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···technologies···

WE KNOW **HOW TO TEST!**

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PXI-based Test Platform for ICT & FCT   LEON Tester Family

MAXIMUM FLEXIBILITY AND USABILITY IN DIFFERENT CONFIGURATIONS

Pin count

LEON
Fixture

LEON
Desktop

LEON
Bench

LEON
Station

LEON
Tower

LEON
Inline Tiny

LEON
Inline Flexcell

Volume
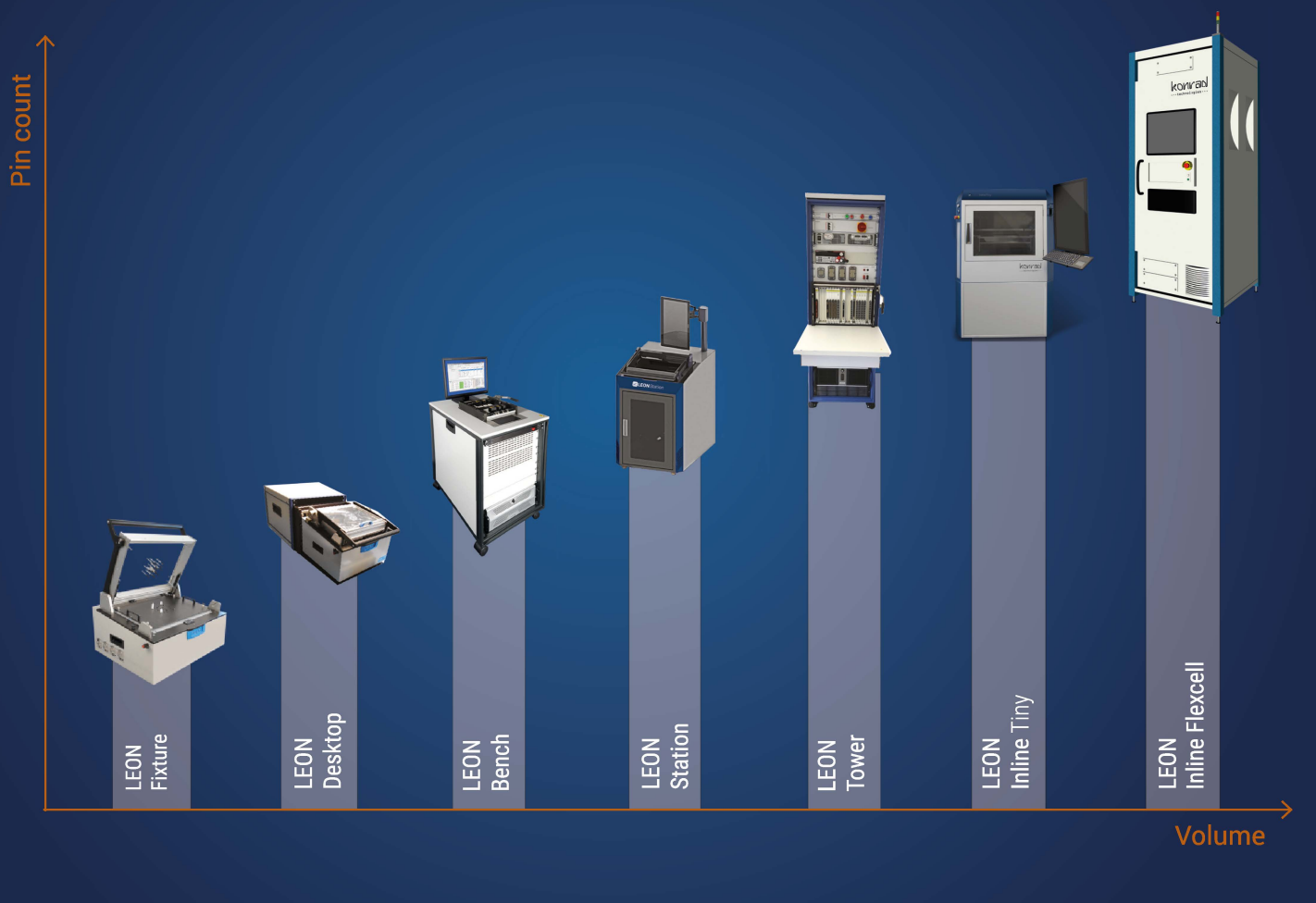
## Opportunities for a Paradigm Shift in PCB Test

In the past, traditional PCB manufacturing test was dominated by dedicated in-circuit test systems as the prime test technology. Today, the modular instrumentation platform PXI has been developed with thousands of modules for almost all kinds of measurement problems, therefore we can observe solutions which have not been thinkable a decade ago. We can now develop high performance board test systems by benefiting from the additional possibilities of the PXI platform, including fast computing power and fast bus systems as well as additional test capabilities for functional test, boundary scan test (JTAG), AOI test and RF test etc. Especially with less complex products the trend in testing goes to a combined test approach where the cost for test equipment is more critical than in high volume manufacturing of complex products.

