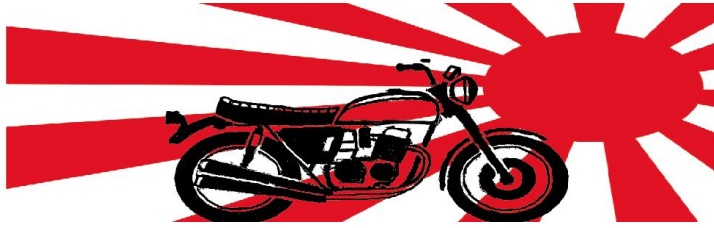


V1.3 VF TAI Ignition Module

Installation Manual

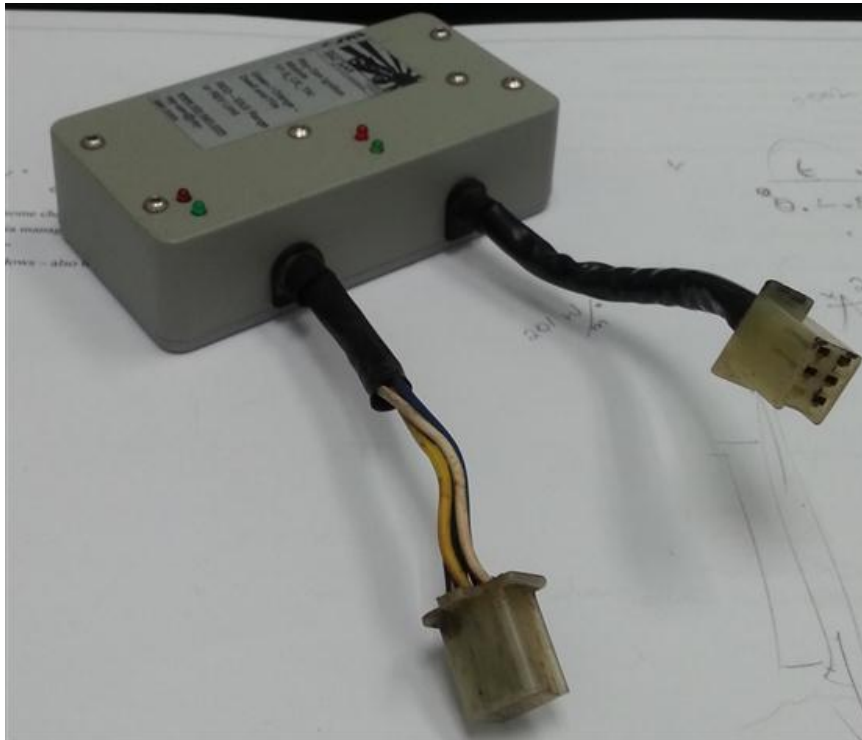
Ray-San
8/12/2015



Ray-San Ignition Module V1.3 VF_TAI

Congratulations on your purchase of a new ignition module for your VF motorcycle.

Your Kit should look similar to the picture below for the Cased 6pin + 6pin version.



The Cased 6 pin + 4 pin version will look the same except one connector will be a 4 pin connector rather than a 6 and they will both be male plugs rather than female.

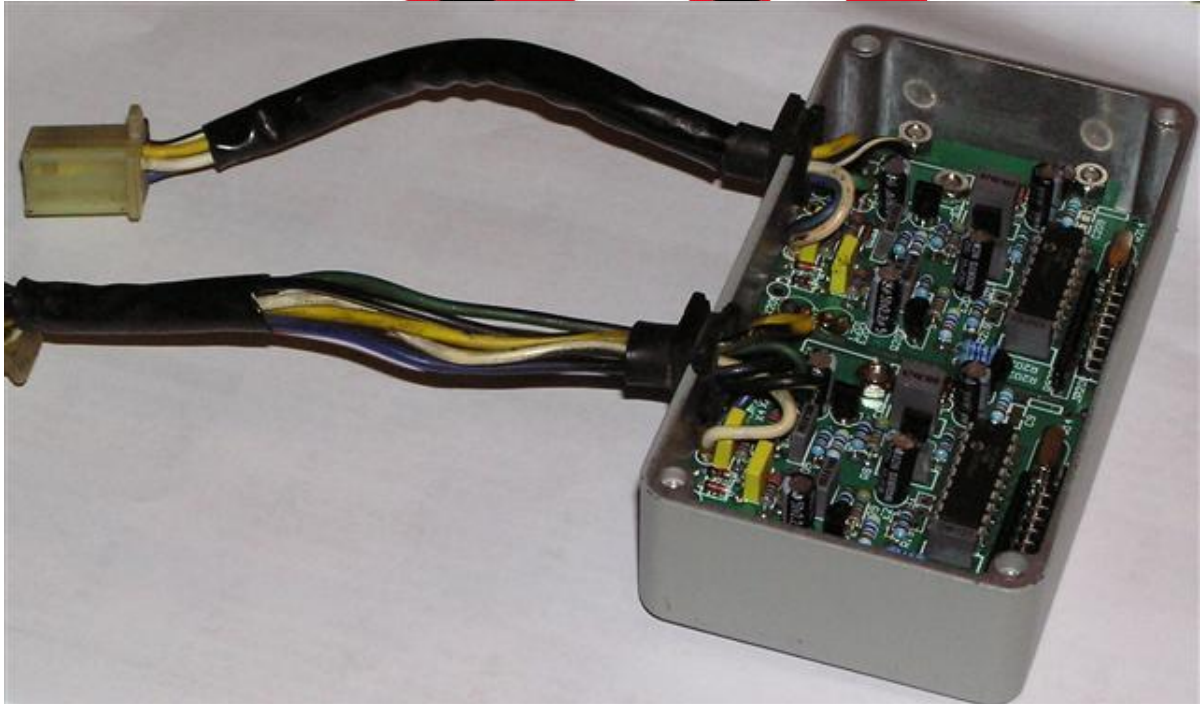
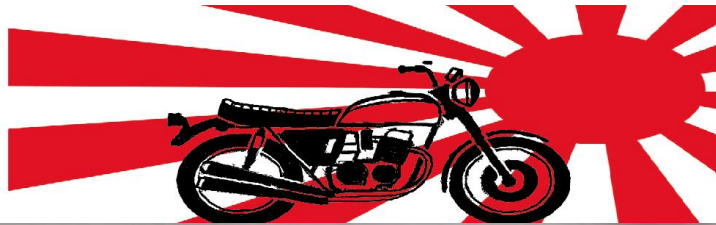
You may also have an extender cable if required for your bike if the two ignition modules are not located close together.

