PRECISION BLIPBOX

Yamaha R1 – 2015 to 2017
Perfect Clutch-Free shifting!

- Fitted in under an hour
- No ECU re-flash
- Can be used in all power modes and adjusts the BLIP response automatically.
- All existing bike systems, and sensors are retained
- Integrates with the bike CAN bus.
- No error codes on the dash when plugged in.
- A single high quality load cell replaces the existing up-shift switch for use with shift and blip functions with fully programmable load set points.
- Supplied with a BLIP-Map for your bike but also fully re-programmable to suit different rider, tracks, gear ratios.
- User can turn off the BLIP if the QS (quick shift) is turned off in the dash settings.
- Fully re-programmable using the simple to use WinBLIP software
- Standard and reverse shifting fully supported and changeable by the user without PC
- Machined aluminium housing with fully sealed electronics and high specification ‘plug n play’ wiring, no wiring modifications needed.
- Designed and made in the UK by Bike Sport Developments Ltd

Blip Box

- Supplied pre-programmed for your bike and the BLIP is triggered by a load cell sensor on the shift rod
- The standard up-switch shifter is removed and replaced with the load cell, this same load cell is used to trigger the up-shift.
- System may be re-programmed or adjusted by the additional USB interface and the **WinBLIP** software. Sold as a separate part.
-

How it works – The Yamaha R1 uses a Ride By Wire system with sensors to read the twist grip % telling the ECU what the rider wants, and electric motors on the throttles carry this out. Between these 2 devices sits the ECU with maps and control strategies to make the bike safe and easier to ride in a wide range of conditions.

Blip-Box reads signals from the twist grip sensors and data from the CAN bus and at the appropriate foot pressure from the rider it creates a BLIP on the throttle which releases the pressure on the gearbox allowing a perfect smooth back shift. Like a quick shifter, but in reverse.

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Tel: 0044 (0)1327 263942

Download the software, drivers and PDF manuals at
www.bikesportdevelopments.co.uk/blipbox

Important rider notes
Must be read and understood by all riders…

- Blip will be activated under these conditions:
  - RPM is higher than 4500 (R1 and MT10) or 5500rpm for the R6
  - Rear wheel speed is higher than 30kmh
  - Throttle grip is closed (less than 2%, engine slowing down)
  - Clutch is OUT (disabled when rider pulls in the clutch)
  - The time since the last blip must have been exceeded (0.30seconds)
  - There are no Blip Box diagnostics active (flashing LED)
  - QS is active in the dash configuration.
  - Foot pressure is applied by the rider

- The BLIP disengages the gearbox very much like a quick shifter in reverse, but your foot pressure makes the gear shift, so make a positive movement just like you would when using the clutch.

- The blip will only work fully after the engine is up to normal temperature. During warm up you should use the clutch as normal.

- For riders who use the slipper clutch excessively you may need to extend the primary BLIP duration to give more time to close the clutch and make the gearbox reversal. Use WinBLIP software or consult your dealer.

- Never force the lever, the BLIP should make it smooth and easy. If you suspect the gear is not fully engaged, pull in the clutch and check in a normal way.

- Never try to make a clutch-free downshift while accelerating (like dropping a gear to overtake). In this case the BLIP system will not work.

- After each downshift blip, release the lever pressure to re-arm it for the next gear Blip change.

IMPORTANT – When first plugged in you will see the LED blinking an error code for 30 seconds. This is perfectly normal during the installation because the CAN connector provides permanent power to the module, and at this stage the bike is not switched ON so the module cannot read some of the inputs correctly. The module also enters a self-calibration mode which lasts approx. 20 seconds.

When the ignition is eventually switched ON this warning will go away and will not come back unless there is a real problem (refer to blink code diagnostic section of the manual)

IMPORTANT – During the initial power ON self-calibration the load cell Mv is automatically adjusted to 2.5v to correct for any sensor drift. For this reason it is very important that there is no load applied by your foot or by ‘sticking’ linkages at the power On stage. If you suspect that the load cell is out of calibration, turn OFF the ignition switch and wait 1 minute for a complete power shutdown, then turn back on to re-start the self-calibration.

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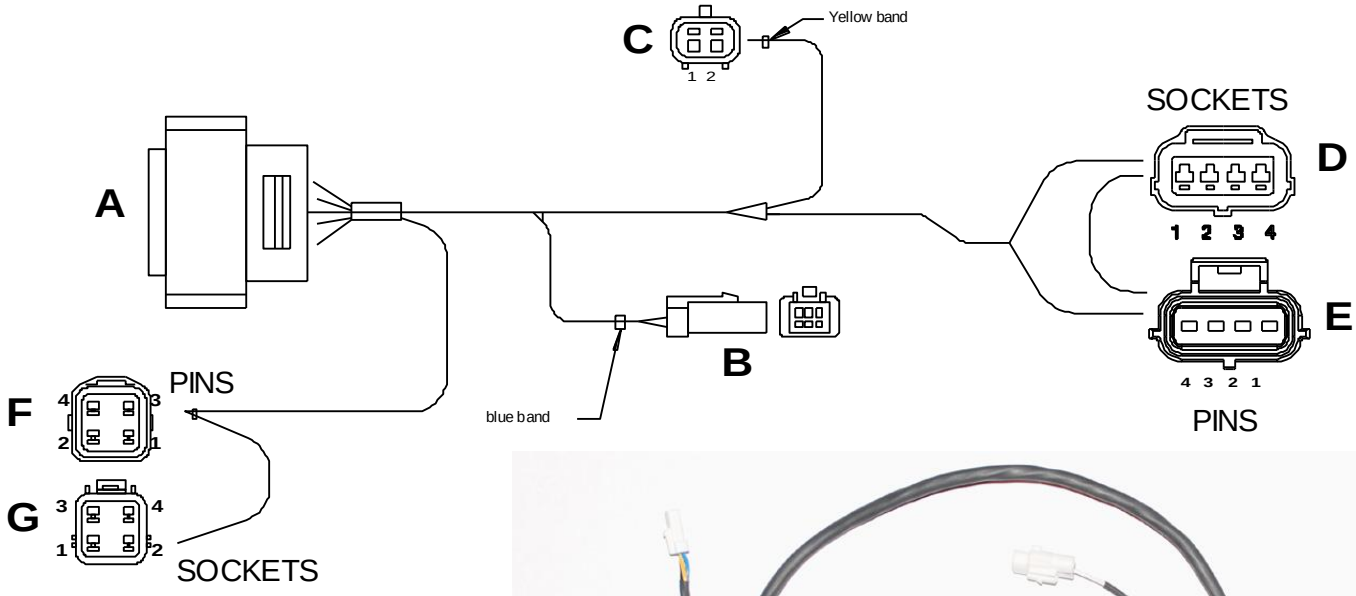
Preparation