Next Generation Test Platform for PCB Test

The LEON Gen III Embedded PCB Tester combines classical analog In-Circuit-Test (ICT) or manufacturing defect analysis (MDA) with additional functional test capabilities on a single PXI board. Multiple embedded testers can be configured in a single system for parallel test and high throughput.

The system is designed for speed, performance and true parallel test processing. Based on the PXI industry standard, it can be integrated into many different tester configurations, from small systems up to thousands of nodes per system. The main target areas include:

- High pin count, medium to high complexity PCB's
- Low pin count, fine pitch access PCB's
- Manual PCB test stations
- In-line test systems
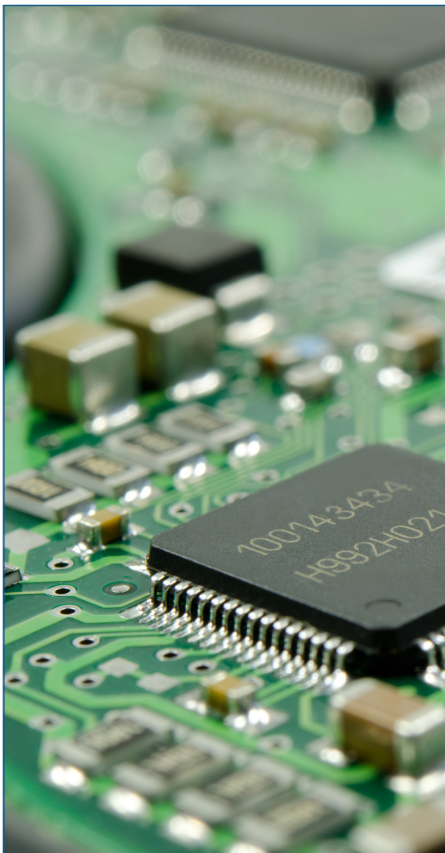
Maximum Test Coverage

Achieving maximum test coverage cost efficiency is the most important goal in electronic production. Factors like production volume, time-to-market, product complexity, combined with technical capabilities including mixed-signal, RF, digital protocols and others are key for selecting the correct test platform.

The LEON Gen III test system is designed to integrate all necessary test technologies depending on the current test requirements. This includes analog In-Circuit-Test, boundary scan test, functional test, RF test, in-system programming and vision inspection. The system can easily be upgraded if the product changes or if the production logistics needs to be changed, e.g from manual testing to an in-line production due to increased manufacturing volume.

Smart Architecture and Cost Effective Configurations

The LEON Gen III test platform is built around the KT PXI-501 universal instrument operating as the system's core module. It combines all necessary measurement functions for high performance PCB test on a single PXI board. Complementing the KT PXI-501 with the available 1500+ PXI products available on the market today, a powerful and cost effective test system can be easily configured for:

- Manufacturing Defect Analysis (MDA)
- Analog In-Circuit-Test (ICT)
- Digital Test using Boundary Scan Technology
- Vision Test combined with electronic component testing
- Functional Test
- Micro contacting board testing (10 micron accuracy)

PMU
- 2x True Four Quadrant Parametric Measurement Unit
- ± 10V Voltage Range
- Two-Wire and Four-Wire Mode
- Synchronous Voltage and Current Measurement
- 4MS/s Sample Rate
- Waveform Generation
- 2MS/s Update Rate

Digital Volt Meter
- Input Range ± 1V, ± 10V, ± 100V, ± 200V
- Galvanical Isolation
- 24 Bit Resolution
- Up to 40kS/s Sampling Rate

FPGA

**High Voltage Current Source**
- Z Diode Measurement

DAC
- 4 Channels
- ± 10V

ADC
- 4 Channels
- ± 10V

Test in Parallel !

