MM5620/MM5622 Rework Instructions

October 2024 Rev 1.4

Introduction

The Menlo Micro MM5260/5622 is an LGA packaged device and although this provides many benefits in terms of space and performance there may be circumstances that require replacement of the part on the circuit PCB.

Treat the device as electrostatic sensitive and observe all customary handling precautions including working on static dissipative surfaces, wearing wrist/shoe straps, ESD smocks/jackets or other ESD control devices. Store unused devices in their packaging in ESD bags. Do not store loose parts in bulk bins, do not use parts that have been stored on workbench tops or that have been dropped.

As the device is only 8.2 x 8.2 x 2.05 mm in size, much of the rework procedure needs to be performed under a microscope or other magnifier. For any rework, we recommend replacement with a new, previously unmounted part.

The top surface of the chip is covered with a black acrylic coating and marked as indicated in the data sheet. Figure 1 shows typical part marking which include machine readable 2D bar code and human readable part number.

This application note provides instructions for the device removal and rework assembly of the MM5620/5622 device. Examples are based on one of our customer's PCB (SynergieCAD), measured at a 4.60mm thickness, as well as Menlo's EVK design, which is constructed with a standard PCB thickness of 1.54mm.

There are two different rework processes that are discussed. The first suggestion is to add solder balls to the underside of the device, converting it to a BGA format, and then mounting it to the PCB as such. The second suggestion is to follow the traditional method of mounting an LGA by using solder paste and a stencil (screen printing solder paste).

All rework in this application note was done using leaded solder. Temperatures and timing mentioned in this application note may vary depending on the type of solder used during the rework process.

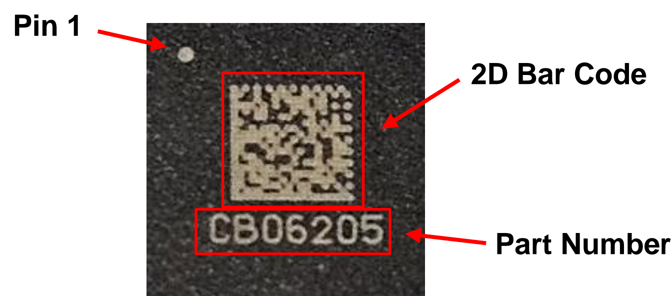

Figure 1: Typical marking with Pin 1 identifier, 2D barcode and Part Number

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Recommended Materials and Equipment

It is critical to ensure that any rework is performed in an ESD safe work area, which includes static dissipative surfaces, wearing wrist/shoe straps, ESD smocks/jackets or other ESD control devices.

Typical supplies and tools required for the rework are listed below:

- Heat Gun
- Air Gun
- Electronic Hot Plate
- Liquid or Paste Flux
- Tweezers
- Spatula
- Brush
- Isopropyl Alcohol (IPA)
- Lint Free Wipes
- MM5620/MM5622 Stencil [*Figure 2*]
- Solder Paste SN63PB37 (or SAC)
- Kapton Tape
- Solder Wick
- Microscope
- 4 mil Stencil thickness
- BGA Solder Spheres .014” (0.35mm) diameter SN63PB37 (or SAC)
- Grounded Work Surface

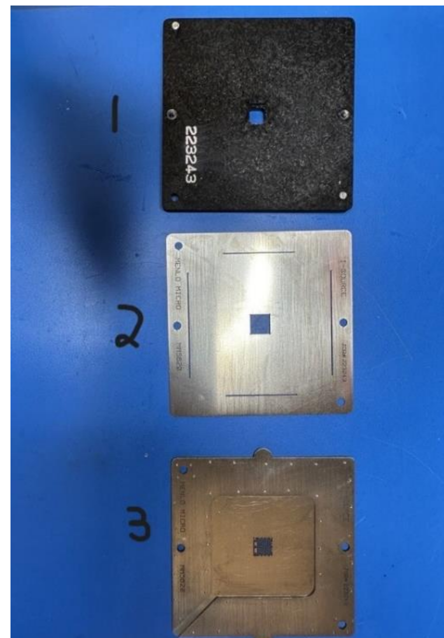

Figure 2: MM5620/MM5622 Stencil (contains 3 layers)

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Balling Procedure – LGA to BGA Device Format