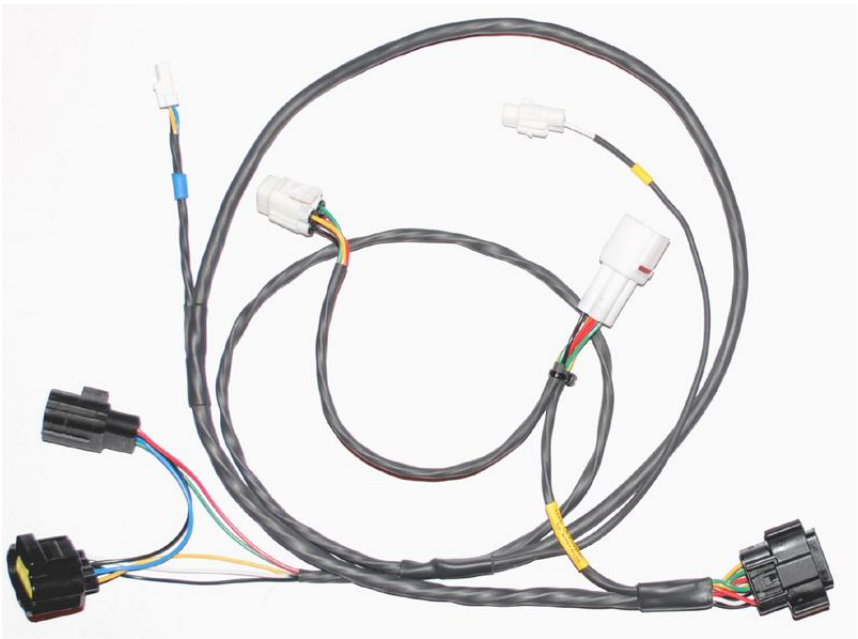
1. Turn off the ignition switch
2. Remove the seat.
3. Remove the battery cover plate
4. Remove the fuel tank
5. Remove the air box upper and lower sections to expose the throttle bodies

Wiring layout and installation

A – Main blip box 12 way connector (rear of bike)
B – 3 way white connector for the load cell (blue band)
C – 2 way white connector for up-shift output to the bike loom (left side near the front sprocket)
D – 4 way black connector (socket contacts) for the throttle twist grip signals of the throttle body (under air box)
E – 4 way black connector (pin contacts) for the twist grip output signals feeding into the bike loom (under air box)
F – 4 way white connector (pin contacts) for linking to the CAN bus diagnostic port under the seat (under seat)
G – 4 way white connector (socket contacts) as a continuation of the CAN bus for use with the Blip Box programming cable or any other CAN device such as a data logger (under seat)

Important note – Connector F will be live as soon as it is connected, so connect this last.





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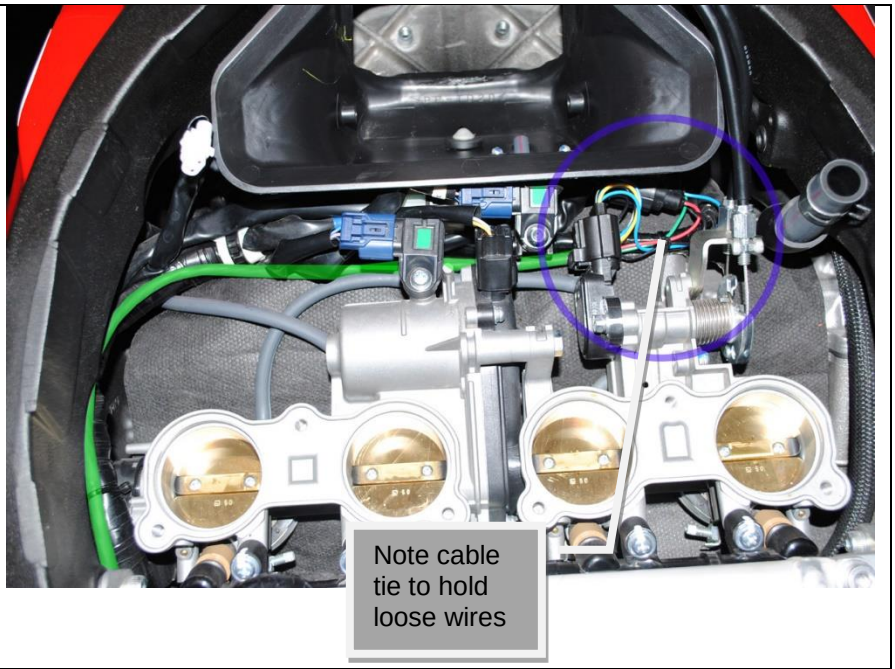
After the air-box has been removed you will see the throttle body assembly as shown in the photo.

Disconnect the throttle grip sensor ringed in blue and use connectors **D** and **E** to bridge between the loom and sensor. **See note -2 below**

Secure the wires using a cable tie so they cannot become tangled in the throttle cables.

The wire routing is highlighted in green and runs under the air pressure sensor along the left side of the bike. Note that it helps to temporarily disconnect the air pressure sensor and throttle motor when routing the Blip Box wiring.

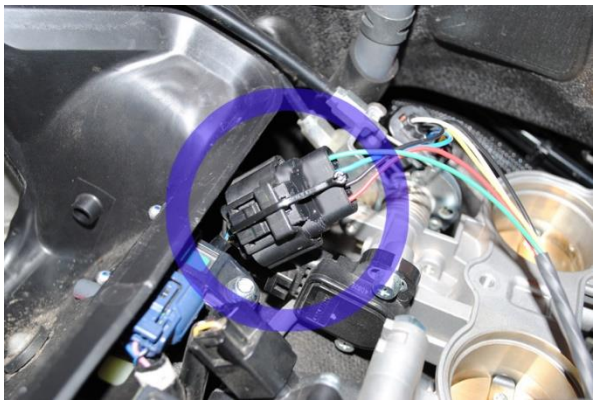
Use cable ties as necessary to retain the wiring.



Note – 2

IMPORTANT – Connector E is 3D printed and due to production tolerances on the latch it should be secured with a cable-tie across the 2 connectors to ensure it cannot come apart. – See image 2 at right inside the blue ring.

You can now re-fit the airbox.



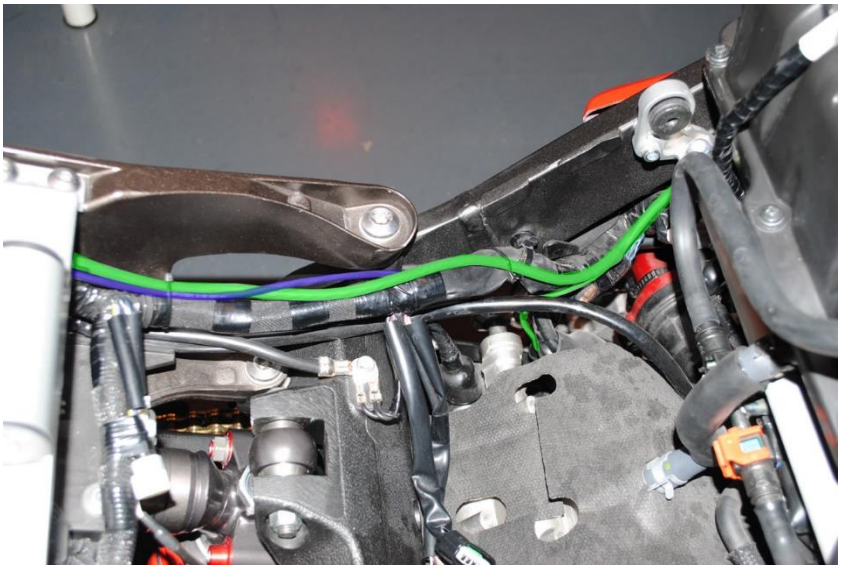
Use the main wiring as a guide and route the Blip Box loom along the left hand side.

The Up-Shift output connector **C** heads downwards and mates up with the standard bike loom shifter connector.

This connector is located in a large rubber shroud.

This image also shows the routing of the load cell sensor wire in blue as it runs alongside the main wiring loom. But this will be fitted later.

When the final wiring installation is complete take your time to secure any loose cables with cable ties.



