ATE

4500 Series Flying Probe

Flying Probe System offering flexible test solutions to the electronic manufacturing industry

- Pure fixtureless test
- Short program development times
- Improved test accessibility
- NetzTest intelligent shorts test
- Up to 1020 additional fixed pins
- Optical inspection
- Toolkit of test techniques

Why Use a Flying Probe Tester

PCB test techniques using conventional bed-of-nails testers require custom made fixtures to allow interface to the tester’s measurement hardware. This poses several issues:

- The cost factor of a fixture per PCB design
- The fixture design and build time
- Fixture redundancy due to changing PCB designs
- PCB testpoint accessibility

The use of fixtures within a prototyping and low volume manufacturing environment are therefore uneconomical as test costs per unit become unacceptable. The Aeroflex 4500 removes the need for fixtures and greatly reduces the time and cost in developing PCB test solutions.

Time To Market

One of the key selection criteria for any ATE is the time taken to produce a test solution. This becomes critical when looking at test requirements for new product introduction. The Aeroflex 4500 is the only flying probe tester available that provides a complete software solution where CAD design translation through to a complete test program is handled by a one company integrated software suite. This integrated approach ensures that test programs of the highest quality can be produced quickly and easily.

The Aeroflex 4500 Flying Probe Test System enhances the automatic test equipment product portfolio offered by Aeroflex. By providing the most flexible flying probe test solution on the market, the Aeroflex 4500 is the first choice for new production introduction and low to medium volume manufacturing test requirements.

Using the latest in flying probe hardware technology and innovative software techniques, the Aeroflex 4500 guarantees short turnaround and low cost PCB test solutions. The use of automatic program generation techniques importing CAD design information, powerful graphical debug tools and state of the art fixtureless probing techniques allow program commissioning times in the region of hours, rather than weeks, to be achieved.
Low Maintenance Costs
Each of the 4 heads of the Aeroflex 4500 moves over a fine bed of air supplied between the head and the plate they run across. This provides friction free motion and greatly reduces the ongoing maintenance costs. All 4 heads are independently controlled ensuring any head can go to any position. This flexibility is paramount in ensuring the maximum throughput for any test program, as no restrictions are placed on the heads during motion.

Short Program Generation Times
Standard bed of nails test program generation packages need to provide program and fixture information in just two dimensions, X and Y. Producing test programs for a flying probe system requires a three dimensional approach so that the height of all components on the board are taken into account to avoid collisions. The Aeroflex 4500 provides all the software tools required that can automatically produce a three dimensional test program that is fully optimised for head movement.

Other software tools provide simple to use graphical interfaces to perform other tasks that may be required for a flying probe test. For example

- Assigning keep out areas
- Assigning target probe points for different access point styles (pad, via, SMD leg etc)

The program generation software has been proven over many years. Tests are automatically generated for components with circuit analysis algorithms used to ensure that the most accurate and efficient test is generated.

Graphical Programmer/Operator Environment
The Aeroflex 4500 provides a graphical debug and operator environment that can be set up with different password secure security levels. A range of debug tools allows the user to easily modify test parameters

- Add guards to isolate components
- Pinpoint the location of components
- Change the probing position on any net

The programming language used on the Aeroflex 4500 is Visual Basic which provides a simple to use operator interface with the flexibility required to allow programmers to provide solutions for more advanced test techniques.

Optimised Test Throughput
To ensure the maximum throughput for any flying probe test, the Aeroflex 4500 uses optimisation algorithms to ensure the fastest possible test times. Optimisation ensures that every test program

- Has the minimum number of head movements
- Has the shortest route for each head movement
- Has a maximised component test to head movement ratio so there are more tests per move

Using normal flying probe techniques shorts testing can be up to 80% of any test program. The Aeroflex 4500 offers two shorts test techniques to resolve this problem. Firstly, a modified shorts test can be applied which will produce shorts tests only between nets that are likely to get a short. Only nets that have points that fall within a specified distance from another net will have a shorts test produced.

The Aeroflex 4500 also offers NetzTest, a technique that can drastically cut program run times. NetzTest greatly reduces the number of head movements required during a test thus reducing the runtime. By taking a combination of measurements between a net and it’s associated ground, the NetzTest technique can ascertain the presence of a short. Automatic diagnostics routines then pinpoint where the short is too. Using these shorts techniques ensures that test coverage is kept high while reducing runtimes drastically over standard shorts test techniques.
Fixed Pin Access

Test times can be further reduced with the use of fixed pins. Large savings can be made with the use of very few fixed pins. By providing fixed pin access to VCC and GND, for example, can greatly reduce the number of movements required by the flying heads. Any board can be accessed by the following means

- Magnetic fixed pins
- Through connector on a board
- Through a fixture

The camera supplied with the system is used to provide an accurate visual means of placing the magnetic fixed pins.

The Aeroflex 4500 has the capability of providing up to 1020 fixed pin channels. This provides the system with flexibility of providing a purely fixtureless test through to emulating a bed of nails system. One system can then cater for products that start at low volumes and ramp up during the length of the product life cycle.

Test Technique

To ensure the highest possible test coverage, the Aeroflex 4500 provides a comprehensive suite of test techniques. In addition to the standard MDA component test techniques, power can be applied to a board allowing full in-circuit testing.

The quality of the unit can be further assured by using a range of additional test techniques

- Automatic optical inspection (AOI)
- Boundary scan
- Device programming
- Opendcheck vectorless test
- Functional test modules
- Serial communication modules

Maintenance support

With one of the smallest footprints in the market, 16 A single phase mains connection and filtered air supply, the Aeroflex 4500 is easily serviced and requires very low maintenance.

Aeroflex offer the same level of service for the 4500 as for all Aeroflex ATE products with full maintenance contracts to customer specific contracts that cater for all differing customer requirements.

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**SPECIFICATIONS**

**Basic 4500 Series**

Four independently controlled test heads

Capability of up to 1020 additional fixed pin channels

**Controller**

Internally placed industrial PC (Windows NT)

17" SVGA 1024 x 768 monitor

**Software**

CAD translation with over 50 different translators for all major CAD design packages

Program generation software

System software inclusive of Visual Basic license

**Accuracy**

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<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Resolution in XY plane</td>
<td>1 µm</td>
</tr>
<tr>
<td>Repetitive accuracy</td>
<td>25 µm</td>
</tr>
<tr>
<td>Resolution in Z plane</td>
<td>1 µm</td>
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<tr>
<td>Maximum topside component height</td>
<td>50 mm</td>
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**Operating Conditions**

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<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Mains supply</td>
<td>230 V</td>
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<tr>
<td></td>
<td>47 Hz - 63 Hz (IEC309 16 A single phase)</td>
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<tr>
<td>Dimensions</td>
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<td>Weight</td>
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<td></td>
<td>Pre-filtered with 40 mm filter</td>
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<td></td>
<td>Min. 5 bar</td>
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<tr>
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<td>200 Nl/min consumption</td>
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For the very latest specifications visit [www.aeroflex.com](http://www.aeroflex.com)
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