Advanced Electronic Test Systems For the Electrical Connector and Cable Industry

The ConnectorTest International Models

The ConnectorTest International models **4097A, 4087B and 4077A** are advanced electronic test systems developed specifically for automated testing of electrical connectors and cable harness assemblies. The model 4087B and model 4097A systems feature a 320 point switching matrix and fully integrated, self-contained electronics...all plug-in replaceable. The 4097A tests cable assemblies and all types of electrical connectors, both filtered and non-filtered. The model 4087B tests all types of filtered, non-filtered and connectors and hermetic connectors. The model 4077A features an 8 point multiplerer for cluster testing hermetic connectors, relays and other devices.

The model 4087B and 4097A test systems are thorough, very accurate and FAST! Each pin on the interconnect device is tested against all other pins tied to the connector shell automatically to ensure against pin-to-pin leakage and short circuits. The precision charging to and from programmed voltages is rapid and computer controlled, leaving zero charge on each pin, in comparison to the slow charge response time of other commercially available equipment used for testing connectors and cable assemblies. No other commercially available test equipment / ATE will match the speed, thoroughness, efficiency, investment payback and ease-of-use of these advanced test systems from ConnectorTest International. The 4097A, 4087B and 4077A test systems typically produce *four to seven times the production output* of other commercially available production ATE systems. The systems will test up to 30 times faster on parts requiring capacitance testing only.

The Leading Provider of Advanced Testing Systems For the Interconnect Industry

Who Uses ConnectorTest International Test Systems?

These advanced test systems are used by manufacturers and end-users worldwide to test electrical connectors and cables installed on everything from automotive engine management systems (ECU's) to implantable pacemakers / defibrillators, satellites and spacecraft, commercial and military aircraft / hardware and subsystems, communication systems, submarine applications, geophysical cables used in oil / gas exploration, railroad industry, nuclear applications and much more. As today's advanced electronic systems are managed by faster, more sophisticated computers, the requirement for specialized connector devices increases - as does the requirement to test these complex interconnect devices. The model 4097A, 4087B and 4077A test systems meets those specialized test requirements.

Our ATE Systems

ConnectorTest International manufactures testing equipment that is 4-7 times faster than the competition. The 4077A, 4087B, and 4097A systems outperform all other ATE products in the market through a unique combination of superior:

- **Speed**
- **Test Function**
- **Ease of Operation**
- **Portability**
- **Serviceability**
- **Return on Investment (ROI)**

User-Friendly and Versatile

User-friendly software requires no programming knowledge. These systems test all stages of production, including the planar capacitor, subassembly and finished part.

High Performance Provides A Quick Return on Investment

At one third the cost of other available ATE equipment, our test systems provide a return on investment (ROI) in as little as four months!

Advanced ATE Systems

At one time, it had been said that the ConnectorTest International Model 4087B test system was one of the industry's best-kept secrets. That is not true any longer, as more connector and cable harness manufacturers and end-users have discovered the multitude of production advantages this equipment provides. Although this might be your first encounter with ConnectorTest International or the Model 4077A, 4087B, or 4097A, be assured that the technology base of these systems is founded upon many years of experience in advanced commercial and aerospace electronics. After almost 26 years of system evolution and improvements in response to user requirements and inputs, these advanced test systems are rapidly becoming the industry test standard for manufacturing and QC testing.

History:

The first system was developed in 1988 as the Model 4087A, dedicated to testing only D-Subminiature filter connectors. The electronics were designed and developed in order to reduce hardware bulk to desk-top size and greatly increase test speeds and avoid reliance on outside suppliers for repairs, etc.

As the first system began to prove itself in production test environments, the need was recognized for a more versatile system capable of testing all types of connectors, including circulars, 'D' subminiatures, Nano 'D,' Micro 'D,' hermetics, ARINC/rack/panel connectors, hi-reliability medical connectors and automotive connectors, both filtered and non-filtered. This led to the development of special modular plug-in test modules with interchangeable test adapters for not only a final product but also for testing incoming planar capacitor arrays and in-process filter sub-assemblies. Simple operator programming capabilities allow pin-by-pin selectable AC/DC test voltages, dwell times, and fail limits, as well as optional features such as Zener Diode/MOV/TVS tests, dissipation factor (DF), inductance, continuity, and contact resistance. The test systems are managed by Intel 3.4 GHz Core i3-3240 computers with Windows 10 Pro OS and ConnectorTest's proprietary operating software. The Models 4087B and 4087A fulfill most of the test requirements of the connector and cable industries.

