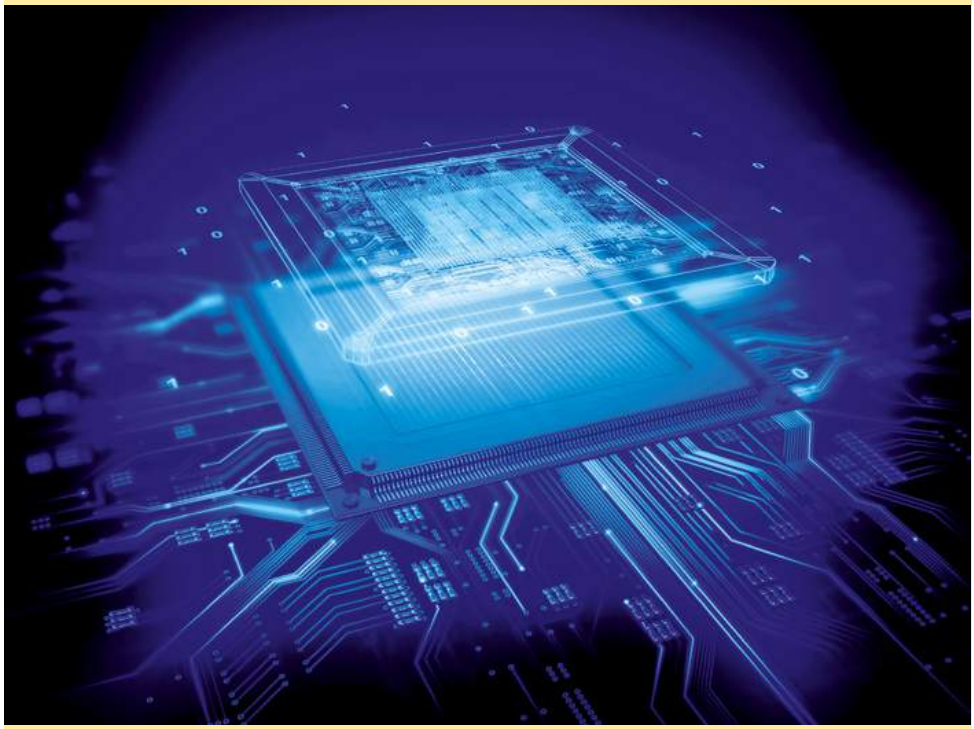
JTAG / Boundary Scan

Multidimensional JTAG / Boundary Scan Instrumentation



GOEPEL electronic

GOEPEL electronic GmbH

GOEPEL electronic is a global company that has been developing and producing ground-breaking solutions for electronic and optical test technologies since the early 1990s. Already in 1991, the enterprise was the first worldwide vendor of dedicated JTAG / Boundary Scan solutions. Today, a highly qualified team of more than 200 experts takes care to guarantee the best solutions for our customers' test tasks. A consistent innovation management as well as a thorough ongoing quality approach emphasises our claim as technology pioneer in the fields of electric and optical testing. This is validated by a continuous ISO-9001 certification since 1996.

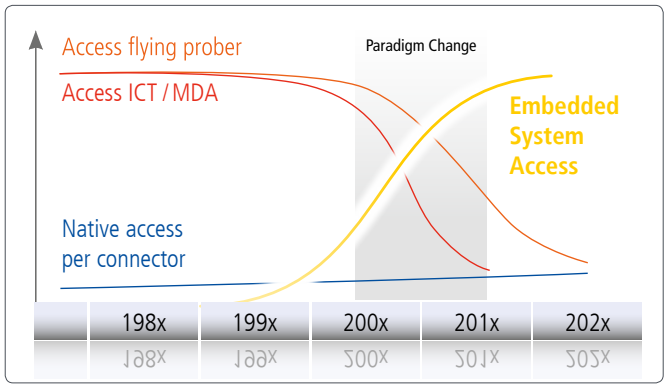
TÜVRheinland® CERT ISO 9001

More about GOEPEL electronic
goepel.com/goepel

What is JTAG / Boundary Scan?

Boundary Scan is a revolutionary technology substituting the physical access via nails and probes by means of special on-chip electronics (electronic nails) in conjunction with a dedicated four-wire bus. The method was developed as successor of the digital In-Circuit Test (ICT). It implements the tester's pin electronics directly in the IC design. Boundary Scan provides a multitude of opportunities for structural or functional tests and hardware debug as well as in-system programming.

Qualitative trend in test access:



JTAG/ Boudary Scan from GOEPEL eletronic is the solution!

