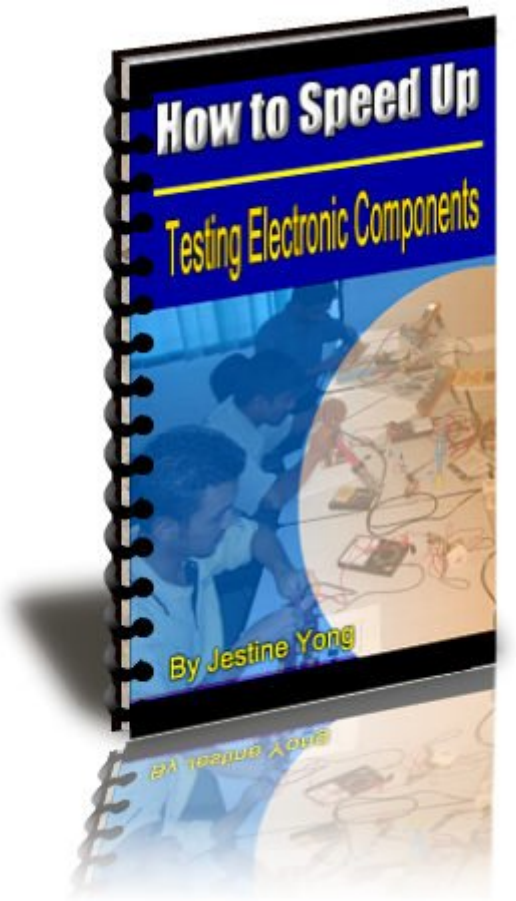
Bonus Report



Brought to you by Jestine Yong

http://www.electronicrepairguide.com

You cannot give this bonus report away for free.
You do not have the rights to redistribute this bonus report.

Copyright@ All Rights Reserved

DISCLAIMER AND/OR LEGAL NOTICES

This Bonus report is for informational purposes only and the author does not accept any responsibilities or liabilities resulting from the use of this information. While every attempt has been made to verify the information provided here, the author cannot assume any responsibility for any loss, injury, errors, inaccuracies, omissions or inconvenience sustained by anyone resulting from this information. Most of the tips and secrets given should only be carried out by suitably qualified electronics engineers/technicians. Please be careful as all electrical equipment is potentially dangerous when dismantled. Any perceived slights of policy, specific people or organizations are unintentional.

If you have any information regarding the illegal reselling or duplication of this bonus report, please report it to jestineyong@electronicrepairguide.com for your reward.

Simple Secrets to Speed Up On How to Test Electronic Components

If you are in the electronic repair line you would know that checking electronic components in electronic boards can take up lots of your time especially if you do not know the short cut way to test it. Many of us when starting in the field of electronic repair check each electronic component one by one by removing it out from the board. This is the right way to test electronic components but it is very time consuming.

For example, if you already confirmed that the power supply section is the main cause of the problem in electronic equipment, you may take about 30-45 minutes to scan through all the electronic components in the section but for some senior or experienced repair technicians, they can check all of the electronic components in less than 15 minutes and accurate too! Wow, that was almost half of the time you spent on checking them.

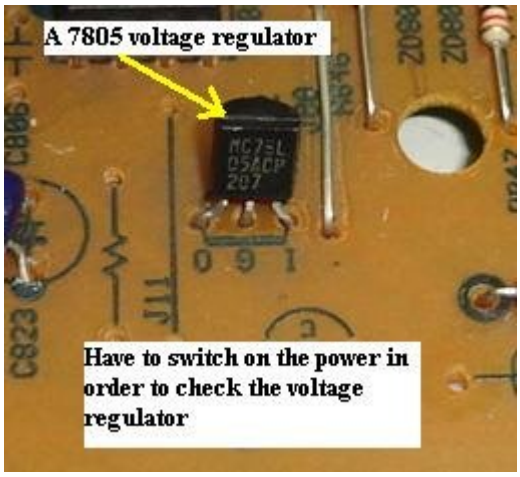
This is a big different in terms of efficiency of how many equipment you can repaired in a day. In other word, if you can solve a problem fast, you can actually repair more equipment in a day and more profit to you. Wouldn't it be great if you can have the skills like the super tech? Or you may ask "Is there a way to actually cut short the process of testing electronic components and at the same time produce accurate result? Yes there is, in this article I'm going to show you how you can speed up the process of testing electronic components. Let's start!

Checking a 47k ohm resistor onboard

We will start with resistor first. Normally the right way to test a resistor is to desolder out one lead and then measure with digital multimeter (please don't use analogue meter as it won't show you a precise reading). Do you know that you can actually check a resistor while it still on board? This is true especially when the test voltage output from your digital meter is less than 0.6 volt as it would not trigger the surrounding semiconductors like the transistors, diodes and integrated circuits (IC). If it is more than 0.6 volt then you may not get an accurate result because your meter had triggered the surrounding semiconductors.

Another thing you need to know is that if the resistor that you are checking on board parallel with another resistor, you will not get an exact reading. Let's take this for example, assuming you are checking a 470 ohms resistor on board and the measurement you get was 200 ohms plus, this means the resistor could have been parallel with another resistor (back circuit) or surrounding circuit. If you get 0 ohms, this is very obvious that the resistor have open circuit. What if you get 2.2 mega ohms? This resistor is either open or has gone up in value. Other circuit components cannot possibly increase the value of a resistor; any back circuit could only make the resistance reading lower!

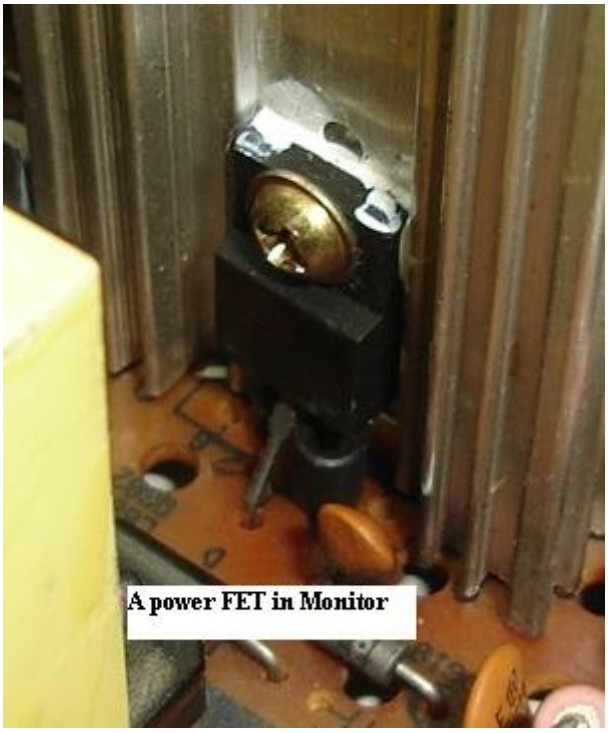
Light emitting diodes or LED is very simple to check. Just connect your analogue meter probe to the pins of LED and set your meter to X1 ohm. If there is no light from the LED, just change the polarity of the probes. You can check LED while it is still in circuit.



