands for Rich-Text Format). This preserves the color of the log entries, and thereby enables you to open the resulting file with a variety of general-purpose word processors, and view and print the log in color if desired.

Event Count

Events #   1569

Total number of events. This value is valid after the Shifter's Event Log begins to load.

**5** **Clear Shifter's Event Log Button**

Clear Shifter's Event Log

Click this button to erase the Event Log stored in the Shifter. CAUTION: Once the Shifter's Event Log is erased, it cannot be retrieved. Once this step is completed, the displayed log is also cleared, and can no longer be saved to your PC.

6 **Clear Displayed Log Button**

Clear Displayed Log

Click this button to clear ONLY the displayed log data WITHOUT erasing the Shifter's Event Log. This leaves the Shifter's Event Log intact, enabling it to be retrieved at a later time. Once this step is completed, the displayed log can no longer be saved to your PC.
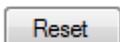
Stats Tab
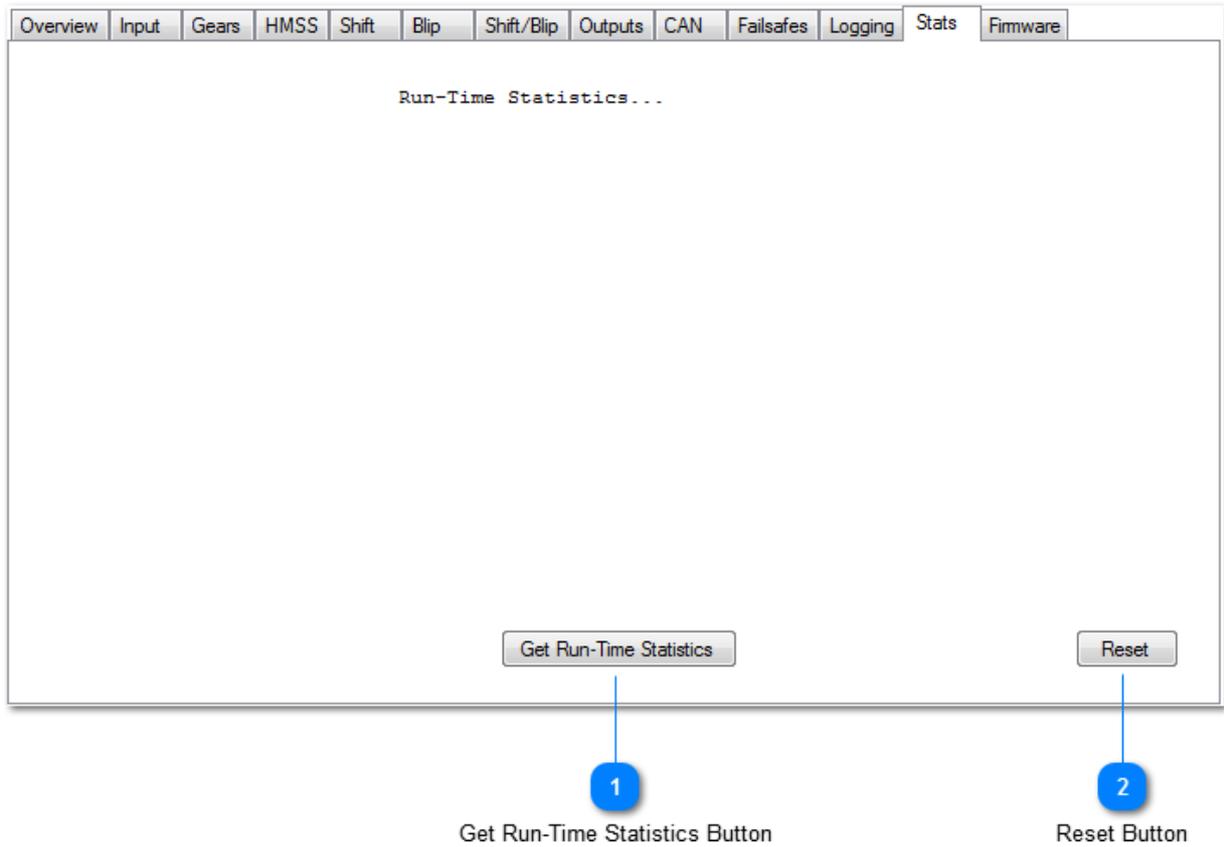
Although this Tab is probably more useful to HM Quickshifter UK, Ltd. Tech Support staff than anyone, it provides a "window" view into some of what is happening inside the Shifter's microcontroller.

