# Seica
Test Solutions

www.seica.com

Flying Probe Test

PILOT4D

THE PILOT⁴ᴰ LINE OF FLYING PROBE TEST SYSTEMS ADDRESSES THE FOURTH DIMENSION OF TEST: TIME

The **dimension of time** in the test of electronic boards and modules has a multi-faceted effect on the efficiency of the test process, and is fundamental in determining the added value it brings to the final product, which is paramount in today's extremely competitive, global market.

Consider test program development **time**, test execution time, digital component programming **time**, handling **time** and, last but not least, the **time** required to repair boards when the process has not been sufficiently monitored. Put all of this together with the challenges presented by the increasingly faster technological evolution of electronic products in terms of performance and cycle times, and it is easy to see that the dimension of time is an essential factor in the equation.

The **Pilot⁴ᴰ** line of flying probe test systems offers a vast series of solutions that are designed to optimize the "time" dimension while maintaining the highest level of test quality.
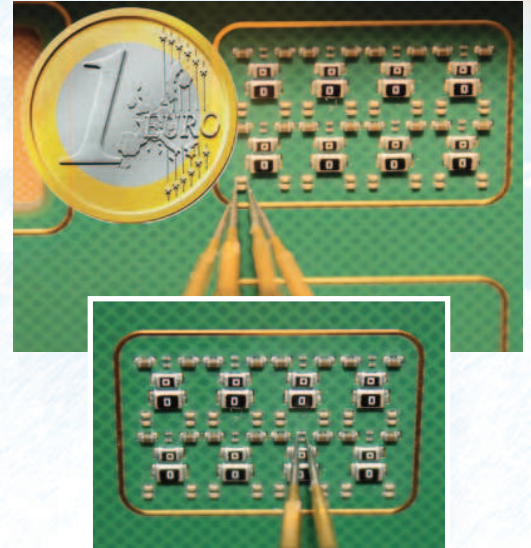
ADVANTAGES OF FLYING PROBE TEST:

❍ **Eliminates fixturing costs and time**
❍ **Fast test program development, easy integration of design changes**
❍ **Process flexibility**
❍ **Circuit access, even in the absence of Test points**
❍ **Controlled probe contact, programmable for any type of board**
❍ **Different test solutions and approaches integrated in a single test system**
❍ **Intrinsic positioning and measurement precision**

INDUSTRY 4.0

Information and the technology needed to collect and analyze data to obtain it, is key to the successful digitalization of the manufacturing process, which is at the heart of the **Industry 4.0** concept. The **Pilot⁴ᴰ** line has all of the capabilities needed for implementation in any **Factory 4.0** scenario, providing the possibility to plug in any proprietary or third party information system to achieve the desired goals.

DIFFERENT ARCHITECTURES FOR DIVERSE SOLUTIONS

The **Pilot⁴ᴰ** line offers architectural solutions, each one optimized for a specific type of applicative scenario:

❍ **Pilot⁴ᴰ L4** is a horizontal, **"pass-through"** solution. Completely compliant to the SMEMA protocol, ensuring complete automation of the in-line test process, it has an architecture which permits the integration of additional pins and jigs to augment test coverage or to integrate other processes, such as on-board programming (OBP) of digital devices.

❍ **Pilot⁴ᴰ V8** and **Pilot⁴ᴰ M4** optimize the test of **"double-side"** electronic boards, which require stimulus and measurement on both sides of the UUT simultaneously, where a "single-side" approach is extremely limiting in terms of test coverage. The use of 8 (V8) or 4 (M4) probes distributed on both sides of the Unit Under Test (UUT) enables full test coverage as well as faster test time, and the vertical architecture capitalizes on the effect of gravity to minimize vibrations during testing, ensuring maximum test precision and measurement stability.

All of the **Pilot⁴ᴰ** systems include the hardware and software tools to acquire the geometric formation (warpage) of the UUT in order to implement the opportune corrections via software to ensure precise and controlled probing on even the most delicate contact points of very small, SMD component pads.

PILOT⁴ᴰ: 4 Test Environments

MANUFACTURING, REPAIR, REVERSE ENGINEERING, PROTOTYPING and **NEW PRODUCT INTRODUCTION (NPI)**, are typically the 4 environments where the Pilot 4D solutions are implemented.

