

MK.4TE Test System

High pin count, rapid relay-based combination ESD & latch-up test system

The MK.4TE ESD & Latch-Up Test System is a complete, robust and feature-filled turn-key instrumentation test package, which performs automatic and manual HBM, MM, and Latch-Up tests on devices with pin counts up to 2304 pins. It features the highest speed of test execution, lowest Zap interval, and extensive parallelism that enables concurrent Zapping with interleaved Trace test capability to global and company driven quality standards.

Features

- Rapid-relay-based operations—up to 2304 channels
- Solid state matrix topology for rapid, easy-to-use testing operations
- Latch-Up stimulus and device biasing
- High voltage power source chassis with patented HV isolation enables excellent pulse source performance
- Advanced device preconditioning with six separate vector drive levels
- Massive parallelism drives remarkable test and throughput speeds
- Addresses global testing demands for devices that are smaller, faster and smarter

Industry standard, ESD and Latch-Up Test System for producers of multifunction high pin-count devices

Thirty years in the making — IC structure designers and QA program managers in manufacturing and test house facilities worldwide have embraced the Thermo Scientific™ MK.4TE™ Test System, a versatile, powerful, and flexible, high yield test system. Easily upgradeable, the MK.4TE Test System is fully capable of taking your test operations through ever evolving regulatory and quality standards.



Relay based matrix topology

The advanced rapid relay-based (modular matrix) hardware of the MK.4TE Test System is on average ten times faster than mechanically driven ESD testers. The switching matrix, while providing consistent ESD paths, also allows any pin to be grounded, floated, vectored or connected to any of the installed V/I supplies. Furthermore, advanced algorithms ensure accurate switching of HV, in support of pulse source technology, per recent JEDEC/ESDA trailing pulse standards.

Advanced controller and communications

A powerful, extraordinarily fast embedded VME controller drives the highest Speed-of-Test execution available. Data transfer between the embedded controller and the tester's PC server, is handled through TCP/IP communication protocols, minimizing data transfer time. The tester's PC server can be accessed through internal networks, as well as through the Internet allowing remote access to the system to determine the systems status or to gather result information.

Latch-Up stimulus and device biasing

The MK.4TE Test System can be equipped with up to eight 100V four-quadrant Voltage and Current (V/I) power supplies. Each V/I supply has a wide dynamic range enabling it to force and measure very low voltage at high current levels from 100 mV/10 A to 100 V/1 A. The system's power supply matrix can deliver up to a total of 18A of current, which is distributed between the installed supplies. These supplies are able to provide a fast and versatile means of making DC parametric and leakage measurements as well as providing latch-up pulses, while offering total control and protection of the DUT.

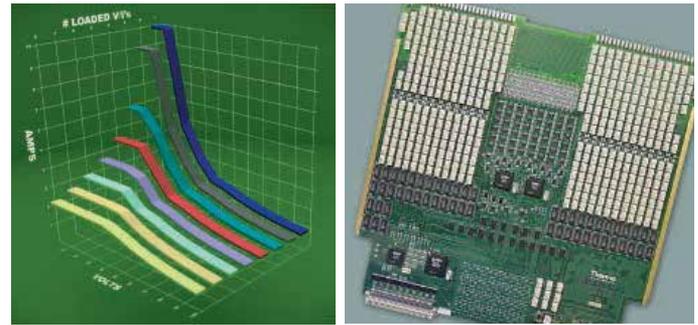
Advanced device preconditioning

The MK.4TE Test System provides the most advanced device preconditioning capability available. The DUT can be vectored with complex vector patterns, providing excellent control over the device. Each pin can be driven using one of the six different vector supplies. The patterns can be up to 256k deep, running at clock speeds of up to 10 MHz. Device conditioning is easily verified, using the read back compare capability available on every pin.

Thermo Scientific MK.4TE Scimitar™ Software makes programming easy, while providing unsurpassed programming flexibility.

The MK.4TE Windows®-based Scimitar operating software empowers users with the flexibility to easily set-up tests based on industry standards or company driven requirements.

Device test plans can be created by importing existing text based device files, on the testers PC server or off-line from a satellite PC containing the application. The software also provides the capabilities to import test plans and device files from previous Thermo Scientific test systems.