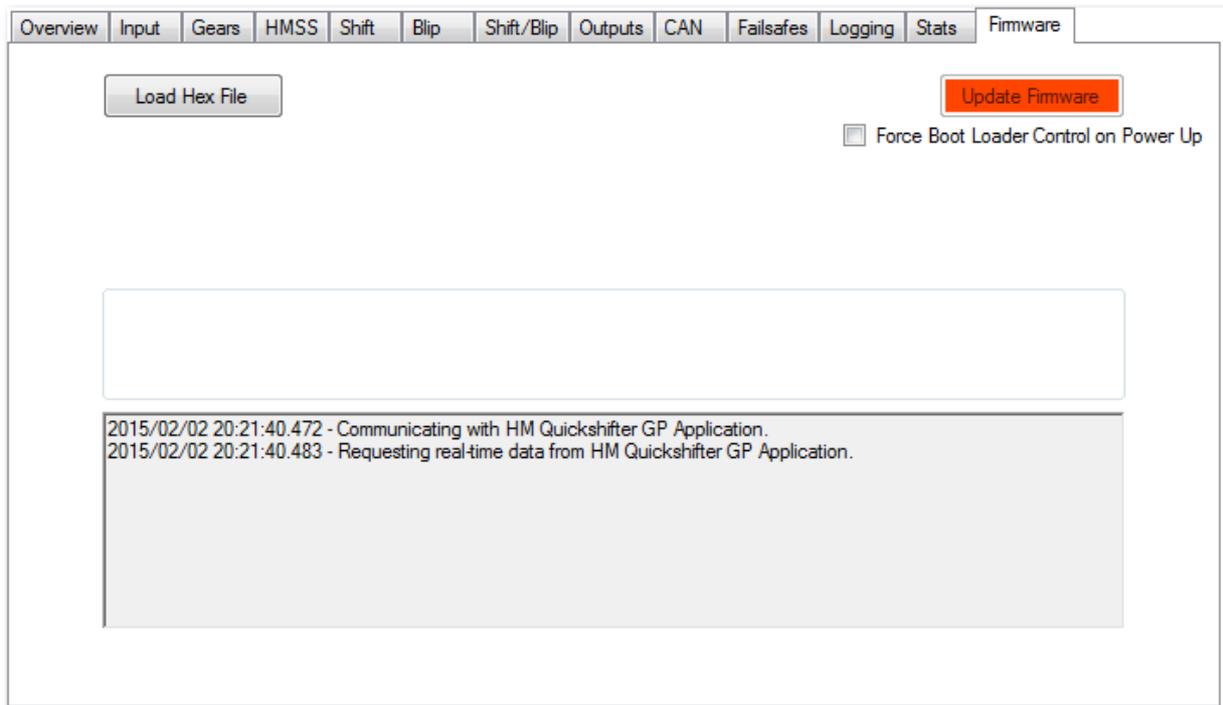### Get Run-Time Statistics Button
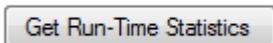
Click this button to retrieve current run-time statistics from the HM Quickshifter GP.

Reset Button

Click this button to reset the HM Quickshifter GP's run-time statistics counters back to zero.
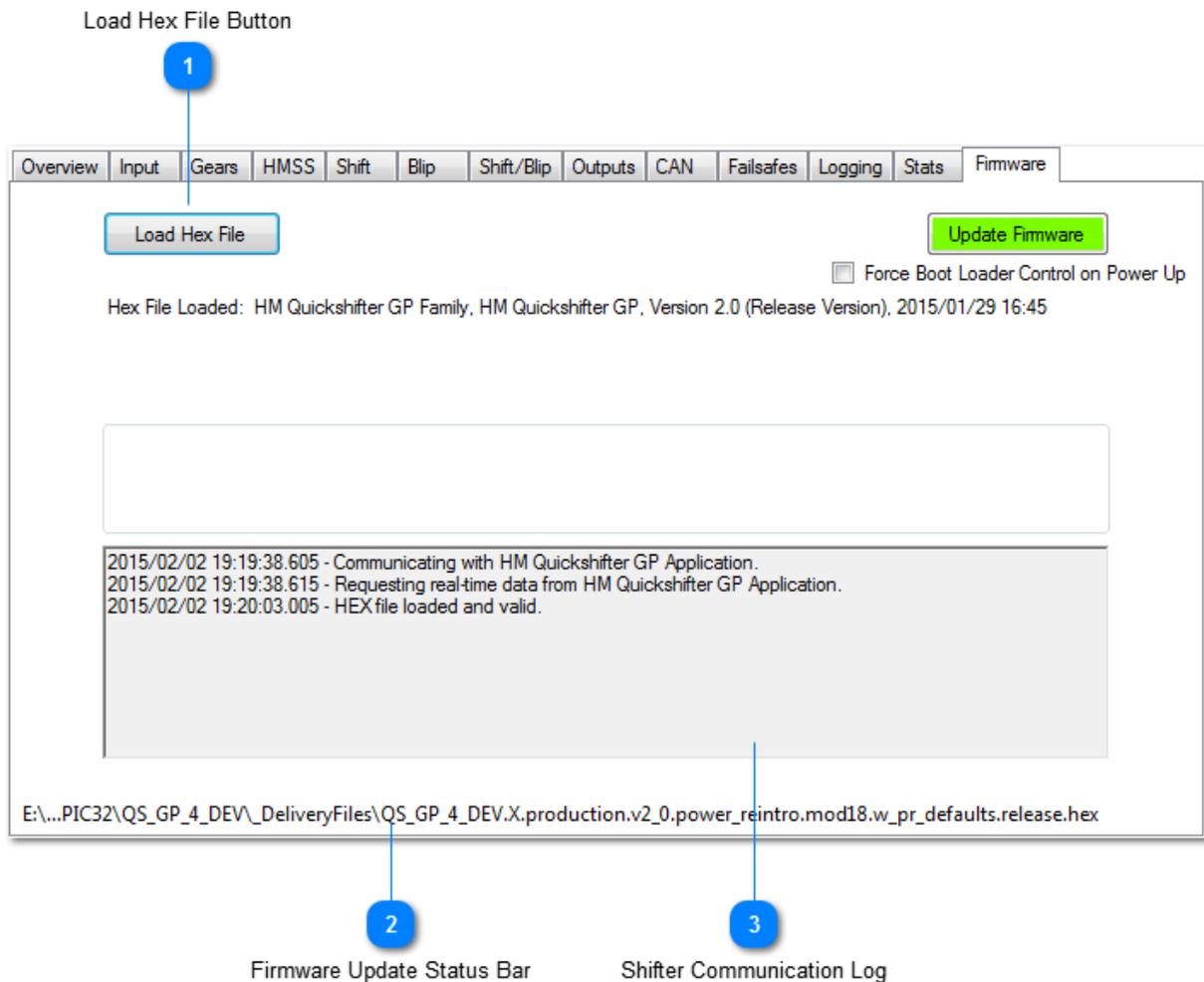
Firmware Tab

