If you’re still using traditional manufacturing defects analyzers (MDAs) to test the increasingly complex SMT/VLSI boards used in personal computers, workstations and peripherals, you’ve probably discovered that test coverage is shrinking while throughput is slowing. The Z1803 is the full-performance solution of choice for manufacturers who need total fault coverage for advanced VLSI and mixed-signal assemblies, but want to preserve the time and cost advantages that their older MDAs have been delivering on simpler boards. Combining high-accuracy analog capability with Teradyne’s acclaimed MultiScan™ vectorless test toolset for detecting VLSI and ASIC pin faults and opens, the Z1803 delivers the high fault coverage you require without sacrificing the attractive economics of a traditional MDA. Unlike MDAs, though, the Z1803 is completely field-upgradable to full digital in-circuit test, boundary scan test, and flash memory programming.
The Z1803 combines the well-known cost and cycle time advantages of MDAs with the high fault coverage and built-in upgradability of manufacturing process testers, making it the ideal solution for production operations building increasingly complex and dense VLSI SMT boards, including PC motherboards, multimedia, peripherals, and networking products. The Z1803 gives you the affordable fault coverage you need now to help ensure the highest possible product quality. And with the Z1803’s exclusive upgradability features you are ready to add additional test capability as you need it.

The Z1803 provides all the performance, productivity and programming features of the world’s most popular manufacturing process testers—the Z1800-Series™—at a very attractive price:

- Full power-off analog in-circuit test for finding interconnect faults and checking passive devices.
- Standard DeltaScan™ vectorless test for high coverage VLSI digital and mixed-signal opens and device faults.
- Standard FrameScan Plus™ and CapScan™ vectorless test for finding connector opens and reversed electrolytic capacitors.
- Available press-down unit for mechanically actuated fixtures.
- Bosch frame-equipped, tiltable console for straightforward integration into automated lines.
- PC-driven run-time operating and programming environment.
- Full program generation tools, including available Momentum™ programming environment for direct CAD-to-tester data transfer and test validation.
- ProcessWatch Parametrics™ package for creating the most accurate, repeatable programs of any tester in this class.
- Full upgradeability on the production floor to complete digital in-circuit, boundary-scan test, and flash memory programming.

Complete Process Fault Coverage

Every Z1803 system includes Teradyne’s exclusive MultiScan vectorless test system—consisting of DeltaScan, FrameScan Plus, and CapScan tools—to find opens and other faults common to digital and mixed-signal VLSI and ASIC device packages without the complex patterns and time-consuming overhead of traditional backdrive in-circuit test. In addition, the MultiScan tools let you identify connector opens and reversed electrolytic capacitors. DeltaScan is the proven industry standard for highest throughput, highest pin fault coverage, and lowest false reject rate—all with the fastest programming times. By eliminating the requirement for external sensors and expensive fixture overclamp devices, DeltaScan is also the most economical vectorless test technique available. FrameScan Plus and CapScan are the reliable means to finding previously undetectable faults: open connector pins and reversed electrolytic capacitors.

The Z1803’s analog sub-system has all the standard capability you need for testing for shorts, passive components (R,L,C), diodes, and transistors— including standard beta tests. Built-in programmable voltage/current stimulus and measurement tools let you design customized tests. The optional +5V fixed and +/-55V programmable power supplies expand your test capability to include a variety of other power-on operational tests such as op-amp testing.

ProcessWatch Parametrics™ is Windows-based data-analysis software for the Z1800-Series test programming process. Easy-to-use and interactive, the ProcessWatch Parametrics software gives you powerful statistical process control (SPC) tools for ensuring stable, reliable test programs in production.
Programming Tools for Maximum Fault Coverage and Stability

Traditional MDAs often feature “automatic programming” to develop in-circuit tests without human intervention. However, the price of “automation” is almost always marginal fault coverage because only the simplest circuit configurations and component types are handled effectively. Even worse, only one or two board samples are used in this programming process, skewing the test limits and leading to test repeatability problems in high volume production.

In contrast, the Z1803’s programming tools produce high fault coverage and test stability in the shortest overall time. You know exactly what’s being tested and how because software tools like ProcessWatch Parametrics (included with the Z1803) give you the information you need to set limits and adjust tests quickly.

In addition, there’s the available Momentum Programming Environment: a comprehensive, easy-to-use toolset that streamlines the process of test program generation and fixture design, enabling users to move quickly from their CAD or Bill-of-Materials data to testability analysis to Z1803 program files—all in a graphical, Windows 95-based environment.

Step-by-step Upgradability

In addition to its low entry price, extended fault coverage, and test program stability, the Z1803 offers total step-by-step upgradability to meet every conceivable test strategy requirement. Available options include:

- QuickCheck™ digital in-circuit backdrive test for SSI/MSI and checking PALs or ROMs for correct program
- Vector Performance™ (VP) Option offering full vector digital in-circuit backdrive test for VLSI and ASICs
- Boundary-scan testing with VICTORY™ software
- IEEE/VXI instrumentation
- Non-volatile memory (NVM) (flash/EEPROM) programming

You can upgrade your Z1803 at any time to include whatever level of digital backdrive pattern testing you require by adding either the QuickCheck or Vector Performance Option. These kits include non-multiplexed driver/receiver hardware, operating software, and an extensive digital test library for thousands of commercial devices—from SSI/MSI through memory chips. Many of today’s boards now include non-volatile memory devices such as flash. By adding the Digital Function Processor™ (DFP) Option, you can eliminate the cost and time of a separate manufacturing step by programming NVM devices right at the process test stage. In addition, the DFP delivers comprehensive digital functional stimulus/measurement capabilities including memory and serial data port testing. All these upgrades can be added without moving your Z1803 system off your production floor.