Voltage regulator can't be check off board with multimeter because it is an IC (it has lots of components inside it). You have to switch "ON" the equipment and check the output dc voltage of the voltage regulator. First you must know what the part numbers of the voltage regulator are, and then you read the specification and locate the input and output voltage and pins. For example, the general type of voltage regulator starts with the part numbers like 7805, 7812, 7908 and etc.

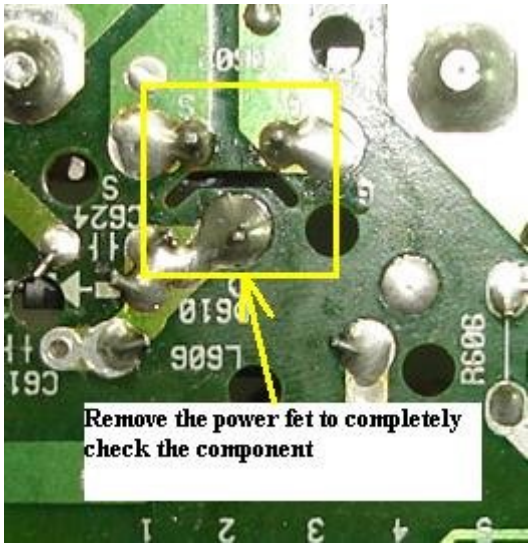
From the spec you would know that pin one is input, pin 2 is ground and pin 3 is output. If there is input voltage to the voltage regulator and no or low output voltage, suspect the voltage regulator itself faulty or something along the output line that dragged down the output voltage. Do you know that voltage regulator can breakdown when under full load?

Since the voltage regulator is easily available and cheap, just direct replace it and retest the equipment or recheck again the output voltage.



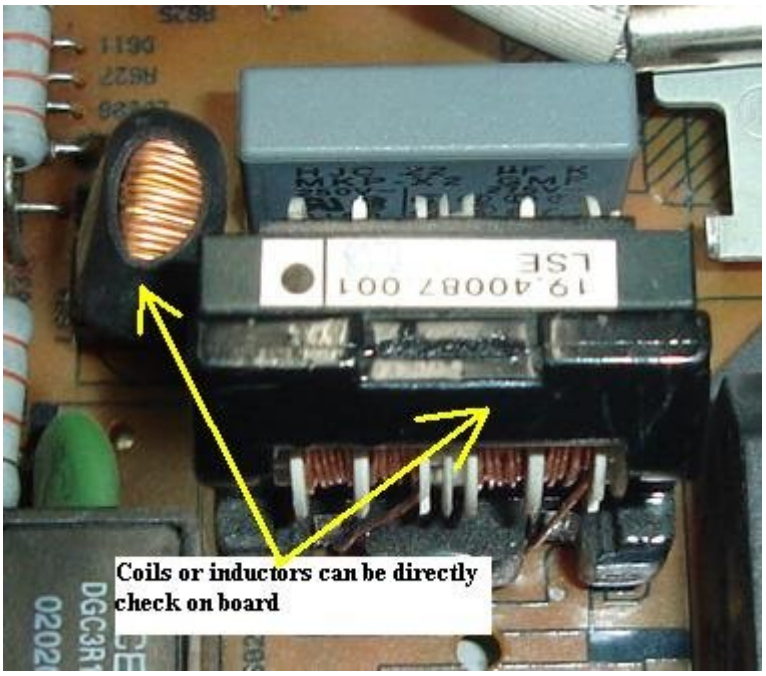
Many switch mode power supply are using the combination of a power FET and a PWM IC design to switch the power transformer. Whenever there is any power failure (fuse totally blown into dark colour) one will always suspect the power FET has gave way. Usually we would use the black probe set to X 1 ohms and place it to the centre pin (drain) and the red probe to the gate and the source pin.

This is the same way when we want to check horizontal output transistor (HOT) on board. If there is a reading, chances are high that the FET has developed a short circuit. But you also have to remember that a shorted bridge rectifier may cause the power FET to have reading when check with the analogue meter while it still on board.



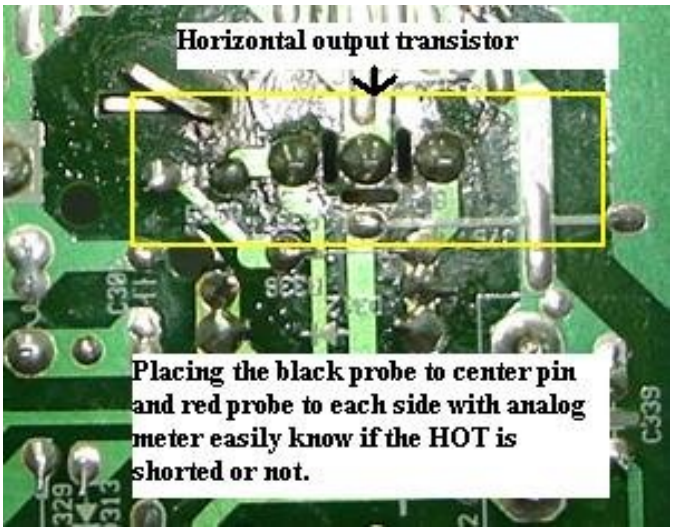
If you get an open reading this doesn't mean the power FET is good because a faulty FET can become open circuit too. My point to you here is that don't waste your time checking FET onboard (if the FET shorted then you can detect right away but what if the FET open circuit?) because it is not accurate, you have no choice when comes to testing FET, you just have to remove it out from board and test it with analogue meter set to X 10k ohms (refer back to "Testing Electronic Components" e-book about testing FET). This is true also if you want to check FET in the B+ circuit (B+ FET) and FET in the Monitor S-correction circuit.

Checking variable resistor (VR) on board is not that accurate because of the back circuit besides some VR have their resistance code printed so small at the bottom of the VR. The best is still removing it out from the circuit and test it with an analogue meter. Any erratic reading can be easily seen from the analogue meter panel compares to using digital meter.



