

BEAPS™
Backside Emission Analysis Preparation System



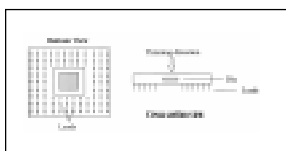
**The Model 575
Backside Emission Analysis Preparation System**

Advances in semiconductor technology have led to the introduction of multiple metal layers and even complete metal ground planes interconnected with vias. In today's advanced semiconductor designs, four or more layers of metallization can trap weak photon emissions beneath overlying metallization or force emissions at such low incident angles relative to the optics that even extended numerical aperture lenses are unable to detect them using frontside inspection techniques. The Model 575 Backside Emission Analysis Preparation System (BEAPS™) is a precision polishing station which provides a means to flat polish a large predefined area maintaining die planarity within 10µ with minimal user supervision. The BEAPS™ system utilizes a versatile stage which can either rotate or oscillate in both the X and Y directions and allows for a wide range of package

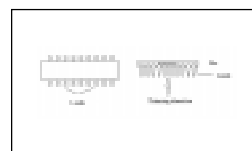
and die sizes to be accommodated. Adjustments set by the user allow only selected areas of the package to be thinned, which helps prevent lead damage and other adverse effects traditionally encountered with standard back thinning methods.

A variety of tools allows for the production of highly polished surfaces which are important for the transmission of the weak photon emissions generally associated with backside failure analysis. Various sized grinding and polishing tools are available to both create the desired thin area and to produce the desired surface finish.

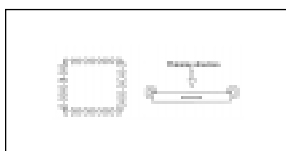
Typical Applications



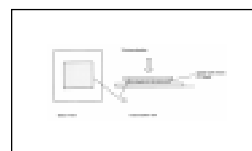
Pin Grid Array Package



Dual In-Line Package



Leaded Chip Carrier Package



Flip Chip Package



Quad Flat Pack Package

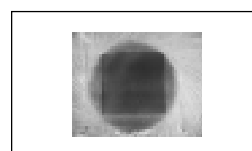


Illustration of the final polished CMOS Si Device produced using the BEAPS™ system.

During the grinding and polishing operation, the specimen is oscillated and the amount of oscillation is controlled by both the Y axis switches and the adjustment of the X axis cam as shown in Figure 1. These various degrees of freedom allow a wide variety of specimen sizes and configurations to be accommodated during the preparation process. Below is a basic diagram of the grinding tool and stage setup illustrating the range of motion which the BEAPS™ stage provides.

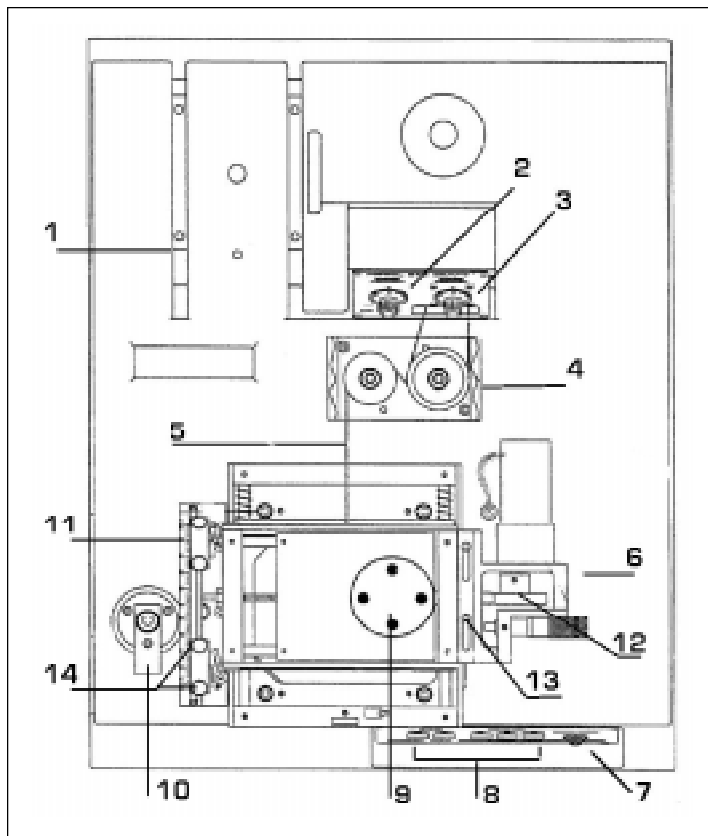


Figure 1 - BEAPS™

Diagram Key

- 1- Work arm
- 2- X axis control
- 3- Y axis control
- 4- Pulley assembly
- 5- Pulley cable
- 6- X axis adjustment
- 7- Wheel speed
- 8- Control Panel
- 9- Specimen pedestal
- 10- Micrometer depth gauge
- 11- Y axis limit switches
- 12- X axis adjustment cam
- 13- X axis stage adjustment screws
- 14- Y axis switch adjustment screws

BEAPS™ System Design and Operation

The unit consists of the following:

- Depth micrometer, with 1μ resolution, controls the amount of material to be removed.
- Arm mechanism which houses the drive pulleys and the arbor shaft where grinding and polishing tools up to 2" diameter are mounted.
- Motorized stage which can oscillate in the y - axis direction up to 25mm.
- Motorized x-axis direction moves the specimen perpendicular to the grinding tool up to 10mm.
- Rotating pedestal can be rotated 360° continuously.

Special Features

- Produces polished areas up to 50mm² on packages up to 2" square.
- Leads are left intact for easy device biasing.
- Automatic depth control allows precision polishing to within 10μ of metallization layer.
- Ideal for both plastic and ceramic packages.

Specifications

Dimensions:	14" W x 14" H x 21" D
Net Weight:	40 Lbs.
Electrical Input:	95-120 VAC 50/60 Hz 200-240 VAC 50/60 Hz
Specimen Load:	0-700 grams
Tool Rotation:	0-250 RPM
Specimen Rotation:	20 RPM
X-Axis Micrometer Resolution:	10μ
Y-Axis Resolution:	2 mm
Depth Micrometer Resolution:	1μ
Tool Diameter:	2" (50mm)



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