# COMPLETING YOUR AUTOMATIC TEST STATION
# WITH PRODUCTION INTEGRATION PACKAGES (PIP)

Adding JTAG to your production tester

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# PRODUCTION INTEGRATION PACKAGES (PIP)

**Production Integration Packages Benefits**
- No need for production operators to learn a new (graphical) user interface
- Increased test coverage and diagnostic capabilities of your existing test stations
- Shorter production repair times and reduced repair costs
- Easy integration of JTAG Test and ISP results in your tracking and tracing reports
- Unchanged logistics surrounding for your existing test stations

## Completing your automatic test station

In a high volume production environment the test station is often a Go / No-Go station. Failing products are removed from the line and transported to a separate repair station. In this case adding a JTAG Technologies' Production Integration software Package (PIP) plus a JTAG **Controller** and optionally some **I/O hardware** is generally enough to enhance your production test station with JTAG capabilities.

JTAG Technologies' boundary-scan **Diagnostics** software package (BSD) helps to quickly relate test failures to their physical cause. Running BSD on your repair station will help to minimize the repair time. BSD reports in text format the cause of the errors detected with the JTAG tests.

JTAG **Visualizer** can highlight in the schematics and/or layout of the target board, the nets, pins and components, associated with the detected faults as reported by BSD. Adding JTAG Visualizer software helps to reduce the repair time even further.

For lower production volumes it is common to combine test and repair in one station. When a board fails the test, the test operator diagnoses and repairs the failing board and then re-tests it on the same station. For this situation it is most economic to install the different software packages - PIP, BSD and optionally Visualizer - together with the JTAG controller and possibly some I/O hardware on the same station.

## Increase coverage

The increasing complexity of devices used on boards – eg. System on Chips (SoCs) - causes a drop in coverage and reduced diagnostics capabilities of existing test systems. By adding a PIP package to a test system its test coverage and failure localization capabilities are highly improved for boards containing one or more JTAG compatible devices. The addition of JTAG test and ISP applications helps to shorten the repair times in the factory and decrease the repair costs for such boards.
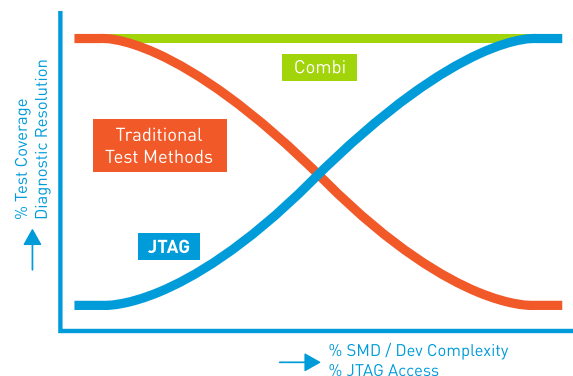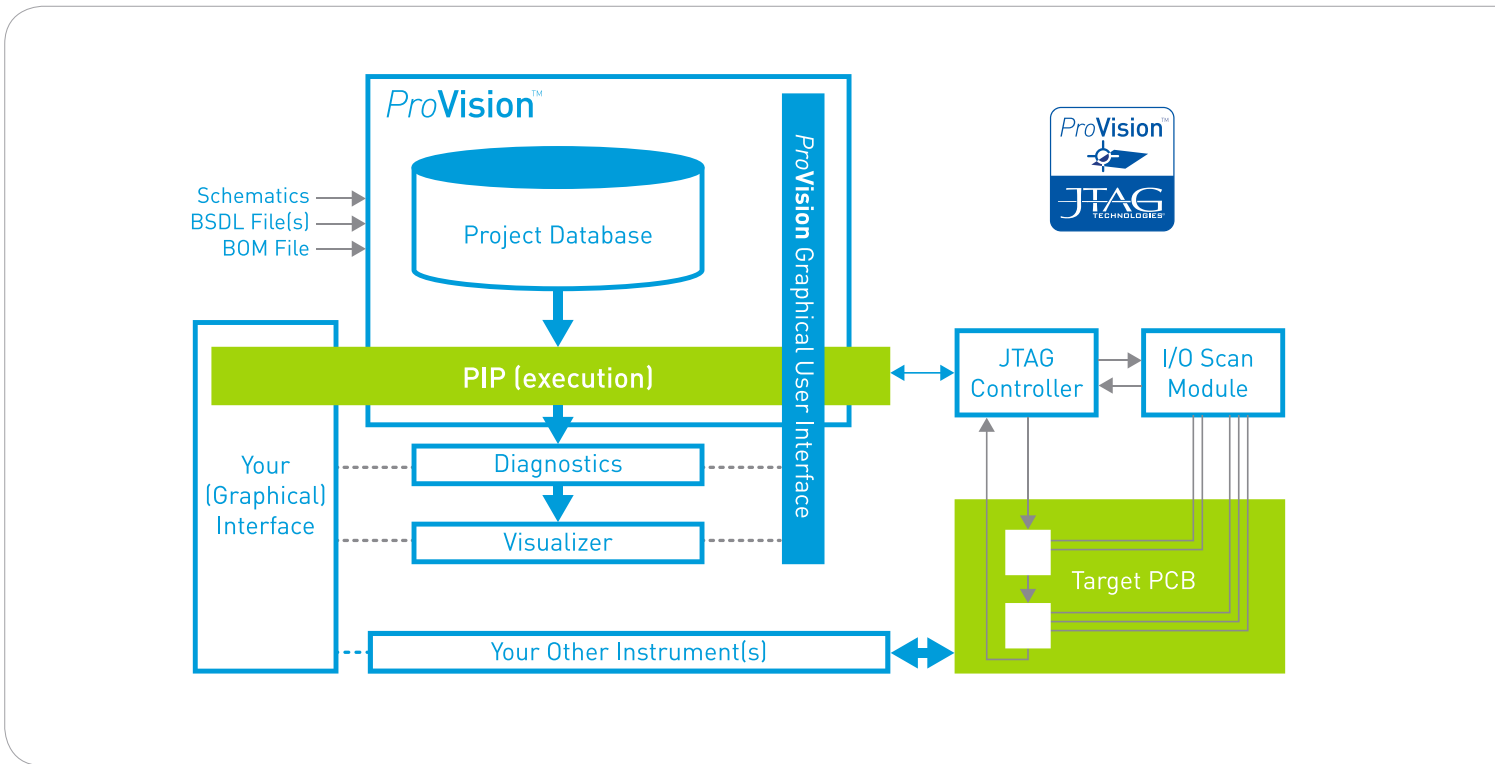
Figure 2: Effect of adding JTAG

