

ChipTest

an IC Test Services Company





Agenda

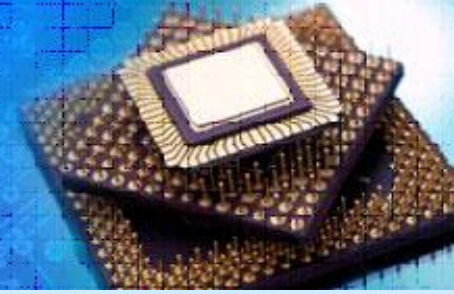
1. Introduction
2. Services
3. Capabilities
4. Team
5. Case Studies
6. Logistics
7. Contacts

Introduction

- Semiconductor IC Test Company founded in 2005
- Product Test Engineering & Application Support Services
- Hardware & Embedded Solutions Business Unit
- Focus on servicing global Semiconductor Companies
- Headquarters & Operations in Chennai, India.
- Part of Valingro Group of Companies
- Training Academy - AlphaOmega Institute for Semiconductors



Vision & Mission



Vision

Consistently excel in Semiconductor Test Solutions for global IC & ATE Customers

Mission

Exceed the fast emerging needs of our Customers by :

- *Accelerating time-to-market thru continuous Innovation & high Quality*
- *Providing unparalleled Service that is Versatile & Cost-effective*

Values

1. **Business Ethics** - defines us as a Company
2. **Professionalism** - defines us as Individuals
3. **Citizenship** - defines our Contribution to Society

Corporate Objectives

1. Profit - earnings that enable achieving our other 4 Objectives
2. Client Satisfaction
3. Competence
4. Employee Satisfaction
5. Growth

Test Services

1. Test Plan Derivation
2. Hardware load board and DUT board design & fabrication
3. Test program generation
4. Test program debugging & correlation
5. Product characterization
6. Test time optimization
7. Wafer Sort Verification & Testing
8. Final Device Testing using developed set-up

Hardware Products

- ATE & Application Board Hardware Schematics
- Board Layout Design - Cadence & Mentor Tools
- Board Fabrication, BOM Procurement & Assembly
- Mechanical Stiffeners & Docking Plates for Handlers
- Handler Spare Parts & Consumables Design & Fabrication
- Handler and Tape/Reel Conversion Kits Design & Fabrication
- ATE Test Sockets Design & Development upto 5 mil pitch
- Low Cost Manipulators Design & Development

Embedded Solutions

- Embedded Hardware Design for Semiconductor Equipments
- Embedded Software Development for Control & Interface
- Semiconductor Equipment & Process Control Applications
- Bench Instrumentation & Labview Automation
- Automated Data Collection & Report Generation
- PLCC Based System Automation to PC Based System
- Auto Loading / Unloading Feature for Manual Equipment

Allied Services

- Onsite Test Engineering Support
- Associated partners for the following :
 - **Proto type Samples Packaging**
 - **Surface Mount Package – Production Assembly**
 - **Lead Scan / Tape & Reel Finish Process**
 - **New Product / Package Qualification**
 - **Long Term Reliability tests - HTOL, HAST, TMCL, Autoclave, etc.**
 - **External & Internal Failure Analysis – X-ray & Decap**
 - **Other Failure Analysis like ESD, Latch-up & CSAM**

Reliability Services

| SI # | Reliability Test Name | | Jedec Ref# | Test Conditions | Test duration |
|-----------------------|--------------------------------------|---------------------|----------------|-----------------|---------------|
| 1 | Initial CSAM inspection | | J-STD-020C | - | - |
| | Pre-conditioning test | Temperature Cycling | JESD 22 A113-E | -40°C to +60°C | 5 Cycles |
| | | Stabilization Bake | | 125°C | 24 Hrs |
| | | Moisture Soak | | 85°C / 85% Rh | 168 Hrs |
| | | Solder Reflow | | 260° C | 3 Cycles |
| Final CSAM inspection | | J-STD-020C | - | - | |
| 2 | High Temperature Storage test | | JESD 22 A103-C | 150°C | 1000 Hours |
| 3 | High Temperature Operating Life Test | | JESD 22 A108-C | 125°C, Max Vdd | 1000 Hours |
| 4 | HAST Test | | JESD 22 A110-C | 130°C, 85% RH | 96 Hours |
| 5 | Pressure Pot Test | | JESD 22 A102-C | 121°C,100%Rh | 168 Hours |
| 6 | Temperature Cycling test | | JESD 22 A104-C | -60°C to +150°C | 1000 Cycles |
| 7 | ESD Test | | JESD 22 A114-D | - | - |
| 8 | Latch Up Test | | JESD 22 78A | - | - |

FA Services

| SI # | Test Description | Manufacturer |
|------|--|------------------|
| 1 | Optical Inspection at 1000X | |
| 2 | X-ray Inspection for internal assembly abnormalities | Phoenix, Germany |
| 3 | Scanning Acoustic Microscopic Inspection (Through Scan, C-scan, B-scan & A-scan) | Sonix, USA |
| 4 | Chemical Decapping | Nisene, USA |
| 5 | Cross Sectional analysis | Buehler, USA |
| 6 | Die Shear Test | HMP, USA |
| 7 | Ball Shear Test | Royce, USA |
| 8 | Wire Pull Test | HMP, USA |

Capabilities - Product

- High Speed Digital Logic & SoC Devices
- Clock Drivers, Buffers, PLL & VCO
- Power Management Devices
- Mixed Signal ASIC Products
- Integrated Passive Devices (R, RC & RCD Networks)
- Industrial Analog Devices
- Audio, Video & Telecom ICs



Capabilities - Platform

Existing

- Verigy 93k Pin Scale Digital Test System
- Advantest T6573 SoC Test System
- Eagle ETS 364 Mixed Signal Test System
- Credence ASL 1K Mixed Signal Test System

Proposed

- High End Mixed Signal Test System
- RF Test System

Capabilities – Eagle ETS 364

| | |
|-------------------|--------------------------------------|
| Max I/O channels | 64 |
| Max Vector Rate | 133 MVPS |
| Max Vector Depth | 8 M |
| Memory Capture | 1 M |
| Fail Memory Depth | 8 K |
| Serial Mode | 8 M, 16 M, 32 M |
| Driver Level | -1.0 to 7.0 V; 16 Bit |
| Current Range | 32 mA |
| Driver Slew Rate | 2 V / nS |
| Min. Pulse Width | 4 nS |
| Formats Supported | NR, RO, RZ, CS, ZS, CPS, CPE, KN, KT |
| Receive Bandwidth | > 150 MHz |
| Time Sets | 4 Unidirectional Per Pin |
| Timing Resolution | < 100 pS |
| Skew | < 250 pS |

Capabilities – Eagle ETS 364

| Parameter | Resolution | Range | Channels |
|-----------------|------------|---|----------|
| Voltage Force | 16 Bit | $\pm 10, 30 \text{ V}$ | 17 |
| | | $\pm 100 \text{ V}$ | 1 |
| | 18 Bit | $\pm 10, 30, 100 \text{ V}$ | 4 |
| Current Force | 16 Bit | $\pm 10, 100 \text{ uA}; \pm 1, 10, 100 \text{ mA}$ | 17 |
| | | $\pm 1, 2, 20, 200 \text{ uA}; \pm 2, 20, 200 \text{ mA}; \pm 1, 2, 40 \text{ A}$ | 2 |
| | 18 Bit | $\pm 1, 2, 10, 20, 100, 200 \text{ uA}; \pm 1, 2, 10, 20, 100, 200, 500 \text{ mA}; \pm 1, 2 \text{ A}$ | 4 |
| Voltage Measure | 16 Bit | $\pm 10, 30 \text{ V}$ | 21 |
| | | $\pm 100 \text{ V}$ | 5 |
| | 18 Bit | $\pm 0.5, 1, 2, 5, 10, 20, 30, 50, 100, 200 \text{ V}$ | 4 |
| Current Measure | 16 Bit | $\pm 1, 2, 20, 200 \text{ uA}; \pm 2, 20, 200 \text{ mA}; \pm 1, 2 \text{ A}$ | 5 |
| | | $\pm 500 \text{ mA}$ | 4 |
| | | $\pm 40 \text{ A}$ | 2 |
| | | $\pm 10, 100 \text{ uA}; \pm 1, 10, 100 \text{ mA}; \pm 1, 2 \text{ A}$ | 21 |



