DiaTem®

JTAG Test Stations for Electronic Boards

Agenda

- ➢ Market and BS introduction

- ➢ JTAG DiaTem Test Stations

- ➢ The Client-Server Model

  - ➢ The DiaServer Station

- ➢ Stations High Volume Production

  - ➢ The stations TemPlayer-HVP

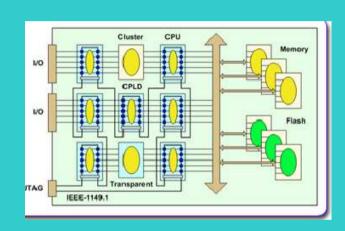- ➢ DiaTem Competitives Advantages

Temento systems

AFTER DFT TECHNOLOGY ADOPTION

TEST IS MOVING FROM HARDWARE BED OF NAILS TO JTAG ARCHITECTURES

JTAG test solution

JTAG ARCHITECTURES ENABLES

- – **Access through connector**
- – **Access to boards layers**
- – **Access to internal design nodes.**

- **PACKAGES ARE GETTING SMALLER WITH MORE PINS, DO NOT HAVE EXPOSED LEADS THAT CAN <u>BE PHYSICALLY PROBED!</u>**

BOTTLENECK

- **BOARDS ARE GETTING SMALLER WITH MORE LAYERS. TRACES ARE OFTEN BURIED INSIDE MULTI-LAYER PRINTED CIRCUIT BOARDS**

BOTTLENECK

- **BOARDS ARE GETTING HIGHER SPEED THAT REQUIRES IMPEDANCE CONTROLLED LINES WHICH CANNOT AFFORD TEST PROBES**
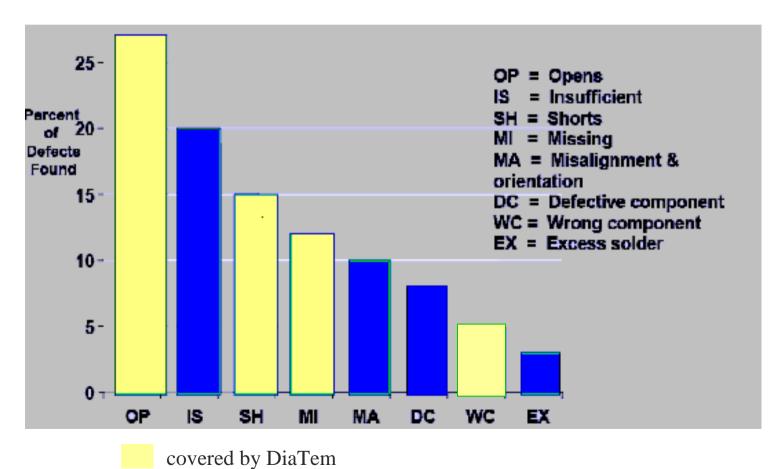
BOTTLENECK

**TRADITIONAL ICT / FLYING PROBES METHODS RUN OUT OF STEAM
NO TECHNIQUES ON THE MARKET AVAILABLE TO GET ACCESS TO INTERNAL NODES
AND TRACKS**

Temento systems

- To identify opens, shorts and missing components
- To enable accurate diagnostic on defective components

OP = Opens
IS = Insufficient
SH = Shorts
MI = Missing
MA = Misalignment & orientation
DC = Defective component
WC = Wrong component
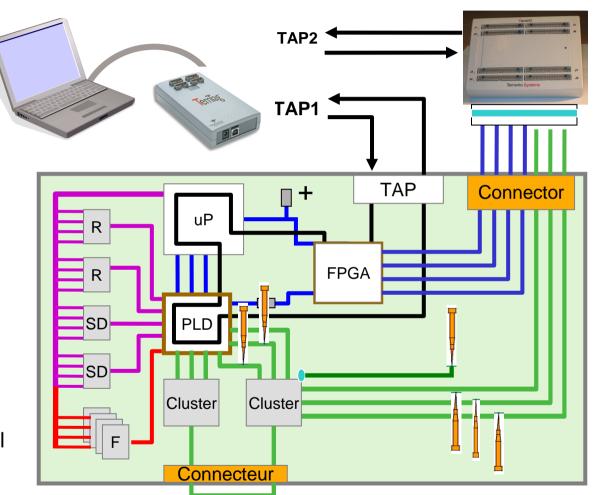EX = Excess solder

