

F&S Bondtec 5630i Wire Bonder User Manual

Version of 2025-11-10.

1. Introduction

This manual explains how to operate the F&S Bondtec 5630i equipment to wire bond a sample to a PCB/Package with aluminium or gold wire.

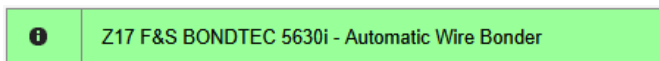
The F&S Bondtec wire bonding system capabilities are:

- Wedge-Wedge bondhead for thin wire
- Working area X/Y-axis 100 x 100 mm
- Z-axis with 60mm stroke
- Wires: Aluminium 25um, Gold 20um, Gold 25um

2. Login on CAE

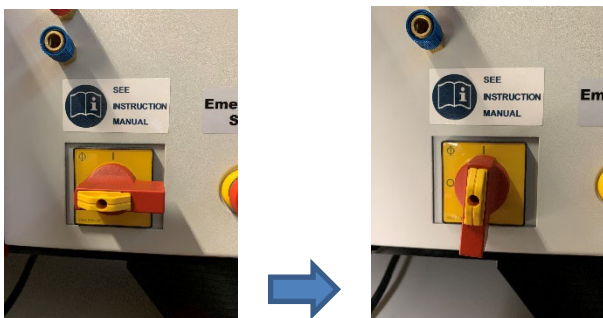
Login with your "CMi" username and password on the Zone 17 CAE accounting computer.

Select the "F&S BONDTEC 5630i - Automatic Wire Bonder".



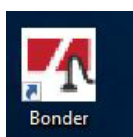
3. Tool start-up, sample loading and workheight setting

Switch the main power switch to the ON ("I") position :

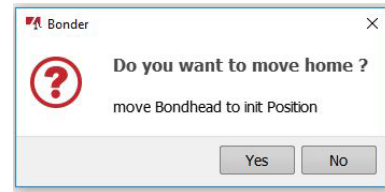


This will also turn the PC on.

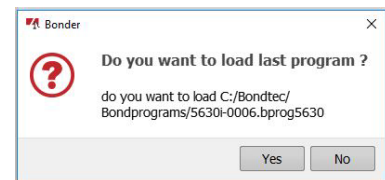
Launch the "Bonder" software:



Click on "Yes" when the prompt below appears. This will initialize and home the stage and the bondhead.

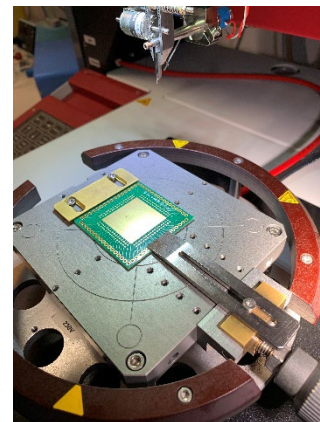


When the prompt below appears, click "Yes" if it is your recipe, "No" if it is not.



If needed, click on File => Open and select your recipe.

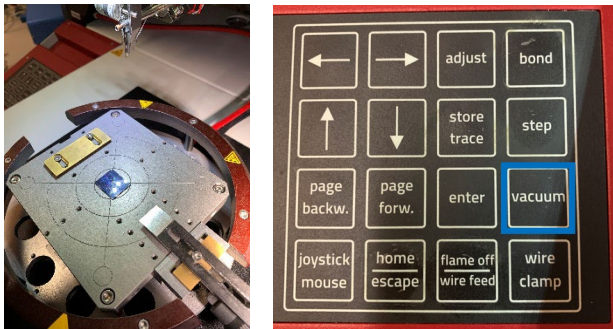
Load your sample on the stage and clamp it:



If the sample is small or fragile, there is the possibility to use vacuum instead of the clamp to hold the sample. To do this, switch on the vacuum pump on the left of the tool:

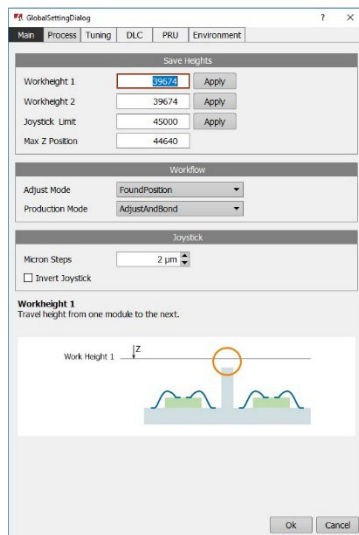


Then, place the sample on the center of the chuck and press on the “vacuum” button on the keyboard which is on the left of the tool.



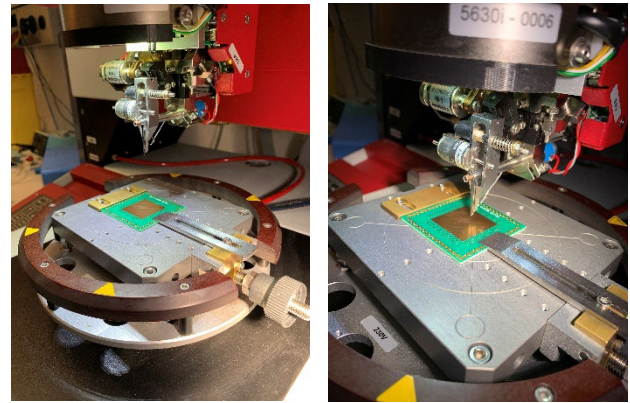
Click on Page => Global Program Settings.

The following windows opens:

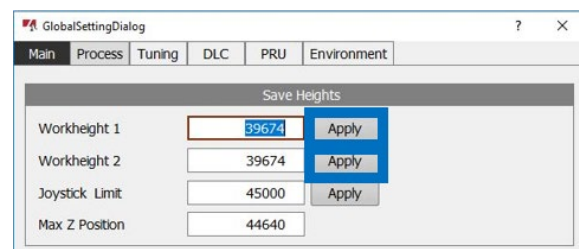


In this step, the workheight of the recipe is set. The workheight is a coordinate along the Z-axis (= height of the bondhead) which should be set few millimetres above the sample. When the tool is initialized, the Z coordinate is set at 0 mm. To set the workheight, the bondhead needs to be lowered until almost reaching the sample.

To do this, use the joystick on the right of the tool and move the bondhead above **the highest point of the sample**. Then, move the bondhead down by keeping pressed the button on top of the joystick, and pull the joystick.

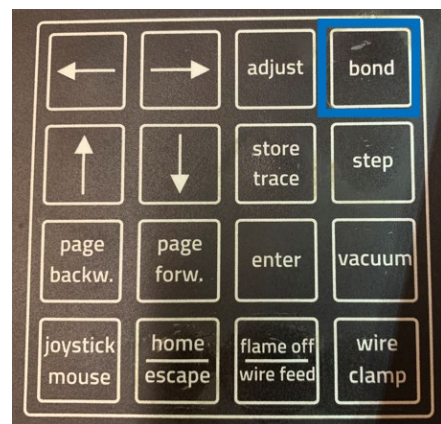


Then, set the current height of the bondhead as the workheight by clicking on the “Apply” button next to the “Workheight 1” and “Workheight 2” fields.

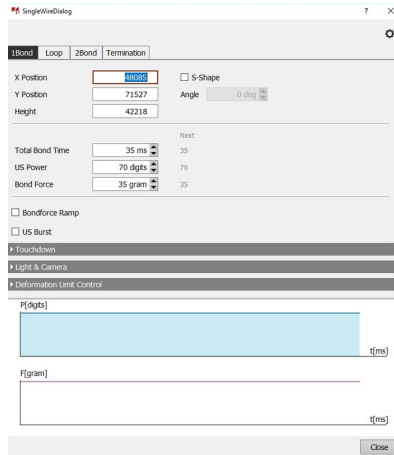


4. Wire Bonding the sample

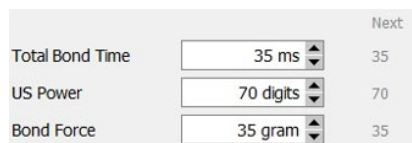
Press on the “Bond” button.



