



Polycarbonate and G-10/FR4 Test Fixture Blanks

Polycarbonate & G-10/FR4 test fixtures are used in the testing of printed circuit boards. In ATE fixtures, these polycarbonate or G-10 blanks are drilled in a specific pattern to match the circuit design and layout of the PCB. **Professional Plastics offers pre-cut polycarbonate blanks** for test fixtures used primarily in "Bed of Nails Testers".

In ATE equipment, the most popular test method is "pin-based testers" using a fixture called a "Bed of Nails". The first generation bare board testing machines used fixtures and tooling, dedicated for everyboard design. The test technique, known as the 'bed of nails' testing, consists of a bed of spring-loaded probes, each one connected to its own electronic circuitry arrayed on a matrix of 0.10" grid. Dedicated fixtures are made with a top plate drilled with the personality of the PWB and the bottom plate interfacing with the tester, with each test pin wire wrapped to a contact point on the bottom fixture.

The individual pins or "nails" as they are called, do not flex under load. The nearest spring-loaded probe below will never be more than 0.07" away requiring an attitude of less than two degrees from the vertical. This type of fixture can be dismantled at will and with the exception of the top plate unique to the board under test, and is totally re-usable. The nails and probes are pointed and gold plated for good contact. The springs are designed to obtain optimum contact pressure. The bare board testing has since evolved itself in fixture design, ability to work on finer pitches than 0.01".

Because of the generally unique nature of the test-point pattern on a given printed circuit board type, a new and different fixture is usually required for each and every different printed circuit board type tested. Since a typical user of ATE equipment may have to test many types of circuit boards each year, user must maintain many different test fixture sizes and patterns. The next generation machines use what is called as "universal" fixtures. It comprises of two tonine plates made of polycarbonate or G-10/FR4. The top plate is drilled with the personality of the PWB, the bottom plate is drilled "on grid" with 0.050" to 0.10" centers depending on test system grid configuration. The middle plate serve to displace the guide pins to their assigned locations. The pins are usually 1.1", 2.02", 2.50", 3.00" or 3.75" long and as a rule a maximum of 10% displacement on their length is allowed.

In a universal test fixture assembly, a test fixture body, a top guide plate and a bottom guide plate are used. Each guide plate includes tracks that extend from a front end to a second end of the guide plates and further includes an integrally formed latching channel that runs perpendicular to the tracks. The top guide plate and bottom guide plate are mounted in an opposing and matching relationship such that the circuit pack slidably engages one of the tracks in the top guide plate and a corresponding track in the bottom guide plate and are moveable relative to one another to accommodate circuit packs of varying sizes. The guide plates include tabs which mate with corresponding slots on the test fixture body to prevent misalignment and reduce tolerance build-ups. A second pair of guide plates are attachable to form a two-tiered structure such that two different circuit pack sizes can be accommodated in the same test fixture. The test fixture assembly uses offset mounting ears so that multiple test fixtures can be stacked together in various combinations and such that a single backplane can be used that spans all of the connected test fixtures. A polycarbonate cover is attachable to the offset mounting ears to protect the backplane and the associated pins and connectors.

- Professional Plastics can offer standard blanks (undrilled boards), or we can provide you with pre-drilled boards produced on our cnc router.

Test Fixtures may be produced from a variety of substrates depending on customer requirements.

- **Common substrates include Polycarbonate, Acrylic, G-10/FR4.**

Test Fixtures are typically used in conjunction with a Support Plate (aka Riser Plate). Support Plates are commonly manufactured from substrates such as Paper Phenolic, G-10/FR4 or Conductive FR4 depending on specific requirements. Support Plates are commonly utilized on equipment from Teradyne, Genrad, Agilent, Check Sum, TRI, TTI, ECT and Functional

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