covered by DiaTem

JTAG tests

- ■ Infrastructure
- ■ Interconnexions
- ■ Memories , bus
- ■ Clusters

Programmation

- ■ CPLDs, FPGAs
- ■ Memories Flash
- ··· SPI,I2C …..

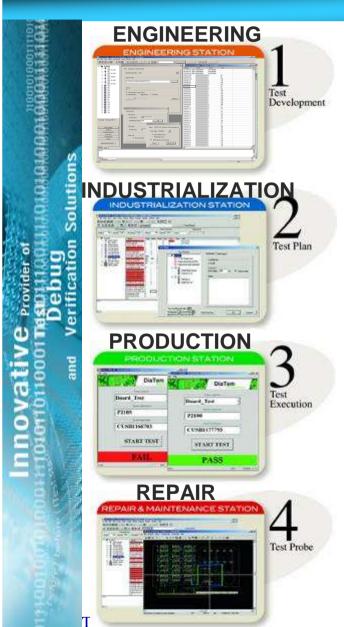## Mixed JTAG Tests

■ By adding Mechanical Probes.

TAP2

TAP1

TAP

Connector

R

R

SD

SD

F

uP

PLD

FPGA

Cluster

Cluster

Connecteur

Temento systems

ENGINEERING

ENGINEERING STATION

1 Test Development

INDUSTRIALIZATION

INDUSTRIALIZATION STATION

2 Test Plan

PRODUCTION

PRODUCTION STATION

DiaTem   DiaTem

Board_Test   Board_Test

P2105   P2100

CUSB166703   CUSB177793

START TEST   START TEST
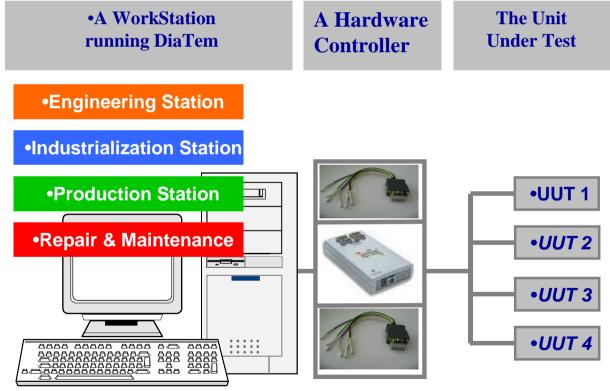
FAIL   PASS

3 Test Execution

REPAIR

REPAIR & MAINTENANCE STATION

4 Test Probe

Diatem Studio is composed of 4 stations to test electronics boards throughout the product life cycle.

•A WorkStation running DiaTem	A Hardware Controller	The Unit Under Test

•Engineering Station

•Industrialization Station

•Production Station

•Repair & Maintenance

•UUT 1

•UUT 2

•UUT 3

•UUT 4

Innovative Provider of Debug and Verification Solutions

Temento systems

TEMTAG / JTAG CONTROLLERS

TEMTAG USB

From 1 to 4 Ports
Tck: 1 to 25 MHz
Voltage: Swing from 1.2 to 5 Volts
1 USB port for Data and Power
Possibility to add a 5 V power supply
HE10 connector

TEMIO / IO CONTROLLERS / TEST EXTENSION

TEMIO 320

Provide up to 320 digital IO on 8 connectors
40 digital IO per connector
Programmable by bank of 8 IO
I/O logic levels 1.2V to 3.3V, programmable by Sw
Tck Hz : 1 to 25 MHz
JTAG interface voltage 3.3V
I/O current capability 12mA (3.3V) limited by buffers
Fully integrated with DiaTem Sw

