6500 DIE BONDER
Precision | Reliability | Customization

The 6500 Die Bonder offers a balanced combination of accuracy, speed and flexibility in a compact system footprint. The 6500 Die Bonder performs ultra-high accuracy eutectic and adhesive placements with cycle times under seven seconds using its four-axis positioning system driven by linear motors gliding over air bearings on a steel based frame.

Designed for fully automatic, high speed, precision hybrid component assembly, its compact footprint fits into a 36 x 35.9 inch area (0.9144 x 0.91186 m), reducing clean room cost. The large work area on the 6500 Die Bonder eliminates the need to purchase additional pick/place heads. With automated tracking of placement and RAM stats, your equipment cost per package is greatly reduced.

**CYCLE TIME**
Up to 1200 UPH

**POST-PROCESS ACCURACIES**
1.5 micron (post-eutectic bond)

**PLACEMENT ACCURACY**
3 micron, 3-sigma ultra-high accuracy eutectic and adhesive placements with cycle time of approximately 3 seconds

**MULTIPLE OPTIONS**
Pulsed heat stage/steady state for eutectic attach, flip chip, tape feeders, magazine handlers, ID tracking software, look-up camera software, in-line assembly lines, islands of automation, fully automatic substrate and part loading

**LARGE WORK AREA**
12.5 inch x 6 inch (317.5mm x 127mm) X/Y six-position, bi-directional turret tool changes tools rapidly

**Ultra-High Precision Eutectic Attach**
**Wafer Scale Packaging**
**Six-Position, Bi-Directional Tool Turret**
**Versatile Work Area**
**Microsoft Windows™**
**Worldwide Technical Support**
**Cost-Optimization**
**High Reliability**

**GOING STRAIGHT TO PRODUCTION**

Begin production today—even while your system is being built. Assembly Services is the precision microelectronic packaging solutions division of Palomar Technologies. Assembly Services can develop a manufacturable process to begin producing end applications. Once your system is complete, production transitions are seamless.
EUTECTIC STAGE

Stage Type
1.0 x 1.5 cm heated area, low thermal mass ceramic hot bar

Ramp Times
>100°C/Sec, +/- 2°C control through cycle

Stage Control
Windows XP Graphical User Interface with up to 16 profiles per program

PERFORMANCE

Cycle Times
1200 UPH
*process and material dependent

Post-Placement Accuracy
1.5 micron, 3-sigma

Placement Force
10-100g, +/- 2g at 3-sigma

DIE EJECTOR WITH WAFER HANDLING

Size Range: 0.5mm - 13mm

Thickness: 0.1mm - 1.2mm

Die Placement Accuracy:
 +/-30um die presentation to 6500 with XY vision aided

Wafer Input: 200mm, 300mm

Dimensions:
Length: 1.60m
Width: 1.70m
Height: 2.1m
Weight: 1500 kg

System Control and Facility Requirements
System Control: PC Based, Windows
Electrical: 230VAC, 1ph +/- 5% at 50/60Hz
Compressed Air: 70-80psi

APPLICATIONS

• P-Side Down Laser Diode Attachment
• Silicon Bench (V-Groove) Placement
• High-Density RF Power Transistors
• Ultra-Fine Pitch Hybrid Assemblies
• MEMS Components
• VCSEL Modules
• Data Storage
• High Bright/High Power LED Arrays
• Optoelectronic Packaging
• LED Printhead Attachment
• Solar Concentrator Packaging

*partial list

The 6500 Die Bonder is ideal for any process that can benefit from high-accuracy eutectic or epoxy die attach.

A low force bond head enables pick and placement of fragile compound semiconductor and crystal components without damage. The six-position, bi-directional tool turret changes tools rapidly on the fly, maximizing throughput and reducing changeover time without traveling to a tool dock.
# Performance and Specifications

<table>
<thead>
<tr>
<th>Motion System</th>
<th>XY Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bond Area:</td>
<td>12 inch x 6 inch (304.8mm x 152.4mm)</td>
</tr>
<tr>
<td>Resolution:</td>
<td>0.1 micron</td>
</tr>
<tr>
<td>Control System:</td>
<td>Air bearing, linear motor/encoder, direct drive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Z Axis</th>
<th>Stroke: 1.0 inch (25.4mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>0.2 micron</td>
</tr>
<tr>
<td>Control System:</td>
<td>Voice coil, linear encoder, direct drive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pick Tool</th>
<th>Up to six smart “on the fly” bi-directional tool turret</th>
</tr>
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<table>
<thead>
<tr>
<th>Theta</th>
<th>Rotation: 0-400 degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution:</td>
<td>0.000225 degree, &lt;0.1 degree post placement</td>
</tr>
<tr>
<td>Direct drive motor</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pattern Recognition</th>
<th>Vision System: 256 gray-scale Cognex Series 8000</th>
</tr>
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<tbody>
<tr>
<td>PR Theta:</td>
<td>application dependent</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Focus Range:</th>
<th>programmable focus across 0.400” (lens floats with Z-axis)</th>
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<tr>
<th>Objective Lenses:</th>
<th>two selectable look-down, one fixed look-up camera</th>
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<tr>
<th>Programmable Lighting:</th>
<th>LED ring light and through-the-lens, programmed separately for look-down and look-up camera</th>
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</table>