What's New With ConnectorTest International?

October 2021: Connector test has developed a new type of module / fixture for testing small Discoidal capacitors. The new module can test multiple parts in one test cycle. The module shown on the Features page will test 40 discoidals. Larger module designs are available for testing up to 160 discoidals in one test cycle.

In **July 2009**, ConnectorTest Int'l. began a testing service for manufacturers of connectors, arrays, and cable harnesses. If your manufacturing department is dealing with customer backlogs and production bottlenecks and you are behind schedule, consider ConnectorTest International's test services as an alternative to lighten your workload and ensure customer delivery schedules run on time. Services include: comprehensive electronic testing, detailed serialized documentation with each device tested, electronic database records, and quick turnaround.
Testing includes but is not limited to: filtered and hermetics, 'D' sub, Micro Ds, ARINCs, medical connectors, planar array capacitors, Zener arrays, MOV arrays, testing of rubber inserts and cable assemblies.

Test systems are also available for lease on a monthly basis.

In **June 2006**, ConnectorTest added new system software features. It is now possible to test matched pairs of filtered pins for a specific capacitance spread calculated in percent or absolute value. The 'Matched Pin Capacitance Spread' feature tests the connector device for specific pairs of matched pins; stores and prints the details of those tests. Results are grouped in a summary form and in a detailed form for further analysis. System software retrieves and prints these documents on demand as well as other information as a paper trailer with your company's product.

In **2004**, ConnectorTest added two new test systems to the product family; the Model **4077A** Hermetic Connector/Cluster Testing System and the Model **4097A** Cable Harness and ConnectorTesting System. Both of these systems are based on the same reliable hardware/software platform that has proven itself in the industry to date.

Model 4087B and 4097A Performance Specifications

4087B-Brochure.pdf

4097A-Performance-Spec.pdf

Test Method:

One pin tested against all other pins tied to the connector's ground shell.

Capacitance:

1.0 pF-1.0 uF, 1% typical; 2% max/1 KHz test frequency
- Test Capacitance at DC Bias Voltages From 0-750 VDC

Insulation Resistance (IR):

5-100,000 Meg Ohms (100 Gig Ohm), 2% (200 Gig Ohm Option)
0-1,500 VDC Test Voltage; 0.1%
0.1-650 second Programmable Dwell Time Setting

Dielectric Withstanding Voltage (DWV/Hi-Pot):

DC:

0-1,500 VDC Test Voltage; 0.1%
0-2,500 VDC Option
0-1,000 uA Fail Current; 2%

AC:

0-1,800 VAC Test Voltage, 60 Hz; 2%
0-2,300 VAC Option
0-2,000 uA Programmable Fail Current
0.1-650 Second Programmable Dwell

AC Ramp Options:

a) 500 VAC / Sec. (Space Station Requirement)
b) 200 VAC / Cycle

Zener Diode / TVS / MOV DEVICES:

0-750 VDC Test Voltage; Bi-Polar / Uni-Polar
1-10 mA Test Current
4.8-750 VDC Breakdown Voltage
Selectable Reverse Leakage Limits: 1 nA-10,000 nA; 1 uA-1000 uA

Shorted Pin Test:

Verify intentionally shorted pins, either to ground or to another pin.

Ground Ring Test:

Verify presence of ground ring on connector/cable shell. Can be disconnected from test to identify pins shorted to one another.

Cable Continuity / Model 4097A Only:

Measure up to 160 Wires (320 terminations);
Resistance Measurements: 0.01 Ohms-4,000 Ohm measurements
Test Current Selectable: 1, 10, 100 mA

Contact Resistance:

Measure 0.004 Ohms-4.00 Ohms @ 100 mA
Resolution = 4 milliohms
Standard on 4097A; Optional on 4087B

AC Power Requirements:

105-125 VAC; 50-60 Hz
350 mA, AC Input Current
Europe 230 VAC; 50 Hz Option

Size:

4087B & 4097A = 14" W x 14" H x 19" D
Weight = 45 lb.

Model 4077A Performance Specifications

4077A-Performance-Spec.pdf

Test Method:

Test clusters of nonadjacent pins; 8 test points available.

