

APPLICATIONS

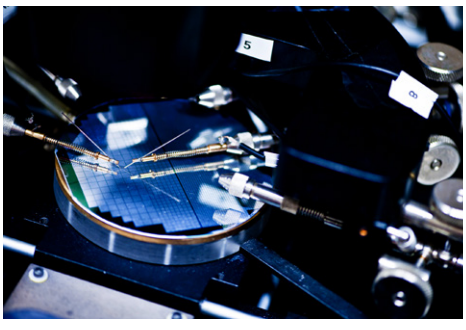
ADLINK's Probe Test Solution Greatly Improves the Speed and Accuracy of IC Electrical Measurement

Taiwan's semiconductor industry has recently become the focus of attention due to global shortages of automotive chips. Taiwan's semiconductors are prized over those made in Europe, the United States, Japan and South Korea, due to their quality supported and assured by rigorous verification procedures. The electrical measurement performed before integrated circuit packaging, for example, is an extremely important step of verification. Semiconductor plants must use engineering probe station systems in conjunction with a variety of test instruments, automatic test equipment and specially designed engineering verification systems to establish a suitable verification environment.

Electrical measurement, however, is a challenging task as the input of the silicon wafer measurement signals cannot be seen directly by the naked eye, but only through simulation. Under these circumstances, the probe station must generate a real-time response based on the analog signal generated from contact between the probe and the silicon wafer, thus directing the probe to continue performing the subsequent motion, such as a slight pause, or horizontal movement, while also ensuring that the probe head accurately touches the silicon wafer. This will ensure contact is at depths that do not damage the wafer while also being deep enough to generate accurate measurement data. All of these challenges are obstacles that must be overcome.

Achieve Both Simulation and Control without Needing to Purchase Additional Servo Controllers

ADLINK has long been developing the semiconductor industry application market and actively cooperating with well-known test equipment factories in Taiwan.
The company has developed a variety of solutions related to probe testing sufficient to appropriately meet the unique manufacturing process requirements of customers.



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An overview of ADLINK's probe test solution will reveal several important features. Apart from basic advantages such as high precision and high speed, It is multi-purpose and can be used for both simulation and control, allowing customers, including semiconductor manufacturers and packaging factories, to directly begin probe test operations without needing to purchase additional servo controllers

ADLINK's Advantages

The process of probe testing comprises a series of up and downward movements of the probe head as it comes into contact with the silicon wafer. As such, good probe testing is predicated on good motion control. ADLINK has long been an expert in the field of motion control and has accumulated significant technical expertise that has enabled the company to master the essentials of probe testing and design the best solutions ahead of industry peers.

After a long period of continuous evolution, ADLINK's probe test solution now contains quite a few key technologies. In addition to the above, the analog input control function has been integrated into the motion control card so that it can instantaneously issue the most precise command control, thereby effectively preventing the probe from moving abnormally. The reason this feature is important is that the silicon wafer is often not an exact, level plane; therefore it is necessary to constantly adjust the horizontal position of the probe to avoid damage to the silicon wafer or probe head due to excessive contact.

A silicon wafer has as few as hundreds or as many as thousands of points to be tested. Regardless of number, each point must be tested and no omissions are allowed. To ensure the timeliness of the testing process, the probe must be able to continue moving quickly. Resonance and jitter however are likely to occur at the moment of positioning, and measurement cannot be performed until after tuning has been completed. To minimize the time spent waiting for tuning to be completed, ADLINK has developed "rapid tuning" technology which allows the probe to move before the Z-axis of the workbench under test can be stabilized, thereby increasing tuning speed and achieving the effect of resonance suppression. This is to ensure that the probe will stop vibrating as soon as it is in place, and is able to immediately execute subsequent testing.

More importantly, ADLINK supports "closed-loop motion control" technology by continuously calculating on a rolling basis the average value of the error between the number of commanded steps and the actual number of steps so that error compensation can be directly carried out when the next command is issued. Even if compensation cannot reach 100% completeness, error distance can be reduced to a certain degree, and is thus is greatly conducive to improving testing speed.

