Westbond 747630E Wire Bonder

All users must receive training from an instrument manager before using the bonder. New users will be given daytime-only access; all-hours access can be granted upon request once some level of experience is achieved. Reservations are not required, but can be made if desired. The bonder main power is interlocked to FOM. If the bond tool is not properly threaded when you arrive for use, please notify the instrument manager.

The bonder is equipped with 25 µm aluminum (1% Si) wire (additional specs available upon request), and bonds will have a footprint of approximately 80 µm x 40 µm. It may help to plan your device/bond pad lay-out accordingly. The sample surface should be clean, and more conductive, stable (i.e. non-oxidizing) materials will generally be more conducive to bonding.

Menu Settings

Appropriate bond settings will vary depending on the sample surface and should be determined by the user. Other instrument settings can be varied and are generally a matter of user preference. (Please note that the procedure below assumes correct settings have already been determined.) Settings can be saved in a "buffer" in the controller memory. Please record buffers in use on the clipboard; other users' buffers can be used as a reference, but should not be edited. Click the EDIT switch to enter and move forward within the settings menu, edit parameters using the UP and DOWN switches, and exit the menu by clicking US/ESC. The manual (blue binder, stored on left side of TPT bonder) has detailed info on each menu item starting on page 20. Some additional notes:

- The "recommended" settings in the menu are intended for gold surfaces and are not likely applicable to other materials, but may serve as a good starting point.
- Adjusting the TIME setting is generally not recommended.
- The bond forces are set to 15 g for LOW and 20 g for HIGH.
- If DUAL FORCE is set to OFF, the HIGH force will be used for every bond (not recommended).
- A higher WIRE TAIL than the "recommended" value is helpful for confirming the tool is threaded.
- Do not adjust/use any menu settings beyond DUAL FORCE.

Procedure

1) If necessary, turn on the main power switch (interlocked to FOM).
2) Open the nitrogen cylinder valve and verify that the delivery pressure is 50 psi (if not, notify manager).
3) Turn on the microscope light source (separate from main power and FOM interlock) to the desired intensity setting.
4) Lower the bonder stage by turning the front knob counter-clockwise. Mount the sample on the sample holder from the Westbond or the TPT bonder, or your own holder. Place it on the stage (away from the tool) and confirm that it is lower than the bottom of the tool (if not, raise the tool and/or lower the sample).

5) Move the sample under the tool and focus the microscope on the sample surface, and set to the scope to the desired zoom.
6) Bring the tool into the field of view and confirm that the wire is properly threaded, the sample is oriented such that the bond path will be straight back (i.e. away from your body), and your desired bond locations are within the field of view and the tool's range of lateral motion.
7) Switch to your buffer using the BUFFER switch, and if necessary, confirm and/or edit your settings by scrolling through the menu using the EDIT switch. (Details on settings below.)
8) Position the tool over the first bond location and gently bring it down onto the surface. The instrument will click and beep as the bond is made.
9) Gently lift the tool up; the instrument will beep when the "loop height" is reached. Move to above the second bond location and slowly lower the tool; the clamp will close as dictated by the "drop before clamp" (audible pneumatic sound).
10) Gently bring the tool down onto the second bond surface. The instrument will click and beep as the bond is made, and the wire will be cut off by the clamp.
11) Repeat 8-10 (after re-orienting/-positioning the sample, if necessary) to make additional bonds.
12) When bonding is completed, carefully move the sample holder out from under the tool and remove the sample.
13) Turn off the bonder and the scope light source, and close the nitrogen cylinder valve.

Troubleshooting

There are two basic failure modes for bonds:

1) Bond not sticking to surface – Assuming the sample is clean and the material is susceptible to bonding, then one or more of the settings is too low. Try switching from low to high force (if applicable) and/or increasing the power in increments of 5 or 10 units until the bond sticks.
2) Wire breaking off after successful bond 1 – Either the tool is being pulled away from the bond too quickly, or the power or force is too high. Try decreasing the power in increments of 5 or 10 units and/or (if applicable) switching from high to low force.

The wire will occasionally need to be re-threaded through the clamp and tool. Westbond has a video on YouTube called "Threading 101" which shows a good demonstration of the technique. Click the OPEN/NEXT switch, replicate the process starting at 0:45 of the video, then click the FEED/PREV switch, and either bond or manually cut off the excess wire. If the wire will persistently not go through the tool, it may be blocked or clogged. Blowing compressed air (back-to-front, ~45° downward angle) can dislodge loose blockages. Organic contamination can be cleaned out by applying a small amount of isopropanol to the tool, then holding the US/ESC switch to apply ultrasonic excitation until it evaporates. If neither of these methods work, please notify a tool manager.

Occasionally, one or both forces will need to be calibrated. If your usual settings (plus or minus small power adjustments) are not working, or if the controller seems to be initiating bonds with little to no force applied (i.e. when simply moving the tool around), please notify a tool manager.