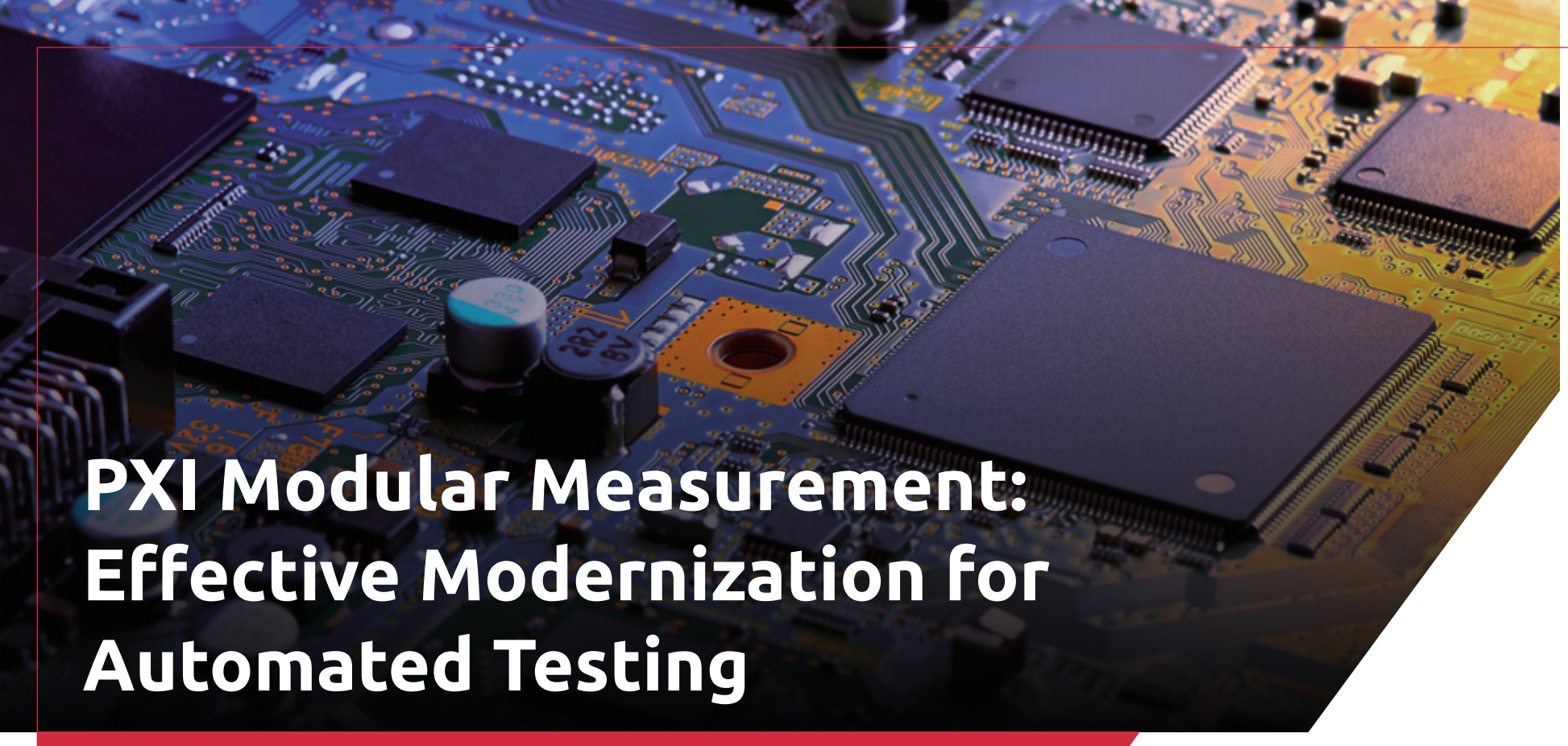


PXI Modular Measurement: Effective Modernization for Automated Testing

Cost-effective and flexible, PXI easily breaks through complex testing challenges

