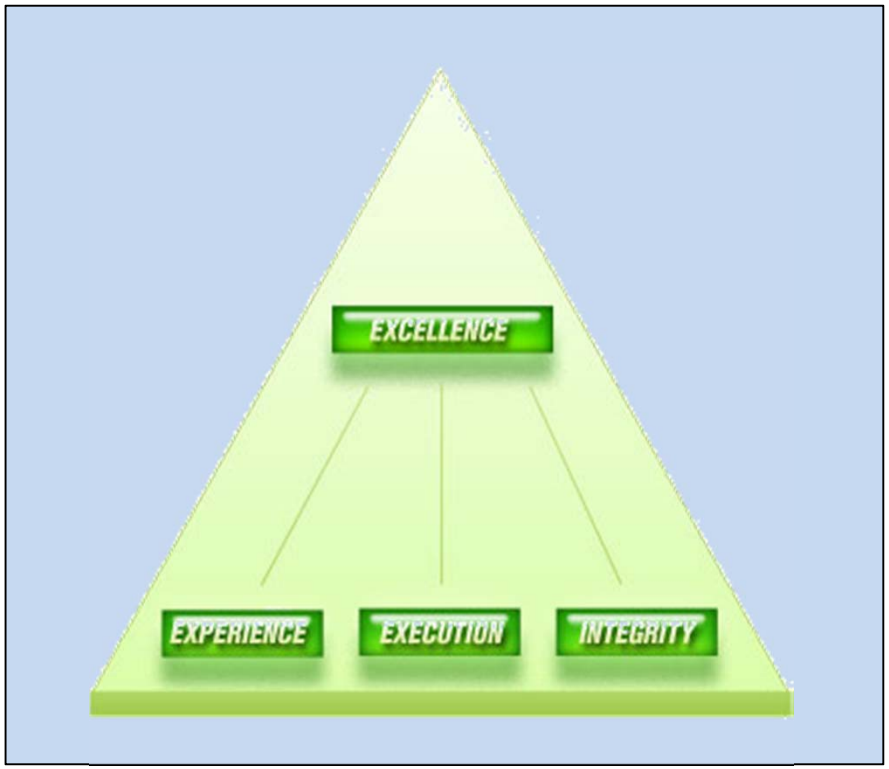
Excellence



through

Experience, Execution *and* ***Integrity***

Company Background

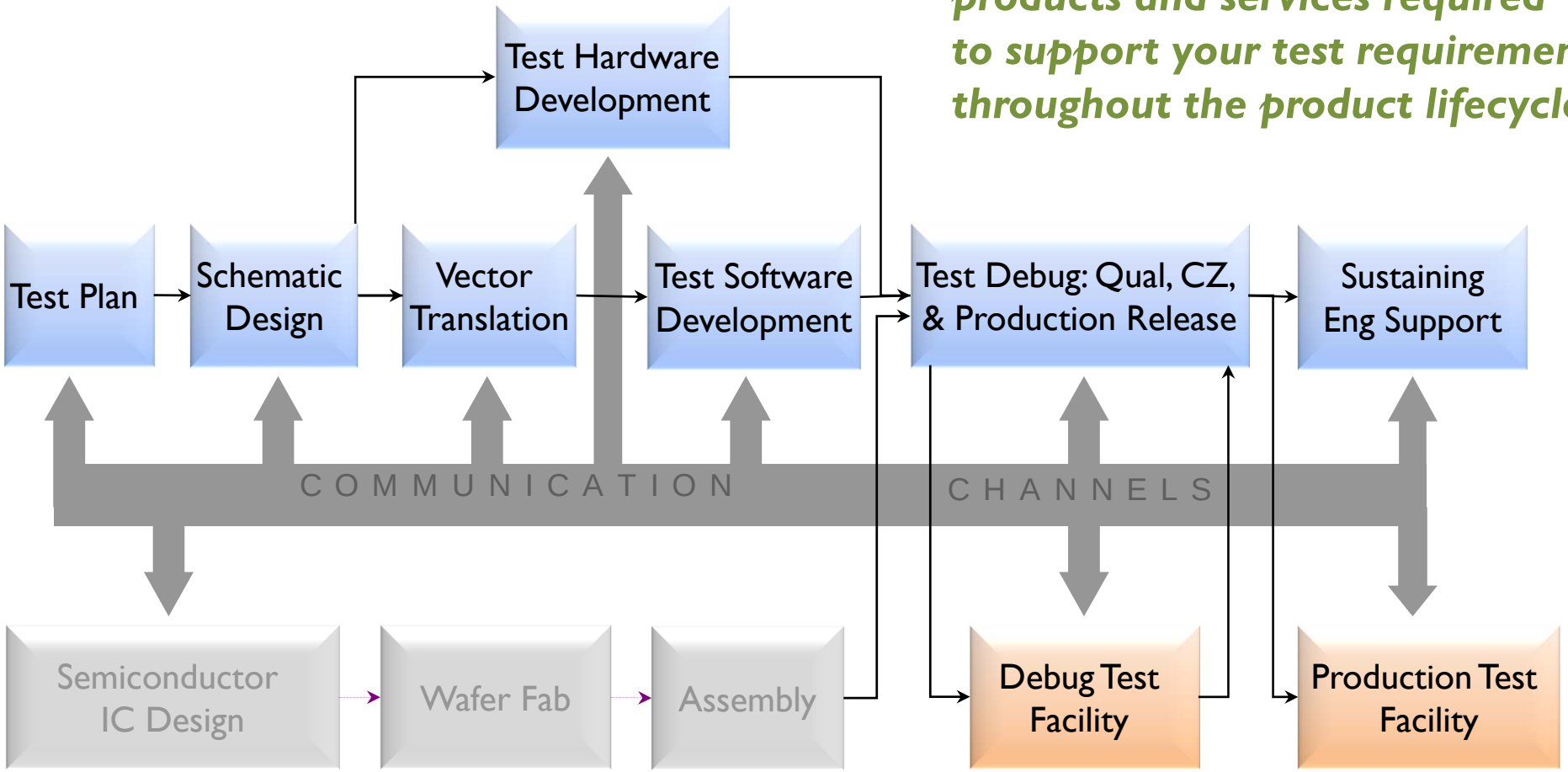
- In business for over 16 years
- Headquartered in Austin, Texas
- Founding Partners are Test Software & Hardware Engineers with 150+ years combined experience
- We hire only the best and brightest engineers
- Independently owned and operated

Vision:
To be the leading independent US provider of Semiconductor Test Solutions

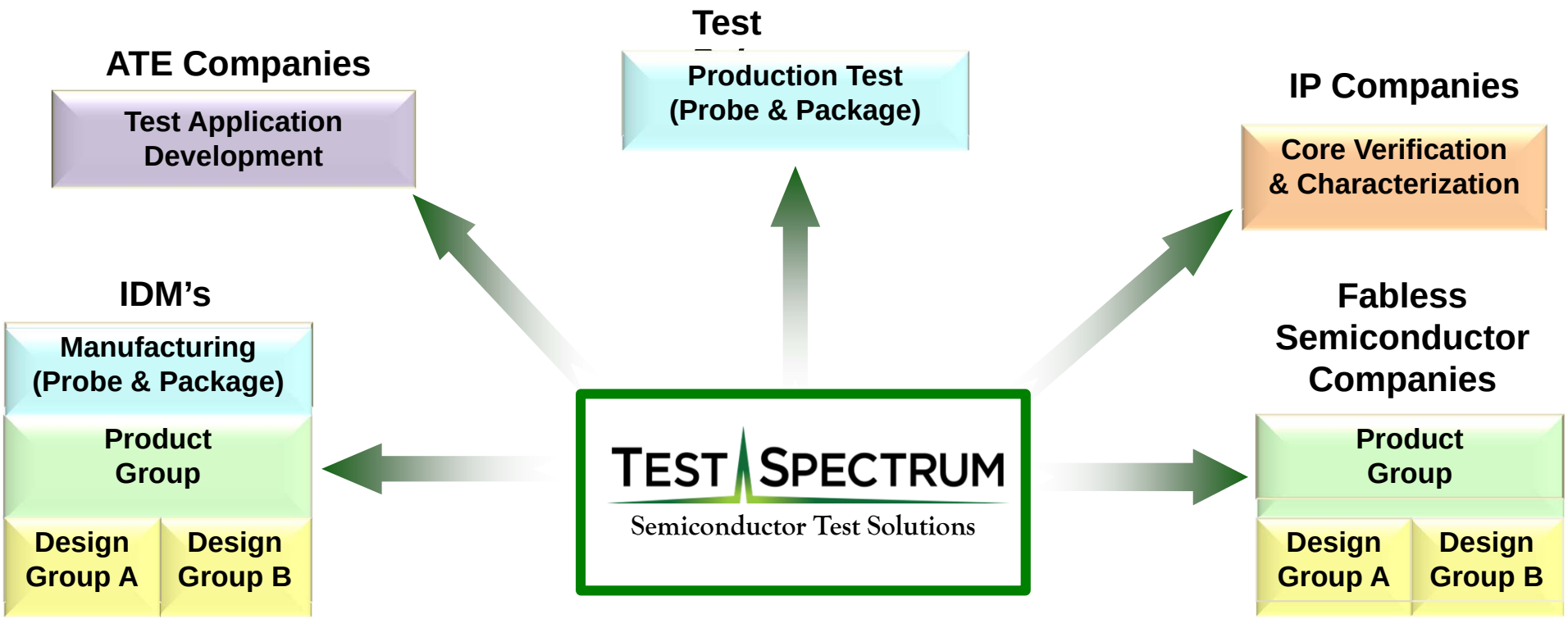
Core Values:
Excellence through Experience, Execution and Integrity

Where We Provide Solutions

Test Spectrum provides the products and services required to support your test requirements throughout the product lifecycle.



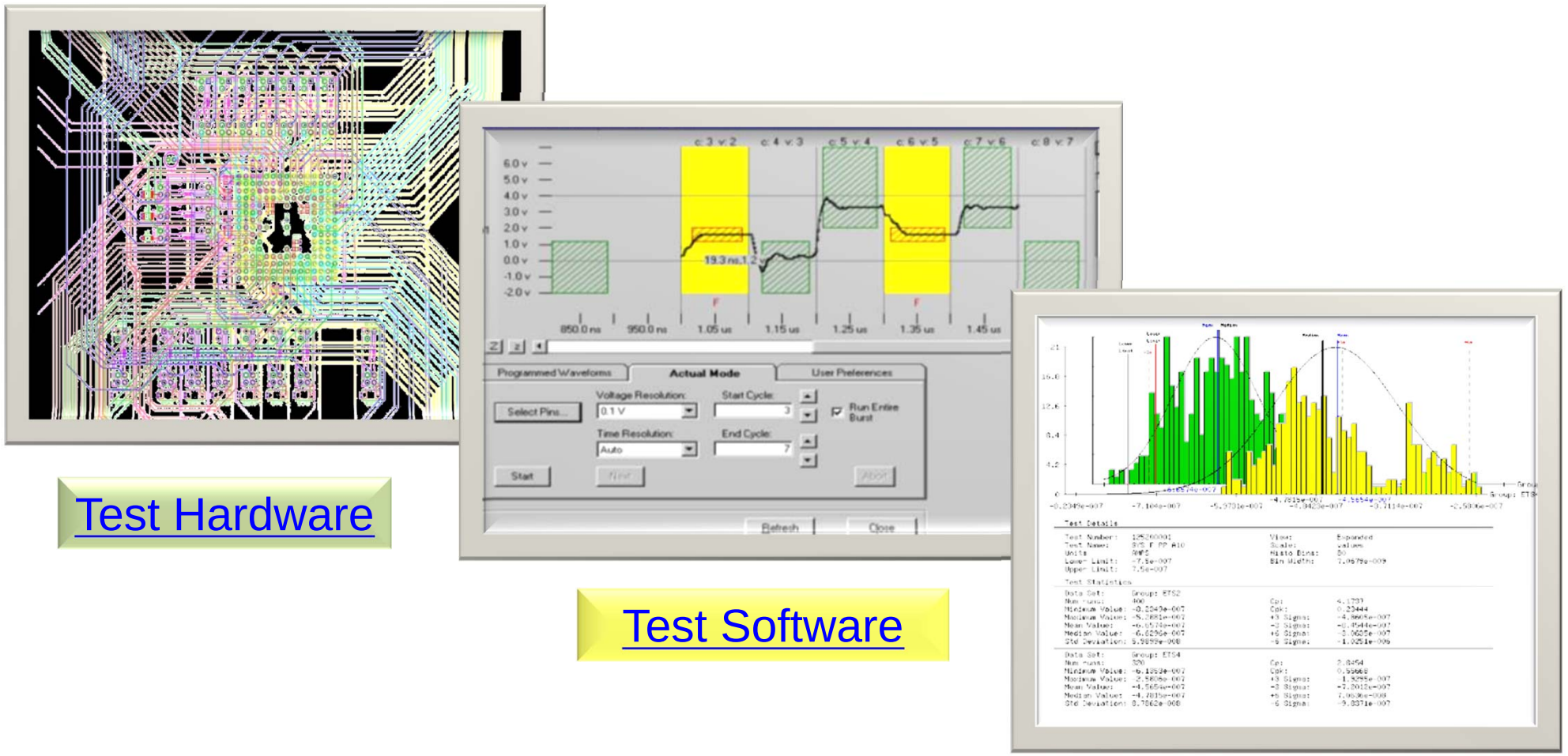
Where we Provide Solutions



TEST SPECTRUM

Excellence in Semiconductor Test Solutions

Semiconductor Test Solutions



Test Hardware

Test Software

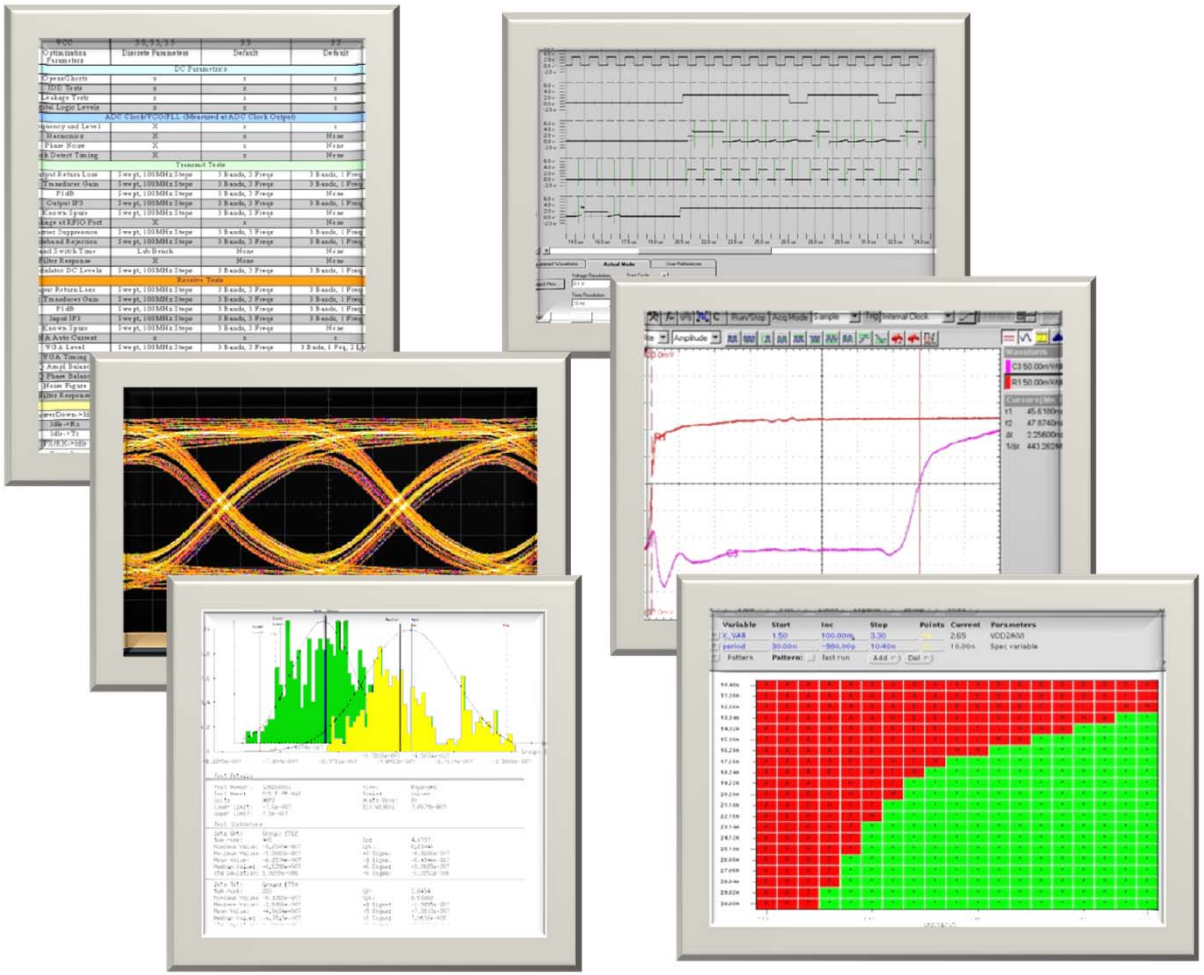
Turnkey Solutions

Test Tools

Test Software

Turn-Key Test Development for New IC's

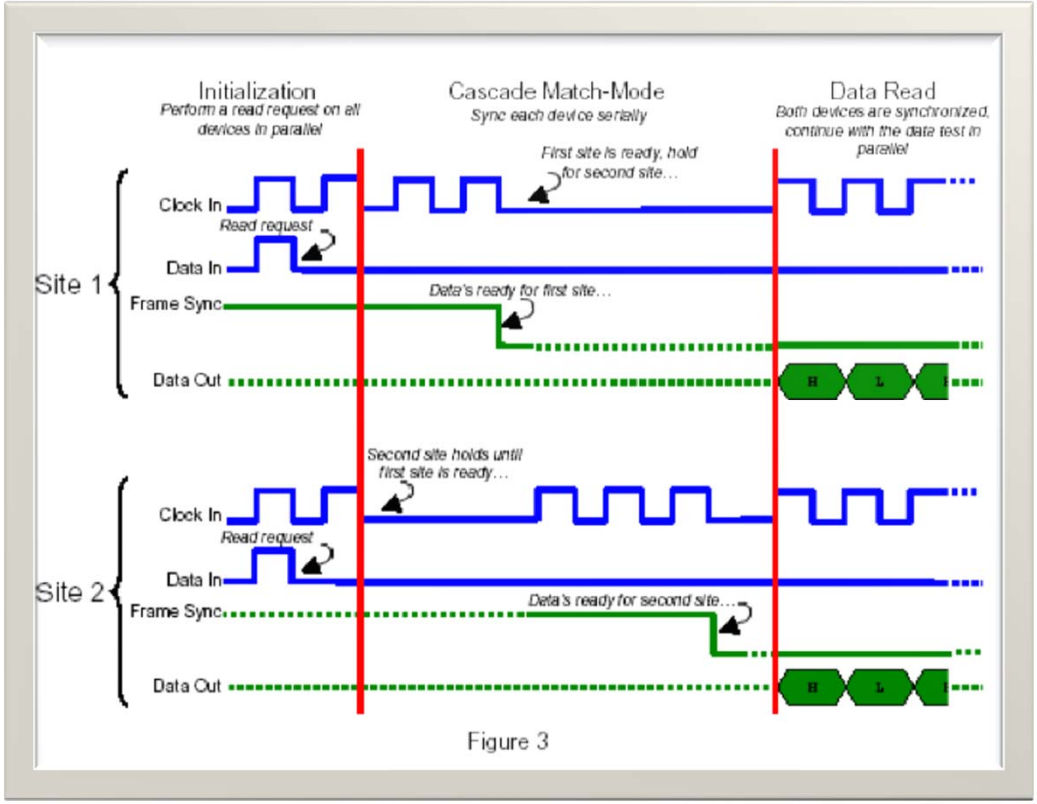
- Test Plan Development
- Test Platform Selection
- Vector Translation
- Schematic Design
- Test Program Development & Debug
- Characterization
- Qualification
- Production Release



Test Software

Turn-Key Test Development for Existing IC's

- Test Platform Conversions
  - Pattern Conversions
  - Program Conversions
  - Correlation Analysis
  - Production Release
- Test Program Optimization
  - Parallel Test Solutions
  - Pattern Compression
  - Test Technique Improvements
  - Correlation Analysis
  - Production Release



Testing Asynchronous Devices in Parallel using Cascading Match-Mode

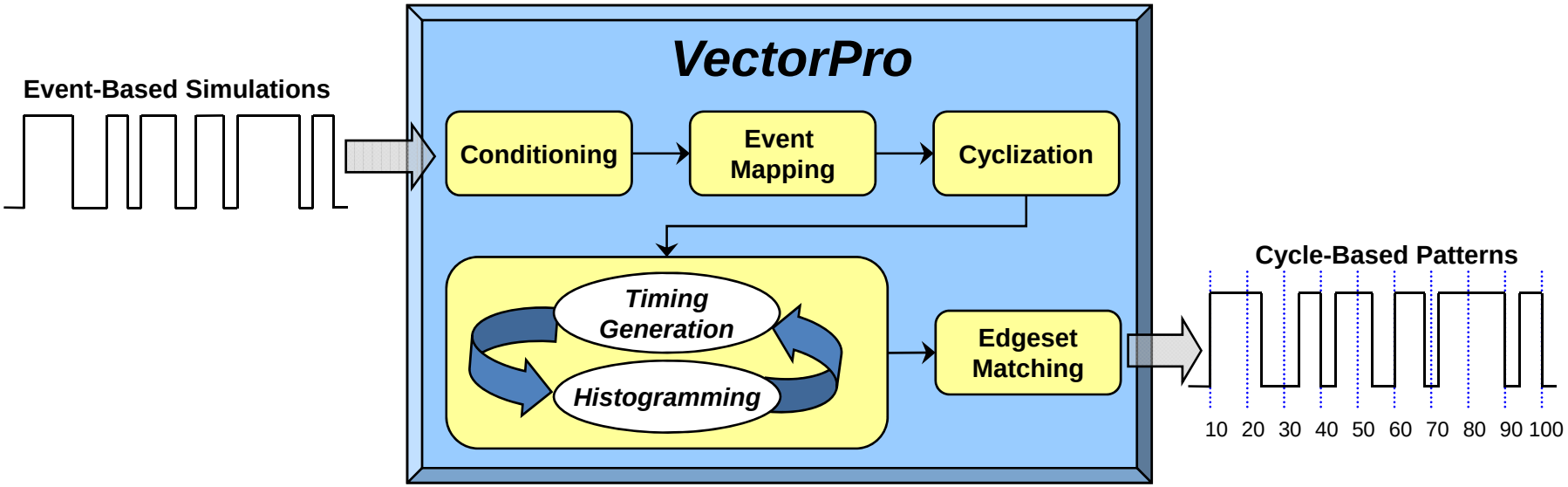
Test Tools

VectorPro	Vector Generation
VectorPort	Pattern Conversion
DataView	Data Analysis

Custom Tools: Defined by Customer

Test Tools: VectorPro

Pattern Generator

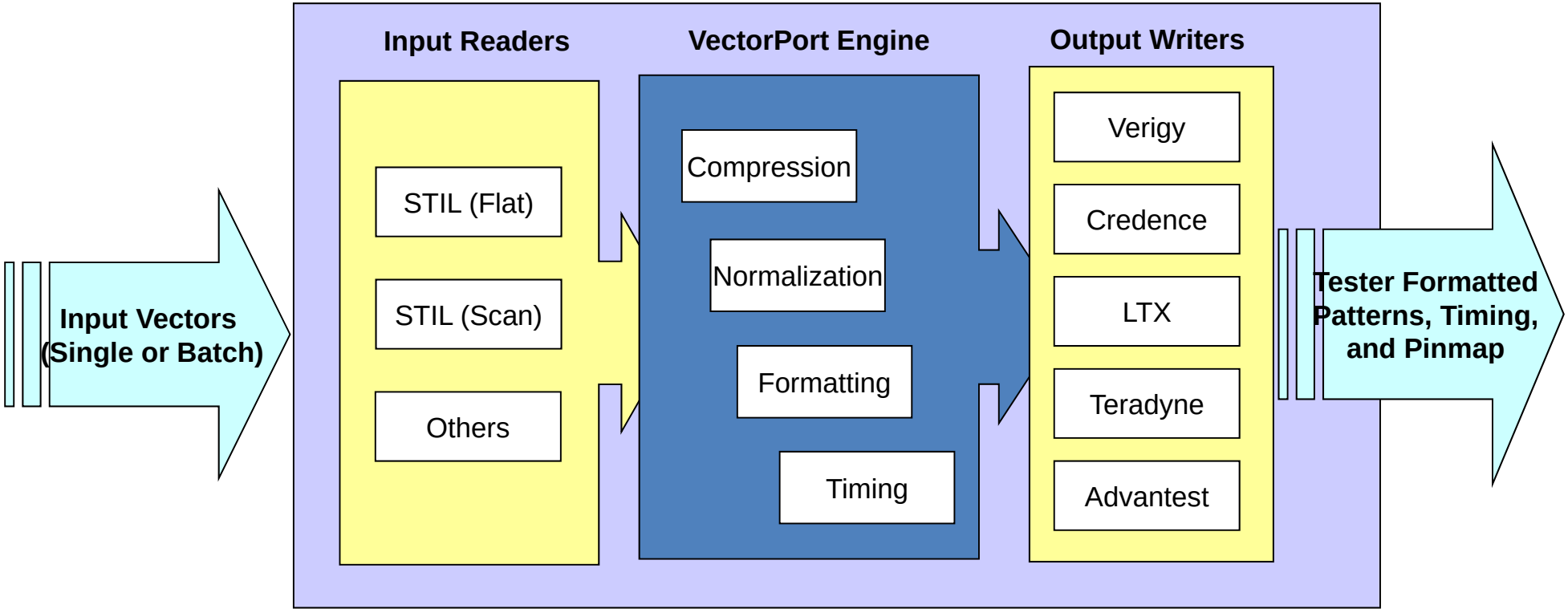


VectorPro

- Used for generating cyclized ATE test vectors
- GUI driven, no command files
- Reads VCD and EVCD files
- Generates WGL or STIL patterns
- Batch mode converts multiple simulations

Test Tools: VectorPort

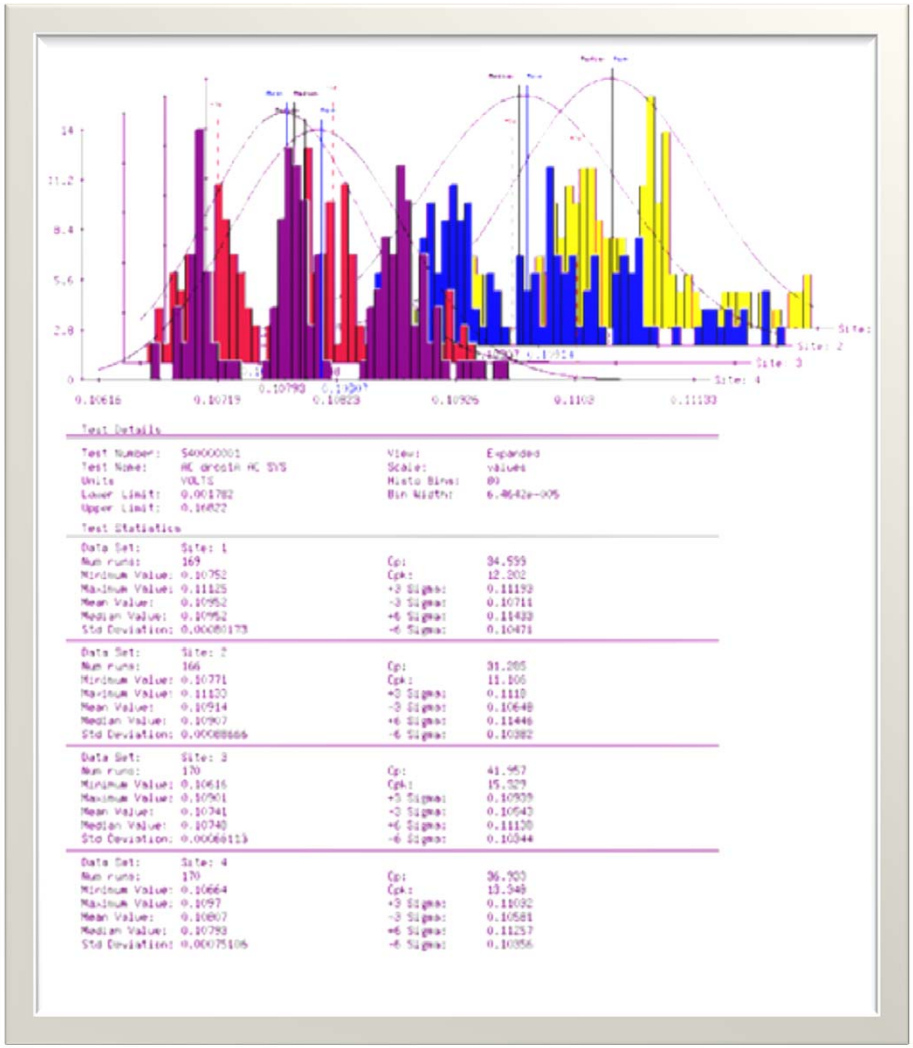
Pattern Converter



- Tool for converting WGL/STIL vectors to targeted ATE tester formats
- Includes pattern, timing, and pinmap data.
- Read and write both parallel (Flat) vectors and serial (SCAN) vectors.

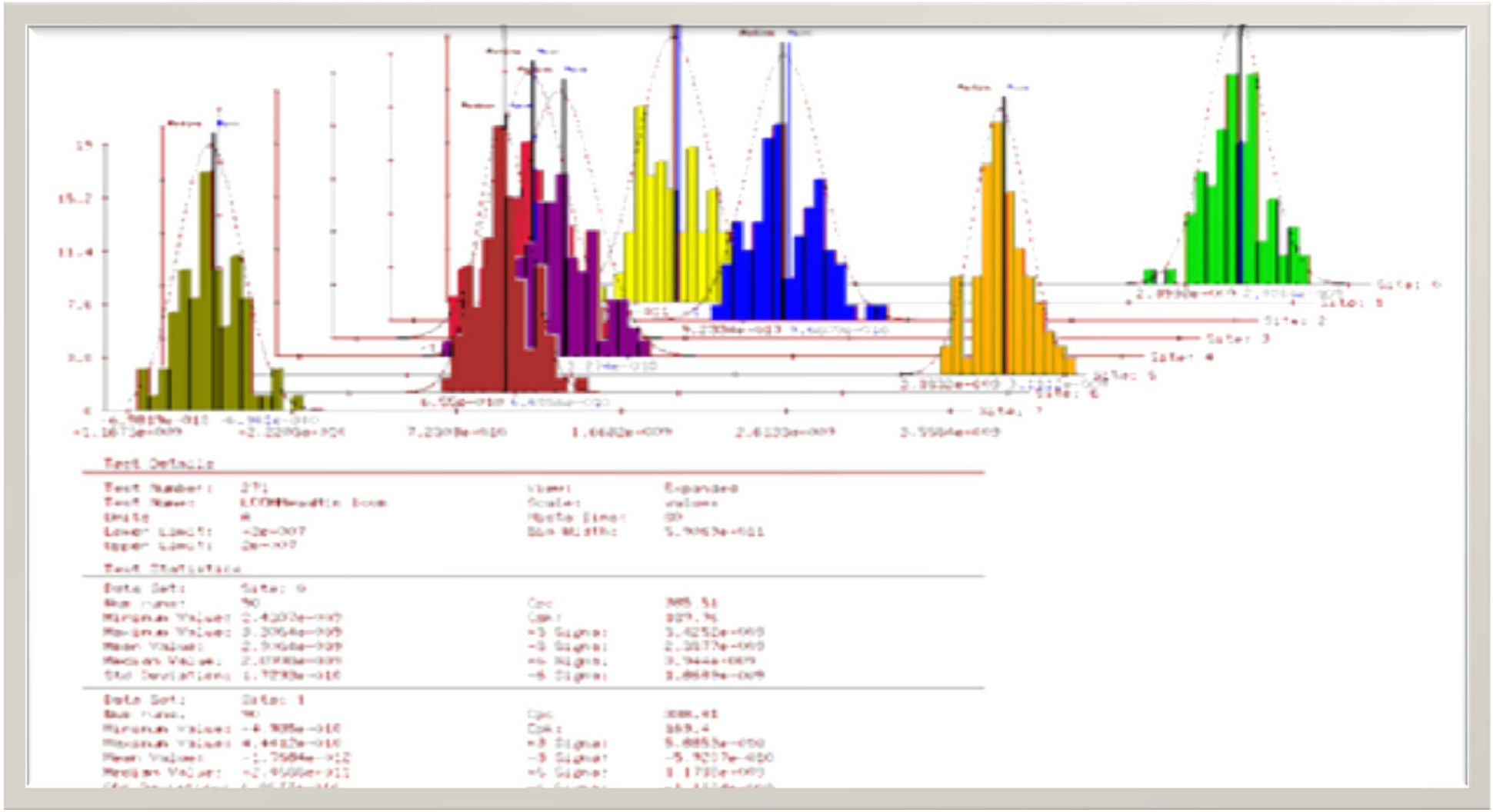
Test Tools: DataView

- Data Analysis Tool
- STDF input
- Reports include
  - Mean
  - Standard Deviation
  - Min, Max (Range)
  - Cp, Cpk
- Composite Histograms
- Wafer Maps



Test Tools: DataView

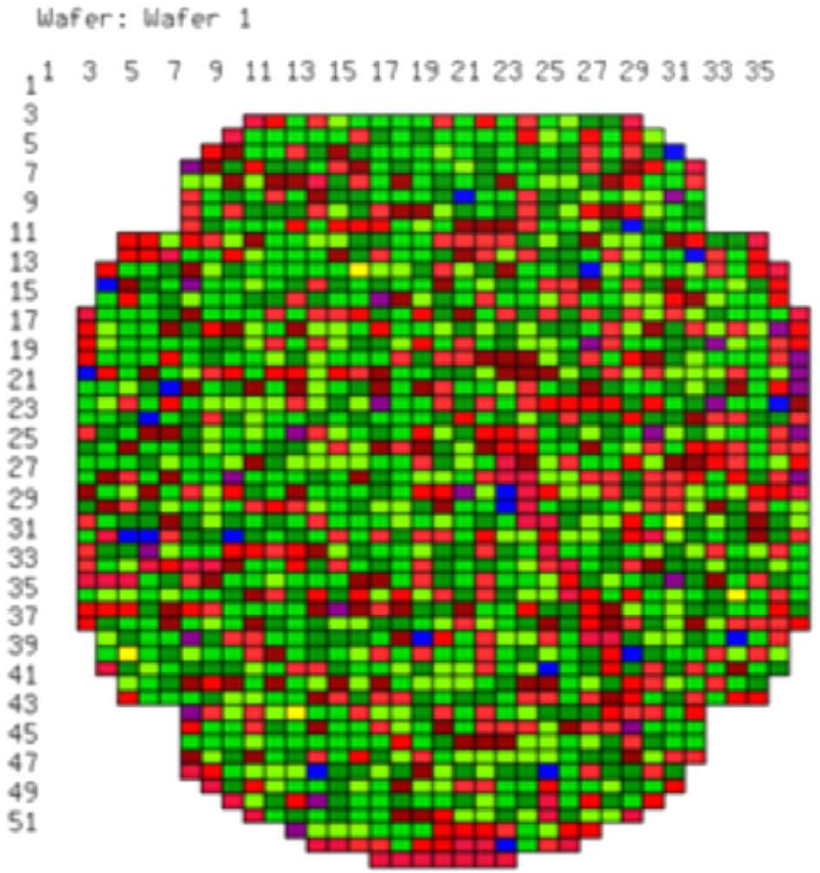
Histograms



Test Tools: DataView

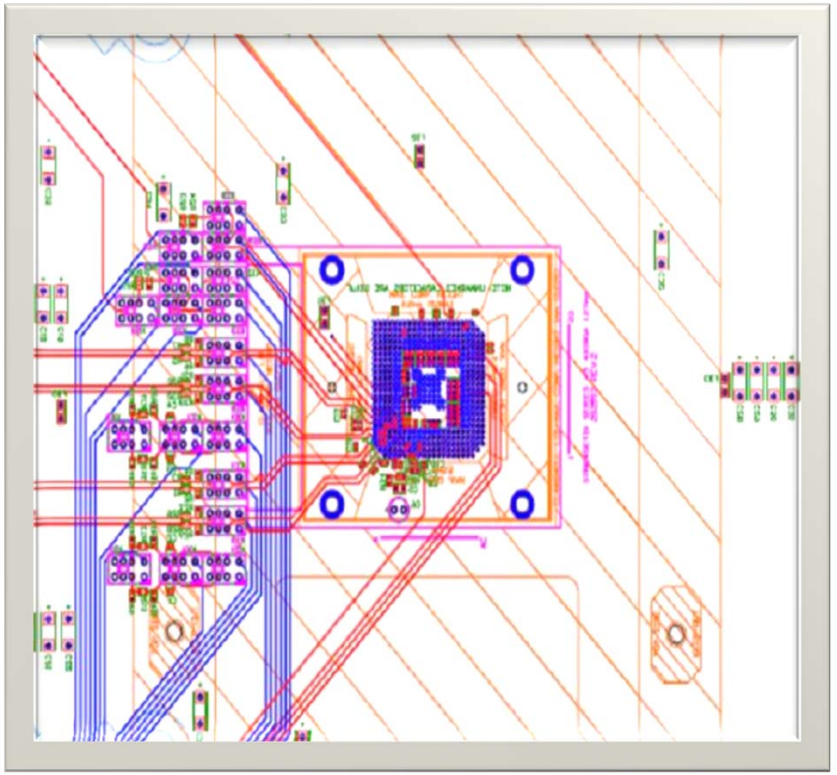
Wafer Maps

Bin	Count	Percent	Pass/Fail
1	435	29 %	Pass
4	193	12.8 %	Fail
2	279	18.6 %	Pass
10	128	8.52 %	Fail
3	241	16 %	Pass
5	122	8.12 %	Fail
7	51	3.4 %	Fail
6	5	0.333 %	Fail
11	22	1.46 %	Fail
8	26	1.73 %	Fail