The following window appears:



Check the parameters of the bonding for both bonds.



If unsure, parameters above can be used as starting point for all wires.

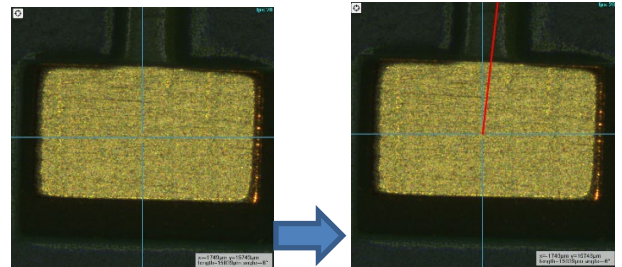
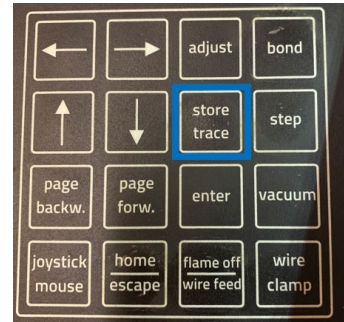
Make sure that the tab “1Bond” is selected.



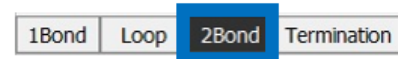
Navigate to the position of the first bond using the joystick. If needed, focus on the sample by keeping the button on the top of the joystick pressed and pushing/pulling the joystick.

Make sure the tip doesn't collide with the sample when focussing !

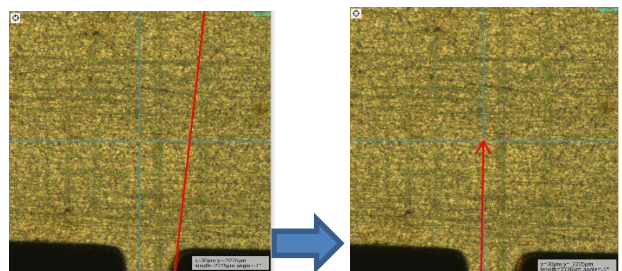
To store the current position as the 1st bond coordinates, press on “Store trace” on the left keyboard. This will store the current “X Position” and “Y Position”. In addition, the tip will move downwards, fast until the workheight set before, and then slowly until contacting the surface of the sample. This allows to measure and fill the “Height” (=Z-Axis coordinate) of the first bond. This will also update the position of the arrow which links the first and the second bonds (in red below).



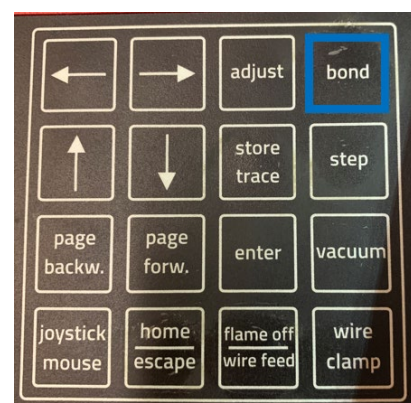
Click on the “2Bond” tab to define the position of the second bond.



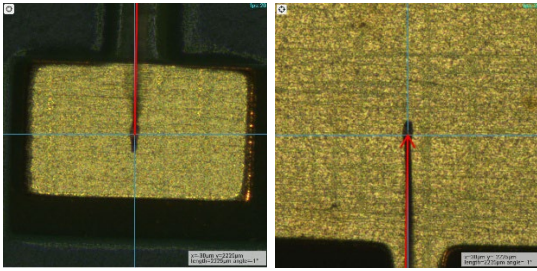
Navigate to the position of the second bond using the joystick. Store the position and measure the second bond height by pressing on “Store trace”. The arrow position is updated.



