Planning

Materials required shall be gerber files, fixture files, and a sample loaded board. A PO will trigger the approval of a project. Initial processing will commence upon approval and all materials required are received. Initial review by the front-end department will be necessary to validate board placement and testpoint selection. If any issues arise, the customer will be notified. Start time will be set for the project after the front-end department has determined that there are no issues, or all issues have been resolved.

Front End Engineering

Test points will be inspected and compared against the sample board and the gerber files for validity.

For Agilent 3070 fixtures, all power supplies, g/p relays personality pins will be added to the fixture drill file.

Front End Design Considerations:

Tooling hole selection and placement should be two diametrically-opposed non-plated holes, typically .125 diameter, as far apart as possible.

Test vias or pads less than .028 in. diameter will require guided probe plate, and .023 in or less will also require zero flex machining. Use of 39mil probes greater than 25 qty will require both guided probe and zero flex drilling/machining.

Quantities of over 500 ea 39mil or 2000 ea 50mil probes will require use of X-probes.

Allocate one (1) pushfinger for every seven (7) 6.5oz probes. Less dense probe areas will receive 1 pushfinger per ¾ sq. in.

If there are about 100 testpoints under BGA devices 1 sq.in. or more, install sufficient number of push fingers for counter force or install perimeter push frames to surround the BGA, whichever method the space would allow. If there are more than 100 probes, consider lowering the probe force. Also consider using spring support blocks on the BGA with prior approval from the customer.

When using spring support blocks, there will always be a gap designed to allow the spring block to compress as required, not a solid push against a BGA component.

Densely probed connectors shall be supported with push blocks.

There should be a clearance of 50mil surrounding a component from any fixture hardware or milling cutouts.

Customer shall be notified immediately of any discrepancies in board revision, gerber revision, testpoint deviations, and support blocks directly applied on components

Drilling

All holes will be drilled according to the probe manufacturer's specifications.

Holes indicated as "blind holes" will be partially drilled.

Any probes that reduce the wall thickness between holes to less than .010 inch will be changed to the next smaller size.

Holes will be drilled in such a way as to minimize drill wander. There will be no wall breakage in the probe plate.

Probes and Receptacles

All probes used will be made by QA, steel tipped if applicable.

Vias and testpads will be tested with razor probes 6RH-S style.

Leads will be tested with crown probes 34H-S style. If guided probe is used, the probes will be headless crown 44H-S.

Non-populated through-hole components will be tested using slotted chisel probes 18H-S style.

Receptacles will be wire-wrap tail for 100mil, 75mil and 50mil testpoints, plug-type for 39mil testpoints.

Tooling Pins

Tooling pins will be made of hardened steel, turned to .0025 to .003 inch less than the non-plated tooling hole diameter, as per the fab drawing. The actual board will be used in the absence of a fab drawing. If the only tooling holes available are plated holes, the tooling pins will be turned to .004 to .005 inch less than the tooling hole diameter in the fab drawing.

Tooling pins will be mounted on the probe plate for standard fixtures, and on the support plate for guided probe fixture.

Tooling pins will be mounted so that its tip is .150 inch from the board surface.

Wiring

For Agilent 3070 fixtures, 50mil, 75mil and 100mil testpoints will be wired using 28 AWG wire. Thirty (30) AWG wire with jacks crimped on one end will be used for 39mil testpoints. If fixture has a ground plane, ground stakes will be installed .150 inch from the pin or receptacle, and the wires wrapped onto the ground stake.

For Teradyne fixtures, different color wires will be used for every row. Power supplies will be wired using 24 AWG wire. Berg connectors will be used to plug into power pins in the interface panel.

Gate

The default gate used will be a vacuum box. It will be completely sealed with no air leaks.

A clear Lexan ½" plate will be used to hold testjets and push fingers.

If the fixture requires top test points, a single probe subplate will be used and will be made of G-10 material.

Stiffeners will be used for full-size fixtures, and as required for single bank fixtures, to prevent the top plate from flexing.

Quality Check

Wire Verification – 100% wire verification will be accomplished on the Max7 wiring verifier

Pushfinger/Board Stop Verification – Two individuals will check whether push fingers or board stops are hitting components on the board using mylar plots

Vacuum Check – The fixture will be placed on an assembly simulating the tester and air will be evacuated from the fixture to detect any air leaks

Registration – Kapton tape will be applied on the board to check probe registration under a high-power microscope. Witness marks must be within 75% of the pad or via.

Probe Travel – Indicator probes that allow measuring travel will be placed in the 4 quadrants of the board, and a fifth one in the center. The travel measured should be at 2/3 to ¾ of the total travel.

Probe Style Map – Probe styles will be checked by two individuals using a map generated by the front-end department

Testjet/IVTEP Verification – Testjet/IVTEP probes will be tested for proper operation, orientation, wiring using the Testjet Verifier designed by Agilent

Checklist – A checklist is filled out at specific stages of the fixture build and before the fixture is shipped to ensure that all aspects of the build are done correctly

Vectorless Test Assemblies

Vectorless Test may be required using Agilent Testjet or IVTEP technology or Teradyne Framescan technology.

The sensor plates will be cut to the size of the package for Testjets, and 10% smaller than the package for IVTEPs. The sensor plates will be soldered to the amp board, and the probes soldered to the amp board as well. If the tested device has a metal housing, kapton tape will need to be applied on the sensor.

If the packages are too small to fit an amp board, use of sensor plates with the amp board soldered/wired to the receptacle tail end may be necessary. The shortest wire possible will be used to connect the amp board to the receptacles. Protect this assembly with ESD-proof shrink tubing.

The vectorless test assemblies will be tested prior to delivery of the fixture to the customer.

LED Test Assemblies

LED sensors may be made by Optomistic or Testcoach depending on the customer.

Typically the sensors must be mounted .040 inch to .100 from the LED device.

Use of lightpipes and lenses may be necessary for multiplexing or accessing hard-to-reach LED devices. In this case, the lightpipe or lens should abut the sensor in order to minimize light loss.

Proper care must be taken when wiring power to the sensors.

Strain Gauge Test

BGA components or other sensitive devices may need to be tested using strain gauges to measure strain in highly susceptible areas. The customer may need to have this done prior to shipping a fixture. The customer also needs to have a loaded board available so the gauges can be mounted on it for testing.

For this test, the min and max values for principal strain need to be at or below 500 microstrain. Also the strain rates measured should be below the allowable strain rate for the board thickness being tested.

Guidelines for mounting, testing, reporting and analyzing are detailed in IPC-JEDEC 9704.