Capabilities – Eagle ETS 364

- **High Voltage & Current Handling: $\pm 100V$, 40 A**
- **Per Pin Digital Architecture with On-Board DSP**
- **Time Measurement Unit with 5 pS Resolution**
- **High Precision Voltage Digitizer: 4 μV Resolution, 4 MHz BW**
- **High Speed Digitizer: 4 GSPS, 1 GHz BW**
- **Programmable Low Jitter Clock Source: 10 MHz to 1 GHz**
- **Programmable V/I Waveform Generator in each Analog Channel**
- **Robust math & data analysis Library**
- **True Parallel Multi-site Testing possible**

Capabilities - Verigy (Agilent)

- Trained Engineering Manpower in 93K SoC systems
- Offline System with HpSmarTest for program development
- Vector Conversion Tools for wgl, stil & vcd patterns
- ATE with 128 Channel PS400 & MSDPS Resources
- Onsite Consultation & Engineering Assistance
- Closely Associated Partner for High End ATE Needs
- Mixed Signal & High Speed Digital Capability
- ATE with P1000, NP2500, AV8 & TIA Resources

Capabilities – Road Map

| Product / Year | Existing | 2012 | 2013 |
|-----------------------|----------|------|------|
| High-End RF | | | * |
| High-End Mixed Signal | | * | |
| High-End Digital | * | | |
| Power | * | | |
| Low-End Mixed Signal | * | | |

Low-end Mixed Signal & Power Products Capabilities since 1996

Capabilities - Hardware

- PCB Design – Cadence Allegro, Mentor Graphics, Orcad Tools
- PCB Design for High Speed Digital & Precision Analog needs
- PCB Fab – Impedance Controlled, 6 mm Thickness, Hard Gold
- PCB Fab – 0.3 mil Airgap, Buried Vias, Sequential Lamination
- Mechanical Product & Conceptual Design
- Mechanical 2D CAD Drafting / Drawings, 3D Modeling
- FEA Analysis & CAE Simulations

Capabilities - Embedded

- Microcontroller Architecture & their Development Tools
- 8/16/32 Bit Microcontrollers – 8051, PIC, ARM
- PC Based Tools, Assembler, C, VB, VC++
- Embedded Compilers – Keil, GNU, CodeWarrior, CCS C
- Embedded Software Stacks Development & Management
- Embedded RTOS, Windows 7/XP/2000/Vista & Linux
- Communication Protocols - I2C, SPI, RS232/485, USB
- Communication Protocols - GSM, GPS, TCP/IP, ZIGBEE

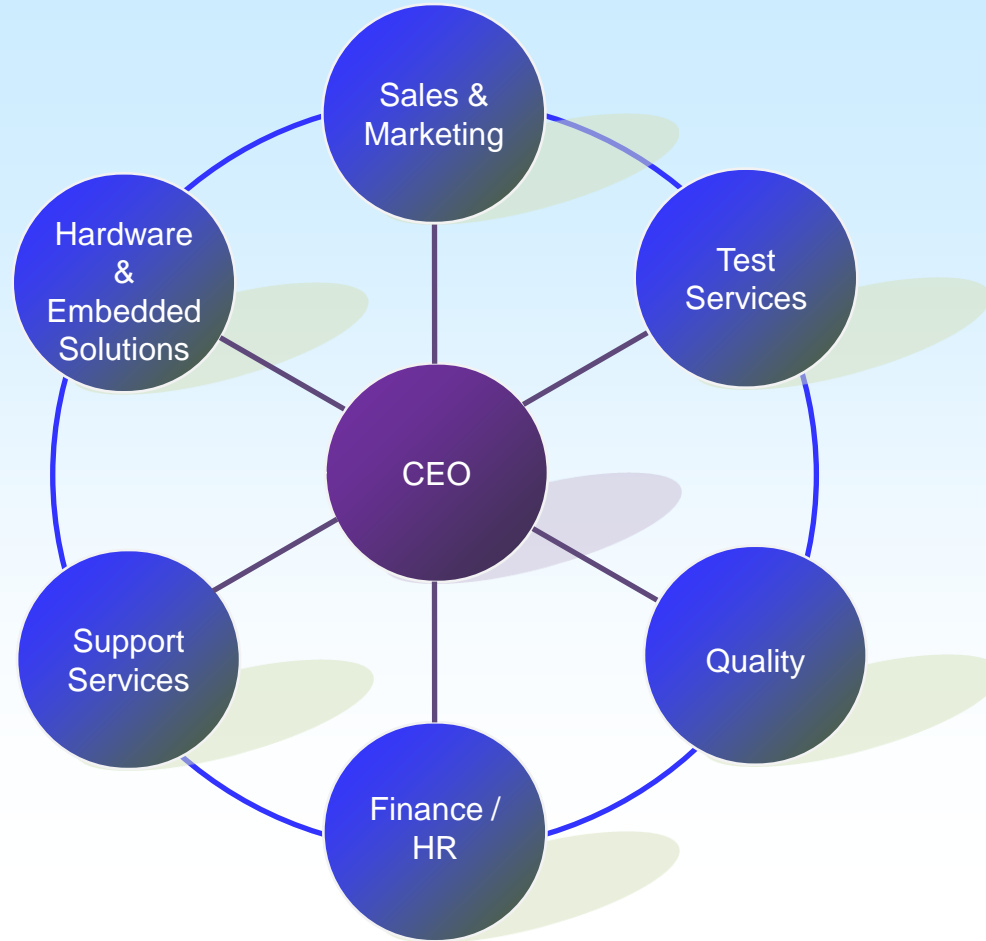
Capabilities – Reliability

| SI # | Equipment | Manufacturer |
|------|---------------------------|--------------------------|
| 1 | Burn-in | Blue-M, USA |
| 2 | Temperature & Humidity | Blue-M, USA |
| 3 | Temperature Cycler | Blue-M, USA |
| 4 | HAST | Hirayama, Japan |
| 5 | Dry Heat (Class 100) Oven | Labline, USA |
| 6 | Autoclave | Hirayama, Japan |
| 7 | Steam Ager | Mountain Gate, Singapore |
| 8 | Solder Pot | HMP, USA |
| 9 | Lead Integrity Tester | HMP, USA |
| 10 | Reflow Oven | Heller, USA |

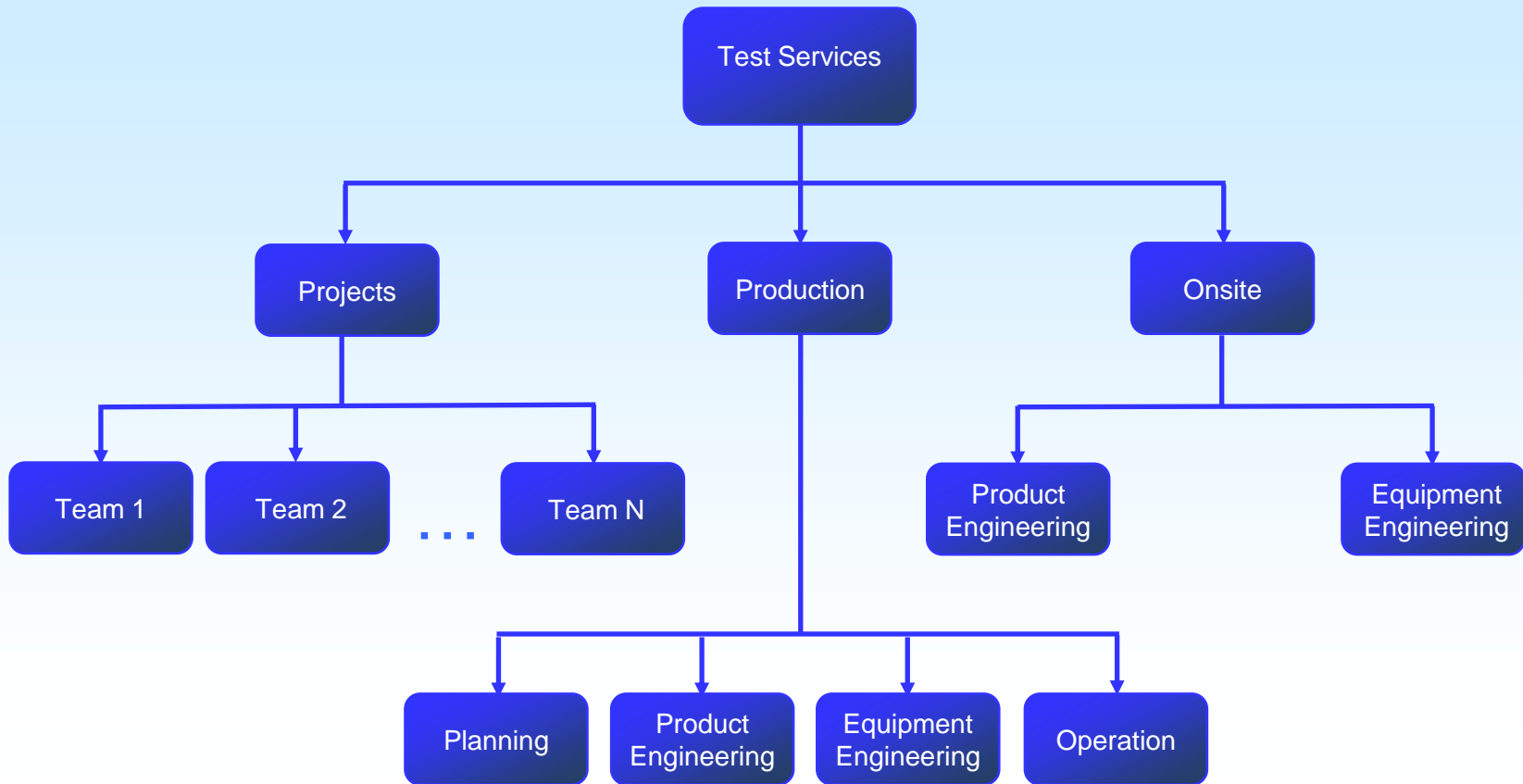
Professional Team

- Promoters with proven track record
- Well Experienced Leadership
- Talented Test Engineers
- Qualified & Skilled Technicians
- Proficiency in Communicating in English
- Low Direct Labor Cost
- Ready availability of Engineering Resources for expansion

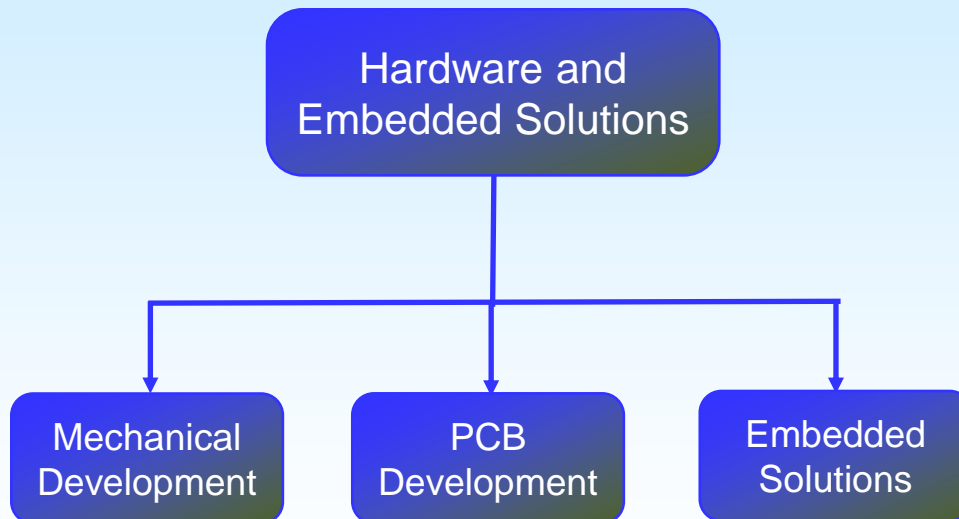
Organization Structure



Test Services BU



Hardware & Embedded Solutions BU



Quality – Road Map

| Systems | Existing | 2012 |
|-------------------------|----------|------|
| ISO Compliant Processes | * | |
| ISO 9001 Certification | | * |
| ISO 17025 Certification | | * |

Logistics

- Green Channel Status for Imports & Exports
- Zero Duty
- No Open Inspection
- Clearance within 6 Working Hrs
- Easy Equipment Consignment In & Out of our Facility
- Daily Direct Flights to US, Europe & Asia Pacific

ChipTest - USP

- **Turnkey Test Engineering & Production Support**
- **Cost-effective Test Solutions – Offshore & Onsite**
- **Talented Hardware & Programming Skills**
- **Excellent round-the-clock Customer Service**
- **Proven track record with Focus on long term Values**
- **Cutting Edge Hardware Engineering & Embedded Solutions**
- **Continuous and Standardized Training Methodologies**
- **Closely Associated partner for Packaging Support**



Customers

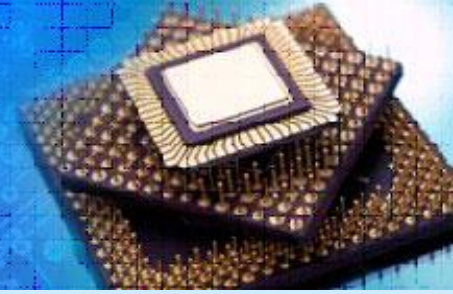
- **Integrated Device Manufacturers**
- **Fabless Product Design Companies**
- **Start-up, ATE & Subcontracting Companies**
- **Equipment Manufacturing Companies**

Case Studies

(more case studies available on our Website)

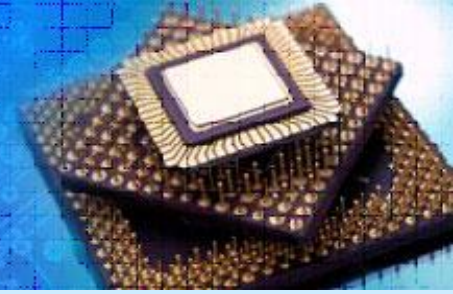
- Audio / Video Decoders
- Notebook DDR Power Controllers
- White LED Charge Pump Drivers
- Li/ Ion Battery Chargers
- Hearing Aid DSP Controller
- MEMS Clock & EMI Clock Synthesizers
- Digital Multiphase Controllers
- Power Interface Switch Products
- Dynamic Beam Steering Controller
- RF LDO, FET, Laser Diode Drivers and much more