TEMIO 60

Provide up to 60 digital IO on 4 connectors
16 digital IO per connector
Tck 1 to 10 MHz
I/O logic level 3.3V
JTAG interface voltage 3.3V
I/O current capability 140mA Max (3.3V) (no bufferization)
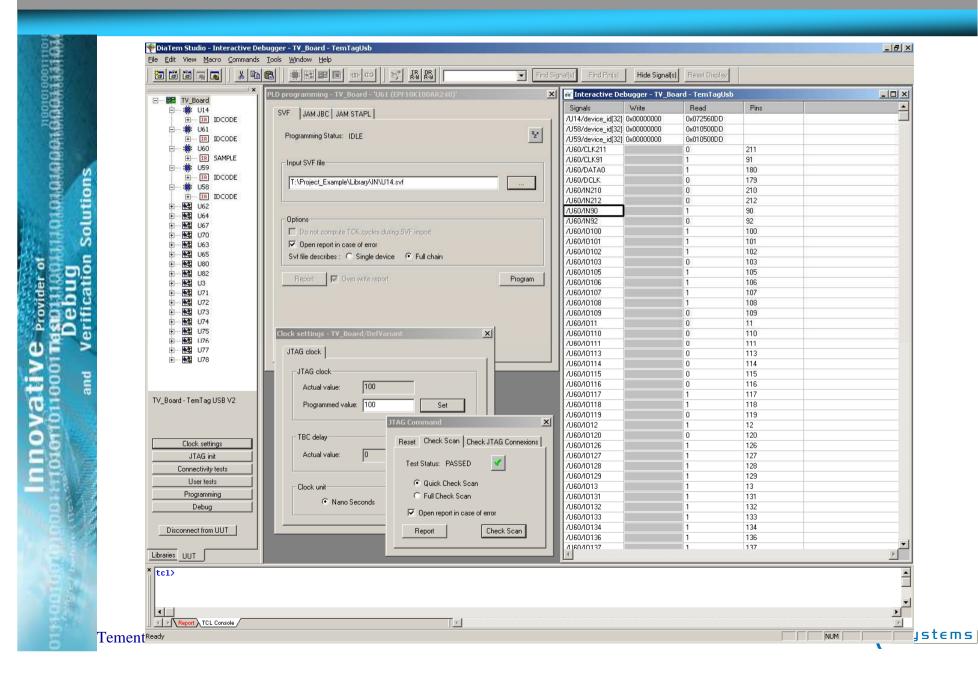Fully integrated with DiaTem Sw

DTS design flow

- **IMPORT DESIGN FILES**
  (COMPONENTS BSDL & NET LIST)

- **CREATE A BOARD PROJECT**

- **VERIFY & DEBUG THE JTAG CHAIN**

- **ANALYZE NETLIST & TEST COVERAGE**

- **IDENTIFY AND DEVELOP CLUSTERS**
- **(USING CLUSTERS LIBRARY)**

- **RUN AUTOMATIC TESTS WITH ATPG**

- **PROGRAM COMPONENTS**
- **(FPGA, FLASH MEMORIES)**

- **GET THE DEFECT REPORT**

- **DEBUG THE DESIGN RUNNING**
  (net viewer & interactive debugger)