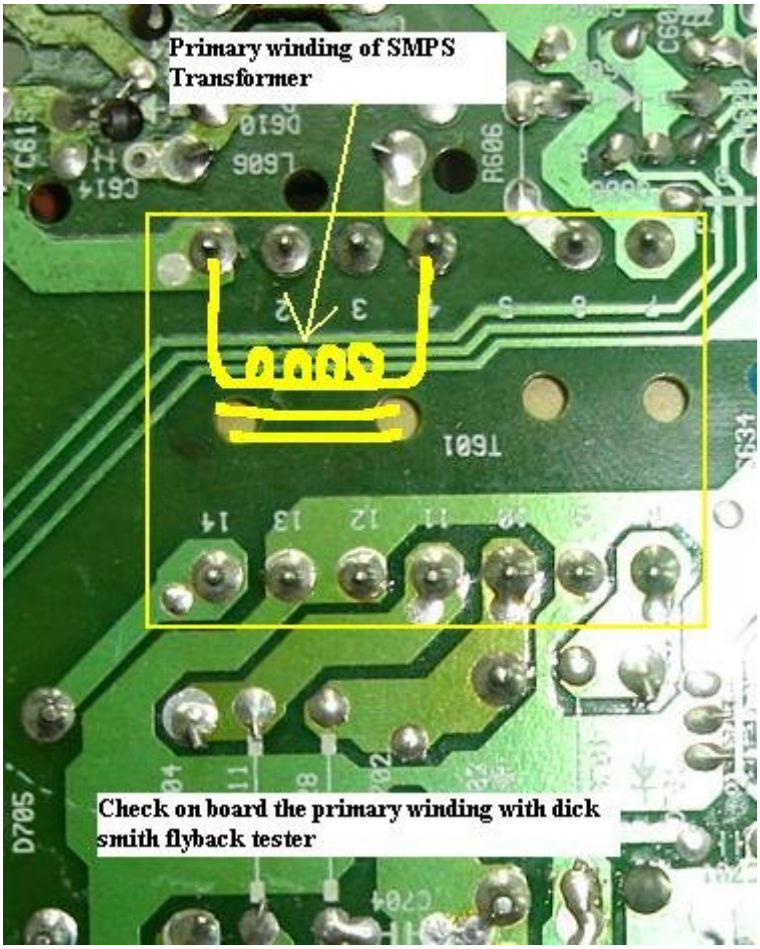
Inductor or coil testing can be done on board without removing the coil out from the circuit board. If a coil has less loops (small coil), then we can just direct measure it with our normal ohmmeter. A small coil is just like a wire or a jumper and it rarely become defective although it has some inductance value in it. Testing coils that have a bigger inductance value like the B+ coil used in Monitor circuit is different from checking the small coils.

You can't just measure the bigger coils with an ohmmeter because a bigger coils tends to develop short circuit internally that can't be detected by a normal meter. The meter that I use to check the bigger coils is the Dick smith flyback tester. You can check the coils while it is still in the circuit. Once you know the right method of testing coils, I'm sure it won't take you long to measure any coils in electronic board.



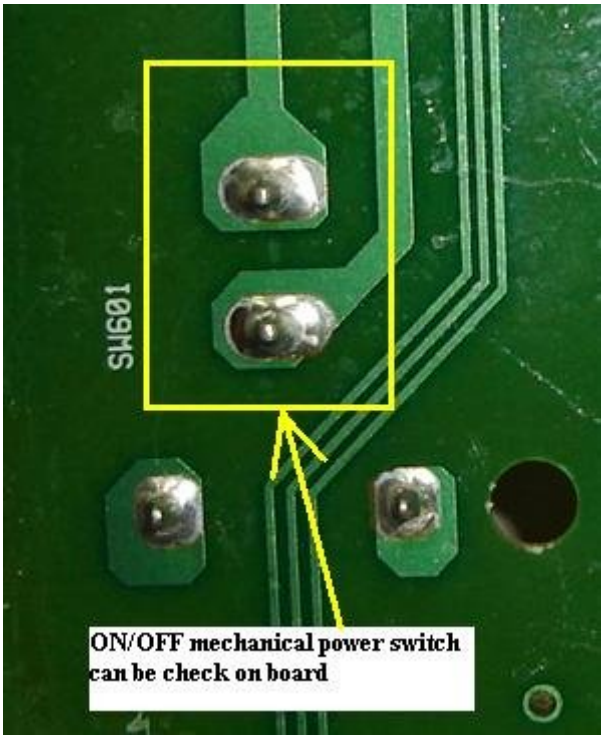
Checking horizontal output transistor is so easy and you can check it on board. Set your analogue meter to X 1 ohm and place the black probe to the centre pin (collector) of the HOT and the red probe to base and emitter. It should not register any reading. If there is a reading, most probably the HOT has developed a short circuit.

Be aware too, components that links to the HOT like damper diode, flyback transformer, safety capacitor, B+ circuit components and if these components go shorted it could cause your analogue meter to have reading. Some HOT in certain Monitor designs are difficult to open (you have to remove the whole board in order to unscrew the HOT) so to save time follow the example above of checking HOT on board.

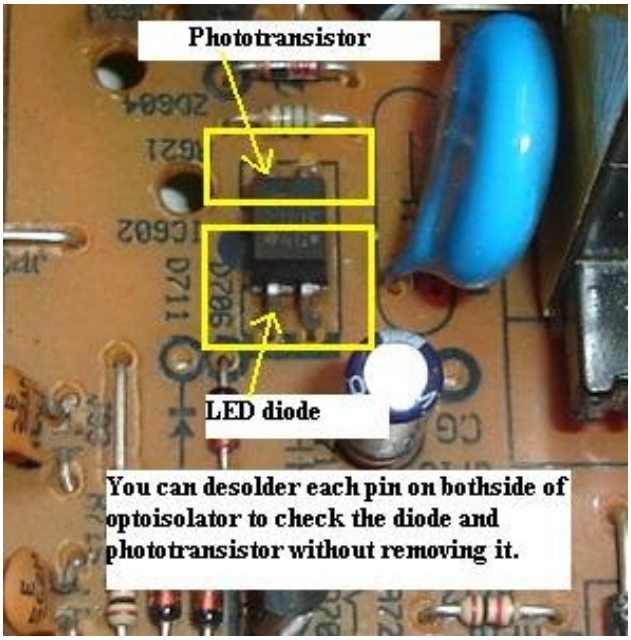


As for the switch mode power transformer (SMPT) primary winding, you can't accurately check it with an ohms meter even if you already took it out from the board. You can only test it with a special type of coil meter or the dick smith flyback tester. You can check the primary winding of the SMPT on board without removing it out with the flyback tester.

