



Seamark ZM

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Bead probe technology - increase ICT test coverage

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Bead probe technology is an exclusive patent application by Agilent (Keysight Technologies). Using existing wiring to increase ICT (In-Circuit-Test) test point coverage without additional board space, to increase printing. Test points on the board to achieve assembly ICT testing can be used for ICT testing purposes.

The density of the parts on the board is getting denser and denser, but the space is getting smaller and smaller, especially the board of the mobile phone. The first thing to be sacrificed is the test point that does not have any function. Many bosses think: "Quality is manufactured, As long as the quality of the board assembly is completed, there is no need for subsequent electrical testing. Which engineer can guarantee that the product does not have a bug? The assembly plant also cannot guarantee that they have zero defects in assembling the board.

Various design and assembly challenges are showing that it is difficult to abandon the traditional ICT, and only other methods



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(such as AOI, AXI) to ensure the quality of the PCB assembly, so more and more Many companies are starting to use ICT again, but the space on the board will get smaller and smaller only, and there is room for test points, so smart Agilent came up with this kind of trace on the existing trace. The method of printing solder paste replaces the "bead probe" method of the test point. The purpose of Agilent is of course to hope that the entire electronics industry can continue to maintain ICT operations, and purchase more of its 3070 series ICT test machine from them.

The traditional ICT test method uses a pointed probe to form a loop on a circular test point. This method requires a large area of test point, and then the probe must be shot like a target. , it needs to use more board space; the bead probe technology is just reversed, it wants the test point to try not to occupy the space of the board, in order to form a loop with the probe, so the solder paste is printed, let test point becomes higher, and larger diameter flat probe (50, 75, 100 mils) is used to increase the chance of contact with the test point.

In theory, this is really a big breakthrough in test points, but there are still many techniques to overcome in practice.



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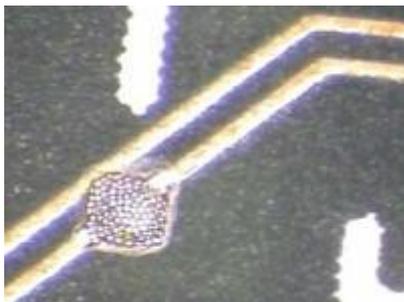
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Printing solder paste on the wiring is likely to cause poor contact between the probe and the test point due to the residual flux. For this point, a number of probe manufacturers have designed probes for use with bead probes.



(Image taken from ingun)

The printing of solder paste needs to be very precise. In particular, the lead-free solder paste cohesion is worse than tin-lead solder paste, which requires more precise solder paste printing. The high tin-printing amount determines the solder height. If the soldering height at the test point is not enough, the ICT misjudgment rate will increase. . This involves the solder paste printing process, the accuracy of the steel plate, and the tolerances of the board.





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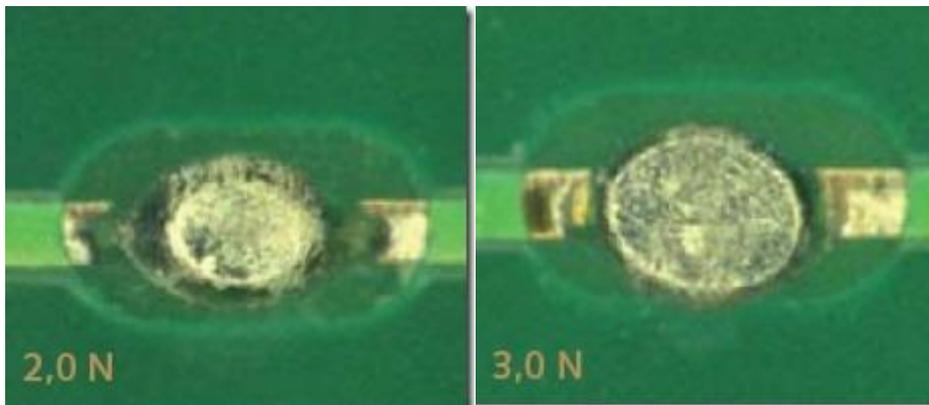
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If the width of the wiring is too small, it is easy to be inadvertently inferred by the probe, or other external force due to insufficient adhesion. In general, it is recommended that the minimum wiring width be more than 5 mils. It is said that some operators have successfully tested 4 mils, but as the width of the wiring is smaller, the misjudgment rate of ICT is higher. It is recommended to increase the width of the wiring and then mask it with green paint, which will be stronger.



(Image taken from ingun · These beads were pressed into the shape of the probe beads with a force of 2.0 N on the left and a force of 3.0 N on the right.)

- Does the use of bead probe technology affect the quality of high frequencies? According to Agilent's test report, it will not affect the performance of high frequencies.



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- Is there a capacitive or antenna effect using the bead probe technology? According to Agilent's response, there is no such problem in the current test and customer response.
- What is the reliability of the bead probe technology? According to Agilent's reply, there were no problems with testing 200 cycles.

In addition, Agilent strongly recommends that the factory use this bead probe technology. It is best to have a test period of more than six months, because it needs to choose solder paste, fine-tuning the opening of the steel plate, the amount of solder paste, and Adjust the type and accuracy of the ICT test probe. Therefore, in the initial experiment, it is best to have both traditional round test points and new bead test points on the board.