ADLINK
LEADING EDGE COMPUTING

intel partner Titanium IoT Solutions

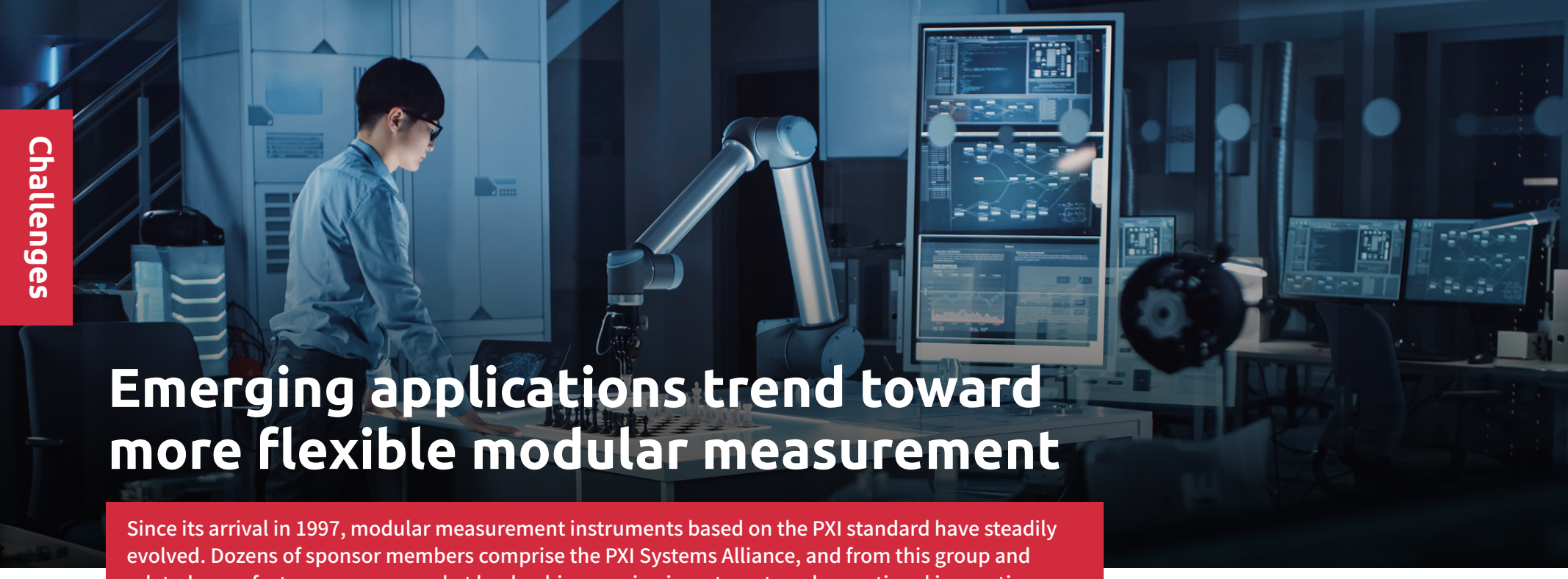
Overview

Advanced manufacturing process drives increased demand for semiconductor measurement equipment

Global demand for semiconductor chips based on ever-smaller manufacturing processes only continues to climb. For example, today's broad rollout of 5G wireless equipment and services is now fueling adoption of devices from Internet of Things (IoT) sensors to cutting-edge smartphones. In the past two years, electric vehicles, digital transformation (DX), and AI-driven intelligent applications have begun to receive considerable attention, all of which place different demands on semiconductor manufacturers. Even with these manufacturers operating at full capacity, and even with supply channels running at peak efficiency, market demand would still outstrip all available supply.

As the demand for more types and quantities of semiconductor chips increases across industries, the need for measurement equipment able to help test and validate those advanced semiconductor process becomes critical. Meeting market demand will require improved measurement performance, compliance with testing regulations, and containing test process costs. A capable, cost-effective testing platform based on the PCI eXtensions for Instrumentation (PXI) standard can help meet these needs.