<table>
<thead>
<tr>
<th>Pick Tools</th>
<th>Supports multiple styles of pick tools:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Eutectic scrub tool</td>
<td></td>
</tr>
<tr>
<td>2) Plastic tool tip</td>
<td></td>
</tr>
<tr>
<td>3) Surface pick tool</td>
<td></td>
</tr>
<tr>
<td>4) Epoxy daub or stamp tool</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ergonomics</th>
<th>1) Ergonomically designed user interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>2) Front machine access to process controls</td>
<td></td>
</tr>
</tbody>
</table>

## Hardware and Facility Requirements

<table>
<thead>
<tr>
<th>Power</th>
<th>200, 208, 220, or 240 VAC +/- 5%, 50 or 60 Hz, single phase, 30 AMP, transient free conditioned power</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Air at Bonder Inlet</th>
<th>150 PSIG + 20, -5 PSIG (an optional Air Amplifier is available at facilities with less than 150 psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7 SCFM minimum at air bearings; dew point suppression; and &lt;5μm particle size, oil free</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vacuum</th>
<th>25 in. Hg</th>
</tr>
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<table>
<thead>
<tr>
<th>Operating System</th>
<th>Windows XP ®</th>
</tr>
</thead>
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<thead>
<tr>
<th>Dimensions</th>
<th>Height: 70 inches (1.778 meters)</th>
</tr>
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<tbody>
<tr>
<td>Footprint:</td>
<td>36 inches wide x 35.9 inches deep (0.9144 x 0.91186 meters)</td>
</tr>
<tr>
<td>Weight:</td>
<td>2000 lbs (907.19 kg)</td>
</tr>
</tbody>
</table>
### OPTIONS

Palomar Technologies has the **flexibility** to **customize** its equipment, tooling and processes to meet your packaging needs.

Even the most **complex** and seemingly impossible packaging challenges can be **solved**.

Our greatest **innovations** are often born out of extraordinary challenges brought to us by our **customers**.

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<table>
<thead>
<tr>
<th><strong>Stages and Add-ons</strong></th>
<th><strong>Software</strong></th>
<th><strong>Tools</strong></th>
</tr>
</thead>
</table>
| **Steady State Eutectic Stage**  
1.0 x 1.75 inch  
3.0 x 3.0 inch  
*includes Cover Gas manifold, steady state controller, mechanical clamp actuator and toggle switch to select between mechanical and/or vacuum clamping (only avail on 3x3) | Look-Up Camera Software  
*accuracy of top and/or bottom side alignment | Die Bonder Spare Parts Kit  
*both standard and custom spare part kits available |
| **Pulsed Heat Stage**  
*0.75 inch (19.05mm) diameter heated area  
*Windows XP Graphical User Interface with up to 16 profiles per program  
*Ramp Times: >100°C/Sec, +/-2°C control through cycle  
*custom presentation site and tooling available | CAD Transfer Software  
*allows the die bonder to read a txt file to program part geometry; includes four hours of technical support | Flip Chip 90-180 Degree  
*automatically inverts face-up components for face-down placement, or rotates parts 90 degrees for vertical placement; 90/180 degree operation selected by hardware configuration |
| **6 x 6 inch Heated Stage**  
*includes pyrometer, adapter plate and cabling  
*additional 0.5 inch top plates can be customized for a variety of wafers/packages  
*able to bolt 6 x 4 inch (X/Y) stage; vacuum and mechanical clamping  
*custom stages available  
*includes pre-heated cover gas capabilities | Stand Alone Software  
*allows emulation of 6500 programming environment on desktop or PC | Daub Pot  
*allows transfer printing (daubing) of fluids (typically epoxy); the wiper blade is micrometer adjusted; required for dot sizes of less than 10 mils |
| **Tape Feeder Base**  
*Tape Size depending on application  
8mm, 12mm, and 16mm are common but can be larger | X-Y Scrub Software  
*allows a programmable x/y die scrub to minimize void content | Pick Tool Kit  
* sized to fit your application |
| **Die Ejector with Wafer Handling**  
Vision aided die position correction ensures die placement accuracy  
Flip and direct die pick option  
Programmable die pick up force  
Air ionizer to eliminate ESD in work zone  
Wafer Mapping capabilities incl. downloading of wafer maps  
Recipe management | ID Tracking Software  
*allows input of part identifications dynamically during the build process and provides output data required for component tracking; date/time stamps all critical activities | Narrow Channel Dish/Blade Kit  
*1/8 inch narrow channel dish and narrow blade kit for daub pot; minimizing working volume in daub pot |
| **Low Capacity (Single) Magazine Handler**  
High Capacity (Single) Magazine Handler  
Upstream 3.1 inch J-Style Auer Boat  
Downstream 3.1 inch J-Style Auer Boat | Remote Machine Control Software  
*allows factory host controller to load program, input and verify object identifications; includes phone tech support | Standard Tool Kit  
*daub tools, surface pick tools with a variety of surfaces, perimeter (or pyramid) tools for eutectic and customized applications |
| **Die Bonder Edge Belt Conveyor**  
*custom tooling available | RAMStats SEMI | Waffle Pack Holder  
*fits six 2 x 2 inch slots  
*wafer changer available |

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### About Palomar Technologies

Palomar Technologies, a former subsidiary of Hughes Aircraft, is the global leader of automated high-accuracy, large work area die attach and wire bond equipment and precision contract assembly services. Customers utilize the products, services and solutions from Palomar Technologies to meet their needs for optoelectronic packaging, complex hybrid assembly and micron-level component attachment. For more information, visit www.palomartech.com.

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