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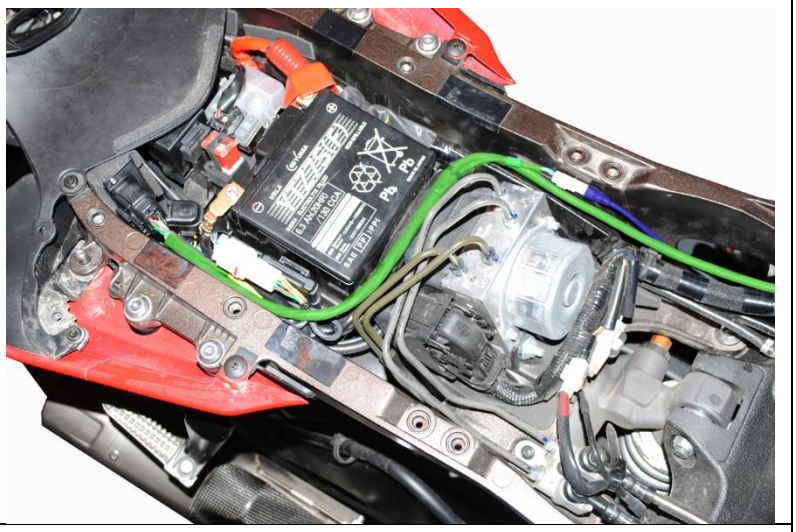
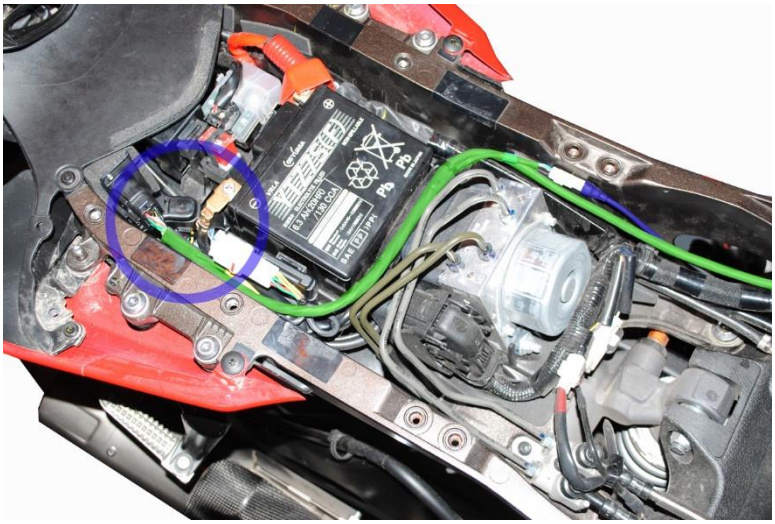
Continue along the left side and cross over to the right side in front of the battery as seen by the green trace line. The connection for the load cell is from the blue trace and sits alongside the ABD pump. For clarity the fuel tank support has been removed. The Blip Box module rests inside the rear of the sub frame alongside the exhaust valve motor. The kit contains strips of foam rubber to isolate from vibration, but mainly to hold the component in place.	
Remove the rubber shroud from the CAN bus connector (ringed in blue) and re-fit this to connector G of the Blip Box loom. Not re-fit connector G to the original mounting post. This just leaves the final connection to ‘power up’ the system when you connect F to the bike CAN connector. At this stage you will see the red LED switch on and start to blink a ‘2 x blink’ code for 30 seconds and is perfectly normal even with the ignition switch off. See notes in the next section to learn more about the LED functions.	

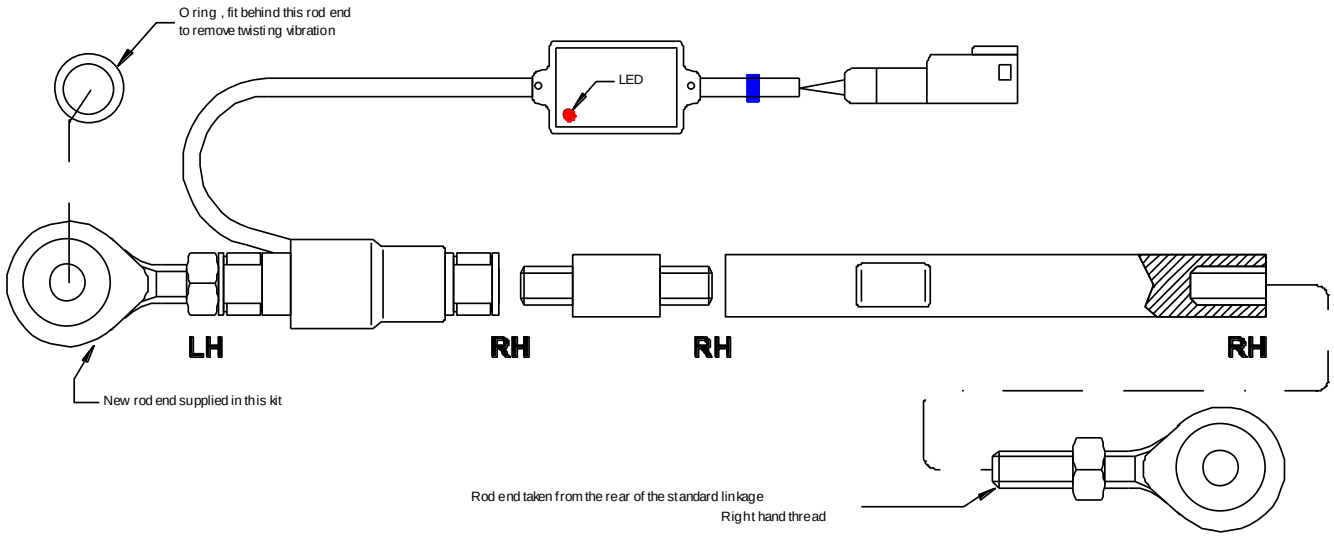
Load cell fitting

1. Remove the standard shifter switch and disconnect it from the bike wiring loom.
2. Measure the total length of the standard shift rod (between centres), this will allow you to re-make the new shift rod assembly to the same length and give you the same shift lever height – Standard 'centre to centre' distance is 258mm
3. The standard rod-end with M6 right hand thread is re-used on the new shift rod assembly
4. We provide a new shift rod in 2 pieces for greater length flexibility, but adjust as needed.
5. Adjust the new load cell shift rod to be the same length as the original via the upper or lower rod end adjusters making sure that there is always 10mm of thread used.
6. During assembly **NEVER** apply spanner force to both sides of the shift load cell when tightening lock nuts. This will cause twisting and damage to the load cell that is not covered by warranty.
7. IMPORTANT : The small control box with LED must be located where the temperature does not exceed 85deg C

The load cell supplied in this kit is a very sensitive component designed to measure both compression and extension, it should NEVER be twisted or permanent damage can occur, so only apply spanner force using the flat section closest to the side you are working on.

Use Loctite 243 or similar thread retainer on all shift rod components

The O Ring we supply for the upper rod end is fitted between the lever arm of the engine and the rod end to reduce vibration of the shift rod and take up the free play.



