# Wedge Bonder --- West Bond 747677E

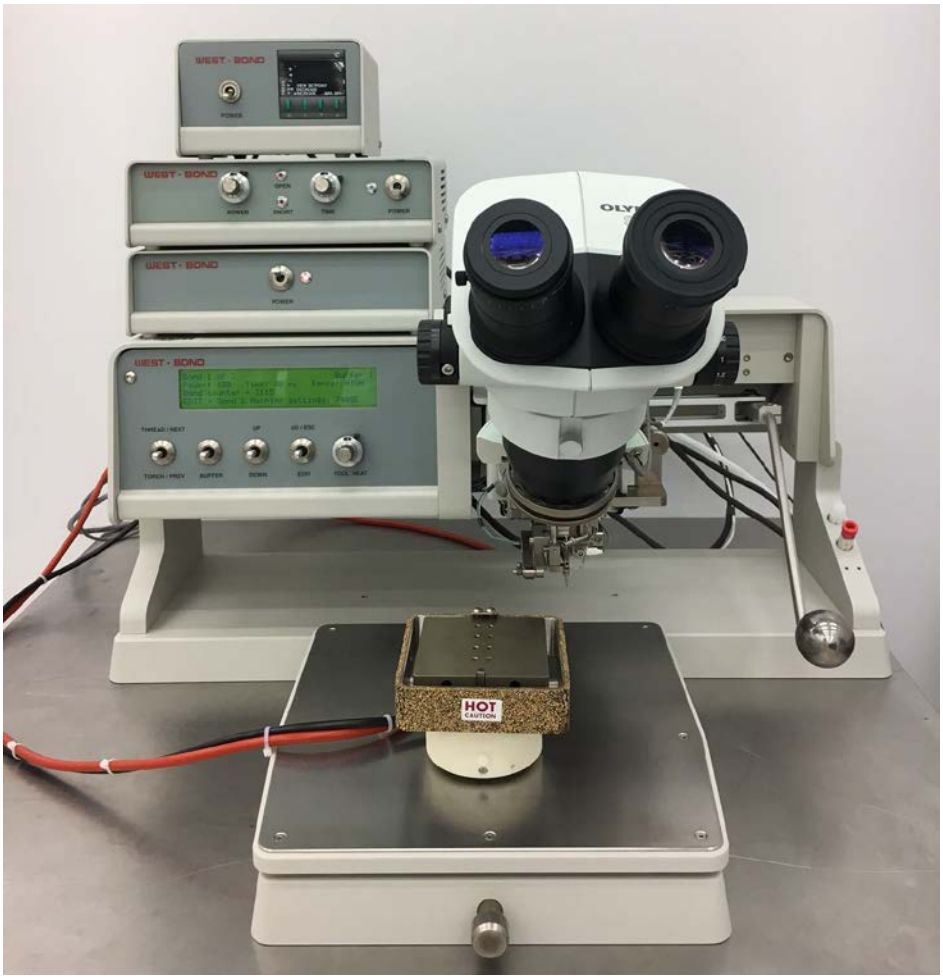



Figure 1: West Bond Wedge Bonder

## Introduction

The West Bond 747677E bonder is an ultrasonic wedge-wedge wire bonder designed to interconnect wire leads to various types of devices. Contact staff to see if it will work with your devices. Bonds are made by the wedge-wedge technique using ultrasonic energy to attach aluminum/gold wires.

## Feature and specifications

1) This wire bonder is set up to use Al or Au wire with a diameter of 25 μm. Contact staff about the currently installed wire, or to change the wire.
2) The bonder works best on Al and Au pads however other metals can be used as well.
3) Beeps when tip touches the bonding pad.
4) Sample stage can be heated up to 150 $^{o}$C.

**Safety**

1) To avoid electric shock, do not touch the NEFO electrode until at least 3 seconds after powering down with the POWER switch.
2) The sample stage may be hot.