The LEON Gen III platform is the perfect choice for high-speed multiple PCB panel testing applications where parallel test capabilities are required. Up to 17 embedded PCB test modules can operate in a single system, operating fully independently. Every KT PXI-501 embedded single-board PCB tester acts as a "Tester-on-the-Board", delivering maximum speed and flexibility.
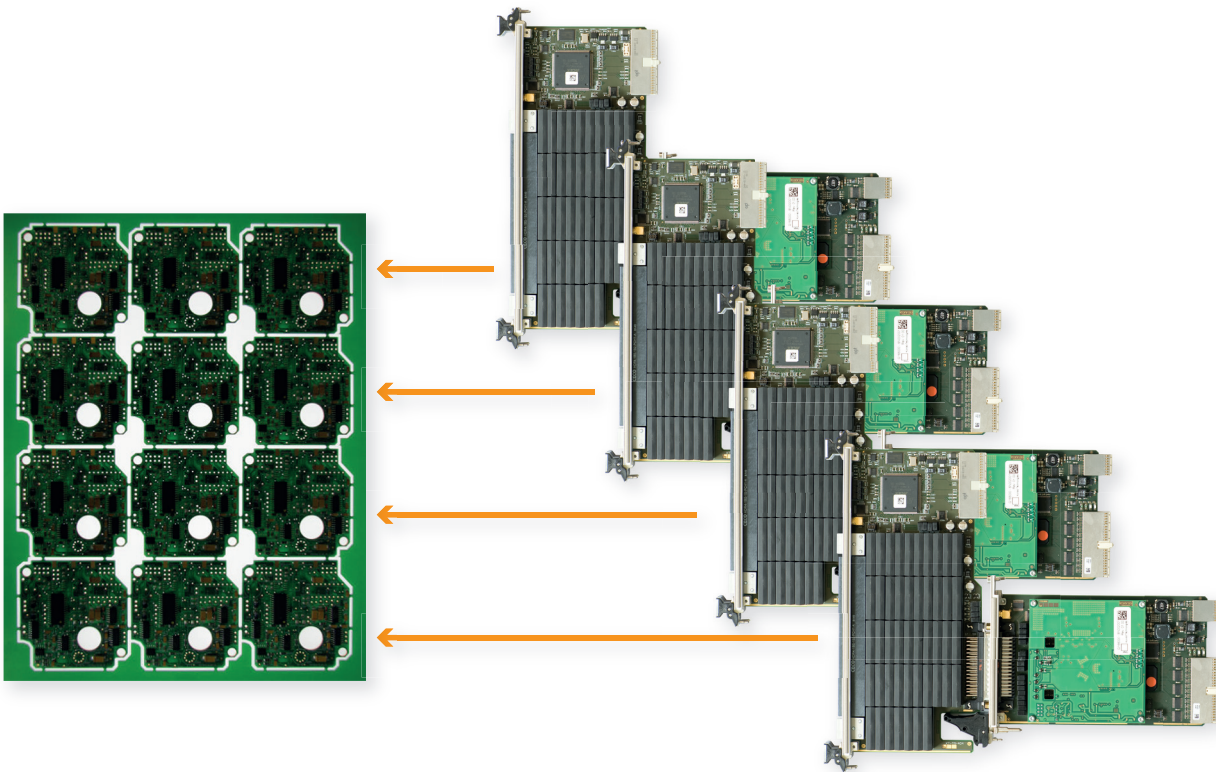
Every LEON Gen III module can be connected to its own independent ABex terminal module offering a high speed 86x4 switching matrix. Additional matrix boards including 128x4 channel PXI boards or ABex modules with 172x4 channels can be added to the system depending on test requirements.

Interface Options

Over the years in board testing multiple different hardware interfaces have been developed from the major board test equipment manufacturers. Virtually every tester manufacturer created its own interface resulting in many incompatible industrial standards. With the LEON Gen III platform we offer many fixture options, including:

- Virginia Panel based KT-DUT interface
- Pylon Interface to Fixture
- Cable Interface

Signal Switching in In-Circuit-Test Systems

A very critical part of an in-circuit test system is its switching sub system. This is critical because it can be a bottleneck in terms of speed and amount of test point coverage of the entire system. All switching matrices from Konrad Technologies are optimized for speed and all relays on one board can be controlled by just a single function call from the driver software. This feature is extremely important for high speed short circuit and continuity measurements.

Furthermore, our switching products for the LEON Gen III series test systems are built in a service friendly manner, allowing relay changes with minimal effort as soon as they reach their end-of-life.

ABex Terminal Module KT TM-404

Every KT PXI-501 measurement module in an ABex system must be connected to the ABex backplane. This might be done using a KT TM-404 terminal module. Beside its function as the link to the analog bus backplane and the DUT interface, the board offers a 86x4 switching matrix.
Alternatively one might use the KT TM-501 terminal module, which integrates 2 output amplifiers for analog outputs and a SHUNT current measurement unit.

This architecture offers interesting parallel test possibilities, allowing system setups with up to 17 KT PXI-501 instruments per chassis operating independently in parallel with a single 86x4 matrix per test head. This constellation is ideal for high speed panel test applications.
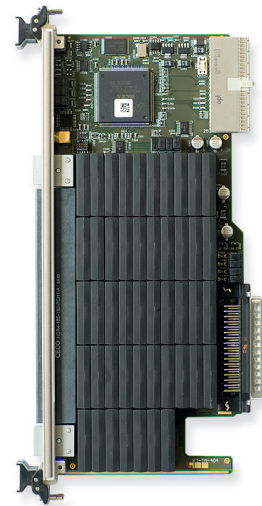
ABex Switching Matrix KT AM-301

The KT AM-301 is a powerful and cost effective switching solution for high pincount systems with 172x4 channels on a single-slot ABex module. Being a native ABex module, this card offers access to all lines of the analog bus and interfaces all channels to the front connector in order to connect via the mass connectivity interface to the test fixtures of the system. Using this matrix, we can build systems up to 2838 test points per 18 slot ABex chassis.