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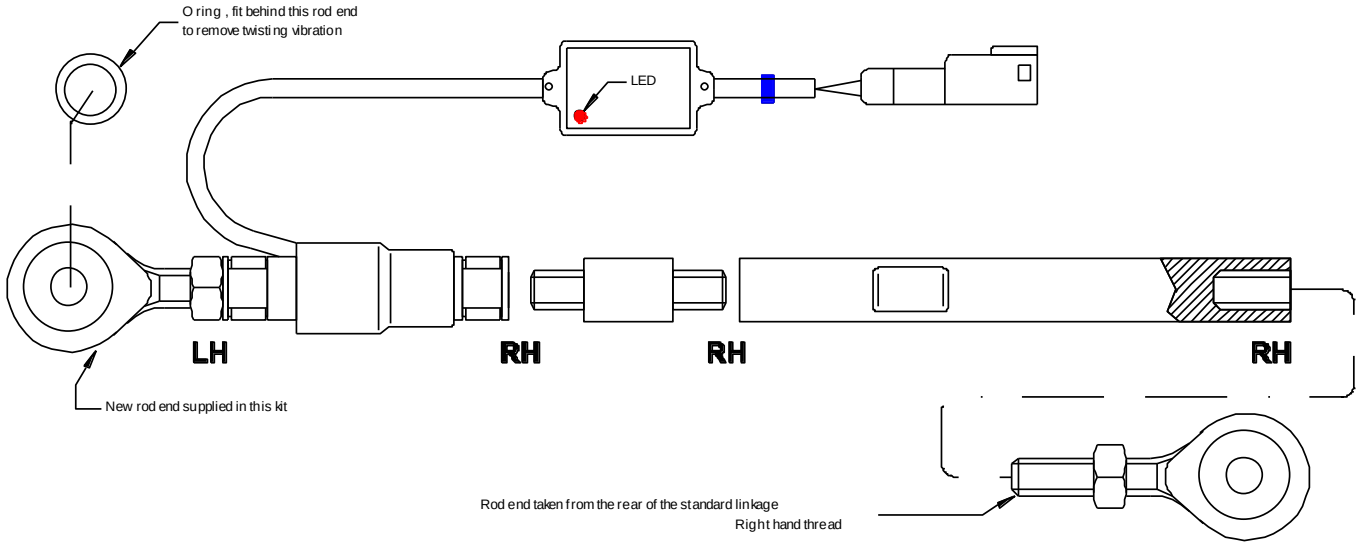
Shift sensor setup

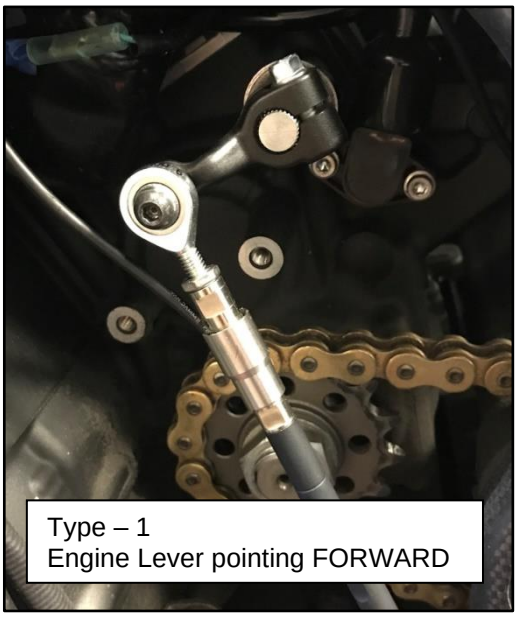
At ‘power ON’ the red LED on the sensor control box (see drawing below) will flash once to suit a ‘Type-1 setup, or twice to suit a Type-2 setup.

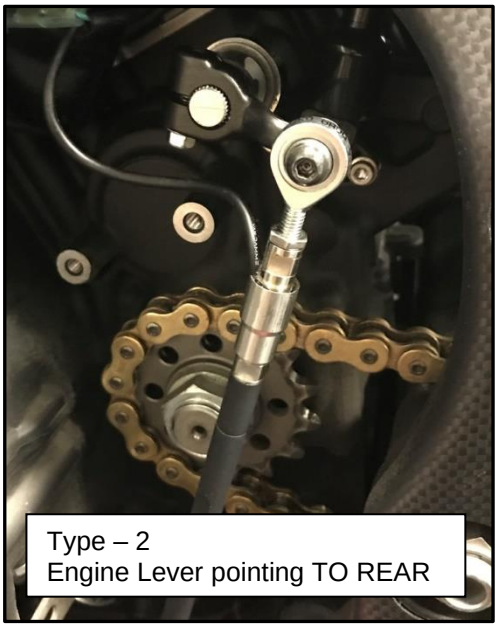
The user can easily swap between these modes via a ‘self-teaching’ process, see page 9

By default, all Blip Box are supplied pre-programmed as ‘Type-1’

Tuning of the load cell force can only be done within the Win Blip software using the dedicated USB cable.







Type 1 – Voltage reduces with PUSH force – The sensor LED blinks once at power ON
Type 2 – Voltage reduces with PULL force – The sensor LED blinks twice at power ON

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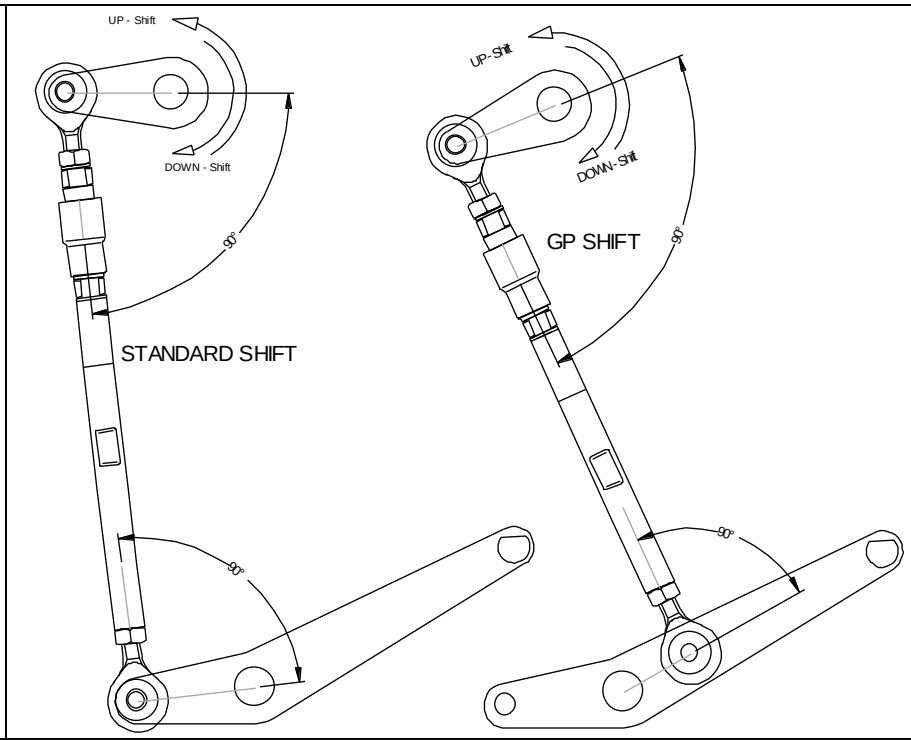
Yamaha – Shift sensor setup / Setup options

Type - 1

This is the standard shift layout with the engine shift lever pointing forwards. Can be used for Road shift and GP shift.

