

## Overview of Various Bed of Nails Test Fixture Features and Designs

A bed of nails tester is a traditional electronic test fixture which has numerous pins inserted into holes in an Epoxy phenolic glass cloth laminated sheet (G-10) which are aligned using tooling pins to make contact with test points on a printed circuit board and are also connected to a measuring unit by wires. Named by analogy with a real-world bed of nails, these devices contain an array of small, spring-loaded pogo pins; each pogo pin makes contact with one node in the circuitry of the DUT (Device Under Test). By pressing the DUT down against the bed of nails, reliable contact can be quickly, simultaneously made with hundreds or even thousands of individual test points within the circuitry of the DUT. The hold-down force may be provided manually or by means of a vacuum pulling the DUT downwards onto the nails.

Devices that have been tested on a bed of nails tester may show evidence of this after the fact: small dimples (from the sharp tips of the pogo pins) can often be seen on many of the soldered connections of the PCB.

Typically, four to six weeks are needed for the manufacture and programming of such a fixture. Fixture can either be vacuum or press-down. Vacuum fixtures give better signal reading versus the press-down type. On the other hand, vacuum fixtures are expensive because of their high manufacturing complexity. The bed of nails or fixture as generally termed is used together with a in-circuit tester.

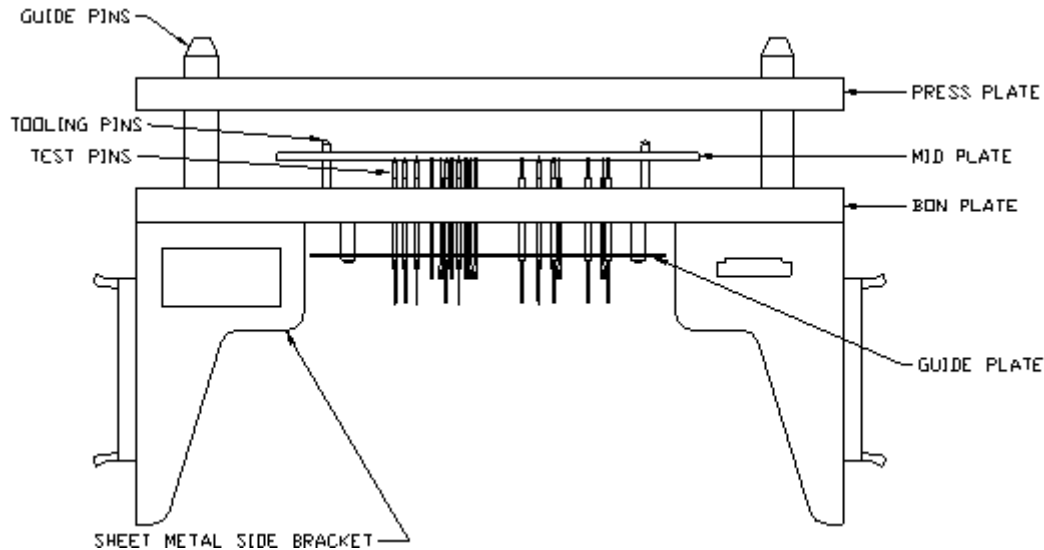
In circuit testing (ICT) is traditionally used on mature products, especially in subcontract manufacturing. It uses a bed-of-nails test fixture to access multiple test points on the PCB's bottom side. With sufficient access points, ICT can transmit test signals into and out of printed circuit boards at high speed to perform evaluation of components and circuits.

A bed of nails tester is a traditional electronic test fixture. It has numerous pins inserted into holes, which are aligned using tooling pins to make contact with test points on a printed circuit board and are also connected to a measuring unit by wires. These devices contain an array of small, spring-loaded pogo pins making contact with one node in the circuitry of the device under test (DUT).

By pressing the DUT down against the bed of nails, a reliable contact can be made quickly with hundreds and in some cases thousands of individual test points within the DUT's circuitry. Devices that have been tested on a bed of nails tester may show a small mark or a dimple which comes from the sharp tips of pogo pins used in the fixture.

It takes a few weeks to create the ICT fixture and do its programming. A fixture can either be vacuum or press-down. Vacuum fixtures give better signal reading versus the press-down type. On the other hand, vacuum fixtures are expensive because of their high manufacturing complexity. The bed of nails or in-circuit tester such as 3070 from Agilent is the most common and popular in the contract manufacturing environment.

# Bed of Nails type Test Fixtures



## High Accuracy Design Features

**This 4 plate mechanical design provides:** Probing accuracy of  $\pm 0.002$ " Repeatability of  $\pm 0.0005$ " Increased probe pointing accuracy beyond the probes actual ratings. Increased probe life when compared to other fixture designs.

## Plate Set Mechanical

The High Accuracy Test Fixture plate set includes 4 plates

1. The top plate, Press Plate, is a 1/2" FR-4 (G-10) plate which contains press down fingers which press the board under test down against the BON (Bed Of Nails Plate). This press plate may also contain test probes and transfer pins for double sided testing.
2. The Mid Plate is a 1/8" Teflon impregnated Delrin plate which is machined out in 3 elevations to precisely form fit to the components on the board under test. This 3 level machining prevents thin walls between components which can break loose and give false test failures. The Mid Plate is also drilled to slip fit on the heads of the test pins. The first function of this Mid Plate is to hold the board under test above the probes while the fixture is open. The second and most important function of this Mid Plate is to guide the probes to the exact centers of the test pads on the board under test as the fixture closes. Thus increasing the probe pointing accuracy beyond the probes actual ratings.
3. The Bed of Nails Plate, (BON) Plate, is a 1/2" FR-4 (G-10) plate which contains the test pins, tooling pins which align the PCB under test, and two 1/2" Stainless Steel guide pins which provide alignment for the Turcite Bushed Press Plate. The BON Plate also contains two sheet metal side brackets for wired connector mounting. This BON Plate is one complete wired removable replaceable module that can be inserted and removed from the fixture with only two screws.
4. Guide Plate is a 1/32" FR-4 (G-10) plate which contains a hole pattern duplicating the BON Plate. This plate provides extra support needed for the smaller test pins (50 mil and under). This Guide Plate provides the receptacles with support from the bottom. The plate is mounted to shroud the bottom of the probe receptacles. This Guide plate eliminates receptacle bending which in turn helps to increase accuracy, but mainly increases probe life 2-3x over the basic fixture which simply supports the probes from the top swage ring only.

For any of the materials, Call **PROFESSIONAL PLASTICS** at **(888) 995-7767** or  
E-Mail: [sales@proplas.com](mailto:sales@proplas.com)  
Order Online at [www.professionalplastics.com](http://www.professionalplastics.com)

Asia Customers Call + 65-6266-6193 E-Mail: [asia-sales@proplas.com](mailto:asia-sales@proplas.com)