If you ordered an Uncased module it will look like the picture below and again may have 2 6 pin, a 6 pin and a 4 pin connector or no connectors fitted at all depending on what was ordered.

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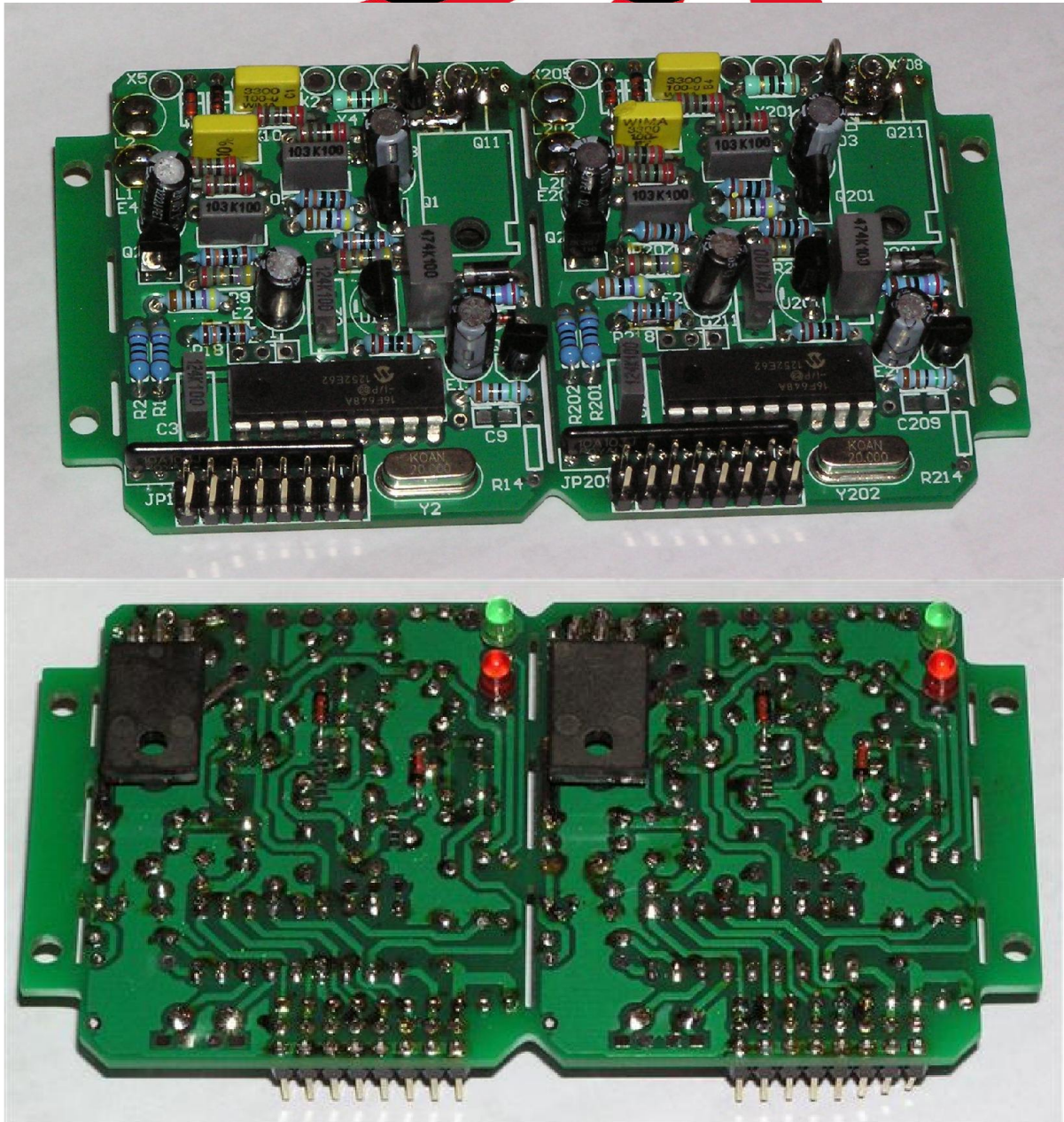
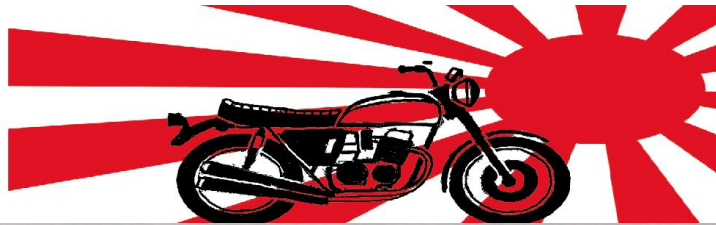
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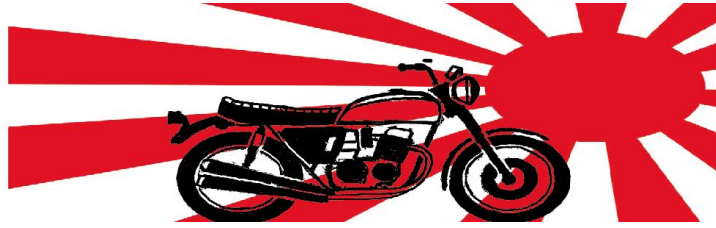
This module is intended to provide you with a replacement to the original Honda ignition system that was fitted from the factory.