Key Technical Highlights



- 400 MHz Base-band Frequency Measurement
- 12 Bit DAC – INL & DNL Measurements
- Serial I2C Bus Test for Various Registers Entry
- 10 pF Capacitance Measurement in guarded network loops
- Clock Generator Product Verification
- Scan Chains with 9000 FF and 3 Meg Vector Patterns
- Multi Site Solution & Test Time Reduction by 50%

Verigy Highlights

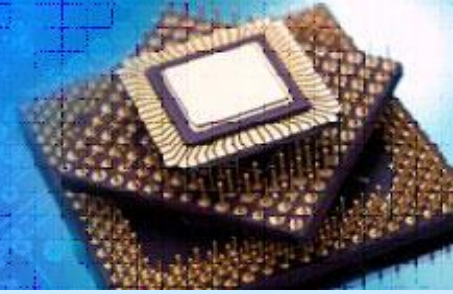


- 12 Meg Scan Vectors Conversion & Debugging
- PCIE Interface Testing @ 2 GHz using NP 2500
- 10 Bit Video ADC Testing using AV8 Module
- 16 Bit Sigma Delta Audio ADC Testing using AV8 Module
- Both Single & Differential Ended ADC Tests
- Multiple Clocks using Multi-port Technique
- Multi Site Production & Characterization Solutions

Verigy Highlights (Contd...)

- HP83K/93K, Adv T6575, D10 & Catalyst ATE Expertise
- Scan/ATPG Tools Usage, Memory Repair, Bitmap generation
- Network Processor, 3D Video Graphic Processor, Port ASICs
- 10 Gig Ethernet Switch, Queuing, Memory, PCI Bridge Products
- FPGA Device Testing – 20 Sites, 1000+ Probes
- Vector Conversion, JTAG Timing, LBIST, Loopback Test, etc

Verigy Highlights (Contd...)



- Strong Scripting Skills - PERL, C & C++
- Scripts to analyze tester logs for yield enhancement
- ATPG Test Data Compression for reduced ATE Patterns
- Functional Design Verification for GSR & HFR ASICs
- Knowledge of VERA & Specman tools
- Block & Chip Level Test Cases Implementation
- DFT Structures & Implementation to reduce DPPM

Contacts

US Office

ChipTest America Inc

848 Stewart Drive

Ste # 101, Sunnyvale

CA 94085, USA

Ph : + 1 (408) 898 - 4629

Head Quarter & Operations

ChipTest Engineering Ltd

2C CMDA Industrial Estate

MM Nagar

Chennai, India 603 209

Ph : + 91 44 4740 5469

eMail : info@chiptest.in ; Website : www.chiptest.in



www.chiptest.in

Please visit our Website for

- Resource, Capability Details
- Projects Case Study Details
- ChipTest's News and Events
- Indian Electronic Hardware Industry News
- Global Semiconductor Industry News

AlphaOmega Institute for Semiconductors

- Unique one for Semiconductor Training in India
- 6 months PG Diploma Course in IC Assembly & Test
- Incumbents are the Engineering graduates
- Practical Online Training with State of the Art Equipments
- Dissertation in Tester Software & Hardware in ATE
- Trained Professionals readily available for expansion

Valingro Group Profile

- Focused on Innovation & Growth
- Building Specialized Businesses
 - ❖ Semiconductor Assembly & Test
 - ❖ IC Test Engineering
 - ❖ E P C & Infra
 - ❖ Life Science Informatics
 - ❖ Enterprise IT
 - ❖ Trading, Distribution & Agriculture
 - ❖ Leadership Development
- Over 1100 people in above Companies



About Chennai, Tamilnadu

- Tamilnadu # 1 for Technical Education in India
- World Class Engineering Universities: IIT & MIT
- Abundant Low Cost Skilled Manpower
- Global Connectivity with modernized Airport and Seaport
- Investor Friendly Government Support for Hi-Tech Industries
- Quality High Speed Internet Connectivity
- Excellence in Software, IT Skills & Services
- Strong Manufacturing & Engineering Industry Base



About Tamilnadu - Continued

