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V1.5

This document is written as a resource for processing flex materials. This list is written to handle most known issues, expedite turn times, eliminate error, and facilitate job processing. Addressed in this documented are proper ways to locate fiducials on a flex circuit as well as recommendations for increased copper usage. This document is offered as additional information to the process-specific Order Guidelines files.

Fiducials in Flex Materials

Due to stretching and floating variations in flex materials, there are steps that need to be taken to ensure proper alignment. The ideal fine fiducial placement is located on or near the part. Securing the fiducial to a significant area of copper limits how much the feature can float and can greatly improve positional accuracy. It is recommended that non-active panel area be copper filled to minimize positional errors. If the part/panel design prohibits a copper re-enforcement pattern or fill, please contact one of our salespersons to create a best case solution.

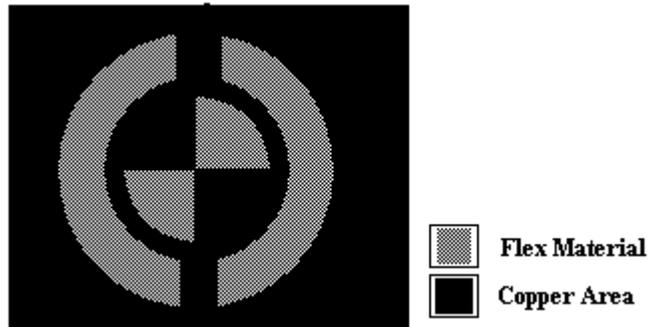


Figure 1

Figure 1 above shows a properly secured fiducial: a bowtie surrounded by copper, tied in with a crossbar to prevent shifting or skewing.

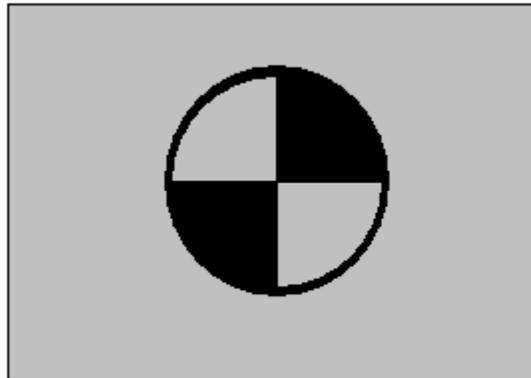


Figure 2

Figure 2 shows an unsecured fiducial surrounded by flex material. This fiducial is likely to vary positionally and lose significant positional accuracy due to stretching, rotation, or non-uniformity in the flex material. Such fiducials can generate inconsistent panel scaling.

Part Fiducials:

Depending on the required part tolerance, placing secured fiducials adjacent to each part promotes more accurate alignments. High tolerance applications can leverage multiple fiducials per part, with a minimum of 2-4 fiducials. See Figure 3 as an example of the best-case layout. The fiducials are securely tied to the copper and located very close to the part. This is ideal, since a shorter distance between part and fiducial gives greater accuracy when per-part alignment is used.