Insulation Resistance:

5-100,000 Meg Ohm; 2%
0-1,500 VDC Test Voltage; 0.1%
0.1-650 Second, Programmable Dwell Time

Dielectric Withstanding Voltage:

DC:

0-1,500 VDC Test Voltage; 0.1%
0-2,500 VDC Option
0-1,000 uA Fail Current; 2%
0.1-650 Second Programmable Dwell

AC:

0-1,800 VAC, 60 Hz; 2%
0-2,300 VAC Option
0-2,000 uA Fail Current; 2%
0.1-650 Second Programmable Dwell

Ramp Options:

a) 500 VAC / Sec.
b) 200 VAC / Cycle

Size:

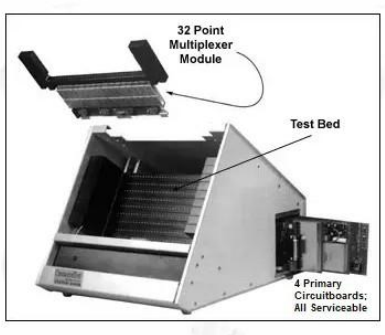
4077A = 12.5" W x 8.5" H x 17.5" D
Weight = 15 lb.

System Options:

- 17" or 19" LCD Touchscreen
- Barcode Scanner (Saves time by scanning long part numbers, job/lot numbers, etc. into menu text field.)
- Temperature/Humidity/Barometric Pressure
- Instrumentation: Displays measurements on
- Instrument's display, printed documents, and main menu.
- UPS (Uninterruptible Power Supply); 500 VA.
- True sinewave power supply; (Recommended)
- Model 4087B can be configured for contact resistance measurements.
- 200,000 Meg Ohm (200 Gig Ohm) insulation resistance measurements.
- 0-2,500 VDC and 0-2,300 VAC Test Voltages

Cutting-Edge Engineering For Efficient Production Testing

ConnectorTest International's test systems offer significant manufacturing and product marketing advantages, some of which are outlined on this page. High-quality OEM manufactured test modules fit into the rugged aluminum chassis using quarter-turn aircraft fasteners, allowing testing of several devices at a time, yielding more efficient testing and much greater product throughputs in the production environment.

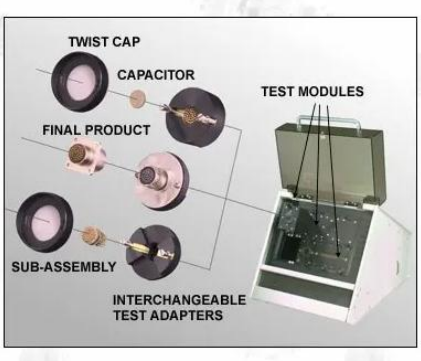


System Features:

- Rugged aluminum encased tester; mid-tower computer w/ 3.4 GHz Intel Core i-3-3240 processor; 4 GB RAM; 1 TB HDD; 19" LCD Monitor and HP Laser Printer. Includes Microsoft's Windows 10 Professional OS and ConnectorTest International's system software.
- Compact workstation. Installs in minutes; easily portable to other test sites. All tests were performed by a single operator with elementary computer skills. Tester itself consumes less than 40 watts of power!
- Password protected 'Supervisor' menus for programming part numbers. 'PIN' codes for up to 20 'Operators.' Abbreviated 'Operator' menus allow only basic testing and printing functions to be performed.
- Modular test bed w/ 320 points for connector testing and 160 points available for Cable Continuity testing. Test multiple parts/different parts in same test cycle. Cumbersome test cables/harnesses no longer needed for using this advanced test system.
- No more shuffling connectors/cables from one test station to another to perform various QA tests. All selected tests are conducted *concurrently* on CTIs advanced test systems in a fraction of time compared to slower, outdated, commercially available ATE systems.
- Low-cost test modules/fixtures for connector/cable assembly devices, sub-assembly devices and capacitor array, or ConnectorTest may adapt to your existing fixtures/test modules.
- Unique, efficient fixture designs – A single CTI test fixture handles the entire 'D' sub and micro 'D' connector lines. This equals efficiency, versatility, cost-effectiveness.
- High-speed testing of each pin for ALL programmed tests ***in one test cycle!***
- Pin selectable test voltages, dwell times and capacitance ranges, Zener voltages (Uni-polar, Bi-Polar); up to 10 separate individual groups of ranges – individually selectable.
- Checkbox for selecting 'Minimum IR Dwell Time' for fastest possible dwell speed; ATE system also groups pins statistically for Capacitance Spread testing in either: Percent or in absolute value.
- Test reports in ATE's database can be sorted by: Date, Operator, Time, Part Number, Record ID number, Job / Lot #, Pass / Fail status, IR, DWV, Capacitance values, etc.
- Creates/stores custom reports for each test with your company logo as header; stores valuable statistical information that can be sorted/analyzed in a number of ways.
- Serviceable plug-in electronic circuit boards; using overnight air courier.
- One-year factory warranty on 4077B, 4087B, and 4097A testers.