The Seica VIP platform software, VIVA, common to all of the Pilot⁴ᴰ systems, allows a completely versatile test approach, from simple ICT to functional tests, from automatic, net-oriented tests to the reconstruction of the data and electrical schematics of boards coming from the field.
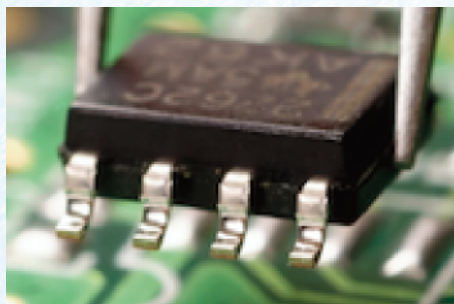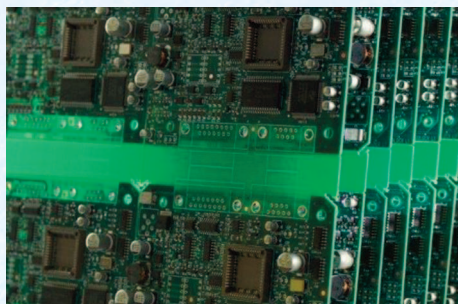
MANUFACTURING: the evolution of the test algorithms and strategies present in the VIVA software mean that the Pilot⁴ᴰ testers provide fast, high performance production testing. The diverse, integrated test technologies such as optical inspection, thermal analysis, boundary scan, power-on functional test, and the possibility to include other processes such as on-board programming (OBP), allow the user to streamline the various production phases, optimizing process time.

REPAIR: There are different types of requirements for diagnosing faulty boards, depending on the characteristics of the boards themselves and the specific repair situation (manufacturing defects, field returns, repair depot, etc.).
The Pilot⁴ᴰ line has an extensive tool set developed to address all of the repair scenarios, and the intrinsic flexibility of the flying probe test approach allows the user to implement from one to all of the test techniques available, to optimize the repair process and results.
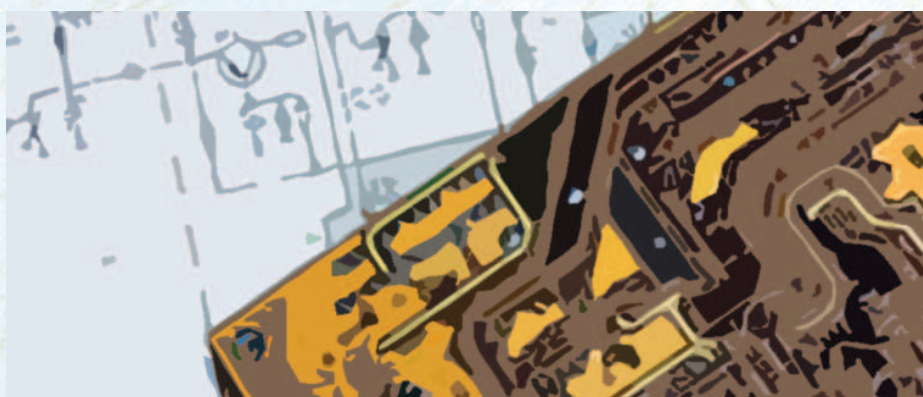
PROTOTYPING AND NPI: by exploiting the versatility of the Pilot⁴ᴰ hardware and software, it is possible to obtain immediate data from the tests of prototypes, avoiding costs and time for building preliminary fixtures or test benches, ensuring maximum fault coverage in the minimum time.

REVERSE ENGINEERING (RE): the necessity of managing field returns is a constant in today's industy, and in some sectors, such as transportation, infrastructure, communication and defense, the repair returns are often older boards which do not have a complete set of documentation, schematics or construction data. The double-side solutions offered in the Pilot⁴ᴰ line are ideally suited to carry out reverse-engineering operations, and include all of the necessary software tools to enable the reconstruction of the electrical schematics and the CAD data of the board under repair, to facilitate fault detection and repair, and to produce the documentation necessary for legacy support of the product.

PILOT^{4D} THE FOURTH DIMENSION IN FLYING PROBE TEST

All of the solutions in the **Pilot**^{4D} line are equipped with excellent new performances for faster testing and higher fault coverage on even the most technologically advanced and complex boards of the latest generation electronic products and devices.