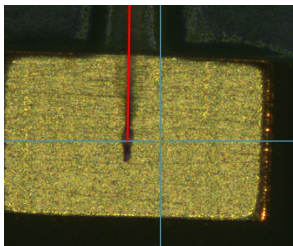
Press on the “bond” button.



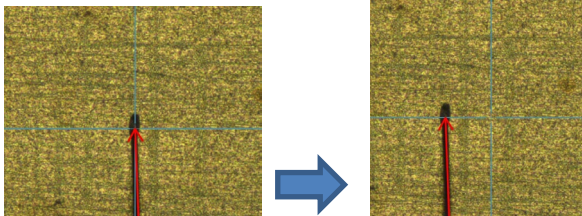
The tool will perform the wire bonding. If successful, wire should be visible at both bond locations.



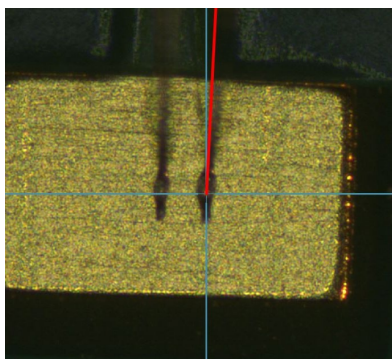
To place another wire, make sure the tab “1Bond” is selected. Move to the next position of the first bond. From now on, it is not needed to measure the height of the surface as long as it is not significantly ($>200\mu\text{m}$) different than the previous one. Instead, press on the “bond” button.



This will store the position of the first bond and switch to the “2Bond” tab. Navigate to the position of the second bond.

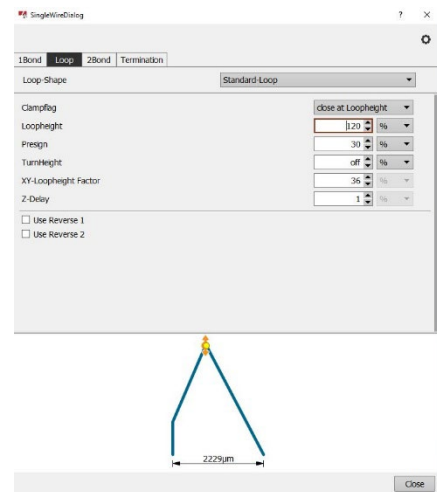


Press on “bond”. This will store the current position for the second bond, **and will immediately perform the wire bonding.**



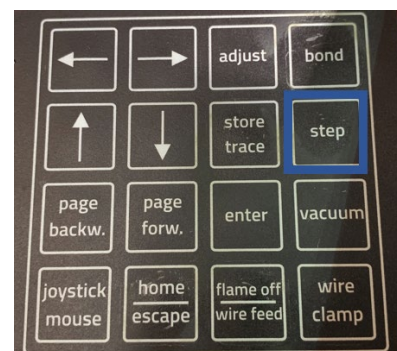
5. Loop-Shape, Step mode, Wire deformation control

To modify the shape of the loop (i.e. the path of the tip when it travels from the first to the second bond), click on the “Loop” tab. Values are defined as a percentage of the distance between the first and the second bond.



For very short wires, it can be useful to enable the “Use Reverse 1” option to avoid that the first bond detaches while the tip travels towards the second bond.

It is possible to perform the wire bonding in “Step” mode to observe the steps sequentially. This is typically done when trying to optimize the bond parameters. The step mode can be enabled using the “Step” button on the left keyboard.



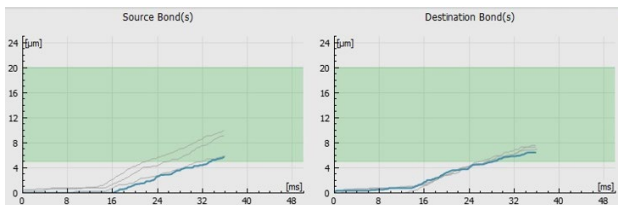
The “Step” label on the bottom-right of the screen should be highlighted in yellow when it is activated.