If there are any shorted components in the primary side (power FET) or in secondary side (secondary output diodes) the flyback tester will registered a shorted reading and the LED bars would not lit. Just play around with the flyback tester (if you have one) and I believe you will quickly notice how it can help you to test a winding fast. Some technicians are using the more expensive type of flyback tester such as the Sencore LC 103 capacitor and inductor analyzer to test the primary winding of SMPT.



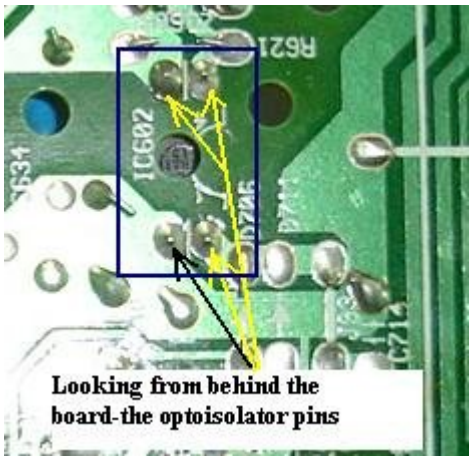
Checking the on/off power switch is the easiest one. Just place your meter probes to the switch point (assuming the power switch have 2 leads) and set your ohm meter or continuity check function. It should show a very low ohm resistance or the beeper will beep if you use the continuity checker. You can perform this test even if the power switch is still in circuit. You can also use this method to test on the micro switch.



Optoisolator or optocoupler IC's usually located in between the primary and secondary side of power supply and can be test even if the IC is still

on board (you can actually test this type of IC with your multimeter). Some of the famous optocoupler part numbers are 4N25, 4N35, PC123 and etc. Just desolder one pin on each side (assuming this optocoupler have 2 pins on each side) of the optocoupler. Pin 1 and 2 is the LED light and pin 3 and 4 is the phototransistor collector and emitter.

Place your analogue meter probe set to X10 k ohms at pin 1 and 2 either way and it should show only one reading (low resistance reading). This is just the exact same way as when you are checking a normal diode. If it shows 2 reading most probably it had developed a short circuit. Now place your probes to pin 3 and 4 either way and again it will only show one reading (this time the resistance reading is a little bit high). If you got two readings then the internal transistor may have short circuit.



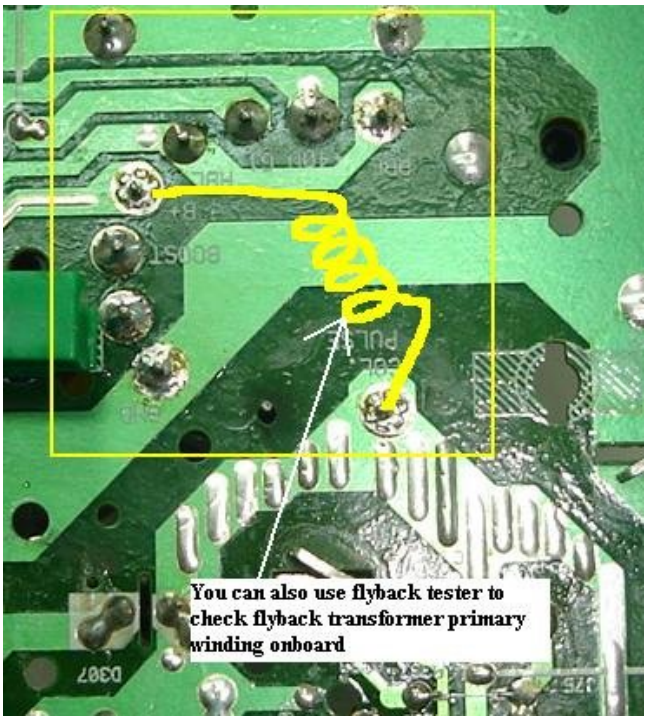
If you want to measure an optocoupler that have 6 or even 8 pins, I suggest that you search for its data first from the internet or from semiconductor data book. Once you know how the internal components are wired, then you will use the best checking method to test them individually. Remember, a shorted optoisolator can cause low power, no power or even power blink in switch mode power supply.

Flyback transformer-well I guess most of you all that deals with either TV or Monitor repair has came across flyback transformer in the circuit. Whenever a flyback transformer have problems it would cause power to cycle, high voltage shut down, no power, low power, arcing, blur, too bright and etc.

Now if you want to check if the flyback transformer is okay or not your first step is to check the internal capacitor with a digital capacitance meter. It should have reading about 1.5 – 3 nano farad measuring from the anode to the internal capacitor pin beneath the Monitor flyback.

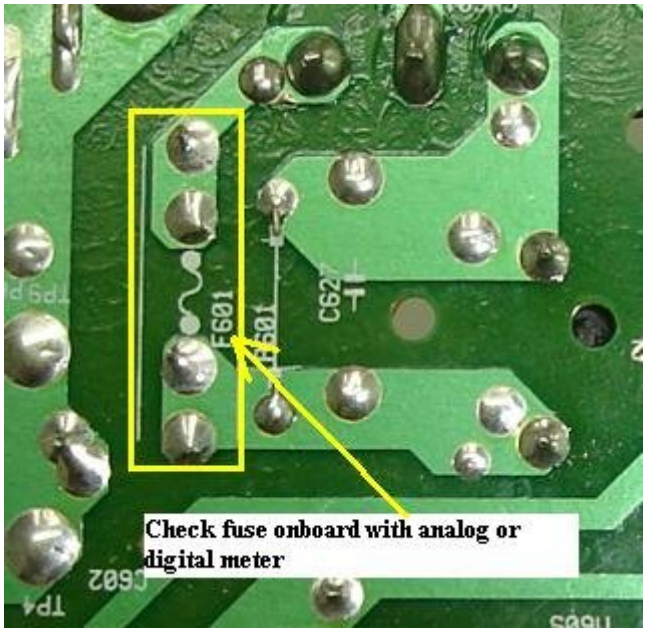
Besides using digital capacitance meter to measure the internal capacitor, you should also must use an analogue meter set to X10 Kohm range to test it.

