

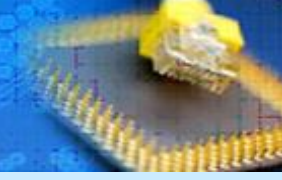
The logo for ChipTest, featuring the word "ChipTest" in a blue, italicized, sans-serif font. The "i" in "Chip" has a dot. The text is positioned over a circular background with a light blue grid pattern.

ChipTest

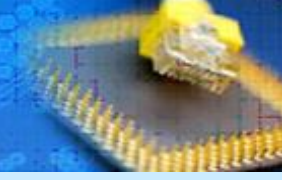
ChipTest Engineering Limited
an IC Test Company

Corporate Presentation





1. Introduction
2. Business Units
3. Customers
4. Quality
5. Team
6. Logistics
7. USP



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



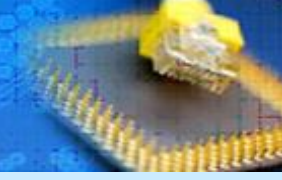
Vision

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*

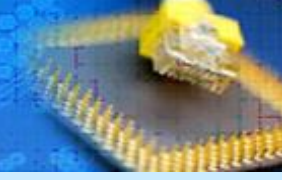


Values

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



1. Test Services

- a. Products
- b. Tester Platforms
- c. Capabilities
- d. Key Highlights

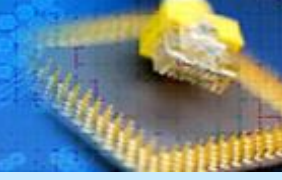
2. Hardware Products

3. Embedded Solutions

4. Allied Services

(Details on each BU follows)

1. 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

1. Test Services Road Map

Product / Year	Existing	2017	2018
High-End RF			*
High-End Mixed Signal		*	
High-End Digital	*		
Power	*		
Low-End Mixed Signal	*		

Low-end Mixed Signal & Power Products Capabilities since 1996

1. Test Services Products

- 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



Existing

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

Proposed

- High End Mixed Signal Test System
- RF Test System

1. Test Services

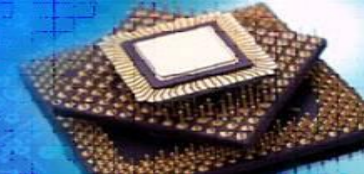
Teradyne ETS 364



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

1. Test Services

Teradyne ETS 364 (Contd...)



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

1. Test Services

ETS 364 Capabilities



- High Voltage & Current Handling: $\pm 100\text{V}$, 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

1. Test Services

Advantest Capabilities



- Trained Engineering Manpower in 93K & T2K 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

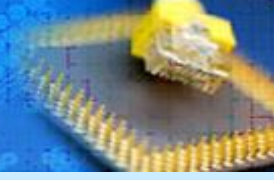
1. Test Services – Case Studies

(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

1. Test Services

Key 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%

1. Test Services

Advantest 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

1. Test Services

Advantest Highlights (Contd...)

- 83K/93K, T2000, T6575, D10 & Catalyst ATE Expertise
- Scan/ATPG Tools Usage, Memory Repair, Bitmap generation
- Network, DSP, CPU, GPU and 3D Video Graphic Processors
- High Speed Mobile Snapdragon Process Applications
- 10 Gig Ethernet Switch, Queuing, Memory, PCI Bridge Products
- TIC, I2C, I2S, SPI, SPMI, Base band Digital & Codec Interfaces
- Vector Conversion, JTAG Timing, LBIST, Loopback Test, etc
- AC delay measurement between MDMA/MMXH in T2K

1. Test Services

Advantest Highlights (Contd...)

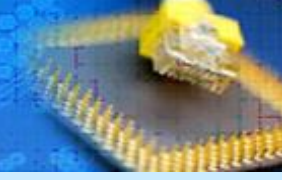
- T2K-IPS resource for Vector, VI & Time measurements
- Fuse blow tests - different trim codes for different sites
- Strong Scripting Skills - PERL, C & C++
- Scripts to analyze tester logs for yield enhancement
- ATPG Test Data Compression for reduced ATE Patterns
- Functional Design Verification for GSR & HFR ASICs
- 20-28 nm Test Coverage Analysis
- Block & Chip Level Test Cases Implementation
- DFT Structures & Implementation to reduce DPPM



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

2. Hardware Products Capabilities

- 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

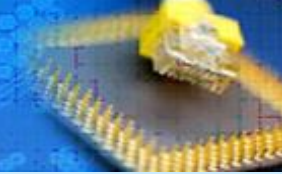


- Hot & Ambient Testing with Option for Cold
- Various Packages with Conversion kit in each Family
- User Friendly Touch Screen Interface
- Real Time Product & Error Monitoring Display
- Bench top & Production Test Applications
- Hard Dock & Soft Dock Mechanisms
- Proven Poke Yoke Features
- Economical & Lower Foot print
- Accelerated Return of Investment

