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# Wire Bond Inspection Tools

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## Purpose

This document explains how and when to use the optical comparator and Reichert microscope at the Wire Bond step. It is intended for use by Wire Bond team members involved in measuring loop heights, ball heights, and ball thicknesses.

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## Safety

You must adhere to all rules and guidelines listed in the following documents:

[Assembly ESD Safety](#)

[Assembly Evacuation Procedures](#)

[Assembly Hazardous Material Safety](#)

[Assembly Safety and Security](#)

[Cleanroom Guidelines for Assembly](#)

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## Materials Required

Refer to the [Wire Bond Materials List](#).

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## Inspection Guidelines

**Frequency:** You must perform this inspection according to the time frame indicated in the [Wire Bond Operator Procedures](#).

To perform this inspection, use the inspection tools and reject interposers (preferred) with attached die (instead of good production parts).

**NOTE**

A good interposer can be used if a reject interposer is unavailable.

Be careful when handling the interposer after the wires are bonded; rough handling of the interposer can change the loop heights.

You may use the inspection tools at any time to monitor the process (in addition to the two required times).

Check one die site (top and bottom) for the following characteristics (additional measurements should be done if needed or when time permits):

- Loop height
- Ball diameter
- Ball thickness

**NOTE**

To verify the correct loop heights and ball dimensions, refer to check [loop heights](#) and [ball size](#).

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## Optical Comparator

**NOTE**

Use the optical comparator for measuring loop and ball heights on non-LOC product.

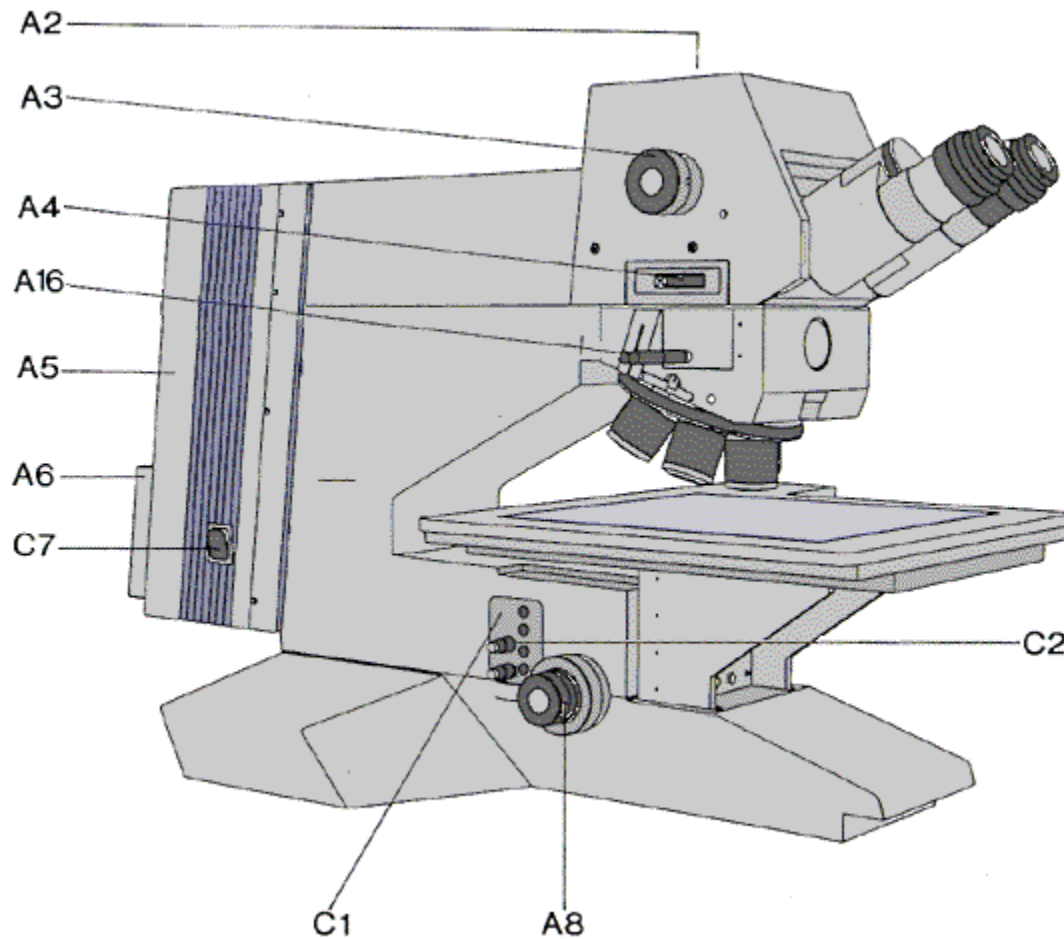
1. Check wires that are bonded on the side.
  - Turn the focus knob on the comparator so that the ball of the side wire is well focused.
  - Zero the comparator and turn the Y-encoder knob to the top of the loop. The measured reading should be  $\pm 0.0015$ " of the loop-height window used for the end wires.
2. By moving the comparator X-Y table in the X-axis direction, check the other die on the interposer for damaged or deformed loops which might be caused by a workholder-indexing error. Loops do not need measured during this check.
3. Remove the interposer from the comparator after all the above measurements and checks are complete.
4. Inspect the sample leadframe for bent paddles after you measure the loop height.