PILOT^{4D} V8 THE COMPLETE SOLUTION

- ○ Maximum measurement precision
- ○ Maximum positioning precision
- ○ Test of 01005 and 03015 metric components
- ○ Suitable for testing all types of boards
- ○ Extremely **fast test times**
- ○ **Parallel test:** two systems in one
- ○ High level of traceability (integrated barcode reading)
- ○ **Industry 4.0 ready:** easy remote monitoring and connection to information systems
- ○ Automatic loading/unloading
- ○ Single Rack / MultiRack handling
- ○ Automatic selection of test program

THE COMPLETE SOLUTION IN ONE SYSTEM:

- ○ ICT
- ○ FlyScan
- ○ OBP
- ○ Thermal Scan
- ○ LED test
- ○ AOI functions
- ○ Reverse engineering
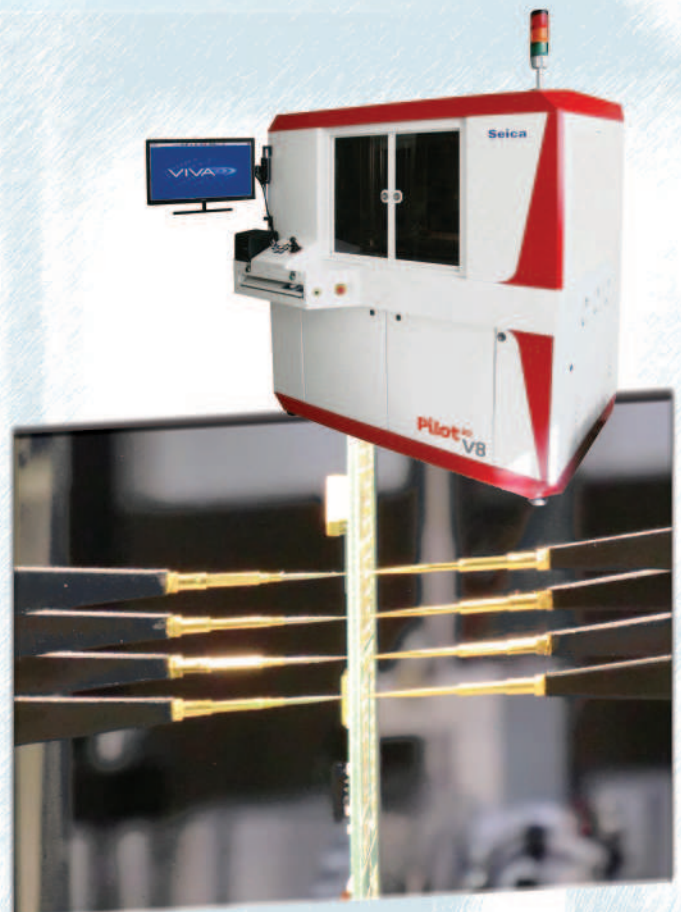
THE AUTOMATED SOLUTION

In the vision of the **Industry 4.0** factory of the future, the implementation of a highly automated, technologically advanced and reliable production line is essential.

The **Pilot**⁴ᴰ **V8** is part of the vision: in the pass-through version, with dedicated loaders and unloaders, it is the operator-free test solution for the manufacturing environment.
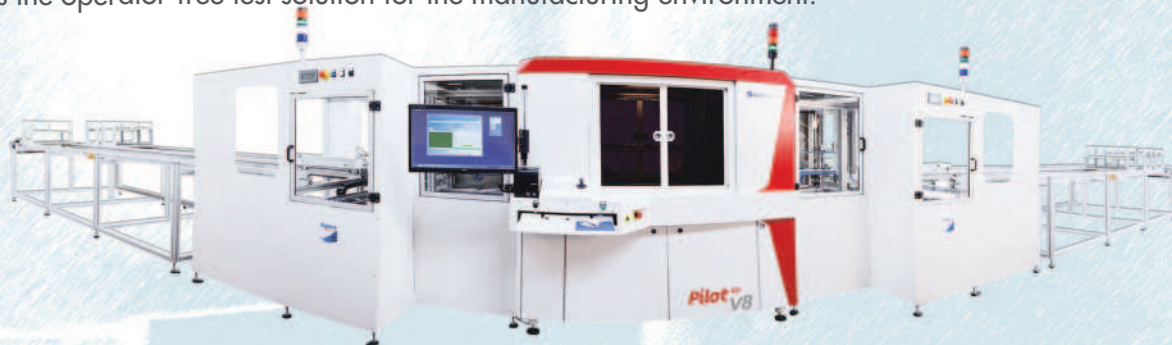
PILOT⁴ᴰ M4

- ❍ High flexibility
- ❍ Suitable for double- side board testing
- ❍ Suitable for prototype testing
- ❍ Suitable for reverse engineering

