

Detecting Counterfeit ICs

Risk mitigation with electrical test

Solutions for Maintenance and Sustainment of critical electronic systems



- Increased Asset Availability
- Shorter Repair Times
- Cost Savings and inventory reduction
- Ability to support legacy and 3rd party equipment
- Independence from OEM
- Control Obsolescence
- Component, Asset and Stock Validation

www.diagnosys.com

Offices and Sales Partners



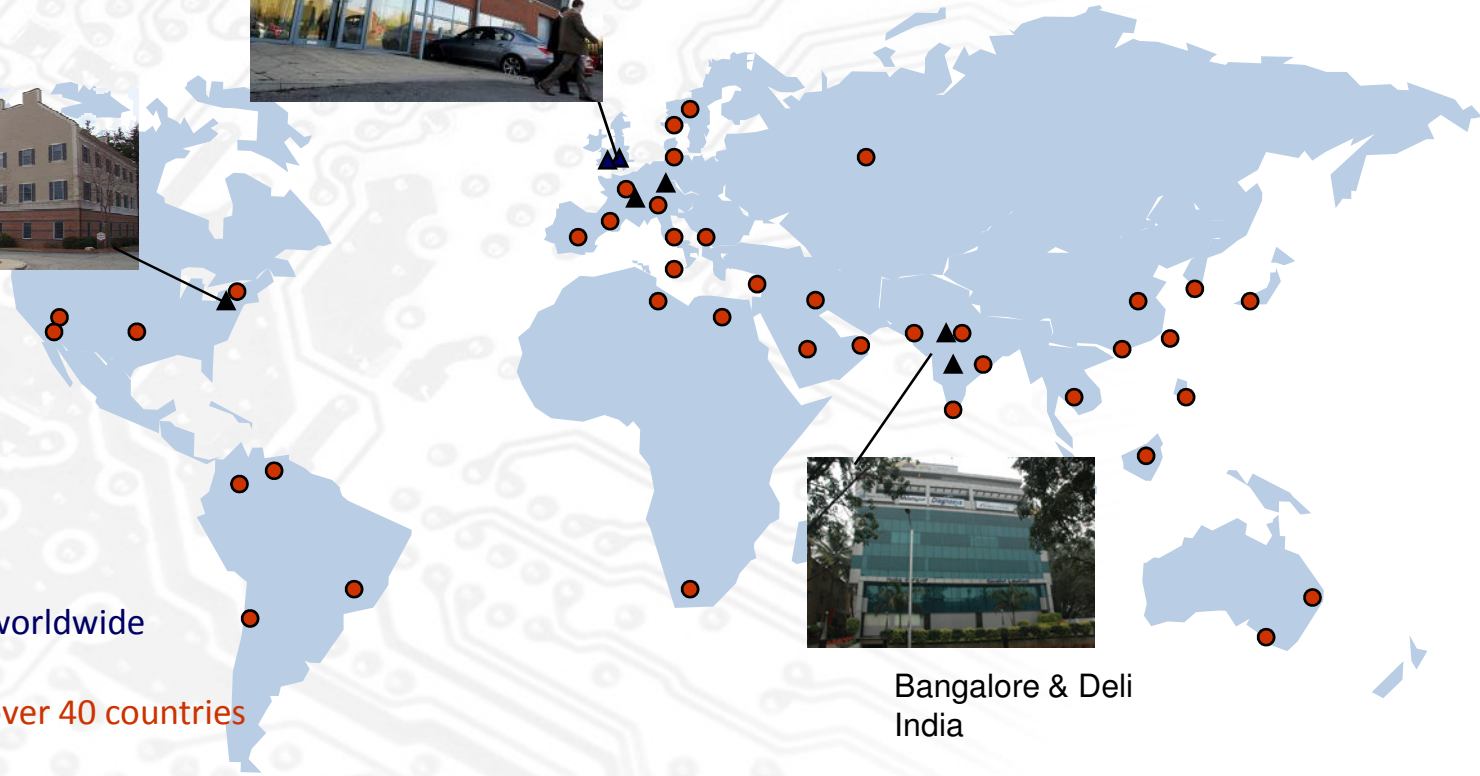
Petersfield
UK



Westford
USA



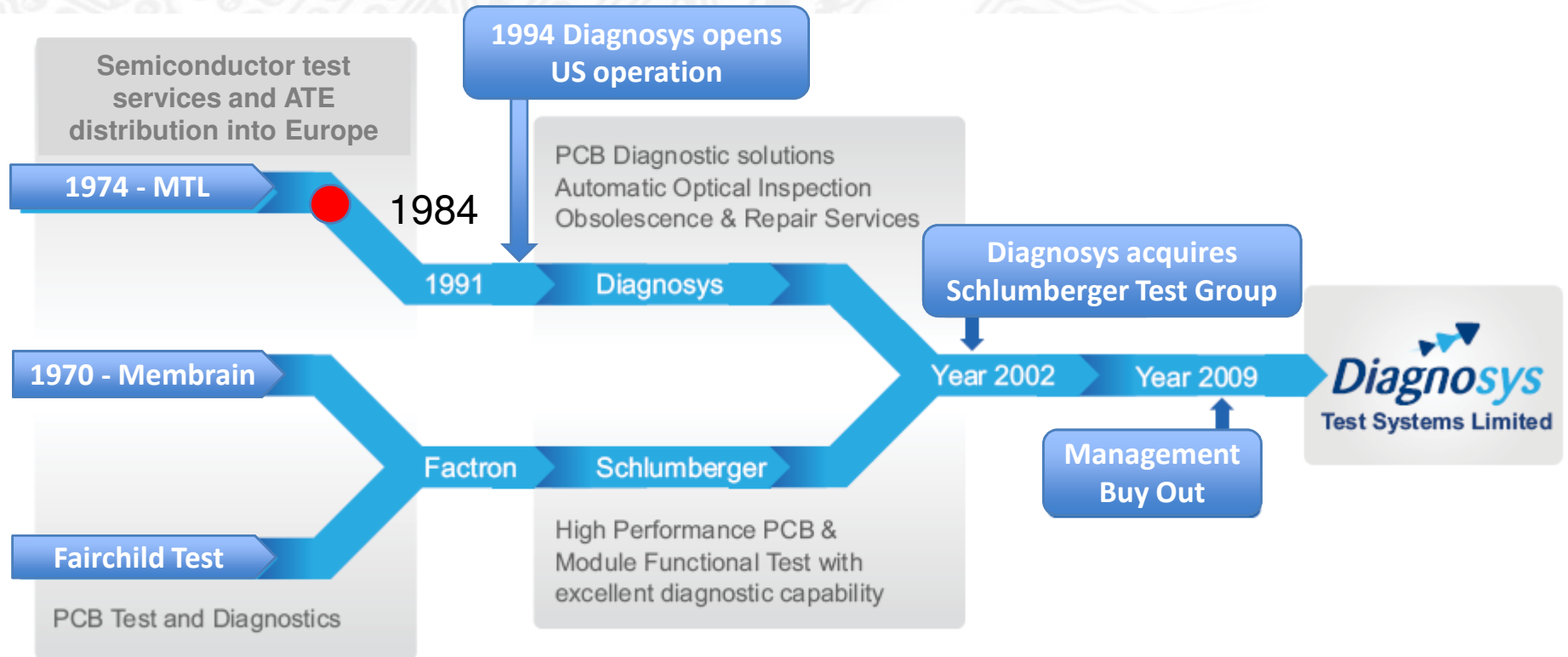
Bangalore & Deli
India



- ▲ Diagnosis Offices
Over 155 people worldwide
- Sales Partners in over 40 countries

Diagnosys History

Spanning 40 Years



Why is Diagnosys at ERAI?



- Over 20 Years addressing “how to test” components In-Circuit.
- Validating the functionality of IC’s and identifying:
 - **defective, incorrect, damaged and good parts.**
- Diagnosys developed functional test programs for over 50,000 different components.
- Worked closely with Defense groups in many countries
- Contracts with most of the major Primes
- The US Navy (NAVAIR) has standardized on our IC validation tools in their circuit board repair depots and on ships in the fleet.

Diagnosys at a Glance



Key Affiliations



NAVAIR PMA-260 established PinPoint II-R as part of CCTARS



AMCOM EXPRESS – U.S. Army Aviation and Missile Command (AMCOM)



Tactical Missiles Supplier Preferred Vendor program



Alliance Partner - VAR Plus status



Approved Contract Holder since 1999



Active member of the National Defense Industrial Association



Software Engineering Institute

CarnegieMellon

CMMI Level 2 Certified – working to Level 3



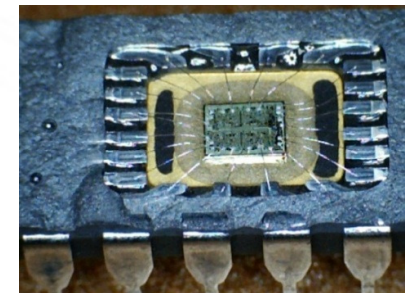
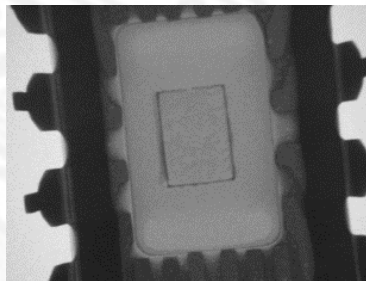
International Organization for Standardization

ISO 9001:2008 Certified



Counterfeit Focus Area

- Component Validation and Risk Mitigation with Electrical Test.
 - Validates the component functions the way it should
 - Validates the component is operational
 - Validates the component can operate at varying temperatures
 - Assesses if there is any likely ESD damage
 - Does not require a Golden unit
 - Non destructive methods used