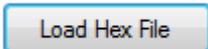**Firmware** is software embedded into a digital device.

This tab is used to update the Firmware in the HM Quickshifter GP. As new firmware introduces new features, these can be acquired by customers who want and/or need those features, and the Shifter can be updated through the connecting USB cable, much like your cell phone's firmware can be updated.

If you are in possession of a firmware update file (called a HEX file because it ends with the letters "hex"), then you can update your Shifter's firmware.

Step 1: Load Hex File

Load Hex File Button

Overview | Input | Gears | HMSS | Shift | Blip | Shift/Blip | Outputs | CAN | Failsafes | Logging | Stats | Firmware

Load Hex File

Update Firmware

☐ Force Boot Loader Control on Power Up

Hex File Loaded: HM Quickshifter GP Family, HM Quickshifter GP, Version 2.0 (Release Version), 2015/01/29 16:45

2015/02/02 19:19:38.605 - Communicating with HM Quickshifter GP Application.
2015/02/02 19:19:38.615 - Requesting real-time data from HM Quickshifter GP Application.
2015/02/02 19:20:03.005 - HEX file loaded and valid.

E:\...PIC32\QS_GP_4_DEV_DeliveryFiles\QS_GP_4_DEV.X.production.v2_0.power_reintro.mod18.w_pr_defaults.release.hex

2   Firmware Update Status Bar   3   Shifter Communication Log

1 Load Hex File Button

Load Hex File

Click this button to select the HEX file to load. During loading, the contents of the HEX file is checked for consistency. If this succeeds, the **Update Firmware** button is enabled and is turned green. When this happens, everything is ready to to proceed with the Firmware Update.

2 Firmware Update Status Bar

E:\...PIC32\QS_GP_4_DEV_DeliveryFiles\QS_GP_4_DEV.X.production.v2_0.power_reintro.mod18.w_pr_defaults.release.hex