There would be no reading either way and if you got any readings then this proof that the internal capacitor had developed a short circuit. If the reading is okay then you can proceed to check the primary winding of the flyback. The primary winding pins are the HOT collector pulse and the B+ voltage in. You should check it on board with a Dick smith flyback tester or with any flyback tester that you have. If you are using the dick smith flyback tester, it should show at least 4 or 5 bars and above. If the tester only shows 1, 2 or zero bars then suspect something has gone wrong with the circuit.



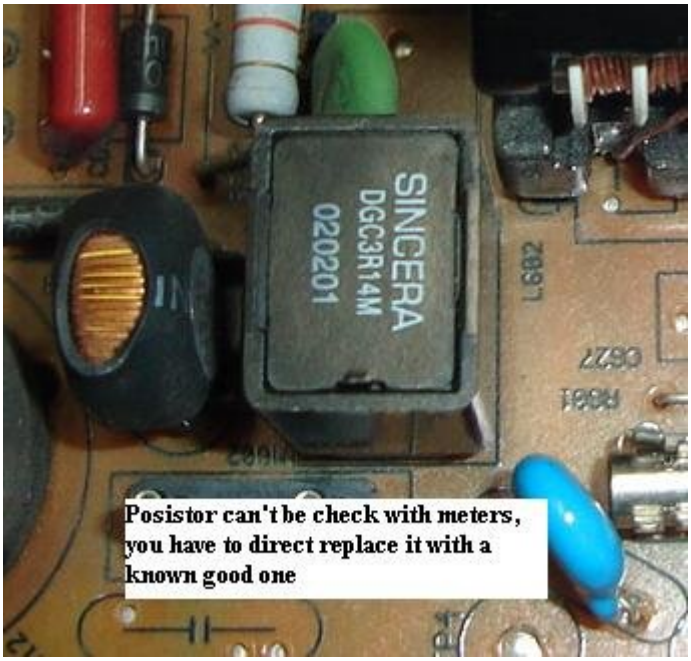
Remember, a shorted diode in the flyback secondary side like the G1 or any other supply lines could pulled down the reading in the dick smith flyback tester. For your information, please don't check the primary winding with an ohm meter (whether it is an analogue or digital meter) because normal meters just can't detect shorted winding in the flyback. Even if there is only one shorted winding, by using a flyback tester, you can easily find out the faults. A shorted horizontal output transistor (HOT), horizontal yoke coil, B+ circuit components, damper diode, safety capacitor may also caused the flyback tester reading to drop. Just practice more on this circuit with the flyback tester on different type of

monitor so that it would be easy for you to solve problems that are related to flyback transformer.

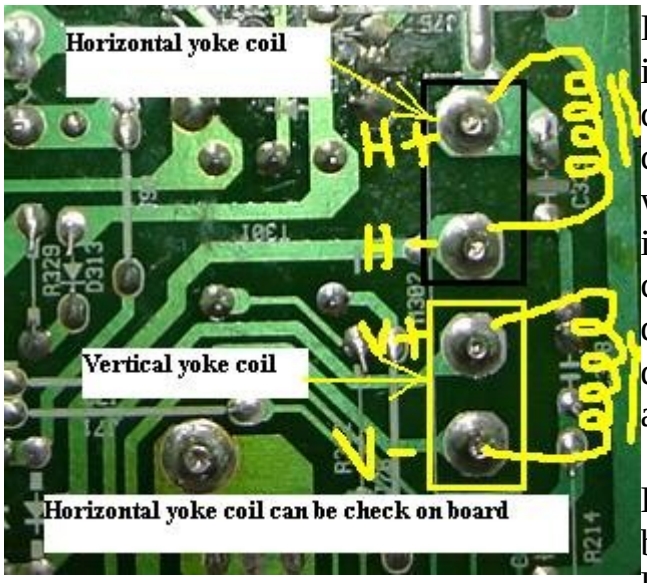


Next is the fuse, you can easily check it on board with your multimeter. Just set your meter either to ohms or continuity. A good fuse should have reading (ohms value) and beep sound if you select the continuity test. If no reading or sound, 100 % the fuse is open and need replacement. Replace only with the same ampere and voltage rating of fuse.

All Monitors and TV have a Posistor used to degauss (demagnetize) the picture tube. Normally, the whole degauss circuit consist only the degauss coil, Posistor and a relay (for auto degauss). The Posistor may have 2 or even 3 leads. You can't check the value of the Posistor with multimeter. You have to direct replace it if you suspect it to blow the fuse every time when the equipment is turn "On" and the bridge rectifier is tested okay. Sometimes you can remove the Posistor and "shake" it to check if you could hear any sound in it. If yes, then most probably something has loosened inside and need to be replaced.



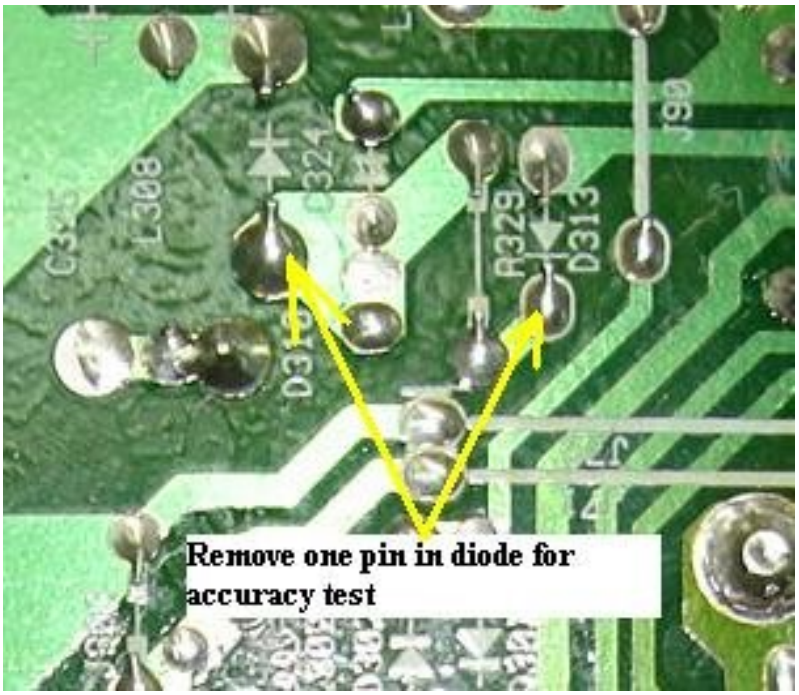
Monitors horizontal yoke coil can be easily check with flyback tester too. You can even check it on board and if the flyback tester shows 1, 2 or zero bars suspect a defective yoke coil. In order to confirm it, you have to lift up the yoke coils connector and directly measure it. If it still shows the same result, then most probably the horizontal yoke coil had developed a short circuit between the internal windings. Please do not check with an ohmmeter or even with an inductance meter as both don't give accurate result when checking horizontal yoke coil.