1991

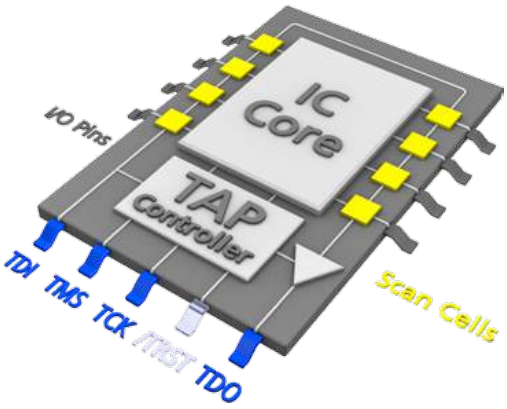
IEEE 1149.1
integrated Boundary Scan tools
Boundary Scan Controller with PIO, A/D, D/A Gang Test
Turbo Flash Programming
Anti Ground Bounce
PXI Controller
Virtual Scan Pin™ enhanced Flying Prober Integration
TAP signal transmission via large distance
Fast Ethernet Controller
IEEE 1532

2000

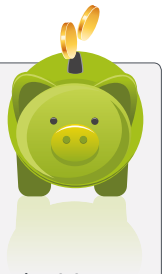
This is how it works:

Similar to In-Circuit Test (ICT), JTAG / Boundary Scan utilises thousands of test points – with only four test access points. Therefore, expensive bed-of-nail fixtures are redundant.

The following image shows the architecture of a typical Boundary Scan IC. The Boundary Scan cells are integrated between core logic and physical contact pins. They enable the test of connections between the pins of ICs, even those without Boundary Scan cells.



JTAG / Boundary Scan is very versatile and can be utilised in the entire production process, e.g. for emulation, design verification, prototype and production test as well as on-chip and in-system programming.



Save money with JTAG / Boundary Scan

- Small investment and operational costs
- Extremely short test times but high efficiency / productivity
- Versatile application across the development and production process
- Future-proof and sustainable investment

Decide for the Technology Leader!

GOEPEL electronic

- Most experienced – GOEPEL electronic is the JTAG / Boundary Scan pioneer and highly reputed vendor since 1991
- Global presence – Five subsidaries worldwide and a network of more than 350 sales and support experts
- Innovation – Continuous market introductions of numerous awarded products
- Versatility – Biggest portfolio of more than 250 products for your individual test solution
- Market leader – Over 8,000 system installations
- Flexibility – Integration of JTAG / Boundary Scan in existing systems of all ATE vendors