ICT Software Options

We offer multiple options for test program development in order to support the user in the most efficient way. Included with the system is an integrated development environment which runs completely independent from any programming language and test executive. The test engineer can also use any common programming language, including LabVIEW™, LabWindows™/CVI™, C++ and others in order to integrate the tester-specific software. For this purpose we offer a Windows DLL and an API.

Integration into the market leading test executive TestStand™ is fully supported, offering seamless access to code written in many common programming languages, simple integration of additional test equipment, result management, data base integration and custom report generation.

Bigger organizations including EMS companies are benefiting from standardized test equipment with full integrated software workflow. The automated program generation (KERFLEX) feature from CAM Consulting's KERCAM software suite efficiently assists the test engineer in test programm development.

Integrated Development Environment

Using the KT ICT IDE, the test engineer gets all necessary tools and functions to develop, debug and perform in-circuit tests using the LEON Gen III systems. Part of the software is our topology editor for organizing the ICT hardware of the systems, including the PXI-501 measurement instruments and all switching boards for PXI and ABex systems. The sequence editor is used to develop and execute the test programs in a very intuitive manner, offering syntax and error highlighting, auto completion and undo/redo. Debugging functions include search, breakpoints, break at fail and many others. Results are displayed in a table, zoomable graph and histogramm, including min/max/mean values and tolerance limits. Results are also presented in a HTML report.
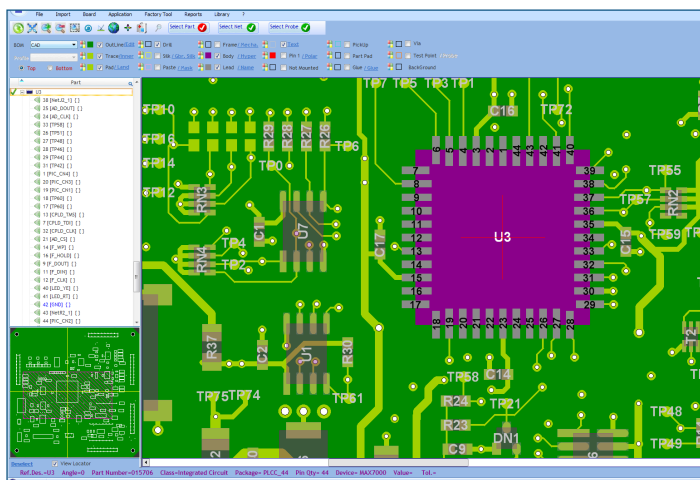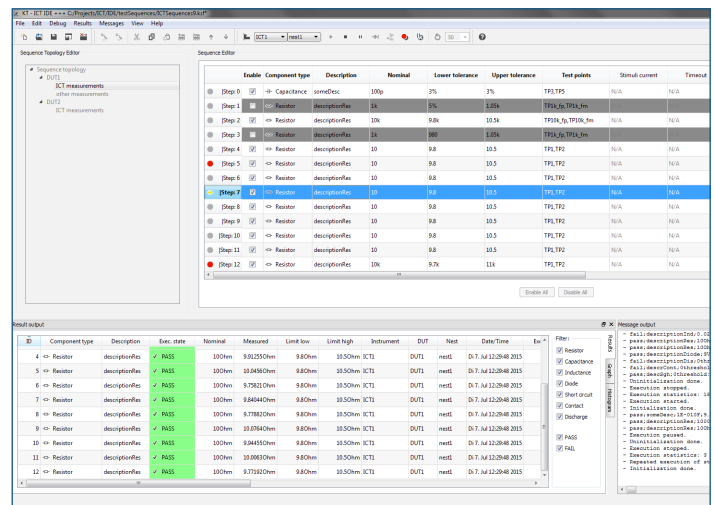

Automated Program Generation

With larger projects users can improve efficiency by using the comprehensive design-for-test software suites KERCAM from CAM Consulting. These software packages can be provided by Konrad Technologies and deliver import capabilities for many CAD data formats, BOM integration and fixture design assistance. Finally, these tools offer automated test program generation for the industry leading test equipment manufacturers, including the Konrad LEON test system.

COMPLETE PLATFORM FOR TEST SYSTEM DEVELOPMENT

From interactive measurements using the universal instrument KT PXI-501 to integrated test systems for functional test, in-circuit test, boundary scan test, vision inspection test, communication test in wireless applications and semiconductor test, Konrad Technologies offers a complete test platform based on standard instrumentation hardware and software from leading companies. These standard products are complemented by KT hardware and software tools to ensure high performance and cost efficiency in every customized test solution.