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## Reichert Microscope



Use the Reichert microscope for measuring ball diameters and thicknesses on all BGA product, all LOC product, and all product with polyimide on the die surface.



### Microscope diagram

1. Set up the microscope (if turned off).



**WARNING**

Before beginning this procedure, make sure that at least  $\frac{1}{4}$ " clearance exists between the microscope objective lens and the stage surface.

- A. Using the main switch (C7), turn the power ON.
- B. Turn ON the Mac 2000 PC.
- C. Turn ON the Acu-Rite DRO 200G display.
- D. After the Mac 2000 PC completes the startup sequence, press HOME on the control box.
- E. On the Acu-Rite DRO 200G display, press ZERO for the X, Y, and Z axis.
- F. Press ABS/INCR until the display is set to INCR mode.

- G. By using the handles (A16), move the triple module into the Brightfield position.
- H. Use the push button (C2) to change the objective lens.

2. Prepare for taking a measurement.

- A. If the microscope is in Idle mode, use the main switch (C7) to turn the power
- B. Place the interposer against the tape stops as show below.



**Correctly positioning the interposer against the tape stops**

- C. Starting with the lowest magnification, use the joystick to center the objective the object to be measured.
- D. Press the magnification buttons (C2) to increase the magnification to the desi
- E. [Review the ball bond example to determine the measurement locations.](#)

3. Take a ball diameter measurement (X & Y axis).

- A. Using the joystick to move in the X-axis direction, position the eyepiece cross edge of the ball bond.
- B. Press the X-axis ZERO key.
- C. Use the joystick to move the crosshair to the opposite edge of the ball bond.
- D. Note the X-axis reading.
- E. Using the joystick to move in the Y-axis direction, position the eyepiece cross edge of the ball bond.
- F. Press the Y-axis ZERO key.
- G. Use the joystick to move the crosshair to the opposite edge of the ball bond.
- H. Note the Y-axis reading.

4. Take a ball thickness measurement (Z axis).

- A. Using the focus knob to move the stage up and down, position the eyepiece c the bondpad.
- B. Use the Fine/Coarse focus knobs to bring the bondpad grain into focus.
- C. Press the Z-axis ZERO key.

- D. Use the Fine/Coarse focus knobs to bring the top of the ball squash into focus.
  - E. Note the Z-axis reading.
5. Take a loop height measurement (Z axis).
- A. Using the focus knob to move the stage up and down, position the eyepiece crosshair on the bondpad.
  - B. Use the Fine/Coarse focus knobs to bring the bondpad grain into focus.
  - C. Press the Z-axis ZERO key.
  - D. Use the Fine/Coarse focus knobs to bring the top of the wire loop into focus.
  - E. Note the Z-axis reading.
6. Once the measurements are taken, press the main switch (C7) to turn OFF the power and place the microscope in Idle mode.
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## Document History

**Date:** April 24, 2002

**Version #** 9

**Requested by:** Brigette Teets

**Case #** [999113](#)

Updated the server links.

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**Date:** January 3, 2002

**Version #** 8

**Requested by:** Richard Oester

**Case #** [897936](#)

In [Reichert Microscope](#), updated a note.

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**Date:** November 6, 2001

**Version #** 7

**Requested by:** Jen Jensen

**Case #** [835724](#), [835725](#)

In [Optical Comparator](#) and [Reichert Microscope](#), updated the notes regarding which product types can be measured with the tools.

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