

TPT HB05 Wire Bonder

Before use, the bonder must be enabled in Coral. This will power up the bonder, LED illuminator, camera, and monitor.

General Guidelines for Use

- The bonder can be configured for aluminum or gold wire bonding. Each uses its own spool and bond tool(s). Ball bonding can also be performed with gold wire. Consult with facility staff if you need an application for which the bonder is not currently configured. The EFO unit must be installed and properly aligned for ball bonding; it may be removed in order to provide easier access for tool threading during wedge bonding.
- The stereo microscope has an adjustable focus and zoom, and is equipped with a CCD camera. The camera is useful for training and collaboration but is not recommended for general use; for viewing through both eyepieces, the VIS setting should be active. A dial on the left side of the LED illuminator adjusts the illumination level.
- The heated stage allows substrate temperatures up to 250° C. A substrate temperature of ~100°C is recommended for gold wire bonding. Please use caution when using elevated stage temperatures.

Control Panel Operation and Parameters

System and bond settings are adjusted using the LCD screen. Turning the dial toggles between parameters, as indicated by a yellow border. Pressing the dial in allows the parameter to be adjusted, as indicated by a flashing red border. Turn the dial to select the desired value, then press again to set. The Clamp button opens and closes the clamp (separate from bond process).

Bond Parameters (for Bonds 1 and 2)

- US – Ultrasonic power (analog of “power” on K&S and MEI bonders) in arbitrary units
- Time – Duration of ultrasonic application in milliseconds
- Force – Downward force applied by bonding tool during bond in grams

Other Parameters

- Prog – Active program number; 20 programs saved in system memory
- Clamp – Graphical indicator of whether clamp is open or closed (Note – Clamp will automatically close after a set time if left open; this is indicated by a beep.)
- Heater status and temperature – Icon indicates stage or tool (not available on our bonder) heating. Numerical indicator shows current stage temperature (°C), or set point during editing. Top circle indicates stage heater status (grey = off, red = heating up, yellow = near setpoint, green = setpoint reached).

- Bond type – Wedge or ball bonding
- Tail mode – Clamp Feed (wedge bonding) or Table Tear (ball bonding)
- Tail – Length of wire left hanging from tool after a bond is finished (arbitrary units)
- Feed +- - Length of wire fed in or out of tool by pressing Up or Down on control puck (arbitrary units, different from tail length units); essentially, this manually adds or subtracts from pre-set tail length.

Bonding Procedure

- 1) The bond surface should be ~79 mm above the stage. Bonds will not be consistent or effective at other heights. The system's heating stage can be raised or lowered by loosening the silver thumbscrew at the bottom of the main body and then rotating the base to extend or retract it (one turn of the base corresponds to a 1 mm height change).
- 2) Set your bond parameters using the control panel as described above. Finding the appropriate values may take some experimentation. For two bonds on identical surfaces, the US setting should be ~30 higher for Bond 2.
- 3) Align the first bond using the control puck, and bring the lever down until the bond engages.
- 4) Slowly bring the lever up (note that the tool will not move up for the first portion of the lever's upward motion) and align the second bond by moving the puck/device towards you.
 - a. If the first bond failed, press red reset button on the control puck in order to go back to the Bond 1 settings. Repeat #3 with adjusted parameters.
- 5) Bring the lever down until the second bond engages and the wire breaks free.
 - a. If ball bonding, the EFO arm will engage and spark to initiate a ball for the next bond.

Other Notes & Tips

- The first bond is much more likely to work if the 'tail' is pointing back towards you. If it points away from you, down, or to either side, you can press the down button on the control puck in order to feed out more of a tail, which will tend to orient itself properly.
- The bond path will be very low and flat if you simply move in a straight line between bond points. Going past the second bond location and then coming back can create higher loops; the exact technique takes some practice. The drawing to the right shows TPT's recommended tool path.
- Threading of the wedge tool is similar to the K&S and MEI bonders in that the wire comes from behind the wedge and goes down and forward through the bottom of it. The main difference is that prior to that, the wire comes straight down through the tool, and out the back at a fairly small vertical distance above the bottom of the tool. If the wire breaks within the tool, push it down into the tool from above until it comes out near the bottom. The clamp (if open) can be moved back/left to provide access for this procedure.
- A sheet is posted by the bonder summarizing the stored programs. Feel free to use any available slots. Please record them on the sheet, and do not edit other users' programs.