Versatile Module Adapters Optimize Production Efficiency

The older twist-cap design shown at right has been replaced by an improved cam-operated assembly whereby the array is moved against spring pins which scrub the interior of the hole in the capacitor array. This yields a positive 'scrub' connection and allows testing of the higher density planar arrays with little or no doughnut area available around the pin area. Twisting the knob slides the capacitor against pins. See picture below of 128-pin circular array module using new cam design. The 'twist cap' has been replaced by an improved design whereby a cam-actuated slider moves the capacitor array against the contacts for easier installation and cycling. See first photos of 128-pin array below.



Gold Spring Contact Pins

Contact and register the parts.

Final Product

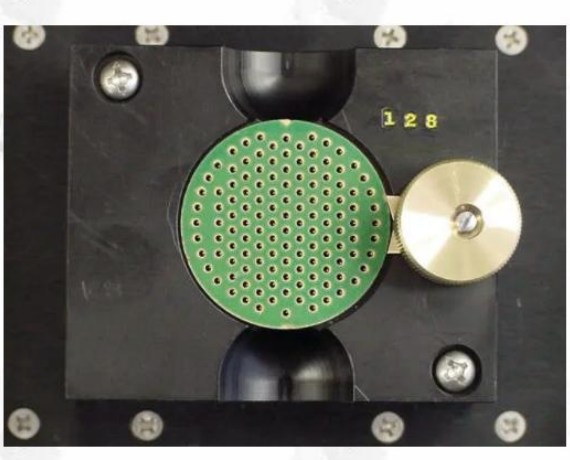
The device under test plugs into a replaceable mating receptacle for easy maintenance.

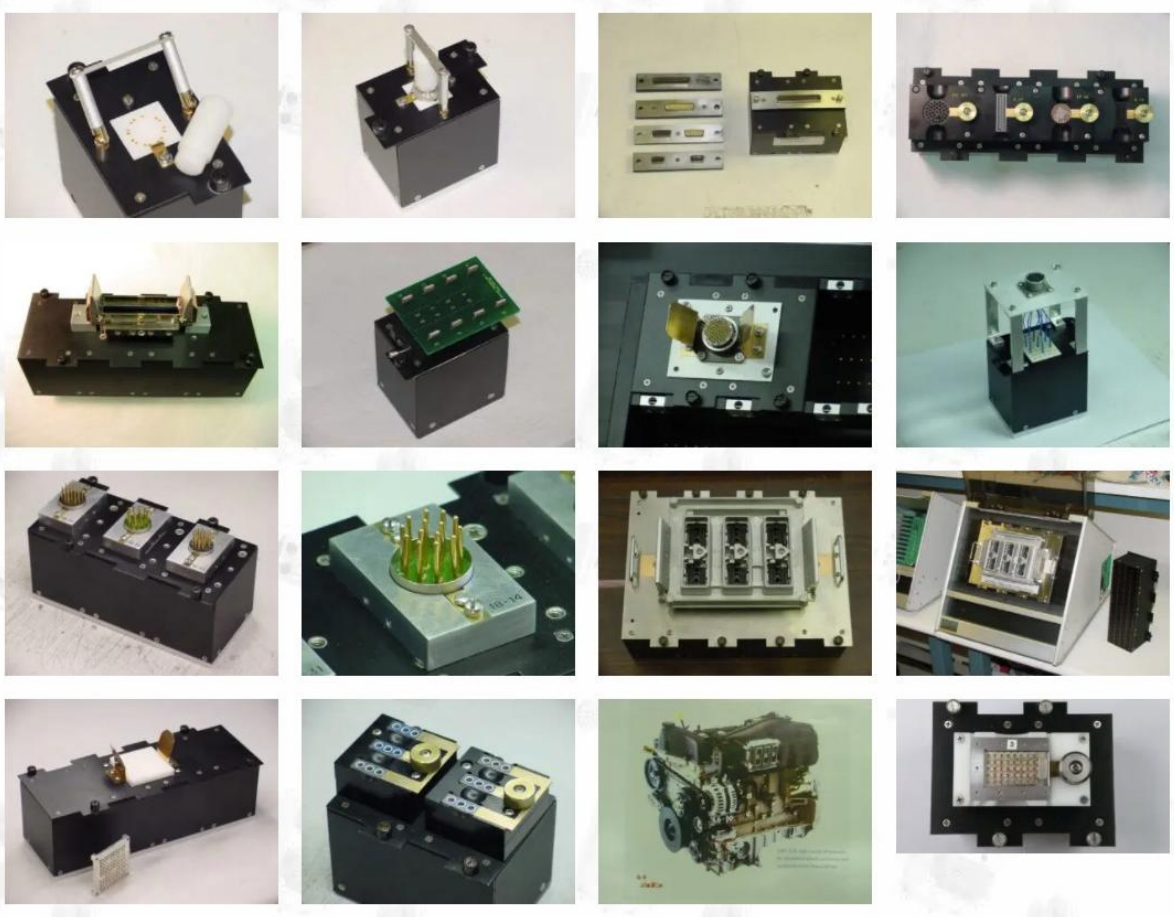
Interchangeable Test Adapters

Allows the testing of arrays or Subassemblies, or the finished product for versatility on a single module.

Test Modules/Fixtures:

Modules seat and fasten into test bed using 1/4 turn DZUS fasters. Modules range in size from 40 pins shown in picture below to 160 pins and up to 320 pins in custom applications. Test bed accepts up to 8 forty-pin connector modules in same test cycle. Custom, universal module-adapter can be fabricated to utilize your company's existing fixtures/modules to this system.





Calibration Plug-In Module

Verifies system's electrical performance to a verified calibration standard.

Cover Safety Switch

Electrically disables tester with open cover to protect operator.

Test Options:

1. Zener Diode: Reverse Breakdown Voltage (Uni-Polar, Symmetrical bi-polar and Non-Symmetrical bi-polar types) / MOV testing (750 VDC Limit) / TVS
2. Dissipation Factor (DF) / Inductance
3. Contact Resistance (0.004 Ohms Minimum; 4,000 Ohms maximum).
4. Capacitance test *conducted at working voltage*; See "Memo to End Users" for more information on Capacitance Bias.
5. Insertion loss plot vs DC bias voltage (optional).
6. Ground ring isolation feature electrically separates pin(s) and shell for additional failure diagnostics.

Hardware Options:

- UPS (500 VA Uninterruptible Power Supply).
- 17" Touchscreen Monitor (SAW type).
- Barcode reader for entering/reading extended part/job numbers into parts menu.
- Temperature/Humidity/Barometric pressure instrument; data is transferred to printouts and recorded into reports in computer's database.

MEMO - TO END USERS AND MANUFACTURERS OF ELECTRONIC PRODUCTS AND SYSTEMS

As a manufacturer or end user of advanced electronic products and systems, you have ultimate responsibility for assuring signal integrity and protecting high energy circuits in your products. High-speed microprocessors, integrated circuit logic, memory and signal transmission products are more susceptible to EMI and RFI; and the consequences of loss of function and damage to sensitive equipment from defective connectors, improperly designed filters are much more severe, and in certain situations, mission or life-threatening.

Manual testing of connectors used in critical electronic components poses unnecessary risks because the connector's pins are not thoroughly tested one-pin-against-all-others-to-ground for leakage and shorts. The tedious labor-intensive method, prone to human error and omission and lacking in test verification / documentation, is still used by many connector manufacturers even now in 2010.

In the case of filter connectors, selecting the proper filter needed to attenuate disruptive frequencies is also critical to design of advanced electronic products and systems. Typical production test equipments are limited to testing capacitance at zero volts DC bias. The ConnectorTest systems have the ability to test capacitance at bias voltages from 0 - 750 VDC. Translating that result into filter performance, or insertion loss, for filters that are intended to be subjected to high voltage DC bias can be misleading, as capacitance of certain filter materials can change as much as 50% under DC bias voltage; this is a critical consideration for both the product designer and end user of filtered products.

Working with world class connector manufacturers, we at ConnectorTest International are eager to share our knowledge and experience with you. Please let us know how we can help assure you that connectors used in your products are tested to the highest quality standards.

Get in Touch With ConnectorTest International Today

test to the hours: 9:00 AM - 6:00PM *Pacific Time*

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