

## **C. INITIAL CIRCUIT CARD INSPECTION**

This section contains a check list of items to verify as a first step to troubleshooting a board. Experience has shown that when a fault is located after extensive troubleshooting and the technician proclaims, "I should have caught that sooner", one of the following procedures was overlooked. The technician that learns these techniques can save time, money, and headaches. Do the inspection procedure at the beginning of every troubleshooting session and it will become second nature.

### **CIRCUIT BOARD INSPECTION CHECKLIST**

Collect and analyze any available data about the suspect board. Some suggestions:

1. Always consider the skill of the person reporting a defective circuit card. Is the problem stated a reasonable fact or a vague assumption?
2. Carefully review and consider any available repair history. Could the fault be a repetition of a previous problem or incorrect repair?
3. Consider any special circumstances associated with the failure; lightning, power failure, maintenance activity, fire, water damage, rough handling, etc.
4. Is the problem subtle or a catastrophic failure? If it is a subtle failure, look for a subtle fault and if it is catastrophic failure, look for a catastrophic fault.
5. Is this an intermittent or solid failure? If it is intermittent, look for an intermittent fault. Determine the catalyst- heat, humidity, vibration, etc.

Always physically inspect the circuit card. Note the revision level, switch settings, and anything out of the ordinary that could be a clue to the problem. The following is a checklist of items a technician should look for:

1. Take note of the board ID and revision level. This is of particular importance when comparing two boards. Be sure you are not hunting revision changes instead of faults.
2. Visually check for indications of rough handling; scratches, buckling, cracks, etc. When a scratch is found across a trace, always check for continuity with your Tracker in LOW range even if it looks okay.
3. Intermittent faults can be caused by fractures. Hold the board up to a bright light and look for cracks. Check for trace continuity while gently flexing the board if cracks are found anywhere on the card.
4. Take note if the board is multilayered. The more layers a board has the more difficult it will be to trace foils and component interconnections.
5. Inspect the soldering on the board. Look for poor quality, shorts, opens, cold solder joints, and fractures around hot components.
6. Closely inspect previous repairs. Verify that the proper components were used and were installed in their proper positions. Check for continuity from traces to pads with your tracker in LOW range. Look for tiny cracks in pads and traces, they can be intermittent. Verify continuity through eyelets.
7. Inspect the board for damaged foil runs that may be pulled up, burnt or discolored.
8. Inspect mod wiring, the leads can break loose at the solder points.
9. Be aware that unclipped component leads may bend over and cause short circuits.
10. Visually inspect the component side of the board for broken or missing components. Large or

precariously mounted parts should be given special attention.

11. Check all plug-in components for legs that may be bent or folded under.
12. Check for blown fuses and heat stressed components. Don't forget your nose- some components may appear in good condition while internally heat damaged. Sniff for the tell-tale "burnt electronics" odor.
13. Look for swollen or leaky electrolytic capacitors.
14. Take note of switch settings, option blocks, eeprom revision levels, and strapping. This is very important when doing good/bad board comparisons with a Tracker.
15. Inspect any previously cut component legs or traces for proper reconnection.
16. Resistors are easily fractured by mechanical shock. Gently push suspected resistors to verify their condition.

It is important to verify the fault, if possible. No one wants to waste time looking for nonexistent or incorrectly diagnosed problems. Operate the board in the same environmental conditions, if possible.

Think before you leap. If a stereo has a noisy left channel, you shouldn't start by troubleshooting the right channel or the power supply. You would look in the left channel circuitry for a possible intermittent.

Test and verify after each repair procedure. After the inspection, there may be some repair required. Test the operation of the board after the work is completed. When tested, if the symptoms change for the worse, go back and check the work you have done before going on to look for the original problem.