I personally owns an inductance meter and when I compared a known good yoke coil with a bad one, the result was still the same (good inductance value) but when I compared and checked it with dick smith meter, it clearly distinguish between the good and the bad yoke coil.

Horizontal yoke coils can breakdown when under full load just like the flyback transformer, so be alert and if you can't solve any weird problems monitors especially power intermittent cycling, horizontal width intermittently big and small with pincushion out, HOT turned very hot in a short time then you have to direct replace the CRT and retest again.

Vertical yoke coil can’t be test with flyback tester and the good news is that the winding rarely give problem. You should check it with an ohm meter to determine the ohms value. If you have the expensive Sencore tester, you can always check the vertical yoke coil for any short circuit between the vertical windings.

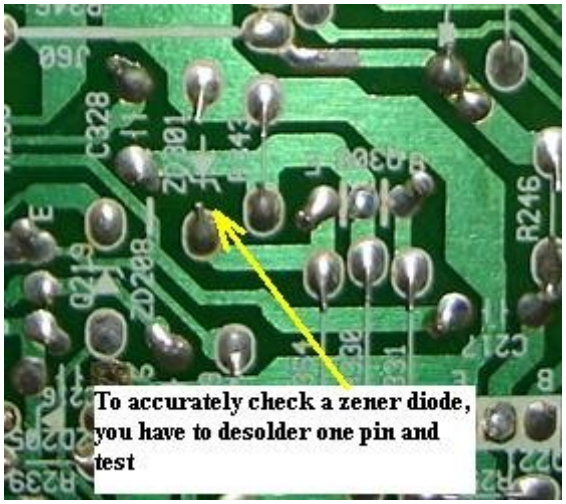


In order to accurately check diodes, you need to desolder one lead and test it with an analog meter set to X 10k ohms range. A good diode should have only one reading while the bad one will have two readings. Be careful if you want to test a Schottky diodes as Schottky diodes will have two readings but not shorted readings. If you get two similar readings then the Schottky diodes is considered bad.

You need semiconductor data book to help you to determine if the diode belongs to which family (general purpose, ultra fast recovery, damper, schottky diodes or etc). However, if you set your meter to X 1 ohm and test a diode on board and if you get two similar readings then chances are high the diode have shorted. In order to confirm it you still need to remove one of the lead from circuit.

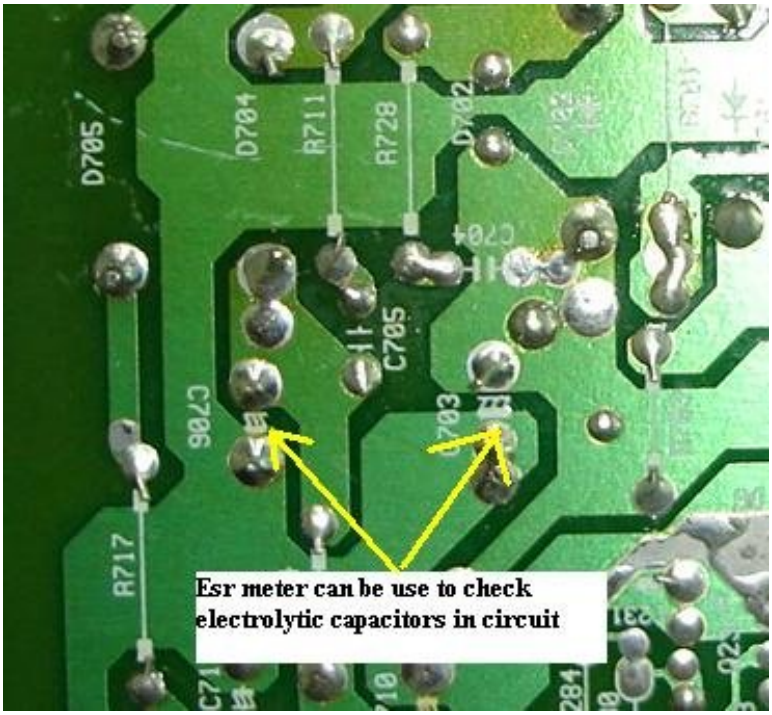
Assuming when an equipment came in with a blown fuse (fuse became dark), this sign shows that the equipment might have a major short circuit somewhere in the circuit (mainly power supply area). Using your analogue meter set to X 1 ohms to check on the bridge rectifier on board you can easily tell if the any of the bridge diodes have shorted. Compare

reading with a known good equipment and I’m sure you will understand about checking diodes on board.



Checking zener diodes, you have to remove one lead from the board. Before you check on any zener diodes, you first need to identify what is the voltage of the zener diodes. Refer to semiconductor data book for any codes printed on the body of zener diodes. Once you know the zener diode voltage, by using again analogue meter set to X 10 K ohm range, you will quickly determine if the zener diode is faulty or not.

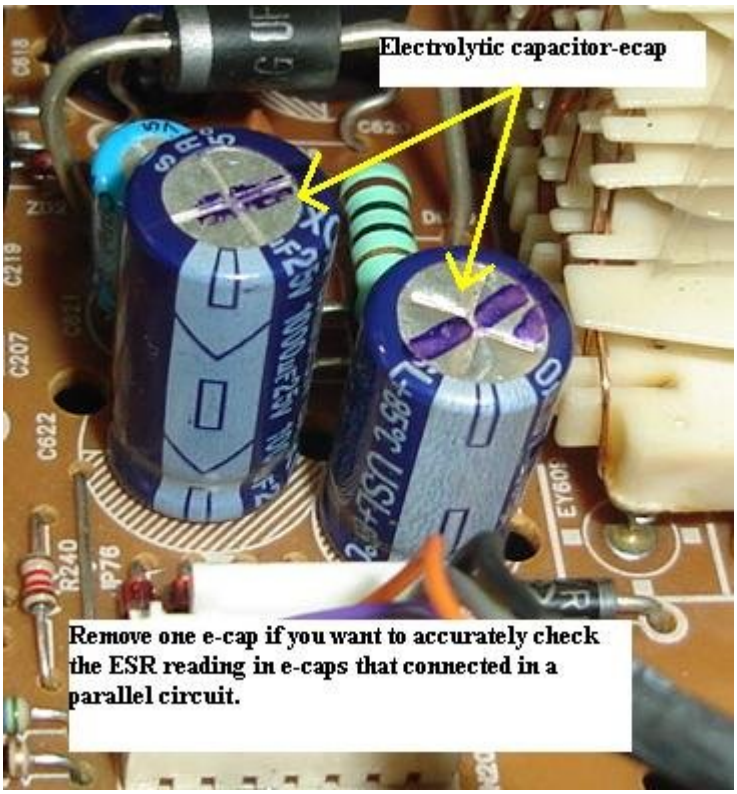
Any zener diodes from 2.4 volt to 12 volt should have two readings but not shorted readings and any zener diodes that have 13 volt and above should have one reading. You can check also zener diode on board if only the zener diode developed a direct short circuit which is easily measured with an analogue meter set to X 1 ohm range. Remember to replace zener diode only with the same voltage and for the wattage, it can be the same or a little bit higher.