- **EDIT A TEST PLAN FOR PRODUCTION**

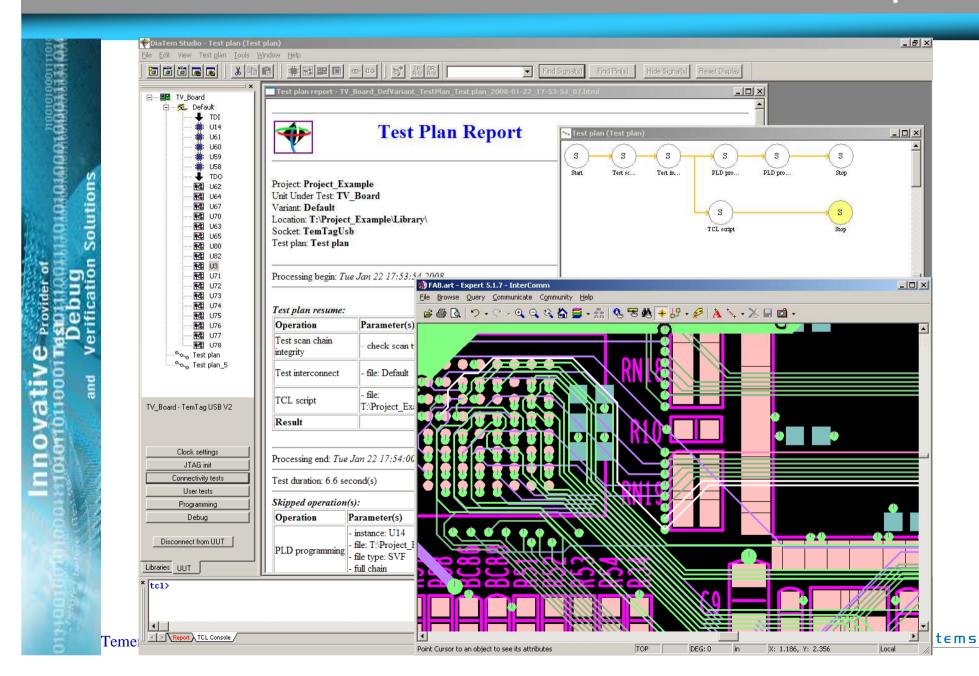- **EXPORT TEST FILES TO OTHER DIATEM STATIONS (DiaTem or Templayer)**
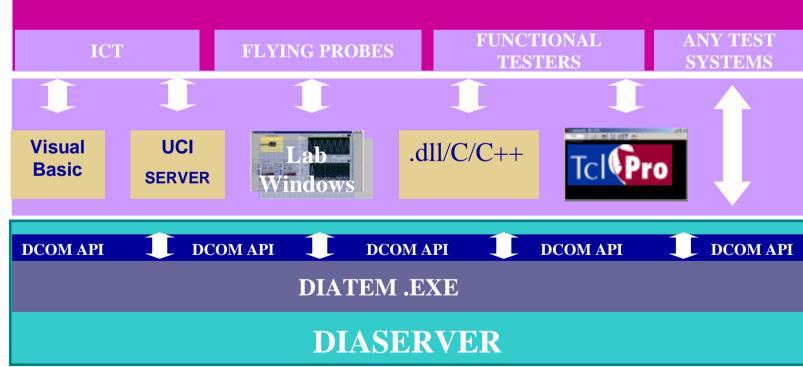
DiaServer Test Station

**A powerful DCOM architecture
to connect DiaTem.exe with
any test system**

- ▪ DiaServer is dedicated to work with any test environment (Test benches, ICT / Customs Equipments etc.)

- ▪Easy integration into any Testers environment using extended API or scripts

- ▪ A unique DCOM based client-server architecture (DiaServer), enables rapid third party integration

ICT	FLYING PROBES	FUNCTIONAL TESTERS	ANY TEST SYSTEMS

Visual Basic	UCI SERVER	Lab Windows	.dll/C/C++	Tcl Pro

DCOM API	DCOM API	DCOM API	DCOM API	DCOM API

DIATEM .EXE

DIASERVER

Temento systems

Screen shots on Teradyne Spectrum showing the calls to DiaTem sessions

(*) integration implemented with C++ interface (DLL)
(**) integration implemented with other test manufacturers Seica, Agilent ICT etc.

