AEROFLEX

A passion for performance.

5800

Multi-Strategy ATE Test System

5800 Series
Multi-Configuration Multi-Function Test System

Today's ever changing technology means printed circuit board (PCB) designs are becoming more and more complex while their life span generally is becoming shorter.

This makes the task of specifying test equipment exceedingly difficult for anyone who manufactures PCBs. While you know what problems and challenges you have today, fast changing technologies make it difficult to predict what problems lie six months ahead, let alone looking forward two to three years.

For your current range of products in-circuit test or flying probe may be your preferred method of test, but tomorrow you may need to consider functional test or system test. Therefore a machine you buy today may not meet your needs tomorrow.

You may already want to perform in-circuit test, functional test and system test, but to justify purchasing three machines to test your product could prove difficult and will certainly eat into your profit margins, let alone the space in your factory. Also there may be a need for training on each of these machines, meaning additional strain on your training budget.

All of these issues take time to resolve and have implications on your time to develop good quality test solutions, which in turn will affect your time to market and profit margins.

The Solution?

A tester with an open architecture that also allows integration of hardware and instrumentation from third party suppliers, enabling one machine to be cost effectively configured for different test environments. An open approach to the software should also be adopted that allows simple integration of third-party drivers and other software. The Aeroflex 5800 Series of PXI based testers provides that solution.

5800 Series Features

- 3 body styles - scalable and future-proof
- PXI capable
- .NET compliant software
- Analog in-circuit and functional test
- Cost effective
- Up to 3456 analog test points
- Up to 1152 digital test channels
- Highly configurable
- Fast program development
- Small footprint - highest pin to volume ratio

Change your configuration

The 5800 Range - Infinite Scalability

5820 Benchtop - Cost Effective Scalable Test

The benchtop model provides a scalable core system but in a low cost package. Allowing you to start small but grow your test solution. The Aeroflex instrument cards are interfaced to the test fixture by means of interconnecting cabling. As with all the body styles, 3rd party PXI and GPIB controlled instrumentation can be added to further enhance the capabilities of the system. This system can then be effortlessly migrated to a rack-mounted system as your test requirements grow with your business without the loss of any previous investment.

5830 Rack Mounted Future-Proof Integrated System

This builds the core system into a 19" rack for further test flexibility. The Aeroflex cards can then be cabled to an industry standard interface of the user's choice such as a Virginia panel™ or MAC™ panel. The rack-mounted system is the easiest platform to integrate additional test resource that is not available in PXI format such as GPIB controlled instrumentation, as it can all be contained within the one unit thus future-proofing your test investment.

5850 Floor Standing - High Volume Production

The floor standing system has the same core ergonomically angled at 30° to the operator, that provides a bed of nails style interface to the fixture. An electro-mechanical locking mechanism engages the fixture onto the interface. The system provides independent dual-well vacuum control to connect the test subject to the fixture. The floor standing system is provided with 3 programmable user supplies each capable of providing 0 to 35 Volts at 3 Amps or 0 to 15 Volts at 5 Amps. The controller is an industrial PC running Windows™, which is mounted inside the system.

to suit your environment.

Versatility
Multiple Test Techniques

The 5820 Building Block

The 5820 is the industry standard building block. This open architecture test platform provides a low cost hardware subsystem that will form the basis of entry for any test solution. This subsystem can be used in a low cost test environment, or alternatively allows the user to customize a test solution in the knowledge that the test solution is affordable, upgradeable and supportable.

Upgradeable and Scalable

Adopting the 5820 as a test building block provides an upgrade route where your test platform can grow with your test requirement, without losing any of your initial investment.