Depending upon the model of bike there might be a two modules the same

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Or two of different sizes located together

Or two of different sizes located in different locations

Or even a single box with two connectors.

Nothing like uniformity.

Your new Ray-San Ignition module uses the existing same trigger pulsers on the crankshaft under the Right Hand Side engine cover to generate pulses which tell the microcomputer where the cranks is and when it is time to fire the spark.

Regardless of the physical arrangement of the “spark boxes” the function is the same – as are the timing curves. The only different timing curve is that used on the VF400F and VF500F,S and C models. These have a base advance of 15 degrees rather than the 10 degrees used on the 750,1000 and 1100 engines.

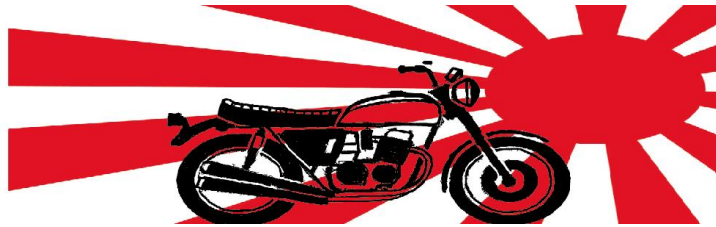
Your version 1.1 Ray-San module provides the following features

- Operates of 12V only.
- Provides electronically adjusted advance
- Provides ability to choose from 4 standard advance profiles
- Provides adjustable curves to work with the 700 and 750/1000/1100s in one module.
- Provides adjustability of the profiles via reprogramming – 64 point adjustability for complex “racing” curves.
- Provides adjustable Rev limiter to protect your engine
- Fully electronic
- Contains two completely independent circuits – one for each cylinder to provide failsafe redundancy.
- Start Assist option – extra delay to the spark fire during cranking to make starting easier and create less stress on the starter clutch.
- Provides power cut-out to protect ignition coils in the event off stalling.

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- Provides Higher spark energy than original due to lower output resistance.
- Software Upgradable to suit Coil On Plug (Stick Coils).

Modifications Required

This ignition module is designed as a drop in replacement into the existing wiring harness – no electrical changes are necessary.

It is designed to work with coils in the 2.5-5 ohm range and this covers the original coils as well as direct enhanced performance replacements.

Coil on Plug (COP) can be used as long as the total resistance of the two coils wired in series is around the 3 ohm mark – in this case the shorter dwell option should be used to avoid putting unnecessary strain on the bikes electrical system and to allow the COPs to run cooler.

While the new module has been made as a direct electrical replacement, it was not possible to completely do this physically due to the wide variety of mounting variants used by Honda in the various different models and years. Instead it was elected to make the module as small as reasonably possible but in a single case.

