Printed Circuit Boards (PCB's)

Fault finding & Repair Techniques

Component Failure

Mistakes and component failure are a fact of life. Circuit boards will be made with mistakes in them, components will be soldered in backward or in the wrong position, and components deteriorate over time, all of which will make a circuit work poorly or not at all.

Some Reasons for Component Failure

- Aging
- Bad circuit design
- Change in environment
- Connected incorrectly
- Connection failures
- Contamination
- Corrosion
- Electromagnetic stress
- Electrostatic discharge
- Manufacturing defects
- Mechanical shock
- Mechanical stress
- Overcurrent
- Over-temperature
- Overvoltage
- Oxidation
- Packaging defects
- Radiation
- Thermal stress

Troubleshooting

PCB troubleshooting can be a monumental task that taxes both the will and the mind. Luckily there are a few tricks and techniques that can greatly speed up the search for the troublesome 'feature.'

1. Visual Inspections
2. Physical Inspections
3. Discrete Component Testing

Visual Inspection

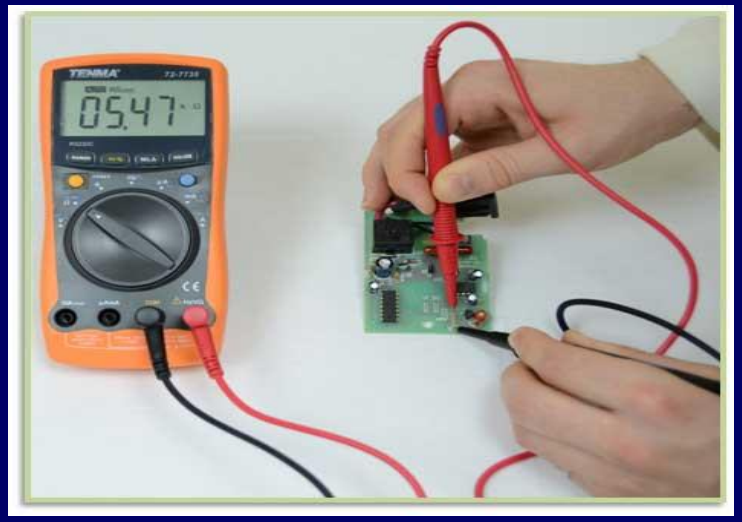
Burnt out components, signs of overheating, and missing components can be found easily through a thorough visual inspection. Some burnt components, damaged through excessive current, cannot be seen easily, but a magnified visual inspection or the smell can indicate the presence of a damaged component. Bulging components is another good indicator of a source of a problem, especially for electrolytic capacitors.

Physical Inspection

This type of inspection should ideally be conducted on a fully retracted or disconnected circuit board and capacitors have been allowed time to discharge before touching.

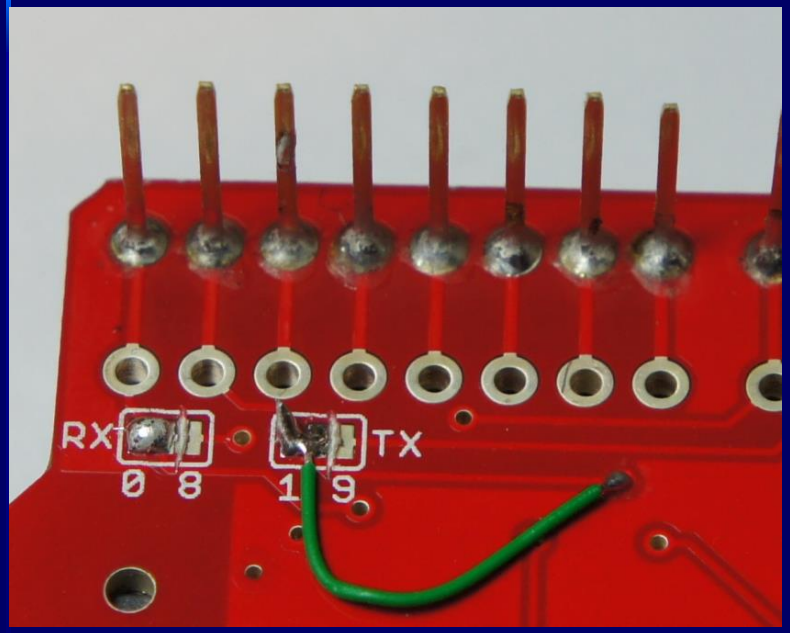
Discrete Component Testing

Often the most effective technique for PCB troubleshooting is to test each individual component. Testing each resistor, capacitor, diode, transistor, inductor, MOSFET, LED, and discrete active components can be done with a multimeter. Components that have less than or equal to the stated component value, the component is typically good, but if the component value is higher it is an indication that either the component is bad or that the soldered joint is bad.



Product Specific Test Stations

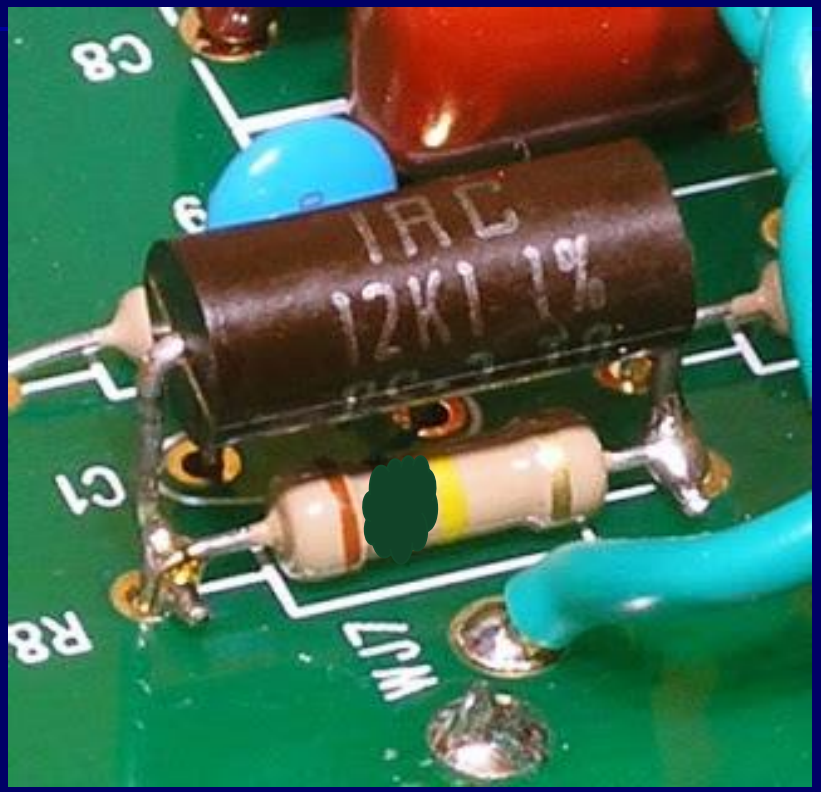
Track Repairs



Jumper wires

Conductive Pens

Quick fix



Piggy Back
Replacement