We **are** boundary-scan.®

**ProVision**™

Schematics →
BSDL File(s) →
BOM File →

Project Database

PIP (execution)

Your (Graphical) Interface

Diagnostics

Visualizer

Your Other Instrument(s)

ProVision Graphical User Interface

JTAG Controller

I/O Scan Module

Target PCB

ProVision™ JTAG TECHNOLOGIES

## Seamless Integration

Production Integration Packages (PIP) allow for a seamless integration of JTAG applications in a wide variety of existing environments on the factory floor. Microsoft C/C++, Microsoft .NET assemblies, Visual Basic, Marvin Test Solutions' ATEasy and National Instruments' LabVIEW, LabWindows/CVI and TestStand are all supported through individual PIP packages comprising of the software execution modules and instrument control libraries for that environment.



Figure 3: Example of a LabVIEW-based GUI combining PIP/LV functions with functions for other instruments

JTAG Test and In-System Programming (ISP) applications which have been developed and validated using the ProVision tooling, may be forwarded to the production environment. For stand-alone applications in the production environment ProVision's built-in sequencer can execute the applications automatically in the desired sequence. When JTAG is combined with a functional test system, running the Test and ISP applications from within the graphical user interface of that system may be preferred. Even more so when you also want to perform combined measurements on a target board in which both JTAG and other instruments are used together. With a PIP package an integrated environment results where the operators see the user interface they are already familiar with.

## The License

A PIP license comes with a Sentinel USB key and associated license file. The license is valid permanently and is independent of the project at hand. This guarantees your PIP license to be available at all times and for all products that need testing. If your PC has a defect, the JTAG Technologies PIP key can be connected to another PC and you can continue your production activities. A permanent license also guarantees that production is not interrupted due to missing an unforeseen license ending date.

A PIP license supports all controllers from JTAG Technologies. You can thus swap controller types easily without facing licensing issues. If you have 2 or more JT 37x7 or JT 5705 controllers in a single station only one PIP license is needed for that station. This provides a cost effective solution if you have to process panels with several identical boards and need to test and program all in parallel to meet your production throughput requirements.
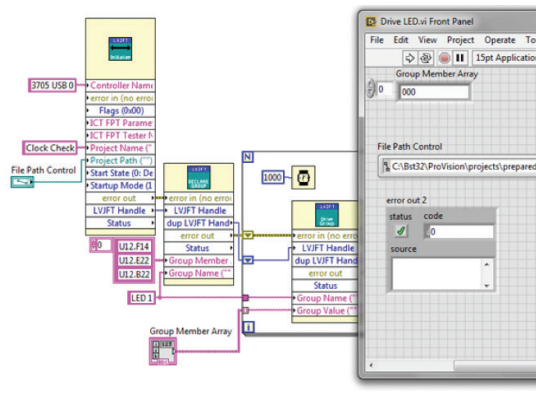
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Figure 4:
Example of a LabVIEW program where PIP/LV functions are combined with functions of a functional tester.

## Supported Function Categories

| Controller Settings | Test Execution | Test Result Reporting | Flash Programming | PLD Programming |
|---|---|---|---|---|
| FTDI 2232 | Infrastructure | Status | 2bin file conversion | Jedec |
| JTAGlive controller | Interconnect | Truth Table | Nor Flash | JAM |
| JT 3705/USB | IEEE 1149.6 | | Nand Flash | STAPL |
| JT 5705 | Memory connect | | I2C Flash | SVF |
| JT 37x7 | Component connect | | SPI Flash | IEEE 1532 |
| | JTAG Functional Test | | Flash emb. in uC | |

## Order numbers

| | |
|---|---|
| PIP/DLL | Microsoft C/C++ Dynamic Link Libraries |
| PIP/EXE | Command Line Executables |
| PIP/LV | National Instruments LabVIEW instrument drivers |
| PIP/LW | National Instruments LabWindows/CVI instrument drivers |
| PIP/.NET | Microsoft .NET Assemblies (C#, VB .NET) |
| PIP/VB | Module files for Visual Basic 6 |
| PIP/ATEasy | Marvin ATEasy instrument drivers |
| PIP/TestStand | National Instruments TestStand Step Types |

## Related products and brochures

| | |
|---|---|
| ProVision | JTAG application development |
| BSD | Boundary-scan Diagnostics |
| Visualizer | Visualizer for Schematics and Board layout |
| Controllers | JTAG controllers |
| I/O | Digital and Mixed-Signal I/O modules |

## More information
# GLOBAL REPRESENTATION

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