This allows it to be fitted into most bikes easily with only minor mounting modifications.

For those that wish to reuse the original boxes to maintain a 100% original appearance it is possible to order the board without a case and / or connectors and to fit the boards in. In this case the board is supplied as one unit but is able to be separated into two separate modules.

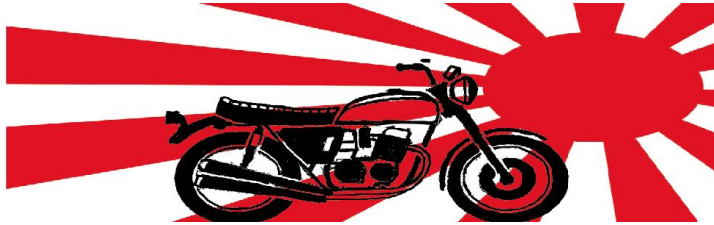
If all joiners are removed, the two boards will fit into the original 82 style VF boxes, if one side joiner is left on then the larger board will fit into the larger box, and the smaller into the smaller box.

Installation

Notes – two circuits are shown – one as the BASIC install which draws current straight from the switched power line (BLACK WIRE).

The new module operates like the original TAI system and draws the power from the 12V of the bike. The second circuit with the relay is an improved version, allowing the current to come straight from and return to the battery, with the relay being switched on when the bike ignition is on.

High Current and low current paths have been kept separate in the circuit board all the way back to the connector. From the Connector they should still run separately to the chassis and battery and power – do not be tempted to connect them at the connector and run a single wire as this will cause noise problems due to the high currents from the coils.



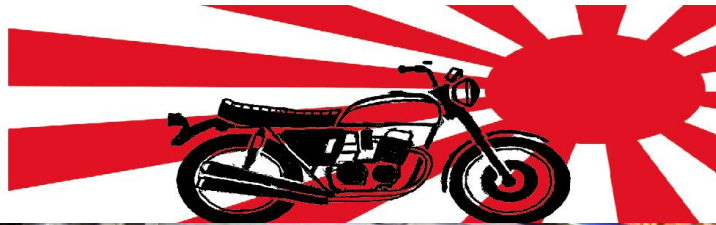
It is important to ground the Chassis Ground wire as well as the main power ground as this minimise noise pickup by the electronics and prevents misfiring.



Original configuration : this shows a large and small box as fitted to the 83 vf750f,s,c. The 82 (which this bike is) actually has two of the smaller boxes seen at the top of the picture – The larger box has the addition of a rev limiter which was not present on the 82 models.

In order to fit the single module version – I cut the mounting pillar and the two inner lips away with a cutting disk on a dremel to make a flat space as shown in the picture below. This allows the module to sit in place and the seat to fit.

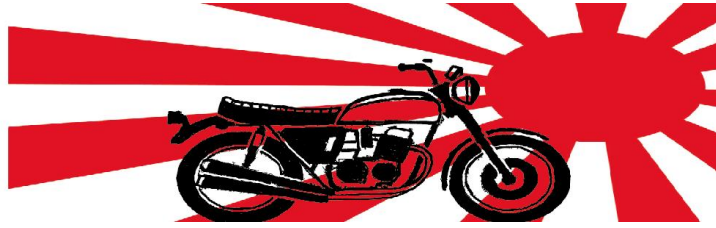
It can be secured in place with some Velcro tape or double sided tape as required.



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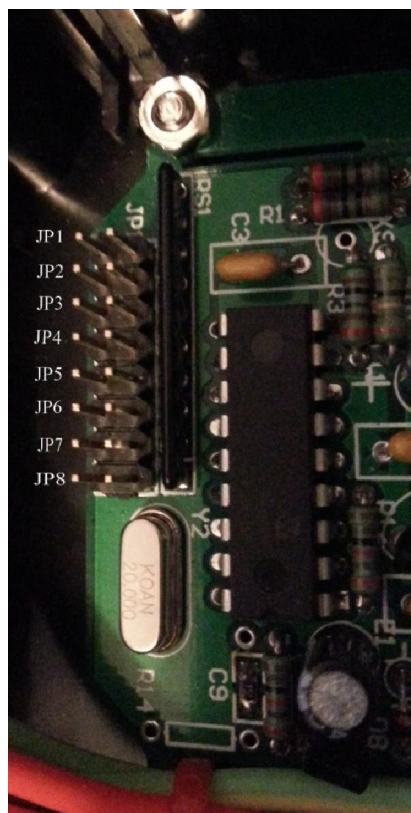


In the case where the original boxes are reused – then it should simply be a matter of taking the old boxes out, fitting the replacement boards and then placing the new refurbished boxes in to the same places the old ones were.

Jumper Settings

The Ray-San ignition Module contains several configuration jumpers grouped together into a header. This head also doubles as the programming interface. In order to perform programming an external PIC programmer must be used on the version 1.3 model. Required connections are available on request, as it is anticipated most uses will not require this.