100W V/I Performance Thermo Scientific MK.4TE: eight-V/I configuration. Powerful V/Is can deliver a total of 800 W to the DUT, enabling complex testing of all advanced high power processors on your product roadmap (Left). Solid state matrix topology - for rapid, easy-to-use testing operations. Design ensures waveform integrity and reproducibility (Right).

Creating device preconditioning files is made easy, by allowing the import of existing vector files from previous Thermo Scientific test systems. Test vectors from your functional testers can also be imported into the application. And of course, the vector application allows manual creation and debug of vector files.

Device test plans and results are stored in an XML data base, providing unsurpassed results handling, sorting and data mining capabilities.

Parallelism drives remarkable test throughput speeds

The MK.4TE software enables ESD testing of up to 12 devices at one time using the multi-site pulse source design. Embedded VME power supplies eliminate any communication delays that would be seen by using stand alone supplies. The embedded parametric (curve tracing) supply also provides fast, accurate curve tracing data to help you analyze your devices performance.

The systems curve tracer can also be used as a failure analysis tool by allowing the comparison of stored, known good results, versus results from a new test sample or samples.

Ready for today's component reliability demands and anticipating those to come

ESD and Latch-up testing of electronic and electrical goods can be very expensive aspects of the design and manufacturing process. This is especially true as market demands for products that are smaller, faster, and smarter become the standard rather than the exception. The MK.4TE Test System leverages the technology and know-how gained over three decades of test system experience, as well as our in-depth participation and contributions to global regulatory bodies governing these changes, enabling today's products to meet both global and industry-driven quality standards.

The real key to our customers success is in anticipating what's next. And to ensure that our customers possess the ability to evolve quickly to meet all change factors with efficiency and cost effectiveness.

As such, the strategically-designed, field upgradeable architecture of the MK.4TE Test System ensures a substantial return on investment over a very considerable test system lifecycle, as well as better short- and long-term quality and ESD & Latch-Up test economies.



Custom fixtures include universal package adaptors to enable the industry's lowest cost-in-service high pin count device fixturing yet devised. (2304-pin, Universal 1-mm pitch BGA package adaptor shown.)

