Solar Cell Mounting Procedure

Based on NASA solar cell mounting method and/or university Kapton tape method.

(Pictures to be added in time)

1. **String together solar cells.**
   1. **Create alignment plate.**

The mounting rig is an aluminum plate with indents for aligning solar cells.

* 1. **Place cells on alignment plate.**

The solar cells are placed face down in the corresponding indents. The tabs attached to the front surface will extend upwards.

* 1. **Prepare interconnections for reflow.**
     1. **Create stencil**

The stencil allows smooth consistent applications of solder paste on the back of the cells in the spots where the interconnecting tabs will lay. Additionally the stencil keeps solder paste away from the edge of the cell so that the top and bottom do not short.

* + 1. **Apply solder paste.**

Use silver saturated solder only. (Datasheet recommends Sn96.5/Ag3.5) It can be low temperature reflow or regular temp reflow. Possible choice of solder is: <http://www.hisco.com/Manufacturers/Alpha/Soldering-Rework/Solder/Solder-Paste/149891-1998>

* + 1. **Overlay interconnectors.**
    2. **Overlay a silver foil tabs as specified.**

The silver tab is used as the positive terminal of the top cell in a string, because the base of the cell does not have a tab of its own without the interconnections from the next cell.

Possible place to acquire silver foil: <https://www.americanelements.com/silver-foil-7440-22-4>

* 1. **Reflow String of cells.**

The entire mounting rig can be reflowed together, according to the NASA engineer the aluminum will not get hot enough to damage the front of the cell.

1. **Option #1: Mounting the string of cells with NASA’s method.**
   1. **Apply Epoxy to the PCB board.**

The NASA engineer recommended a “2 part RTV epoxy which cures at room temperature”.

* 1. **Place the string of cells on the epoxy.**

While the epoxy is curing the cells can be moved into position.

* 1. **Solder the top and bottom tabs in place.**

This should be done while the epoxy is still curing using the same silver saturated solder using a heat gun.

* 1. **Place in vacuum bag to cure.**

This will prevent air from being trapped under the epoxy.

1. **Option #2: Mounting the string of cells with Kapton Tape.**
   1. **Clean the back of the cells.**

This step allows the kapton tape to stick better.

* 1. **Place double sided kapton tape across the surface area of the cells.**

Trapped air is not a huge issue here because the area of the trapped air compared to the area of the kapton should be small. But applying the kapton carefully and smoothing it out is required. Additionally parallel strips of kapton could be used to provide a path for the air to escape.

* 1. **Cut the Kapton tape along the outline of the cells.**
  2. **Place the board onto the cells in the alignment rig.**

Here air pockets don’t have to be avoided because the board side will have vias to space.

* 1. **Solder the top and bottom tabs onto the pads.**

Use the silver saturated solder and a heat gun.