Functional In-Circuit Testing •
Functional Board Level Testing •

SYSTEM 8 Advanced Test Module

COSINUS®
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The *Advanced Test Module* (ATM) is a solution that offers high test capabilities and comprehensive fault diagnosis with a high degree of flexibility. Powerful test combinations ensure the best fault coverage on PCBs or components and include functional, connections, voltage, thermal and V-I signature tests.

A sophisticated but easy to use system with minimum user input required ensures that components and PCBs are tested efficiently and faults are detected rapidly.

KEY FEATURES

- Library driven, in-circuit component testing
- Board level functional testing
- Automatic test sequences
- Logging and reporting facilities

PROVEN BENEFITS

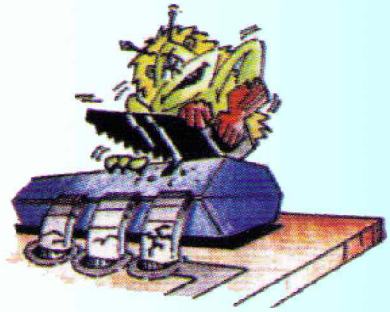
Reduce fault-finding time by testing in-circuit with no schematics
Become self-dependent for all test and repair needs
Introduce board level testing capabilities into your business
Increase reliability by testing at component and board level
Lower capital expenditure with one solution for all applications
Improve data traceability and integration of your setup
Free up engineers time by implementing automated test procedures
Reduce setup times by using a practical software

Innovative solution for well known problems

Manufacturing defects

These are faults such as dry joints, solder bridges or broken tracks. Even the most rigorous test of an IC is of no use if the fault is a broken track leading to an IC input. The IC passes but the board still does not work.

The Advanced Test Module uses a combination of connection, voltage and V-I tests to identify any discrepancies in the wiring of a component. A high level of confidence can therefore be achieved, especially when the results are compared with a known good board or saved results.



Faulty components

These problems include faulty ICs, shorted diodes or open resistors. Even if a component is correctly linked to the rest of the components, the board will still fail if this component does not functionally work.

The Advanced Test Module uses a unique and established technique to functionally test devices in-circuit "as-wired". Because an IC may be configured in several different ways, the system can detect how the IC is wired and automatically adapt the test vectors to suit.

In-Circuit Functional Tester

The ATM offers the most complete set of test methods to ensure components are assessed thoroughly and potential faults are identified quickly. The extensive library of components makes in-circuit testing easy by simply entering the part number of the device under test (DUT). The following tests are selectable with the ATM :

- **Functional** checks that the device is working as per the datasheet
- **Connection** checks the way the component is wired in-circuit
- **Voltage** checks the voltage on each pin of the device
- **Thermal** checks the relative temperature of the component
- **VI** checks the internal structure of the device

The ATM is suitable for all logic families including TTL, CMOS, LVTTL, ECL, DTL, LSI, RTL, PECL, LVPECL.

Library

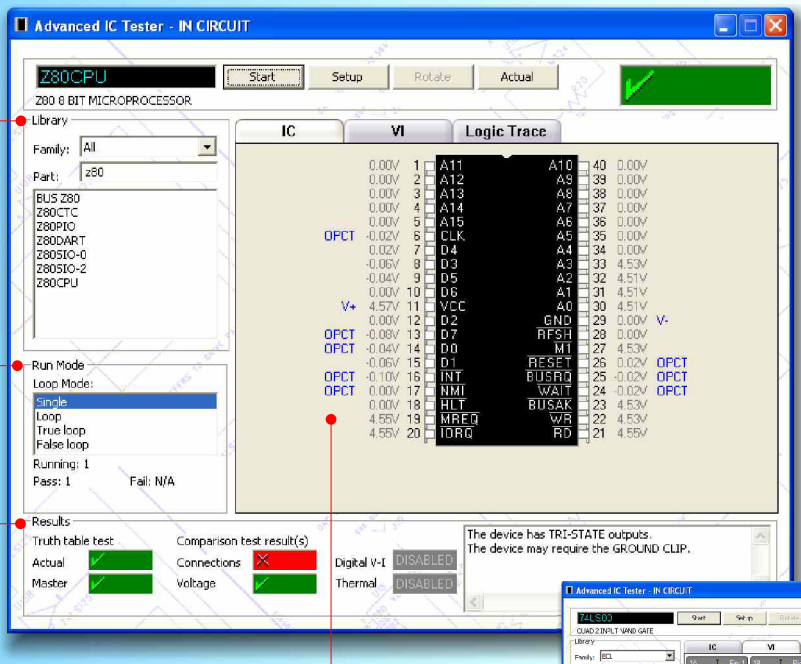
The extensive library makes component testing easy by simply entering the part number. The database is arranged in families and includes preset packages and board connectors.