Mehr about JTAG / Boundary Scan
goepel.com/en/bscan

More than 20 years of innovations – a time line

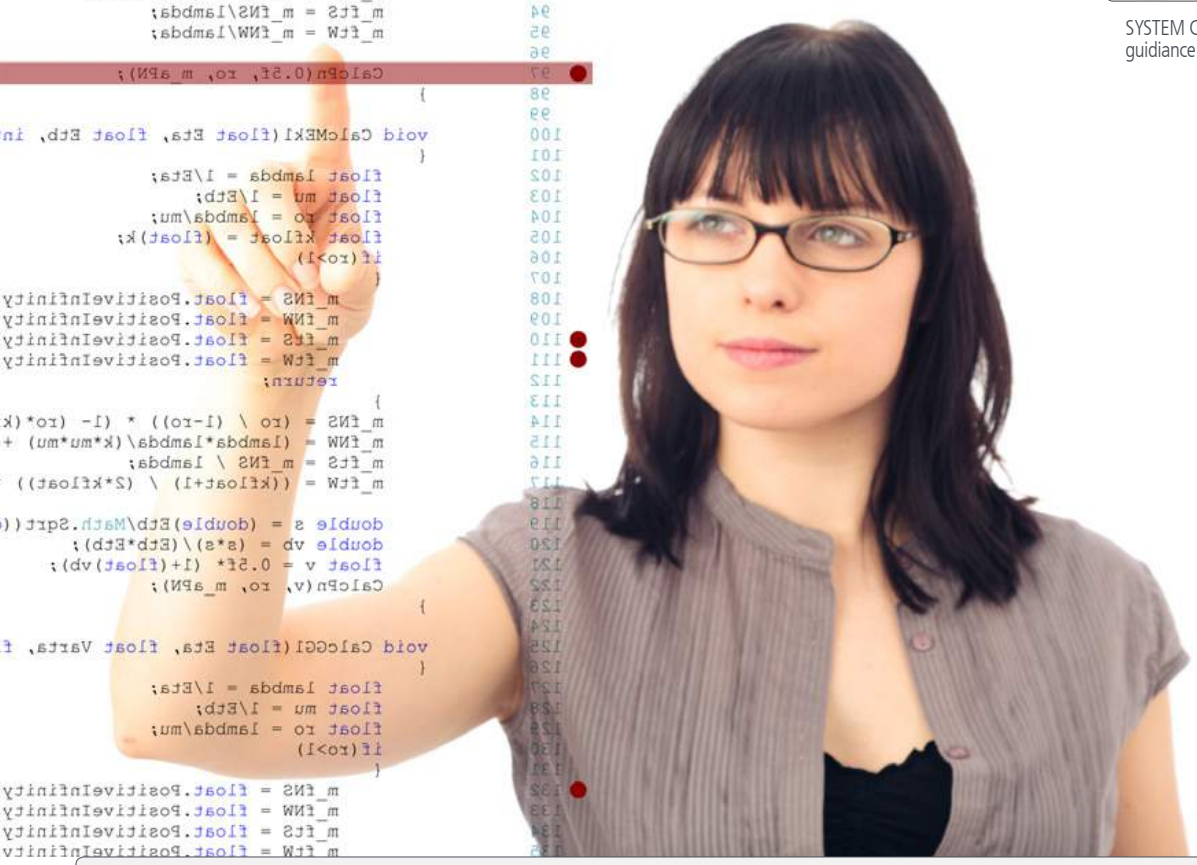
Software that sets Quality Standards

The key for successfully utilising JTAG / Boundary Scan is determined by the quality of the applied software – today more than ever. Grown within the innovations across nearly two decades, SYSTEM CASCON™ is the most utilised JTAG / Boundary Scan software platform worldwide.

More than 1,000 design and test engineers, quality managers, service technicians and system diagnosticians use this unique integrated software environment every day.

SYSTEM CASCON ™: intuitive user guidiance through Mission Assist™

Details about SYSTEM CAS CON™ features & packages
goepel.com/en/cascon



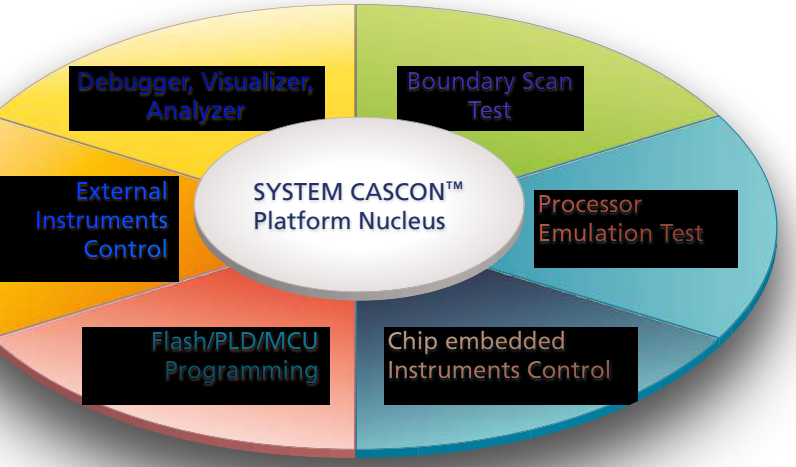
Features that make the Difference

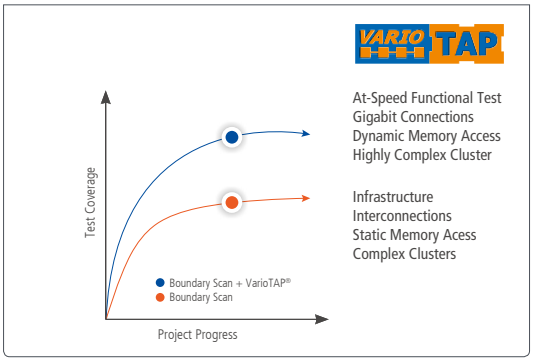
- **50+ Powerful** – Scalable high-performance platform with more than 50 integrated tools, central project database and intuitive user interface
- **Intelligent** – Simple, fast and goal-oriented project development by intelligent tools and automated system processes
- **Safe Test** – Integrated safety functions avoid hardware damaging scan vectors and guarantee safe test programs
- **Visual** – Interactive Boundary Scan visualisation on layout, schematic and logic level for graphical analysing and debugging
- **Universal** – Support of test and programming strategies for internal and external instrumentations beyond Boundary Scan
- **Coverage** – Extended test coverage and precise fault diagnostic by complete inclusion of non-Boundary Scan circuits

Debugger and graphical test coverage

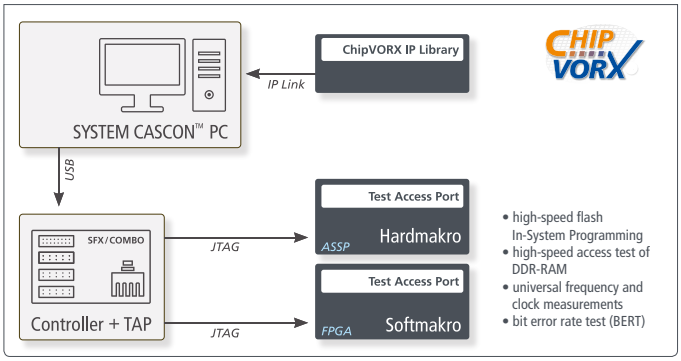
ESA Technologies (Embedded System Access)

- JTAG/Boundary Scan Test (BST)
- Processor Emulation Test (PET)
- Chip Embedded Instruments (IJTAG)
- Embedded Diagnostics Test (EDT)
- In-System Programming (ISP)
- Core Assisted Programming (CAP)
- In-Application Programming (IAP)
- FPGA Assisted Programming (FAP)