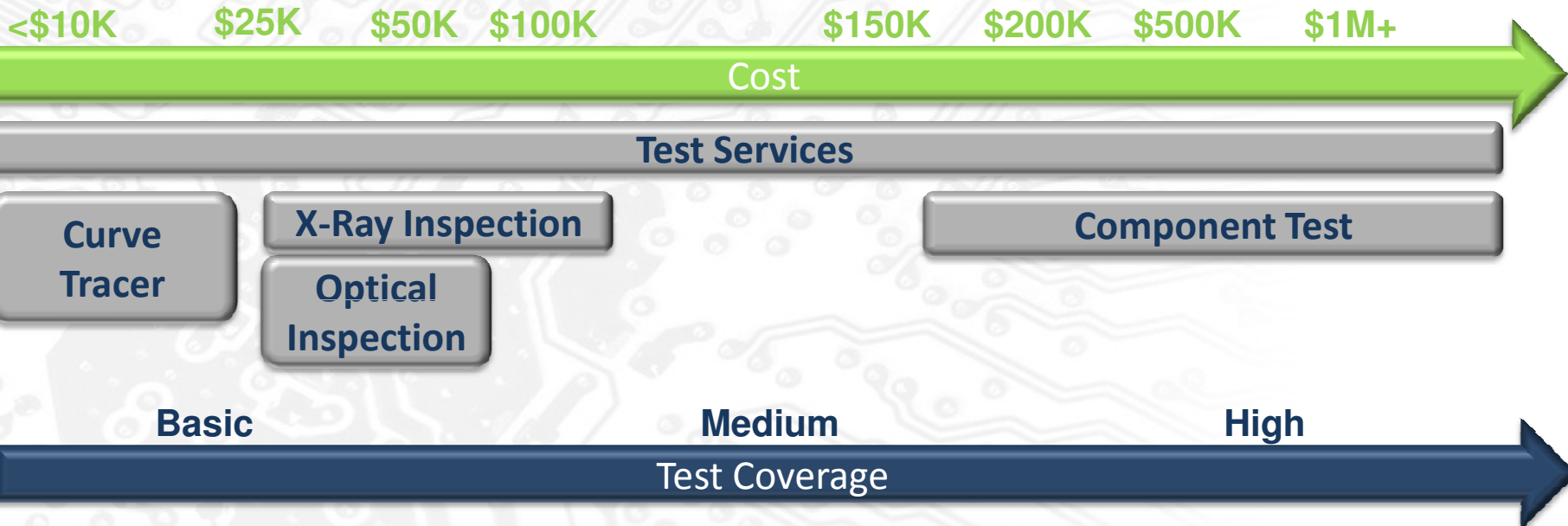


Solution Comparison

Issue	Mitigation Solutions			
	Physical inspection		Electrical test	
	Optical	X-ray	Curve Tracer(VI)	Functional Component Test
Re-labelled device	Found	Not found	May find	Found
Wrong functionality	Not found	Not found	Not found	Found
Empty package	Not found	Found	Found	Found
Wrong die	Not found	Found	May find	Found
Previously failed device (power on)	Not found	Not found	Not found	Found
Reference device required	Yes	Yes	Yes	No
Operates at Hot/Cold temp	No	No	No	Yes

Found	Found
Not found	Not found
May find	May find

Solution Comparison





BIG IRON ATE

Component
Test/Characterization



Conventional Component ATE

Pros:

- Best method to test that a device has been manufactured to the OEM design specifications and is working correctly.
- Ideal for component Characterization

Cons:

- Initial Cost of Equipment \$200K and up
- Program development cost – estimated \$10K+/program
- Interface costs - estimated \$10K+ for each DUT type
- Time to develop a program – weeks /months
- Component test time - Hours
- Annual maintenance costs
- Skilled labor

IMPRACTICAL



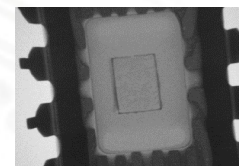
Characterization Vs Validation

Characterization:

- Extensive testing and analyzing of all technical facets of a component.
- A sampling process to prove or disprove that components will perform functions with the technical characteristics for which they were designed
- Essential for Semiconductor manufacturing prior to volume production

Validation:

- Electrical / Functional Test process to validate the operation and integrity of a component.
- Validates the component performs as per the OEM data sheet.
- Validates the component is operational and not defective.
- Validates the component has the correct die
- Validates the component performs as per the Part Number
- Validates the component operates at specific temperatures ranges



High Coverage @ Low cost!



- A Low cost electrical test platform with:
 - Low cost program development
 - Rapid Program development
 - Flexible Interface adapter to accommodate different package styles
 - Extensive Program Library with pre-written tests
 - Simple operator interface for ease of use
 - Environmental test option (Hot/Cold)
 - Test results showing what passes and what fails
 - Traceability: Proof that what you are providing your customer is not counterfeit.