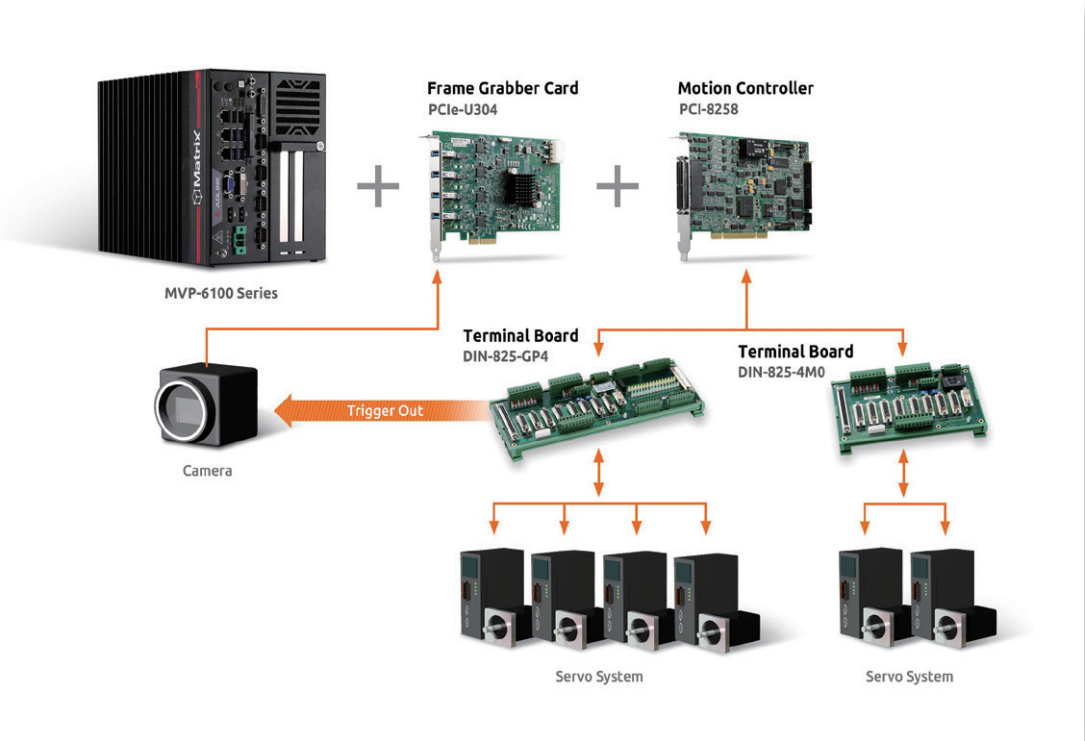
Furthermore, ADLINK's probe test solution supports mixed use of multi-axis linearity and arc angle compensation, allowing customers to continue performing route detection step by step and error compensation at any time regardless of whether the wafer carrier moves along a straight line, a curved path, or a mixture of both. As such, there is no need to pause even if the probe encounters a switch between a straight line and an arc.

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The solution also supports the process interruption protection mechanism which is extremely crucial in scenarios of sudden power glitches or power failure. Because ADLINK's probe test solution has the ability to record the state immediately before the power interruption, the process can continue to be executed after power is restored without the need to waste time by starting the process all over again.

ADLINK has developed an Automation Product Software Development Kit (APS SDK) based on the experience and product functions the company has accumulated over the years. The APS SDK can also be used in probe test application scenarios to help clients significantly improve efficiency in the development and deployment of motion control programs.

Looking to the future, ADLINK will continue to closely monitor the evolutionary trends of Mini LED or Micro LED backlight technology, 2.5D or 3D packaging technology, and even two nanometer or one nanometer process technology, as it continues to optimize product design and add new and innovative functions so as to continue offering customers highly sophisticated probe test solutions with increasingly fast execution speeds.



ADLINK's Probe Test Solution

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