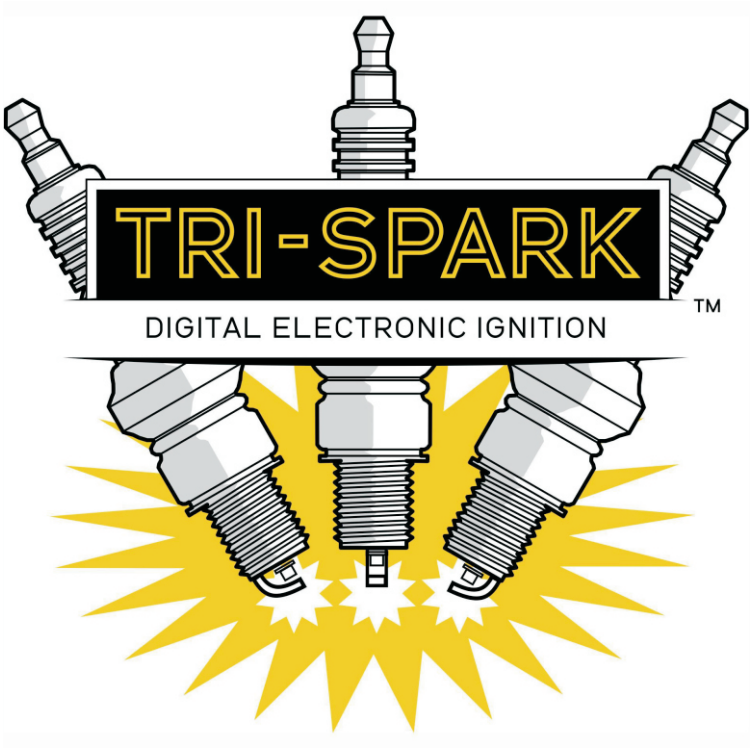


Fire Box Pro
PC Software
User Guide

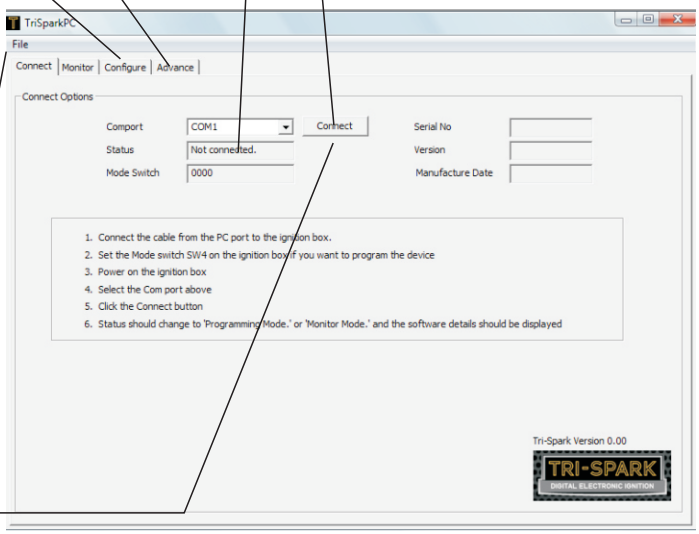
Preliminary release Nov 2014

Basic Steps required to modify the saved configuration in the FireBox Pro (box)

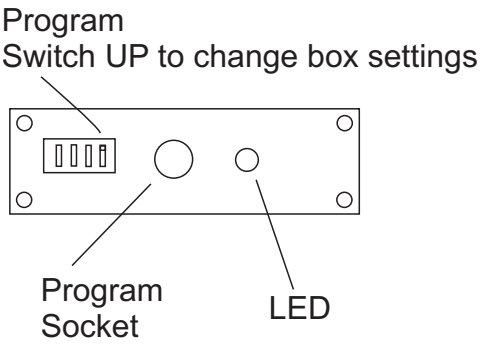
1. Power OFF the box
2. Connect the cable From PC to the box
3. Launch the Tri-Spark program on the PC
4. Switch the box to program Mode (Prog Switch to UP)
5. Power ON the box

6. Click on “Connect”
   Status should change to
   “Program Mode”
7. Click on one of the tabs
   “Advance” to change the advance curve
   “Configure” to change the rev limit

8. Make the changes to settings



9. Click on “File”
10. Click Option “Save to Box”
11. Click “Disconnect”
12. Power OFF Box, disconnect cable,
13. Return the program switch DOWN for Normal operation
13. Power ON the box - it should now be running the new settings



