Draft INTT Ladder Assembly Steps   (ver. 12/16/2020)

A. Carbon Fiber Flatness Inspection Steps

1. Remove all fixtures from the OGP platen, except for the Base Fixtures and the Pickup Base Fixture.
2. Clean all debris from the OGP platen and base fixtures.
3. Power on the OGP system and open MeasureMind 3D Multisensor.
   a. Go through the OGP initialization process.
   b. File->Open: C:\INTT\Prod Routines\INTT-CF-Flatness.RTN
   c. Navigate to System - > Configuration -> Safe Zones and enable Safe Zones 1 and 2.
4. Open MeasureFit
5. Open SmartReport
   a. File->Open: C:\Prolink\QC-CALC 3.2\Data\INTT-CFStave-Flatness.mfp, INTT-CF-Flatness_Report.Qcc
   b. This file should already be open upon SmartReport startup. Check the top border to verify this.
6. Place Carbon Fiber Stave on Base Fixture (top fixture meaning located towards the wall) and remove the lower left (towards you), and lower right (towards you), pins to expose the small thru-holes in the fixture. (Pins closest to the operator when standing in front of the OGP machine).
7. Engage the vacuum pump.
8. Run the routine on the OGP.
   a. When prompted, save the output as C:\INTT\Prod Data\INTT-CF-Flatness.DAT
   b. After the OGP routine is completed, go to C:\INTT\Prod Data\ and save a time stamped copy of the DAT file in the Archive subfolder. (MeasureFit will delete the original when it generates the report).
9. In MeasureFit, play the INTT CF Flatness Inspection under the Macros tab.
10. Once the report file is generated, save the file under C:\INTT\Prod Reports\
    a. Save the file with the following timestamp format:
    INTT_SNXXXX_205-310-0100-XX_Report.pdf
    &
    INTT_SNXXXX_205-310-0100-XX_VAC_Report.pdf
11. Repeat these steps. Once with the Vacuum on and once with the vacuum off.

B. High Density Interconnect (HDI) Gluing Steps

1. Install the Carbon Fiber Stave on the Base Fixture (mounted to the OGP platen located towards the wall) in the same fashion as [Section A | Step 6].
2. Verify that all 2mm locating pins are installed in the Base Fixture and are captured by the Carbon Fiber Stave.

3. Place the HDI Glue Mask on the Carbon Fiber Stave by engaging the 2mm locating pins on the Base Fixture.
4. Mix epoxy on the lab bench.
5. Apply a thick bead of epoxy (3M Epoxy Adhesive TC2810, 50 mL, /1.75 fl oz) along the center of the HDI Carbon Fiber Stave from left-to-right, within the area of the HDI Glue Mask using the pressure syringe.
6. Using an epoxy knife, spread the epoxy around the exposed Carbon Fiber Stave so that the epoxy is as thick as the HDI Glue Mask and does not run underneath the glue mask.
7. Remove the HDI Glue Mask by removing all 2mm locating pins and then peeling the glue mask from the left-most side to the right-most side.
8. With the HDI Glue Mask removed, re-install the eight 2mm locating pins. There should be no epoxy touching the pins.
9. Install the first HDI on the left side of the Carbon Fiber Stave by sliding the HDI down the locating pins (similarly to the glue mask).
10. Repeat step 9 for the second HDI to be installed on the right side of the Carbon Fiber Stave.
11. Verify that the 2X sight is installed on the OGP.
12. Power on Computer.
13. Power on OGP.
14. Open MeasureMind 3D and run the homing sequence.
15. Open RTN.
    a. File->Open: C:\INTT\Prod Routines\INTT-HDI-Parallelism.RTN
16. Verify that only Safe Zone 2 is enabled.
    a. System -> Configuration -> Safe Zones
17. Run the RTN file.
18. Save the .TXT as INTT-HDI-Flatness[TIMESTAMP].txt
    a. Save in C:\INTT\Prod Data\
19. Gently place the HDI Glue Weight by installing it to the outer 8mm pins on the base fixture.
20. Let cure for overnight.

C. Chip Gluing Steps

1. Install 52 chips into the chip pockets on the Chip-Sensor Assembly Fixture so that the bonding surfaces of the chips are facing upward.
2. Place the four Chip Pickup Tools on the fixture base so that they are mounted in their marked positions, engage the 8 mm pins (the four big pins), and make contact with the chips.

3. Be sure that all valves are closed.
4. Install the Carbon Fiber Stave on the Base Fixture (mounted to the OGP platen) in the same fashion as [Section A | Step 6].
5. Verify that all 2 mm locating pins are installed in the Base Fixture and are captured by the Carbon Fiber Stave.
6. Place one Chip Glue Mask (50 um thick) on the left side of the Carbon Fiber Stave by engaging the 2 mm locating pins on the Base Fixture.
7. Mix epoxy on the bench table.
8. Apply small beads of epoxy (silver epoxy Loctite Ablestik t2902 BIPAX) on each slot in the Chip Glue Mask for the chip positions.
9. Using an epoxy knife, spread the epoxy evenly within each chip slot so that the epoxy is only as thick as the glue mask and does not run underneath the glue mask.
10. Remove the Chip Glue Mask by removing only the 2 mm locating pins engaging the glue mask and then peeling the glue mask towards the middle of the HDI, starting at the protruding outer edge.
11. Open the vacuum valve on <u>one</u> Chip Pickup Tool and engage the vacuum pump.
12. Lift the Chip Pickup Tool. Verify that all chips are secured to the tool via vacuum.
13. Place the Chip Pickup Tool on the Base Fixture, in the same corresponding location that it was removed from on the Chip-Sensor Assembly Fixture.
14. Verify that all chips made contact with the epoxy.
15. Close the vacuum valve for the pickup tool and turn off the pump.
16. Leave the pickup tool on the chips and let cure for 4 hours.
17. Repeat steps 11-16 for the second Chip Pickup Tool to be placed in the position that already has epoxy.
18. Repeat steps 6-17 for the second glue mask and remaining 26 chips in the Chip-Sensor Assembly Fixture.

D. Chip Electronics Test

1. After wire-bonding all chips to the HDI, test ladder on the bench test.

E. HDI Sensor Pad Flatness Inspection

1. Verify that the 2X sight is installed on the OGP.
2. Power On Computer
3. Power On OGP
4. Open MeasureMind 3D and run the homing sequence.
5. Verify that only Safe Zone 2 is enabled.
   a. System -> Configuration -> Safe Zones.

6. Open INTT-SensorPad-Flatness.RTN
    a. C:\INTT\Prod Routines\INTT-SensorPad-Flatness.RTN
7. Run
8. Press ENTER on joystick when first crosshair is on screen.
9. Save DAT file as INTT-SensorPad-Flatness.DAT
    a. C:\INTT\Prod Data\INTT-SensorPad-Flatness.DAT
    b. Save as a new file with a timestamp, do not overwrite an existing files as the output data will be tagged onto the end of the existing file.
10. Wait for Routine to complete
11. Send the DAT file to Connor for analysis and report generation.

F. Silicon Sensor Gluing Steps

1. Start the OGP and accompanying computer.
2. Clear the OGP Platen of any items other than the mounted fixtures and the tools in their home positions.
3. Open Measuremind 3D and complete the homing and initialization process.
4. Press the START/STOP button to continue.
5. Accept the homing message.
6. Accept safe zone message.
7. Inspect all four Sensor Pickup Tools and "zero" them by adjusting the thumbscrews so that the block slider is centered and straight (use tooling to center)
8. Make sure that all valves of pumps are closed but the pumps are ON.
9. Install four sensors in their respective pockets on the Chip-Sensor Assembly Fixture so that their bonding surfaces are facing up.
10. Place the four Sensor Pickup Tools on the Chip-Sensor Assembly Fixture so that they engage the 8 mm pins and make contact with the sensors.
11. Install the Carbon Fiber Stave on the Base Fixture (mounted to the OGP platen) in the same fashion as [Section A | Step 6].
12. Turn the pump on and valve on the stave
13. Verify that all 2 mm locating pins are installed in the Base Fixture and are captured by the Carbon Fiber Stave.
14. Install the Sensor Glue Mask (50 um) on the Carbon Fiber Stave by engaging the 2 mm locating pins on the Base Fixture.
15. Mix epoxy (silver epoxy Loctite Ablestik t2902 BIPAX) on the lab bench.
16. Apply a long, thin, bead of epoxy to an epoxy knife and lay a film of epoxy over the glue mask so that all the epoxy bays in the glue mask fill with epoxy using the pressure syringe.

17. Check that all apertures have epoxy no higher than the glue mask without bleeding underneath the mask.
18. Remove the Sensor Glue Mask by removing the 2 mm locating pins engaging the glue mask and then peeling the glue mask from one side to the other (left to right), starting at the protruding outer edge.
19. Open the vacuum valve on <u>one</u> Sensor Pickup Tool and engage the vacuum pump.
20. Lift the Sensor Pickup Tool. Verify that the sensor is secured to the tool via vacuum.
21. Place the Sensor Pickup Tool on the Base Fixture, in the same corresponding location that it was removed from on the Chip-Sensor Assembly Fixture.
22. Verify that the sensor made contact with the epoxy.
23. Leave the pickup tool on the sensor with vacuum ON.
24. Tight the screws knobs
25. Repeat steps 15-19 for the remaining sensors.
26. File -> Open : C:\INTT\Prod Routines\INTT-Sensor-Placement.RTN
27. System -> Configuration -> Safe Zones
28. Enable Safe Zone 2 and Safe Zone 3
29. Select OK
30. File -> Run
31. Select OK
32. Wait for OGP Camera to move and stop.
33. Press ENTER on Joystick Controller.Will be out of focus until enter.
34. Wait for OGP to find crosshair on HDI and then move to nominal sensor crosshair location.
35. Use the adjusters on the Sensor Pickup Tool to move the sensor crosshair to the location of the on-screen OGP crosshair (red).
36. Press ENTER on Joystick Controller.
37. Repeat steps 14-16 for the remaining crosshairs on the sensor.
38. After the final crosshair on the sensor, complete the User Input prompt.
    a. Enter anything, or nothing, in the text field to repeat steps 14-17 on the same sensor. This should be done until the user is confident that all the sensor crosshairs are in their nominal position. No less than three cycles.
    b. Enter the numeral "1" to continue to the next sensor on the HDI.
39. Repeat steps 12-18 for the rest of the ladder.
40. After completing the final sensor, complete the User Input prompt.
    a. Enter anything, or nothing, in the text field to repeat steps 14-17 on the same sensor. This should be done until the user is confident that all the sensor crosshairs are in their nominal position. No less than three cycles.

  b. Enter the numeral "1" to continue to the final overall measurements.
41. Enter file name for the measured data.
42. Wait for the OGP machine to measure the location of all the HDI crosshairs and sensor crosshairs.
43. When the routine is complete, select OK on the prompt.

F. Full Ladder Electronics Test

1. GET ELECTRONICS TEST STEPS