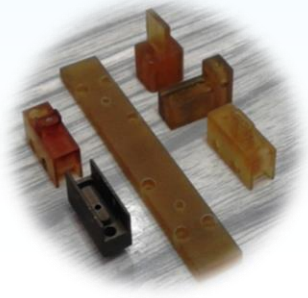
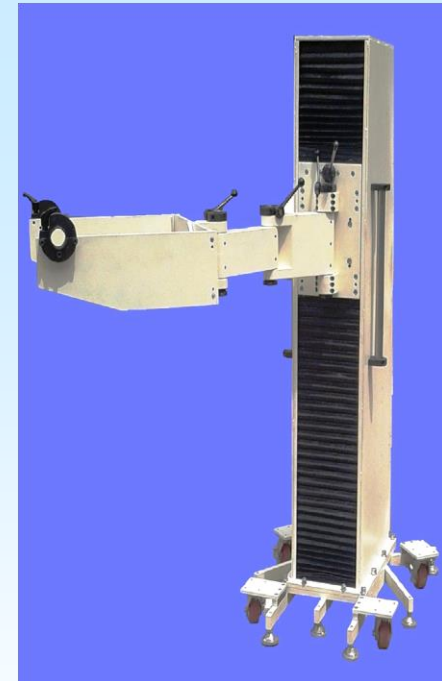


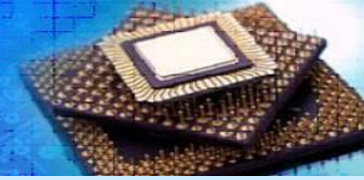
2. Hardware Products

Universal Test Head Manipulator



- Modular Low Cost Reliable design
- Optimum Footprint Area—1410 x 1220 mm (56 x 48 inch)
- Gravity Feed & Pick/Place Handler Interface
- Overhead Wafer Sort Prober Interface
- Easy positioning with Linear movements





- Pick & Place Automation and Robotic Instrumentation
- 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

3. Embedded Solutions Capabilities



- 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

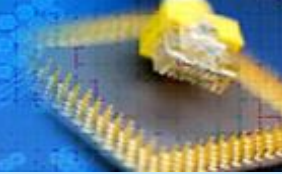
- Onsite Test Engineering Support
- Associated partners for the following :
 - Proto type Samples Packaging
 - Surface Mount Package – Production Assembly
 - Lead Scan / Tape & Reel Finish Process
 - New Product / Package Qualification
 - Long Term Reliability tests - HTOL, HAST, TMCL, Autoclave, etc.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



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	-	-

4. Allied Services

FA Facilities



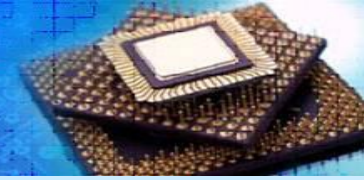
SI #	Test Description	Manufacturer
1	Optical Inspection at 1000X	
2	X-ray Inspection for internal assembly abnormalities	Phoenix, Germany
3	Scanning Acoustic Microscopic Inspection (Through Scan, C-scan, B-scan & A-scan)	Sonix, USA
4	Chemical Decapping	Nisene, USA
5	Cross Sectional analysis	Buehler,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

4. Allied Services

Reliability Facilities

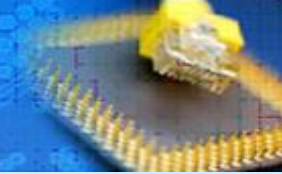


SI #	Equipment	Manufacturer
1	Burn-in	Blue-M, USA
2	Temperature & Humidity	Blue-M, USA
3	Temperature Cycler	Blue-M, USA
4	HAST	Hirayama, Japan
5	Dry Heat (Class 100) Oven	Labline, USA
6	Autoclave	Hirayama, Japan
7	Steam Ager	Mountain Gate, Singapore
8	Solder Pot	HMP, USA
9	Lead Integrity Tester	HMP,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



“To consistently excel in Semiconductor Test Software and Hardware Solutions and exceed the fast emerging needs of our Customers through continuous innovation, high quality, accelerated, versatile & cost-effective services”

- Quality Controlled Process flow approach
- Archival of Process records and Quality data
- Closely monitored Corrective Action Systems
- Well defined Process Flow documents & Check-lists
- Setting & Monitoring of Key Performance Indices
- Project Scheduling & Milestone Tracking
- Systems for Continuous Process Improvement
- Customer specific Qualification Process



TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD TÜV SÜD

ZERTIFIKAT ♦ CERTIFICATE ♦ 認証証書 ♦ СЕРТИФИКАТ ♦ CERTIFICADO ♦ CERTIFICAT



South Asia

CERTIFICATE

The Certification Body
of TÜV SÜD South Asia Private Limited
certifies that



ChipTest Engineering Limited
2C, Dr. Subramania siva salai, NH-7,
CMDA Industrial Estate, Maraimalai nagar
Kanchipuram Dist – 603 209, Tamilnadu, INDIA

has implemented a Quality Management System
in accordance with **ISO 9001:2008**
For Scope of

Provision of semiconductor test services and hardware products

The certificate is valid From **2016-08-12** until **2018-09-14**
Subject to successful completion of annual periodic audits
The present status of this Certificate can be obtained on www.tuv.sud.in
Further clarifications regarding the scope of this certificate may be obtained by consulting the certification body

Certificate Registration No. **99 100 14680**
Date of Initial certification : **2013-08-12**

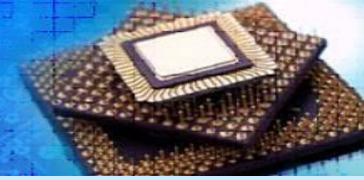


Certification Body
of TÜV SÜD South Asia Private Limited, Mumbai
Member of TÜV SÜD Group




TÜV SÜD South Asia Pvt. Ltd. • TÜV SÜD House • Saki Naka • Andheri (East) • Mumbai – 400072 • Maharashtra • India TUV®

ISO 17025 Certification by 2018



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



- Global Semiconductor Customer Base
- Markets Served – America, Asia Pacific & India
- Markets Explored – Europe, Japan
- Applications – Mobile, Computing, Automotive & Consumer
- Customer Specific Dedicated Teams – Offshore & Onsite
- Inbuilt Long Term Partnership Model

- 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

For most people, the idea of Social Service is donating money to a social organization - perhaps an old-age home or an orphanage or similar. This however is the easy part. The difficult part is volunteering one's time to improve society.



When can we make a contribution to society

- **During Phase 1** of our lifetime, perhaps up to the age of 35, we are so focused on building our careers, starting our families & establishing a name for ourselves
- **During Phase 2**, perhaps from age of 35 thru 65, we are the most active in our work, working as a team, being able to significantly contribute to Economic Development
- **During Phase 3** perhaps from age 65 onwards, we are most able to contribute our time on an increased basis to social causes

S-E-C at ChipTest is all about how we can contribute socially during Phase 2 itself while also handling Economic Development.

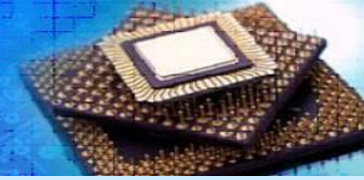
Towards this, there are 3 areas that each of us can assist by making these a part of our day to day approach:

1. Following discipline in any and everything we do
2. Providing a helping hand to people around us in any way we possibly can
3. Showing the right path forward to people around us

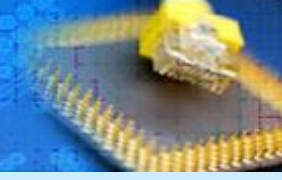
S-E-C in ChipTest is primarily done by One-to-One Mentoring as each person encourages & motivates the other, towards a more purposeful & effective lifestyle.



- 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



- Green Channel Status for Imports & Exports
- Zero Duty
- No Open Inspection
- Clearance within 6 Working Hrs
- Drop ship Facility to end Customers
- Proximity to Sea & Air Ports with efficient Cargo Handling



- Easy Equipment Consignment In & Out of our Facility
- Daily Flights to US, Europe & Asia Pacific Destinations

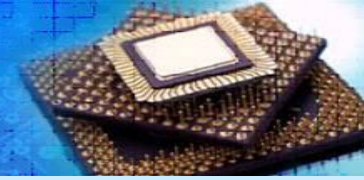
- Turnkey Test Engineering & Production Support
- Cost-effective Test Solutions – Offshore & Onsite
- Talented Hardware & Programming Skills
- Excellent round-the-clock Customer Service
- Proven track record with Focus on long term Values
- Cutting Edge Hardware Engineering & Embedded Solutions
- Continuous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



Contact

ChipTest Engineering Limited
No. 18, Zakaria Colony, 1st Street
Choolaimedu, Chennai
India – 600 094
Ph : +91 44 4502 4300

eMail : info@chiptest.in ; Website : 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



Annexure

- 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