Benefits of Open Architecture

- Reduced investment.
- Lower on-going cost - Reconfigurable testing allows the 5800 to be configured for specific test needs, greatly reducing the need for investment in capital equipment.
- The 5800 can be utilized for either Production testing or the New Product Introduction (NPI) phase, or anywhere in the target product life cycle, avoiding separate test facility costs.
- Using the 5820 building block strategy realizes fast Return on Investment (ROI) when moving from design testing to production utilization. The 5820 can be redeployed in a 5830 environment for example.
- The 5820 Series is designed for in-line operation, bringing the benefits of fast high quality, volume testing.
- Depending on volumes, manufacturers may produce products in multi-board formats. The 5800 Series will allow sequential testing of products, reducing handling time costs and damage limitation.
- Using the 5800 low cost test strategy from NPI through to final test also reduces the need for ongoing training.
- Parallel board testing.

Open Architecture

Aeroflex Integrated Development Environment (IDE)

Aeroflex has developed a powerful interactive environment that is simple to use allowing fast program development. It is a purpose-built software environment that not only gives you access and control of the Aeroflex 5800 hardware but also gives you the tools to effectively utilize any 3U PXI hardware. In addition any .NET programming environment can be used to access and control the 5800 Series hardware

• Fast Program Development

The Aeroflex IDE uses a mouse-driven "drag-and-drop" editing system for fast and accurate program development that ensures developed code is syntactically correct. The environment offers the developer a list of possible tasks that can be added and edited in real time with many tests taking only a single line of code.

• Fully Integrated

All the components of the user interface act as a cohesive unit, which presents the developer with the complete state of both the program and the hardware. This allows the user to make fully informed decisions during program development.

• Interactive Edit and Debug

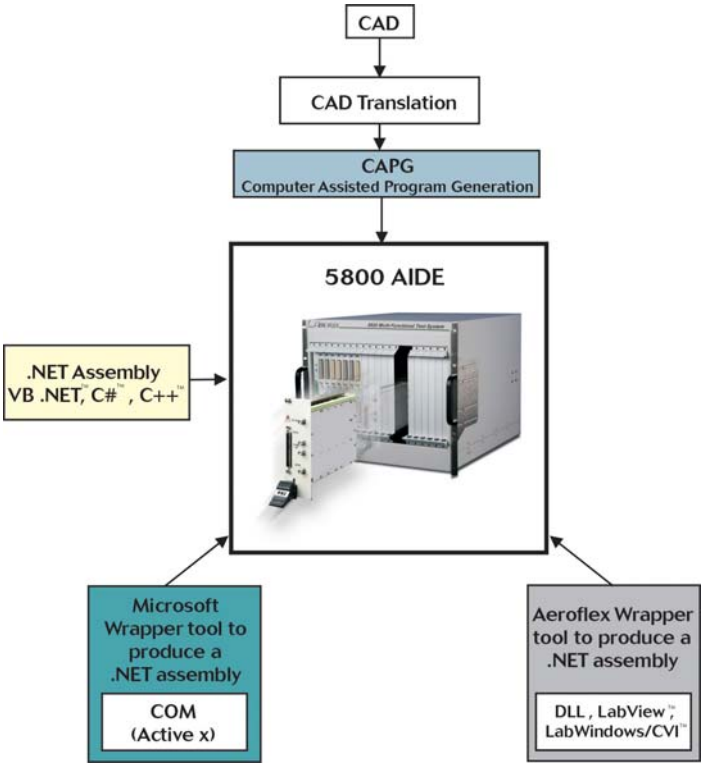
The Aeroflex IDE gives the user a full set of debug tools which provides the ability to modify code and variable values during the debug and execution of the program. This can dramatically shorten development times as there is no need to terminate a program to make edits and then re-execute.

• Full Access to the .NET Framework

The functionality that the .NET class library provides is available to all users of the Aeroflex IDE. This allows the user to take full advantage of this library saving many hours of program development by using previously defined routines. The .NET framework is used by many of today's programing languages such as Labview™, C#™ and Visual Basic™.

• Code Redeployment - Protect your Intellectual Investment

The open approach that has been adopted by the Aeroflex software enables the use of third party software such as Teststand™, Labview™, C#™, and Visual Basic™. In short any platform that is .NET compliant enabling any .NET code developed during the test and development stage of a new product to be re-used in production test.