Run Mode

Options are available for cycle testing. Loop mode is particularly useful for intermittent faults and the system can be set to stop at the first failure in order to analyse the fault.

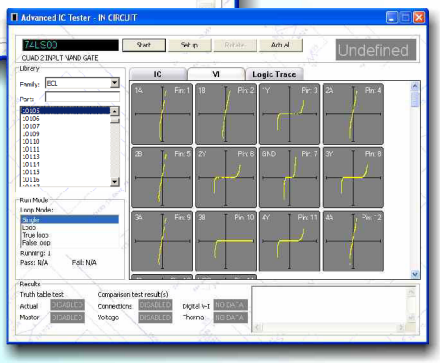
Results

Results analysis will automatically highlight potential problems through green ticks and red crosses for quick assessment. Truth table tests are based on a functional test program and other tests are compared with saved results.



Test Window

Device information with pin out and test results are shown (voltage results in grey and connection results in blue).

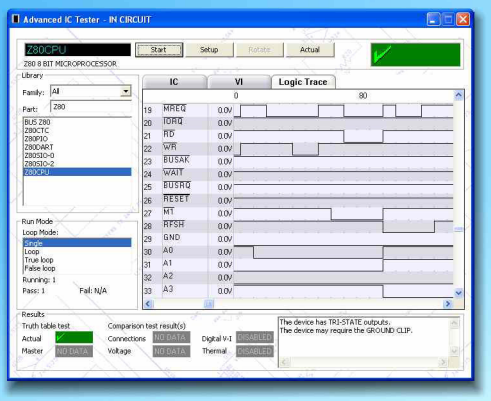


V-I Results Window

Analogue signature analysis displays the VI signature of each pin of the device to analyse the component and to check for internal damages.

Logic Trace

Graphical representation of the test signals (or test vectors) applied to the device and the response from the device are displayed in this tab to determine the exact section of failure.



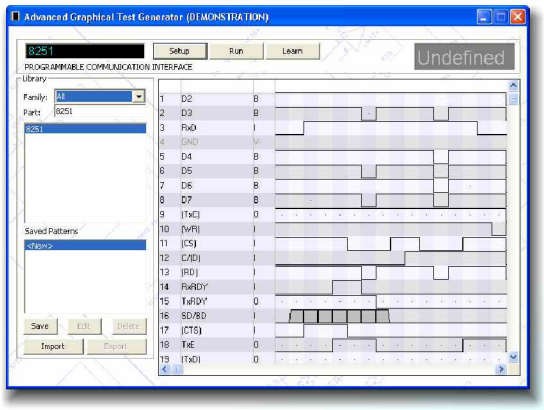
Out-Of-Circuit Functional Test

Use the out-of-circuit adapter to isolate the component and to run tests outside the board environment. This is useful to further diagnose a suspect device, to remove the influence of other components or to check a new device before it is placed in-circuit.

Established technique in commercial and military applications

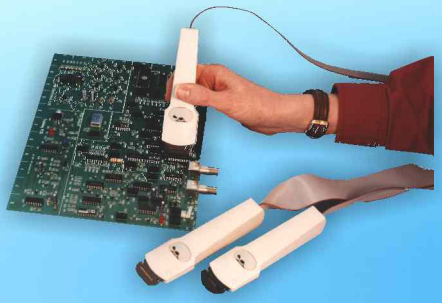
One of the most widely used techniques of fault-finding is to use a known good board as reference to compare the results with a suspect board. The SYSTEM 8 Premier software offers this capability by temporarily or permanently saving the results of any test(s) and automatically comparing them. Differences and potential faults are highlighted down to pin or contact level, making the detection easier and quicker. This technique is widely used throughout ABI's range of customers.

Board Level Tester



The graphical test generator is the easiest way to create test patterns for individual devices and complete PCB assemblies. Each channel of the ATM can be individually selected to be an input, an output or both (bidirectional). A logic pattern (test vector) can quickly be generated with the use of the mouse.

The output response of the unit under test can be learnt automatically or compared with preset vectors. The patterns and responses can be saved in the software for repetitive use (production environment) or when a similar board is received (repair shop).



PCB vs Component Testing

An IC is a device which, usually, has several input, output and power pins with a core logic designed to carry out particular functions. A PCB assembly, usually made up of several ICs, offers connectors with input, output and power connection and is designed to run specific functions.