1. Place MM5620/MM5622 device on the stencils 1st layer

2. Apply flux on the device and use a brush to spread it evenly.

3. Place the 2nd layer of the stencil and then place the 3rd layer on top of the 2nd layer.

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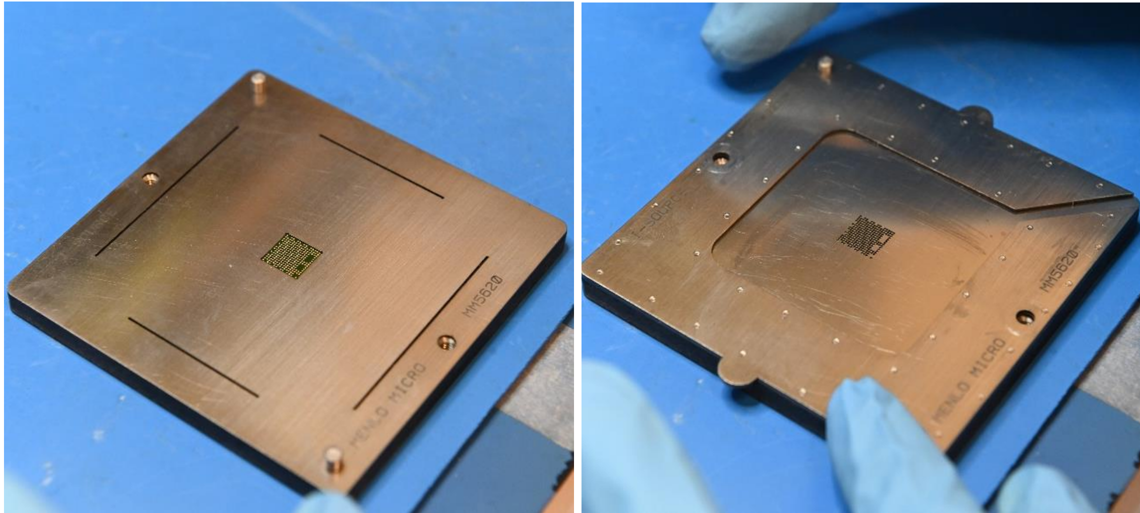
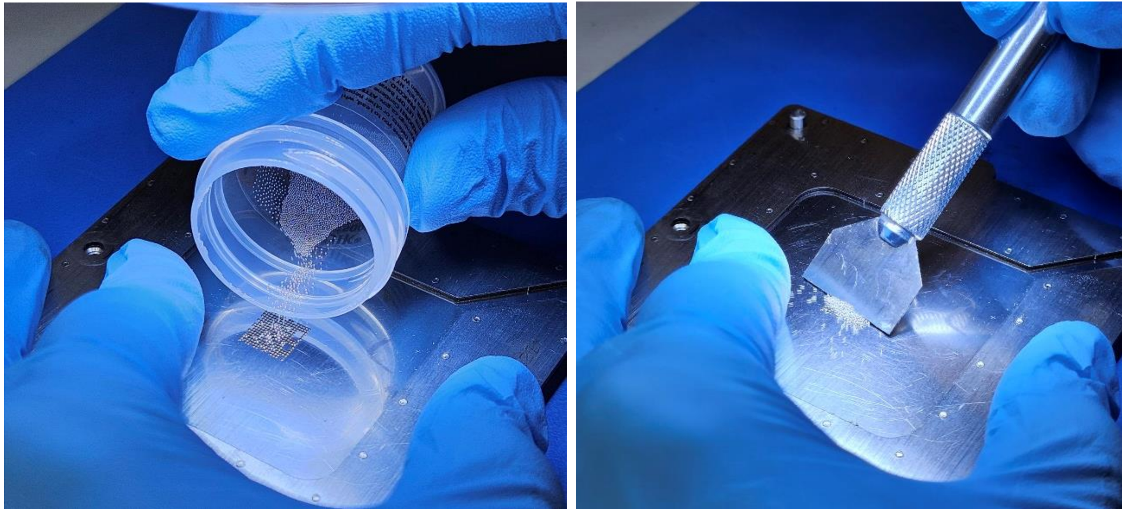


4. Apply the solder balls and spread around using the spatula. Make sure each aperture contains a solder ball.



5. After ensuring that each aperture contains a solder ball under a microscope, carefully remove the 3rd and 2nd layer of the stencil without disturbing the solder ball placements.