Programming Software Benefits

- Re-use of previously developed software routines
- Single software program generation platforms reduce training costs
- Integrated approach keeps generation times to a minimum
- Low application generation costs
- Quality software tools ensure high quality applications
- ECO/Modification capability supports changing board design
- Environment tuned to test

Hardware Architecture

PXI Ready

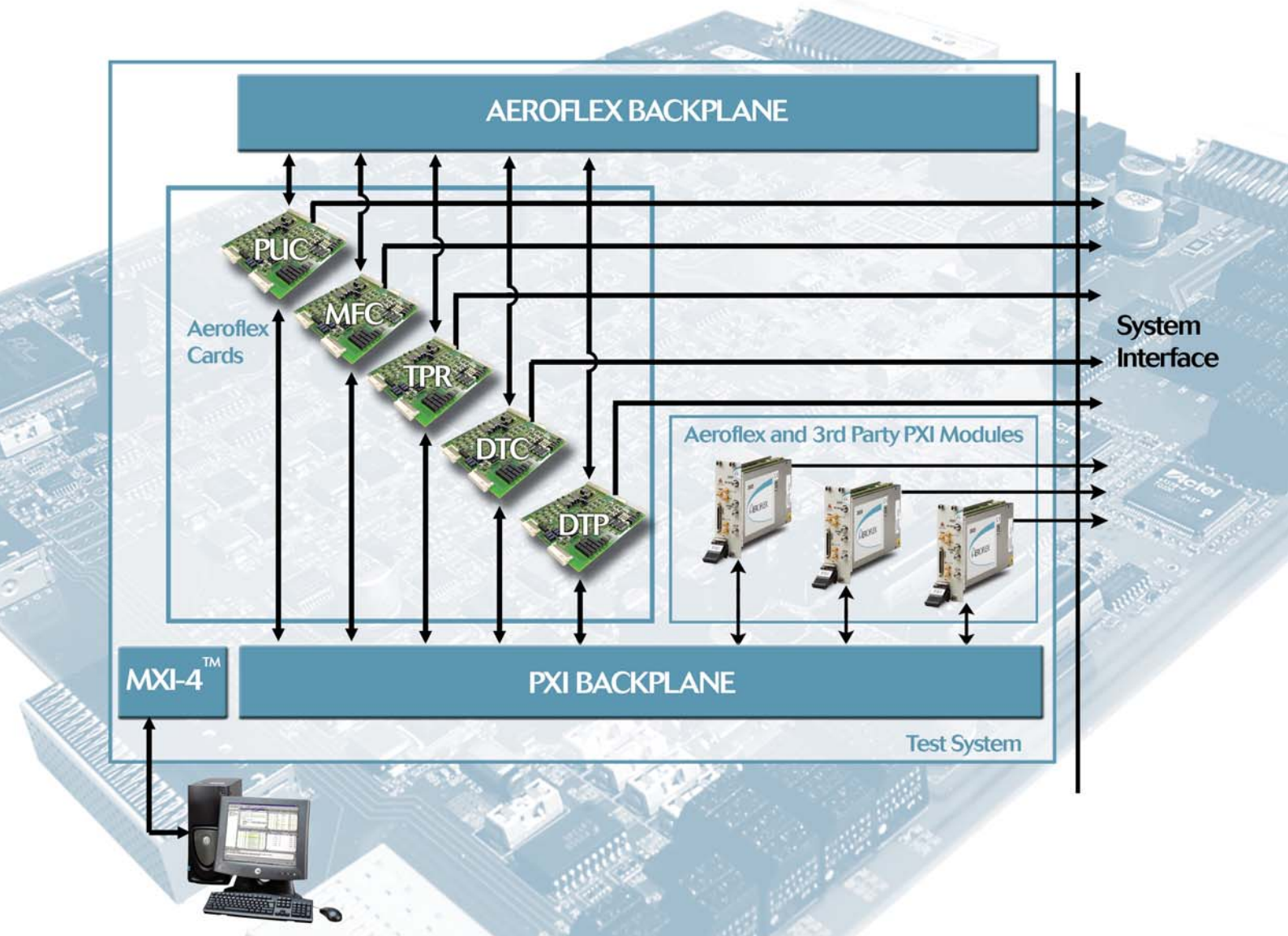
The Aeroflex 5800 Series utilizes the National Instruments MXI-4™ link, enabling a seamless connection between the PC and the instrument cards, be they Aeroflex 5800 instrument cards or 3U PXI cards from any vendor. The MXI-4™ is a PCI - PXI system enabling the use of an external PC as opposed to an embedded controller.