Changing the operational settings on the “Configure” screen

1. Start by connecting to the box - follow the instruction on page 1

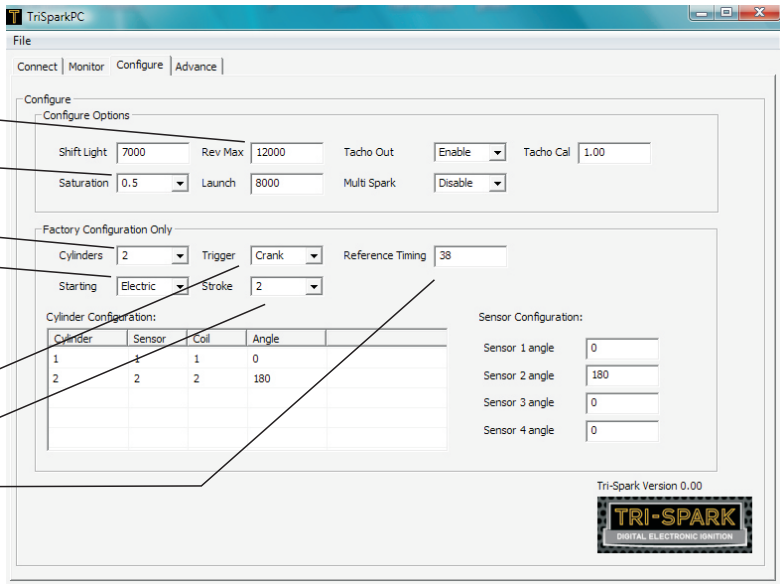
Note: some of the options on this screen are not implemented and will not alter the operation of the system. Only the options mentioned here are functional.

2. Set the coil “Saturation”. choose an option from the list - do no type in a value
   For most coils we will recommend a value - the wrong value here can damage the Box or the coils or both. Ask if you are not certain

3. Set the rev limit “Rev Max” - the spark will cut out momentarily if this RPM is reached

4. select “Starting” Electric or Kick. “Electric” will disable the first spark to allow the starter time to spin up the motor.

5. Select the number of “Cylinders” from the list of options



6. Select the “Stroke” 2 or 4 stroke as appropriate for the engine

7. Select the “Trigger” Crank or Cam corresponding to the trigger sensor location

8. Select “Reference Timing” Use the full advance crank angle figure BTDC to suit your engine. A typical figure would be 35 and the units are degrees. This number is used by the system to compute all advance curve values. It MUST be set to a higher number than any values entered on the advance curve.

   It is required that the trigger sensor 1 be installed and the magnetic rotor aligned so that it triggers the LED at the “Reference Timing” crank angle. All spark events will occur AFTER this position eg. as the piston moves closer to TDC.

   In other words all spark events are retarded or delayed from the “Reference Timing” crank angle.

9. Click on the ”File” menu and select “Save to Box”

Setting up the Advance Curve on the "Advance" screen

1. Start by connecting to the box - follow the instructions on page 1

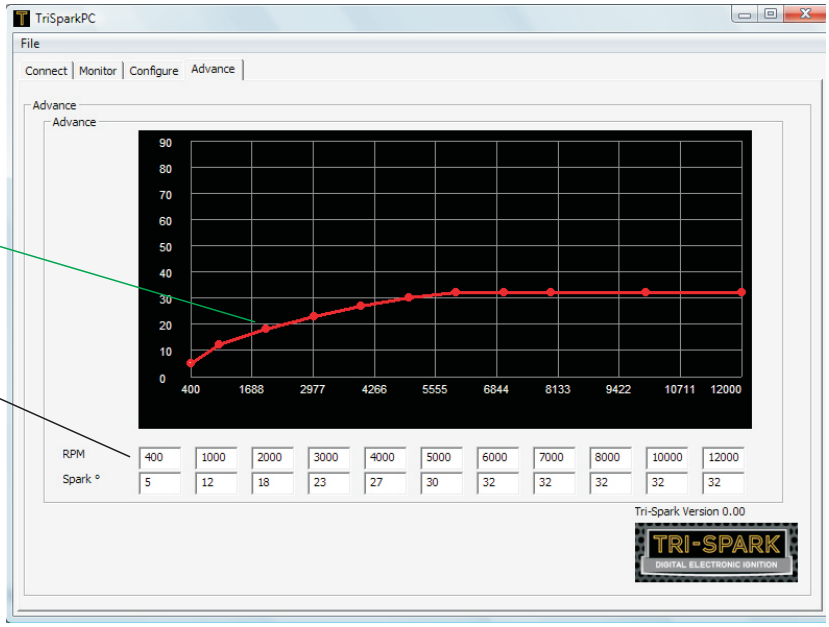
Note: Before adjusting the advance curve you must enter the "Reference Timing" on the configure screen. Refer to page 3 for this instruction.

2. Begin by moving all the advance curve points below the "Reference Timing" value. You can move the points by clicking on the red dots with your mouse and dragging them. Alternatively you can enter the advance curve values into the boxes below the graph.

