# Very Fast TLP Pulse Curve Tracer

**BARTH Model 4012 VFTLP+ ™**
**Specifications**

## Barth 4012 Very Fast TLP Pulse Curve Tracer

The 4012 Very Fast TLP (VFTLP+ ™) system is built with specially designed high speed hardware. Its test pulse simulates the CDM speed and its current and voltage sensors capture the very fast response of ESD circuits necessary for CDM design. Our BEI manufactured hardware has the fastest instrumentation of any system and corrects for losses inherent at these picosecond speeds. This system is the first to add accurate peak TDDB oxide threat data to the usual I-V data plot. These two voltage data are used together to analyze electrical characteristics of ESD protection structures, the 4012 system now captures both voltage and current waveforms at silicon level before packaging for first silicon CDM success.

## Barth Software

The Barth software now includes: Voltage & Current DUT waveform capture; Automatic calibration / compensation (and save / recall); Save / recall operator set-ups; Auto or manual axis scaling; Single or multi-point leakage testing (configurable); Adjustable measurement window; Dynamic resistance plots with values; Compare & analyze multiple tests; Save / recall pulsing "profiles"; Multi pulsing capability (between data collection points); Scope auto-SPC (signal path compensation); and numerous other new features to aid your CDM design effort.

## How It Works

To use the Pulse Curve Tracer, the operator enters the desired test parameters via keyboard, such as starting voltage, current and voltage limits, voltage step increments, pulse risetime, and pulse width. The test then proceeds automatically, controlled by Barth software developed with National Instruments LabView®. The operator can halt and resume the testing and can view the plotted test data points as the test proceeds. The operator can also view (during testing or afterward), voltage & current waveforms, single point or multi-point leakage evolution, test set-up parameters, or numerical data information. The active test and several previous test data plots may be viewed simultaneously on the I/V plot. Hardcopy prints are immediately available on the provided printer. This includes both the active I/V plot plus leakage vs. average current plot.

## System Components

- Tektronix Scope Model DPO 70604, 6 GHz Digitizing
- High Reliability Barth Electronics Control Box/Pulse Generator
- Keithley Picoammeter/Voltage Source
- Main power switch/power distribution panel
- Test control computer (Dell Optiplex Minitower; Dell 19” flat panel; Windows XP; Keyboard; Mouse)
- High speed business class color printer
- LabView® runtime Control and Analysis Software
- One year warranty on the entire system

## Accuracy

Special Barth wide bandwidth pulse current and voltage sensors provide a high standard of measurement capability for ESD test equipment. The complete system has been built with special attention paid to minimizing losses in the test circuitry and the coaxial cable connections. This results in accurate measurements of low dynamic resistance CDM protection circuits directly at the silicon pads.

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## Barth 4012 VFTLP+ ™ Specifications

**Output to DUT** (program driven)
**Test Pulse width:** 1ns, 2ns, 5ns and 10ns (standard). Pulse width is software selectable.
**Test Pulse voltage:** 0-500v @ 50Ω load, 1,000v @ open circuit
**Test Pulse current:** 0-10 amps @ 50Ω load, 20 amps @ short circuit
**Test Pulse risetime:** 100ps, 200ps, 400ps (built-in, software selectable)
**Test Pulse rate:** ≈ 10 test pulses per minute
**DUT Voltage sensor risetime 30 ps**
**DUT Current sensor risetime 35 ps**
**Leakage voltage:** 0 to 100v (0.1 v increments)
**Leakage current sensitivity:** 1 pA to 2.5 mA
**Source impedance:** 50Ω
**Load Impedance:** any silicon ESD voltage clamp circuit
**Factory Selectable power:** 100,120 vac @ 1.5amps; 220,240 vac @ .75amps, 50 to 60 Hz (USA default:120 vac; 60 Hz) The following are powered separately – oscilloscope, computer workstation, and Keithley SMU
**Size:** Control Box is 19"W x 20.5"D x 11"H, the total height with a Tektronix Model DPO70604 Oscilloscope is 21"
**Weight:** The total weight is approximately 168 lbs, plus shipping materials (Control Box – 57 lbs, Tektronix Model DPO 70604 Oscilloscope – 44 lbs, Dell Workstation – 43 lbs, HP Printer – 24 lbs.)

## Options

- Model 40312 BGA-Test Fixture (for VFTLP+ ™).
- Other custom test fixtures are available by special request.

## Data Storage

Data is automatically stored to hard disk in comma delimited format and can be recalled for viewing or transferring to disk. Data is automatically time/date stamped when saved.

## Hardcopy Printout

Hardcopy printouts on a color printer listing data point values and showing plotted results using operator selected scaling are immediately available in a presentation ready format at the end of a test.

## Screen Displays

Eight display screens all display the active test and up to 5 recalled tests (on the left half of the screen). The left side display shows the I/V curve and leakage evolution. The right side display can also show: V & I waveforms, single or multi-point leakage evolution, operator info, test parameters, numerical test-point data, or calibration values.