**Precautions**

1) **Do not crash the bonding tool**. Never lift the sample stage from the work platform, gently slide it out.
2) Only bond on clean surfaces. Dirty surfaces do not bond and can easily block the bonding tool. Use acetone or oxygen plasma to remove organic residues on the bonding pads.

**Operating Procedure**

1) Active the equipment in FOM.
2) Power on the main switch and the microscope LED switch (Figure 2).

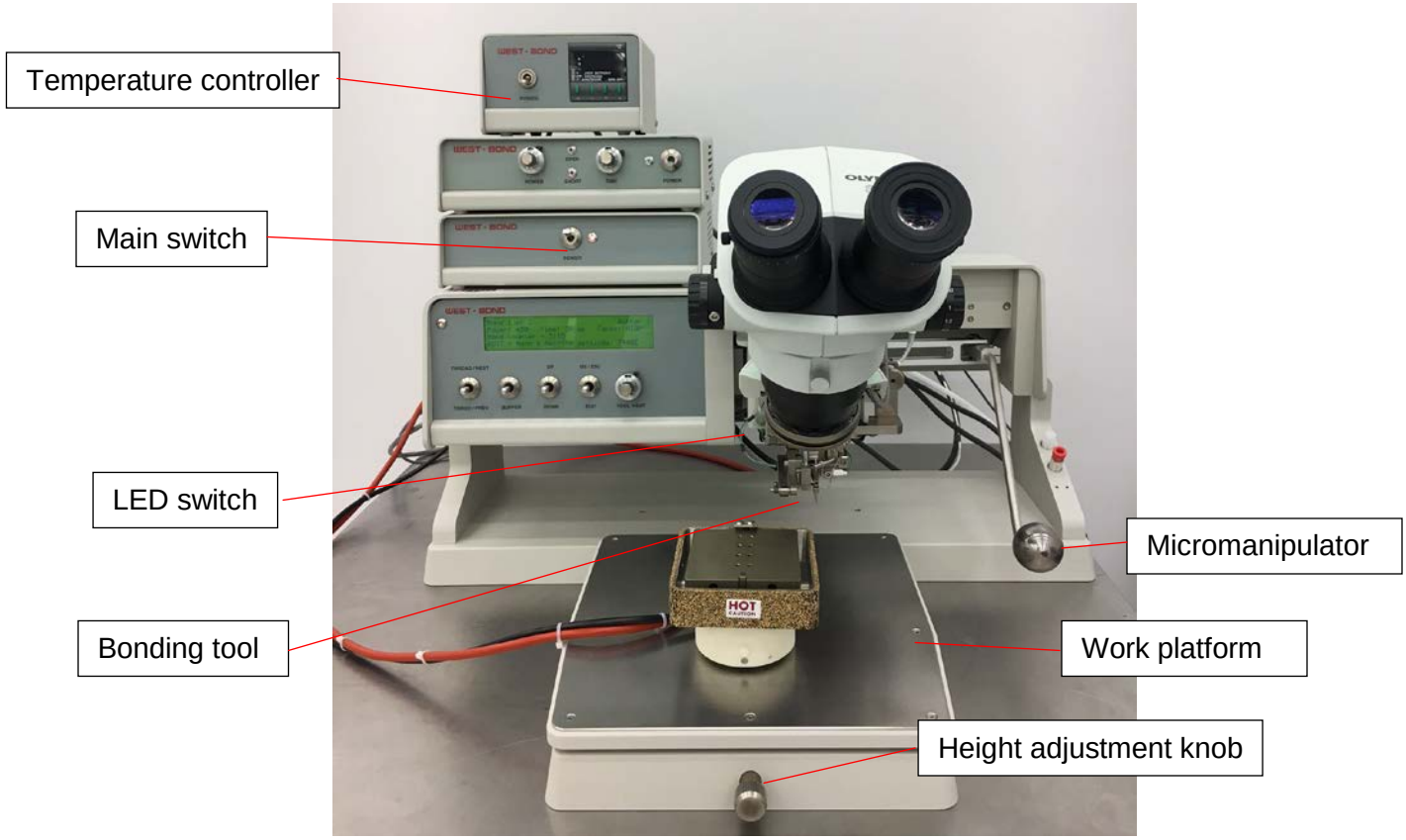



Figure 2: Parts of the bonder.