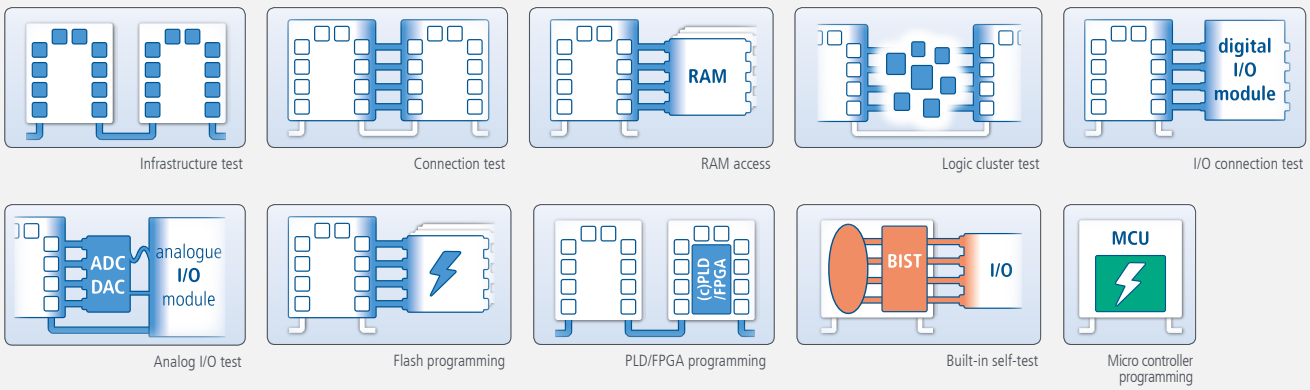


VarioTAP® increases Test Coverage by Emulation Tests



ChipVORX® drives Flash ISP Performance

Structural tests, Functional/emulation tests, Programming



Hardware Solutions without Compromise

Just like the software, GOEPEL electronic's hardware traditionally meets highest quality and performance demands throughout the entire product life cycle.

The available product lines of SCANFLEX® and SCANBOOSTER™ are the fourth generation of GOEPEL electronic's Boundary Scan Hardware solutions. Coupled with intuitive software, they enable applications far exceeding standard Boundary Scan to be quickly realised. The support of external instrumentations plays a key role.

SCANFLEX® received the prestigious "Best in Test Award", rewarded by Test & Measurement World magazine, for its outstanding architecture concept.

Details about SCANFLEX® and other hardware products
goepel.com/en/scanflex

Hardware

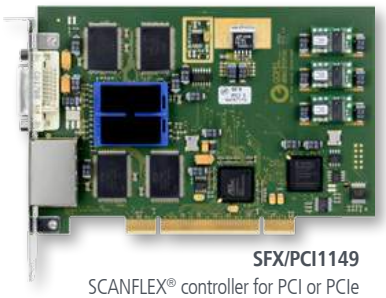
SFX/COMBO
SCANFLEX® controller for Gigabit Ethernet & USB with integrated TAP transceiver for 4 independent ports

SFX/ASL1149-x
SCANFLEX® controller for Gigabit LAN, USB 2.0 & Cabled PCIe

SFX/PXI1149/C4-x
SCANFLEX® controller for PXI bus with integrated TAP transceiver for 4 independent ports

SFX-6308
With 8 analog in- and outputs

SFX-TAP6 & SFX-5296
SCANFLEX® TAP transceiver with 6 independent ports & SCANFLEX® I/O module with 96 digital I/Os



SFX/PCI1149
SCANFLEX® controller for PCI or PCIe

SCANFLEX® redefines Boundary Scan

80 MHz Powerful – Scalable high-performance platform for scan operations of 80 MHz with up to eight parallel independent TAP interfaces

Universal – Broad support of a multitude of test, emulation and programming strategies complementing Boundary Scan

Flexible – Separately controlled I/O modules with VarioCore® technology for reconfigurable analogue, digital and Mixed-Signal functions

Modular – Freely configurable controller, I/O modules, TAP transceiver and TAP Interface Cards (TIC) enable scalable system configurations

Adaptive – Best TAP signal transmission quality also over long distances of up to ten metres with full signal delay time compensation

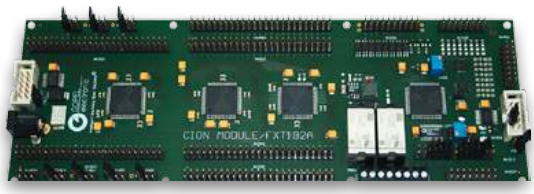
ATE ready – Special front-end hardware ensures seamless integration into In-Circuit Testers, Flying Probe Testers, Functional Testers and other ATE

SCANBOOSTER™/USB
Controller for USB 2.0 with
2 independent test access ports

CION LX
Configurable ASIC for
extended mixed signal test

ChipVORX Module™/FXT-X90
Test & programming with chip
embedded instruments

CION Module™/PCIe
Structural test of PCIe interface



CION Module™/FXT192A
Test digitalen & analog I/Os

Bus Access Cables
for extended functional test of interfaces

Platform of highest Flexibility

SCANFLEX® offers the unique opportunity to use various kinds of instrumentation based on a flexible platform

In-system instrumentation with external instrumentation is the key for highest fault coverage and nearly unlimited flexibility within the definition of a test strategy.