Challenges



Emerging applications trend toward more flexible modular measurement

Since its arrival in 1997, modular measurement instruments based on the PXI standard have steadily evolved. Dozens of sponsor members comprise the PXI Systems Alliance, and from this group and related manufacturers comes market leadership, ongoing investment, and exceptional innovation.

Measurement is key to ensuring high production yields in advanced semiconductor processes. Although the automated test equipment (ATE) equipment used in traditional semiconductor inspection has multiple functions and powerful performance, its closed structure inhibits broad utility, resilience, and affordability. A conventional rack-mounted measurement will offer more flexibility, but its cost-based barrier to entry is even higher. Proprietary test solutions like these can challenge customers' abilities around installation and maintenance. Also, it is difficult to share software between such devices, thus increasing time and cost. Emerging industries and new applications demand system-level and customized testing, but they demand measurement equipment with flexibility, performance, and cost advantages. PXI modular measurement equipment provides these advantages and has become the mainstream choice for semiconductor testing.

Challenges

Measurement equipment selection is vital in ensuring yield

To ensure desired integrated circuit (IC) functionality, an IC designer will conduct limited-scale production runs for yield verification before proceeding to mass production. Stepping through the yield ramp-up process involves a variety of testing procedures in the packaging factory. There may be many challenges, including with hardware integration, test program development, the software and hardware environment, equipment calibration, user interface, machine maintenance, internal information transfer, and knowledge sharing.

With the continuous emergence of novel application fields, IC chip design grows ever more complex, continually expanding what functions require testing during measurement. However, the steps from IC design to shipment are complicated and intertwined. Countless issues may affect schedules and results. If the laboratory uses rack-mounted measurement equipment and the software is difficult to share, additional programs for the oscilloscope and electricity meter must be written. Errors result in production losses and IC production delays. These problems and many others can be circumvented by starting the IC testing process from a foundation based on superior, flexible measurement equipment.

Solutions

Efficient measurement is the ultimate goal

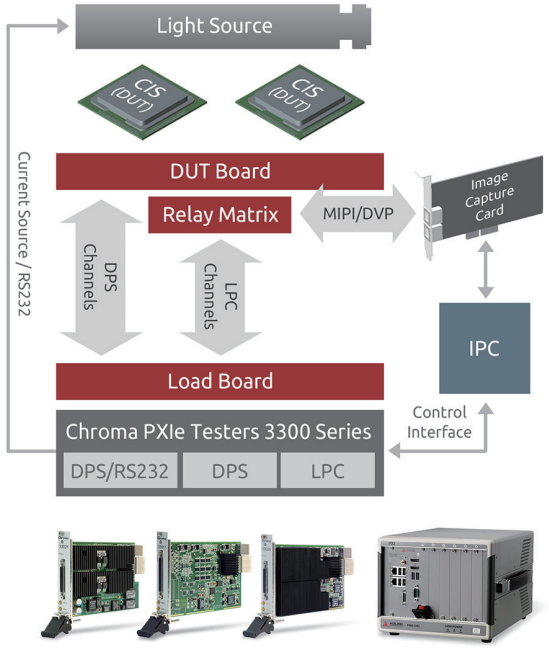
In semiconductor testing, all manufacturers strive to measure efficiently, and few if any testing solutions can rival the efficiency of the Chroma Semiconductor PXIe Tester 3300 Series. The Chroma 3300 series' modular design allows customers to have full flexibility over the solution’s configuration and use. The testing platform is based on the Chroma 3300 instrumentation card series along with ADLINK’s PXI chassis, which comes in configurations featuring 6, 9, and 18 slots compatible with the full range of industry-standard PXIe modules, including for digital I/O capture. To meet future simultaneous computing needs, ADLINK also provides many controller options based on Intel’s Core i3, i5, i7, and even high-end Xeon CPUs. The Chroma 3300 series can use both standard and SLT methods for test classification, allowing users to adjust the configuration according to needs or environmental changes. It is a flexible, cost-effective, complete solution for semiconductor testing, born from ADLINK's more than 20 years of hardware R&D experience. ADLINK provides the most robust and stable platform for Chroma's key technologies while giving users the most flexible modular measurement design available.