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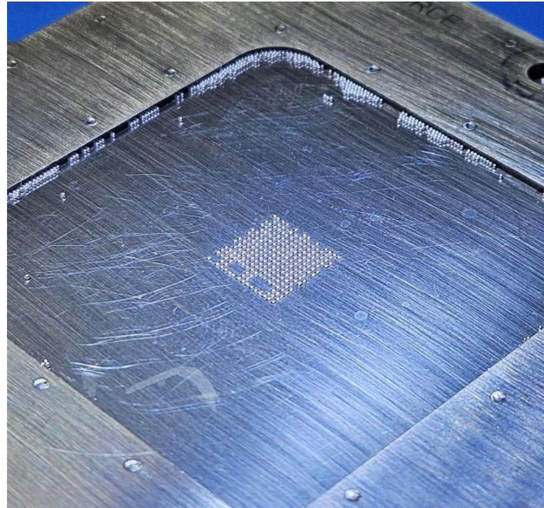
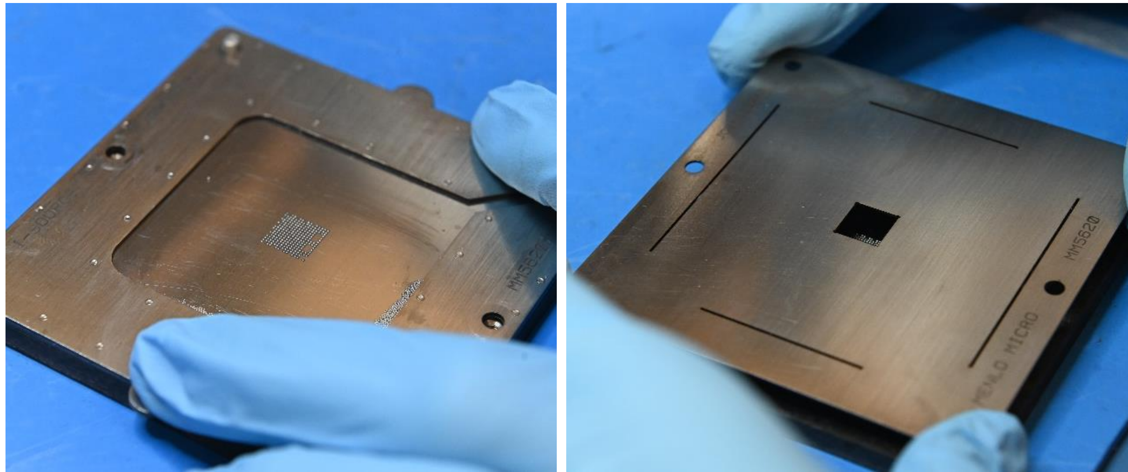
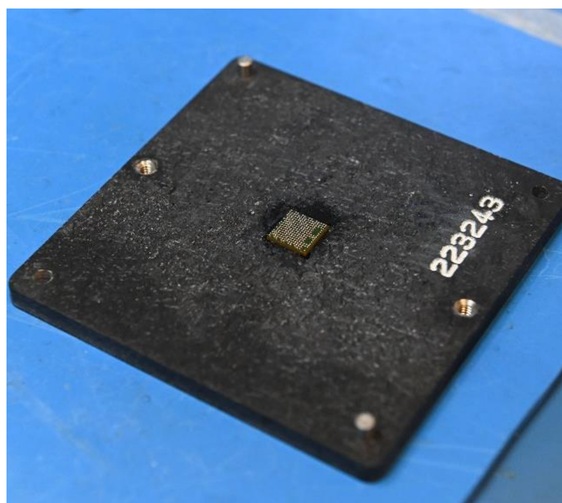




6. Check that the solder balls are even with the pad under a microscope.



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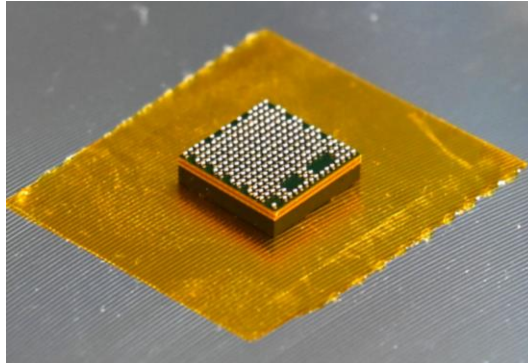
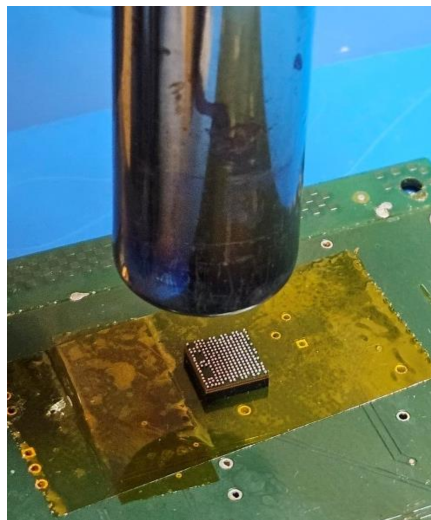
7. There are 2 options for this next step:

   a) Option 1: Using the electronic hot plate, place a small piece of Kapton Tape down on the plate. Then place the device on top of the tape. Preheat the hot plate to ~236° C. Wait for the solder balls to melt. They will have a shiny look to them. Turn the electronic hot plate off after about 10 seconds.



   b) Option 2: Using the heat gun, set it to ~350° C and hover over the device until you see the solder balls melt; they will have a shiny look to them.



8. Let the device cool down. After allowing it to cool down, complete a final inspection. Examine solder balls under a microscope to ensure everything looks even and all apertures are filled.

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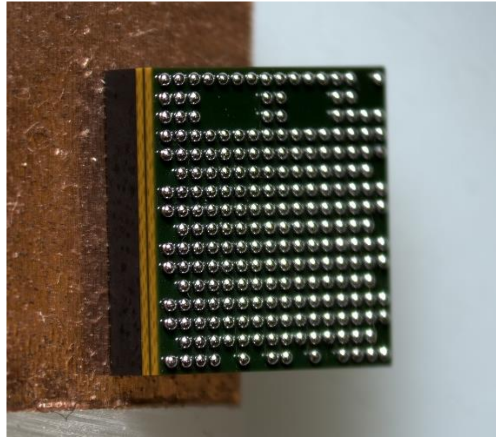
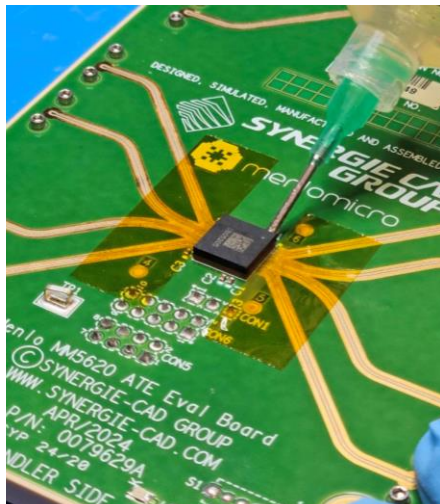


Device Removal Procedure – Thicker PCB

1. Place Kapton tape around the device to protect the surrounding board/traces then apply flux around the device as well as the underside of the part.



2. Preheat the bottom of the device to ~100° C using a hot plate. In addition, use the heat gun (heated to ~350°C) and hover over the device. Solder paste will start to melt. This should take about 2-3 minutes to accommodate for the PCB's thickness.

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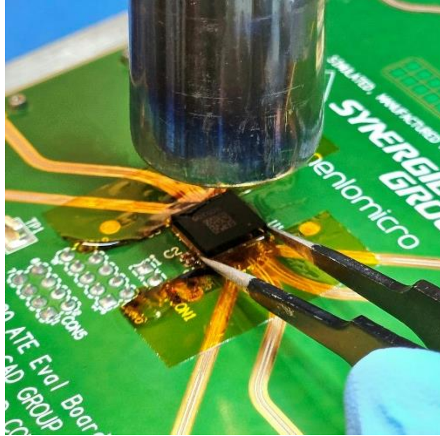
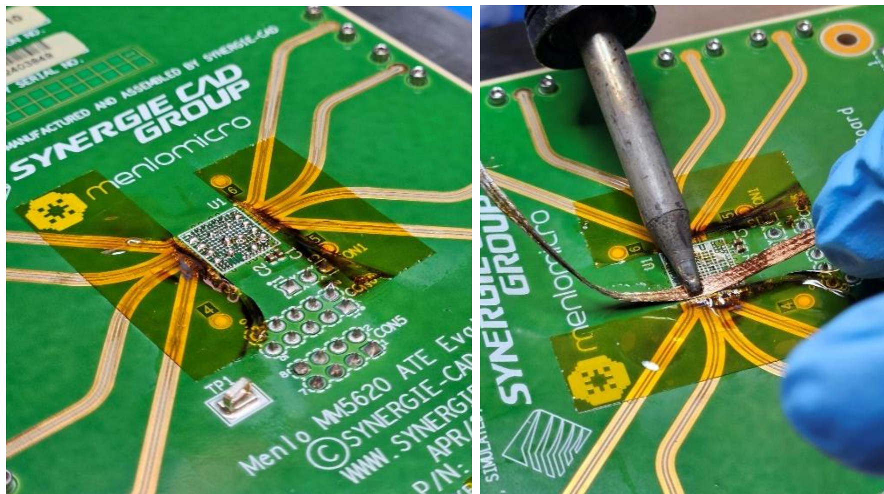
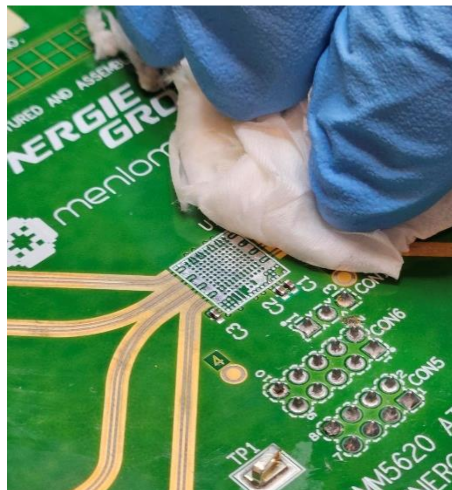


3. Once solder is melted, remove the device using tweezers. Clean the pads with solder wick to remove the remaining residue.



4. Use lint-free wipes and IPA to thoroughly clean the board of any residue.



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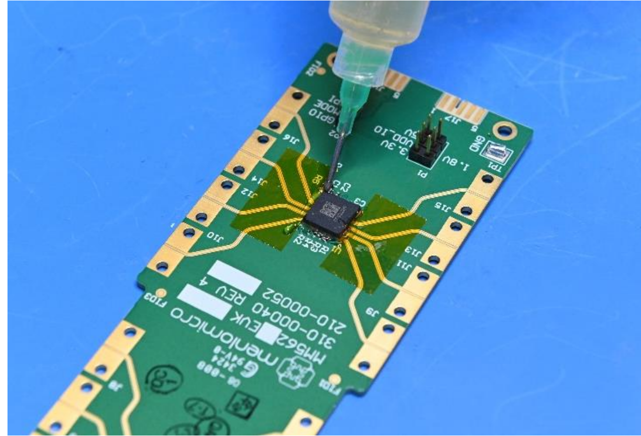
Device Removal Procedure – Standard PCB Thickness

1. Place Kapton tape around the device to protect the surrounding board then apply flux around the device as well as the underside of the part.



2. Preheat the bottom of the device to ~100° C using a hot plate. In addition, use the heat gun (heated to ~350°C) and hover over the device. Solder paste will start to melt.

3. Once solder is melted, remove the device. Clean the pads with solder wick.

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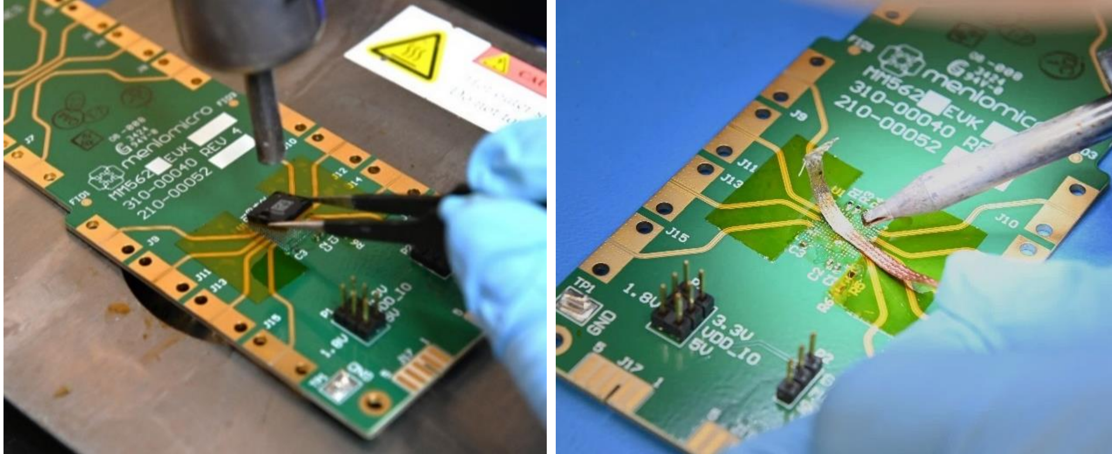
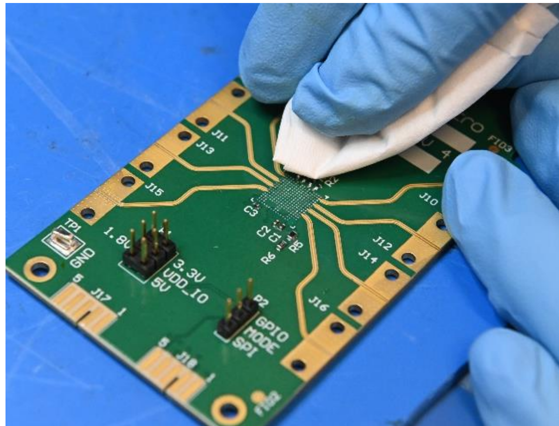
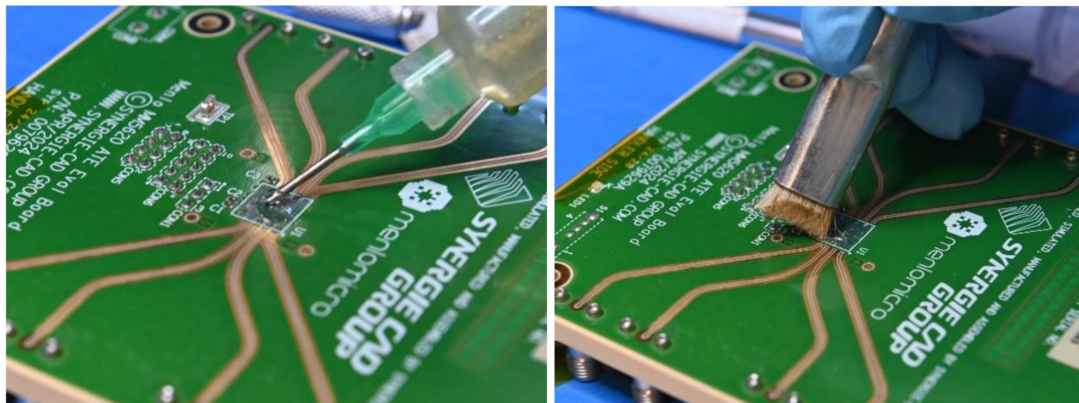


4. Use lint-free wipes and IPA to thoroughly clean the board of any residue.



Device Assembly Procedure – Placement of Devices with Solder-Ball Contact on Thicker PCBs

