

Industrial field: Circuit boards, Semiconductors Operational category: Manufacturing and production lines

# **Probe Card and IC Test Socket Testing System**

#### **Key feature**

This article introduces a system that's capable of flexible, high-speed testing of probe cards and IC test sockets used in semiconductor testing.

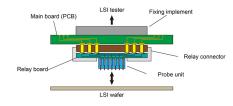




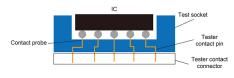
## Need for probe cards and IC test sockets in semiconductor testing

When a semiconductor tester operates 24 hours a day, new probe cards and IC test sockets must be installed and verified either by pausing normal testing or while the tester is not being used. If this process cannot be performed in a quick and integrated manner, production will be adversely affected. To that end, it's essential to eliminate products with irregularities by means of shipping inspections. That said, increasing man-hours spent on shipping inspections to implement such measures can increase costs and compromise profitability. The current approach suffers from the following issues:

- The need for time-consuming adjustment and verification prior to shipment
- Missed defects due to careless mistakes
- Increased work time due to reliance on individual workers
- Higher workloads due to long working hours



Probe card structure



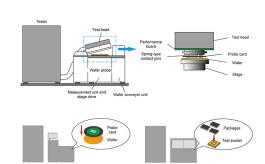
IC test socket structure

### **Testing issues**

Currently, workers carry out these tests by inserting a connection test head into one IC socket at a time. Since the test heads are not fixed in place, the state of contact varies with the worker's movements, and the testing process tends to be characterized by poor yield due to issues like needing to repeat tests a number of times.

Workers must do their utmost not to change their movements during testing. The effects of such movements, as well as the workload, increase as the test time for each IC socket lengthens. In summary, testing is characterized by the following issues:

- Poor yields and time-consuming tests
- Omitted tests and missed defects due to careless mistakes
- Variability in test results due to dependence on individual workers
- · Higher workloads due to long working hours





## Realizing high-speed testing and high maintainability

The Short-Open Tester FA1221 and In-Circuit Tester FA1220 incorporate a circuit switch (scanner) and resistance meter into a compact enclosure that implements test sequences created using a computer application. An integrated I/O board allows the system to interoperate with external drive systems. By performing tests while moving the workpiece incrementally in the Z-axis direction, the system can automatically verify contact height and contact resistance values.

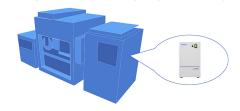
High-speed testing is made possible by the optimized synchronization of the system's built-in scanner and measurement boards.

An optional I/O board can be used to enable interoperation with external drive systems. (Please contact Hioki for more information about support for automation.)

Test data can be created in a short period of time using application software .

Semiconductors are increasingly utilizing new information technologies such as the IoT and AI. Going forward, more and more manufacturing facilities are likely to be faced by the need to achieve both higher quality and shorter test takt times. The Short-Open Tester FA1221 and the In-Circuit Tester FA1220 hold the potential to address the needs of such facilities.

Realizing automation by embedding the system in a drive system



Realizing high-speed, high-precision testing

Мо	del	Maximum number of pins	Test parameters	Measurement range	Measurement speed
	FA1221	128 (fixed)	Multi-pin S/O test	4Ω to 400kΩ	From 0.8ms / pin
FA1			Resistance measurement (component test)	400μΩ to 40MΩ	From 0.9ms /step
	FA1220	1024 (Expandable in blocks of 128)	Multi-pin S/O test	4Ω to 400kΩ	From 0.8ms / pin
FA1			Resistance measurement (component test)	400μ $\Omega$ to 40M $\Omega$	From 0.9ms /step

Creating test data quickly





## Flying-probe testers don't need test fixtures

The FA1221 and FA1220, which were introduced in this article, test probe cards and IC test sockets using test fixtures that incorporate probes. However, if the test points on a probe card are too close together, it may not be possible to space the probes on the test fixture closely enough to test the probe card. Additionally, the need to fabricate a test fixture for each probe card increases running costs. In situations such as these, you may wish to consider a flying probetype tester.



FLYING PROBE TESTER FA1240-6x



FA1283



FLYING PROBE TESTER FA1817