To give the 5800 Series ultimate flexibility and power, two backplanes have been incorporated into the design of the system. The PXI backplane gives the 5800 the ability to benefit from the wealth of PXI cards available, while the Aeroflex backplane ensures that the integrity of fast in-circuit and functional signals between Aeroflex cards are maintained. These two features give the Aeroflex 5800 a truly open architecture.

The diagram below illustrates the relationship between the two backplanes and the architecture of the tester interface rack.

It can be seen that the Aeroflex instrument cards communicate with both the Aeroflex and PXI backplanes, utilizing the MXI-4™ link to interface with the PC controller. The Aeroflex cards shown are the Power and Utilities Card (PUC), Multi-Function Card (MFC), Test Point Relay (TPR), Digital Test Controller card (DTC) and Digital Test Point card (DTP).

Third party PXI cards communicate directly with the PXI backplane and therefore do not require connection with the Aeroflex backplane.



Interface and Data Collection

The Benefits of Flexibility

Interfacing - In fixturing

The 5800 Series offers a number of interfacing options to the test fixture and test subject. Rackmount and Benchtop machines give the choice of a simple cost effective cabled approach to a high performance interfacing solution.

The floorstanding system offers a dedicated high performance test fixture interface that grows with the system configuration. Each 5800 instrument card used in the floorstanding machine utilizes a probe carrier card which plugs directly into the instrument card.

The probe carrier card becomes the fixture interface and as it plugs directly into the instrument card, ensures a very short signal path to the test-fixture. The probe carrier card is populated with high performance bed-of-nails interface pins that ensure excellent electrical performance and a long life cycle.

If only half of the system is populated with instrument cards, only half of the interface needs to be populated with probe carriers therefore halving the cost of the interface.

Cabled Interface

Pylon Interface

Rack mounted

If it is accepted that test and manufacturing yields are permanently and inextricably linked, then in today's highly competitive markets, companies must be able to monitor and control their manufacturing process, dynamically and in real time.

Aeroflex *i*-base is an extremely powerful and flexible software tool that allows single or multiple test and repair cells to automatically log data from the networked systems.

With its paperless repair environment *i*-base will report on historical key test information and has the ability to present this information in different real time management reports and graphs.

Typically information reported would be:

- Time of day
- Operator
- Yield and trend analysis
- Failure rate
- Failing components
- Tester type
- Traceability and history
- Repair information

i-base has the option to provide a product routing and tracking ability which will check that the product to be tested is in the correct test location, and then provide that test location with the permission to proceed. This ensures that test operations are carried out in the correct sequence. The exact location in the test process, of any product, can be displayed dynamically. This is particularly important in safety critical applications

In the repair environment *i*-base will provide the repair operator with historical repair information, with hints and tips on successful repairs. In addition, Computer Aided Repair (CAR) allows an on-screen graphical location of the failure, therefore ensuring successful first time repairs.

Function and Instrument Options

Instrument card options Code	Capability
MXI-4™	Tester Interface
PUC	Power and Utility Card
MFC	Multi Function Card
TPR	Test Point Relay Card
DTC	Digital Test-system Controller
DTP	Digital Test Point Card

High Performance Analog In-Circuit

The 5800 is a high performance small footprint cost effective tester with the highest test channel to footprint ratios, all this with no compromise on performance or quality.

A further enhancement is that during test program modifications only the modified sections of code are recompiled. The fast switching relays provide the interface between the board and the system.