The Test system supports a full range of PCB test applications that include in-line and end-of-line board and system level test. Field or depot test, diagnostics, and repair capabilities can be readily added. It also offers a proven, reliable and cost-effective solution to most functional test problems. The system features a scalable architecture and is designed to meet a wide range of requirements, such as:

• High speed analog & digital functional test – PXI, and PXIe based instrumentation
• Boundary Scan test integration
• On-board Flash and other non-volatile device programming
• In-system programming (ISP) of PLD, CPLD, etc.
• Full turnkey fixture design and integration service
• Manufacturing Defect Analysis (MDA)
• Micro contacting board testing (10-micron accuracy)
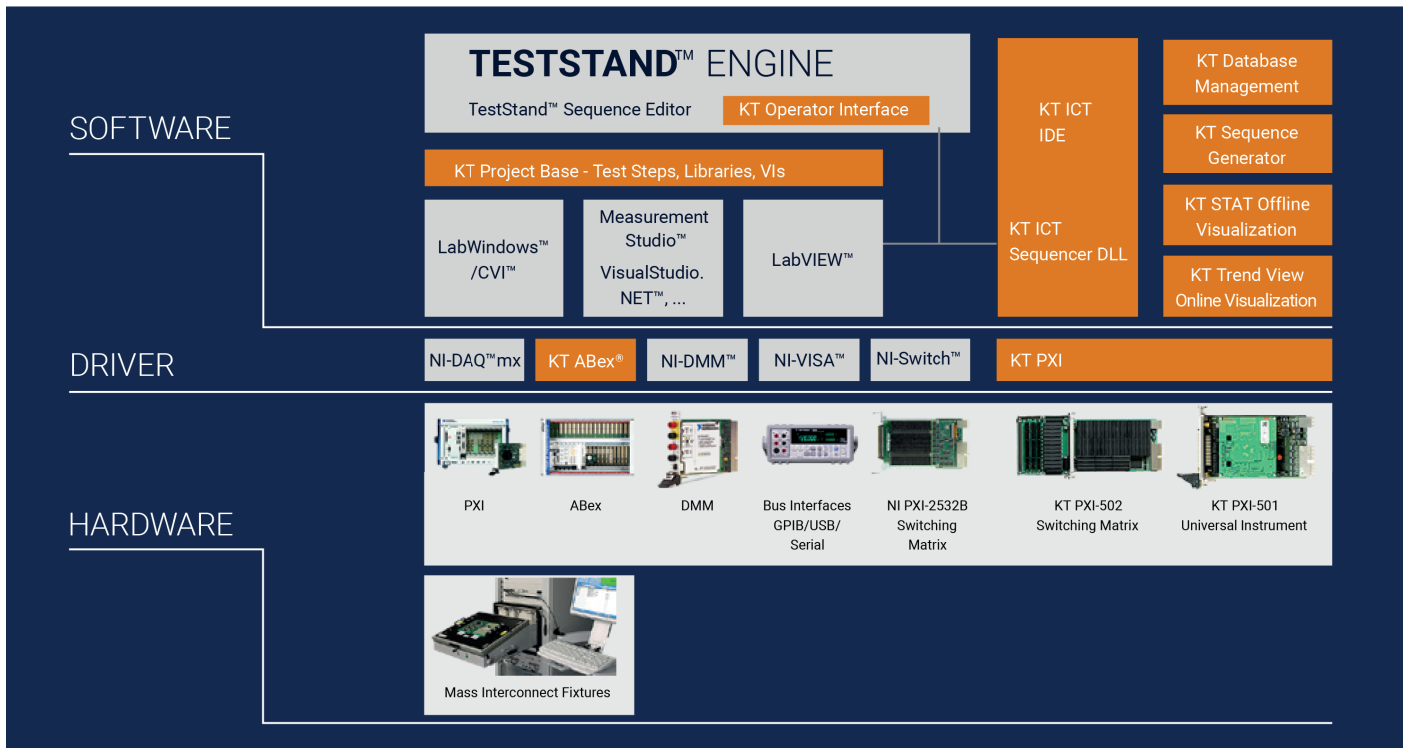
LEON Test System Family

The LEON Gen III tester family is designed focussing on maximum flexibility and usability in different configurations. All variants share the same measurement core for component measurements in in-circuit test.

FEATURES

- Fixture compatibility to LEON Inline Tiny and LEON Station
- Continuity
- 86..2838test points
- Very Compact test system
- Contact/Short circuit
- Resistance Test (2-/4-Wire): 100 mΩ to 10 MΩ
- Capacitance Test (2-/4-Wire): 100 pF to 10mF
- Inductance Test (2-/4-Wire): 25 μH to 100 mH
- Passive and active guarding

- Diode Test
- Z-Diode Test up to 55 V
- Discharge of capacitors with constant current (current up to 200 mA; voltage up to 100 V)
- Transistor/Mosfet Test
- Optocoupler Test
- Relay Test
- Digital Voltmeter per parallel Tester
- 2x Paramteric Measurement Unit 10V/160mA per parallel Tester

KT LEON Fixture

LOW COST TEST SYSTEM FOR ICT/ FCT/ ISP

The KT LEON Fixture, is the ideal fixture solution for function test, final test and ICT applications. Our test system combines optimal ergonomics with high performance, durability, and precision, ensuring your investment over the long term. It is prepared for a safety switch with guard locking, and an electrical interlock. It's hard-ware interface ensures minimal maintenance and retooling times. Our fixture technologies reduced debug time, ease ECO's and reduced maintenance, while allowing for the highest test performance, ability to probe denser smaller targets and achieve ultra-high node counts.

