wireflow

Design Guideline

Production Test

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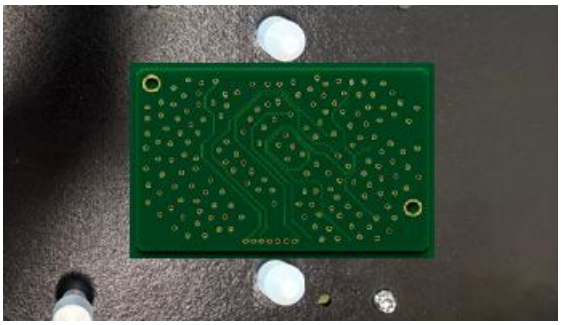
AB0230-007, rev A

Design Guideline for Production Test

This guideline helps you to create a PCB that is ready for production test.

Guiding holes in the PCB

- There must be at least 2 guiding holes in the PCB.
- Do not use “half holes” at the PCB-edges, they will not give the same precision as complete holes.
- The dimension of the guiding holes should be at least 3 mm.
- Make sure that the PCB-specification states that the guiding holes must be drilled, not milled. Drilled holes has much better position- and dimension-tolerance.
- Place the guiding holes as long as possible from each other (the precision gets higher with greater distance).
- Avoid using plated guiding holes (the dimension on plated holes can differ from batch to batch).
- Make sure that there are no high components around the guiding holes (at the fixture-bottom-side of the PCB). Such components can easily get knocked off when the board is placed in the fixture.
- Place the guiding holes asymmetrical in the PCB, add a blocker in the fixture. Then the operator will be forced to place the PCB correctly oriented in the fixture. See picture below.



PCB Test points

- The test-point-dimension should be at least 1mm. Absolut minimum is 0.89 mm.
- The distance between the test-points shall be at least 50 mill which means 1.27 mm.
- If possible, place ALL the test-points on the same side of the PCB. This will be the bottom-side when the board is placed in the fixture. A fixture that has all the test-points on the bottom-side is much cheaper than a fixture that can connect to the DUT from both sides.
- It is OK or even better to use plated holes as test-points. If needed, these can be connected from both sides of the PCB.
- Via-holes shall NOT be used as test-points, it will cause insufficient contact and lot of problems.
- Try to not place test-points close to THM-components, there is a risk that the selective soldering will cover the test-points with flux and generate connection-problems between the probe and the test-point.
- There is normally no need to create test-points for signals/voltages at THM-component-pins. It is possible to put fixture-probes directly onto the THM-component-pins.

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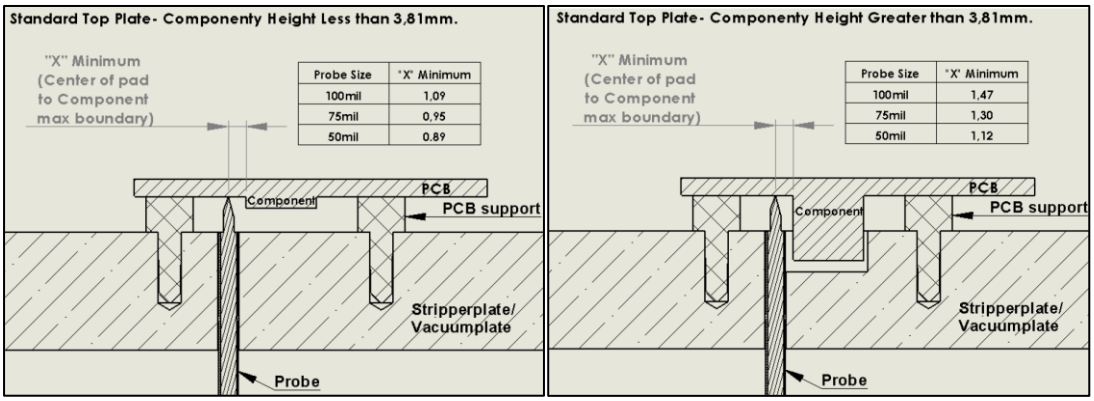
- There is normally no need to put test-points on oscillators or crystals, and that can cause functional problems for the product. This can apply to other signals as well (be careful with adding test-points on important signals that are sensitive, this can cause an instable product).
- It is normally a good idea to have test-points for all the supply-voltages, boot-signals and reset-signals. It is also good to have several test-points for GND. Signals/voltages in FFC-connectors must have test-points (it is not preferable to build test-fixtures that requires FFC-cables).
- Test-fixture manufacturers require a specific distance between a test-probe and DUT-components beside the test-point. The required distance depends on the height of the component and thickness of the test-probe. These guidelines are based on fixture drilling requirements and not on any board related keep-out requirement (which may require even more distance). In the two pictures below, you find an example of the fixture manufacturer Columbia requirements in mm (the pictures are from Columbias document “Design for Testability Guidelines” Revision A).



- Enough space between the centre of a guiding hole and the centre of a test-point is also required. This requirement is related to a need for space when using a specific insertion tool when assembling the fixture. As an example, Columbia requires a minimum of 7 mm.

PCB silk

- Mark up each test-point with its number in the silk.
- Mark up pin 1 for each connector and polarized component in the silk. In addition, it is also preferable to markup connectors with pin 2 and the last pin-number.

Coating

If the product shall be coated it is important to try to keep test-points at areas where there is no need for coating. Then it will be possible to test coated units like reclaims from the field.

Housing

If the product shall have a housing it is a good idea to evaluate if there is a need for production test after the assembly of the housing. In that case the housing may need holes for test-probes and guiding pins, and this may have impact of the positioning of the test-points and guiding holes of the PCB.

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