Due to the high level structure of the AIDE environment, the writing and modifying of analog tests is simple. All analog test verbs use a common format to describe the appropriate test parameters. The purpose of these verbs is to implement what can be complex test methods within a very simple statement. The graphical commissioning tools, supplied as standard, further simplify the process by automatically dealing with the formatting of instructions, thus eliminating syntax errors.

Analog ICT - Test Program Generation

The menu driven Aeroflex Computer Assisted Program Generation (CAPG) software enables the test engineer to automatically generate test program and fixture information from formatted CAD/CAE data.

When generating the test program and fixture information the test engineer follows a number of defined and logical steps. Briefly those steps are:

- Import CAD/CAE data, to CAMCAD
- Generate .CB file.
- Generate .Fixout and AIDE files for fixture and test program

At each stage warnings and errors are generated so that the test engineer can modify data to suit their needs as appropriate.

The 5800 Series builds on the Aeroflex reputation of supplying the fastest test systems on the market. Analog test speed is the area where the largest gains can be made in improving overall test time and this is achieved by the use of the following techniques:

- Pre-charge facility
- Test language compilation
- Fast switching relays operate time 300us typical

Flexible Configurable

Key Features	Comment
Interface to the system controller	Occupies slot 1 in all configurations
Control including power sensors and triggering	Occupies slot 2 in all configurations
User defined signal generator	For use with analog in circuit measurement system
Provides 192 test channels for analog in-circuit system	Maximum of 18 cards per system
Provides control for digital test system	For use with DTP
Supplies 64 high speed digital functional channels	Maximum of 18 cards per system

Statistical Display Tool

If a test has not been correctly modified this can lead to unstable measurements being made. The effect of this is that the 5800 will report a false fail on the component in question. To aid the test engineer is assessing the stability of passive component tests the 5800 Series comes with the Statistical Display Tool.

Vectorless Test

Aeroflex is unique in offering both inductive and capacitive vectorless techniques. Inductive probing is performed using the Aeroflex patented Q-Test II technique. The option of these two techniques allows the test engineer to use the most appropriate method for any given test subject.

The Digital Test System - DTS

When engineers think of digital test, they usually envisage an application that either generates or acquires a pattern of 1's and 0's to communicate with or test a device under test (DUT). Changes in recent digital components, which include faster speeds, new logic families, and smaller packaging, require more data throughput on fewer pins. These changes require a digital tester to support more operations than just the two basic states, drive logic low and drive logic high.

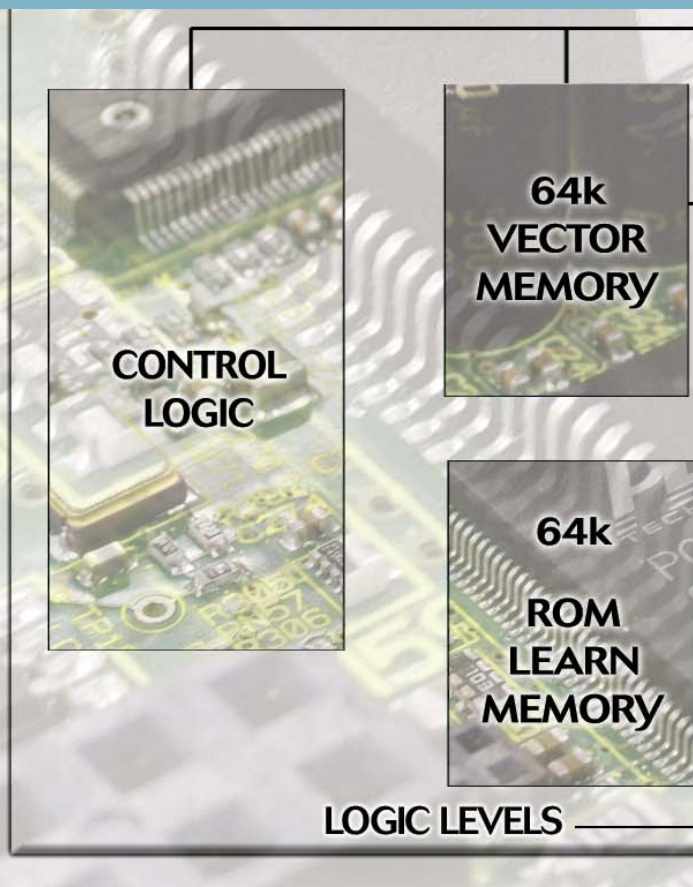
In addition, current digital electronics, from simple memory chips to complex communication systems, require a flexible, powerful digital test solution to reduce the cost and time of interfacing to a wide range of electronic technologies.