The Configuration Jumpers are labelled in the picture below – there are two sets – one for each cylinder but only one is shown here as the other is identical.

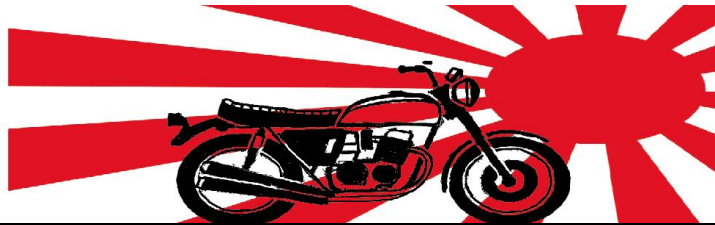


Jumper	Function	Comment
JP1 (1-2)	Power Pins for Programming	<u>DO NOT CONNECT JUMPER</u>
JP2 (3-4)	Ignition Curve Select A	See Table 2
JP3 (5-6)	Ignition Curve Select B	See Table 2

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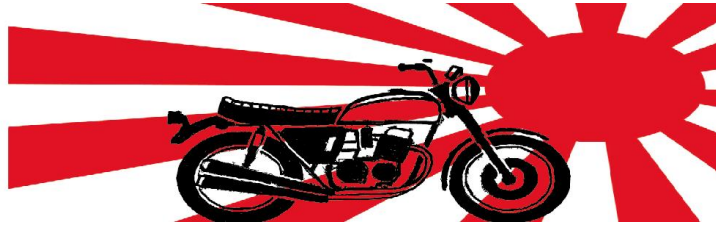
JP4(7-8)	RESERVED	-
JP5(9-10)	RESERVED	-
JP6(11-12)	START ASSIST	OFF Normal, ON Start Assist on
JP7(13-14)	REV LIMIT A	See Table 1
JP8(15-16)	REV LIMIT B	See Table 1

Table 1

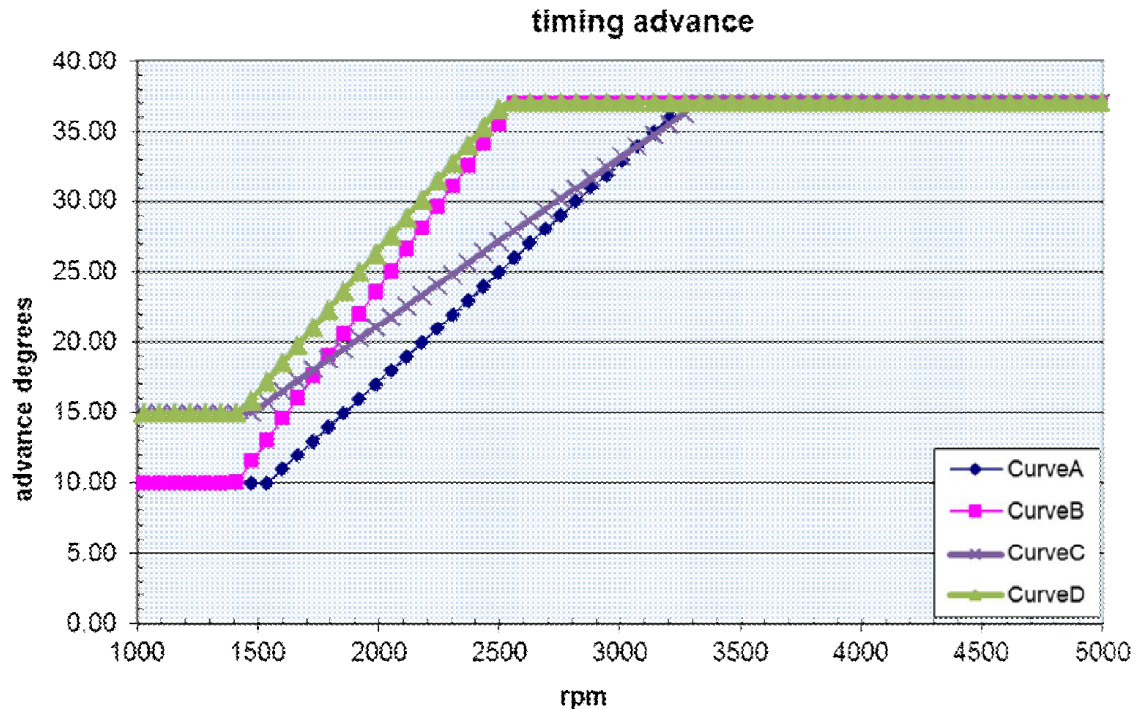
REV LIMIT RPM	JUMPER A	JUMPER B
10000	OFF	OFF
10500	ON	OFF
11000	OFF	ON
12000	ON	ON

Table 2

Timing Curve	JUMPER A	JUMPER B
A	OFF	OFF
B	ON	OFF
C	OFF	ON
D	ON	ON



Timing Curves



In general a start advance point of 1500rpm has been chosen as this is the specified point where the advance starts for nearly all of the bikes.

The end point has been chosen as 3500 as this represents the middle ground between the models – some specify 3300 some up to 3800. 3500 is central value.

Curve A (10 degree start @ 1560 – 37 degree finish @ 3300)

This is the stock curve for all Gen1 Sabres, magnas and Interceptors. 750 and 1000,1100 cc.

Curve B (10 degree start @ 1400 – 37 degree finish @ 2550)

This is the economy curve – its designed to give extra advance a bit sooner so that at cruise speeds above 2500 rpm, full advance is run. This can result in a slight improvement in fuel economy.

Curve C (15 degree start @ 1480 – 37 degree finish @ 3300)

Stock curve but slightly earlier start to the advance –for 700 cc

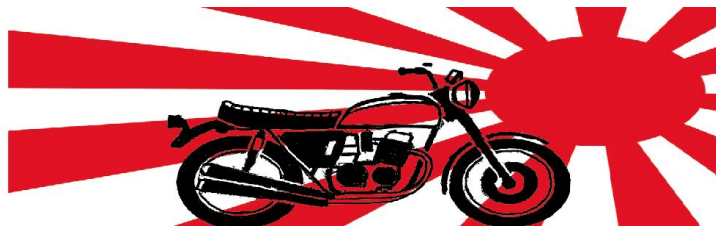
Curve D (15 degree start @ 1430 – 37 degree finish @ 2500)

This is the economy curve – its designed to give extra advance a bit sooner so that at cruise

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speeds above 2500 rpm, full advance is run. This can result in a slight improvement in fuel economy. – For 700 cc.

Jumper Settings

The default settings are tabled below, however if your ignition was ordered with a specific bike model specified in the order – your ignition will be supplied configured to suit with the jumpers already fitted.

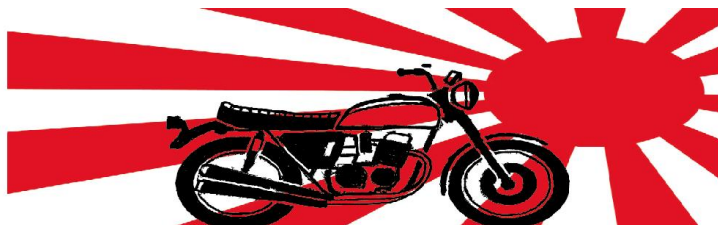
Jumper	Function	Comment
JP1 (1-2)	Power Pins for Programming	<u>DO NOT CONNECT JUMPER</u>
JP2 (3-4)	Ignition Curve Select A	See Table 2
JP3 (5-6)	Ignition Curve Select B	See Table 2
JP4(7-8)	RESERVED	-
JP5(9-10)	RESERVED	-
JP6(11-12)	START ASSIST	OFF Normal, ON Start Assist on
JP7(13-14)	REV LIMIT A	See Table 1
JP8(15-16)	REV LIMIT B	See Table 1

Factory Original Settings

There are a large number of VF variants with some variation in timings – the factory specified timings are in the table below.

Some of the VFs and VFRs use a 6pin + 4 pin + 2pin + 1 pin connectors: the one pin connector is a tacho output and the two pin connector is a cam trigger that tells the ignition which one is the compression stroke and which the exhaust stroke – as in these bikes there are 4 separate ignition coils rather than two using a wasted spark system. It is not possible to convert these bikes to use the standard 6+4 setup, as Honda changed to a to a 180degree crank and a result needed to change to 4 coils as none of the firing times coincide and as wasted spark setup is not possible.

Model Name		Model nos	Idle RPM	Base Adv Value	@ RPM	Final Adv value	@ RPM	No of boxes and locations	Connectors	Rev Limit
VF 750S	RC07	82-83		10	1000	37	3300	2 –tail	6pin + 6pin	10,000
VF750C	RC07	82-84		10	1000		3300	2 - tail	6pin + 6pin	10,000
VF700S	RC22	84-85		15	1200	37	3500	2 – tail	6pin + 6pin	10,500
VF700C	RC21	85-86		15	1200	37	3500	Single	6pin + 4 pin	10,500
VF750C	RC21	85-86		15	1000	37	3500			10,000
VF700C	RC28	87-88		15	1200	40	3500	Single	6pin + 4pin	
VF750C (SuperMagna)		87-88		15	1000	40	3500	Single	6pin + 4pin	
VF750F	RC15	All		10	1000	37	3300	2 – tail	6pin +6pin	
VF700F	RC23	84-85		15	1200	37	3300	2 - tail	6pin +6pin	
VF1100S	SC17	All		10	1000	37	3800	2-tail	6pin + 6pin	
VF1100C	SC12	All		10	1000	37	3800	2-tail	6pin + 6pin	
VF1000F	SC15	84		10	<1500	37	3800(3300)	2 –tail	6pin +6pin	
VF1000R	SC16	85-86		10	<1800	37		Single – tail	6pin +4pin	10,500
	SC20									10,500
VF500C	PC13	??-??		15	1300	30		2 - side	6pin+6pin	??
VF500F	PC12	84-85		15		30				12,000
VF500		86		10		25				