If loading the HEX file succeeds, the path of the HEX file is displayed here. The purpose of this is to enable easy visual confirmation that the intended HEX file is loaded. This is important if you have more than one HEX file to select from.
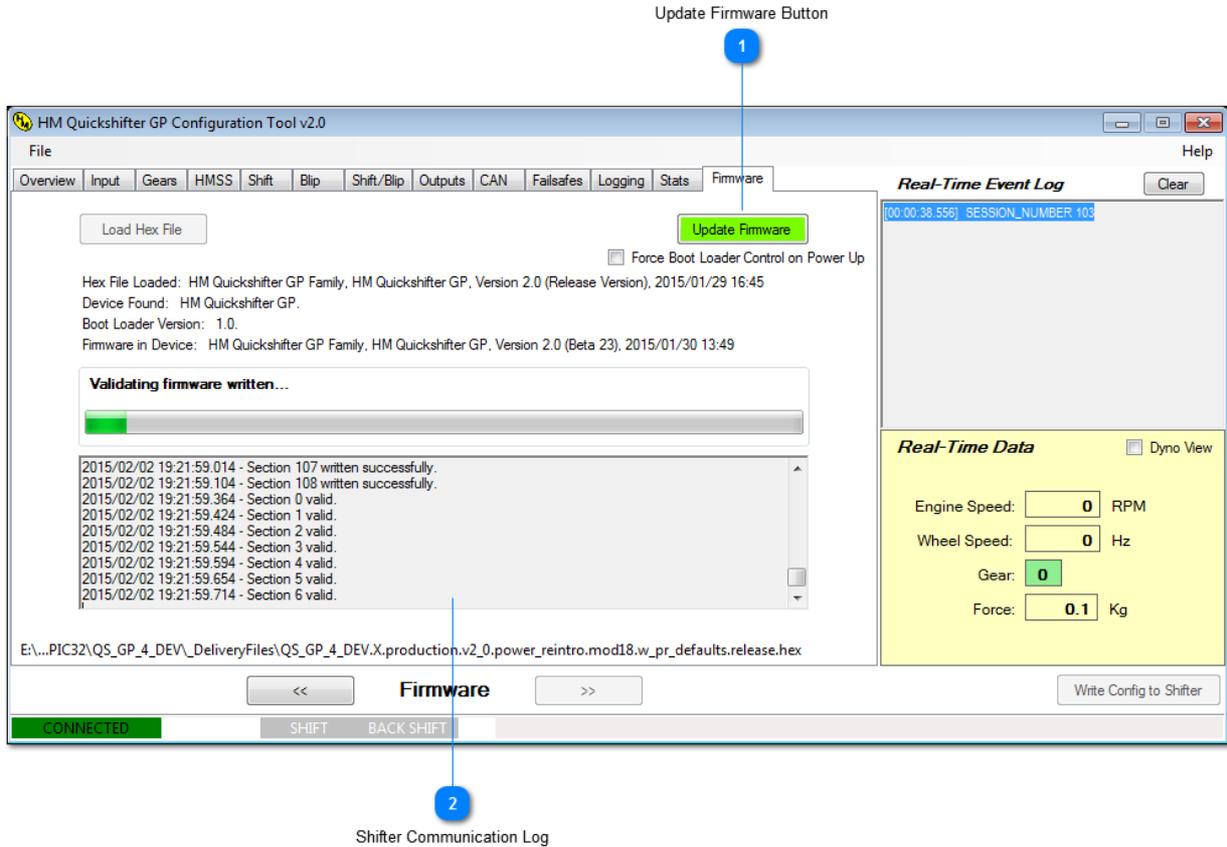
3 Shifter Communication Log

```
2015/02/02 19:19:38.605 - Communicating with HM Quickshifter GP Application.
2015/02/02 19:19:38.615 - Requesting real-time data from HM Quickshifter GP Application.
2015/02/02 19:20:03.005 - HEX file loaded and valid.
```
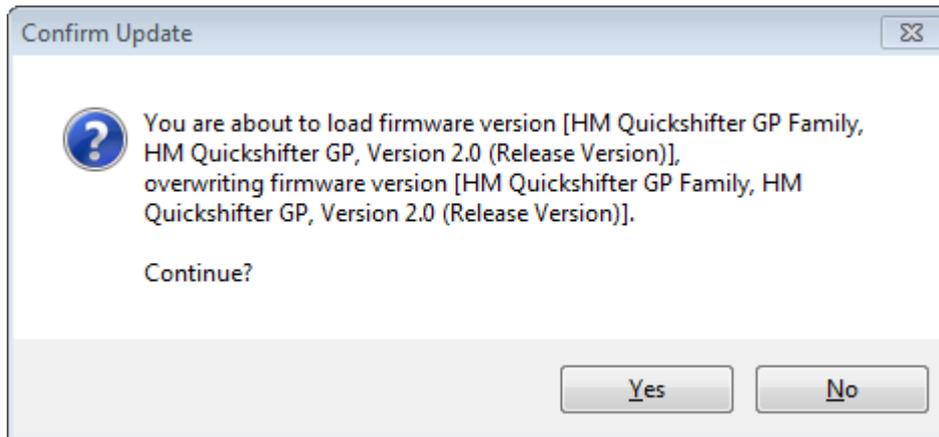
Actions completed are logged here.

Step 2: Firmware Is Written and Validated

Update Firmware Button

Shifter Communication Log

1 **Update Firmware Button**

Update Firmware

When this button is enabled and green after successfully loading a valid HEX file, click this button to begin the update process. The firmware on the device is checked and compared with the firmware in the HEX file, and you are promted with this information for confirmation. If you are about to load older firmware replacing newer firmware (which would usually be an error), a cautionary message in this dialog box would warn you about that here.

Confirm Update

You are about to load firmware version [HM Quickshifter GP Family, HM Quickshifter GP, Version 2.0 (Release Version)], overwriting firmware version [HM Quickshifter GP Family, HM Quickshifter GP, Version 2.0 (Release Version)].

Continue?