3) If sample heating is needed, switch on the temperature controller. Set the temperature by pressing the ★ and the ▲ (or ▼) buttons at the same time. Maximum temperature is 150 $^{o}$C. Wait about 10 min until the temperature is stable.

4) Slide the sample stage out of the work platform. **Never lift up the sample stage**. It may very possibly hit the bonding tool.
5) Mount the sample package on the sample stage (Figure 3). Use a screwdriver if needed. Slide the sample stage back.

Figure 3: sample stage (top view).

6) Lower the bonding tool by holding the micromanipulator in its lowest position and adjust the height of the work platform by rotating the height adjustment knob (Figure 2). The bonding surface should be approximately 0.7 mm higher than the tip of the bonding tool (Figure 4).

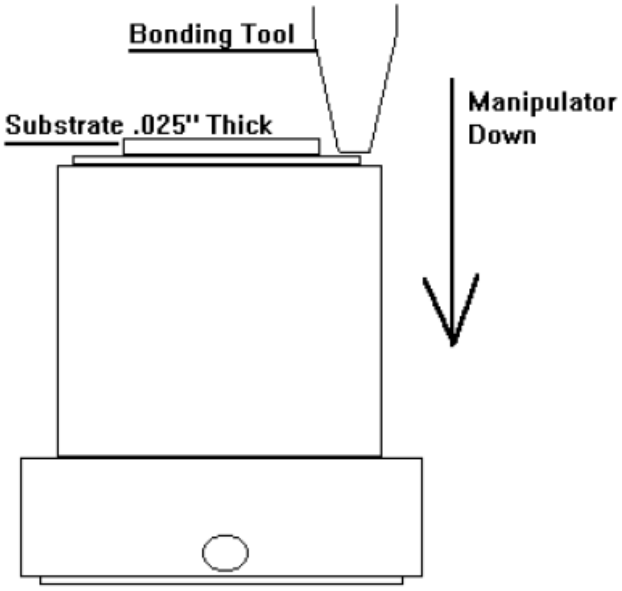



Figure 4: height adjustment.

7) Look through the microscope and make sure that there is wire underneath the bonding tool.
8) Set your bonding parameters by pushing down the EDIT switch (Figure 5). Use UP/DOWN to change the settings of the parameters. Use EDIT to move to the next parameter. Push up to US/ESC to quit editing. Parameters will be automatically saved.
8.1) BONDS PER WIRE: the number of bonds per wire, usually 2.

8.2) POWER: sets the ultrasonic power applied during each bond. The range is 0 – 999. If the power is too low, no bond will be made. If the power is too high, the wire breaks after the bond.
8.3) ULTRASONIC TIME: sets the bonding time.
8.4) FORCE: sets the force applied by the bonding tool.
8.5) LOOP HEIGHT: This function is designed to assist the operator in producing consistent loop height. An audible beep will occur once the bonding tool reaches the set height after the first bond. The loop height does not affect any mechanical functions.
8.6) DROP BEFORE CLAMP: controls the distance the tool can be lifted after a bond before the clamp closes.
8.7) WIRE PULL: sets the distance that the clamp pulls back to break the wire after the terminating bond. Suggested setting is 34.

