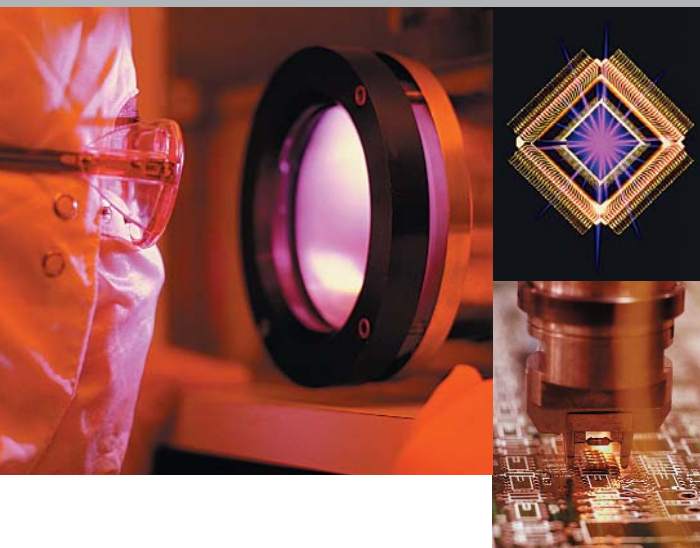


The Thermo Scientific Celestron is a two-terminal bench-top TLP/VF-TLP test system for fast, accurate, reliable, and affordable characterization of advanced semiconductor structures.

## Thermo Scientific Celestron

### TLP/VF-TLP test system



#### Features

- Wafer and package level TLP testing
- Integrated WINDOWS®-based system controller
- TLP pulse generator
- Integrated source/meter unit
- Optional bias supplies (up to 5) under computer control for powered testing and measurements
- Can be interfaced with semi-automatic probers
- Advanced, intuitive software for control and report generation
- Small bench top footprint

#### Flexible test capabilities

The Thermo Scientific Celestron can be configured for TLP, VF-TLP, HBM ESD, and MM ESD for testing at the wafer level and/or the package level. Optional probes can also be used to measure signals on pins or pads other than the ones being stressed.

#### Unsurpassed test control

The Celestron system software is the most comprehensive in the industry, and utilizes graphics to assist in system setup and connection to the DUT. During test operations, it displays recorded TLP pulse voltage and current waveforms, compiled pulsed I-V

curve, leakage current measurements, and DC I-V curve trace data. The operator can select the range of test voltages (stress pulses), pulse polarity, leakage and curve trace parameters. The position and duration of the measurement window within the TLP pulse can also be selected, and modified after the data is collected.

## Thermo Scientific Celestron TLP Configuration

<b>Pulse widths from 30 to 500ns</b>	100ns is standard, common optional widths include 30, and 200ns (others available) Can be manually selected with cable connections at front of the system Optional computer pulse width control with 3 selectable widths
<b>Rise times available</b>	From 0.5ns to 10ns Controlled by optional filters One filter included Optional computer rise time control with 3 selectable rise times Note: 500 MHz or faster oscilloscope is required for TLP measurements. 1 GHz scope is recommended for measurements with rise times less than 1ns.
<b>Support of all TLP configurations</b>	Optional changing of configuration for 25 to 500 ohm delivery impedances Support for all configurations described in the ESD Association's TLP Standard Practice Both wafer level and package testing at all impedances
<b>Time Domain Reflection with Overlapped pulses (TDR-O)</b>	Standard TLP configuration for pulse widths above 30ns 50 ohm delivery impedance Allows "adaptive ranging" of oscilloscope for improved accuracy Maximum DUT current of 10A into 50 ohm load and 20A into a short Multiple grounds, multiple biased pins/pads, multiple ground current path measurement, and multiple voltage node measurements are possible
<b>Time Domain Reflection with Separated pulses (TDR-S)</b>	50 ohm delivery impedance Standard TLP configuration for pulse widths under 50ns or when measurement pod can not be placed close to the DUT DUT current of 10A into 50 ohm load and 20A into a short Multiple grounds possible
<b>Optional ESD pulse generator</b>	HBM ESD pulses up to 4000 volts MM ESD pulses up to 400 volts Includes leakage measurement or curve trace between pulses Uses same wafer probe needles as TLP
<b>Optional Time Domain Transmission (TDT)</b>	25 ohm delivery impedance Maximum DUT current of 10A into 25 ohm load and 20A into a short Multiple grounds, multiple biased pins/pads, multiple ground current path measurement, and multiple voltage node measurements are possible
<b>Optional Time Domain Reflection and Transmission (TDRT)</b>	100 ohm delivery impedance Maximum DUT current of 6.6A into 50 ohm load and 10A into a short
<b>Optional 500 ohm (Current Source) TLP</b>	High-Z TDRT mode for high efficiency Computer switching between 500 ohm and 50 ohm TDR-O Maximum DUT current of 1.8A into 50 ohm load and 2A into a short
<b>48 pin DIP DUT board (one included)</b>	Calibration Zener Diode and resistor included
<b>Wafer probe (one set included)</b>	50 ohm coaxial probe pulse delivery Tungsten ground probe Needles are replaceable