When working in “Step” mode, operate as usual until pressing the “Bond” button while “2Bond” tab is selected. Then, the “Bond” button needs to be pressed to progress in the sequence of steps until the wire bonding is completed. The step mode can

be disabled at any time by pressing the “Step” button on the left keyboard.

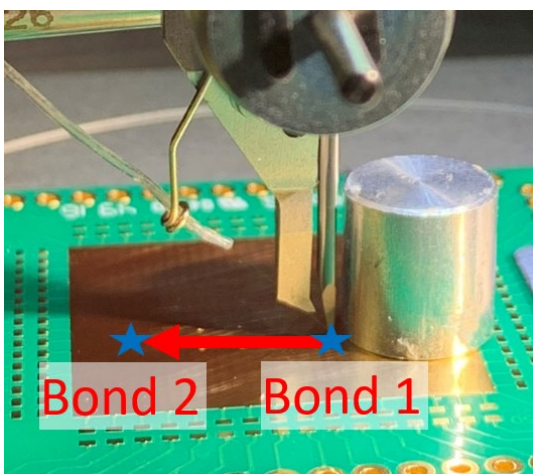
To optimize the wire bonding parameters, the graphs on the bottom left of the screen can be used. Each time a wire bonding attempt is performed, two new graphs appear which show the deformation of the wire with respect to the bond time. The left graph shows the deformation of the wire during the first bond, and the right graph shows the deformation of the wire during the second bond.



The green area shows the range of correct deformation of the wire at the end of the bond. If the bond is not successful and the graph lies below the green area, the bond parameters need to be increased. Conversely, if the graph is above the green area, reduce the bond parameters. Small variations (+/- 10 to 15% on each parameter) should already result in a noticeable shift of the curve on the next wire bond attempt.

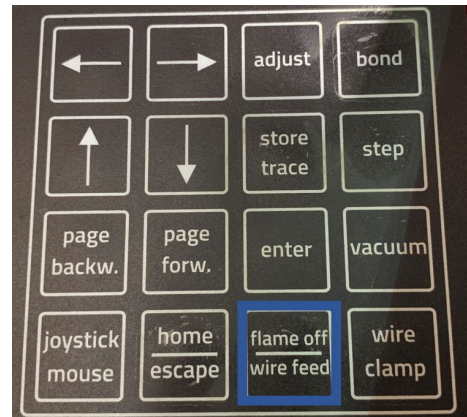
6. Avoiding collisions between the tip and the sample

When wire bonding close to protruding elements such as connectors that could collide with the tip, always place the first bond close to that element and the second bond away from it. This will ensure that the tip is rotated in a way that there is no collision with the protruding element. The picture below shows how to correctly place the first and the second bond in such situation.

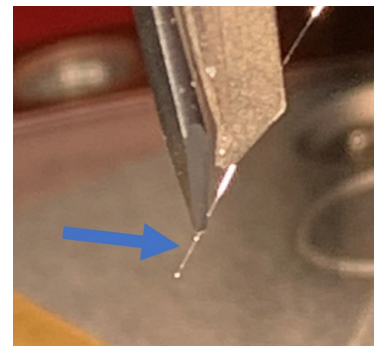


7. Wire feed, Rethreading the wire (i.e. inserting the wire in the tip when it gets out of it)

It can happen that the wire gets stuck inside the tip and doesn't come out of it. In that case it is not possible to wire bond successfully. First, press on the “Wire feed” button on the left keyboard.



