QA Technology Company, Inc.

A p p l i c a t i o n s N o t e

Probe Maintenance

Test probes used in production testing will eventually get dirty enough to cause contact problems. The following steps will eliminate contact problems caused by dirty probes:

1. Practice preventive maintenance on fixtures, test boards and the test environment to prolong probe life.
2. Use techniques approved by the probe and fixture manufacturers to clean the probe tips.
3. Develop a maintenance program, which defines intervals at which probes are cleaned or replaced.

1. Preventive Maintenance:

Some recommendations to help keep test probes clean in the first place:

Test Environment – The test environment is one of the largest contributors to probe contamination. Minimize airborne contamination such as dust, clothing fibers or particles from a nearby wave-solder machine to improve contact reliability.

Circuit Boards – Printed circuit boards, which are being tested, should be as clean as possible. If testing boards coated with no-clean flux, choose low-solids fluxes and fine-tune process controls to minimize the amount of flux applied to the board. Testing contaminated boards will not only cause poor contact on new probes, but will leave residues behind on the probe tips, which impede the next test as well.

Dust Covers – Use dust covers over idle fixtures to prevent airborne contaminants from settling on the probe tips. In the case of vacuum fixtures, dust that settles on the board test area is drawn directly onto the test probes when the fixture is first put into use.

Air Filters – When a vacuum fixture is released, room air rushes into the fixture around the test probes. Protect the probes from airborne contamination by installing an air filter in the release port.

Receiver Bays – Like the probes in test fixtures, probes which are exposed on a test system's receiver bay should also be protected. Keep bays covered with either a dust cover or a test fixture, and maintain clean electrical contact surfaces on all fixtures.

2. Probe Cleaning:

In some cases, especially in high volume production (where the probes see many cycles over a short time) it may be practical to clean the tips of the probes.

Virtually all manufacturers of low-resistance, long-life probes use some sort of lubricant to prolong the life of the probe's internal sliding contact surfaces. Cleaning a probe by bathing it in Freon or other solvent will remove this important lubricant. Even spot cleaning the probe tips with solvent can wash particles down into the critical internal surfaces where they can drastically affect performance.

To clean probe tips, remove lint, fibers, flux, and other contaminants by gently brushing the probe tips with a small brush and vacuuming away the dislodged particles. A brush with nylon or natural fiber bristles works well; metallic bristles may damage the probe plating and are not recommended.

3. Maintenance Programs:

A practical maintenance program for fixtures can save considerable time and money at the production level. Testing becomes more reliable, thus reducing the chance of false failures and lost rework expense.

Diagnosing contact problems as they arise and replacing test probes one at a time is more expensive than replacing probes on regular intervals. Use cycle counters on test fixtures to help establish a maintenance program, which calls for cleaning or replacing probes after a predetermined number of cycles.

Developing such a program requires some tracking to determine the average life of the probes in a particular application. Since test conditions vary widely, it is difficult to generalize probe life. Some applications call for replacement as often as every few thousand cycles, while probes in clean environments or applications with wide electrical tolerances can last far longer.

Better test yields and reduced downtime are the rewards for keeping fixtures and probes in top condition.