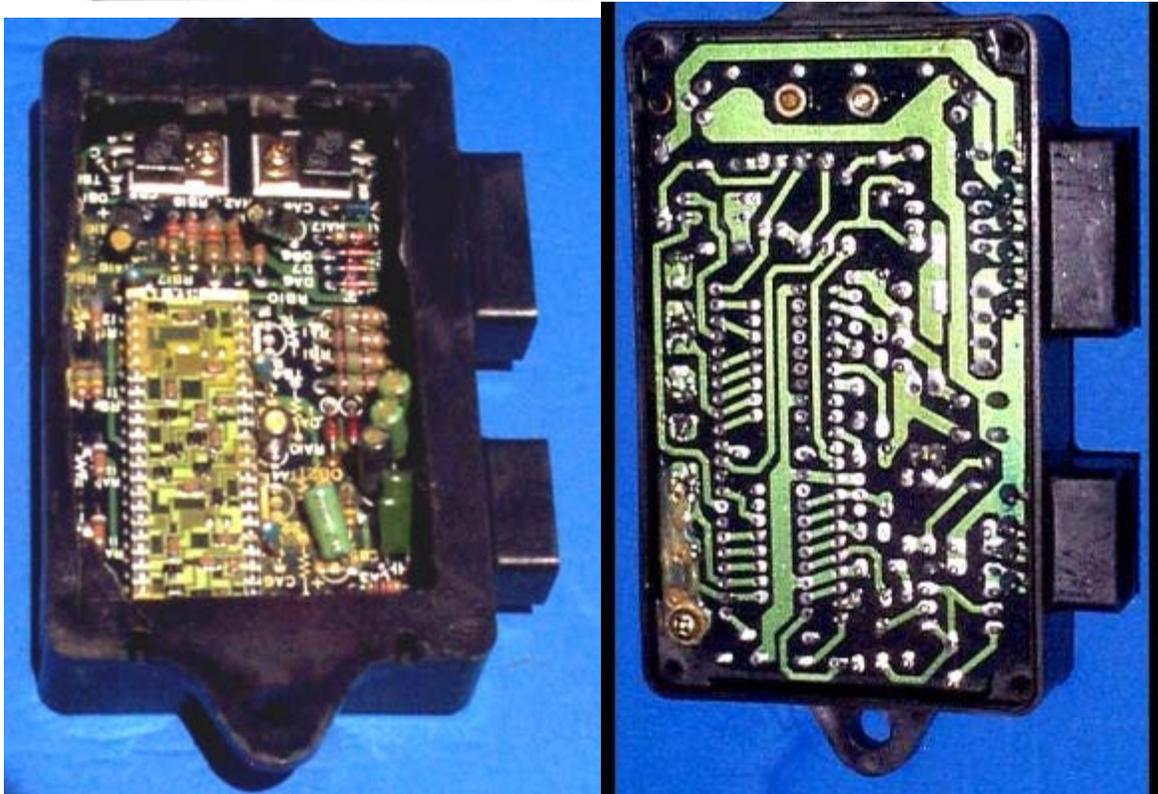
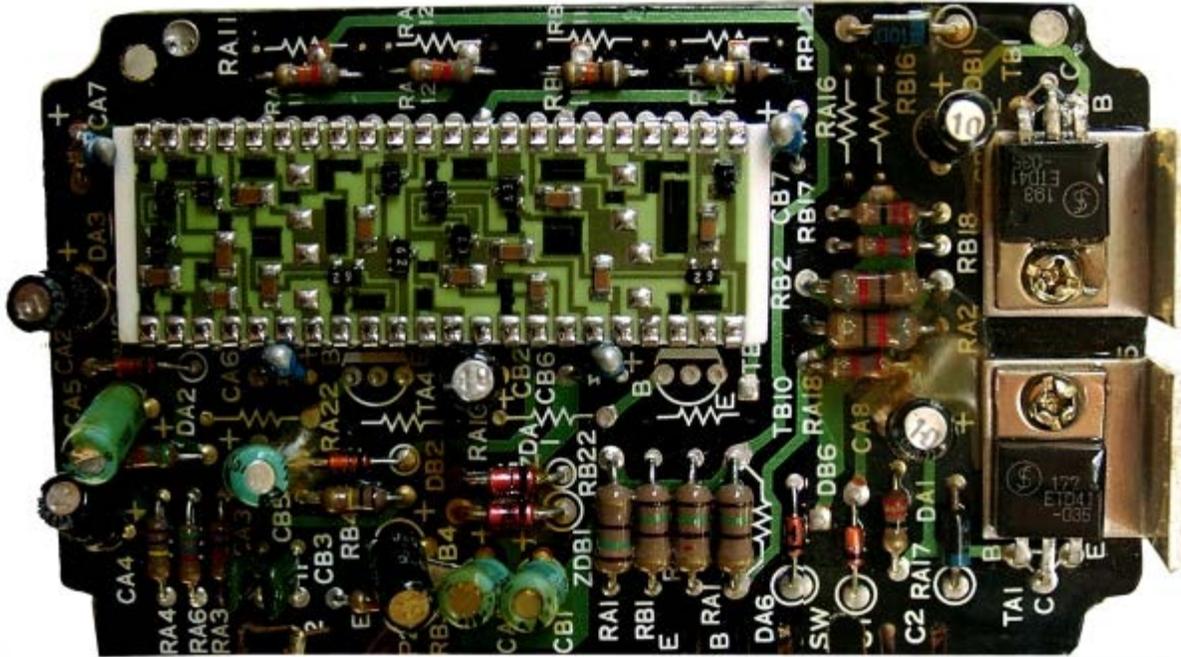


# Electronic Ignition Overview ("The BIG Picture")

## TCI Circuit Board



### Component List

Transistors and Suitable Replacements		
TA1 / TB1	Type TO220	FAST Switching Power Transistor Darlington NPN
	NTE	NTE2315
	Fairchild	Fairchild BU806/807

	<b>SGS</b>	<b>SGS Thompson</b>
	<b>RCA</b>	<b>RCA part #SK9431</b>

<b>Resistors</b>		
<b>RA1</b>	<b>RB1</b>	<b>150 Ohm 1/4 w</b>
<b>RA2</b>	<b>RB2</b>	<b>620 Ohm 1/4 w</b>
<b>RA3</b>	<b>RB3</b>	<b>1000 Ohm 1/4 w</b>
<b>RA4</b>	<b>RB4</b>	<b>100,000 Ohm 1/4 w</b>
<b>RA6</b>	<b>RB6</b>	<b>5600 Ohm 1/4 w</b>
<b>RA17</b>	<b>RB17</b>	<b>22 Ohm 1/4 w</b>
<b>RA18</b>	<b>RB18</b>	<b>2700 Ohm 1/4 w</b>
<b>** RunTime Resistors</b>		
<b>RA11</b>	<b>RB11</b>	<b>62,000 Ohm 1/4 w</b>
<b>RA12</b>	<b>RB12</b>	<b>90,000 Ohm 1/4 w</b>

**\*\* RA11/RB11, RA12,RB12 are "run-time" components. That means they are selected at the time of actual assembly to adjust some values on the board. No 2 TCI are alike here and the resister values can't be predicted. The values here are examples of what was found in (1) TCI module.**

<b>Electrolytic Capacitors</b>		
<b>CA1</b>	<b>CA2</b>	<b>10 mfd @ 25v</b>
<b>CA2</b>	<b>CB2</b>	<b>2.2 mfd @ 50v</b>
<b>CA4</b>	<b>CB4</b>	<b>.47 mfd @ 50v</b>
<b>CA5</b>	<b>CB5</b>	<b>10 mfd @ 25v</b>
<b>CA6</b>	<b>CB6</b>	<b>.1 mfd @ 35 tantalum</b>
<b>CA7</b>	<b>CB7</b>	<b>.1 mfd @ 35 tantalum</b>
<b>CA8</b>	<b>CB8</b>	<b>.22 mfd @ 50v</b>

<b>Mylar Capacitors</b>		
<b>CA3</b>	<b>CA3</b>	<b>472k @ 50g</b>

<b>Diodes</b>		
<b>DA1</b>	<b>DA2</b>	<b>1N1001</b>
<b>DA2</b>	<b>DB2</b>	<b>Small Signal Glass</b>
<b>DA6</b>	<b>DB6</b>	<b>Small Signal Glass</b>
<b>ZDA1</b>	<b>ZDB1</b>	<b>Zener (? voltage)</b>

## Rebuilding The TCI Notes

*My thanks to Dick Stelter, David Denowh, Uwe Werner, Brian Fosh of TzRewinds and many others for what follows.*

**There is a good chance you can repair the TCI module.** A little soldering skill may be all it takes. This is a "work in progress" so this is only a start. I believe we will repair a couple Vision TCI in 2001 and answer many questions. General speaking, it is most likely the transistors which have failed on the circuit board. Also, some have reported loose solder connections that have been corrected with some cleaning and resoldering. However, the Vision TCI circuit board is a "doublesided plated thru design" which means the components are mounted on one side but soldered on the other. This is a strong design and makes weak solder joints less likely. The Virago TCI which is very similar uses a single sided design where the components are soldered on the same side as the circuit foil. This makes it more prone for the circuit foil to peel up and fail due to vibration (a problem less likely on the Vision TCI board). The Vision TCI is more prone to component failure where the Virago TCI often fails to mechanical failure. David Denowh is currently reconditioning TCI for the Virago group. This TCI is very similar to the Vision with the obvious difference being that it is a 3 cylinder bike. Here is the link if you're curious:

<http://members.aol.com/ddenowh/TCI/index.html>

The problem of course is testing what you have done and Dave has no easy way to test a reconditioned Vision module. In the UK Paul Fosh is rebuilding TZI at "TZRebuild" and testing them with a test bench setup. He mechanically rotates a magnet with a drill motor past the pickups to simulate the engine RPM. Here are some of Dave's comments: "I have been very lucky with the Virago repairs thus far. I have done over 150 TCI units and they ALL have had similar problems. Resoldering the board has repaired them all with only a few needing the transistors replaced. I suspect these went bad because the bike either had a bad coil or had a wire pinched somewhere. The transistors on the Virago are a bit different. The part number is either a ETD051-030 or a D1071. Both have the S with a line through and a circle around the logo like the Vision ETD41. I have replaced these with a RCA part #SK9431. I suspect that any transistor that is similar or stronger will work as a replacement. It is just a switch after all :-)".

**Here's what we think we know so far:** The Vision TCI ignitor was supplied by Hitachi as part #TID 12-06. The semiconductor (fast switching transistor) inside marked ETD41 was made by Fuji Electronics. Fuji also produces ignitors and maybe even builds them for Hitachi too!? They also produce a line of after market ignitors, some advertised under other brand names for homebuilt aircraft. The ETD41's are diode protected Darlington NPN transistors. You want to replace these with heavier duty substitutes. We can make a good guess at what that would be based on the TCI and coil voltages/currents. This should probably be something that can handles 8 amps+ at the collector and double that for peak. The BU806 from Fairchild (spec below) , SGS Thompson, and NTE2315 should work. The NTE2315 is slightly more expensive (we're talking a couple dollars total here) but is more readily available on the net. Again, the Virago is similar in vintage and electrical design so for discussion notice that the power semiconductors in a Virago ignitor are marked D1071. They have also been replaced successfully with the BU806 and ST9431. All the components in the Vision TCI have been identified and are listed below. The exception is the 'piggy back' board on the printed circuit board (called a Hybrid) which has an IC mounted on it. This is most likely the timing curve. This can't be fixed and there's no obvious replacement.

**Fixing the TCI:** This would be my recommended order of things till you get it working.

### 1. Gain access to the PCB ("Printed Circuit Board").

Remove the top cover to the TCI (held by 4 screws).

**\*\* DO NOT TRY TO PRY IC-BOARD OUT OF THE TCI CASE!!! \*\***

It is held in by one small Philip screw, and MORE IMPORTANTLY, is soldered to the plug pins molded into the side of the case. To get the board out you have to desolder the pins or break them off when you take it out. You'd then have to solder them (or wires connecting them) back together.

**There is an another way.**

Try to avoid pulling the PCB out of the case. Replacing any components while leaving the PCB still in the plastic box would be good. Ultimately you'd like to reuse the case / wire plugs , the whole setup. To get to the other side ..... cut a large "port-hole" into the plastic "bottom" (other side of the case). Use a dremel tool small cutting wheel. This is risky because you can accidentally cut into IC components on the board. MAYBE BETTER, a sharp knife heated with a torch (so your melting through the plastic). Anyway.... GOOD LUCK (Could be a Darwin award recipient!).

Lay the case flat. Cut down (knife straight up + down) into the case about 1/2" in from the sides. Another words you're cutting a rectangular hole out of the bottom cover 1/2" smaller than the bottom cover size. One end of the module has the metal heat sinks which is why you need to cut about 1/2" in from the sides.

**\*\*\*\* Cut no deeper than about 1/8" or you will cut into IC components \*\*\*\***

2. Look for obvious bad solder joints, corrosion points, or moisture and correct.
3. Replace transistors. Try it.
4. Replace capacitors. Try it.
5. Replace resistors. Try it.
6. You're fucked ..... (that's actually a technical term dating back to Galaleo 😞)

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**Transistors Specs**

BU806/807 Transistor Specs  
TO-220 style

High Voltage & Fast Switching Darlington Transistor

- Used for Crt Video Displays
- BUILT-IN SPEED-UP Diode Between Base and Emitter

NPN Epitaxial Silicon Darlington Transistor

V EBO Emitter-Base Voltage 6 V  
I C Collector Current (DC) 8 A  
I CP \*Collector Current (Pulse) 15 A  
I B Base Current 2 A  
P C Collector Dissipation (T C =25....C) 60 W

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**Related Links:**

**David Denowh Virago TCI site**

<http://members.aol.com/ddenowh/TCI/index.html>

**Paul Fosh TZ Repair site**

<http://tzrewinds.co.uk/>

**Fairchild Semiconductors**

<http://www.fairchildsemi.com/>

**Accell Ignition Systems**

<http://www.mrgasket.com/accel.htm>

**Misc Ignition Stuff:**

[http://dmoz.org/Recreation/Motorcycles/Maintenance\\_and\\_Tech\\_Tips/](http://dmoz.org/Recreation/Motorcycles/Maintenance_and_Tech_Tips/)