Program the shift sensor as Type – 1 (single LED flash on the shift sensor control box)

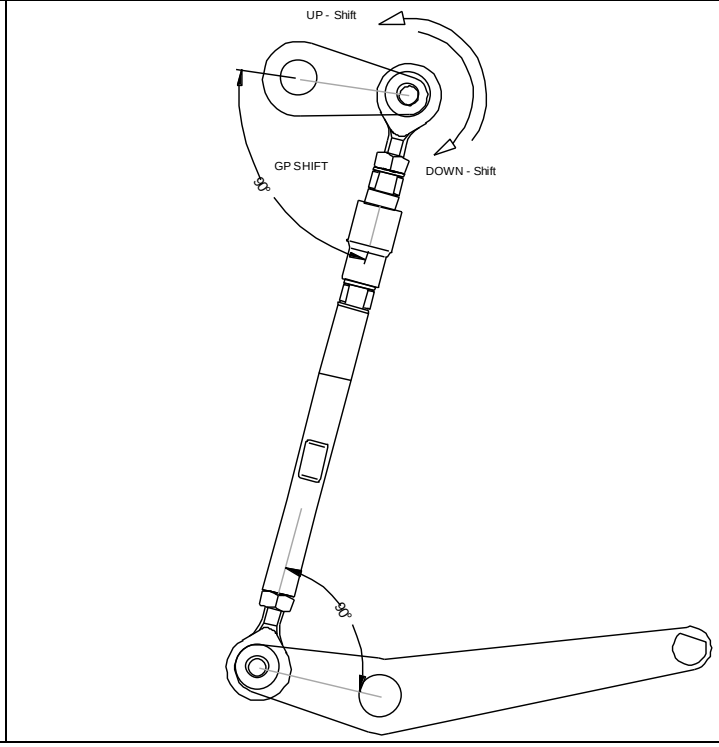


Type - 2

This layout is used by some GP shift levers and the engine lever is reversed backwards

This layout is used for GP shift and the engine lever is reversed backwards

Program the shift sensor as Type – 2 (Double LED flash on the shift sensor control box)



Tip : Always try to achieve 90deg angles between all linkage positions when ‘at rest’ this ensures an equal force measurement in both directions.

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Yamaha – Shift sensor setup / Changing the shifter from Type-1 to Type-2

Important note, the LED blink referred to in this document is the LED on the sensor box, not the Blip Box LED.

Changing from Type 1 – (Single LED blink) to Type 2 (double blink)

a. Turn **OFF** the bike, wait at least 2 minutes for full shut down of the bike and the blip box
b. Turn **ON** the ignition, you will see the LED blink once, then the LED will go off
c. Wait 3-4 seconds then **Press and HOLD** on the gear lever as if you were going into 1st gear, this may be up or down depending on your rear sets, but it must be the 1st direction. The LED will start to blink rapidly and you have about 10 seconds to complete the next process.
d. Release the foot pressure, and then count **6 more** rapid presses in the 1st gear direction, and **HOLD THE PRESSURE** on the 6th press.
e. The LED will go out for a few seconds and you will now be shown 2 x blink of the LED to show you are now in Type 2 mode – Voltage reducing with PULL. You can now release the pressure, re-programming is complete

Changing from Type 2 (double blink), to Type 1 (Single blink)

a. Turn OFF the bike, wait at least 2 minutes for full shut down of the bike and the blip box
b. Turn ON the ignition, you will see the LED blink twice, then LED will go off.
c. Wait 3-4 seconds then **Press and HOLD** on the gear lever as if you were going into 1st gear, this may be up or down depending on your rear sets, but it must be the 1st direction. The LED will start to blink rapidly and you have about 10 seconds to complete the next process.
d. Release the foot pressure, and then count **6 more** rapid presses in the 1st gear direction, and **HOLD THE PRESSURE** on the 6th press.
e. The LED will go out and you will now be shown 1 single blink of the LED to show you are now in Type 1 mode – Voltage reducing with PUSH. You can now release the pressure, re-programming is complete

Tip: If you did not get any 'LED blink' at power ON, you did not wait long enough for a full power shut down.

Tip: If you do not want to wait, just disconnect and re-connect the shift sensor

Suggested voltages for use with Blip Box and this new silver Cordona sensor.

Note that any Blip Box we supply with a silver Cordona load cell will already be pre-loaded with these values.

Yamaha R1	BLIP Threshold [mV]: 2850 ± 50 UpShift Threshold[mV]: 2150 ± 50
Yamaha R6	BLIP Threshold [mV]: 2900 ± 50 UpShift Threshold[mV]: 2100 ± 50
Yamaha MT10	BLIP Threshold [mV]: 2850 ± 50 UpShift Threshold[mV]: 2150 ± 50

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System 'power up' and first use.

IMPORTANT – When first plugged in (ignition switch OFF) you will see this sequence of LED events because the Blip Box module is getting power from the rear CAN connector but all bike systems such as the ECU are OFF.

1. LED is solid ON for 2 seconds to indicate power up
2. LED blinks twice to indicate a diagnostic state relating to the throttle grip. This is because the ECU is still OFF and the signals the Blip Box reads are invalid.
3. During this time the Blip Box is looking for CAN data from the ECU.
4. After 30 seconds of no CAN activity the Blip Box will automatically turn itself off and all LED activity will cease.
5. The system is now waiting for you to turn on the ignition in a normal way.

Normal Power on sequence if the bike has been switched OFF for at least 30 seconds. When you turn ON the ignition:

1. LED is solid ON for 2 seconds to indicate power up
2. LED blinks twice to indicate the start of self-calibration.
3. LED blinks 3 times for approximately 6-7 seconds (3 events of triple blink) , module is self-calibrating and is perfectly normal
4. LED turns off and will now only activate when the load cell threshold is reached for UP or DOWN shift, or there is a problem.

Normal Power on sequence if the bike has been switched OFF for less than 30 seconds. When you turn ON the ignition.

1. In this case the Blip Box module never actually turned off so there are no LED indicators or self-calibration

Normal ignition OFF sequence

1. First you will hear the main bike relay click off.
2. Blip Box will display a 2 x blink error code as the throttle grip signals go out of range when the ECU turns off.
3. The CAN data from the ECU also stops when you turn off the ignition so Blip Box goes to sleep after 30 seconds of no CAN activity.
4. At this point the LED diagnostic activity also stops.

Summary of activation conditions for the Blip to work normally.

- System not to be in a diagnostic state / bypass mode
- Load cell to have exceeded threashold Mv
- The inhibit time must have been exceeded since previous shift – Default is 0.20seconds
- The load cell must have returned to it's resting Mv before another blip can occur, remember to take your foot off the lever between shifts.
- Engine must be above minimum RPM
- Throttle grip must be lower than threshold (therefore closed)
- Rear wheel speed must be above minimum
- QS must be switched ON in your riding mode.
- Clutch switch must be out (clutch not pulled in). Note that the system is designed not to BLIP if the clutch is pulled in but due to the delay in Blip Box getting the clutch signal over the CAN bus it is very likely that users with a fast 'clutch / shift' action can beat the system and still get a blip even when using the clucth.

Summary of activation conditions : Up-Shift output

- System not to be in a diagnostic state / bypass mode
- Load cell to have exceeded the Mv threashold
- The load cell must have returned to it's resting Mv before another blip can occur, remember to take your foot off the lever between shifts.
- The inhibit time must have been exceeded – for up-shift

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System diagnostics - The red LED is also used as a 'blink code' to indicate potential problems with the system, wiring or sensors.

