

Thermo Scientific MK.4 ESD and Latch-up Test System

The Thermo Scientific MK.4 ESD and 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. 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.

- 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.4, a versatile, powerful, and flexible, high yield test system. Easily upgradeable, the MK.4 ESD and Latch-Up Test System is fully capable of taking your test operations through ever-evolving regulatory and quality standards.

Solid-State Matrix Topology

The advanced rapid relay-based (modular matrix) hardware of the MK.4 system is at least 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.4 can be equipped with up to eight 100 V 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.4 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 6 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.4 Scimitar™ Software Makes Programming Easy, while Providing Unsurpassed Programming Flexibility

The MK.4 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.



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.)

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.4 software enables ESD testing of up to twelve devices at one time using the multisite 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.

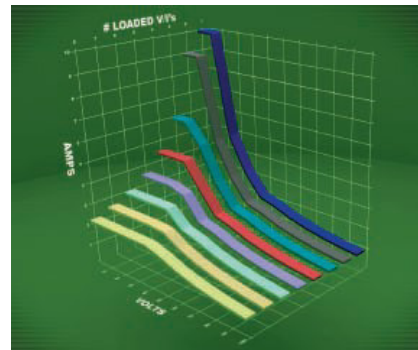
The systems curve tracer can also be used as a failure analysis tool by allowing the comparison of stored, known good results, versus results from a new test sample or samples.

Ready for Today's Component Reliability Demands and Anticipating Those to Come

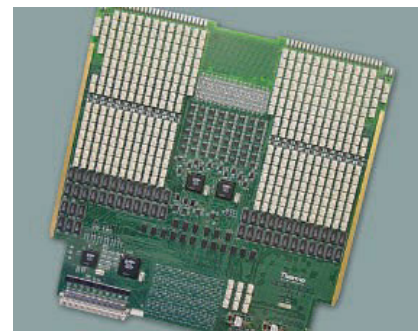
ESD and Latch-Up testing of electronic and electrical goods can be very expensive aspects of the design and manufacturing process. This is especially true as market demands for products that are smaller, faster and smarter become the standard rather than the exception. The Thermo Scientific MK.4 leverages 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.4 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 and Latch-Up test economies.



100W V/I Performance Thermo Scientific MK.4: eight-V/I configuration. Powerful V/I's can deliver a total of 800 W to the DUT, enabling complex testing of all advanced high power processors on your product roadmap.



Solid state matrix topology for rapid, easy-to-use testing operations. Design ensures waveform integrity and reproducibility.

General Specifications

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.
Wizard-like prompts on multi-step user actions 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 at least 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	Provides additional flexibility to meet more demanding test needs of integrated system-on-chip (SOC) flexibility.
Manages ancillary test equipment through	Plug-n feature allows the user to control external devices, such as scopes or heat streams or other devices the Scimitar Plug-ins feature as required for automated testing.
Pin drivers for use during Latch-Up testing	Vector input/export capability from standard tester platforms and parametric measurements.
256k vectors per pin with read-back	Full real-time bandwidth behind each of the matrix pins.
Six independent vector voltage levels	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) capability through the V/I matrix	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 Keithley PSU	With the optional 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	60 cm (23.5 in) W x 99 cm (39 in) D x 127 cm (50 in) H

Scimitar Software 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 an arbitrary position 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
- 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.2, MK.4, and Paragon test plans

Curve tracing with curve-to-curve and relative spot-to-spot comparison

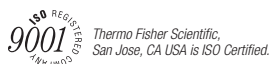
Off-line curve analyzing, including third-party generated waveforms

Canned JESD78A test (static latch-up only) that can be defined automatically

Pause/Resume test capabilities

Intermediate results viewing

Automated waveform capture capability and analysis using the embedded EvalWave software feature



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