MK.4TE Test System

Human Body Model: (HBM) per ESDA/ JEDEC JS-001-2014, MIL-STD 883E, and AEC Q100-002 25 V to 8 kV in steps of 1 V	Test to multiple industry standards in one integrated system; no changing or alignment of pulse sources
Machine Model (MM) per ESDA STM5.2, JEDEC/JESD22-A115, and AEC Q100-003, 25 V to 1.5 kV in steps of 1 V	Integrated pulse sources allow fast multi-site test execution
Latch-up testing per JEDEC/JESD 78 test pin and AEC Q100-004	Includes preconditioning, state read-back and full control of each
Rapid Relay-based operations on average 10 times faster than robotic-driven testers	Super fast test speeds
Test devices up to 2304 pins	Systems available configured as 1152, 1728 or 2304 pins
Waveform network	Two, 12 site HBM (100 pF/1500Ω) and MM (200 pF/0Ω) pulse sources address up to 12 devices simultaneously. Patented design ensures waveform compliance for generations to come
Multiple device selection	When multiple devices are present; graphical display indicates the devices selected for test; progress indicator displays the current device under test (DUT), along with test status information
Unsurpassed software architecture	Flexible programming, easy to use automated test setups, TCP/IP communication
Enables use of device set-up information	Increased efficiency and accuracy from other test equipment, as well as device information import
Event trigger output	Manages setup analysis with customized scope trigger capabilities
High voltage power supply chassis	Modular chassis with patented HV isolation enables excellent pulse source performance
Power supply sequencing flexibility	Provides additional flexibility to meet more demanding test needs of integrated system-on-chip (SOC) flexibility
Manages ancillary test equipment through the Scimitar Plug-ins feature	Plug-in feature allows the user to control external devices, such as scopes or heat streams or other devices as required for automated testing
Pin drivers for use during Latch-Up testing and parametric measurements 256k vectors per pin with read-back Six independent vector voltage levels	Vector input/export capability from standard tester platforms Full real-time bandwidth behind each of the matrix pins Test complex I/O and Multi-Core products with ease
Up to 10MHz vector rate (programmable)	Quickly and accurately set the device into the desired state for testing from an internal clock
Comprehensive engineering vector debug	Debug difficult part vectoring setups with flexibility
Up to eight separate V/I supplies (1 stimulus and 7 bias supplies)	High accuracy DUT power, curve tracing, and Latch-up stimulus available; design also provides high current
Low resolution/high accuracy parametric Measurements, using an embedded Tektronix Keithley PSU	With the optional Tektronix Keithley PSU feature (replaces one V/I, nA measurements are achievable, allowing supply bus resistance measurement analysis to be performed
Multiple self-test diagnostic routines	Ensures system integrity throughout the entire relay matrix, right up to the test socket
Test reports: pre-stress, pre-fail (ESD) and post-fail data, as well as full curve trace and specific data point measurements	Data can be exported for statistical evaluation & presentation
Individual pin parametrics	Allows the user to define V/I levels, compliance ranges, and curve trace parameters for each pin individually
Enhanced data set features	Report all data gathered for off-line reduction and analysis; core test data is readily available; all data is stored in an easy-to-manipulate standard XML file structure
Interlocked safety cover	Ensures no user access during test. All potentially lethal voltages are automatically terminated when cover is opened. Safety cover window can be easily modified to accept 3rd party thermal heads.
Dimensions / Weight	60 cm (23.5 in) W x 99 cm (39 in) D x 127 cm (50 in) H; 224 kg (500 lbs)
Temperature Range	Operating Temperature +19°C to +22°C (+66°F to +72°F) Non-operating temperature 10°C to +60°C (+50°F to +140°F) Humidity Range 30-60% non-condensing
Power Requirements	System 190-230VAC, 3 Phase, 5 wire, WYE configuration, 47-63Hz, 22A Computer and Monitor 100-240 VAC, 6.5A, 50/60 Hz

Single-source, total component reliability Software (Scimitar) Features

- Summary Panel with easy navigation among device components
- Wizard-like prompts on multi-step user actions
- Control of external devices through the use of Scimitar's user programmable Plug-in capabilities, in addition to the Event Trigger Outputs, which provide TTL control signals for external devices, such as power supplies or for triggering oscilloscopes
- Flexible parametric tests that are defined and placed at arbitrary positions within the executable test plan
- Comprehensive results viewer that provides:
 - ESD and Static Latch-up data viewing capabilities
 - Curves viewer with zooming capabilities and the ability to add user comments
 - Data filtering on the following criteria – failed pins, failed results, final stress levels and other user selectable options
 - A complete set or subset of results using user defined parameters
 - Sorting in ascending or descending order by various column criteria
- Tree-like logical view of the tests and test plans
- Flexible data storage that provides the ability for the end-user to query the data
- Seamless support of existing ZapMaster, MK.1, MK.2, MK.4, and Paragon test plans
- Full support for the latest JS-001 test standard
- Capability to induce a latch up condition using pulses compliant with standard test models (TLU test type)
- Instrumentation support for third party instruments – oscilloscopes, source-meter units, power sources, heat streams, etc.
- Realistic representation of the package under test. Variety of sources available for importing outlines into new or existing test plans
- Wide range of device and result data visualizers; comprehensive waveform and statistical data analysis tools

- Curve tracing with curve-to-curve and relative spot-to-spot comparison
- Off-line curve analyzing, including third-party generated curve traces
- Ability to perform curve comparison against previously stored know good traces
- Canned JESD78 test that can be defined automatically using programmed device and power level knowledge
- Pause/Resume test capabilities
- Intermediate results viewing - pause, view results and continue
- Automated waveform capture capability and analysis, using the Plug-in and the embedded EvalWave software feature

ESD & Latch-Up test solutions

Specialists who understand the challenges you face. Innovative ideas. Leading technologies. Breadth of high yield component reliability test equipment, Thermo Fisher Scientific – your component reliability test solutions partner.

Contact us today for details

Find out more at thermofisher.com/EM-Sales

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