Low Cost Electrical Test Platform



PinPoint Alpha and Sigma series

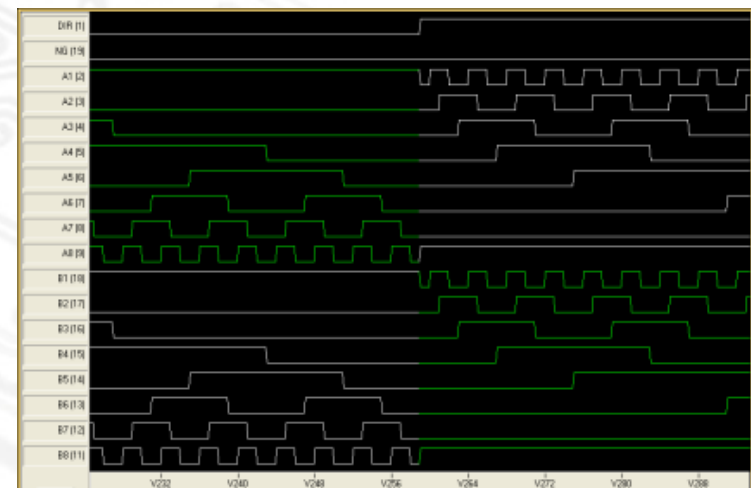
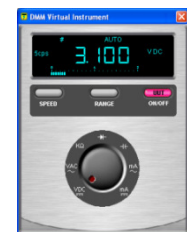
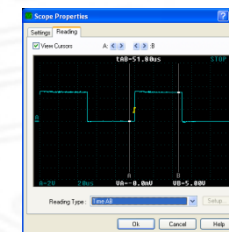
- Dynamic electrical test systems
- 48 to 640 Test Channels
- Test Rate Programmable up to 25MHz
- Configurable and Upgradeable
- Digital, Analog & Mixed signal test vectors
- LCR Bridge
- Self contained DUT power supplies
- Standard library with >50,000 programs
- Boundary Scan where compatible
- Compact Bench top system



Functional Test Vectors



- Uses test vectors (input and output patterns) in a test routine
- Test routines are created from the OEM datasheet
 - Extensive PinPoint library of over 50,000 proven test routines
- Provides an in-depth power-on test of device functionality
- Rapid test delivering confidence in IC functionality
- Can be digital, analog or mixed signal test vectors
- Will identify
 - Wrong die / function
 - Faulty device
 - Electrostatic damage (ESD)
 - Empty package
 - Wrong pin-out
 - Shorts and open



Rapid affordable program development



Test Program Development Services

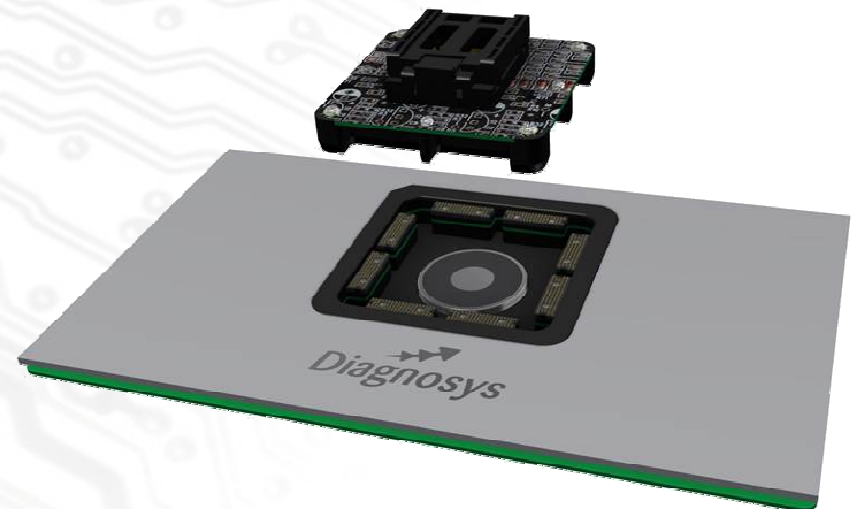
- Typical development time 1 to 2 weeks
- Express development available for program conversion
- Different levels of component programs available
- Remote validation of programs (Ultra VNC)
- Boundary Scan - BSDL conversion
- Curve Trace from Golden unit – (option)
- User Programmable option