Tem*P*layer

A product line dedicated to the production market

TEM**P**LAYER - HVP STATION
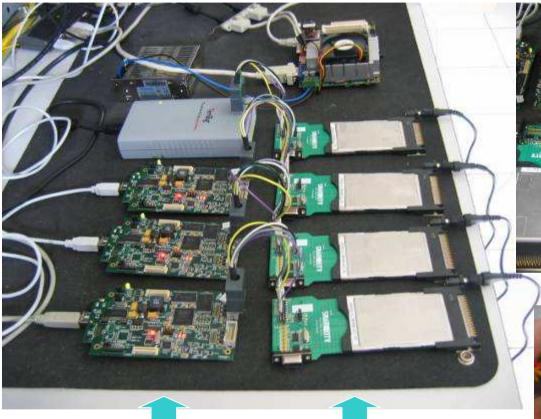
JTAG PRE-TEST SYSTEM CONFIGURATION

ONE PROCESSOR BOARD/ N INSTANCE.EXE / N TEMTAG 1 PORT

Test launching & result getting are independentfor each JTAG port

LAN
Ethernet RJ45

API
TEMPLAYER
DCOM

Common
File System

PROCESSOR BOARD

TemPLAYER

D C O M

TemPlayer

Mgr

DiaServer   SOCKET API

DiaServer   SOCKET API

DiaServer   SOCKET API

DiaServer   SOCKET API

Start
RunTestPlan
Stop

TemPlayer Mgr monitors each
DiaServer asynchronously and
independently

UUT1

UUT2

UUT3

UUT4

TEMPLAYER - HVP STATION

TEMTAG   UUTs
       PROCESSOR BOARD

DIATEM STATIONS			
TYPE	**TAP**	**STATIONS**	**OPTIONS**
CLASSIC	1 - 3	ENGINEERING	FLASH PROGRAMMING
		INDUSTRIALIZATION	SYSTEM MERGER
EVOLUTION	1 - 6	PRODUCTION	VIEWER
		REPAIR	DCOM
PERFORMANCE	UNLIMITED	DIASERVER	

TEMPLAYER STATIONS			
CLASSIC	1 - 3	HVP 111	
		HVP 212	
EVOLUTION	1 - 6	HVP 313	ALL INCLUDED
		HVP 414	
PERFORMANCE	UNLIMITED		

Choose and up grade your configuration as per your needs !

- DIATEM -
COMPETITIVES ADVANTAGES

DIATEM COMPETITIVES ADVANTAGES

- **CA1- CLIENT SERVER – DCOM ARCHITECTURE**
  - Enable to launch a command or to run a job from a PC (the client) over a LAN to a Server (link to a UUT)
  - Easy integration with any OLE automation tools and languages
    e.g / Lab View, Visual Basic, C, C++, Tcl, Test Stand etc..
  - Then, enable to equip any test systems with our BS engine called DiaServer
    (integration with any bed of nails, Emulation tools, ICT and Functional test equipments
    e.g / Spectrum Digital, Teradyne, Agilent, SEICA etc..

- **CA2 - NO PROPRIETARY LANGUAGE! OPEN SOURCE**
  - DiaTem uses the popular TCL open source Scripting language
  - Easy learning, ease of use, well adapted to test programs
  - Worldwide use by a community of more than 200 000 users
  - No dependency of the JTAG tool supplier and its associated language

- **CA3 - NO COMPILATION TOOL**
  - No compilation required for your test programs
  - Any individual test can be written and applied on Fly over the UUT
  - Reduction of the time to develop and to optimize test programs
  - More powerful diagnostic and fast debugging due to the "on the fly test" adaptation

- **CA4 – DIRECT PC - UUT COMMUNICATION**
  - No programs and data storage stored on the JTAG controller
  - Enable powerful interactive debugging and test programs adaptation
  - You master your test program (no black box)
  - Reduction of the time required to apply the tests

- **CA5 – HIGH TEST DATA COHERENCY AND ROBUSTNESS**
  - One data base per project and for all board test data
  - Very high data coherency (because the overall data base is permanently updated)
  - Better security (data located in one place)
  - Quick data access during the process flow (all data are permanently in the memory)
  - Quick data update for any modifications done by the user on data files
  - Better capacity to manage multiple versions of the same board "variant" and large systems

- **CA6 – "ALL IN ONE" PRODUCT LINE**
  - Full integrated product, Not an aggregate of several Modules.
  - All is included, only several options
  - Purchase the product adapted to the complexity of your board and not as the type of functions you need