Problem Solved

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# The Specification Maze: From Confusing to Crystal

## A new characterization standard allows buyers to compare placement machines from several different vendors.

### Problem:

Sellers of any type of product naturally seek to present their own wares in the best possible light. But customers have a difficult time understanding how a product will perform in practice, be it capital equipment, personal digital assistants (PDAs), hi-fi or white goods. So how do buyers of assembly equipment make a valid comparison among several candidate placement machines?

When choosing a placement machine, accuracy and throughput are the top two concerns. Since one usually comes at the expense of the other, predicting whether the manufacturer's quoted figures will ever be achieved on the shop floor is tough. Comparing accuracy specifications from a range of manufacturers, with raw data quoted in $C_P$ or $C_{PK}$ at widely differing values of sigma, is particularly difficult. The figures must also be balanced against the manufacturer's specifications for repeatability, reliability and availability.

Buyers have historically had to invest considerable time to understand the methods each prospective supplier uses to verify its equipment. But an emerging set of performance benchmarks, agreed upon by placement equipment vendors, allows customers to compare placement equipment directly, without the need for lengthy research.

### Problem Solved: Introducing IPC 9850

Buyers need to compare like with like to understand how a machine will behave on their shop floor. To enable comparison, the leading placement machine suppliers have established a set of tests that compare machines from all manufacturers against each other. The machine performance tests and reporting form have recently been ratified as IPC-9850 Surface-Mount Placement Equipment Characterization.

### Scope of the Tests

IPC-9850 standardizes the parameters, measurement procedures and methodologies used to specify, evaluate and continuously verify equipment characterization parameters. The standard establishes a relationship between placement accuracy and speed because these parameters must be tested simultaneously.

To characterize to IPC-9850, a machine must populate a number of standard panels requiring patterns of up to five standard component outlines representing the range and type of components that mainstream manufacturers are placing. The components include standard 0603 surface-mount device (SMD) passives; standard 16-pin small-outline integrated circuits (SOIC); 225-pin ball grid arrays (BGAs); 100-pin quad flat packs (QFPs); and 208-pin QFPs.

For the tests to be applicable to high-speed placement, flexible fine pitch and platform machines, each can be characterized using a subset of these components. However, the components selected must be specified in the reporting form.

### Customer Benefits

Equipment vendors can use the test kits to publish representative specifications for machine types in their catalogues and to compile characterization reports to be shipped with each machine.

The kits allow users to carry out their own characterization procedures using IPC methodologies. Users are empowered to independently audit vendors' claims before committing to a particular platform and can perform accurate acceptance testing when equipment is delivered. They can also re-characterize equipment on the shop floor at any time.

Broad acceptance of the standard will encourage vendors to quote machine performance figures derived from tests developed by industry consensus. Specification sheets published by equipment manufacturers should provide an accurate representation of how the delivered machine will perform.

One final note: IPC-9850 covers only performance parameters. Factors such as cost, footprint, software features and vendor support are not covered. Customers must still decide which of these factors are most important to them. ■

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