High-I/O package styles are successfully shrinking board dimensions, but are increasing the challenges surrounding test engineering. Boundary scan testing can offer a solution, and the latest equipment is able to deliver further savings in test development time by using a high-level programming language and supporting valuable test re-use.

Packages with area array interconnects, such as BGAs and now Chip Scale Packages (CSPs), have always challenged conventional test instruments that probe I/Os, including logic analysers, oscilloscopes and Bed Of Nails testers. In addition, progressive reductions in interconnect pitch of QFPs and other components such as connectors make it extremely difficult to gain reliable physical access using these traditional techniques.

As far as production test engineering is concerned, reducing probe access places downward pressure on test coverage using conventional equipment. Applying additional test techniques can take longer, which is unacceptable if the product is required to be tested at the line beat rate.

independently of any individualistic characteristics of the board, such as the operating system.

Valuable and reusable IP

Test scripts written in XJTAG's programming language, XJEase, are device-centric rather than being specific to the board as is normal with most boundary scan test systems. This device-centric approach allows users to accumulate libraries of test scripts for individual devices, which can be easily re-used in future designs wherever the same or a similar component is employed. Pre-prepared test scripts for a wide range of commonly used devices can also be downloaded from XJTAG's website, to further streamline test development.

Prism uses the XJTAG system to provide component-level analysis that can be used to maintain process control and thereby maximise production yield. This detailed information contrasts with the straightforward pass/fail indication produced by a black-box type tester, giving production teams extra power to identify and solve upstream process issues.

XJTAG yields success for Prism

Richard Walton and Dominic Plunkett describe how boundary scan equipment is being used to maximum effect at a Cambridgeshire EMS company

Speeding up debug and test time

Prism Electronics in St. Ives, Cambridgeshire, is using the XJTAG boundary scan development system to speed up the process of debugging and testing its boards. The system allows engineers to develop meaningful tests without having to have an in-depth understanding of how the board operates. This is important for CEMs, whose customers also now tend to outsource product design as well as the manufacturing tasks. Where a boundary scan chain, or multiple chains, is available on the board, XJTAG allows engineers to develop tests for specific functional blocks from a high level of abstraction. A further advantage is that this enables a common test development methodology and a common test language across all types of assemblies,

Although correct process control is essential to maintaining a high yield, simply ensuring that area array components such as BGAs or CSPs have been soldered in the correct orientation is no longer satisfactory. Customers increasingly require proof that the device is electrically operational. XJTAG provides access to the boundary scan chain, enabling an interactive graphical view of all the device I/Os and allowing them to be read or written with a single click, either as individual pins or as buses. The information gained about each assembly is also valuable if faults are discovered, as it allows the location and nature of faults to be accurately identified ahead of rework.

Improving test coverage

High test coverage and the ability to boost production yields and reduce lifecycle costs are extremely important to CEMs. On one customer design, which contains five boundary scan enabled devices including a 32-bit CPU, three FPGAs and an Ethernet controller, Prism has achieved test coverage as high as 98% using XJTAG and has seen significant yield improvements.

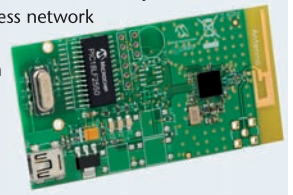**Prism Electronics** I www.prism-electronics.com
XJTAG I www.xjtag.com

Richard Walton is Technical Director at Prism Electronics and Dominic Plunkett is Chief Technology Officer at XJTAG

Prism's Richard Walton using XJTAG

Mini spectrometer modules: Hamamatsu's 1" cube miniature spectrometer module, the RC series, is suited to use in small handheld sensor products and instruments.

The new C9407MA and C9409MA feature a reflection grating permanently attached to a wide dynamic range CMOS linear image sensor. Both modules cover the spectral range from 340 to 780nm and light is input from the sample under measurement via a 30cm long integrated fibre-optic cable. The C9407MA spectrometer module also includes a USB interface.

Field portable spectrum analyser: TTi has further developed its PSA1301T handheld spectrum analyser to improve specification points such as phase noise, making it an ideal tool for companies making site surveys for UHF RFID applications.

The PSA1301T has a frequency range of 150kHz to 1.3GHz with selectable resolution bandwidth down to 15kHz. Sweep modes include continuous, single, peak hold and average (up to 256 sweeps). Sweep parameters can be set in terms of centre plus span or start plus stop to 1kHz resolution. A zero span mode with AM or FM demodulation is also provided.
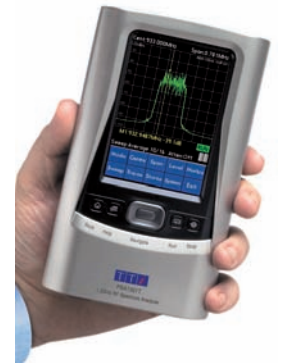
First PCIe waveform digitisers: Strategic Test claims its PCI-express based waveform digitiser boards are the world's first of their kind. There are twelve new digitiser cards in the UF2e-4600 series. Using multiple 16-bit ADCs for true simultaneous sampling, the cards are available with a choice of maximum sampling rates from 200kS/s to 3MS/s and 2-, 4- or 8-channel configurations. 32MSamples of signal memory is provided as standard, but can be expanded to 2GSamples via a proprietary onboard DIMM module.