- Modular and Scalable test system
- Easy implementation
- Upgradable from Manual to Inline if required
- Open Platform PXI
- 86..430 test points
- True parallel Test
- Low-cost VG interface or pylon Interface
- Saves floor space (Test system integrated in fixture)
- Optimized for throughput, reliability, repeatability, and cost
- ABex (Analog Bus Extension) platform

LIGHTWEIGHT, FAST, LOW COST

The high-capacity fixture by KonradTechnologies combines a range of benefits for perfect processes in your production environment. The LEON Fixture is customized for the size of the PCB, which means not only low unit weight but also fast suction. The Low-cost exchangeable cassette systems ensure long-term flexibility, as the device is available in all stages of assembly and ensure the value of your investment.
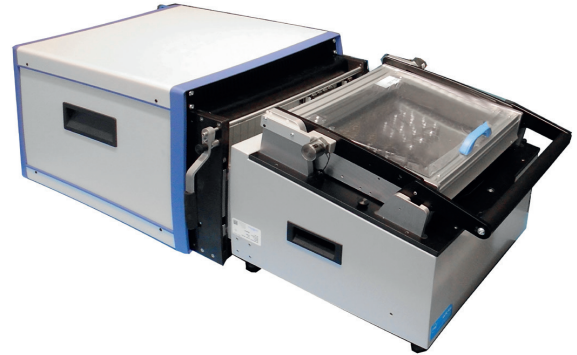
KT LEON Desktop

REDUCE YOUR COST OF TEST

The LEON tester family is designed with focus on maximum flexibility and usability in different configurations. The KT LEON Desktop test system is a compact test system that features an excellent signal integrity and a high quality fixture interface based on Virginia panel connectors. The KT LEON Desktop is optimized for medim pincount ICT/BSCAN/Flash test systems. As well as all testers of Leon Family the KT LEON Desktop is based on the multifunction card KT-PXI-501.

- Upgrade from Manual to Inline if required
- Modular and Scalable test system based on Open Platforms PXI and ABex (Analog Bus Extension)
- Bench Top System
- 86..2838 test points
- True parallel Test (Maximum 17 embedded PCB testers in parallel)
- Virginia Panel interface to fixture
- Optimized signal integrity (No wiring from test cards to Virginia panel interface)
- Standard Ingun MA2112 fixture (others on request)
- Easy implementation
- Optimized for throughput, reliability, repeatability, and cost
- Optionally, an ABex solution with an integrated Ingun fixture is possible

KT LEON Bench

The LEON tester family is designed with focus on maximum flexibility and usability in different configurations. The KT LEON Bench test system is a flexible test system that features an excellent signal integrity and a high quality fixture interface based on Virginia panel connectors. The KT LEON Bench is optimized for medim pincount ICT/BSCAN/Flash test systems. As well as all testers of Leon Family the KT LEON Bench is based on the multifunction card KT-PXI-501.

- Modular and Scalable test system based on Open Platforms PXI and ABex (Analog Bus Extension)
- Cabinet based System (optimized for FCT applications, free 19" space for additional instumentation)
- 86..1118 test points
- True parallel Test (Maximum 7 embedded PCB testers in parallel)
- Virginia Panel interface to fixture
- Optimized signal integrity (No wiring from test cards to Virginia panel interface)
- Easy implementation
- Optimized for throughput, reliability, repeatability, and cost

KT LEON Station

Leon Station Test Handling system is designed to facilitate the automated testing of PCB´s in an in-line or stand-alone process. The handlers are economical in footprint and cost, give an excellent return on investment and embrace all the latest concepts in lean design.

The system is fully equipped with its own control and diagnostics via an user-friendly interface. The units are fully compatible with other SMEMA units and other standard equipment in electronics manufacturing lines to ensure a truly ‚plug and play' assembly line strategy. Fixture exchange can be carried out in seconds to ensure minimum downtime. The handler perfectly integrates between KT LEON Fixture and KT LEON Inline Tiny as it uses the same type of fixtures. It incorporates the robust ABex - Analog Bus extension - backplane and a lot of free 19inch space for customer defined measurement equipment.