In-System Instrumentation [1]

- Digital Boundary Scan test (IEEE 1149.1/6)
- High-speed Flash programming via IEEE 1149.1
- PLD programming (JAM / STAPL, SVF, IEEE 1532)
- Analogue Boundary Scan test (IEEE 1149.4)
- Functional emulation test via JTAG debug port
- High-speed Flash programming via emulation
- Control of on-chip verification and test IP
- Control of Built-in self test (BIST)

1 Partly support also in the SCANBOOSTER™ economy product line
goepel.com/en/scanbooster

External Instrumentation [2]

- Digital I/O (static / dynamic)
- Digital functional modules
- Analogue I/O (static / dynamic)
- Analogue functional modules
- Programmer for serial Flash (SPI / I2C)
- Protocol based bus interface tester
- Control of reconfigurable IP (VarioCore®)
- Control of third-party I/O (ICT, FPT, FCT)

2 Partly support also in the CION Module™ economy product line
goepel.com/en/cionmodule

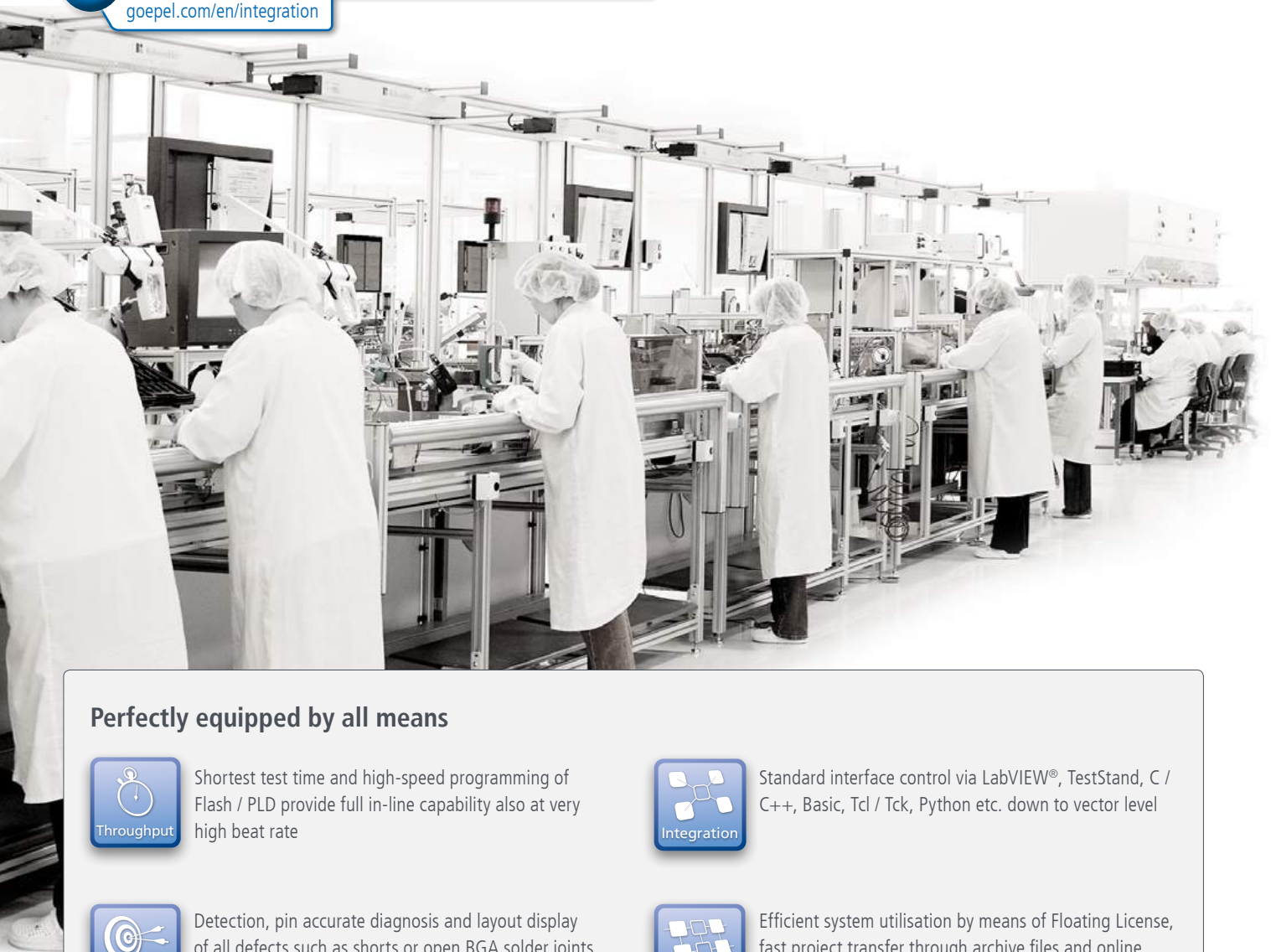
Flexibly defining Production Tests

Nowadays, testing is an important integral part of any quality assurance strategy. But each production environment and every product put different demands on the test equipment.