VF400F	NC13	82-85								11,500
VFR400R	NC21	86-87							180 Crank Not Suited	11,500
VFR400R	NC24	87-88							180 Crank Not Suited	
VFR400R	NC30	89-93 E type F,G			diff pulser			Single - tail	360 Crank 6pin+4pin	14,500
RVF400R	NC35	94-96							360 Crank	
VFR700/750	RC26 RC24	86-89 88-89		15	<1800	37	3300	Single –tail	180 Crank Not Suited	
VFR750R	RC30	87-89							360 Crank	
VFR700/750	RC36	90-96		15	<1800	37	3300	Single –tail	180 crank Not Suited	

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Operation

In operation there should be nothing to do – the module should behave similarly to the original ignition.

The GREEN Led will flash to indicate the trigger interval from the pulser.

The RED led will flash to indicate when the ignition coil is being charged (the dwell interval) so it should flash during cranking and slow speed running.

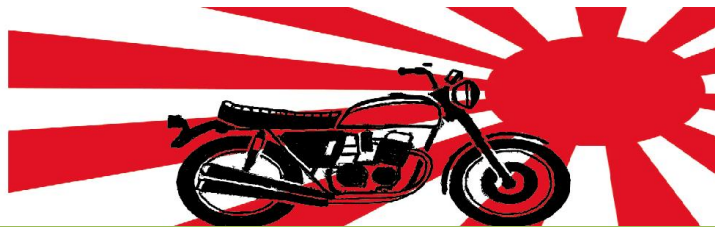
The dwell time is set to normally 4 - 5 mS which is safe for most coils around the 2.5 – 5 ohm range.

Note that residual fuel might be ignited in the cylinder occasionally if the air fuel mix is right when the unit is turned on or off by the ignition due to charging/discharging of the coil due to the power up.

Add photos for wire colour / labelling of connections

6 PIN and 6 PIN

BOARD	Connector	Function	Colour	Connector Pin	Connector
1	X	Pickup Sense 1-3	Yellow	1	6 PIN A
1	X	Pickup Return 1-3	White/Yellow	2	6 PIN A
1	X	POWER	Black/White	3	6 PIN A
1	X	POWER GROUND	Green	4	6 PIN A
1	X	OUTPUT 1-3	Yellow	5	6 PIN A
1	X	OUTPUT GROUND 1-3	Green		6PIN A
1	NONE	NONE	NONE	6	6 PIN A
2	X20	Pickup Sense 2-4	Blue	1	6 PIN B
2	X20	Pickup Return 2-4	White/Blue	2	



2	X20	POWER	Black/White	3	6 PIN B
2	X20	POWER GROUND	Green	4	6 PIN B
2	X20	OUTPUT 2-4	Blue	5	6 PIN B
2	X20	OUTPUT GROUND 2-4	Green		6 PIN B

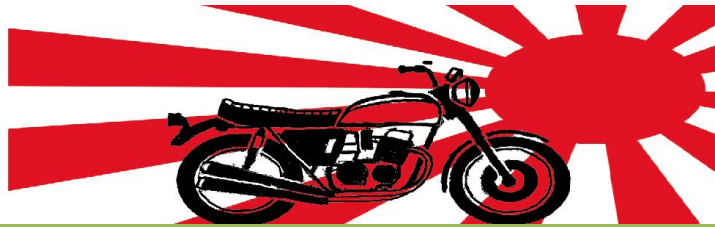
6 PIN and 4 PIN

BOARD	Connector	Function	Colour	Connector Pin	Connector
1	X	POWER A	Black/White	1	6 PIN A
1	X	POWER GROUND A	Green	2	6 PIN A
1	X	POWER B	Black/White	3	6 PIN A
1	X	POWER GROUND B Ground	Green	4	6 PIN A
1	X	OUTPUTA	Yellow	5	6 PIN A
1	X	OUTPUT GROUND A	Green		6PIN A
1	X	OUTPUTB	Blue		
1	X	OUTPUT GROUND B	Green		
2	X20	Pickup Sense 1-3	Yellow	1	4 PIN B
2	X20	Pickup Return 1-3	White/Yellow	2	4 PIN B