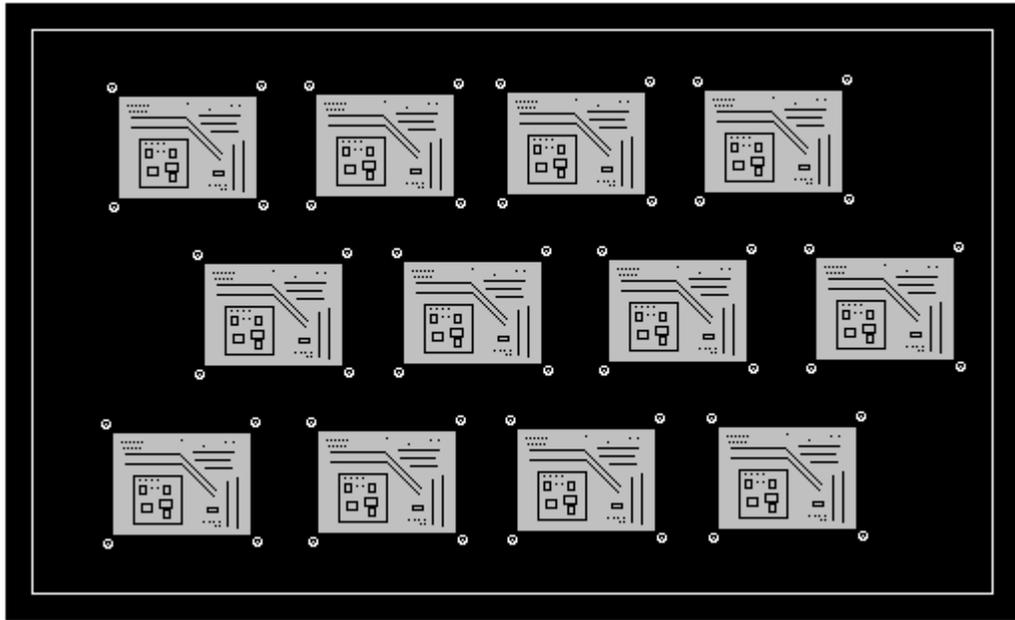


Figure 3 : Per part alignment with copper filling

Panel Fiducials:

Where part tolerances allow, fiducials can be located for half-panel(2 alignments/panel, as shown in Figure 5) or quarter-panel(4 alignments/panel, as shown in Figure 6) alignments. In Figure 4, full-panel alignment is shown. The advantage is reduced alignment time and cost. However, this method of alignment may reduce positional accuracy as compared with per-part alignment.