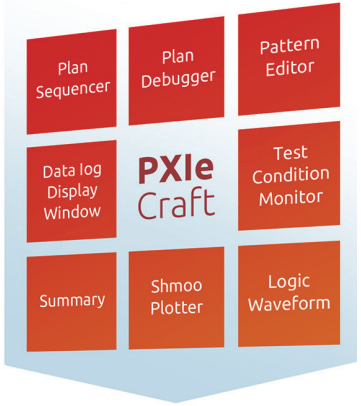
Solutions

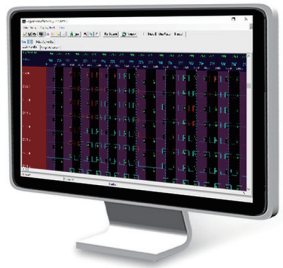
Beyond flexibility, the Chroma 3300's most important feature is the ease of its test platform. Users only need a set of PXIe CRAFT software tools to build a test environment. From test development process control, debugging, and voltage and current monitoring to parameter settings and system integration using Shmoo/Logic Waveform/Pattern Editor, PXIe CRAFT can simplify and streamline implementation. Customers can quickly and efficiently transfer the 3300 test results and test programs to the 3380 series of large-scale test machines, if necessary, and conduct test production on a larger scale at the factory. There is no need to invest additional resources into adjusting test environment parameters, thus accelerating the transfer of production platforms. The powerful and comprehensive software functionality of PXIe CRAFT saves communication costs, reduces problems, and allows engineers to test operations and integrate handover more smoothly.

Chroma and ADLINK collaborated to create the highly customizable Chroma 3300 PXIe tester solution.

Solutions







While traditional ATE systems can meet high-performance test requirements, the Chroma 3300 PXIe does this and much more. Customers can purchase only the number of machines needed rather than commit to unnecessarily large “package”solutions. Moreover, users can easily reconfigure equipment to meet expanding test requirements, and CRAFT software is the only requisite for the overall test environment. Because the test platform is so easy to build, develop, and use, engineers save considerable time and cost from not having to repeat work multiple times, such as for integrating information or rectifying inconsistent data communication.

