

Die Bond Machine

July 22, 2008

Issues / Problems / Challenges

- 1) Competition from low cost machine suppliers in E and SE Asia --> Need faster cycle times
- 2) Part Positioning Challenge at higher speeds.
- 3) Need higher production efficiency at lower cost
- 4) Competition was MITSUBISHI

Solution

Controller:	Customer Controller
Controller Software:	Proprietary
Interface:	Step/Dir
Servo:	Sigma-5 SGDV (22 axes)
Power Level:	50 W up to 3kW
Voltage Level:	230 VAC 1 Ph.

Performance Achieved

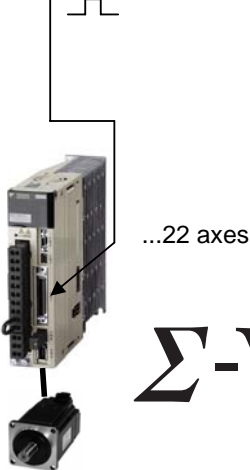
Throughput:	11.3k cph (+11%)
Accuracy:	+/- 15 micron (X,Y bonding accuracy)
Auxiliary Functions:	vibration suppression

Customer Information

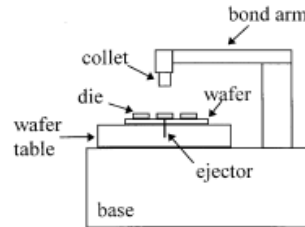
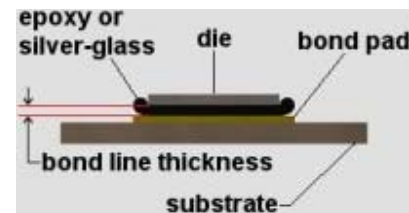
Industry:	Semiconductor
Application:	Die Bonding

Customer Controller

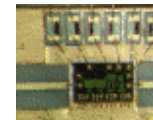
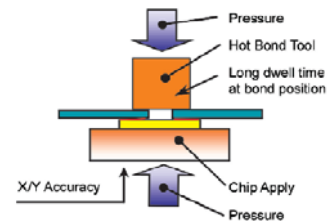
Step/Dir Signal



Σ -V



Bond Position



Application Description

Die bonding is the process of attaching single die or multiple die arrays for Chip Scale Packaging (CSP). The bonders are used for a variety of semiconductor die types including LEDs, ASICs, MEMs and Sensors that are currently being used in applications within the Medical, Industrial and Commercial markets. As the first step in the process, the precision of die placement is critical in controlling downstream wire-bonding yield and reliability. As designs require the die edge to be pushed closer to the packaging edge, accurate placement affects epoxy spread and subsequent wire bond strength. This issue is apparent for both Fine-Pitch Ball Gate Arrays FBGA and standard BGA devices. Complex motion and mechanical linkages define each OEM machine builder's design for performance - and high performance servo systems are needed to shorten positioning time in order to increase throughput without sacrificing absolute accuracy of die bond placement.

Differentiating Solution Features

- Settling time reduced to 1/10th of previous through advanced autotuning
- 1.6kHz response freq & 20 bit resolution
- Technical support availability
- Step/Dir input
- Shorter lead time for off-the-shelf product (service level was 99% for 10 systems)

Resulting Solution Benefits

- More accuracy at higher speeds which meant more throughput to compete
- Increased performance with more features
- Improved integration of servos to process, proving of prototype of mechatronics system
- Conforms to customer's controller outputs
- OEM is able to respond to fluctuating demands of end user customer base