No LED at ignition switch ON	• Check CAN connection at rear of the bike • Inspect wiring • Disconnect other non-standard CAN devices and try again
LED on for 2 seconds at ignition switch ON, then light off	Normal operation
1 blink > short gap	Internal error – contact manufacturer
2 blinks > short gap	Throttle grip input(s) out of normal range: Grip signal IN 1 range is 0.72 > 4.11v Grip signal IN 2 range is 4.32 > 0.92v • Check grip connector • Check wiring • If wiring is all OK we suggest you plug the grip directly into the bike look and see if the same diagnostics are shown on the bike. Potentially a twist grip failure. **See power up notes on previous page.**
3 blinks > short gap	Throttle grip output is out of range Grip signal OUT 1 or 2 range is 0.4 > 4.5v • Check grip connector • Check wiring • If wiring is OK and there is no diagnostic for the Grip Inputs signals it suggest a damaged sensor • Note – This diagnostic is also used for the self-calibration at power ON and lasts approximately 20 seconds.
4 blinks > short gap	Battery voltage out of range 8.5v to 16.5v
5 blinks > short gap	Load cell error - If less than 1.5v or greater than 3.5v for longer than 1.2 seconds • In this diagnostic condition the Blip and Upshift is disabled until the sensor is back in range • Pin 1 is the 5v power from pin 7 of the Blip box • Check the signal (pin 2) is at 2.5v unloaded. • Pin 3 is ground from pin 11 of the Blip box • If all wiring checks out OK, replace the sensor
6 blinks > short gap	Load cell is out of normal range at power on. The normal value is 2.5v without any load and this diagnostic will trigger if the sensor is less than 2.0v or greater than 3.0v (at power on) • Pin 1 is the 5v power from pin 7 of the Blip box • Check the signal (pin 2) is at 2.5v unloaded. • Pin 3 is ground from pin 11 of the Blip box • If all wiring checks out OK, replace the sensor
7 blinks > short gap	More than 5% difference between IN and OUT voltages for input 1 • Possible twist grip damage • Possible 5v sensor supply problem • Possible module damage
8 blinks > short gap	More than 5% difference between IN and OUT voltages for input 2 • Possible twist grip damage • Possible 5v sensor supply problem • Possible module damage
9 blinks > short gap	BLIP has been disabled by the Quick Shifter being turned off at the dashboard

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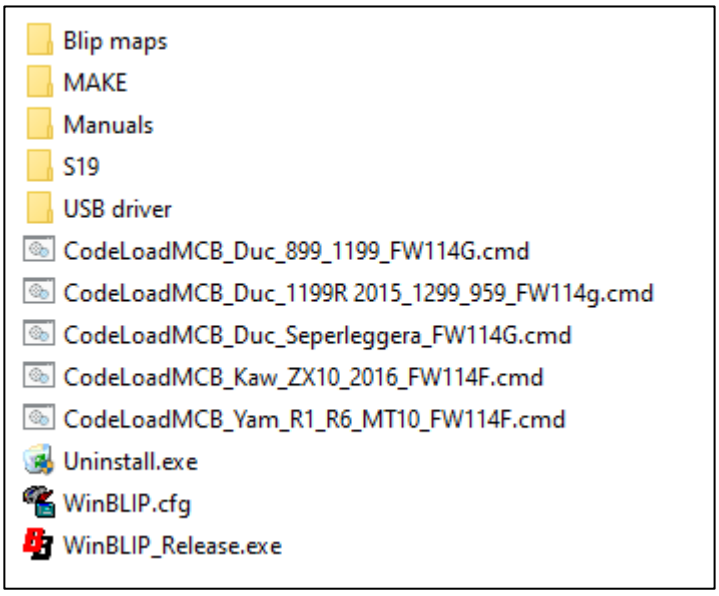
Download the software, drivers and PDF manuals at
www.cordona.net/manuals

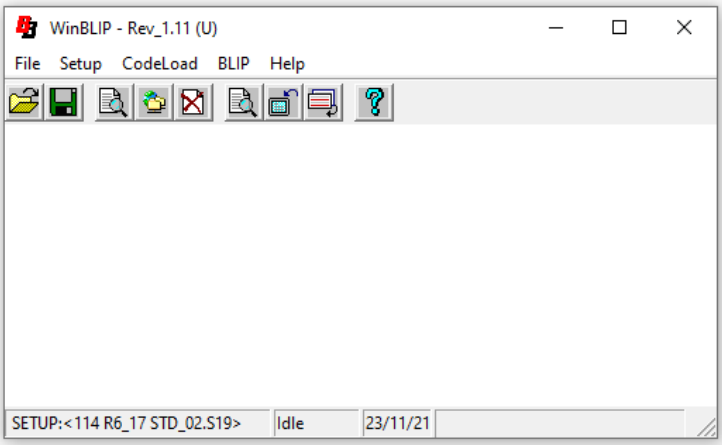
WinBLIP software – Installation

Download the Win Blip software at www.cordona.net/manuals

1. Double click your download selection and look at the lower left of your screen to see when the download is complete. You may have a waring then 'some downloads may harm your computer' just change this to Keep, not Discard.
2. Double click this **Win Blip 1.14_x** at the lower left to start the installation process.
3. You can choose to keep the default install folder or change to one you prefer.
4. When complete you will have a new folder on your PC containing the software, blip map library and the USB drivers for the PC cable BB-UCIF. There will also be Blip Box icon on your desktop.
5. From time to time there will be re-releases of the Blip map library, these can be downloaded separately from the web page given above.
6. Once installed you will find folders that look like this on your C drive. These contain
    a. Blip map library
    b. Firmware files
    c. Application software – Win Blip
    d. USB drivers



When you first run the Win Blip software it will look like this:



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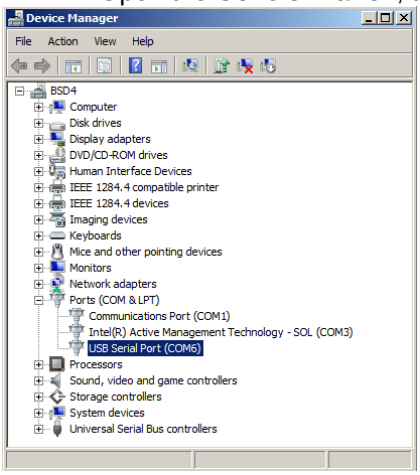
USB driver installation

1. PC operating systems from Windows 7 to Windows 10 are OK to use. If you have an older PC with XP then please Email us for specific drivers.
2. Do Not plug in the USB cable at this stage.
3. Download and install the latest software which includes USB drivers and install this at the default location.
    a. The USB drivers can be found in the USB Drivers folder of Win Blip
    b. Now look in that folder to find the file called **CDM21224_Setup.exe**
    c. Double click the exe file to run the new driver installation.
    d. Re-start your PC.
    e. Now plug in the USB adapter and wait for up to a minute (sometimes 2) for the drivers to install correctly.

4. Open the **Control Panel** , then look for the **System** icon , then **Device Manager** to view this window:

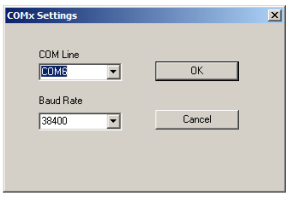


This icon shows that the USB adapter is installed and working.

Look at the COM number that has been allocated and make a note of this as it will be used in the WinBLIP software.

Note also that you may get a different COM number if using different USB ports on your PC, so try to use the same one each time.

5. Open WinBLIP and go to **Setup** / **COM settings** from the upper menu



It should look like this with the Baud Rate at 38400 and the COM line set to the one you noted in the Device manager.

If it does not, then use the pull down arrows to change things.

Then press **OK**

You should now have communication.

Notes:
In cases where there are still PC communication difficulties or Com Error, ensure you have used the default folder location for the software installation.

C:\Winblip\Blip Box….