The Digital Test System for the 5800 Series is an option that allows for high-speed Digital Functional testing. The DTS consists of two resources the Digital Test Controller Card - DTC and the Digital Test Point Card - DTP, each DTP will accommodate 64 individual test points

Digital Testing Techniques

The Digital Test System - Benefits

- Fast Functional Testing using simulation and processor based techniques. Providing high quality tested products.
- Dynamic testing, emulating user environments for safety critical products.
- Emulation of end user environment, also reduces field failures. Resulting in high quality product and spares deliveries.
- Detects process and functional failures early in the process, reducing expensive WIP.
- Vectorless test capability is utilized when component access is a problem. This increases test coverage and quality of tested product.
- In Situ Programming (ISP) provides a capability to program devices on board. Reducing investment needs for separate programming stations.
- Mixed Signal testing means analog and digital tests operate in real time further enhancing the quality of functional testing.



The 5800 Series will support a DTS which includes a single DTC and up to a maximum of 1152 digital test points (18 slots), in 64 pin increments.

The Digital Test Controller - DTC

The DTC is used as the control card for the DTS, it is mandatory to fit one card. The DTC will allow the DTS to perform using a number of different test techniques:

- High speed 10 MHz pattern application rate
- Full clock at pin face
- DTS edge placement to 5 ns
- Protocol emulation
- ISP and Device programming
- ROM learn

The Digital Test Point Card - DTP

The DTP is a 64 channel non-multiplexed, bi-directional test point card. Each DTP is made up of four groups of 16 channels, each group is individually programmable with 64K RAM behind each pin. Daughter cards are provided to accommodate drive and sense thresholds for TTL logic families on a per board basis

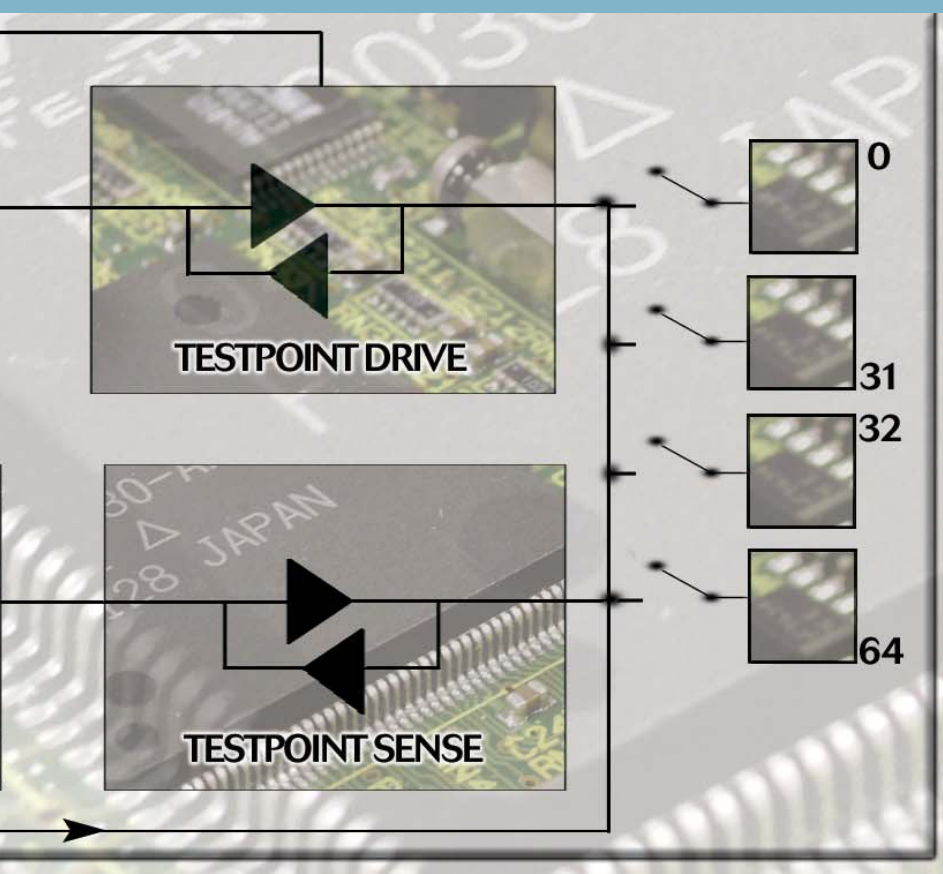
Functional Testing-Test Program Generation