PILOT⁴ᴰ L4/H4

L4
- ❍ Perfect in-line integration
- ❍ Easy connection to loader/unloader modules
- ❍ Allows the integration of dedicated frames and/or dedicated jigs
- ❍ Best for boards with single-side test access

H4
- ❍ Stand-alone solution
- ❍ Allows the integration of dedicated frames and/or dedicated jigs
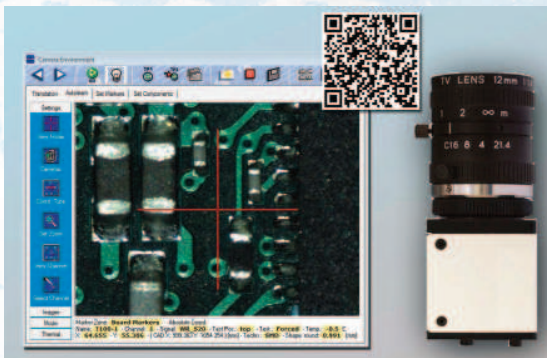- ❍ Best for boards with single-side test access

PILOT⁴ᴰ Options
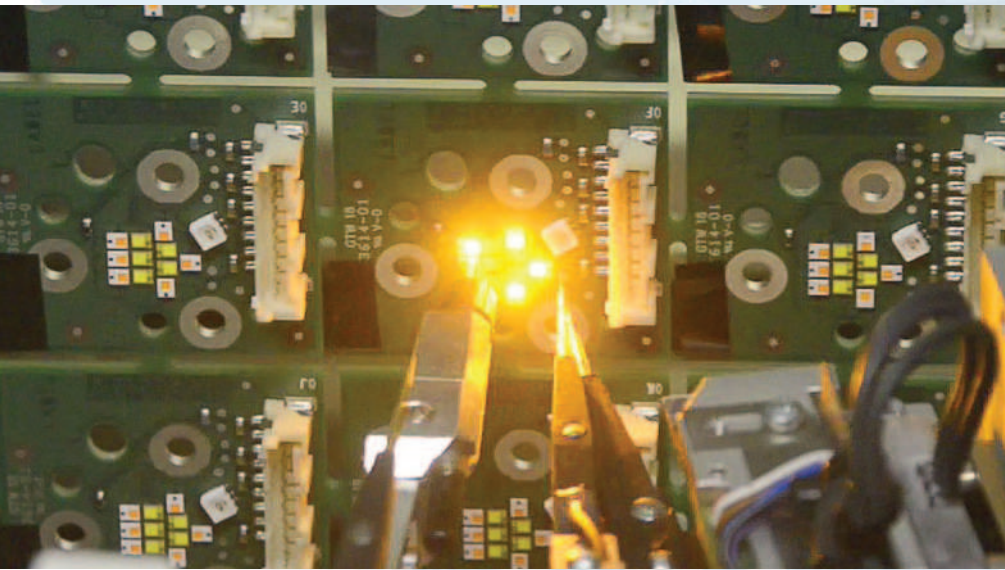
LED TEST

The LED sensor option is used for testing the LEDs present on the UUT. The UUT is powered on, and the LED sensor measures luminosity, color, saturation and frequency spectrums of the LEDs, operating in the visible and infrared light range of wavelengths.

HD CAMERAS

The Pilot⁴ᴰ systems are equipped with high definition color cameras which, together with new, sophisticated software algorithms, enable an advanced level of optical inspection of the UUT, complementing the electrical tests with the verification of presence/absence, polarity. In addition they are used for automatic centering of fiducials, reading barcodes and for the acquisition of the board image for offline programming development and support during fault diagnostics and repair.

SPECIAL TEST SEQUENCES AND OBP

VIVA software can call , during test program execution, functional test sequences written using third party languages: for example Labview, VBScript, Python, and C, allowing the user maximum test flexibility. The Pilot⁴ᴰ systems also offer fully integrated On board Programming solutions, applied to the UUT via the mobile system probes.

TRACEABILITY

The Pilot⁴ᴰ systems include a series of hardware and software features and performances to support full traceability of the test results of each single UUT: the cameras automatically read 2D barcodes allowing test results to be stored for each board, making them available for subsequent repair operations, statistical analysis, etc., whether locally, via the resident repair station module, or to external information systems.

THERMAL SCAN

The thermal Scan module verifies the operating temperatures of the circuits and components on the UUT, comparing them to the temperature profile acquired on a powered on sample board. Like all of the other test techniques available in VIVA, thermal scan tests are fully integrated into the complete test program for the specific board.