General System Features

- 996 analog stimulus/measurement pins expandable up to 2048 hybrid (non-multiplexed digital and analog) pins.
- Anti-static work surface and ESD kit.
- Bosch console frame to attach accessories and simplify integration in-line.
- 100VAC to 250VAC, 50/60Hz single phase line voltage transformer.
- Integrated power line conditioning and monitoring.
- System self-test and diagnostic fixture software (system MTTR 10 minutes typical).
- PC I/O card and cable.
- Optional DUT power supply: +5V @ 45A.
- Optional dual programmable power supply: 0 to 55V, 2A.
**Analog Test Specifications**

3- and 6-wire test measurements for high-precision analog testing of low impedance devices.

**Resistance**
- 6-wire: 1Ω to 20Ω @1% accuracy typical.
- 20Ω to 2kΩ @ 0.5% accuracy typical.
- 3-wire: 200kΩ to 100MΩ @1% accuracy typical.

**Capacitance**
- 6-wire: 1µF to 100µF @ 1% accuracy typical.
- 3-wire: 100pF to 200nF @ 5% accuracy typical.

Extended analog mode using quadrature measurement:
- 3-wire: 1Ω to 20Ω @1% accuracy typical.
- 20Ω to 2kΩ @ 0.5% accuracy typical.
- 3-wire: 200kΩ to 100MΩ @1% accuracy typical.

**Inductance**
- 6-wire: 10µH to 30mH @ 5% accuracy typical.
- 3-wire: 3mH to 300mH @ 5% typical.

**Guard ratio**
- 6-wire: 100 to 1.
- 3-wire: 100 to 1.

- Programmable signal averaging for noise immunity, 1 to 255 measurements.
- Low voltage stimulus for resistor, capacitor and inductor measurements, nominal stimulus 200mV across component-under-test.

**Transistor gain testing**
- Analog Switching
  - Rdelay-on resistance < 200 milliohm.
  - Rdelay-off resistance ≥ 10 gigaohm min.
  - Rdelay stand-off voltage > 120 Volts.
  - Rdelay carrying current 1A.
  - All relays socketed for quick service, self tests identify failing relays.
- HiGuard™ nulls thermal EMF for improved guarded measurement accuracy.
- 60V/20mA (required for GS Certification) or 100V/20mA ac/dc stimulus for high voltage device testing (optional).

- Active Squelch discharges components quickly prior to each test step to ensure accuracy, high throughput and repeatability.
- Automatic learning of shorts and continuities tests.
- Separately programmable shorts and continuities thresholds: default 5 ohm.
- Dual, independently programmable stimulus sources.
- 16-Bit programmable stimulus source.
- Validate™ /AutoAccept automatically debugs analog tests.

**Software**
- Language-free, menu-driven programming system with self-guiding on-line help.
- Automatic guard analysis.
- Interactive debugging of test programs using “stop-on-fail” editing.
- AutoProbeCheck™ verifies fixture-to-board contact to eliminate false rejects.
- Nofinder™ probe utility detects/displays test system channel numbers, speeding debug operations.
- Reverse Nofinder physically locates specific test system nodes at the board-under-test using a handheld probe.
- Program branching and chaining commands control test program flow for testing of multiple boards.
- ProcessWatch™ online data collection of test results for real-time yield monitoring, alarms and defect analysis.
- ProcessWatch Parametrics™ analyzes variations in test results to produce stable, repeatable test results.
- Optional Relay Array Board provides 32 programmable user relays.
- Multiplexed testing.

**Specifications for Optional Digital In-Circuit Upgrade Kit**
- N-on-multiplexed driver architecture individual driver behind every pin at all times.
- Dynamic truth table testing using Gray code coherent stimuli (up to 32K patterns per burst), static logic levels and synchronous preset pulses.
- Up to 2 million data patterns per second.
- Measurement characterization modes: signature analysis, transition counting, period (high) measurement.
- Fully automatic, unlimited digital parallel sensing per-test-step.
- Programmable dual threshold sensing checks IC output high and low level; input voltage range of -2V to 10V.
- Global digital guards (disables) speed and simplify digital debug.
- Digital test libraries: Gray code and vector template library for automatic test generation (VLSI, LSI, MSI, microprocessor, memory). Built in JEDAC translator provides models for programmable PAL/GAL devices.
- 400mA Source/Sink capability at every node. Sufficient backdrive current for all logic families. (TTL, MOS, CMOS, NMOS, AS, & FAST).
- Programmable backdrive timeout and duty cycle control protects digital devices.
- Controlled slew rate of 120V per µsec prevents overshoots.
- HiCheck™ produces a “HIGH” signature for all “stuck high” measurements.
- Selectable pull up, pull down and mid-terminators.
- Tracer™ interactive open pin verification routine eliminates false device rejects.
- Fault Inject grades fault coverage of digital tests.
- Optional Vector Performance™ subsystem adds full vector pattern capability to basic Digital In-Circuit Upgrade Kit.

**Environmental Requirements**
- Ambient Temperature: 64-89°F (18-32°C).
- Relative Humidity: 20-70% non-condensing.
- Power Requirements: 100-250V , 1.8KVA, 3-wire, 50 or 60 Hz single phase.
- Vacuum Pump Capacity: 41 CFM.
- Vacuum Pump Temperature: 32-122˚F (0-50˚C).
- Relative Humidity: 20-70%, non-condensing.
- Required Vacuum Pump Capacity: 41 CFM.
- Weight: (approximate): 525 lb (239 kg).
- Nominal Power Requirements: 100-250V, 1.8KVA, 3-wire, 50 or 60 Hz single phase.
- Power Connectors: NEMA L5-30P.