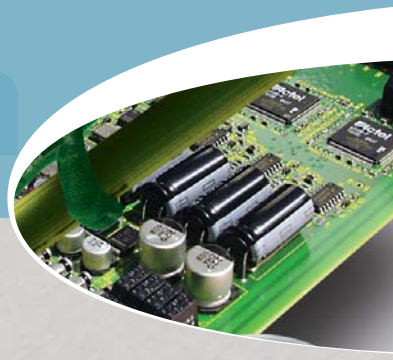
The open approach that has been adopted by Aeroflex for the test environment allows the use of any third party software that is .NET compliant. This mean that software and hardware integration of PCI or PXI instrumentation has never been easier. The AIDE software allows the user to simply import the .NET assembly for any given instrument and use it as if it were running under any of the industry standard test languages.

Boundary Scan

The 5800 option for boundary scan allows a JTAG Technologies JT37x7 boundary scan controller or Goepel's Scanflex controller to be integrated into the system. This allows existing JTAG and Goepel boundary scan test programs to be executed under control of the 5800's IDE. The advantage of this is that programs that have been developed for the debugging of new designs or for bench testing of prototypes can now be re-used in production test. Execution of the boundary scan program and the resultant fault reporting is handled transparently by Aeroflex IDE, giving a totally integrated run time environment. An added advantage of this approach is that the complex task of creating and debugging a boundary scan program can be performed off-line from the 5800, allowing it to continue to be used for production testing.

Test Pattern Generator





Digital Test Techniques

- Stimulus Response Compare
- Protocol Emulation
- ROM Learn
- Waveform display
- Analog/Digital testing

Mixed Signal Testing

The Aeroflex 5800 Series ATE system is ideal for engineers performing mixed-signal testing, device programming, functional test, in-system programming, and simple protocol communications.

The 5800 Series has an easy-to-use digital system that integrates seamlessly with the analog suite to provide mixed-signal testing as well as pure digital functional test. When simulating the operating environment of a mixed signal product, the 5800 will generate multiple time domains, whether pure digital, mixed-signal or analog time domains.

Consider a high-speed digital-to-analog converter (DAC) test example shown in Figure 1. The device has VCC input with a series of digital pins, a clock pin and a synchronization pin to indicate when to start converting data. There is an 8-bit parallel word as the data input. The output of the DAC is an analog output called Aout. The example shows the digital pattern and the analog event that takes place during test.

```
Digital Module Clock = Internal, 100ns
  Digital Configuration Data
  Digital Variables
  Code
    Digital Test Block
      STEP DNBL
      STEP DML(Enable)
      LOOP 8192 Times
        STEP CLOCK_PG(Clock) DMP(DataBus)
        PAUSE
          DC Voltage MeasureVolts[i] PinA = #4.74 PinB = #5.
          Evaluate i = i + 1
        END LOOP
      STEP DMH(Enable)
      STEP NDM(Clock) NDM(DataBus)
      STOP 0
```