MARKER

The optional UUT test marker can be installed on any Pilot⁴ᴰ system, for visual test traceability and subsequent identification purposes.

PARALLEL TEST

The architecture of the Pilot⁴ᴰ offers the possibility to execute parallel testing of two single or double-side boards. This capability has a significant impact on test throughput, doubling it in the first case, and in the second case, achieving a significant increase, as well as the ROI of the test system.

AOI AND RGB LIGHTING

The Pilot⁴ᴰ systems integrate new, improved RGB lighting: the advanced filters and color programming options allow the user to achieve the best conditions for automatic optical verification of component and solder presence.

NET-ORIENTED TEST: FNODE-PWMON

The net-oriented test techniques included in the Pilot⁴ᴰsystems significantly reduce the number of measurements required for in-circuit test, therefore test time, without sacrificing fault coverage.
FNode: stimulates and compares the analog behavior of the nets on the UUT to those on a golden sample board.
PWmon: stimulates and compares the behavior of the board nets in the power on condition with respect to a golden sample board. This test technique is applicable to both analog and digital nets.

FLYSCAN

This option brings a fully integrated solution for flying probe boundary scan testing. The boundary scan tests are generated automatically along with the other electrical tests by the VIVA software, and are executed as part of the complete test program. A single test report includes the boundary scan results, and in the case of faults, further tests are carried out via the flying probes to provide component-level diagnostic information, usable in the VIVA Repair Station environment. The "extended test" feature also enables the jtag-type test of non jtag nets, eliminating the need to create manual cluster tests reducing programming time and increasing fault coverage.

VECTORLESS TECHNIQUES

There are two vectorless test techniques available on the Pilot⁴ᴰ systems used to check for process faults on ICs (typically shorts and unsoldered pins), fully integrated and combinable in the test program:
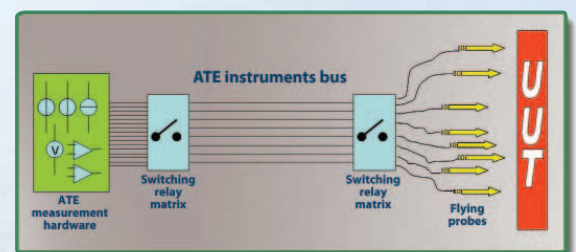Autic: based on clamp diode measurements
Openfix: performed via a capacitive sensor which measures the response of all of the pins of the IC under test.

QUICK TEST

This simple and intuitive software interface enables the user to create customized functional tests by simply clicking on the various system resources displayed to connect them to the UUT.
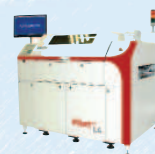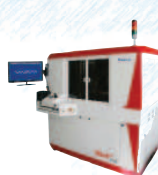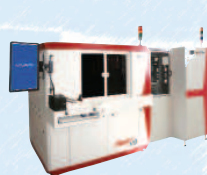
GLOBAL SUPPORT NETWORK

THANKS TO THE GLOBAL EXTENSION OF SEICA AND ITS SUBSIDIARIES, SEICA CAN ENSURE LOCAL SERVICE SUPPORT WHEREVER THE CUSTOMER NEEDS IT, IN ADDITION TO 24-HOUR TELEPHONE ASSISTANCE.

Different architectures for diverse solutions

Pilot^{4D} V8 Pass-Trought / Pilot^{4D} V8   Pilot^{4D} M4   Pilot^{4D} L4 / Pilot^{4D} H4

	Pilot4D V8 Pass-Trought / Pilot4D V8	Pilot4D M4	Pilot4D L4 / Pilot4D H4
Architecture	Vertical	Vertical	Horizontal
PCB Load/unload	Automatic/Manual	Manual	Pass through/Manual
Max mobile resources	17	11	7
Electrical probes	●●●● + ●●●●	●● + ●●	●●●●
Power probes	●●	○	○
Openfix probes	●●	●●	●
Thermalscan sensor	●●	●●	○
Led sensor	●●	●●	●
Laser sensor	●●	●	●
HD color camera	●●	●●	●
Lighting unit	●●	●●	●
Marker	●	●	●
Barcode reading	●	●	●
ICT Test	●	●	●
Functional Test	●	●	●
OBP	●	●	●
Parallel Test	●	○	○
FNode	●	●	●
Autic	●	●	●
PwMon	●	●	●
Flyscan	●	●	●
Quick test	●	●	●

Seica reserves the right to change any technical specification without notice