## Thermo Scientific Celestron VF-TLP Configuration

<b>Pulse widths from 1.2 to 10ns</b>	Selected by cable change at front of system Standard widths are 1.2, 2.5 and 5ns (others optional)
<b>Maximum pulse current</b>	15A into a 50 ohm load Approx. 30A into a short circuit
<b>DUT testing</b>	Wafer level and package-level
<b>Rise times from 100ps to 2ns</b>	Controlled by optional filters Standard rise times are 200 and 300ps One rise time filter included
<b>Time Domain Reflection (TDR) with separated pulses standard (TDR-S)</b>	50 ohm delivery impedance Uses high frequency GS or GSG needle assembly (sold separately)
<b>Time Domain Reflection and Transmission standard (TDRT)</b>	100 ohm delivery impedance Flexible independent needles for testing wafer or packaged parts
<b>Signal Merge Box Technology</b>	Converts TDR-S signals to TDR-O Allows "adaptive ranging" to reduce voltage noise
<b>VF-TLP current and voltage measurement pod</b>	Bandwidths > 2 GHz
<b>VF-TLP DUT boards</b>	VF-TLP DUT board for DIP device included Calibration standards on DUT board Custom boards for use with customer supplied sockets are available
<b>Typical pulse characteristics</b>	Overshoot vs. rise time: < 20% at 100 ps, < 10% at 200 ps, and < 5% at 300 ps Ringing amplitude peak-to-peak including overshoot < 30% at 100 ps, < 20% at 200 ps, and < 10% at 300 ps Settling time (ring duration) to $\pm 2\%$ : < 1ns at < 300ps rise time and < 500ps at > 300ps rise time Fall times between 1 and 2 times rise time

## Thermo Scientific Celestron TLP /VF-TLP System

<b>Wafer and package level TLP testing</b>	Flexibility
<b>Integrated system controller</b>	No need for a dedicated computer Windows® operating system
<b>TLP pulse generator</b>	Cable-generated pulse Dual polarity pulses under computer control Peak pulse current 10A (allows DUT currents approaching 20A)
<b>Current and voltage probes</b>	Included in a small pod for flexibility
<b>Integrated source/meter unit</b>	Curve Tracing to ± 200V Leakage measurements down to 50pA DUT failure detection based on leakage or voltage with forced current or both
<b>Optional bias supplies</b>	Up to 5 under computer control for powered testing and measurements
<b>Can be interfaced with semi-automatic probers</b>	Flexibility, cost-savings, ease of test
<b>Advanced software</b>	Exacting test control, report generation
<b>Platform</b>	TLP test capability (TDR 50 ohm standard): Pulse single pin Can ground one or multiple pins (TDR) Semiautomatic operation Customer supplied oscilloscope: 500 MHz min. BW for Standard TLP 2.5 GHz min. BW for VF-TLP Wafer interface kit requires customer-supplied prober station and micro positioners
<b>Transmission Line Pulse (TLP)</b>	Designed in compliance with the current ESD Association Standard Practice Document
<b>ESD specifications (optional)</b>	HBM Waveform to 4kV MM waveform to 400 Volts Note: Stress levels are limited by the current handling capability of the probe needles.
<b>Operating range</b>	Temperature: +40 to 112°F (+5 to +44°C) Humidity: 10 - 80% non-condensing
<b>Physical</b>	23" (l) x 22" (w) x 24.5" (h) 58.5cm (l) x 56cm (w) x 62.25cm (h) Standard system weight: 85 lbs (38.6kg) Shipping weight: 200 lbs (91kg)
<b>Power requirements</b>	120/240 VAC, 50/60 Hz
<b>Options</b>	Bias supply up to ±50V and 2A DUT test fixture boards Semi-automatic prober interface software Custom charge lines (pulse width): 30ns to 200ns VF-TLP charge lines: 1.2 to 10ns Custom time delay/TDR-S cables: 10ns to 200ns Variable pulse widths and rise times from 0.2 to 20ns Computer switching between 3 pulse widths Computer switching between 3 rise times Coaxial and solid wafer probe needles Kelvin probes to remove wafer contact resistance Additional ground wafer probes (for TDR and TDT only) Wafer probes of various radius tips in tungsten and copper

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