1. Once mounting area is cleaned, apply flux to mounting pads on the PCB and use the brush to spread the flex evenly.



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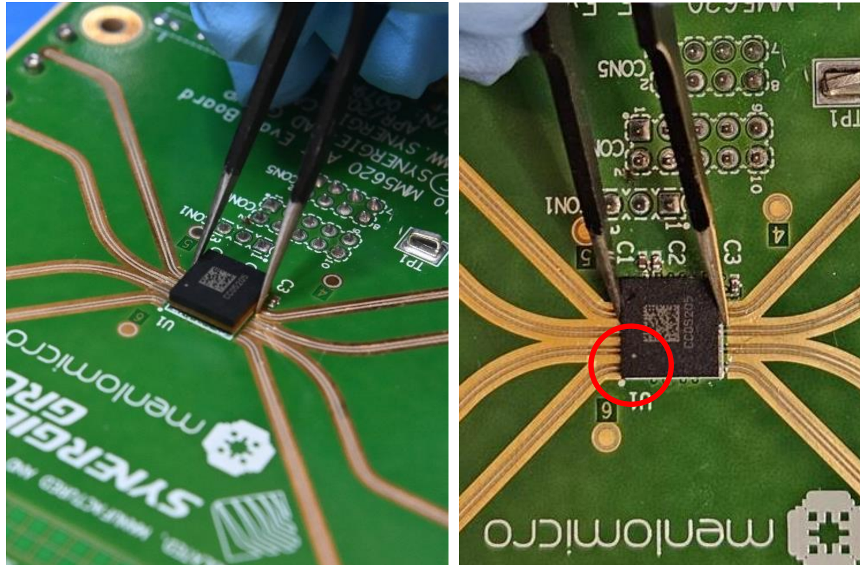
2. Place the device onto the board in the mounting area. Make sure that it is aligned using a microscope and that the device is oriented correctly with Pin 1 marker. Then, apply slight pressure to the device to ensure contact.



3. Place Kapton tape around the device to protect the surrounding board/traces.

4. Place the board with the device on the hot plate. With the hot plate turned on, use the heat gun set at ~350° C and hover over the device. Wait until you see the solder melt; it will have a shiny look. This takes about 5 seconds.

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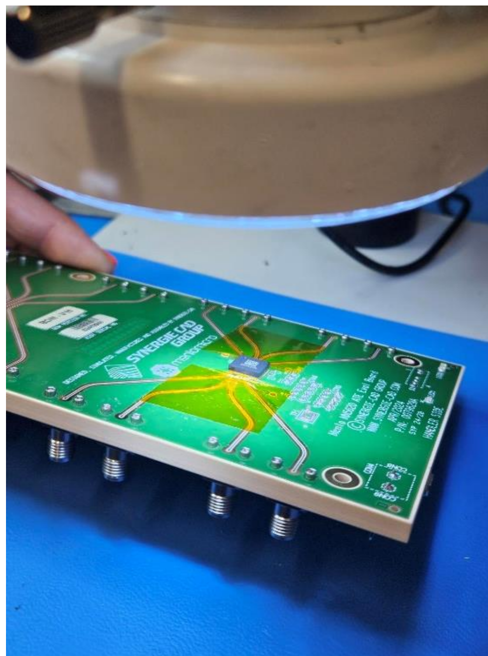
5. Afterwards, remove the board from the hot plate and allow it to cool. After cooling down, complete final inspection of the device using a microscope to ensure that the solder is evenly melted on all sides.



Device Assembly Procedure – Screen Printing with Solder Paste on Standard PCBS

1. Place the MM5620/MM5622EVK Board onto the fixture.

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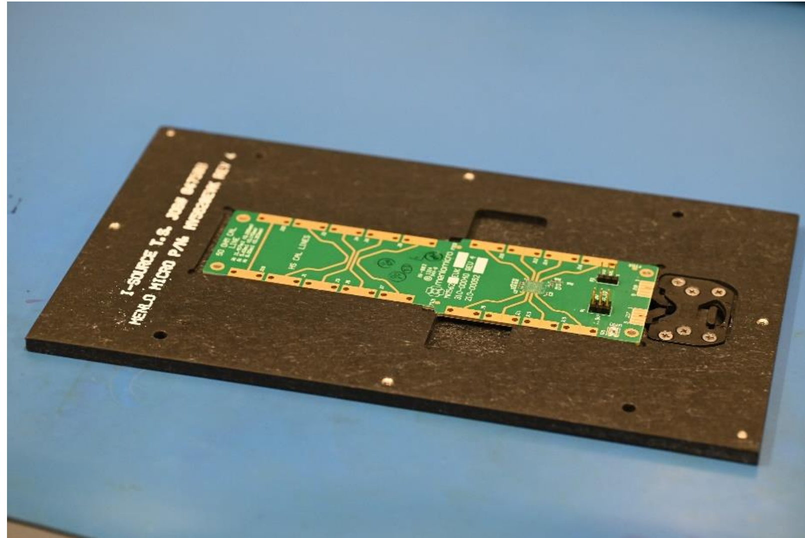
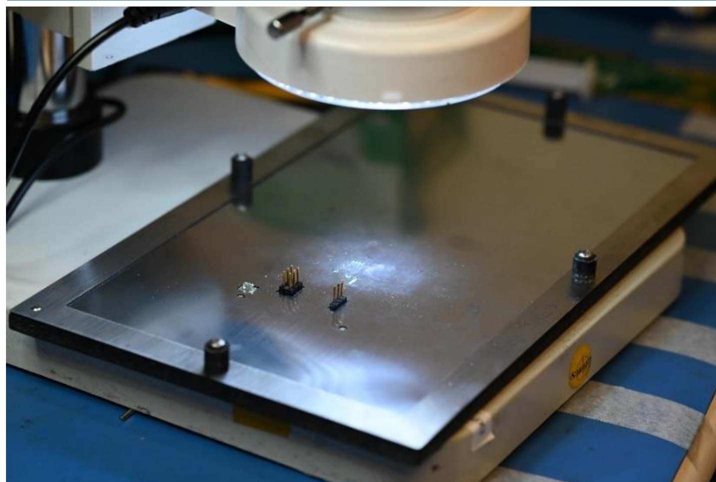


