QuickFix Version 4.0

Since the introduction of QuickFix Version 4.0 with the modular frames and the self-locking Product Area Support (PAS) posts, Test Connections has experienced a dramatic increase in the number of North American & Asian printed circuit board fabricators converting from their present universal test fixture system to our patented system. What is behind this tremendous momentum? Is it a move towards cost-effective test tooling or is the industry ready for a reliable ***Universal*** test fixture system that works on the vast majority the universal grid testers (UGT)?

The larger manufacturers of ATE (automated test equipment) invested significant resources to develop and market unique universal fixture formats that were proprietary to their grid test systems. These specialized fixture systems were developed and marketed for two simple reasons; the first was to create a secondary market of test fixture products (which generally outsold the ATE market) and the second rational was to engineer a test fixture that worked well under the mechanical constraints of vendor's grid system (they understood the UGT's mechanical limits).

The most common universal test fixture format was and still is the post and donut. You can travel to any PCB shop worldwide, visit their electrical test department, and you will see some version of a post and donut test fixture. These fixtures work well with most through-hole technology and with a limited number of test points. As you increase the number of test points, add a few micro BGAs, and throw in smaller pad features, this fixture format loses its luster very quickly.

QuickFix is the first ***Universal*** grid test fixture format that was designed to handle the mechanical stresses created by the UGT's mechanical actuator (RAM or PRESS) and the spring-loaded probe field that interfaces the test fixture (electrically & mechanically). The box construction of QuickFix distributes the mechanical force from the tester's actuator and probe field without distorting the PCB under test or the test fixture. The spring force in a test probe varies depending on the spring probe manufacturer and the grid density. Generally single density grids (.100") have higher spring forces, 6.5 to 8.0 ounces (some ATE vendors use up to 10 ounces of spring force). The higher the spring force, the more reliable the mechanical contact and the more mechanical force required to reliably compress a test fixture. Double density grids (.071") are usually 4.5 to 6.5 ounces per spring probe.

We are going through these numbers for a reason. If your test fixture has 7,250 test points, which in today's environment is not a large test fixture and using 6.5 ounces as our standard spring force, it will take 47,125 ounces or 2,945 pounds of force for a reliable mechanical contact. In simple terms, a test fixture must not distort or buckle. A 20,000-test point fixture takes 8,125 pounds of force. So you can see why double density grids use lower spring tensions. Also, remember that the mechanical force generated by the tester's ram or press is fixed. It does not change with the number of test points. This is why your current test fixtures buckle and your PCBs under test distort. You can see it

when the fixture closes. Any PCB distortion means mis-registration between the rigid test pin and the test feature on the PCB. So maybe, most of your registration issues are due to unstable fixtures.

How stable is your fixture? Pick it up. Can you twist it with your hands? The vast majority of today's bare board test fixtures can be distorted just by twisting the adjacent corners. You cannot begin to simulate the mechanical forces generated by your tester. Can you stand on one side of your test fixture (top or bottom)? You can stand on our QuickFix and not distort or damage the test fixture. It seems silly, but the average male is less than 200 pounds and your UGT is going to generate at least two tons of force on your fixture. A strong rigid fixture has several benefits:

- Fewer false opens, most false opens are due to fixture instability
- Almost no false shorts, almost all false shorts are due to smaller diameter test pins collapsing and making contact inside the test fixture
- Less witness marks on the fine pitch devices, pad damage can be from unstable fixtures & PCBs distorted under test
- Better through put during the test cycle due to less verification of test faults

QuickFix provides additional cost benefits:

- The modularity allows for any fixture size based on 4.0 inch centers
- The internal slots can handle eleven (11) guide plates as you move into micro diameter rigid test pins (.010, .008, &. 005 inch)
- As the internal slots for the guide plates are not a friction fit, you can incorporate any thickness from .062" down to .020"
- The box construction aids in Quick assembly of the modular components & guide plates
- As the outside rail or box creates the stability, very few standoffs or product area supports are required in the PCB image area.

One last subject; the unique rigid construction of QuickFix allows you to utilize cost effective fixture materials. Most PCB test departments have made the expensive transition to exotic laminates for their PCB image (P1) and snap/grid plates (P8). Or in some cases, all of the test plates are made from surfaced FR-4 as a stopgap to test fixture instability. The basic function of the test plate is to hold the rigid test pin in a static position from the PCB test feature x/y vector to UGT's test grid x/y vector. Over the last twenty years, test fixture houses and test fixture engineers have thrown exotic materials and expensive machined hardware at a very simple problem. Build a fixture that does not distort under compression and you can utilize cost-effective materials to build reliable test fixtures.

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