Chroma ATE Inc, as a turnkey test & automation solution provider, integrates customized solutions with Test & Measurement Instruments, Automatic Test Systems and Manufacturing Execution Systems. Over the years, Chroma has accumulated strong experiences in semiconductor IC test areas. Chroma provides a wide portfolio of semiconductor IC test solutions ranging from ATE, PXI systems, IC handlers, and system level test solutions.

On the ATE & PXI side, the solutions cover applications in consumer SoC (MCU, controller, audio, peripheral), power management IC (Regulator, LDO, DC/DC, AC/DC, LED Driver), RF (FEM, Connectivity, Mobile) and other specific applications (CIS, Light Sensors, RFID).

On the handler & automatic system side, the solutions include thermal control, extreme device handling technologies, bare die handling, pick and place handlers, CIS turnkey solutions, and system level test solutions.

With the turnkey solutions, Chroma provides a best approach for customers to bring down the cost of test while maintaining the test quality and performance.
Semiconductor Automatic Test Equipment (ATE)

Chroma semiconductor ATE is specifically designed for high-throughput and high parallel test capabilities to provide the most cost-effective solution for fabless, IDM and testing houses. With the full functions of test capability, high accuracy, powerful software tools and excellent reliability, it is ideal for testing consumer devices, high-performance microcontrollers, analog devices and SoC devices.

**Key Features**
- High Performance in a low-cost production system
- High parallel test capability
- Flexibility from engineering to production
- Powerful suite of software tools
- Small footprint to save space in factory
- Adapter board to use other platform directly

### SoC/Analog Test Systems

#### Model 3650-EX
- **Key Features**
  - 50/100MHz Clock Rate
  - Maximum 1024 I/O Pins
  - 32/64M Pattern Memory
  - Maximum 96 CH DPS
  - SCAN / ALPG Function
  - 512 DUT Parallel Test
  - Microsoft Windows® 7 /XP OS

#### Model 3650
- **Key Features**
  - 50/100MHz Clock Rate
  - Maximum 640 I/O Pins
  - 16/32M Pattern Memory
  - Maximum 32 CH DPS
  - SCAN / ALPG Function
  - 32 DUT Parallel Test
  - Microsoft Windows® 7 /XP OS

#### Model 3650-CX
- **Key Features**
  - 50/100MHz Clock Rate
  - Maximum 256 I/O Pins
  - 16/32M Pattern Memory
  - Maximum 16 CH DPS
  - SCAN / ALPG Function
  - 32 DUT Parallel Test
  - Microsoft Windows® 7 /XP OS

### 3650 Series Options
- **Key Features**
  - PVI100 Analog Option
  - VI45 Analog Option
  - HDADDA Mixed-Signal Option
  - Mixed-Signal and RF Box (MRX)
  - Timing Interval Analyzer Option
## VLSI Test Systems

**Model 3380**

**Key Features**
- 50/100MHz Clock Rate
- Maximum 1280 I/O Pins
- 32/64/128M Pattern Memory
- Maximum 128 CH DPS (4 wires)
- SCAN / ALPG Function
- 1024 DUT Parallel Test
- Microsoft Windows® 7 OS
- Flexible configuration

**Flexible Configuration**
- Support flexible slots
- Flexible slot can insert I/O, UVI, ADDA, PXIe, and etc. versatile functions
- 3360-D : 2 slots ; 3360P : 8 slots ; 3380-P : 9 slots ; 3380 : 20 slots
- Time/Freq Measurement unit

**Model 3380-P, 3380-D**

**Key Features**
- 50/100MHz Clock Rate
- Maximum 576 I/O Pins (256 for 3380-D)
- 32/64/128M Pattern Memory
- Maximum 64 CH DPS (4 wires)
- SCAN / ALPG Function
- 512 DUT Parallel Test (256 for 3380-D)
- Microsoft Windows® 7 OS
- Flexible configuration

**Model 3360-P, 3360-D**

**Key Features**
- 50 MHz Clock Rate
- Maximum 256 I/O Pins (64 for 3360-D)
- 8/16M Pattern Memory
- Flexible configuration
- SCAN / ALPG Function
- 32 DUT Parallel Test
- Microsoft Windows® 7 /XP OS

## PXI IC Test Systems

### Programmable Pin Electronics Module Model 36010

**Key Features**
- PXI / PXIe-Hybrid Compatible
- 50/100MHz Clock Rate
- 32M Pattern Memory
- Per-Channel PMU
- SCAN Function 4Chain/256M
- Support Labview / LabWindows
- Microsoft Windows® 7/XP OS

### DUT Power Supply Model 36020

**Key Features**
- PXI / PXIe-Hybrid Compatible
- +10V/-2V Voltage Range
- 6 Selectable Current range
- 16-Bit V Force Resolution
- 18-Bit I Measurement Resolution
- Support Labview / LabWindows
- Microsoft Windows® 7/XP OS

### Mini ATE Model A360101

**Key Features**
- Maximum 64 I/O Pins
- 8 Channels DPS
- Universal Loadboard
- Support Labview / LabWindows
- Windows® 7 /XP OS
**Pick & Place Handler - Final Test (FT) and System Level Test (SLT)**

**Final Test**

FT is taken to test before delivery of the product to customers. This test through test patterns to verify the functionality of the device and measure the electrical characteristics to meet the desired specifications. The purposes of testing are listed as below.