We have consistently taken up this challenge and developed flexible system solutions, which adapt to the production process and can be integrated in existing environments without performance loss. Tests, already developed in the lab, can be directly taken over into the production process for fast New Product Introduction (NPI).

SYSTEM CASCON™ for JULIET™

Details about our production stage solutions and integrated packages
goepel.com/en/integration



Perfectly equipped by all means

Throughput – Shortest test time and high-speed programming of Flash / PLD provide full in-line capability also at very high beat rate

Integration – Standard interface control via LabVIEW®, TestStand, C / C++, Basic, Tcl / Tck, Python etc. down to vector level

Precision – Detection, pin accurate diagnosis and layout display of all defects such as shorts or open BGA solder joints within one application

Modular – Efficient system utilisation by means of Floating License, fast project transfer through archive files and online fault data tracing

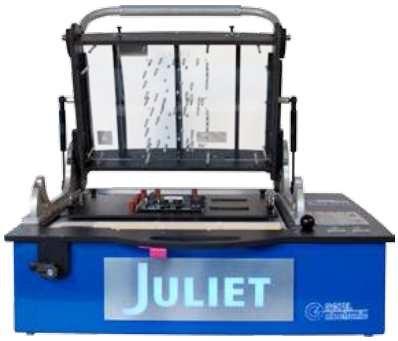
Synchronous – Complete interaction of Boundary Scan patterns with test vectors of other ATE or AOI systems for highest fault coverage

Turn-key – Availability of custom JTAG / Boundary Scan systems incl. adaptation based on platforms such as PXI, JULIET™ or RAPIDO

RAPIDO
RPS 3000

RAPIDO

RAPIDO represents a new generation of system solutions for high-speed onboard programming of non-volatile memories like flashes, microcontrollers and PLDs. Based on advanced integrated In-System Programming technologies it addresses not just the problems of continuously increasing memory size, but also offers a true alternative compared to traditional device programmers, due to its excellent flexibility.



JULIET™

The modular JULIET™ systems combine all test electronics, as well as the basic mechanics in a compact desktop system. Furthermore, they are equipped with a special interface to an exchangeable adaptor providing fast changes to accommodate different Units Under Test (UUT).

The JULIET™ test systems particularly address the flexible low volume production area, but are also utilised for fault diagnosis in repair processes and specific calibration procedures. The new features help for a significant increase in the systems' safety, productivity and fault coverage.

Stand-alone or Integration?

It doesn't matter what variant you decide for, our product portfolio covers it.

With the help of our powerful software and hardware, every PC can be transformed into a JTAG / Boundary Scan tester with extended fault coverage.

However, ready-made testers like JULIET™ & RAPIDO include Unit Under Test (UUT) power supply and are preconfigured professional solutions for adapting the UUT.

As far as the analogue circuit parts are concerned, the highest possible fault coverage can be achieved by combining JTAG / Boundary Scan with other methodologies. Numerous integration packages of various performance classes are available for such purposes. Typically, they have been developed in close cooperation with, and are authorised, by the respective ATE vendor.

Increased Test Coverage by Combination of

Boundary Scan and Flying Probe
- High flexibility without bed-of-nails for high-mix

Boundary Scan and Functional Test
- High fault coverage also in dynamic domain

Boundary Scan and HASS / HALT
- Dynamic monitoring for tests in environmental chamber

Boundary Scan and In-Circuit Test
- Hoher Durchsatz bei bester Diagnosegüte für High-Volume

Boundary Scan and AOI
- High throughput with best di-agnosis for high-volume

Boundary Scan and Gang Test
- Parallel programming and test of several boards

A couple of our ATE partners

Agilent Technologies · Polar · National Instruments · Aeroflex · Rohde&Schwarz · digitaltest · SPEA · Teradyne · Takaya