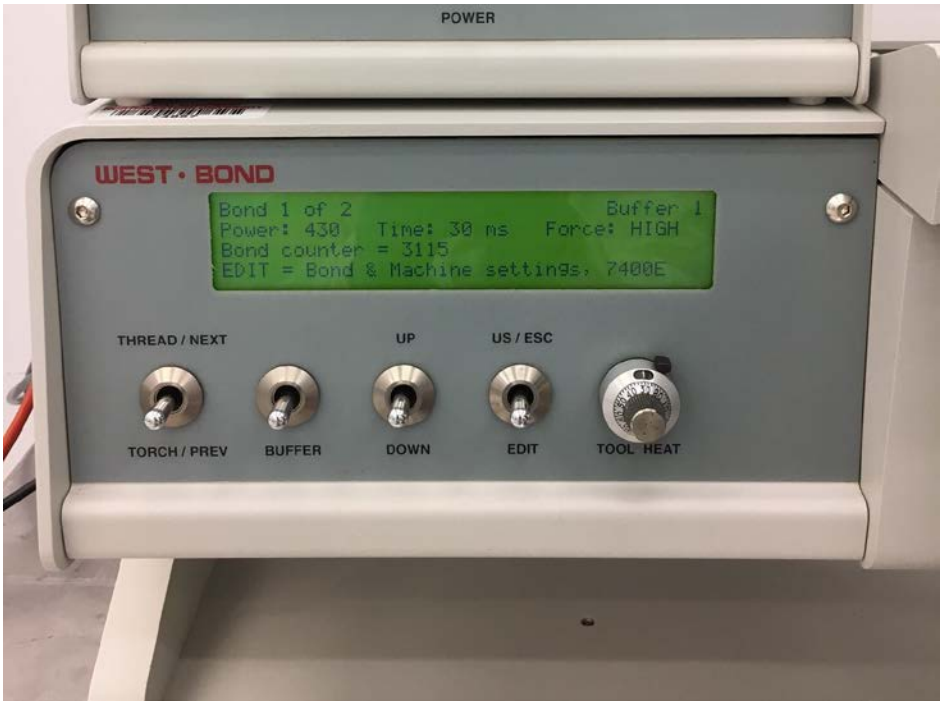


Figure 5. Parameters setting

9) Bond by moving the micromanipulator to the bond location and gently pushing down. The bonder detects contact and will automatically activate the ultrasonic energy on contact. An audible beep will be heard while the bond is being made.
10) After the first bond, lift the micromanipulator and move to the second bond location. Gently push down to make the second bond. Below are the displays and the explanation during the bonding.

**"HOME"**

```
Bond 1 of 21                    Buffer 1
Power: 300   Time: 30 ms

EDIT = Bond & Machine settings, 45° feed
```

Ready for first bond
45°/90° feed – Programmable during power up.

**BONDING SEQUENCE** (Begin by using the X-Y-Z Micromanipulator to touch tool to the bond pad.)

```
Bond 1 of 21                    Buffer 2
Power: 300   Time: 30 ms
Wire clamp is open.
Lift from first bond.
```

First bond is complete.
Tool is still in contact.
User must lift the tool from the bond.

```
Bond 2 of 21                    Buffer 2
Power: 350   Time: 50 ms
Wire clamp is open.
Proceed to stitch bond #2.
```

Tool is off surface, ready to make second bond

```
Bond 2 of 21                    Buffer 2
Power: 350   Time: 50 ms

Proceed to stitch bond #2.
```

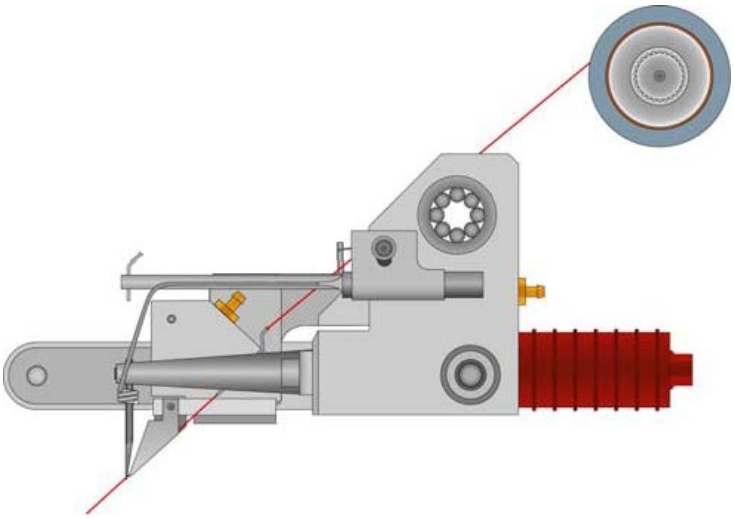
Tool has descended, wire clamp has closed; ready for second bond.

Repeat sequence until last bond is terminated.

11) After the terminating bond, the clamp should automatically cut the wire and prepare the machine for the next bonding sequence.
12) If wire breaks during bonding, feed the wire through the clamp and bonding tool. Follow the steps in the "Feed Wires" section.
13) Once all the bonds are finished, turn off the temperature controller and the main switch.
14) Log off in FOM

**Feed Wires**

1) Push up the THREAD switch to open the clamp. The screen will read "wire clamp is open."
2) Thread the wire through the clam and into the back of the bonding tool. The opening of the bonding tool is located near the tip of the tool. Be sure that the wire is straight. Try to thread the wire at $45^{o}$. Figure 6 shows the wire path. Figure 7 shows the tip of the bonding tool.
3) Press down the TORCH switch.
4) Bond off the excess wire.



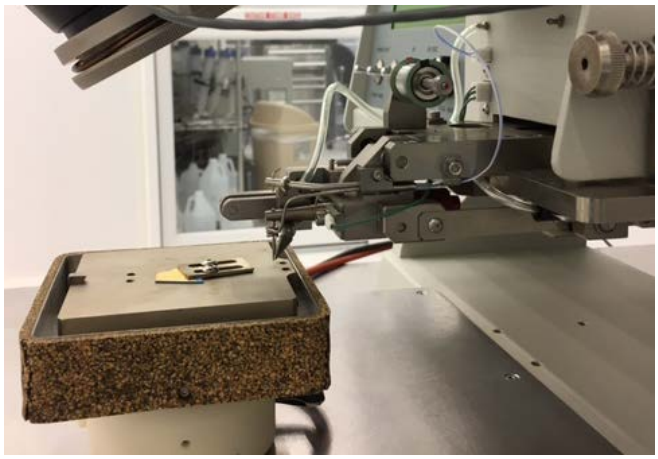


Figure 6. Wire path

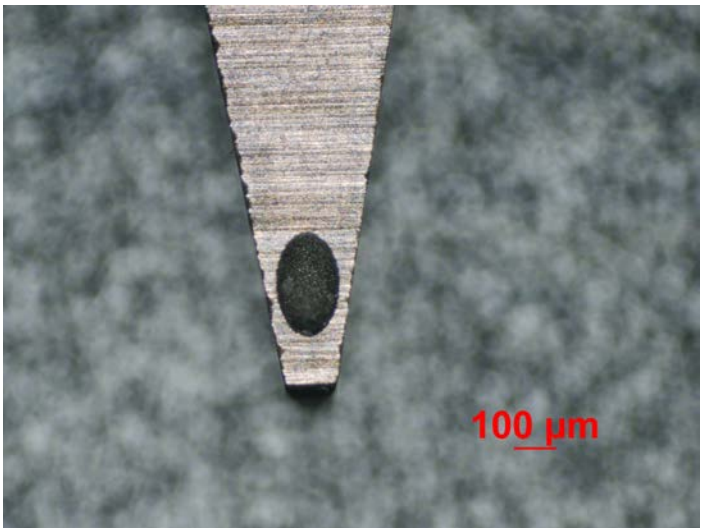



Figure 7: Tip of the bonding tool (backside view).