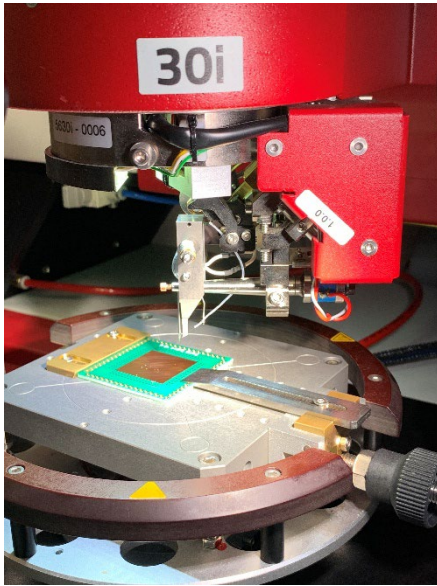
This can help to push the wire out of the tip :



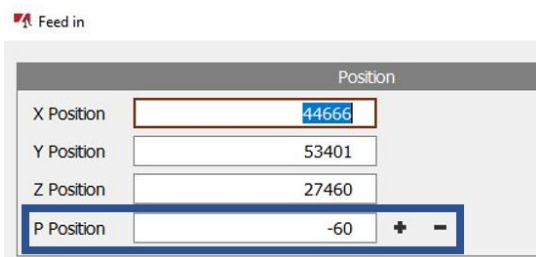
It can also happen that the wire gets out of the tip. This can happen if the parameters of the wire bonding (Bond time, US power, bond force) are too high. In order to place the wire back in the tip, press on the “Feed in position” button on the top bar of the screen



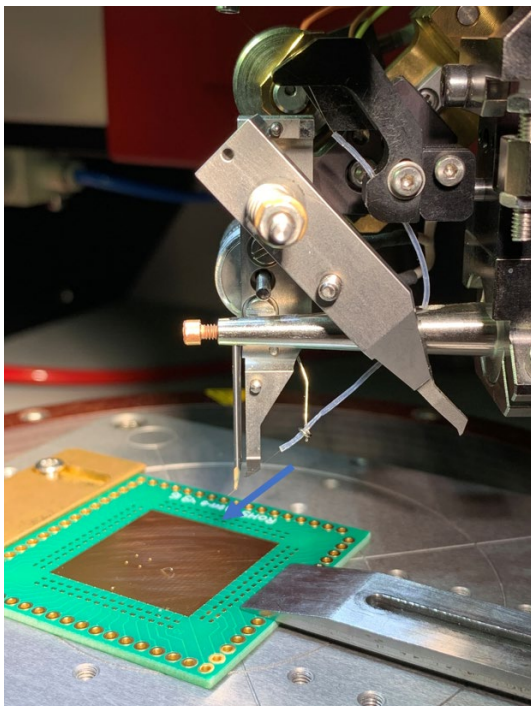
This will open the “Feed in” dialog and rotate the tip in order to allow a better visibility for the wire insertion.



The angle of the bondhead can be modified by changing the “P Position” value with the +/- buttons.



Then, pull the clamp and rotate it as shown below.



The wire can now be inserted in the tip using a fine tweezer. The wire should be oriented as shown by the blue arrow (45° angle with respect to the tip).

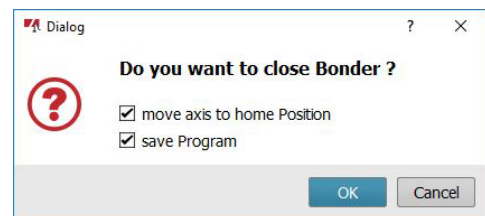
Once the wire is inserted, close the clamp, close the “Feed in” dialog and press on the “Bond” button on the left keyboard to continue wire bonding.

If it is not possible to insert the wire in the tip, the tip might be clogged. In that case change the tip as explained in the following section.

8. Tool shutdown

It is very important to follow the procedure below to avoid corrupting the internal memory of the tool which can result in the tool not starting up again correctly.

1. Click on File -> Exit
2. The following dialog appears. Acknowledge by pressing “OK”.



3. Wait until the black window with the “Bondtec” logo disappears.
4. Shutdown the PC properly (click on “Shutdown” on the main windows menu)
5. When the PC is off, shutdown the tool by turning the main power switch.



9. Changing the wire