To Adjust the advance curve

click on the red dots and drag them

OR enter the values into the boxes



3. If you find that you have more points than you need on the curve, move the unused points to a higher RPM value than the engine can ever reach - for example 15000 RPM.

Note: the y axis is in degrees relative to the crank position and the Reference Timing.

It is important to note that the advance degrees are scaled either to the cam or crankshaft depending on where the trigger rotor and sensors are installed in the engine.

Example 1: Crank fitted trigger - degrees on this graph are crankshaft degrees BTDC

Example 2: Cam fitted trigger - degrees on this graph will be scaled to the cam. You may use the full advance crank degrees figure for reference but the advance retard range must be reduced by half to account for the slower rotation of the cam as the crank turns twice for one rotation of the cam. This is further explained with examples later in the instructions.

4. When the advance curve is complete - click on the "File" menu and select "Save to Box"

More about the settings on the "Configure" screen

What is coil "Saturation" and why is it important?

Coil "Saturation" is essentially the length of time that the ignition coil is switched on for before the spark event. The options available are 0.5 to 10 milliseconds (thousandths of seconds) to suit a wide range of ignition coils. We recommend 8 mS for coils like our Tri-Spark IGC-1012 coils. Coils with lower primary resistance require a shorter saturation time.

Coil type	Part Number	Primary resistance	recommended Saturation
Long Dwell	Various	5.0 Ohms	10.0 mS
Long Dwell	ICG-1012	3.5 Ohms	8.0 mS
Mid Dwell	IGC-1006	1.8 Ohms	5.0 mS
Short Dwell	Various	0.8 to 1.2 Ohms	3.0 mS

Warning: Coils with lower than 0.8 Ohms primary resistance are not compatible and must not be used. Damage to the Box will result.

Warning: Damage to the coils and the ignition system will result from operation with an incorrect saturation value; specifically selecting values higher than 3.0 mS for short dwell coils. Overheating in the coils will result causing them to burn up and fail. The ignition box could also be damaged if for example 8mS is selected for short dwell coils.

Additionally, misfiring can result from an excessively low value of Saturation. For example setting up Long dwell coils with 3mS saturation would probably result in misfiring.

There is a figure that suits a particular coil as detailed above. Trying to tune this will not improve the operation - stick with the figures that we provide for a particular type of coil.

Example 1: Advance Curve setting for a Crank Triggered 4 Stroke Engine

Note : The Following example takes you through the set up for a Honda Cb750 or similar with Crank Triggering of the ignition, 35 degree BTDC full advance timing and a 20 degree range of advance retard.

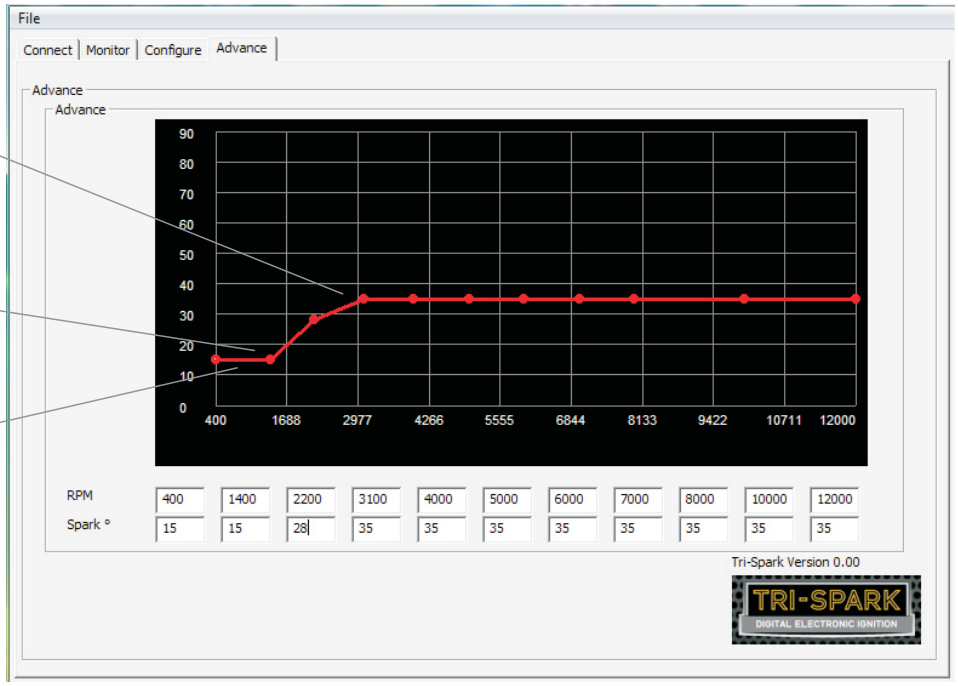
1. Following the curve adjustment sequence on page x and begin by entering the “Reference Timing” of 35 on the configure screen. Refer to page 3 for this instruction.