Support from the very Beginning

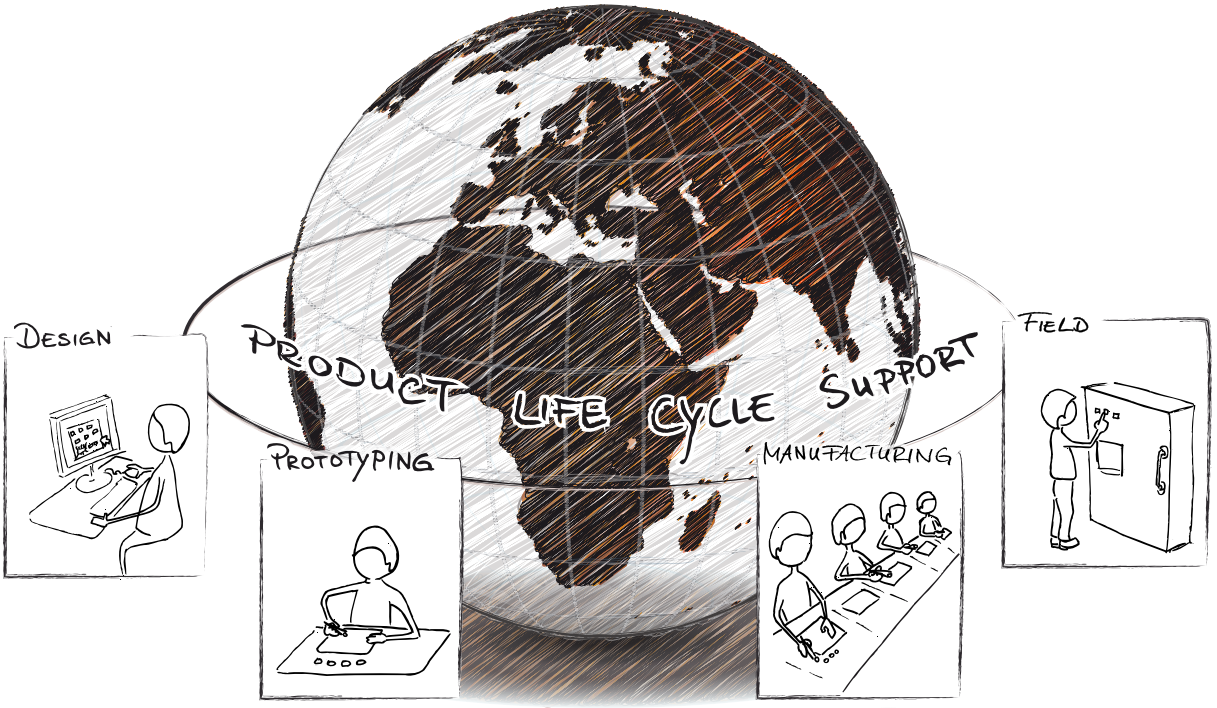
The credo of excellent customer and product support has been part of GOEPEL electronic's overall corporate philosophy since the very start.

Five technology centres in Europe, the USA and Asia as well as a global network of highly qualified and experienced application engineers are available for support and service at any time. The scope of services extends from pure Boundary Scan applications to turn-key solutions, complete process integrations and hardware/software developments.

Our GATE™ alliance partners (GOEPEL Associated Technical Experts) also play a decisive role in technology transfer. They include design and test houses as well as system integrators with special knowledge that supply valuable complementary services for successful project implementations. In summary, we are well positioned to individually support any type of customer such as OEM, ODM or EMS.

GOEPEL electronic GATE Partner

Details about GATE™
goepel.com/en/gate



Details about support and service
goepel.com/en/support

Competence is our Passion – Services at a Glance

Knowledge transfer in workshops, seminars and training – on-site, in our technology centres, at our partners' premises, or via internet

- Boundary Scan basics
- Advanced JTAG / Boundary Scan (incl. emulation)
- Design-for-Testability / in-system programming
- Test strategies in practice (incl. AOI, AXI, ICT)
- Project related application training
- System training for test and repair personnel
- Certification

Performance transfer by project engineering – in our technology centres or our partners' premises

- Hierarchic Design-for-Testability analysis
- BSDL file development / verification
- Development of complete test programs
- Definition of test strategies (incl. AOI, AXI)
- System integrations for ICT, FPT, MDA and FCT
- Custom development (hardware, software)

Use from prototyping to volume production

No matter what stage of product development or manufacturing cycle you are currently in, JTAG/ Boundary Scan brings forward your work.

Benefit from numerous advantages like easy program generation, fast adaptation to changes, best debug capabilities as well as easy transition from development to manufacturing.

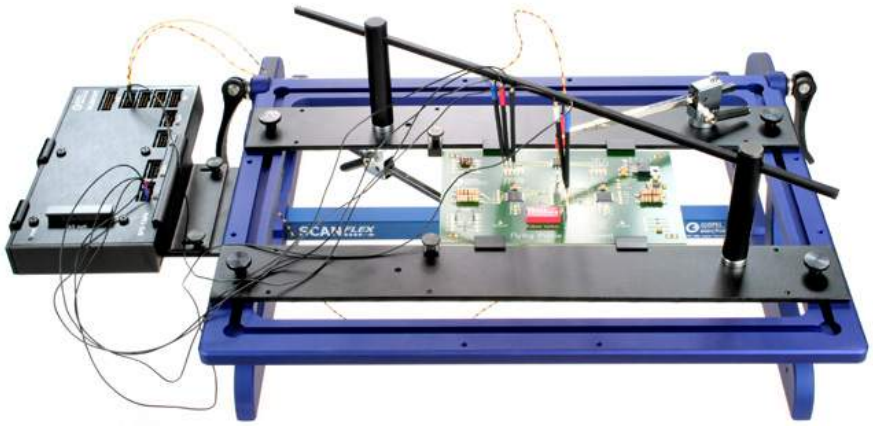
- Simple troubleshooting via detailed and graphical fault analysis
- In-system programming of ICs from all vendors through one tool
- Access to all digital component pins via four-wire-bus

Benefits as a Customer!

Have you already purchased our JTAG / Boundary Scan equipment? Then you have full access to all customer benefits such as

- GENESIS, our support website with library models, manuals, application notes, software updates and much more
- Library model development for new flash, RAM and additional non-Boundary Scan devices
- BSDL file verification
- Support hotline via phone, video via internet (Skype), desktop sharing (WebEx) and email
- Attendance at our worldwide organised Boundary Scan Days®
- Information about product roadmap and influence on new developments
- Special maintenance contracts for hardware and software
- Extended hardware warranty of 36 months

Boundary Scan Probe



SCANFLEX® Board Grabber

What do satisfied Customers say about GOEPEL electronic's Support

„We have been successfully applying GOEPEL electronic's Boundary Scan test systems in our production since September 2003. The performance of the systems and the support by GOEPEL electronic have impressed us. We are able to process the test application regarding the technical and time specifications to the complete satisfaction of our customers."

Ernst Neppl

Zollner Elektronik AG

Germany

„It's the best Boundary Scan system available that we have seen and GOEPEL electronic seem intent on continually taking it forwards. We've always been satisfied. Anyway why would we use equipment from anyone else but the European market leader?"

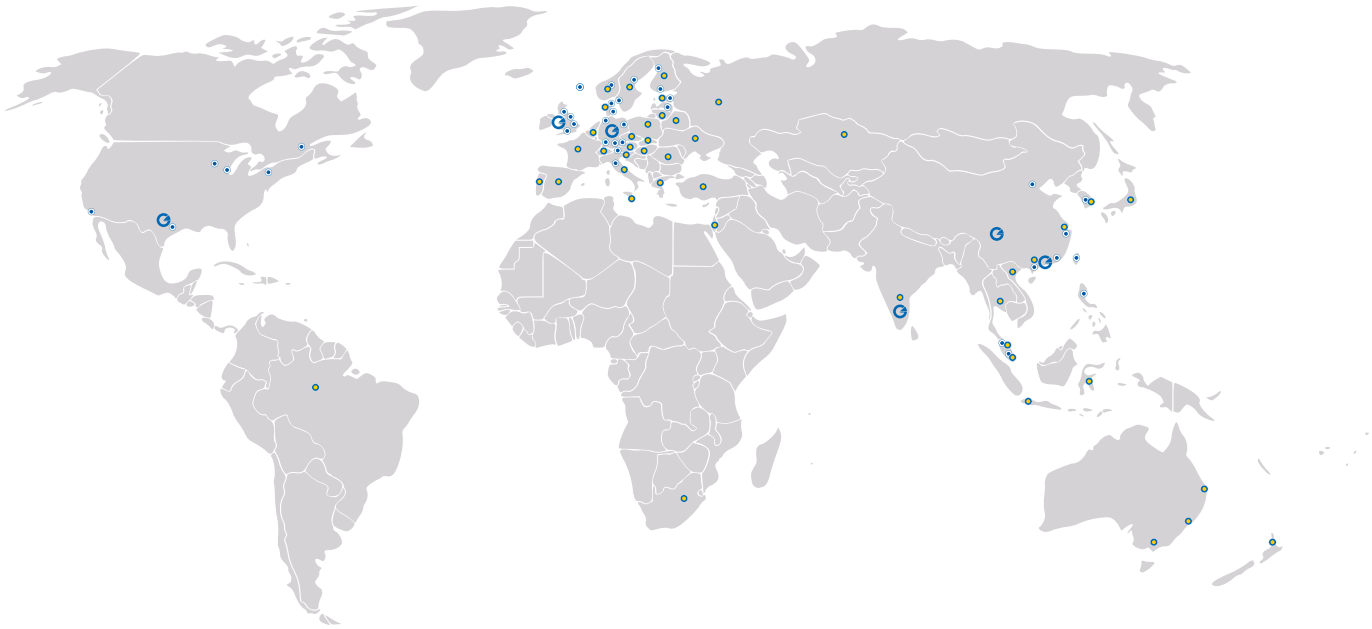
Phil Randall

ACW Technology Ltd.

United Kingdom

JTAG / Boundary Scan Support

	Location	Hotline	Freephone	E-Mail
	Europe	+49 (0) - 36 41 - 68 96 - 699		bscan_support@goepel.com
	USA	+1 (0) - 512 - 782 - 25 00	+1 (0) - 888 - 4GOEPEL	support@goepelusa.com
	United Kingdom & Ireland	+44 (0) - 12 23 - 858 - 298		bscan.support@goepel.co.uk
	China	+852 (0) - 25 23 - 21 71		support@goepel.asia



Branch Office Distributor GATE™-Partner

You will find your local contact for product aailability and support:
goepel.com/en/contact

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