JTAG Technologies Symphony for 3070

Universal Boundary-Scan Upgrade for Agilent 3070 UNIX- and PC-based In-Circuit Testers

Features

- Low-cost implementation of full JTAG Technologies boundary-scan capability on Agilent 3070™ in-circuit test (ICT) systems
- Combination of boundary-scan with ICT simplifies test fixtures and increases test coverage
- Ethernet and PCI interfaces available for universal compatibility with all 3070 UNIX controllers and PC-based Windows systems
- Interchangeability of application files between PC and UNIX environments for application development and execution
- Fixtureless application preparation
- Fast flash programming with easy S-record, Intel Hex file and binary updates
- CPLD programming without compiling and debugging numerous PCF routines
- Easy to retrofit to existing fixtures and programs

The Impact of High-Density PCB Design on In-Circuit Testing

As electronics designers continue to drive greater densities onto their printed circuit boards, testing for the occurrence of manufacturing faults becomes an increasingly difficult challenge for the test engineers. For digital target boards, fixture-based in-circuit test systems are bumping against their limits in terms of the number of available test nodes, inadequate spacing between test points, and inaccessible nodes underneath ball-grid array packages and within inner board layers. As a result, the test coverage on complex boards is decreasing, resulting in several undesirable and costly outcomes:

- To catch up with the IC device packaging technology, ICT test fixtures are becoming more complex, more expensive, and less reliable.
- ICT misses an increasing percentage of defects, delaying detection and correction until later in the production process, and thereby weakening the effectiveness of process control.
- As a result, more faults must be found in functional testing, requiring highly skilled engineering resources for test development and “bone-pile” resolution.

These trends are causing test professionals to look for effective and budget-minded solutions, often by combining available test techniques in an optimized test strategy for maximum value.
Benefits of boundary-scan testing on high-density boards

Boundary-scan testing, based on the IEEE Std. 1149.1, has been widely adopted by leading manufacturers to perform testing and in-system programming of flash memories and PLDs on digital circuit boards. In thousands of manufacturing facilities around the world, boundary-scan, often in combination with ICT, has been proven to be extremely effective even on the most crowded PCBs.

The boundary-scan products of JTAG Technologies lead the industry in delivering powerful benefits to the designer and test engineer:

- High degree of automation in test development, in-system programming and fault diagnosis
- Highly effective tools to analyze test coverage
- Unlimited number of boundary-scan test points and scan chains
- Negligible impact on board real estate requirements, with a high degree of design flexibility
- High production line throughput for testing and in-system programming including extremely fast flash memory programming
- Cost of ownership and needed capital investments are low compared with traditional structural test methods

Test Strategy Considerations

Choosing between the many possible combinations of inspection methods (for example, optical, X-Ray, and boundary-scan) depends on several factors including the characteristics of the product to be tested, production throughout requirements, and the anticipated fault spectrum. Because boundary-scan and ICT are complementary test methodologies, this combination often provides an optimal test strategy with lowest overall cost and maximum coverage for anticipated fault types. One particularly valuable test platform is the JTAG Technologies Symphony for 3070 which combines the original boundary-scan solution of JTAG Technologies within the Agilent Technologies’ UNIX- and PC-based 3070 In-Circuit Test System.

The JTAG Technologies Solution

Symphony for 3070 by JTAG Technologies is unique in its architecture, delivering the benefits of both boundary-scan and ICT without disrupting your existing test methodology. Tests and in-system programming applications are generated on JTAG Technologies industry-leading development tools and easily ported to the 3070 production system. There, the applications run within the 3070 environment on one of the proven JTAG Technologies hardware controllers and genuine JTAG Technologies software for the highest execution performance. Diagnostics of detected faults are fully supported by the JTAG Technologies BSD software, often with pin-level accuracy.