There are two different ways to test capacitors, one for the electrolytic capacitor and the other one for the non-polar or the ceramic type capacitor that do not have polarity. I will start explaining the electrolytic capacitor first. I believe many of you already own the ESR meter for testing electrolytic capacitor on board.

There are many types of ESR meters in the market nowadays. Brands name such as the famous Dick Smith ESR meter, EDS Cap analyzer 88a, Tenma, B& K Precision, Cap Wizard, Peak Electronics and etc. No matter what ESR meter you use, the result you get will be the same which is checking the ESR Ohm of the electrolytic capacitor while it still on board. We all knew that it is quite accurate to measure e-caps while it still in circuit but do you know that ESR meter can't test e-caps on all type of circuit?

I'm not frightening you or make you to lost confidence in using ESR meter. I myself also use ESR meter to check for bad e-caps everyday. I just can't part it away with this ESR meter. Without one I will have a hard way to find the defective E-caps.

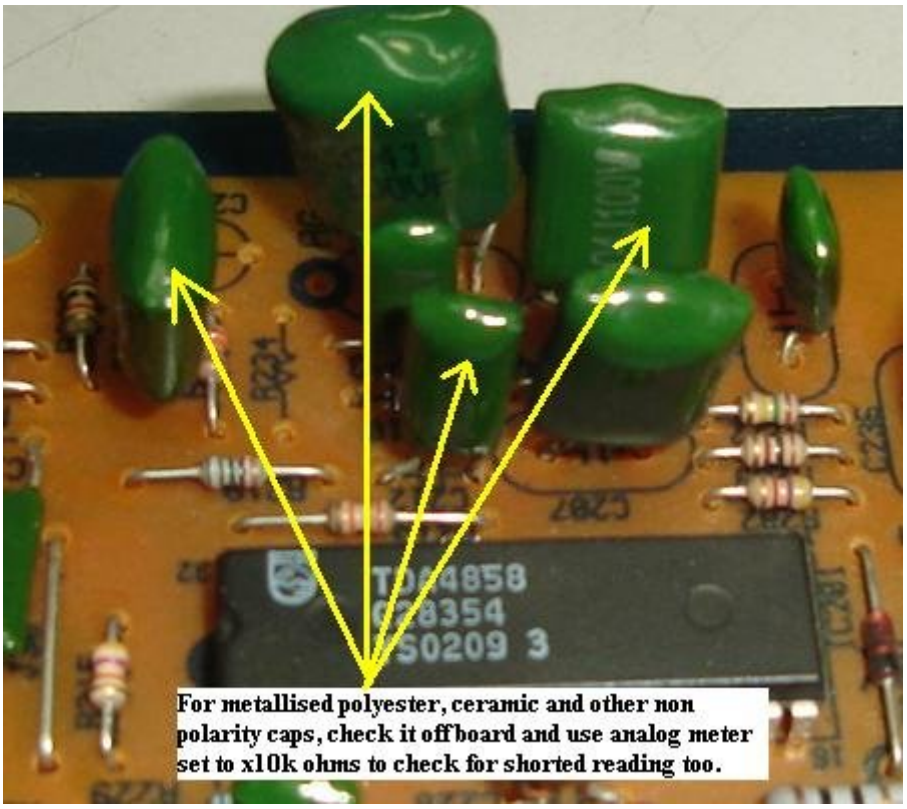


What I mean ESR meter can't test accurately on board in all circuit was that it depends on what type of circuit you are checking! If you check on the Monitor heater circuit, it would not give you an accurate reading because the heater line is eventually go to cold ground through the filament inside the CRT tube. In other words you are actually measuring the low resistance winding of the filament.

The same case also happen if you try to check any E-caps that have a low ohm resistor parallel with the e-caps that you want to check. Another good example would be the secondary output lines. Have you ever come across secondary output lines that have few electrolytic capacitors along the same line? Yes, that's mean if one of the e-caps turned bad the ESR meter would test the E-caps as good because the same line have another good e-caps there. Don't be discouraged by the examples that I've explained above. In fact those are not just examples; it was the real life experienced that I had encountered as electronic repairer.

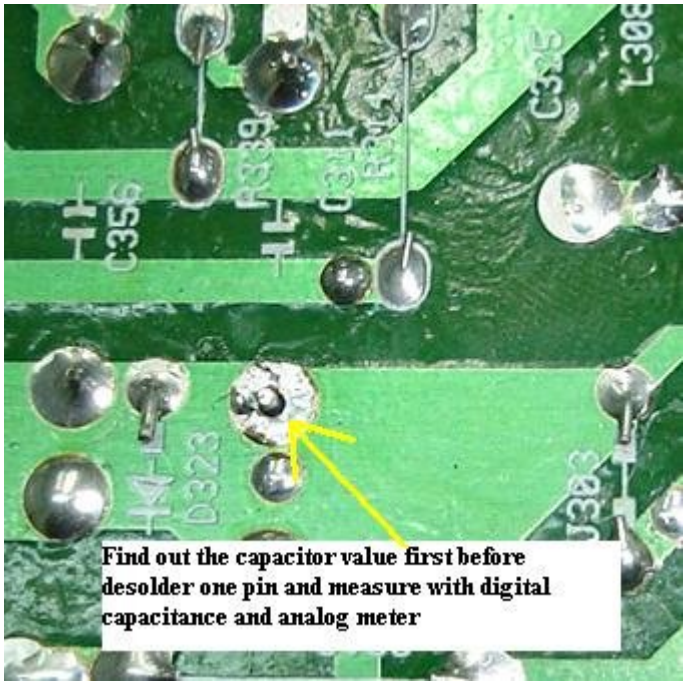
Do not worry about the above explanations as there are solutions for it. First, before using ESR meter on any e-caps, please make sure to ask yourself "what kind of circuit that I'm checking now?" If it is a heater circuit or secondary output lines that have few e-caps that connected in parallel, you have to desolder one lead of the e-caps and test it with your