- To verify product design
- To achieve high quality production
- To control production quality
- To acquire continue improvement in product yield

**Advanced TEC Controller**

**Model 54100 Series**

**Key Features**

- Bidirectional driving with 150W (24V 8A), 300W (27V/12A), or 800W (40V/20A) output
- Filtered PWM output with >90% driving power efficiency while maintaining linear driving with current ripples<20 mA
- Temperature reading and setting range -50 to 150°C with 0.01°C resolution and 0.3°C absolute accuracy
- Short term stability (1 hour) ± 0.01°C and long term stability ± 0.05°C with optimal PID control
- Feature true TEC large signal PID auto tune for best control performance
- 2 T-type thermal couple inputs, one for control feedback and the other for monitor and offset, providing versatile control modes

**Full Range Tri-temp Final Test Handler**

**Model 3110**

-40°C~125°C

**Model 3110-FT**

-40°C~125°C

**Model 3160-A**

40°C~125°C

**Model 3180**

Ambient~125°C
System Level Test

In conventional IC backend process, to ensure shipment quality, most companies test packaged devices at speed with full function. However this induces several issues:

1. Device shipment quality is not ensured due to the difference between ATE and real working environment
2. Time to market is delayed due to months-long test program development on ATE’s
3. Test cost continually raises in contrast with reducing silicon cost.

Drivers to System Level Test

Time To Market
☑ Shipment made before ATE program ready
☑ Maximize device
☑ Availability

Cost
☑ Lower investing cost (COO) than ATE
☑ Higher efficiency (lower unit cost) than manual test

Fault Coverage
☑ Control DPPM
☑ Quality assurance
☑ Reduce personnel effort
☑ Evaluating the system's compliance
☑ Test accessibility
☑ Detect inconsistencies between SW and the hardware assemblages

Mini Tabletop Single Site Test Handler

Model 3111
Key Features
☑ IC packages: 5x5 mm to 45x45 mm
☑ Software configurable binning
☑ Air damper contact
☑ Optimizes IC force balance
☑ Maximize test socket lifetime
☑ Double stack protection
☑ Continuous automated re-test
☑ Remote control operation
☑ Real time system camera monitoring
☑ Alerts to mobile device

Disruptive Process Implement in Semiconductor Test

System Level Test Handler

Model 3260
Key Features
☑ Reduce overkill rate by RC (re-check or retest)
☑ Time and resources saving
☑ Yield increasing
☑ Tie-in BICT for various testers for RC
☑ Optional PoP (Package on Package) solutions
☑ Made-to-order test procedure design
☑ Unique FACT (Fault Auto Correlation Test) to reduce personnel handling time
CIS Turnkey Test Solutions

The CIS (CMOS Image Sensor) test solution is one of Chroma’s unique turnkey solutions. It provides the best UPH with best optimized resource, which delivers the performance and quality for functional and image tests. Chroma integrated CIS solution provide the best COO (Cost Of Ownership) to customers.

Key Features
☑ Handler Model 3270 -16 sites Parallel
☑ 16/16 light source(FT)/IPC
☑ ATE 3380P 100MHz clock Rate
☑ 128 M Pattern Memory
☑ 192pins I/O pins
☑ 16 CH UVI (4 wires)
☑ RMB2 switching board
☑ Capture card (MIPI 1G)

Chroma ATE, Capture Card, and MIB
☑ 3380 Series 100 MHz ATE solutions
☑ Flexible optimized configuration by MIB (Matrix Interface Board)
☑ Cost reduction 2-3 times vs traditional full config ATE solutions
☑ Up-to-date capture card solutions : supporting MIPI CSI1/2, Multiple-lanes

Light Source
☑ > 10 times longer life time than Halogen light source
☑ No overheat issues
☑ < 1% difference in spectrum response vs D65 spectrum
☑ LED light source size expandable for 16-site above parallelism requirement
☑ 8 to 10 times cost reduction than Halogen light source

Pick and Place IC Handler
☑ Reliable high speed pick & place handler, supporting up to 16 sites
☑ Handling various package types, with outer dimensions 2x2mm to 14x14mm
☑ Integrated FT light source for each site
☑ Support low temp (-40 °C) in quad sites by Model 3110-FT