Yes   No

Click **Yes** to proceed, or **No** to abort the update.

Once the update has started, the new firmware is sent to the device and validated.
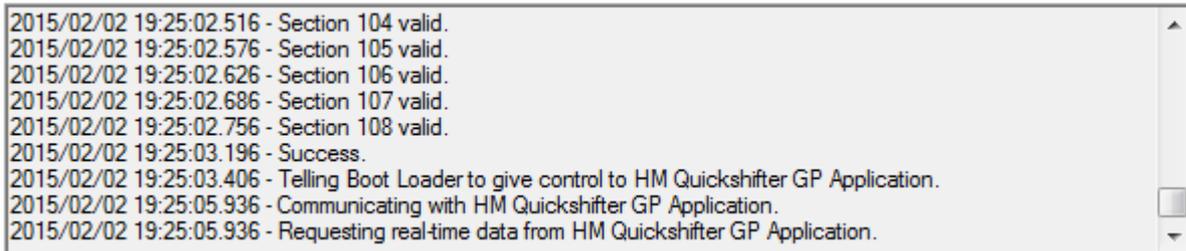
2 **Shifter Communication Log**
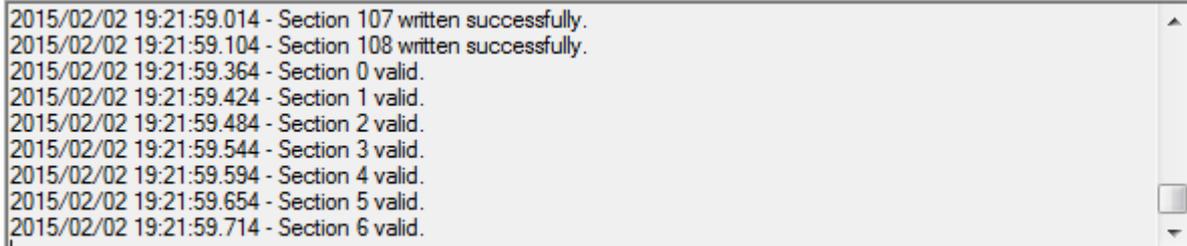
```
2015/02/02 19:21:59.014 - Section 107 written successfully.
2015/02/02 19:21:59.104 - Section 108 written successfully.
2015/02/02 19:21:59.364 - Section 0 valid.
2015/02/02 19:21:59.424 - Section 1 valid.
2015/02/02 19:21:59.484 - Section 2 valid.
2015/02/02 19:21:59.544 - Section 3 valid.
2015/02/02 19:21:59.594 - Section 4 valid.
2015/02/02 19:21:59.654 - Section 5 valid.
2015/02/02 19:21:59.714 - Section 6 valid.
```

Each step is logged in this display.