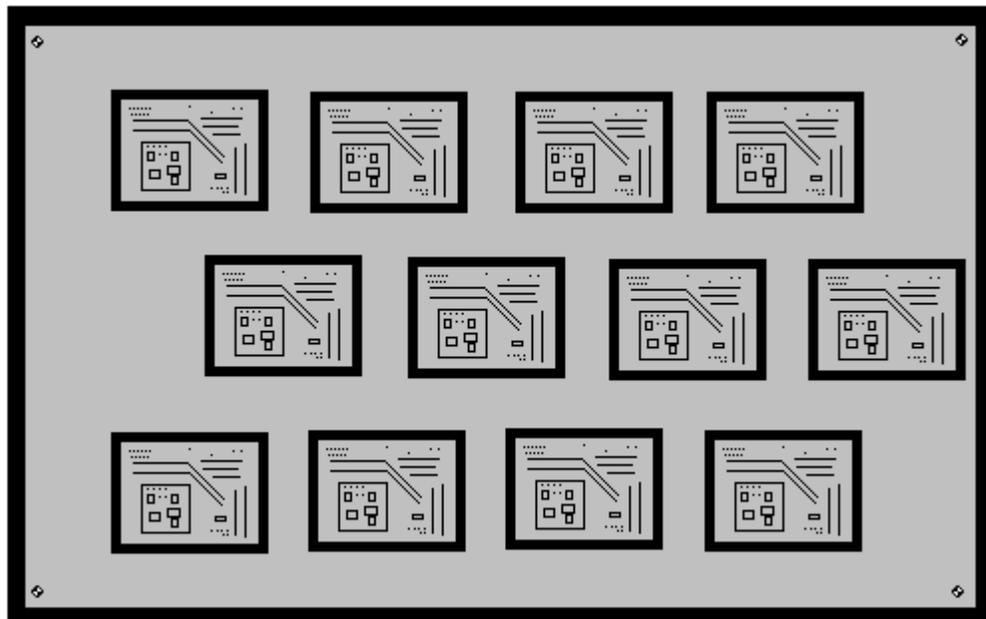


Figure 4: Full-panel alignment without copper filling

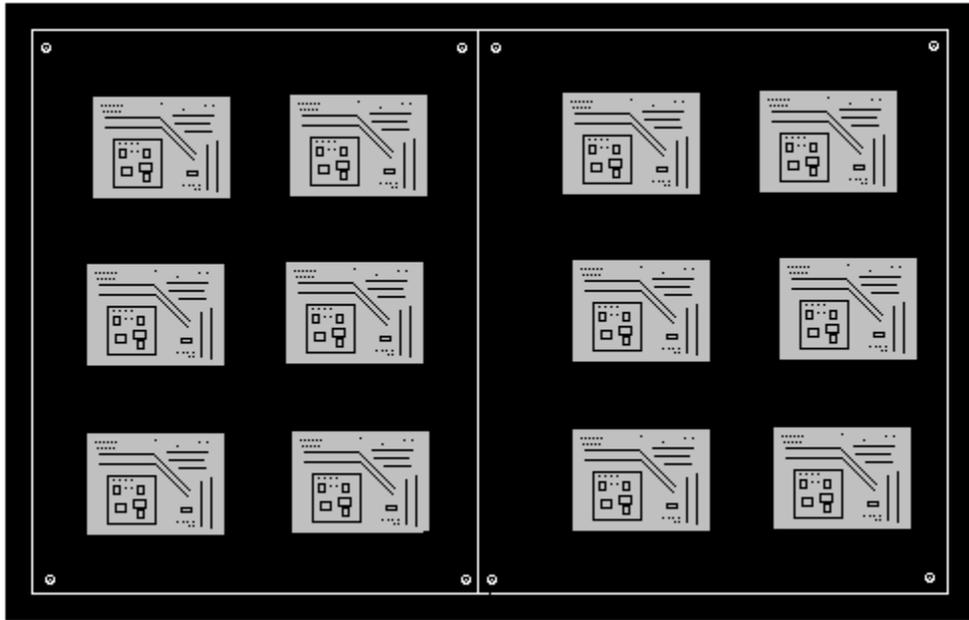


Figure 5: An example of half-panel alignment.

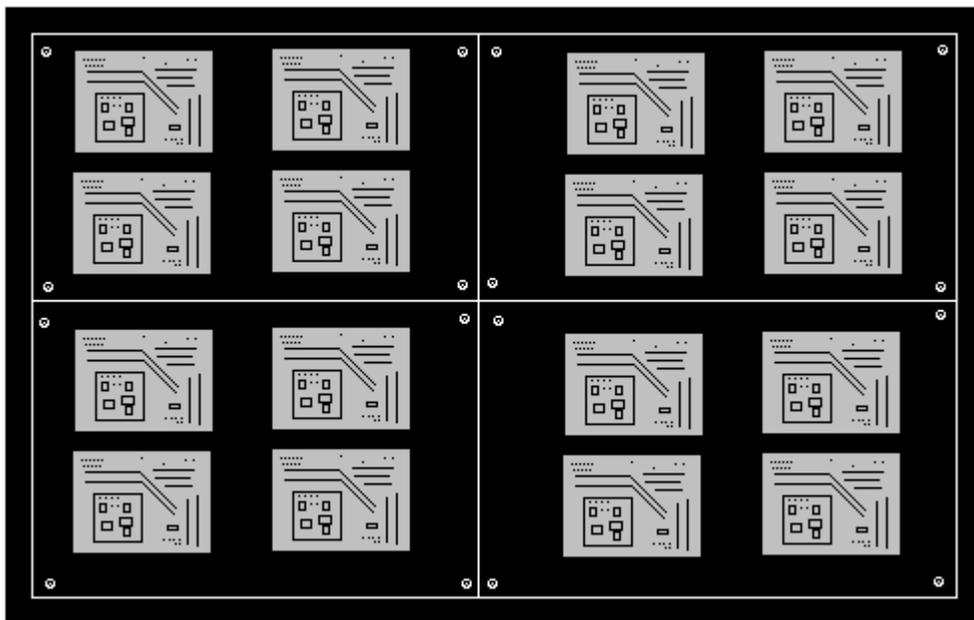


Figure 6: An example of quarter-panel alignment.