Figure 2 is a block diagram of the system, showing the JTAG Technologies’ Ethernet based boundary-scan hardware controller (JT 37x7/TSI) installed at the Agilent 3070 system. Boundary-scan signals are isolated from the in-circuit tests by means of a buffer card assuring signal integrity throughout your test program.

The combined test system delivers the following benefits:

- Reduced fixture complexity and cost as a result of boundary-scan access to a large portion of the digital nets on the board
- Ability to test analog portions of the UUT using inherent 3070 capabilities
- Retention of the familiar 3070 operating system (typically UNIX) and user interface for production, with minimal impact on existing shop operations
- Off-loading the 3070 system by developing and verifying boundary-scan test and in-system programming applications using JTAG Technologies tools on a lower-cost PC-based system or on a UNIX-based workstation
- Straightforward porting of applications from the development system to the 3070 for production
- High-speed flash programming using JTAG Technologies’ Enhanced Throughput Technology™ at the 3070 system allowing one-stop processing in the production process with highest possible throughput
- Convenient file interchangeability between PC-based work stations and UNIX-based production systems
JTAG Technologies’ boundary-scan software can easily be integrated into the 3070 to run under UNIX as well as under Windows. Thus, you can incorporate Symphony on a UNIX-based 3070 and, in the future, if you decide to convert your 3070 to the Agilent Windows PC version, migrate the JTAG Technologies’ boundary-scan solution seamlessly and easily. Applications are fully compatible without recompilation and no extra investments are needed. Just re-install the hardware and software in the Windows PC environment and your boundary-scan applications are up and running again!

The fixture interface provided by the JTAG Technologies solution is also straightforward, avoiding the need for a performance port or a special access card. The physical connection to the UUT is made directly into the fixture from the JTAG Technologies control card. This allows high speed operation of the boundary-scan chain without special buffering. To prevent ground loops from disturbing unpowered testing, the test access port (TAP) signals are connected through isolation relays mounted in the fixture.

The JTAG Technologies Symphony for 3070 Package from JTAG Technologies consists of:

- JT 37x7/TSI DataBlaster high-performance boundary-scan controller (Note, other hardware arrangements using PCI and ISA interfaces are available depending on the 3070 controller type in use. Please contact JTAG Technologies for more information.)
- JT 2139 Isolation Module (quantity 4, one per TAP)
- PIP 2176 runtime software for UNIX or PC-based environments
- PM 3790 Boundary-scan Diagnostics software package
- User Manuals
Boundary-Scan Upgrade for In-Circuit Test Systems

Ordering Information

<table>
<thead>
<tr>
<th>Product Number</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Ethernet Solution for Windows-based 3070 ICTs</td>
<td></td>
</tr>
<tr>
<td>Symphony 3070/TSI-x7/PC</td>
<td>Agilent 3070 series PC-based ICTs using JT 37x7/TSI</td>
</tr>
<tr>
<td>Ethernet Solution for UNIX-based 3070 ICTs</td>
<td></td>
</tr>
<tr>
<td>Symphony 3070/TSI-x7/UX</td>
<td>Agilent 3070 series UNIX-based ICTs using JT 37x7/TSI</td>
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JT 37x7/TSI supports any of three selectable interfaces (Ethernet, USB 2.0 and 1.1 and Firewire). The DataBlaster performance levels, signified by “x” in the ordering information above are:

**JT 3707/TSI** — base-level model suitable for board testing, CPLD programming and flash programming of small data blocks in engineering environments. This model can be upgraded to the higher performance JT 3717 by adding the JT 2108 ETT module.

**JT 3717/TSI** — suitable for all applications including in system programming of CPLDs, moderate-size flash memories and for board test in manufacturing (low and high volume) and debugging environments. JT 3717 contains 64 Mbit on-board image memory that can be upgraded to JT 3727 by adding the JT 2116 Flash Image module.

**JT 3727/TSI** — suitable for all applications including in system programming of large flash memories and CPLDs and for board test in manufacturing and debugging environments. JT 3727 contains a 128 Mbit on-board flash image memory.

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