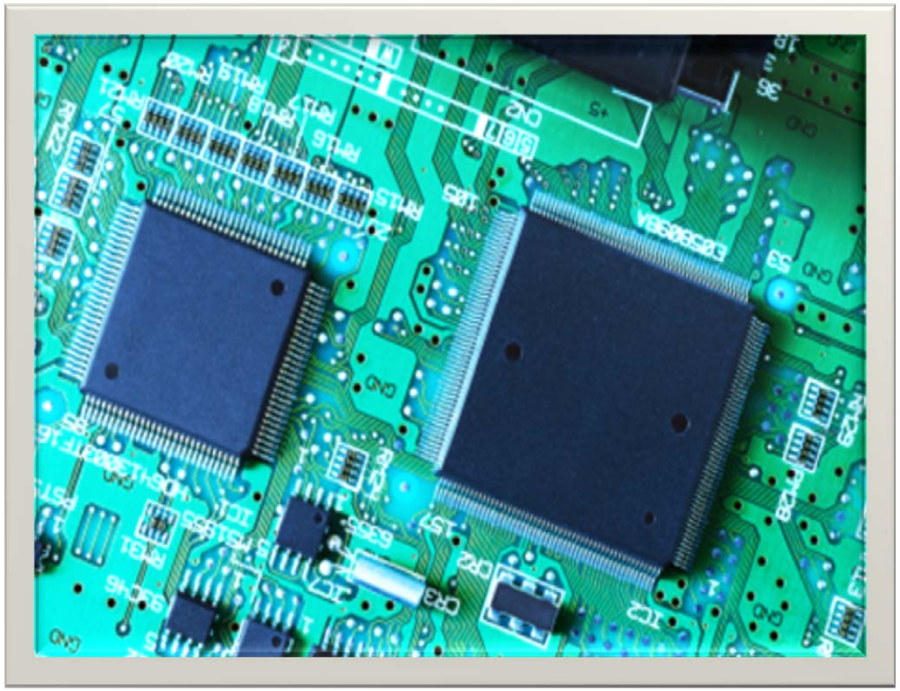
Test Hardware

- PCB layout design
  (Cadence Allegro)
  - RF, Mixed-Signal,
    High Speed Digital/Datacomm
  - Schematic Driven Flow LVS Verification using ORCAD/Capture or Concept.
  - Schematic & BOM Back Annotation.
  - Calculated Electrical Parameters.



Test Hardware

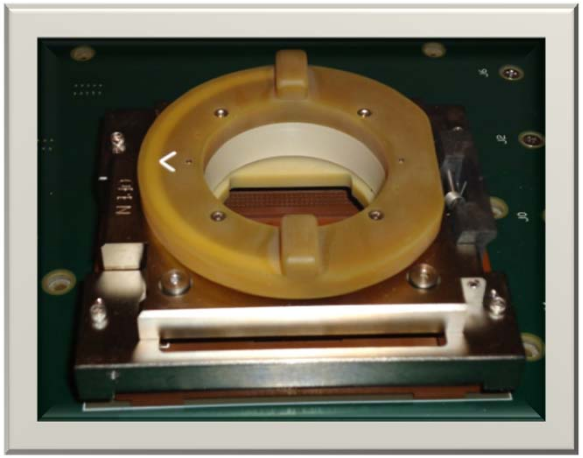
- PCB fabrication
  - Controlled Impedance
  - Specialized materials when required
  - Sequential Lamination
  - Blind/Buried Vias
  - Electrical test for impedance and continuity
  - High Drill Aspect Ratios



Test Hardware

- Component procurement & installation
  - Automated or Manual Assembly
  - Flying Probe Option
  - Surface Mount
  - Reflow & X-Ray verification when required.
  - Sockets

- Probe card needle and epoxy ring assembly.
  - Cantilever
  - Vertical Probe



ATE Platform Capabilities

ATE Manufacturer	Tester Platform	Pattern Conversion	Test Software	Test Hardware
Advantest (Verigy)	**83K**	✓		✓
	93K	✓	✓	✓
	Pinscale	✓	✓	✓
	Ocelot (Inovys)			✓
National Instruments	**STS**	✓	✓	✓
Teradyne (Eagle)	**A5XX**	✓	✓	✓
	Catalyst	✓	✓	✓
	Tiger	✓	✓	✓
	J750	✓	✓	✓
	J97X	✓	✓	✓
	Integra Flex	✓	✓	✓
	Ultra Flex	✓	✓	✓
	ETS-364	✓	✓	✓
Teseda	**V5x0**	✓		✓
Xcerra (LTX/Credence)	**D10/DiamondX**	✓	✓	✓
	Duo/Quartet	✓	✓	✓
	Fusion X-Series	✓	✓	✓

Product Technology Experience

Digital/Datacomm	***Mixed-Signal/Analog***	***RF***
ASIC w/ PCIx,GDDRIII	UWB BBIC	UWB Front End
PPC DDRII SOC	PHS BBIC	PHS PA/SW/Down Cnv
Dual MCU/DSP Core BB	Class D Audio Amplifier	FM Tuners
Quad Serial Backplane	Voice over SLAC	Direct IQ Mod/Mixer
Multi-Port Serdes IC's	VDSL Front End	GPS RF ASIC
10Gbps Serdes	Disk Drive Read Channel	Bluetooth Transceivers
5Gbps Laser Driver & PA	WLAN BBIC	WLAN Dual Transceivers
PWM Controller	DC-DC Converters	CDMA/FM BBIC w/ RF
8ch, 1.6Gbps Timing Gen	Powerline Transceiver	GPS RF Front End
CMOS Image Sensors	Power Management IC's	Software Radios

Benefits of using Test Spectrum

- Stable - Established Corporation.
- Experienced - Test Software & Hardware Expertise, with turnkey solutions.
- Flexible - Large Pool of Engineering Resources.
- Cost Effective - Avoid expanding staff for “Peak Demand Only” situations.
- Focused – Semiconductor Test Development.

Excellence through Experience, Execution and Integrity