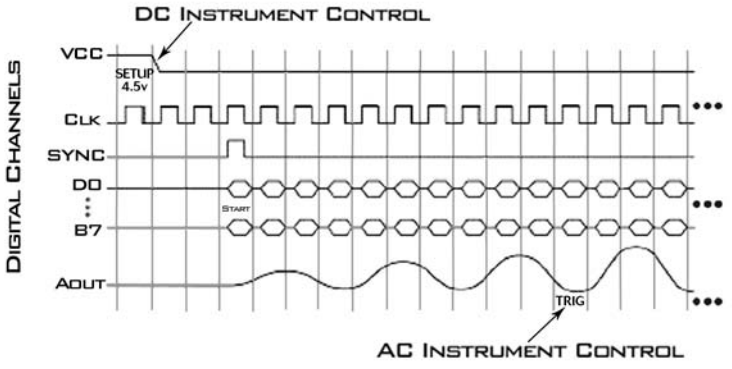


Figure 1

Global Service & Support

One of the most important factors in any purchase of capital equipment is the availability and level of support that is provided.

With over 25 years of proven quality support, Aeroflex provides a multi-level support strategy to all its customers. Aeroflex's world-wide and regional support centers provide software, service and application support for all products including the 5800 Series. Dedicated and experienced engineers provide both telephone and on-site support for all of your requirements. A dedicated help-desk manned with experienced technical engineers provides the point of contact for all your hardware and software questions.

Aeroflex can also offer a comprehensive programming and board test service. Whether your requirement is for application only or to support the testing of boards in an overload situation, the application team can support you as required.

A dedicated training team can provide hardware and software training worldwide thus ensuring that you get the most out of the system.

All of this ensures that your system will pay you back from day one and all throughout its life.

"...over 25 years of proven quality support and training."

5800 Series Overview

- ★ Future proof - Infinitely scalable open architecture
- ★ Protection of intellectual investment through code redeployment
- ★ PXI compatible
- ★ .NET compliant- enable use of LabWindows™, VB, C#™, anything .NET
- ★ Small footprint – smallest pin to volume ratio
- ★ Integrated boundary scan
- ★ Easy to use software
- ★ Combinational test
- ★ Low cost of ownership
- ★ In-line ready
- ★ High performance analog in circuit up to 3456 test channels
- ★ Parallel testing
- ★ Graphical development environment
- ★ Comprehensive built-in self test
- ★ Digital functional test
- ★ Vectorless test
- ★ Industry standard high density fixturing
- ★ Assisted program generation for rapid CAD to test program creation
- ★ Full data collection capability

CHINA	Tel: [+86] (21) 5109 5128 • Fax: [+86] (21) 5150 6112
FINLAND	Tel: [+358] (9) 2709 5541 • Fax: [+358] (9) 804 2441
FRANCE	Tel: [+33] 1 60 79 96 00 • Fax: [+33] 1 60 0177 69 22
GERMANY	Tel: [+49] 8131 2926-0 • Fax: [+49] 8131 2926-130
HONG KONG	Tel: [+852] 2832 7988 • Fax: [+852] 2834 5364
INDIA	Tel: [+91] (0) 80 4115 4501 • Fax: [+91] (0) 80 4115 4502
JAPAN	Tel: [+81] 3 3500 5591 • Fax: [+81] 3 3500 5592
KOREA	Tel: [+82] (2) 3424 2719 • Fax: [+82] (2) 3424 8620
SCANDINAVIA	Tel: [+45] 9614 0045 • Fax: [+45] 9614 0047
UK Stevenage	Tel: [+44] (0) 1438 742200 • Fax: [+44] (0) 1438 727601 Freephone: 0800 282388 (UK only)
USA	Tel: [+1] (316) 522 4981 • Fax: [+1] (316) 522 1360 Toll Free: 800 835 2352 (US only)

www.aeroflex.com
atesales@aeroflex.com

AEROFLEX
A passion for performance.

Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

Part No. 46891/564
Issue 3
03/09