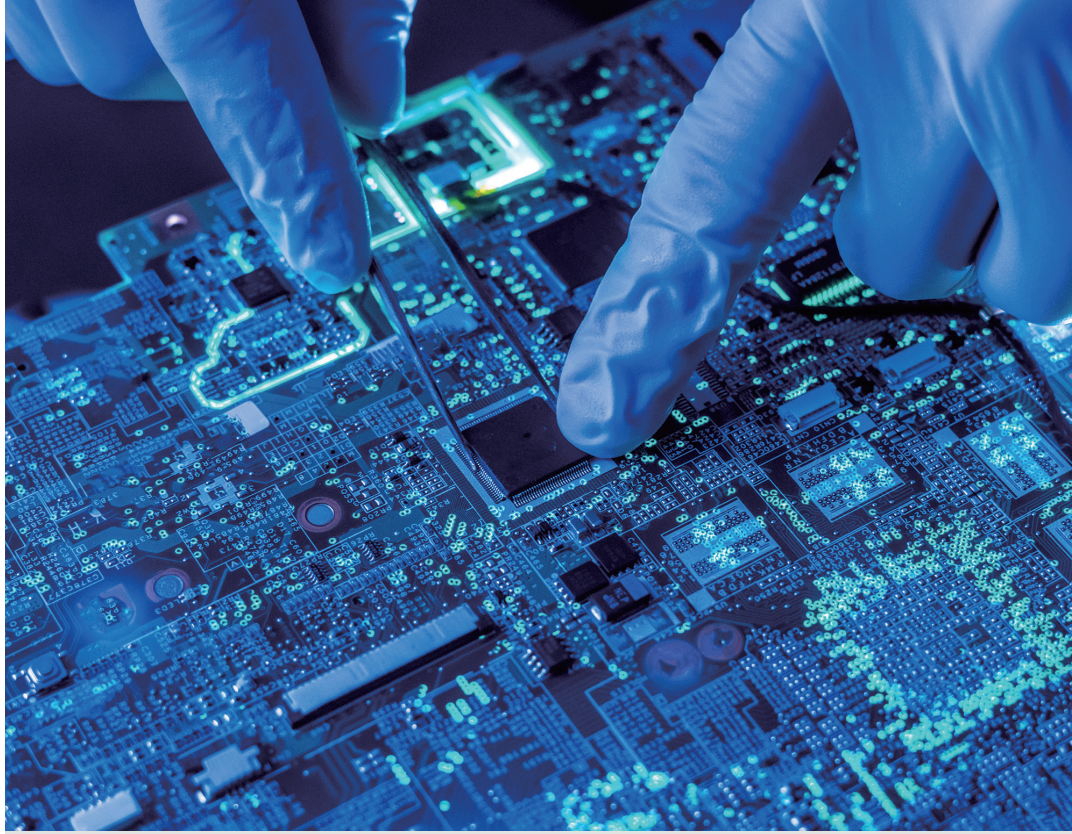
To illustrate the performance and flexibility of the Chroma 3300 PXIe tester, consider when Chroma tailored the solution for a CMOS imaging sensor (CIS) manufacturer. Using powerful and comprehensive PXIe CRAFT tools, Chroma successfully combined traditional ATE standard testing and image testing to provide a complete measurement process for CIS projects. At the same time, through hardware upgrades and software integration, the Chroma 3300 helped customers significantly shorten product testing time and achieve more than 20% productivity improvement, greatly exceeding the customer’s expectations.

By saving communication time and cost, while providing more versatility in document digitization and visualization, the Chroma 3300 PXIe has more advantages than simple rack-based measurement solutions in terms of cost, time, flexibility, and handover, all of which greatly improves work efficiency.

Insight

As a leading, world-renowned supplier of edge computing solutions, ADLINK is deeply involved in industrial computers, with over a decade of core competitiveness and experience in the measurement field. In recent years, ADLINK engaged in the development of electric vehicles and smart applications. Additionally, the company continues to cooperate closely with solution manufacturer Chroma, which has over 20 years of deep experience in the measurement industry. This background and collaboration enables ADLINK to grasp user needs and trends in today's ever-changing application environment. With its earned reputation and trust among manufacturer partners, ADLINK continues to provide the best, highest-value solutions for the market's shifting measurement needs.

Beyond achieving required inspection performance and high product yield, many users' biggest concern with measurement equipment is overall ownership cost. Fortunately, ADLINK solution flexibility helps extend product life cycles in the measurement field for even lower total cost impact. At the same time, ADLINK continues to leverage continuous improvements in chip capacity and performance across its product lines. The company will continue to study and expand its PXIe domain knowledge and continue to innovate designs for greater performance and energy efficiency. ADLINK will also continuously improve testing capabilities and precision while helping customers meet the key business and technical challenges that comprise technological progress.



Chroma

Chroma is a leading manufacturer of precision electronic measuring instruments, automated test systems, smart manufacturing systems, and measurement and automation solutions. With operations all over the world, Chroma provides customers with higher value-added solutions, innovative technologies, and commitment to serve user needs.

Conclusion

As related applications become increasingly diverse and complex, modular measurement with flexibility and cost advantages will likely continue to play a pivotal role in future semiconductor testing. Chroma and ADLINK will remain highly complementary partners, combining Chroma's long-accumulated, cutting-edge technology experience in measurement and automation solutions and ADLINK's robust and stable measurement platform. The two companies' comprehensive experience continues to provide the most suitable overall solution for facing dynamic measurement requirements. This solution not only benefits customer product yield rates but also shortens time to market, allowing users to seize new opportunities and realize greater success.