2. Place the stencil on top of the fixture and secure it with the screws.



3. With the stencil screwed on, apply solder paste.

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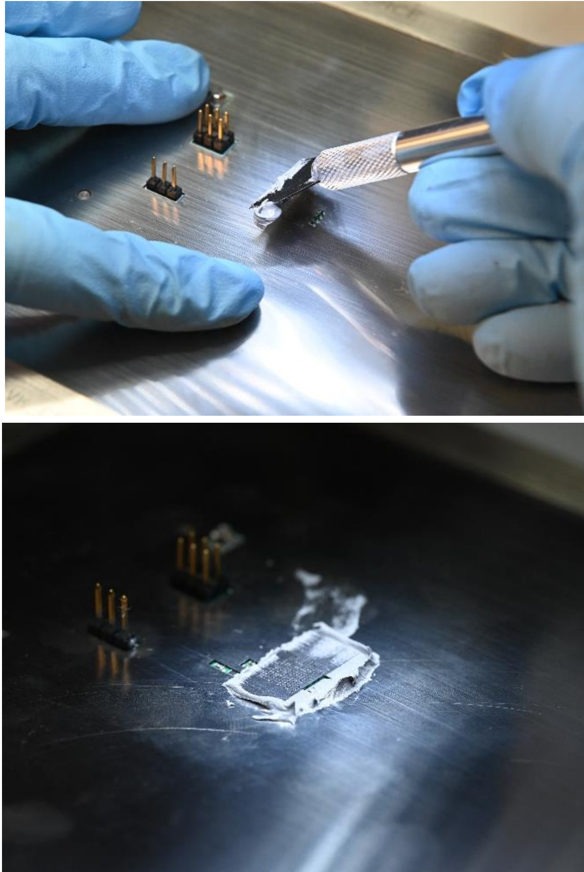
a. Stir the solder paste and apply it to the stencil with a miniature squeegee. Hold the spatula at a 45° angle to the board and apply the paste using enough force to ensure that sufficient solder is compressed into the apertures. This stencil allows you to go back and forth numerous times to ensure that the apertures are filled up.



