

# RapiTrim Case Study #1

## Thin Film, Multi-up Circuits

### The Setup

The customer's circuit consisted of a total of 16 thin-film resistors, laid out on an area approximately 5 x 10.5 mm. A 5 x 10 array of circuits was on a standard high purity alumina substrate, 60 x 60 mm in size, as well as aluminum nitride. A variety of resistor shapes and trim types was required. The customer was interested in cut quality and throughput.

### The Resistors

- R1 Serpentine with 5 long legs.
  - R2, R3 Symmetric scan cuts with shared metal leg that was also to be cut.
  - R4-R7 Symmetric scan cuts.
  - R8 Ladder rungs with final top-hat plunge cut.
  - R9 Scan cut around outer edge of all three sides of a U-shaped resistor.
  - R10-R13 Symmetric scan cuts similar to R4-R7, but arranged at a 45 degree angle.
  - R14-R16 Scan cuts on parallel resistors but trimmed individually using a guard probe.
- Marking Circuit alphanumeric serialization mark to be placed at designated location.

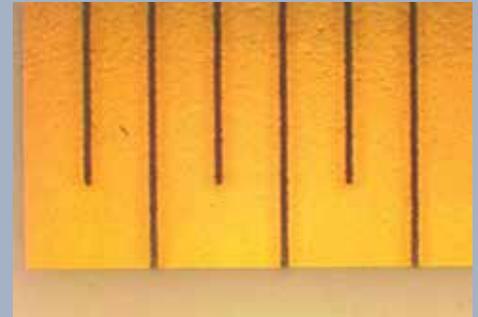
### Tests Performed

For demonstration purposes, and to avoid any batch variation in resistor creation, all resistors were trimmed to their maximum allowed physical limits, regardless of the actual resistance target. E.g. symmetric scan cuts were set to remove 25% of the resistor width, 12.5% from each side. The long scan cuts on the U-shaped resistor took the most time.

### The Results

Total trim time for the 50 circuits on the substrate was 9m15s, including about 10s for coarse (2-point) and fine (4-point) alignment.

The response from the customer was that this was a "GIANT" improvement in throughput over his probe-card based system.



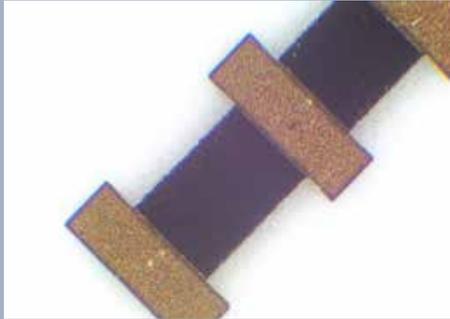
Serpentine Trim Cuts



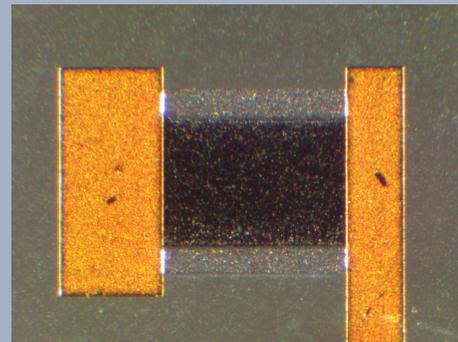
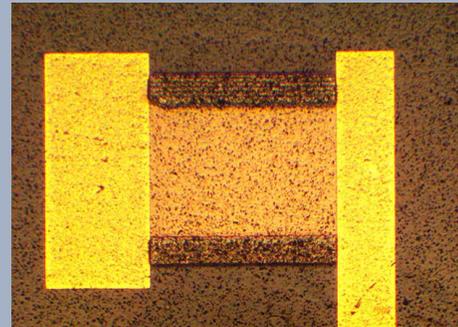
Corner of U Shave Cut



Ladder Cuts and Final Plunge



Symmetric scan cut at 45°



Symmetric scan cuts with different illumination demonstrating no damage to the AIN substrate



Alphanumeric marking example

#### PPI Comments

As shown in this example, the fixtureless technology in the RapiTrim uses four independent flying probes, allowing dense, complex circuit layouts to be trimmed as easily as simple designs. Any component location, size, orientation and layout can be accommodated and there is no longer a requirement for multiple probe card passes for dense designs.

A complete family of RapiTrim products is available with different wavelengths. Optional hardware includes stack loaders, custom fixturing, the SM200 switching matrix, external instrument support, bar-code readers and process sequence customization.

PPI can provide turnkey solutions for all trimming needs, from standard component and circuit trim to complex active-trim scenarios with custom fixturing.



**RapiTrim - *The Future of Resistor Trimming™***