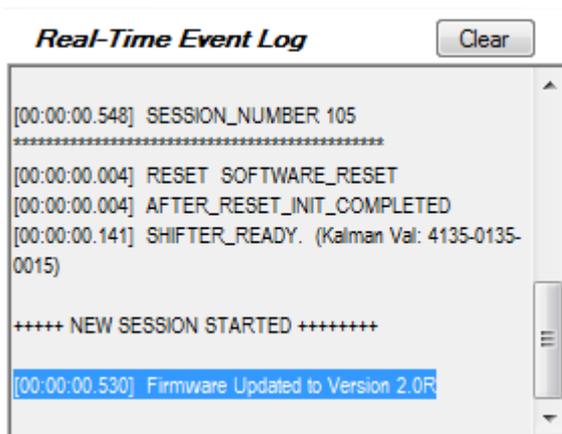# Step 3: Firmware Update Completed

1 Shifter Communication Log
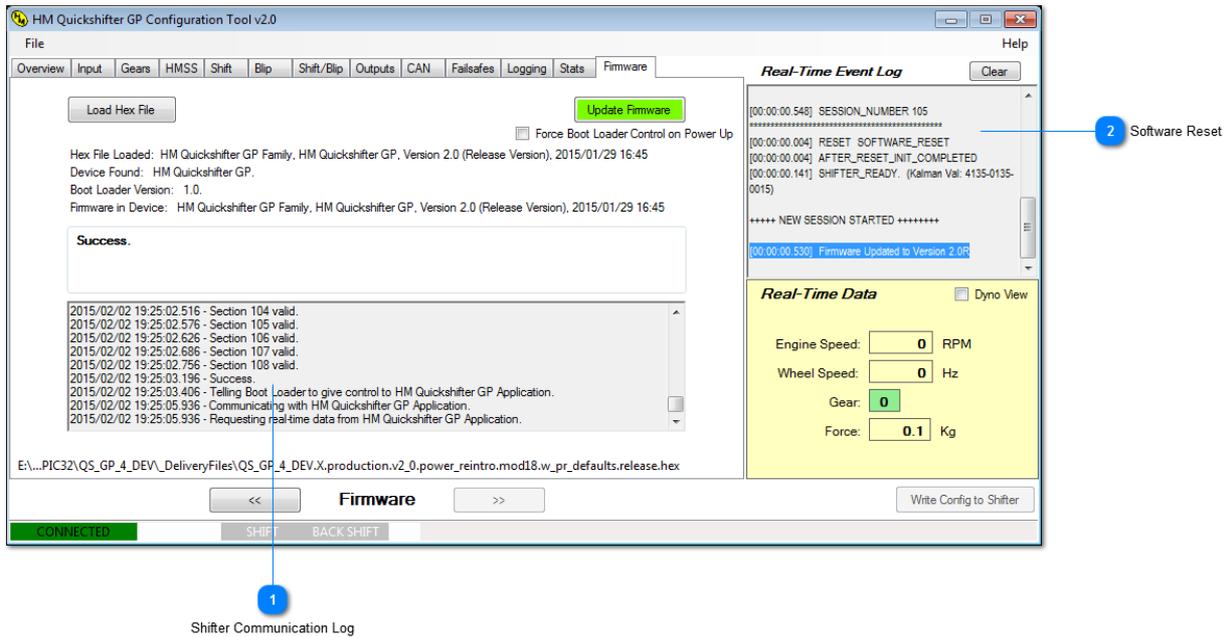
Shifter Communication Log

If the validation succeeds, the Communication Log shows this with the "Success" log entry, and the Shifter will be ready to operate with its new firmware.

2 **Software Reset**

Real-Time Event Log   Clear

[00:00:00.548] SESSION_NUMBER 105
****
[00:00:00.004] RESET SOFTWARE_RESET
[00:00:00.004] AFTER_RESET_INIT_COMPLETED
[00:00:00.141] SHIFTER_READY. (Kalman Val: 4135-0135-
0015)

+++++ NEW SESSION STARTED ++++++++

[00:00:00.530] Firmware Updated to Version 2.0R

Note that at the beginning of the firmware update, a Software Reset was performed. The "memory" of this correctly appears in the Real-Time Event panel after the new firmware has been loaded and begins executing. This is normal.

Training the Shifter

Purpose:

The HM Quickshifter GP uses knowledge of which gear the motorcycle is in to achieve smoother shifts, and thus is able to get power back to the rear wheel sooner than is possible with traditional fixed-time quickshifters.

Gathering information needed to determine which gear the motorcycle is in is fully automatic for the lifetime of the Shifter, even if you install the Shifter on another motorcycle.

When the Shifter is newly installed on a motorcycle, it will take a short period for it to gather this information. During this time, it does not have enough information to determine the gear, and so uses a user-configurable default duration and trigger force for each shift and blip, until the required information has been gathered. (See Default Shift Characteristics and Default Blip Characteristics for more information.)

Because this process is entirely automatic, "training" the Shifter before the first riding session is entirely optional. However, in a racing situation, where the rider may need the Shifter to be able to identify gears right from the beginning of the first riding session, the rider and/or engineer/mechanic may want to "train" the Shifter in advance of the riding session.

How to Train the Shifter:

If the rider needs to have the HM Quickshifter GP know which gear the motorcycle is in right from the start of riding, in order to guarantee smoothest shifting through the entire riding session, such as in a racing situation, you will want to run the Shifter through a short "training" period that it needs in order to identify gears.

This training can be done on a dyno or by placing the motorcycle on a paddock stand, and running the motorcycle slowly through each gear. Watching the display on the Gears Tab of the HM Quickshifter GP Configuration Tool is recommended so you can tell when enough information has been gathered from each gear. (See the links below to see an example of this process.)

From the moment the HM Quickshifter GP first begins getting RPM and Wheel Speed pulses from the motorcycle, it begins learning how to identify gears. All it needs to do this is to know how many gears there are. This is why the Number of Gears setting on the Gears Tab is crucial.

Typically, running through each gear once or twice while gradually accelerating is enough to train the Shifter.

See the links below to see for details on how to identify the stages of this training process, and when it is completed.

