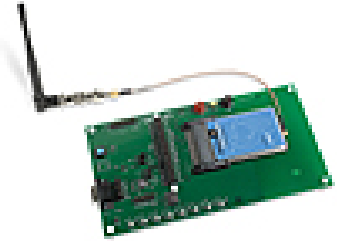
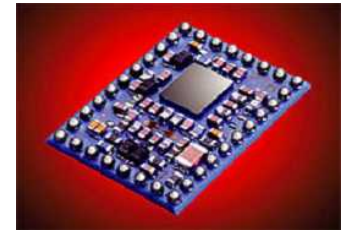


# Semiconductor Applications

*Semi is Growing*



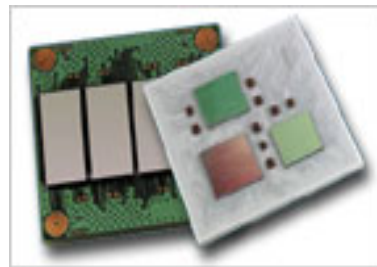
**Wi-Fi**



**System-in-a-Package  
Bluetooth**



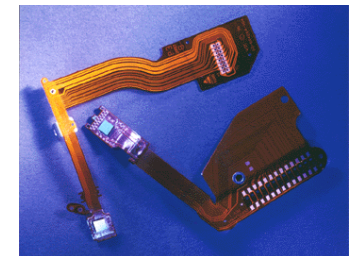
**Flip Chip in Package**



**Multi Chip Module**



**Image Sensors**



**Flip Chip on Flex**

# Semiconductor Applications

*Universal Knows...*

Power Module



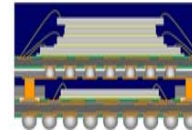
Medical



SiP



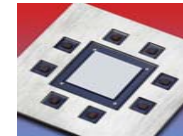
RFID



Stacked Module  
with Dispensing



Automotive Module  
WF Die Attach



Flip Chip and passives  
on Microprocessors



HDD

# The Universal Solution

## *Flip chip accuracy at Universal speed*

- **High productivity**
  - Best throughput: up to 15K cph
  - Multi-spindle heads (InLine7, InLine4 HP)
  - High-speed wafer feeding
  - Machine-side NPI software
  - Applications and process expertise of Advanced Process Laboratory
- **Proven and Robust**
  - Highly mature platform technologies
  - VRM Linear Motor: introduced in 1996, over 1000 machines in the field, accurate over time
  - Mature process peripherals: Innova, LTFA, substrate handling, FC vision
- **Low Cost of Ownership**
  - Lowest capital investment/performance delivers best ROI
  - Low maintenance requirements
- **Unmatched Flexibility**
  - Bare die and flip chip (wafer up to 300mm)
  - Multiple feeding options (wafer, tape/reel, tray)
  - SiP capable
- **Extreme Accuracy**
  - Down to  $\pm 10\mu\text{m}$
  - High-stiffness frame design
  - VRM Linear Motor technology: dual-drive, 1 $\mu\text{m}$  encoding, closed-loop, thermally stable
  - Specialized software



# High Productivity

## *High-speed Wafer Feeding*

### Innova+

- Up To 5,000 die/hr (Flip Chip)
- Auto wafer exchange
- Auto wafer expansion
- Multiple feeders supported on single machine
- Parallel processing
- Wafer mapping support (ALPS)