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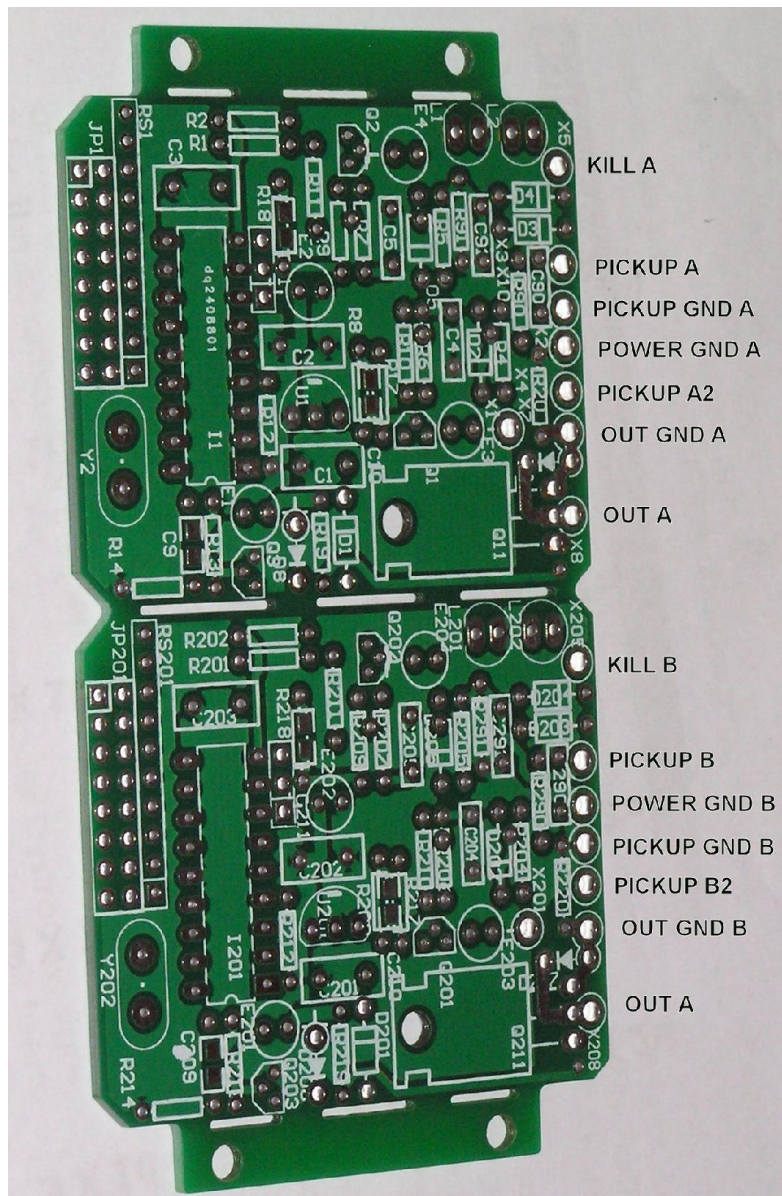


2	X20	Pickup Sense	Blue	3	4 PIN B
		2-4			

2	X20	Pickup Return	White/Blue	4	4 PIN B
		2-4			

Connections

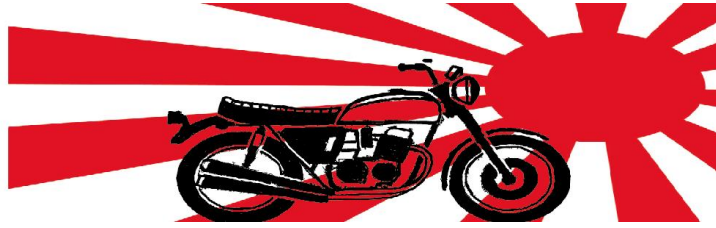
The Picture below shows the actual connections – shown on a bare board for clarity for those uses that are attaching their own connectors.



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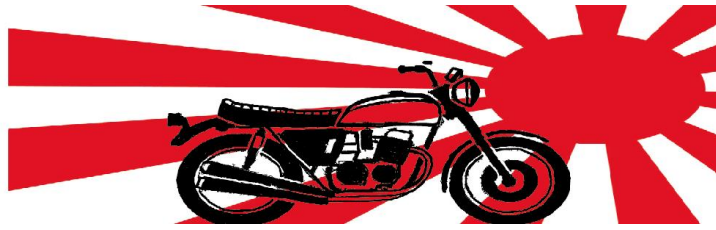
Connection Schematic

The first schematic shows the standard 6 + 6 pin connection, the second the 6 pin and 4 pin variant used on the single box options.

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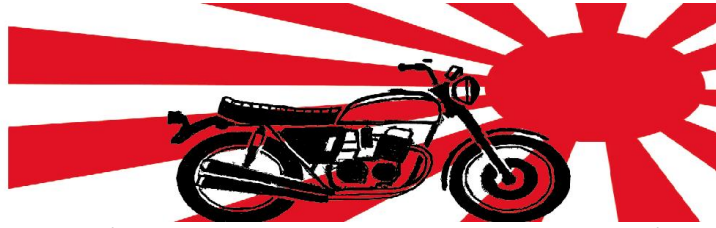
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