



Preparation of Surface Mount Packages Directly on PC Boards for Backside Emission Analysis



SBT
Lapping and
Polishing

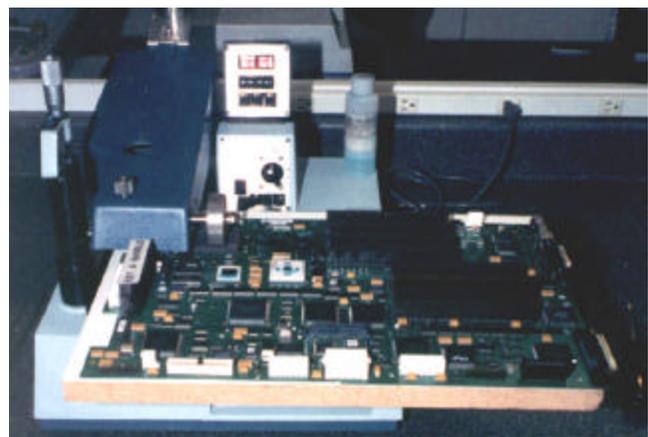
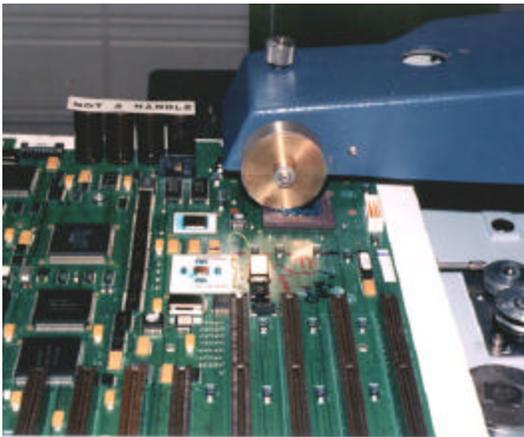
1.0: Purpose

To successfully prepare a surface mounted FLIP CHIP as received on a functioning and operating PC board. The device needs to be thinned down to within 100 microns of the surface layers and should be planar over the entire die area. Polishing of the die to a mirror finish should also be accomplished as these devices will be imaged using backside photoemission microscopical techniques.

Development of a new stage for the Model 575 will also be considered to accept these largely irregular specimen types.

2.0: Experiments and Procedures

The chip to be prepared for backside analysis was mounted onto the PC board at the upper left corner of the pc board. The board was quite large, with dimensions of 15" long x 10" wide. Below are two pictures showing the basic configuration used for the preparation.



After the stage was modified, it was then placed onto the BEAPS for backside grinding. The initial grinding was done using a 15mm wide, 15 micron diamond grinding wheel. This was used to bulk thin the backside substrate to about 100 microns of the frontside metallization. Polishing was done using 9, 6, 3, and 0.5 micron diamond paste with a polishing wheel. The load applied during these steps was 25 grams and the speed of the grinding wheel was set at 10 (about 200 rpm). Stage oscillation was set to allow the entire device to be thinned.

Although the grinding was successful, the package began to delaminate during the final polishing stages mainly caused by too much substrate material being removed.

3.0: Results

Although the overall process appears to be a success, there are a few difficulties associated with this technique, primarily due to the stage modification which had to be made to accommodate the large board. The largest grinding tool currently made by SBT is 15 mm and the total die width was 20mm. Therefore this meant the entire board had to be moved over to allow the entire package to be thinned. Due to inconsistency in the mounting of the board, this caused some differences in height measurements and thus caused the die to thin unevenly. Also, the pc board material itself gives slightly with any applied force, and with the weight of the grinding tool onto the board this also caused a minor change in specimen height. All of these factors can be dealt with easily by having a good stage design and a larger grinding tool.

Overall the process looks very promising and can easily be adapted to the existing machine so long as the devices of interest are not centered in the PC board area.