ADAT3 XF TWINREVOLVE FLIP-CHIP DIE BONDER

The game changer in flip-chip die bonding

Assembling up to 60,000 flip chips per hour, ITEC's ADAT3 XF TwinRevolve flip-chip die bonder is five times faster than anything else on the market. So it gives the same production from a fifth of the factory floor space. That also means fewer maintenance and operator hours, fewer spare parts, and lower energy costs, so the new Flagship machine has much lower Total Cost of Ownership (TCoO). It will open a whole new range of applications to flip chips, which give better thermal and high-frequency performance, lower power consumption and better reliability than fragile wire bonded products.

Two rotating pick-and-place heads flip and place the die in a fast, smooth action. There's less inertia and less vibration, which maintains accuracy at much higher speeds. Like all ADAT3 XF (eXtended Flexibility) machines it is automated, modular and field upgradable for extended lifetime and even more sustainable operation.

Key features

Performance
- Up to 60,000 units per hour
- Supports 8 to 12 inches wafer on frame film carrier

Strip size
- 100 x 300 mm

Die size
- Minimal: 0.2 x 0.2 mm
- Maximum: 3 x 3 mm
- Proven flux screenprint solution available on request
- 4 cassettes at output (optional at input autoloader)
- Full die traceability (strip E142 – wafer)
- Auto recipe download (MES interface)
- SECS/GEM interface with E142
- QFN, DFN, HVQFN, SOT, SO, TSSOP, LGA leadless and leaded packages

Specifications

Speed
- Up to 60,000 units per hour (depending on die size, lead frame pitch, and selected quality inspections)

Die Range
- Length, width: 0.2 x 0.2 mm to 3 x 3 mm
- Aspect Ratio: 1:1 - 1:3
- Thickness: 50-400 µm

Lead frame size
- Minimum length, width: 100 x 40 mm
- Maximum length, width: 300 x 100 mm
- Thickness: 0.1-1.0 mm

System accuracy
- Small die (< 1 mm): XY: 1σ xy $\leq$ 4 µm Rotation: $1\sigma\phi < 1^{\circ}$
- Large die (> 1 mm): XY: 1σ xy $\leq$ 4 µm Rotation: $1\sigma\phi \leq 0.15^{\circ}$
- Pick and place force: 0.2 - 1.5 ± 0.1 N

Pick up tooling
- Vespel tip
- Rubber tip
- Push-up needle

Wafer handling
- Wafer size: 6-12 inches
- Wafer frame: 8-12 inches
- Steel/Plastic Film Frame Carrier (FFC)
- Foil Tension: Programmable expander (8 inches: 1-10 mm; 12 inches: 1-15 mm)
- Automatic wafer change and expander
- Automatic barcode reader

Lead frame handling
- Stack loader including paper separation.
- Magazine loader/unloader: Maximum 4 magazines at load and unload
- 20-40 slots per Magazine size: Minimum length, width, height: 100x45x80 mm Maximum length, width, height: 305x110x270 mm

Optional In-line flux screen printer Or Dispense flux:
- Twin cross flux dispense module, volumetric dispense
- Dot/Cross size, resolution: ≥ 120um 1σ 20 µm
- Dot position: $1\sigma < 20$ µm
- Uph dispense depends on IO-count

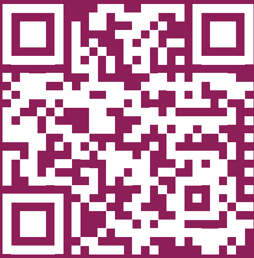
Imaging system
- Number of cameras: 5
- Resolution/Field of View (FOV) glue: 0.3MP camera (3.2 UM/pixel), FOV 2.1 x 1.x4 mm
- Resolution/ Field of View (FOV) pick-up and backside: 5.0MP camera (2.3 UM/pixel), FOV 5.6 x 4.7 mm
- Resolution/ Field of View (FOV) post-bond: 5.0MP camera (4.6 UM/pixel), FOV 11.3 x 9.4 mm
- Resolution/ Field of View (FOV) sidewall: optional
- Minimal object detection: 10 UM
- Lighting: coaxial and ring light, including multicolour light

Inspection categories
- Program mode: fast programming for common reject criteria
- Reject treatment: strip map (E142) and reject bin
- Inspection view: 5 cameras: (1) glue, (2) pre-pick, (3) back, (4) top, (5) post-bond

Inspection items
- Die-related: Bump inspection, Top chipping, Backside chipping, Damaged, Die size/ die ratio, Scratch, Cracked die
- Flux-related: Drop size, Drop shape coverage wrt pillar size
- Post-bond related: Die alignment (position, size, rotation)

Automation
- Wafer map SEMI E142 format, SECS-GEM MPA exchange
- Start and reference die functionality.
- MES Interface including auto recipe download
- Monitoring of critical process parameters during production. Automatic stop function when parameter out of control
- Servo, bond-force and vacuum auto-diagnostics functionality to check health status of the machine

Machine dimensions
- Length, width, height: 3000 x 2100 x 1250 mm^3 (without magazine loader)
- Length, width, height: 3500 x 2100 x 1250 mm^3 (with magazine loader)
- Net weight: 3000 kg (without magazine loader)
- Net weight: 3300 kg (with magazine loader)



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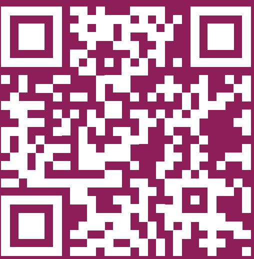

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