### Capability

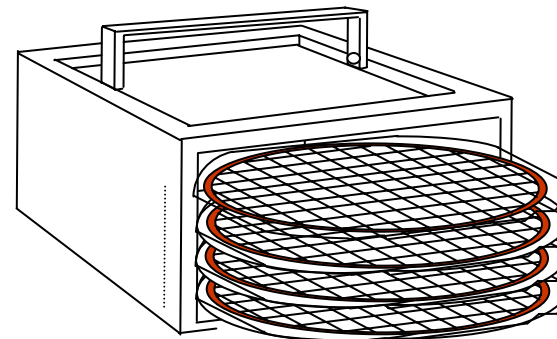
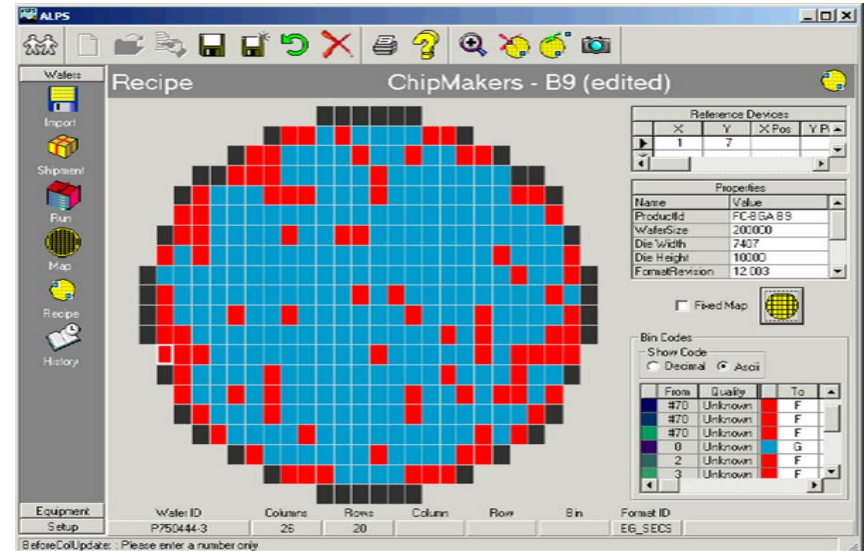
- Can be used for a both flip chip and die attach
- 0.5mm<sup>2</sup> to 20mm<sup>2</sup> die size supported
- Die thickness down to 75 micron supported
- 300 mm wafer capability



# High Productivity

## ALPS Electronic Wafer Mapping

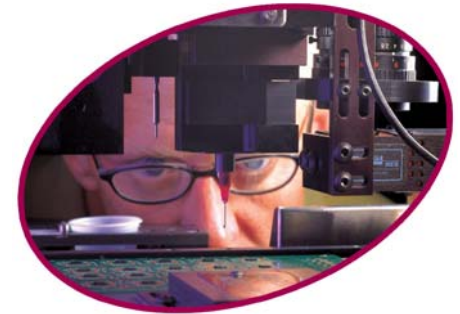
- ALPS Server Compatible
- Auto Wafer Map Download
- Bar Code Reader Recognition
- Known Good Die Alignment
- Real Time Map File Update
- TCPIP Communication
- Wafer Mapping Done in Parallel to Other Operations



# High Productivity

## Advanced Process Lab

- **Founded in 1987 as first and most complete Advanced process laboratory in the industry generally accessible to customers**
- **Founded first Consortium 1992**
- **Became profit center 2002**
- **Provide**
  - Research and Development
  - Process audits and support
  - Prototyping
  - Root cause failure analysis
  - Knowledge transfer and training
- **Complete analytical laboratory**
- **Vitronics Soltec process engineers resident**
- **Dover presence with app. engineers from DEK**
- **ITAR Compliant**
- **Close relationship with Binghamton University**
- **Collaborations**
  - Binghamton University
  - Clarkson University
  - Tsinghua University
- **Research Activities**
  - Consortia
  - Applied research
- **Graduate Research Assistants**
  - Approximately 160 students funded and graduated since 1994
  - Graduates in notable positions at Boston Scientific, GE, Acer, HP, TI and many others



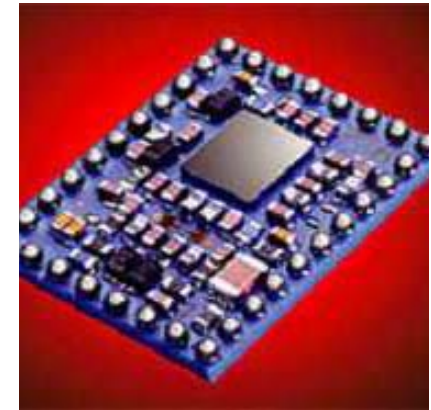
## Proven and Robust

- **Highly mature platform technologies**
  - VRM Linear Motor: introduced in 1996, over 1000 machines in the field, accurate over time
- **Mature process peripherals: Innova, LTFA, substrate handling, FC vision**



# Unmatched Flexibility

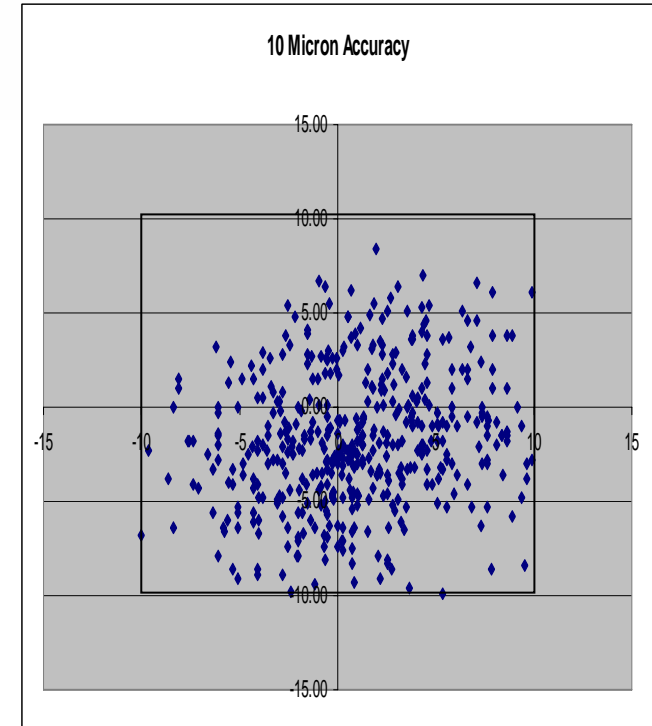
- **Bare die and flip chip**
- **Multiple feeding options**
  - Wafer (Innova/Innova+)
    - Various sizes (up to 300mm)
    - Multiple wafer feeders
  - Tape & reel
    - Standard tape feeders
    - Dual Lane for 0201 and 01005
  - Matrix tray
    - Stationary – 2x2, 4x4, JEDEC
    - Automated Stackable feeders- 2x2, 4x4, JEDEC
- **SiP capable**



**System-in-Package  
Bluetooth**

# Extreme Accuracy

- **Down to  $\pm 10\mu\text{m}$**
- **High-stiffness frame design**
- **Patented VRM Positioning System**
  - Encoder resolution of  $1\ \mu\text{m}$
  - X / Y Axis repeatability of  $<1.5\ \mu\text{m}$
  - Real-time, closed-loop control on all motors
  - Pick and place gantries driven and encoded on both sides
  - High stiffness frame design
  - Excellent vibration dampening properties and thermal stability
  - Maintenance-free for long life design
- **Closed Loop Controls (X,Y,Z, Phi, Valves, Pick/Place Touchdown)**
- **Automated features to compensate for variability (components, feeders, boards)**
- **Specialized software**

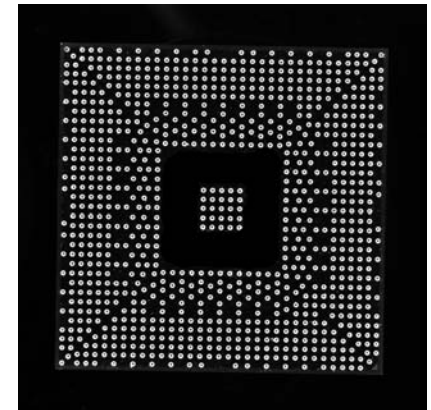


# Extreme Accuracy

# Specialized Software

## UPS+ SC Software

- **All bump inspection**
  - Inspecting all bumps to see if some are missing or some are substantially under or oversize
- **Inspect after dip**
  - Capability of inspecting parts after flux dipping for better placement accuracy (only on IL4)
- **Pre-pick**
  - Start picking before substrate is in place
- **Look before pick**
  - Looking at components before picking them for improved accuracy, especially for small parts
- **Vacuum Board sense**
  - Sense if a substrate is misplaced before picking and placing a component
- **Fluxer parameters**
  - Various parameters adjustable for better accuracy
- **Z-zone**
  - Stacking protocol for various layers



# Genesis SC Platform Portfolio



GI-14D	GX-11S
<b><i>Dual-beam overhead gantry</i></b>	<b><i>Single-beam overhead gantry</i></b>
2 InLine7 (7-spindle) Heads	1 InLine7 (7-spindle) Head / 1 InLine4 HP (4-spindle) Head
Hi-res ULC in both front and rear	Hi-res ULC in both front and rear
Hi-res PEC camera (dual-wavelength)	Hi-res PEC camera (dual-wavelength)
Up to 2 LTFAs (process dependent)	Up to 2 LTFAs (process dependent)
01005 – 55mm sq & 25mm tall	01005 – 150mm connectors & 25mm tall
For higher throughput requirements	Lower-cost option
Low force (<150g) not required	Low force (down to 35g) capability
Parts are fed primarily from tape & reel or wafers	Matrix tray feeding is required
<b><i>High accuracy at high speed</i></b>	<b><i>Flexibility to place a broad range of components</i></b>