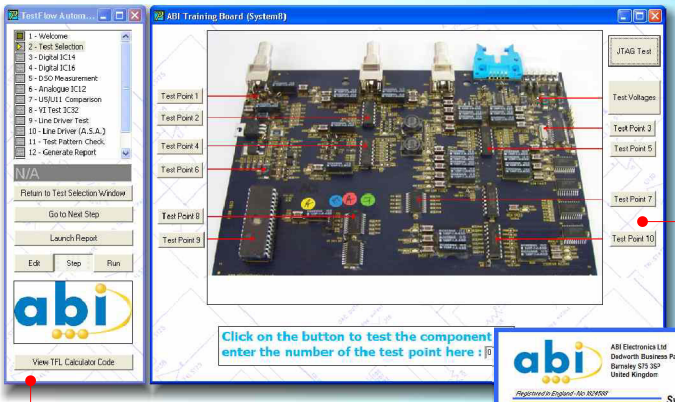
The Advanced Test Module is equally at ease with testing large quantities of boards (production testing) and testing in-circuit single components (repair and diagnostics).

PremierLink Library Developer

Use the PremierLink functional test generator software to create new programs for custom ICs and complete PCB assemblies. Compiler and debugger are included in PremierLink.

TestFlows & Reports

In order to automate the test procedure and to make testing accessible to inexperienced staff, the SYSTEM 8 Premier offers the option to write and run test sequences, known as TestFlows. These TestFlows are easily generated and record the master data, all the test parameters and the windows layouts in order to keep the procedure as user friendly as possible.



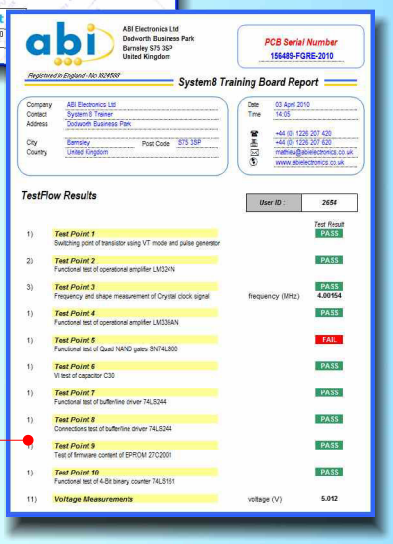
Traceability of information is key to highlighting trends. For instance, repetitive failures of PCB assemblies through a TestFlow may point to a manufacturing defect whilst a board that keeps coming back for repair for the same fault might highlight a design

Test Window

Windows can be customised to include test instructions, photos or links to other windows.

TestFlow Manager

This window is used to control the test sequence and to log data.



Report

Use logged data to generate professional looking reports with external software applications.

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Specifications

Number of I/O channels:	64 per module - expandable to 2,048 channels
Number of guard outputs:	8 per module
Drive output voltage:	+/- 10 V
Drive output resolution:	20 mV
Drive output current:	600 mA
Compatibility standard:	DEF 00-53 (defence standard)
Drive slew rate:	>100V/µs
Sense input voltage:	+/- 20 V
Sense input resolution:	10 mV
Sense input detection:	Actual voltage measurement
Sense input thresholds	Fully programmable
Input impedance:	10k
Channel termination:	Programmable for tri-state, pull up and pull down Fully bi-directional
Memory per channel:	Unlimited
Circuit modes:	In-circuit, out-of-circuit (with adapter), board level (with test fixture)
Automated functions	Auto clip positioning Automatic circuit compensation Automatic drive level offset compensation

Test modes

Single:	Single test
Loop:	Unconditional cycle
True Loop:	Cycle as long as test passes
False Loop:	Cycle as long as test fails
Auto (swept):	Finds tightest valid thresholds

Test types

Truth table (functional):	Library based functional test
Connections (MDA):	Short circuit detection Floating input detection Open circuit detection Linked pin detection
Voltage:	Logic state detection with programmable thresholds
VI signature analysis:	Sweep ranges -10V to +10V (programmable) Maximum test current 1mA Multi-plot with single waveform zoom
Thermal:	Indication of pin temperature

Test libraries

Library classes:	All logic families including TTL, CMOS, LVTTL, ECL, DTL, LSI, RTL, PECL, LVPECL, Memory, Microprocessor
Package types:	DIL, SOIC, PLCC, QFP
Connector types:	D Type, Edge, PCMCIA, SCSI, DIN, Header, IEEE

Operating System Windows XP©, Windows Vista©(32 bit), Windows 7©(32 bit)

Interface PCI, USB

The ABI development team strive continually to improve their products for the benefit of the customer. The specification of current products may therefore vary from that described in this brochure.

Notes :

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