2. Begin by moving all the advance curve points below the ”Reference Timing” value. You can move the points by clicking on the red dots with your mouse and dragging them. Alternatively you can enter the advance curve values into the boxes below the graph.

Full Advance reached at 3100 RPM

Timing Commences Advancing at 1400 RPM

Timing is constant below 1400 RPM in the idle zone



Fine tuning would involve small changes to the first 5 points on the curve in most cases.

The idle setting at 1400 RPM could be lowered to 1100 if the engine idled reliably below 1000 RPM for example.

Additional idle stability might be possible by moving the lowest point at 400 RPM up to 17 degrees BTDC.

The third or fourth points could be lowered a few degrees if spark knock was experienced in either of these ranges.

Raising any of the points above 35 is not possible because 35 is the “Reference Timing”.

Example 2: Advance Curve setting for a Cam Triggered 4 Stroke Engine

Note : The Following example takes you through the set up for a Norton Commando or similar with Cam Triggering of the ignition, 30 degree BTDC full advance timing and a 12 degree range of advance retard.

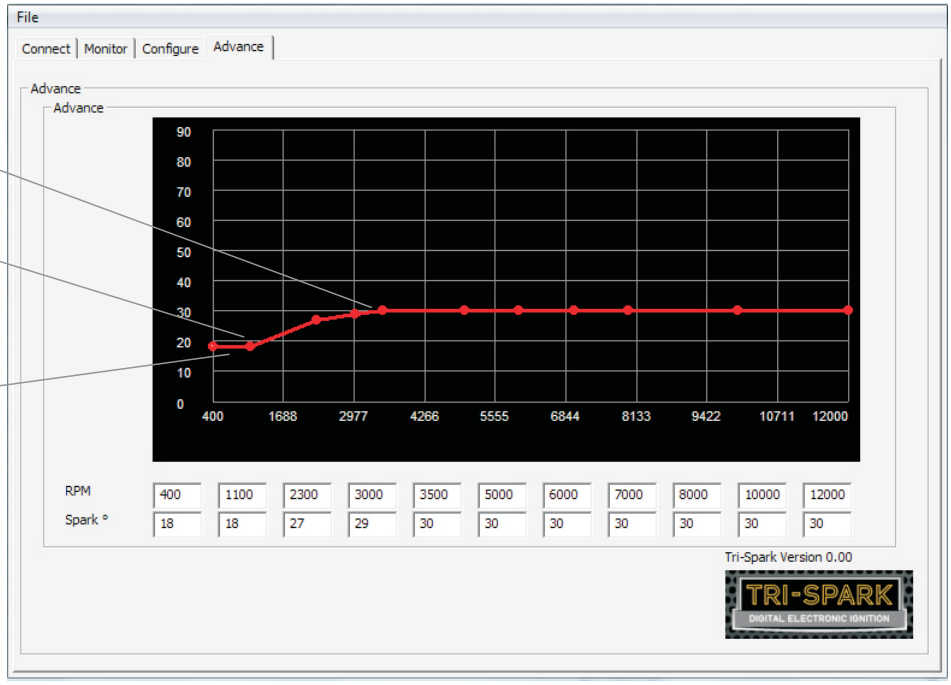
1. Following the curve adjustment sequence on page x and begin by entering the “Reference Timing” of 30 on the configure screen. Refer to page 3 for this instruction.

2. Begin by moving all the advance curve points below the ”Reference Timing” value. You can move the points by clicking on the red dots with your mouse and dragging them. Alternatively you can enter the advance curve values into the boxes below the graph.

Full Advance reached at 3500 RPM

Timing Commences Advancing at 1100 RPM

Timing is constant below 1100 RPM in the idle zone



Fine tuning would involve small changes to the first 5 points on the curve in most cases.

The idle setting at 1100 RPM could be lowered to 1000 if the engine idled reliably below 1000 RPM for example.

Additional idle stability might be possible by moving the lowest point at 400 RPM up to 19 degrees BTDC. Timing below 400 is the same as at 400 RPM.

The third or fourth points could be lowered a few degrees if spark knock was experienced in either of these ranges.

Raising any of the points above 30 is not possible because 30 is the “Reference Timing”.

Important: This graph shows the advance retard action referenced at the camshaft. At the crank the advance range is doubled because the crank turns twice as fast as the cam (for example a 12 degree advance retard range at the cam = 24 degrees at the crank).

In this example the full advance timing at the crank is timed to 30 degrees BTDC but the idle timing will be retarded double what is shown on this graph when measured at the crank. (actual timing at idle measured at the crank will be 6 degrees BTDC in this example)