Flexible DUT Interface

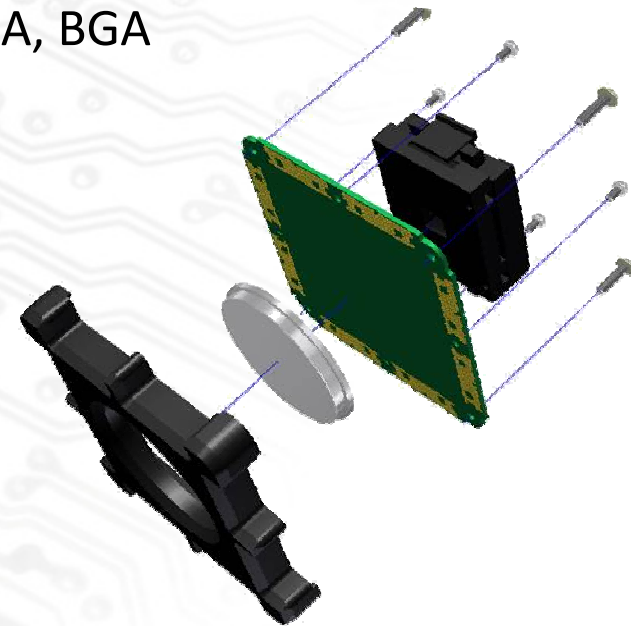
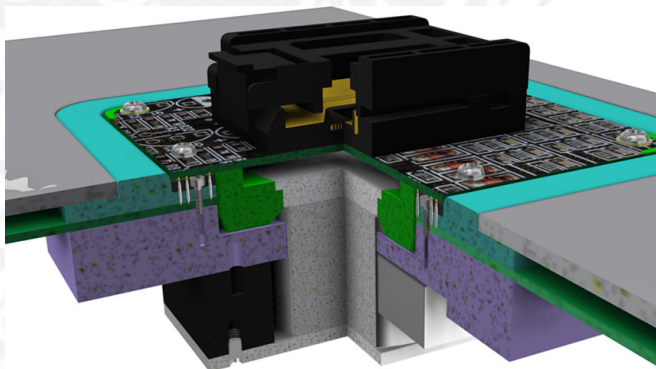
Universal Component Interface Adapter - UCIA

- 96 to 640 Pins
- Routes Digital and Analog signals
- Programmable Power Supplies
- Automatic Power Routing (APR)
- Quick-Connect interface for easy switching of DUT Carriers
- Simple operator mode



Flexible DUT Interface

- Features
 - Device Under Test (DUT) Global Unique Identifier (GUID).
 - Low Cost DUT Carrier (DUC) design
 - Customer Controlled Design
 - Flexible design architecture for virtually any Package style:
Includes:
DIL, SOIC, PLCC, SSOP, TSOP, PQFP, PGA, BGA
Transistor Module

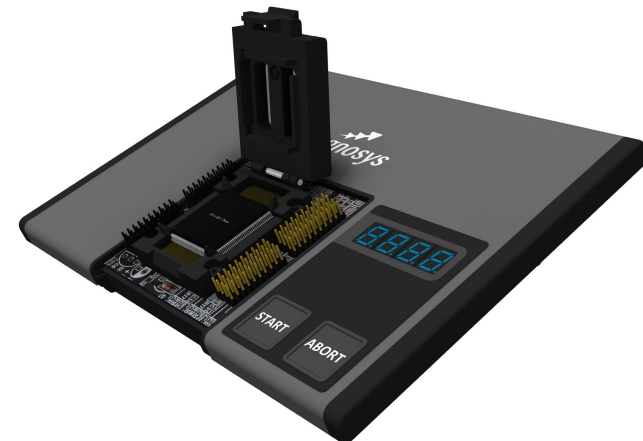


Dynamic Electrical Test - Summary



Dynamic electrical test will:

- Find faults other methods can't
- Provide confidence at In-Bound Inspection
- Validate stock holding
- Increase customer confidence
- Eliminate or reduce the need for external testing
- Mitigate the risk of counterfeit devices



QUESTIONS?



Tim Webb
Diagnosys Systems Inc.
5 Lan Dr.
Westford, MA 01886



A white sine wave graphic that transitions into a square wave pattern.
www.diagnosys.com