6. After the solder paste application is done, unscrew and carefully remove the stencil without disturbing the solder.

4. Inspect the solder paste application after removal of stencil to ensure everything looks good.

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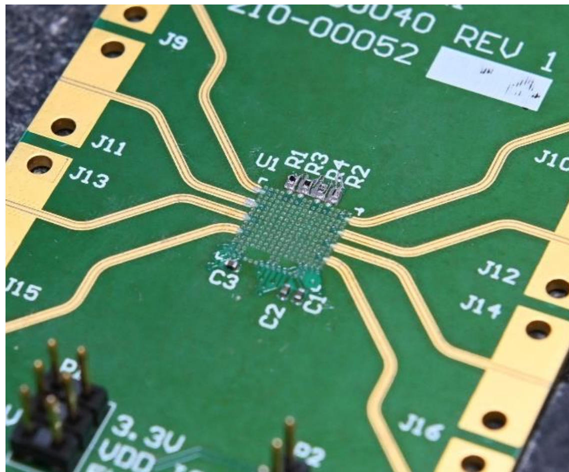
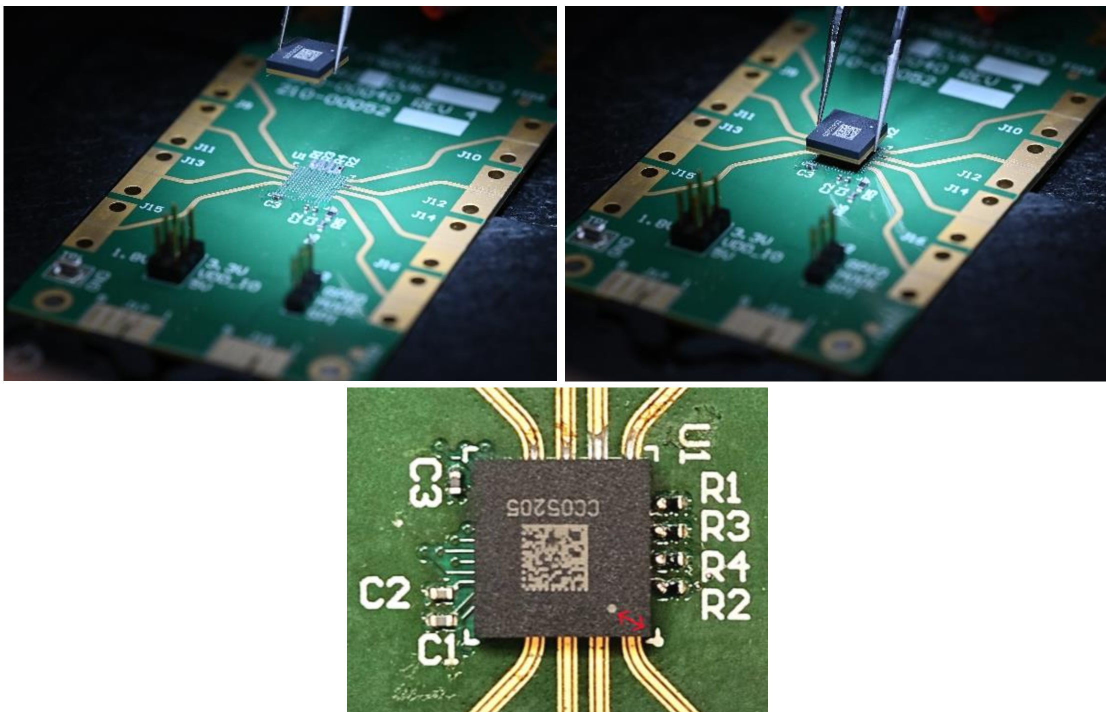


5. Place the MM5620/MM5622 device by hand, on top of the solder and press down on it lightly to ensure that the device lays flat. You will feel the LGA slide into place when it is aligned. Make sure that the pin on the corner of the device is lined up with the pin on the PCB.



6. Place a small piece of Kapton tape near the device and add a drop of solder paste on the tape. Use this as a guide to see when the solder melts. Then, place the PCB on the hot place. Preheat the bottom to ~235° C.

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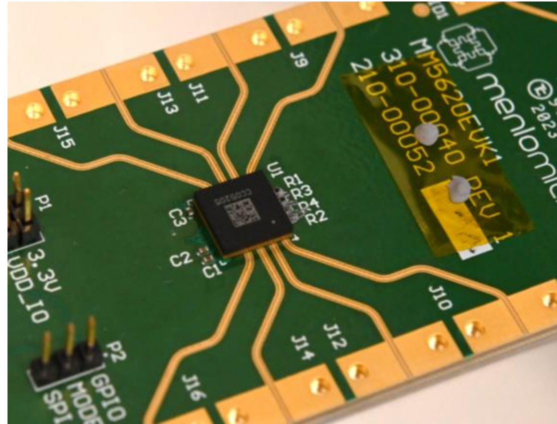
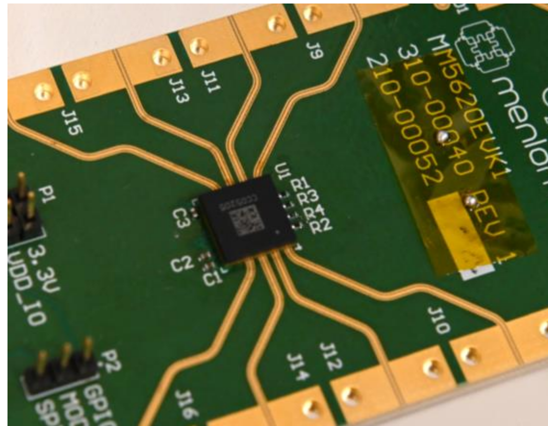
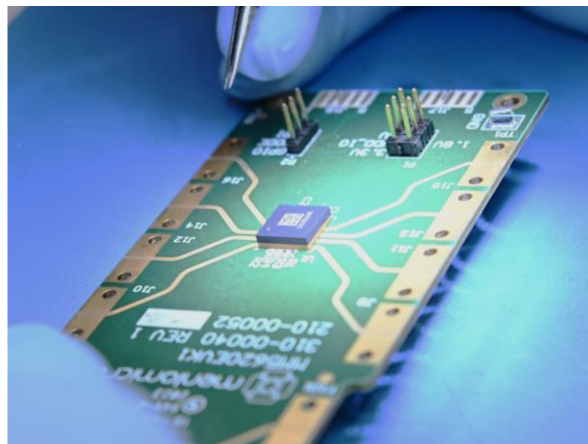


7. Allow the solder to melt then wait 15 seconds before turning off the reflow soldering station. It should have a shiny look to them. Let the PCB cool down before touching or moving it off the hot plate.



8. Complete final inspection under a microscope. Ensure that the solder is evenly melted on all sides.



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