



Hardware Conversions

ELECOMP Capstone Design Project 2023-2024

Sponsoring Company:

Vicor

1 Albion Rd
Lincoln, RI 02865

<http://www.vicorpower.com>

Company Overview:

Vicor Corporation designs, develops, manufactures and markets modular power components and complete power systems based upon a portfolio of patented technologies. Headquartered in Andover, Massachusetts, Vicor sells its products to the power systems market, including enterprise and high-performance computing, industrial equipment and automation, telecommunications and network infrastructure, vehicles and transportation, aerospace and defense.



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Project Motivation:

1st semester:

Wafer diameters are always increasing. A few years ago, Vicor converted all 6-inch wafers to 8-inch line. One of the products is 180 degrees out. Meaning we need to run the wafer upside down with existing hardware. This requires a tech to rotate the wafers maps when shipped for bumping, when they get back and again when shipped for tape and reel. We want to eliminate these three added rotation steps.



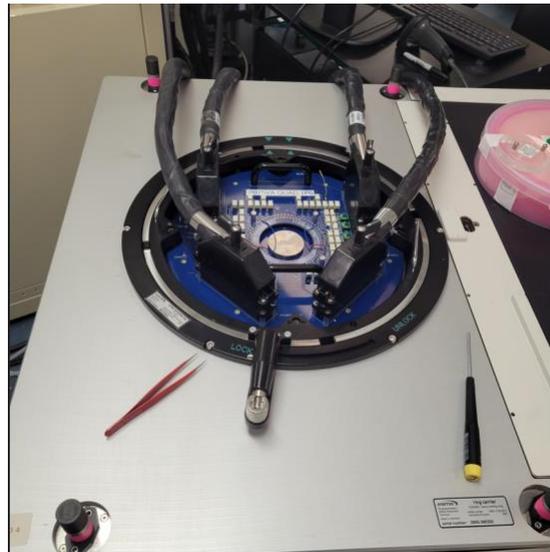
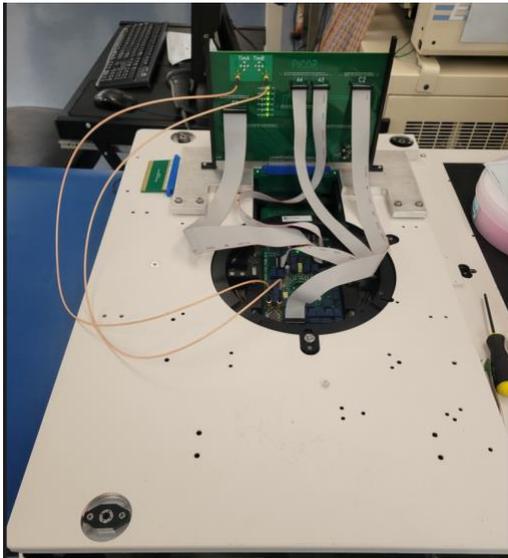


We also want to convert from rectangle 4 ½ cards to 12” round cards. For both Probe and Bump cards.

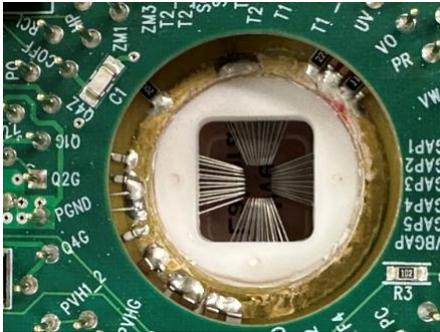




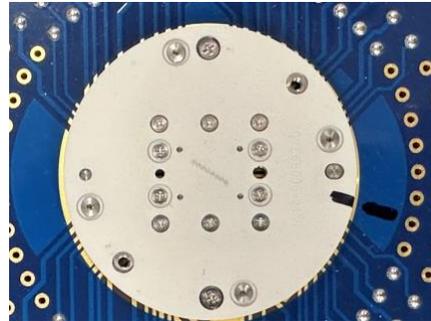
Going to a round 12 inch solution allows for more component real estate and eliminates the need to swap probe tops.



Technology is always improving so we want to change our probe cantilever needles to direct connect probe needle.



Cantilever



Direct connect

This will help in reducing scrap from needles pushing outside the passivation area.

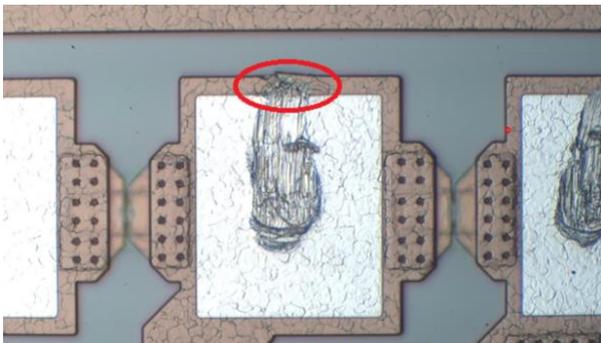


Figure 1.

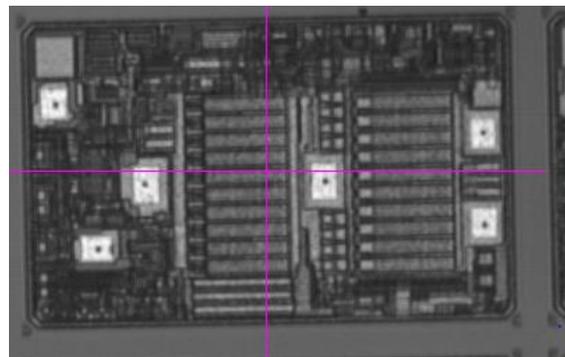


Figure 2.

You can see in Figure 2, the small indents on the pads when using Direct connect compared to cantilever in Figure 1.



Anticipated Best Outcome:

1st semester:

The anticipated best outcome of this project is the creation of a 12" Round direct connect probe solution and a 12" Round Bump solution eliminating the need to rotate wafer maps.

2nd semester:

The anticipated best outcome of this project is to evaluate new driver chips in an application where the device passes.

Project Details:

First Semester:

PAD:

- X,Y pad locations
- Ordering SV probe head
- Create Schematic (Orcad / Altium)
- Review Layout
- Test device on wafer

Bump:

- Create Schematic (Orcad / Altium)
- Review Layout
- Test device on wafer



Second Semester:

- Components Research
- Create Schematic (Orcad / Altium)
- Review layout
- Evaluate signals with scope and device under test.

Hardware/Electrical Tasks:

- Researching IC's
- Using Ohms law to understand the process of the testing

Composition of Team:

2 Electrical Engineers

Skills Required:

Electrical Engineering Skills Required:

- Basic Electrical Engineering laws (Ohms Law)
- Basic Debug skills
- Basic ability to solder
- Schematic Capture
- Basic PCB design understanding



Anticipated Best Outcome's Impact on Company's Business, and Economic Impact

With the conversion of the hardware, we will be able to eliminate the need to rotate maps, which is the gating item when running production. This will save man hours and the cost associated with time loss if the step is missed.

Broader Implications of the Best Outcome on the Company's Industry:

Our current obsolete drivers can be damaged if improperly handled. With new driver chips, we can eliminate our risk exposure by having available replacement components.