Training Phase 1
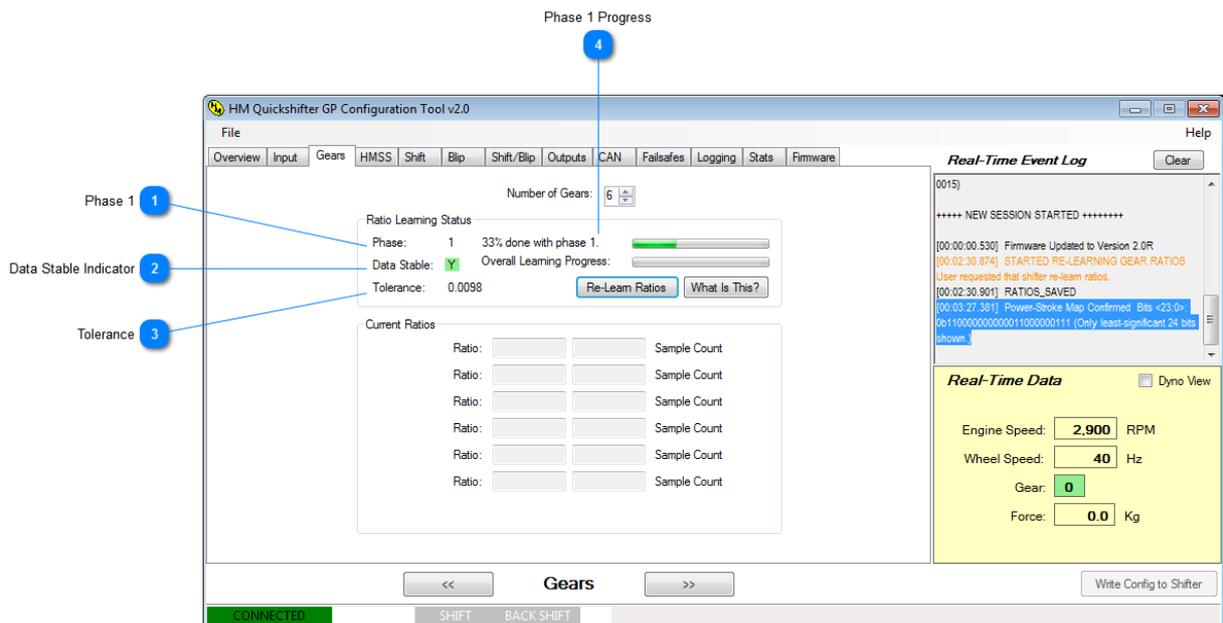
1 Phase 1

Phase: 1

1 = Just Starting -- the Shifter watches the incoming RPM and Wheel Speed pulses to determine certain characteristics of the incoming data.

2 Data Stable Indicator

Data Stable: Y

Note that the Shifter intentionally ignores RPM and Wheel-Speed pulse information it receives while the chain is slapping or while the gearbox is lashing -- transitioning from accelerating to decelerating, or vice versa. This is by design, because this information is not reliable for determining which gear the motorcycle is in. The indicator shows an orange "N" for No, or a green "Y" for Yes. Steady acceleration or deceleration makes the green "Y" appear more consistently, and speeds up the training process.

Here, the incoming data is stable and useable for the training process. If the chain were slapping or gearbox lashing, this would show "N" with an orange background instead.

3 Tolerance

Tolerance: 0.0098

This is an internal value the Shifter uses to determine a "band" around a center ratio for each gear.   The current "ratio" is determined by comparing RPM and Wheel Speed pulse frequencies. When the current ratio value is within "Tolerance" range from a known ratio, then the Shifter knows which gear the motorcycle is in. This value is tuned automatically by the Shifter during its training period, and thereafter automatically tuned and refined over the lifetime of the Shifter.
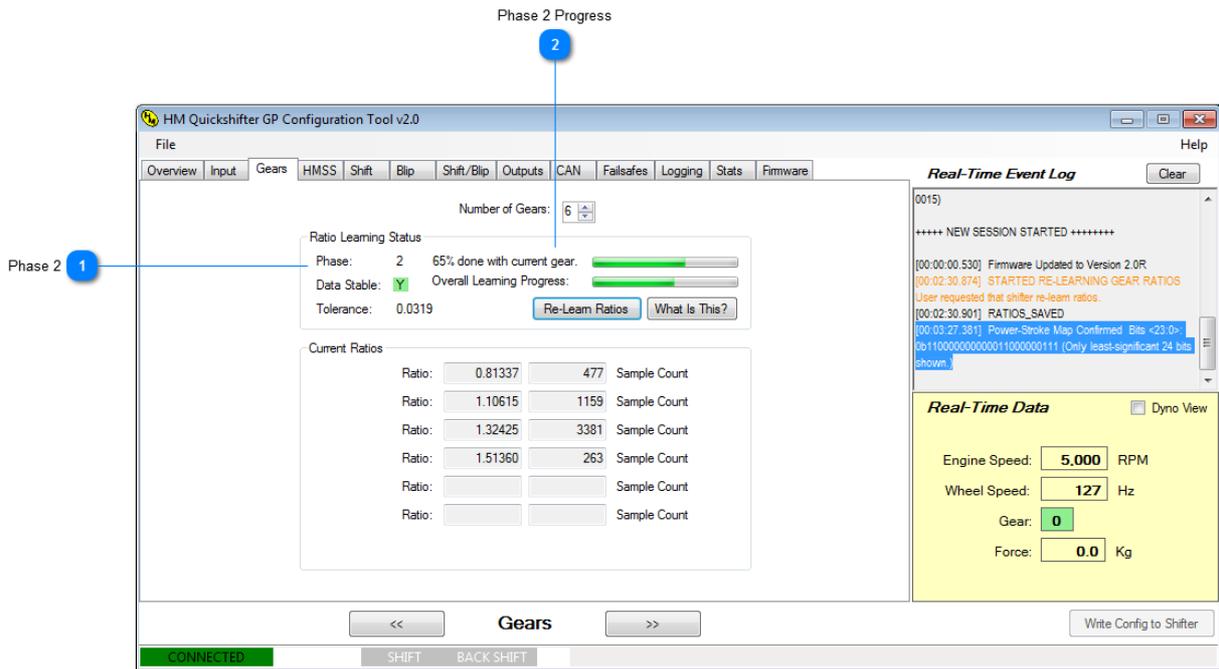
4 **Phase 1 Progress**

