California Antique Slots, Inc. – (805) 583-0785 (FAX)
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Troubleshooting Electrical Components

The following list shows the order in which you should check components (with or without the schematic diagram or manual) based on the probability of them being defective:

1. First, look for components which burn out or have a tendency to wear out, i.e. mechanical switches, fuses , relay contacts, or light bulbs. (Remember, that in the case of fuses, they burn out for a reason. You should find out why before replacing them.)

2. The next most likely cause of failure are coils, motors, transformers and other devices with windings. These usually generate heat and, with time, can malfunction. Some of the causes of failure are: heat, over or under voltage, normal component aging. Some problems can be visible such as exploded components, or, more often, they could look perfectly good and require meter testing of each component.

3. Next, look at discrete components. These would be: electrolytic capacitors (replace these after five years in any 24-7 environment), power dissipating carbon or wire-wound resistors (1 watt or greater), switching transistors, power transistors, and diodes. Look for scorched, burned or discolored regions on PC boards, indicating excessive heat. Some burnt components, damaged through excessive current, cannot be seen easily, but a magnified visual inspection with a magnifying glass, light source (both white and UV) or the odor can indicate the presence of a damaged component. Bulging components are good indicators of multiple problems, especially for electrolytic capacitors. Look at the components nearby the failed ones.

4. Connections should be your fourth choice, especially screw type or bolted type. Over time these can loosen and cause a high resistance. In some cases this resistance will cause overheating and eventually will burn open. Connections on equipment that is subject to vibration are especially prone to coming loose. Look for connections that are held together with plastic Molex connectors. These plastic housings can be brittle after being in a high-heat area of a 24-7 machine.

5. Finally, you should look for defective wiring. Use your sense of smell! Burned insulation, plastic, components and solder all have a unique odor. Pay particular attention to areas where the wire insulation could be damaged causing short circuits. Don't rule out incorrect wiring, especially on a new piece of equipment. Inspect the PC board traces carefully. These are the conductive pathways, tracks or signal traces etched from copper/silver coated sheets and laminated onto the non-conductive substrate. Some of the causes are: power surges, lightning strikes, use of inappropriate acid core solder causing shorts, contamination such as metallic dust. Trace damage is often visible to the naked eye and can often, though not always, be repaired.

Although this is not an official step of the troubleshooting process it nevertheless should be done once the equipment has been repaired and put back in service. You should try to determine the reason for the malfunction.

- Did the component fail due to age?
- Did the environment the equipment operates in cause excessive corrosion, heat damage, etc?
- Did the component fail due to improper use?
- Did it fail due to incorrect soldering or mounting?
- Is the component in question incorrect for the installation?
- Are there wear points that caused the wiring to short out?
- Is there a design flaw that causes the same component to fail repeatedly?

Safety First!

Make all checks with the power off first, unless indicated otherwise. Work with a partner, be trained and be able to provide first aid, and CPR. Have an AED (Automated External Defibrillator) accessible.

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Slot Machine Electrical Check

Date and Time:
Location:
Name of Game:
Denomination:
Model Number:
Serial Number:
Type of Game:

Component Type	Visual Check (power off)	Electrical Check (power on)	Pass or Fail - (Explanation)
Phase 1 Check			
Mains Power Check			
Line Cord			
Mechanical Switches			
Fuses			
Ground			
Relay Contacts			
Light Bulbs			
Other			
Other			
Other			

Component Type	Visual Check (power off)	Electrical Check (power on)	Pass or Fail - (Explanation)
Phase 2 Check			
Coils or Solenoids			
Motors			
Transformers			
Other Devices with Windings			
Other			
Other			
Other			
Other			
Other			

Component Type	Visual Check (power off)	Electrical Check (power on)	Pass or Fail - (Explanation)
Phase 3 Check (part A, passive components)			
Electrolytic Capacitors			
High-wattage Carbon Resistors			
Low-wattage Carbon Resistors			
High-wattage Wire-wound Resistors			
Potentiometers			
Printed Circuit Board Regions			
Tantalum Capacitors			
Inductors			
Other			

Component Type	Visual Check (power off)	Electrical Check (power on)	Pass or Fail - (Explanation)
Phase 3 Check (part B, active components)			
Diodes			
Bridge Rectifier(s)			
High-speed Diodes			
Zener Diodes (usually with a resistor in series)			
Bipolar Transistors			
MOSFETS			
OPTO-Electronics			
Digital ICs			

Component Type	Visual Check (power off)	Electrical Check (power on)	Pass or Fail - (Explanation)
Phase 4 Check			
Mechanical Connections			
Electrical Connections			
Soldered Connections			
Screw-type Connections			
Bolted-type Connections			
Printed Circuit Board Foil			
Molex Connectors			
Other Connectors			

Component Type	Visual Check (power off)	Electrical Check (power on)	Pass or Fail - (Explanation)
Phase 5 Check			
Defective Wiring			
Incorrect Wiring			
Incomplete Wiring			
Potential or Actual Short Circuits			
Solder Bridges or Solder Splashes			
Exposed Wiring			
Potential Mechanical Failures			
Loose Metal Hardware or Foreign Matter			
Other			

Summary:
Assessment:
Recommendations:
Name of Casino Supervisor:
Signature:
Thomas R. Baker - California Antique Slots, Inc.
Signature:
Date/Time: