

GÖPEL electronic GmbH.  
Constantly growing, yet close to its customers.  
Testing technologies that are a pleasure to use



GÖPEL electronic develops and manufactures electrical and optical measuring and testing technology, as well as test and inspection systems for electronic components, printed circuit boards, and also industrial electronics and automotive electronic systems. The company's business divisions are Automotive Test Solutions, Embedded JTAG Solutions, Industrial Function Test and Inspection Solutions (AOI, AXI, SPI, IVS). Besides the company's headquarters in the German city of Jena, GÖPEL electronic also operates multiple sales and service offices in the US, the UK, India and China. We also have numerous specialists involved in the global distribution and service network. For more information, visit [www.goepel.com](http://www.goepel.com)

Automotive  
Test Solutions

Test solutions for the automotive industry.

Test systems for automotive control units, bus communication and acoustic analysis as well as end-of-line applications

Embedded  
JTAG Solutions

With its roots in optics. Established in electronics.

Powerful testing and programming for the development and production of electronics

Industrial Function  
Test

Tailor-made and customer-focused.

Customised test systems for industrial electronics and PLC systems

Inspection Solutions  
AOI · AXI · SPI · IVS

Optics as an inspiration and benchmark.

Inspection of printed circuit boards using Automated Optical Inspection (AOI), Solder Paste Inspection (SPI), Automated X-ray Inspection (AXI) and custom solutions (IVS)



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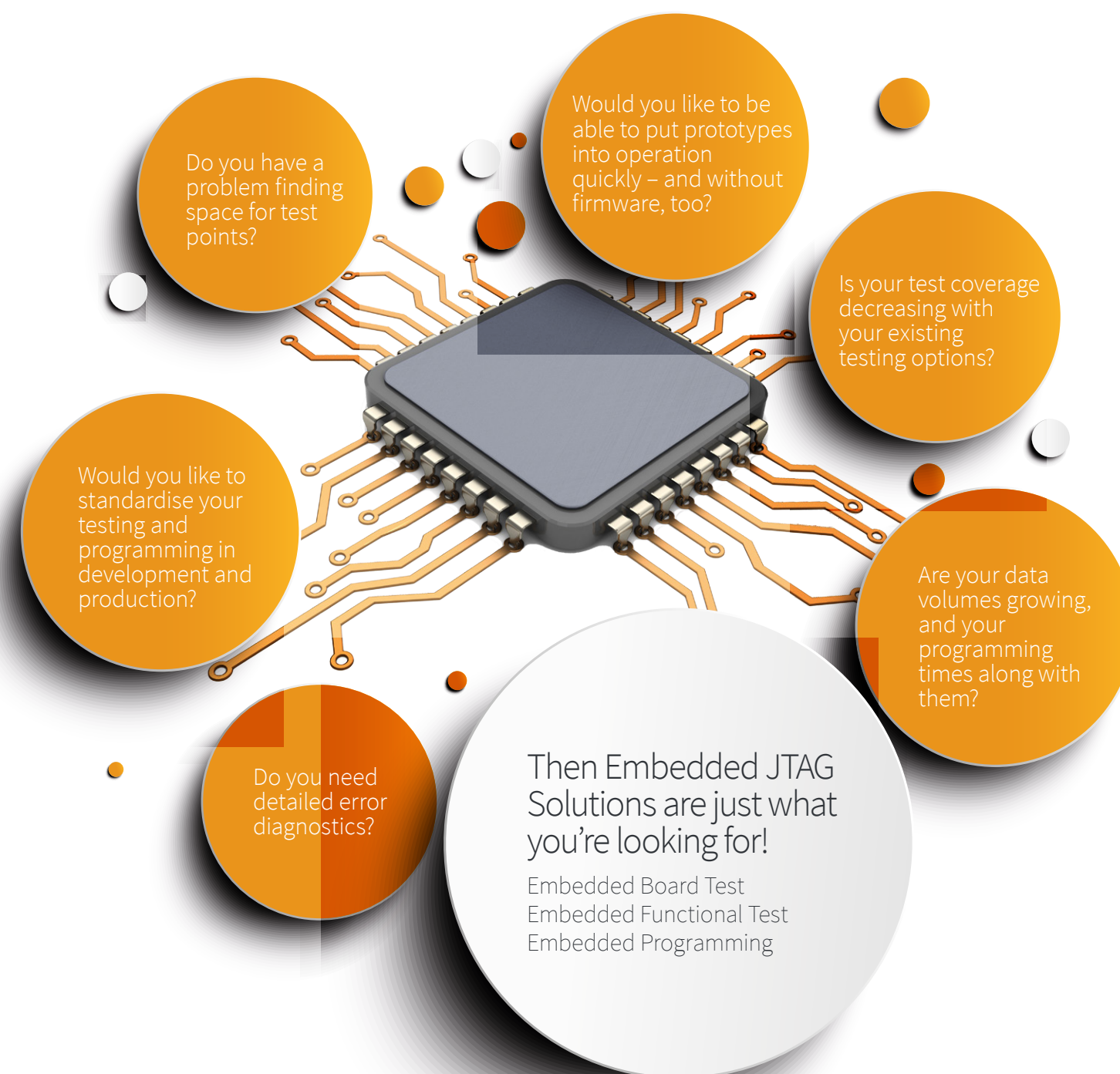
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Embedded JTAG Solutions/E/05-2020

# Embedded JTAG Solutions

## Testing and programming every assembly



Embedded JTAG Solutions

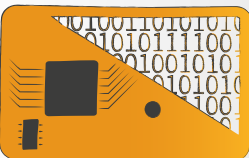
Since the introduction of the 1149.1 standard in 1990, GOEPEL electronic has been working on hardware and software solutions that utilize the JTAG interface for testing board connections and functionality. Over the years, additional extensions to the standard and test technologies have been added, which are now grouped together under the term Embedded JTAG Solutions. But what are these Embedded JTAG Solutions? Embedded JTAG Solutions consist of a total of three application areas.



Embedded Functional Test

Embedded Functional Test

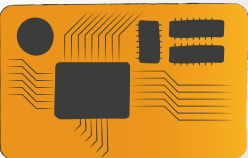
Today's test strategies now require more than just testing board connections. In addition to the traditional task of assuring perfect connectivity, Embedded JTAG Solutions provides Embedded Functional Test to also assure correct board and component functionality.



Embedded Programming

Embedded Programming

The growing demand for and challenges involved with in-system programming of a variety of data often represents a major hurdle today, especially with increasing file sizes and growing demands on programming speed. Embedded JTAG Solutions addresses such challenges by enabling the use of on-board resources to program at high speed.



Embedded Board Test

Embedded Board Test

Embedded JTAG Solutions also provides Embedded Board Test for verification of functional board connections. With this capability, Boundary Scan, microcontroller and FPGA resources are used to find shorts, non-soldered pins and pull resistors.

Embedded JTAG Solutions reveal the test coverage that can be achieved right from the first circuit diagram. As a result, optimisations can be introduced as early as the design process, and a large number of test points can be omitted.



Design



Prototyping

Diagnostics on first prototypes can often prove difficult as there are no reliable testing options available for the hardware and software. Embedded JTAG Solutions make it possible to find or rule out any soldering and assembly defects, and all without any firmware or software on the board.



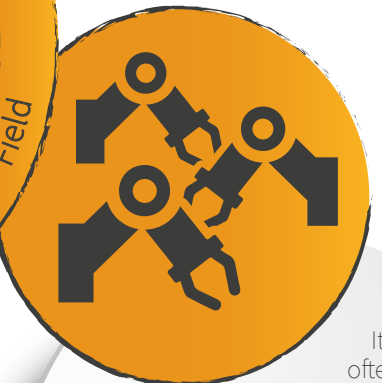
Manufacturing

From individual assemblies to panel testing, Embedded JTAG Solutions enable a high level of test coverage in an extremely short test time, as well as allowing programming of assemblies in series production. This is possible both in panels and on all individual circuits in parallel.



Repair and Service

Embedded JTAG Solutions are also ideal for repair work. No matter whether faults appear during production or only after reaching the end customer – detailed error messages make repair work much easier.



Field

It is often necessary to analyse malfunctions in detail either in the panel or separately. With Embedded JTAG Solutions, testing can be carried out as soon as a power supply and JTAG bus are available. A bed of nails is not required.



**Basis**

The cornerstone for a good testability of assemblies is laid in development. In order to face production errors as early as possible, options for later testing must be considered in the circuit.

**Implementation**

A test coverage analysis in the circuit diagram provides information in advance of where test points can be saved and others more optimally set.

**Goal**

Fast, precise prototype testing from the very first assembly.

**Result**

Better tests with higher quality.

**Solution**

The Embedded JTAG Solutions offer universal test and programming tools for the developer with many options.

fast program creation

Mission Assist

CASCON GALAXY  
Version 4.6.8 beta04

- Mission Assist
- Licenses
- User Management
- Login
- System Settings
- Tester Configuration

GOPEL electronic

programming independently of the manufacturer

assembly testing without any firmware

interface testing

The project documentation for Embedded JTAG Solutions is fully automated. Test programs that are created can be easily reused in subsequent production and repair processes.

Project report

Hand drawing circuit diagram

**SCANFLEX II CUBE**

Compact LAN/USB system

SCANFLEX II CUBE

Hardware debugger without firmware at the pin or cable level

Signal Traces

Pin Toggler

Test coverage analysis in the wiring diagram and layout

ScanVision Schematic

ScanVision Layout

fast hardware verification

Board Grabber

Board Grabber L

GOPEL electronic



### Requirement

Test focus on production faults. The increase of fault coverage and testing throughput are the top priority.

### Challenge

The core problem persists: missing or limited test access to the unit under test. The Embedded JTAG Solutions therefore provide the optimum tools for precise fault diagnosis.

### Independence

Test programmes can be used as early as in development. As no firmware is required for testing assemblies, the tests are possible and adaptable independent of development.

### Speed

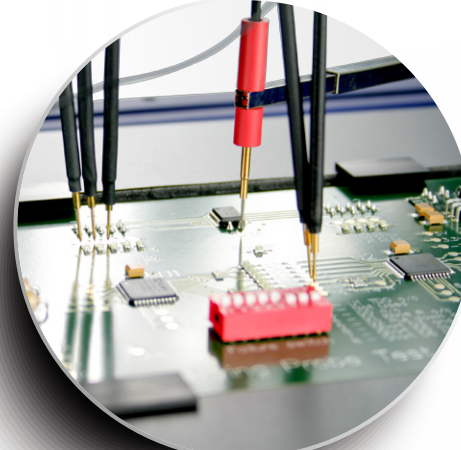

The Embedded JTAG Solutions are a universal tool for quick testing and rapid FPGA and Flash programming - as well as for individual assemblies as well as for complete use.

### Precision

Combined with existing test systems (ATE), you can also achieve an even greater testing depth.

- Electrical testing of hidden solder joints (e.g. BGAs)
- Error report
- Test coverage report
- Panel testing and programming
- high test coverage without test points
- Reduced time-consuming function tests
- Serial-number handling (MAC address)
- Connection to MES systems
- Testing of high-speed signals (USB 3.0, PXIe, SATA)

- Control by 3rd-party systems (LabView, TestStand ...)
- Interface validation/ testing





### Combining technologies to increase test coverage



Boundary scanning and HASS/HALT Dynamic monitoring for tests in climatic chambers



Boundary scanning and flying probe Complete flexibility without adapters for high-mix



Boundary scanning and AOI Placement testing and opto-electronic checks



Boundary scanning and function testing High test coverage, even in dynamic applications



Boundary scanning and in-circuit testing High throughput with the best diagnostic quality for high volumes



Boundary scanning and gang testing Simultaneous programming and testing of multiple units



ScanVision fault



JULIET Series 3





Faults

Production faults are particularly annoying in high-quality assemblies. Yet faulty assemblies do not necessarily have to be destroyed.

Analysis and fault prevention

A precise fault analysis of the assemblies can preclude series faults and helps to prevent future defects.

Solution

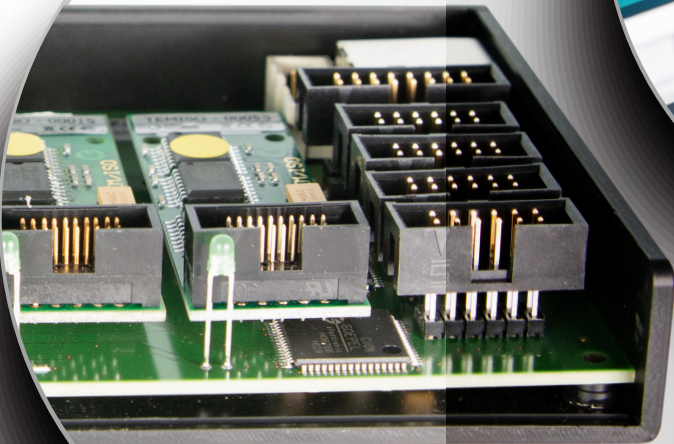
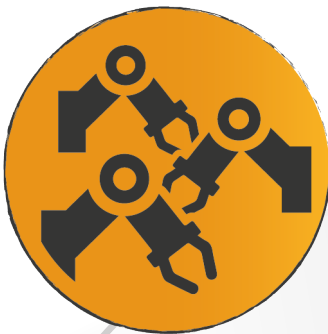
The Embedded JTAG Solutions also allows the repair of field returns. This plays a particularly important role in the automotive sector, for example, in the avoidance of product recalls. Such a test can also take place on site. The user therefore has the option to immediately repair the assembly or to replace it later.

· fast repair thanks to detailed fault analysis

· Hardware debugging options without the need for firmware

· Firmware update options for the software in the panel

· Cyclical panel testing also possible



· easy test access via JTAG interface, even with built-in and encapsulated PCBs



Debugging and diagnostics tool







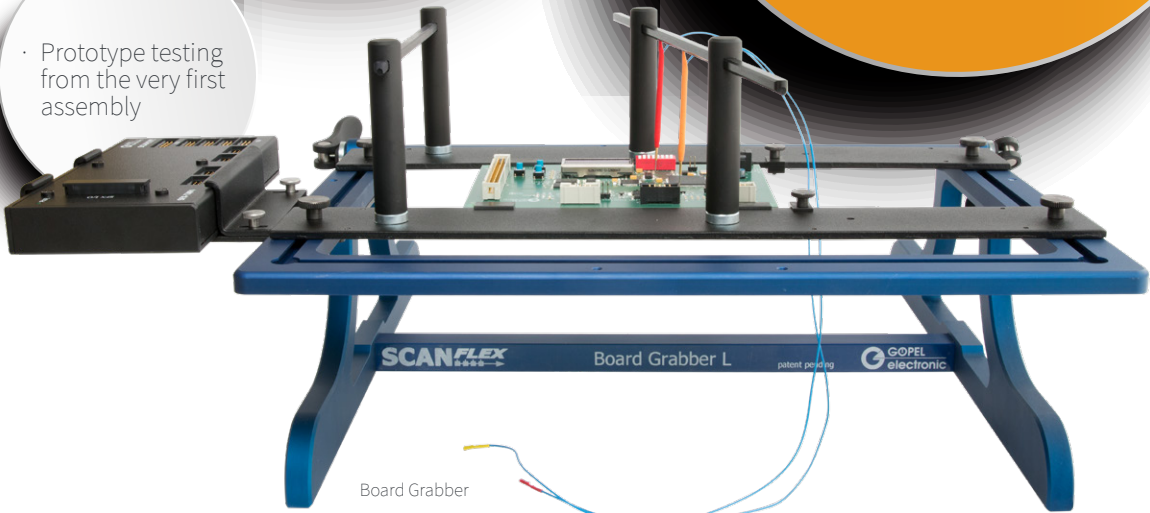
Support

In terms of support you have around the clock access to the GENESIS user platform. Updates and upgrades for software applications as well as the latest product information such as training videos are available there. Furthermore, you receive worldwide comprehensive support for your special requirements thanks to a global partner network.

Guidance

GOEPEL electronic accompanies and supports its customers right from the start. The Design-for-Testability Guide, for example, offers recommendations with which you can optimise later test processes as early on as possible. With the test coverage analysis for circuit diagram and layout you can optimise test points and test coverage.

· Prototype testing from the very first assembly

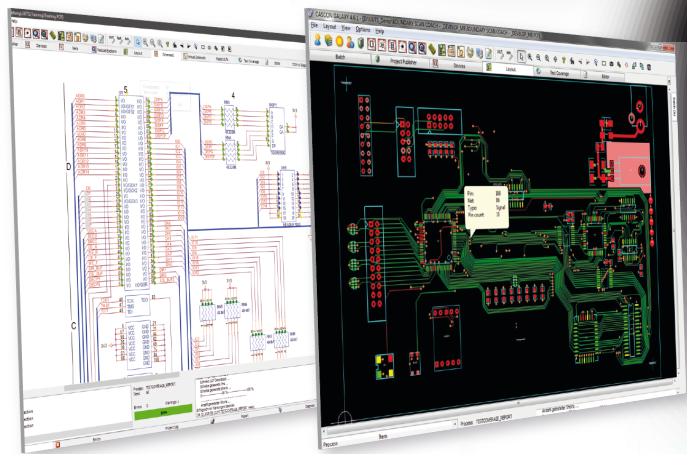


Customer requirements

Be it system installation, on-site commissioning or in-line and stand-alone turnkey solutions: you can rely on the expertise of GOEPEL electronic employees at all times. Particularly with customer-specific adjustments, project creation or adapter planning and design, we are always on your side.


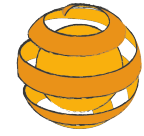




Training

Both as a user of and someone interested in our technologies, you can be brought right up to date at regularly occurring seminars, training sessions and webinars. At user conventions, such as the Boundary Scan Days, you can also expand your personal network and exchange experiences with colleagues. Interesting EMS service providers also have the option of becoming a partner in the „EMS programme“ cooperation network. And, of course, the experts at GOEPEL electronic will help you to find the test strategy tailored to you.





Features that make all the difference

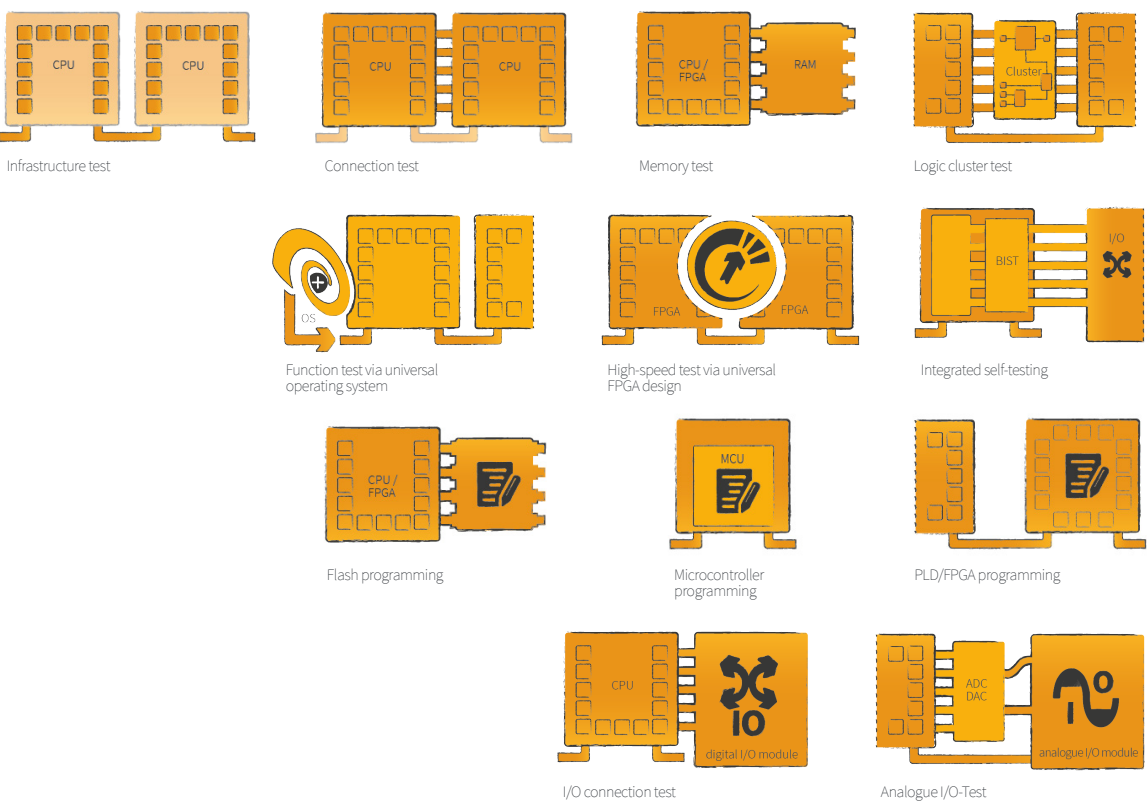
-  Intelligence  
Simple, fast and targeted project development using intelligent tools and automated system processes
-  Universality  
Support for testing and programming strategies that goes beyond boundary scanning, for internal and external instrumentation
-  Visualisation  
Interactive visualisation at the layout, schematic and logic level for graphical analysis and debugging
-  Security  
Integrated protective functions block scan vectors that damage hardware, guaranteeing safe test programs
-  High-performance Tools  
Scalable high-performance platform with over 50 integrated tools, a central project database and consistent user interface
-  Test coverage  
Enhanced test coverage and precise error diagnostics thanks to full inclusion of non-scan circuitry components

Solution

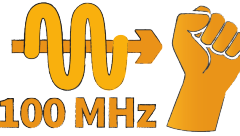
The key for a successful use of the Embedded JTAG Solutions, more than ever before, lies in the quality of the software used. Various editions ensure that, depending on the requirements in development and production, the best possible service is available. As a pioneer of automatic test programme creation, GOEPEL electronic offers the complete range, from the smallest studio system to the high-end version. The modular expansion-capability, as well as licensing that can be adapted to every need, ensure a high degree of flexibility.





Structure tests, function/emulation tests, programming

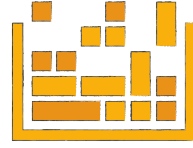




  
**100 MHz**  
High-performance platform

  
Flexibility

  
Data transmission quality

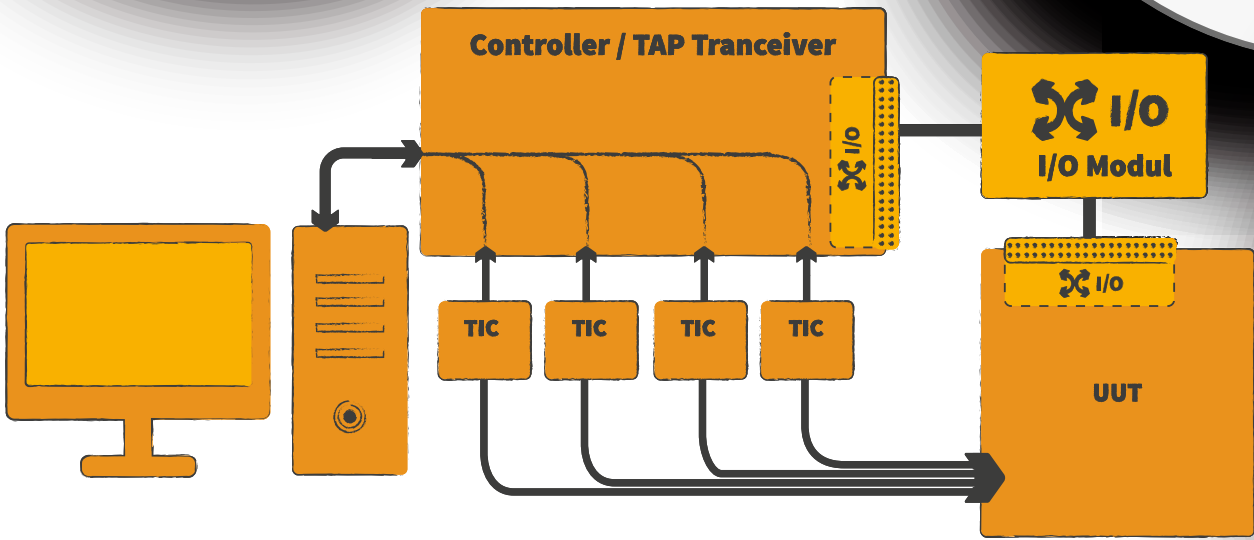
  
Modularity

  
ATE ready

  
Universality

Solution

Just as with software, hardware is also a part of the GOEPHEL electronic tradition of fulfilling the highest quality and service demands throughout the entire product. In perfect teamwork with the software, the Embedded JTAG Solutions make applications possible that go far beyond the standard boundary scan. There is a particular focus on flexibility in the development of our hardware lines. This means all systems can be scaled and expanded.



SCANFLEX controller for industrial use

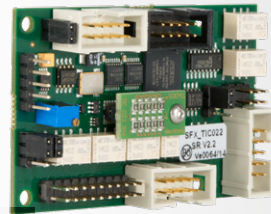


SCANFLEX controller for industrial use



SCANFLEX II CUBE

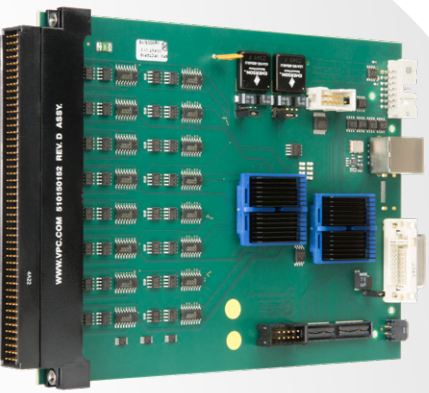
USB/LAN controller for up to eight units under test



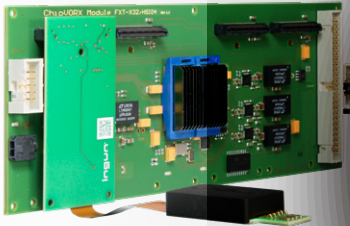
Transceiver interface card for integration in adapter solutions



I/O-module with 96 mixed-signal channels



VPC-based TAP16



ChipVORX fixture module for testing high-speed modules



SCANFLEX controller for PXI Express



SCANFLEX II module for error-free (differential) data transmission