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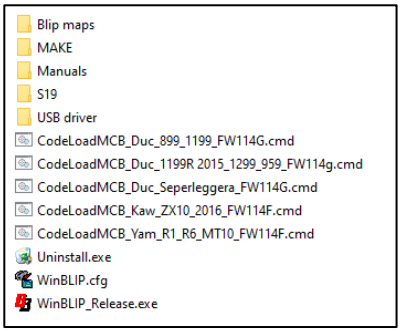
WinBLIP - Files

Blip box mapping files can be found in the Blip Maps folder as seen here.



Note that these maps are split up into two folders:

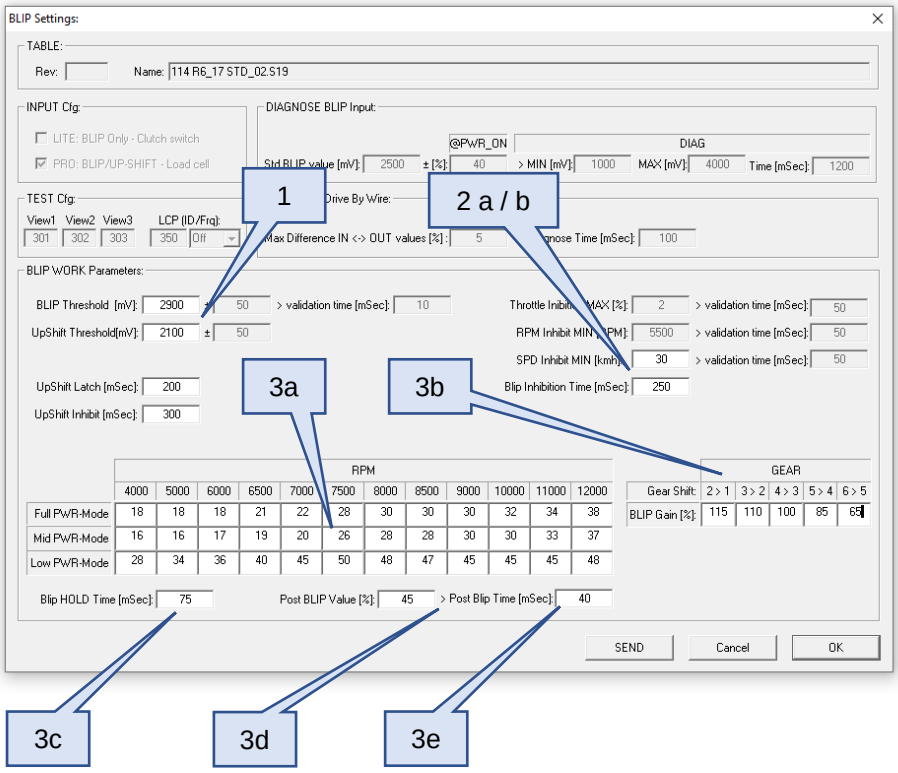
- RED shift sensor
- SILVER CORDONA shift sensor

Choose a map from the correct folder to suit the product you have

WinBLIP - Tuning

The system is supplied with multiple base files that are split into folders specific to each bike and shift sensor type.

From the File / Open menu locate the **Blip maps** folder and select the appropriate base file. In this example I have loaded the 1199 Pro file



1. These values control the activation threshold for the Load Cell
    a. Blip threshold Mv – above this the blip is triggered. Note the 50Mv hysteresis so it would be 2900 ON and 2850 OFF (example only)
    b. Up shift threshold Mv – below this the blip is triggered. Note the 50Mv hysteresis so it would be 2100 ON and 2050 OFF.
    c. The signals must also be above the threshold for longer than the 10mSec validation time.
    d. Zones that are ‘grey’ cannot be adjusted by the user.

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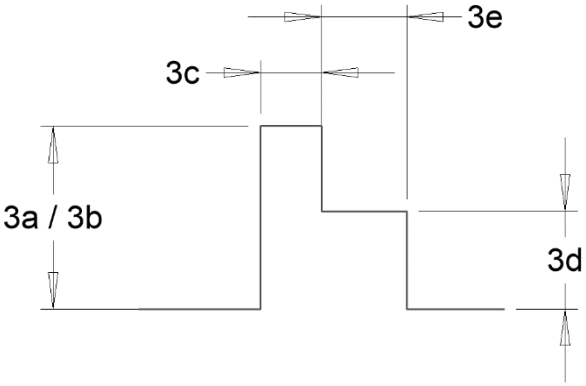
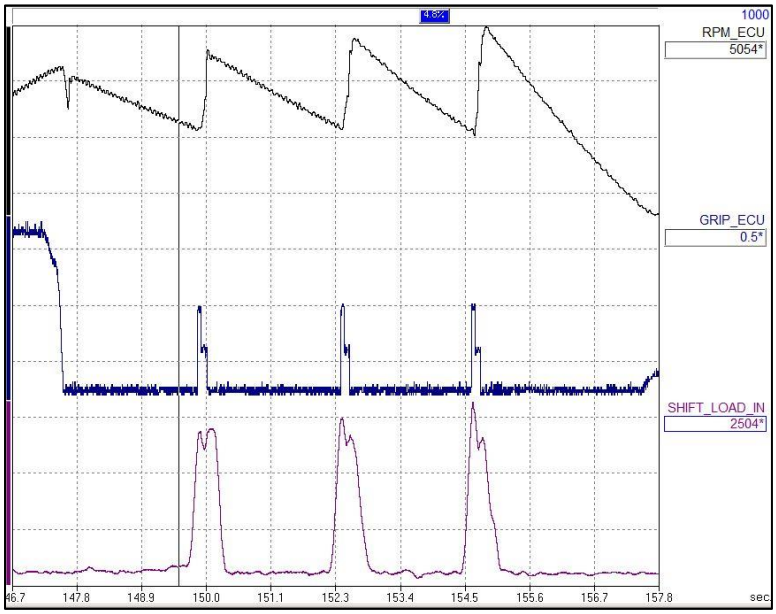
WinBLIP Tuning - *continued*

2. Blip inhibit settings.
    a. This is the minimum timer permitted between blips. (Note 250 = 0.25 seconds)
    b. Minimum speed to enable the 'blip', we suggest you do not use a lower value than this.

3. Blip settings. The BLIP values are in % of twist grip (not engine throttle) and as the relationship between the twist grip and the engine changes depending on which power mode and gear you are in, the settings are equally adjustable.
    a. There are 3 rows of BLIP values with the first column covering all RPMs up to 4000, the next up to 5000 etc.
    b. The 'Gear Shift BLIP gain' is a multiplier applied to the base BLIP values, This enables a higher blip value in lower gears. Example a Gain of 115 would multiple the BLIP value by 1.15 (15% extra)
    c. BLIP Hold – This is the primary BLIP duration and will be of a height equal to the BLIP value from the table x the BLIP GEAR Gain. The primary blip is short and fast to rapidly raise the engine RPM and disengage the gearbox pressure from braking to accelerating.
    d. There is then a 'post blip' with a height of **x** % of the primary blip
    e. Continuing on for **x** mSec . This keeps the RPM sufficiently high after the blip to match the RPM of the next gear selected.

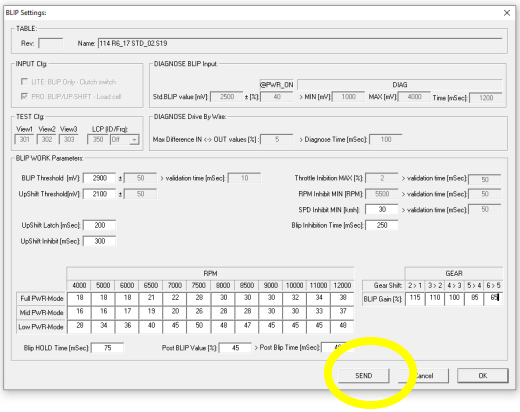
The image below shows the 2 stages of BLIP and the perfectly matched RPM values.