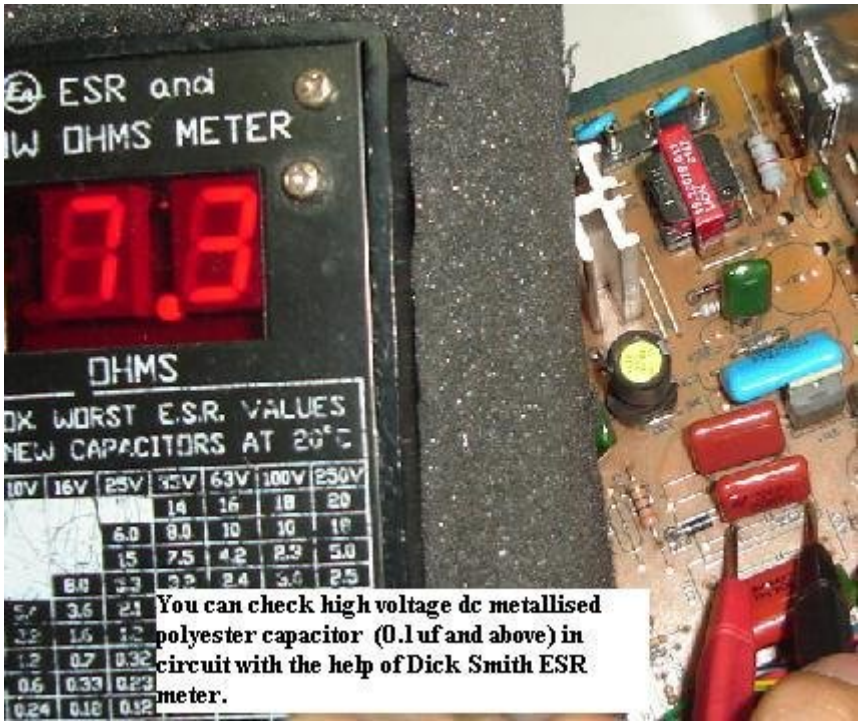
ESR meter. Otherwise you would not get an accurate result from your ESR meter. After reading the above example I'm sure you would be careful next time when you want to check for bad e-caps on board. One more advice, never check the e-caps with a digital capacitance meter as a bad e-cap the meter will tell you it is good and you will be wasting of your precious time trying to find out the real fault in the equipment.



Next is the non polarity capacitor, you have to desolder on lead in order to test the capacitance. You can't measure the non polarity capacitor on board as the digital capacitor meter doesn't have the capability to check on board not like the ESR meter. After you have confirmed that the capacitance is good you need to perform another test which is using analogue meter set to X 10 k ohm to check for any short circuit between the internal plates.

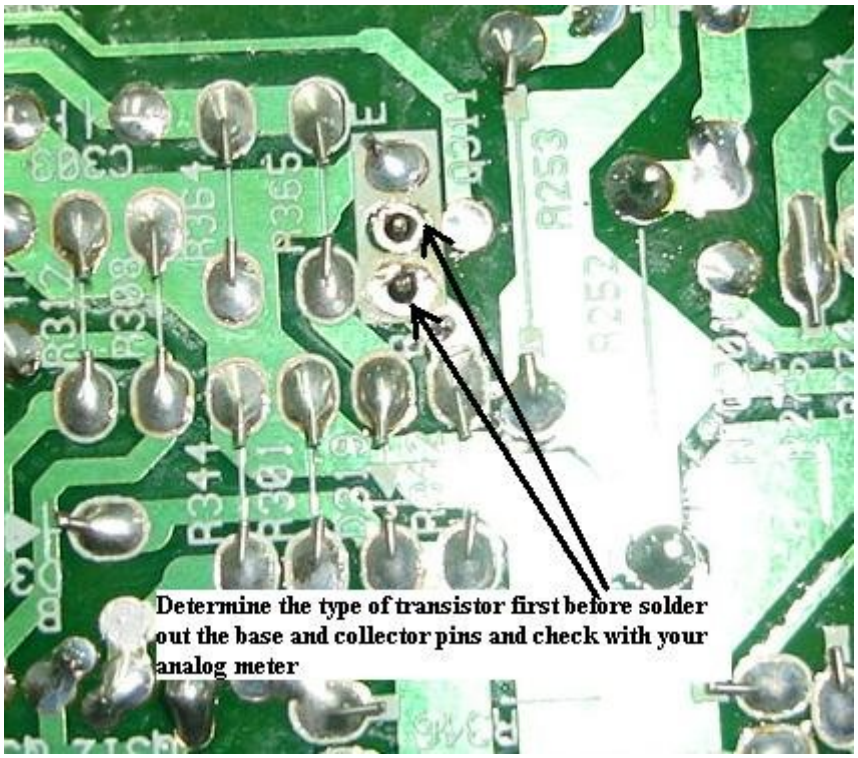
If the capacitor that you want to check rated several hundreds volts then I guess you have to use an insulation tester to check it. In other words, your analogue meter does not have the feature that can pump in hundreds of volt to a non-polarity capacitor. Just let the insulation tester do the job.





The last component that I want to share in this article is the bipolar transistor. You can actually check transistor on board without removing it to speed up your repair work. First you must know as which types of the transistor that you want to measure belong to. It can be either NPN or the PNP. Assuming you have checked that the transistor is NPN type, then desolder the base and the collector pin. Do not desolder the emitter pin. Place your analogue meter black probe to base (meter set to X 1 ohm) and

the red probe to collector and then to the emitter pin. It should give two similar reading but not shorted readings! Now set your meter to X 10 K ohms and place your meter probes to the collector and the emitter pins (either way). Some good transistors can show no reading on both ways while some will show only one reading but not shorted reading. If you get two readings then the transistor is considered bad and need replacement.



Conclusion- I really hope that you can start practicing the methods that I've covered in this bonus report. Hands on practice only make us perfect and the result would be you can check any electronic components in the shortest time and accurate too.

However, you have to remember that electronic components can test good but breakdown when under full load. Your experienced will tell you if the components need a direct replacement or not. Have a good day!