- Manual test and programming
- Single and dual side contacting
- 19" Mounting space
- Odd-form PCB´s
- Manual test and programming
- Economical fixture
- Easy fixture exchange
- Optimized footprint for parallel testing
- Multifunctional test handling
- Integrated ABex test system
- Open Platform PXI
- Fixture compatibility to KT LEON Fixture and KT LEON Inline Tiny

LEON Rack

The LEON tester family is designed with focus on maximum flexibility and usability in different configurations. The KT LEON Rack test system is a flexible test system that features could be used to integrate in own automation or handling solutions. The KT LEON Rack is highly flexible and could be configured in 3 different chassis sizes to range from low pin count to high pin count test systems. As well as all testers of Leon Family the KT LEON Rack is based on the multifunction card KT PXI-501.

- Modular and Scalable test system based on Open Platforms PXI and ABex (Analog Bus Extension)
- Rack based solutions for integration into own automation or handling solutions
- 86..2838 test points
- True parallel Test (Maximum 17 embedded PCB testers in parallel)
- Cable interface to DUT
- Easy implementation
- Optimized for throughput, reliability, repeatability, and cost

KT LEON Tower

The LEON tester family is designed with focus on maximum flexibility and usability in different configurations. The KT LEON Tower test system is a flexible test system that features an excellent signal integrity and a high quality fixture interface based on Virginia panel connectors. The KT LEON Tower is optimized for high pin counts ICT/BSCAN/Flash test systems and FCT applications. As well as all testers of Leon Family the KT LEON Tower is based on the multifunction card KT PXI-501.

- Modular and Scalable test system based on Open Platforms PXI and Abex (Analog Bus Extension)
- Top Load System
- 86..2838 test points
- True parallel Test
   (Maximum 17 embedded PCB testers in parallel)
- Virginia Panel interface to fixture
- Optimized signal integrity
   (No wiring from test cards to Virginia panel interface)
- Standard Ingun MA2112 fixture (others on request)
- Easy implementation
- Optimized for throughput, reliability, repeatability and cost

KT LEON Inline Tiny

A FLEXIBLE AND CONFIGURABLE INLINE BOARD TEST SYSTEM FOR ICT/FCT/BSCAN.
High production volume often requires inline solutions with fully automated product Handling. The KT LEON Inline Tiny is a complete Board Test Solutions for circuit boards. Depending on the application the system is fully customizable and is optimized for throughput, reliability, repeatability and cost. The dedicated system perfectly matches with the needed measurement requirements. It integrates the PXI/ABex – based LEON technology into a test handler for an overall high performance and high-volume production test solution and offers cable-less connection from the test probe to the instruments.

- Test handler with integrated ABex - Analog Bus Extension for PXI, test system and fast handling
- Precise contacting with a motorized toggle lever mechanism
- True Parallel Test with the maximum productivity of -/+ 16 embedded
   PCB testers (per chassis)
- 100% Fault Coverage
- Optimized for throughput, reliability, repeatability, and cost
- Fully upgradeable & customizable
- Compatible to offline fixture kit ATS MA 13 Ingun
- SMEMA compliant

LEON Inline Flexcell

In high volume manufacturing we offer a standard ICT system, based on our fully automated test handler KT LEON Inline Flexcell. The ABex based tester is vertically integrated into the test handler using pogo-pin based test interface board connecting without cables from the test probe to the test fixture, resulting in a high performance, low-maintenance test solution with extremely high signal integrity. The handler integrates well with industry standard board handling equipment including conveyors and sorting stations.

- Full Automatic In-Line ICT and FCT Test Handler
- 86 ... 2838 test nodes per chassis
- Single stage, dual stage and double sided contacting
- Optimized footprint for parallel testing
- Unlimited and freely programmable contacting positions
- Multi -functional test handling
- Easy fixture exchange
- Cable-less Test system interface
- Open Platform PXI
- High Volume Test
- Micro alignment in fixture kits if required
- No limit in PCB thickness
- SMEMA interface

KT PXI-501 Universal Instrument

Beside its role as the core instrument in the LEON Gen III tester platform the KT PXI-501 can be used in various test applications beyond in-circuit test. With this instrument users can significantly reduce cost for test and benefit from the increased functionality of the test equipment. The instrument offers the following test functionality:

- Two independent parametric measurement units
- Digital Multi Meter
- Digital / Analog Converters
- Analog / Digital Converters
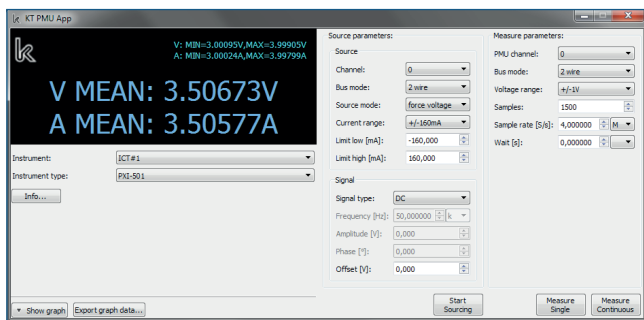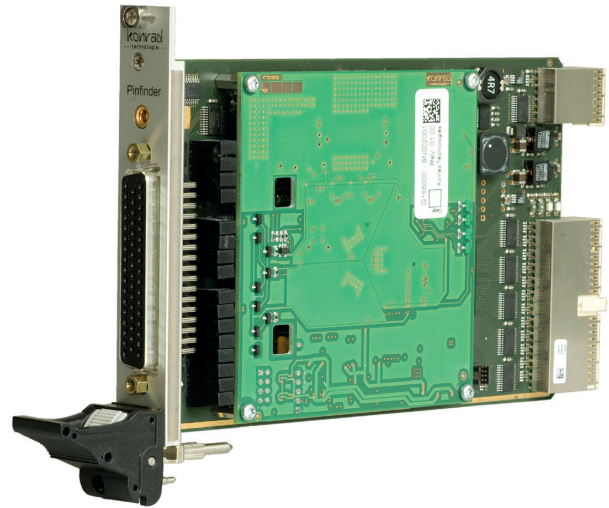
The instrument offers two completely independent parametric measurement units. They are versatile measurement instruments, e.g. for semiconductor test applications. Using the PMU soft front panel the user has full interactive access to the PMU functions. Most important features are:

- Force and measure voltage/current
- DC, sine wave, rectangular signals
- Perform measurements in single and continuous mode
- Store measurement data into files and display them in a graph
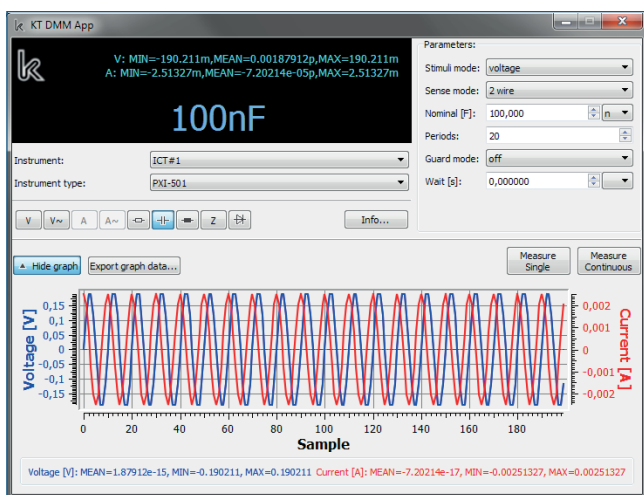
With the PMUs, digital multi meter functions are implemented:

- R/C/L (active and passive guarding, 2-/4-wire)
- Impedance
- Diode

A separate digital volt meter allows measuring DC/AC voltage. Next to the measurement value (mean for DC, or RMS for AC) the soft front panel shows minimum, maximum and mean voltage/current in its main display. The raw data is plotted in a graph display and can be exported to a file.
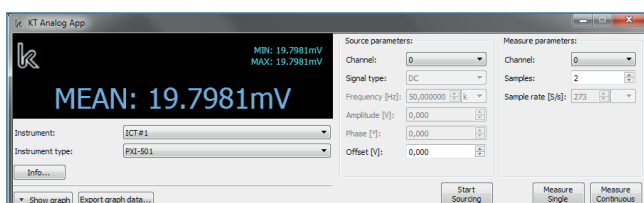
The analog soft front panel is used for controlling the four ADCs and the four DACs of the KT PXI-501. Single and continuous measurements are displayed as the mean value in the main display or shown in waveform charts.

KT PXI-501 Specifications – Component Measurements

- Resistance (2-/4-Wire): 100 mΩ to 10 MΩ

- Capacitance (2-/4-Wire): 100 pF to 10 mF

- Inductance (2-/4-Wire): 25 µH to 100 mH

- Impedance (2-/4-Wire)

- Passive and active guarding

- Diode / Transistor

- Z-Diode up to 55 V

- Varistor

- Continuity

- Contact/Short circuit

- Discharge of capacitors with constant current (current up to 200 mA; voltage up to 100 V)

KT PXI-501 Specifications – Functional Test Mode

Parametric Measurement Units
- 2x fully four-quadrant PMU
- Output range ±10V
- Measurement range ±1V and ±10V
- Two-Wire and Four-Wire Mode
- DC or waveform generation with up to 2MSps
- Simultaneous sampling of voltage and current with up to 4MSps

Digital Volt Meter
- Input Range: ± 1V, ± 10V, ± 100V, ± 200V
- 24 Bit Resolution
- Up to 40 kS/s Sampling Rate

Analog Inputs
The card has four analog inputs
- ± 10V Input Range
- 13 Bit Resolution

Analog Outputs
The card has four analog outputs
- ± 10V Input Range
- 14 Bit Resolution

Notes:

Notes:

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