Send your changes to the module

1. Make sure the bike ignition is switched ON
2. Press the SEND button.
3. The BLIP Settings window will close and the main screen will show the status of the transmission and a bar graph at the lower edge.
4. You will get an OK message when finished.



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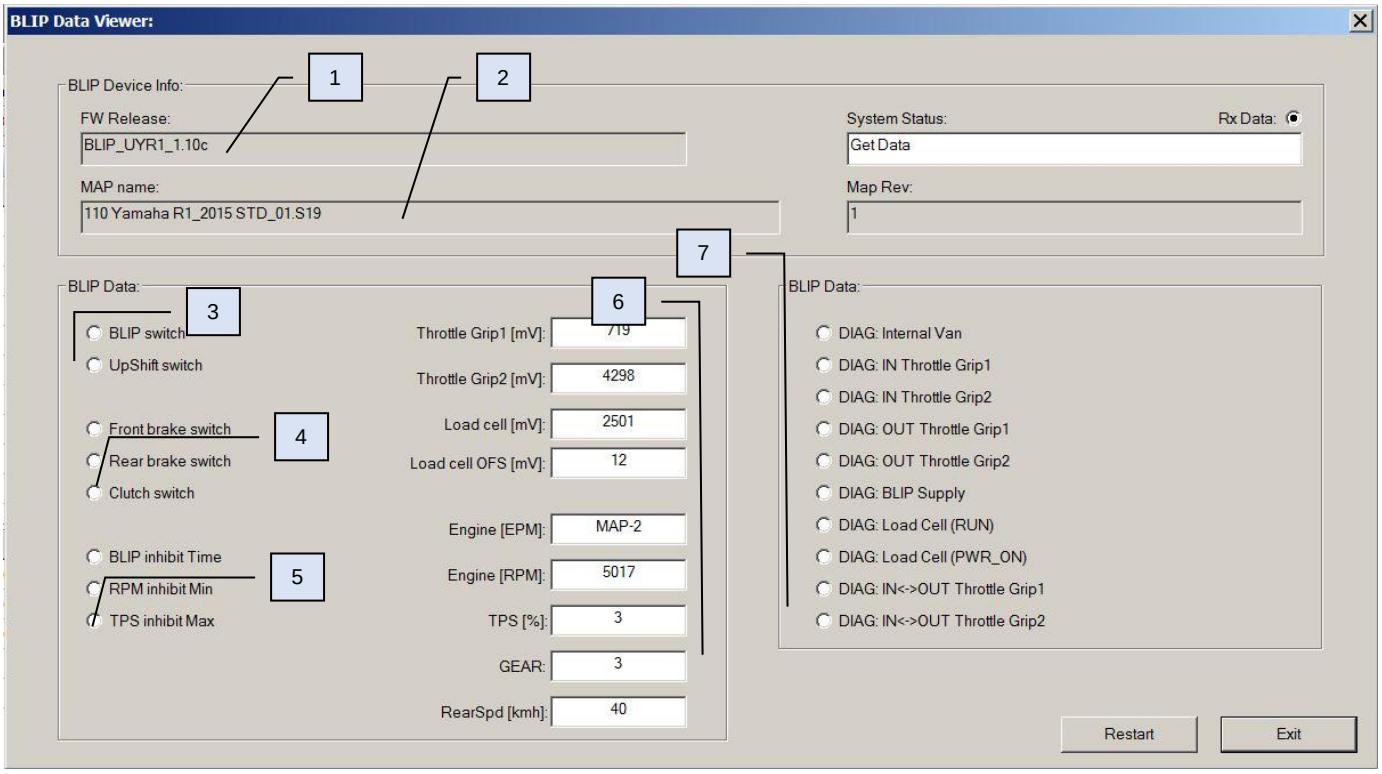
WinBLIP - View Data

From the upper menu select **BLIP** / **View data** to get the following live data screen.



1. Firmware version of the Blip Box module
2. File name currently loaded into the module
3. These icons will light up when the voltage thresholds are exceeded for UP and DOWN shift
4. These icons will light up if either the front or rear brake is applied, or the clutch (note that clutch icon will be active also if the bike is in neutral)
5. These icons will light up if the BLIP is currently inhibited by one or more reasons
6. Live data:
    a. Throttle grip 1 – Input Mv
    b. Throttle grip 2 – Input Mv
    c. Load cell – Mv
    d. Load cell offset (self calibration adjustment after power ON)
    e. Engine power mode 1 > 4
    f. Engine RPM
    g. TPS (Throttle grip %)
    h. GEAR (0 is neutral)
    i. Rear wheel speed in kmh
7. These icons will light up if one of the diagnostic (flashing LED) is active.
8. Restart – system re-start, not normally needed by the user. Used in case of power sleep mode and bench testing.

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WinBLIP - Firmware update / Changing the bike type

The software of Blip box can be considered as two levels.

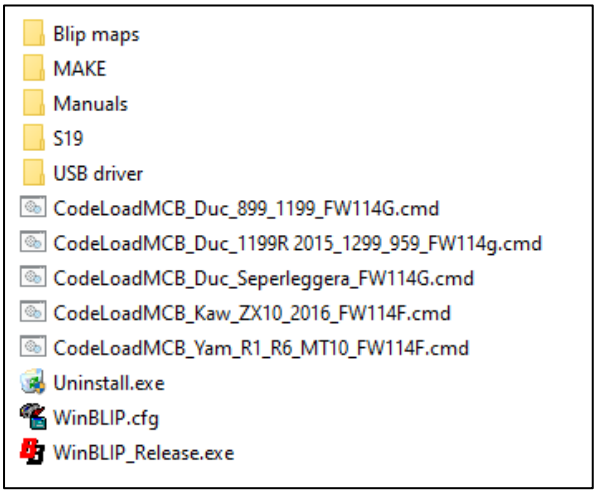
Level 1 is the firmware; this contain all of the software to make the box work and it also tells the Blip Box what type of bike it is connected to and how it should communicate with that bike. Loading the wrong firmware will of course stop the system working and may also create a diagnostic error on the bike.

Level 2 is the Blip mapping, this contains all of the tuning parameters

To change the firmware:

- Turn on the bike ignition
- Fom the upper menu select **Codeload / Run sequence** and browse for the files you see in the image below with a .cmd suffix
- Double click this file and the load procedure will begin and start to count up to approx, 3600. This completes the firmware update.
- IMPORTANT : Do not play with other things on your PC during the process, or interrupt the power supply.
- IMPORTANT : You have now loaded the firmware, remember to load an appropriate Blip map.

This image is an example and may be subject to change.



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This system is intended for off-highway performance use only. It is not certified for use ‘on the road’

Application : Yamaha R1 2015 to 2017

Components	**Item No.**	**Qty**
Blip Box control module	800 BB	1
Main wiring loom	BDW1608_02	1
Shift load cell – Cordona 500Nm (female) threads	401SBK L500	1
M6 RH/LH thread nut and stud kit		1
Aluminium shift rod – 150mm (RH/LH threads)	168	1

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PRECISION BLIPBOX

Cordona Precision Technology AB

www.cordona.net

Download the software, drivers and PDF manuals at
www.cordona.net/manuals

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