33% done with phase 1.

Overall Learning Progress:

These two progress bars show progress through the training steps.

Training Phase 2

Phase 2 Progress

Phase 2

Phase: 2

2 = Learning Gears -- the Shifter gathers information on each gear. During this phase, you can view the Sample Count and Progress Bar for the current gear to determine if enough data has been gathered for that gear.
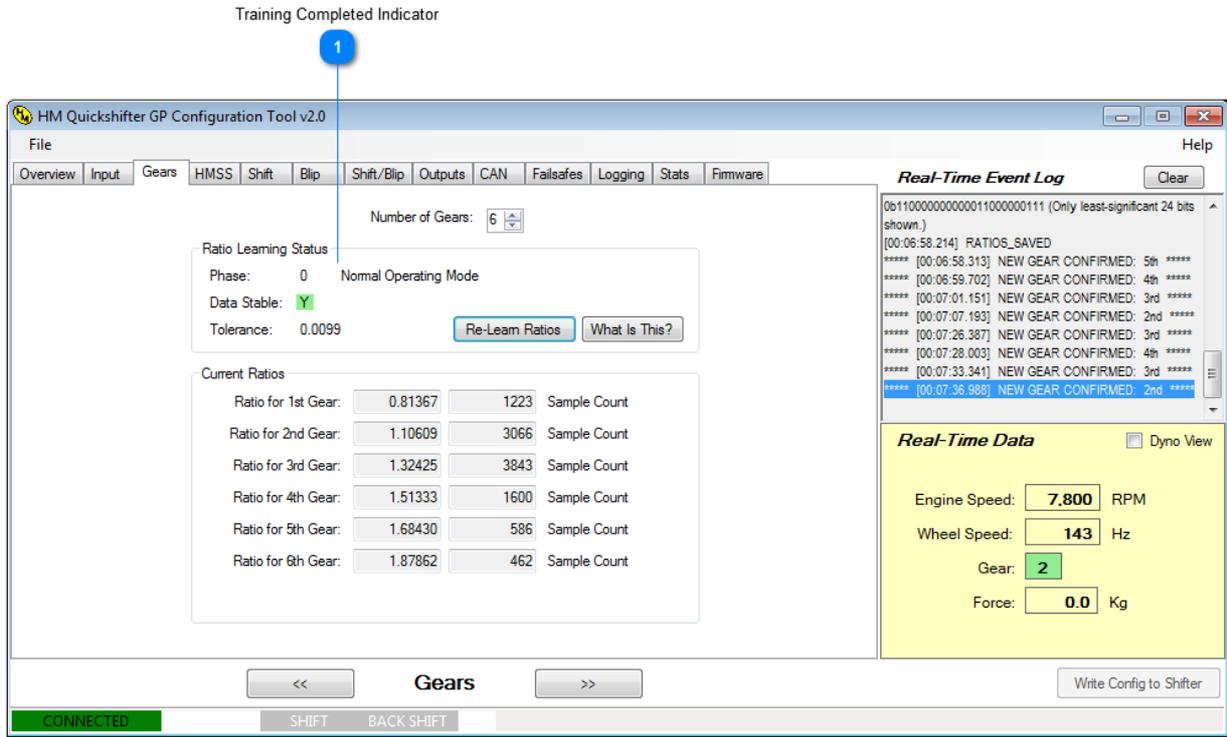
Phase 2 Progress

65% done with current gear.

Overall Learning Progress:

These two progress bars show progress through the training steps. In this example, training for the current gear is 30% complete, and the overall training is about 60% complete.

Training Completed

Training Completed Indicator

Phase: 0   Normal Operating Mode

0 = Normal Operation -- the Shifter has gathered all needed information to determine gear from the incoming pulse information. The training is completed.

Credits

"HM Quickshifter GP", "HM Quickshifter GP Configuration Tool", "HM Seamless-Shift (HMSS) Technology", the "Oval HM Quickshifter Logo" and the "HM Quickshifter Logo" are trademarks owned by HM Quickshifter UK, Ltd. and are used with its permission.

"Windows", "Windows 7", "Windows 8", and "Notepad" are trademarks owned by Microsoft.

Credits