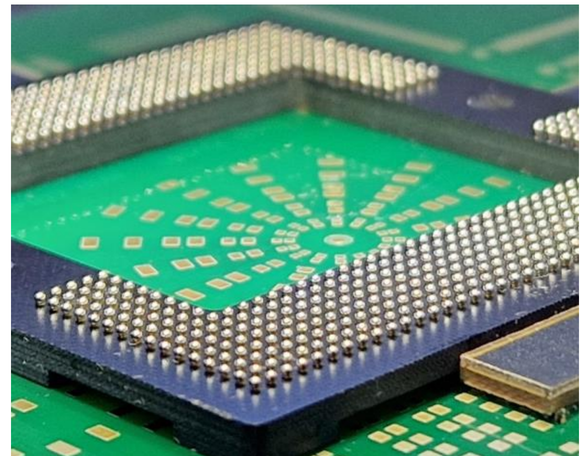
essemtec A NANODIMENSION DIVISION

BGA REBALLING (BALL GRID ARRAY)

Description

BGA reballing is a process used to remove the obsolete solder balls on a Ball Grid Array (BGA) component and to replace them with new ones. This process is commonly done when the solder balls become damaged, cracked, have poor connections, or the BGA is simply too valuable to be thrown away.

The BGA reballing process requires specialized equipment and expertise to ensure that the solder balls are precisely applied, aligned, and reflowed. The solder balls have usually a size range of Ø 0.25 to 0.9 mm



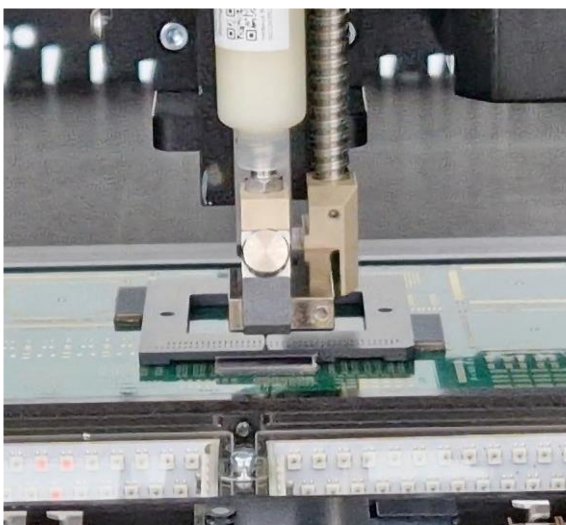
Replacing the solder balls

The following steps are involved in the reballing process:

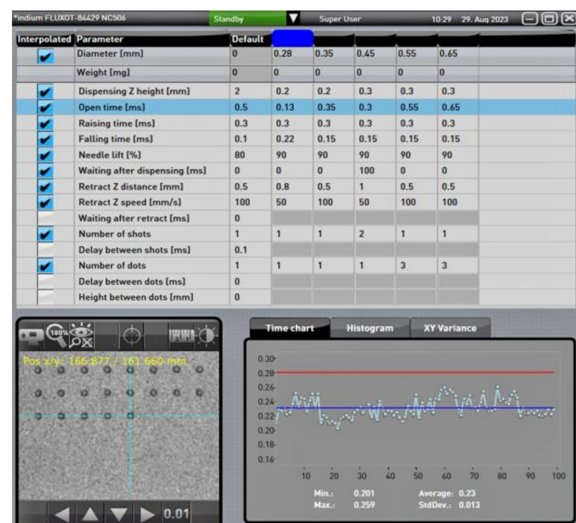
1. Removal of the damaged solder balls: (not part of Essemtec process)
The BGA component is heated to melt the existing solder balls. The balls are then removed from the BGA package using a tool or equipment.

2. Cleaning and preparing the BGA component: (not part of Essemtec process)
The BGA component is thoroughly cleaned to remove any residual solder or contaminants. The surface is then prepared for the reballing process.

3. Dispensing of flux paste:
The precise dispensing of the soldering flux in the accurate quantity is basis for a successful process.



Flux dispensing with a piezo jet valve



Interpolated	Parameter	Default					
✔	Diameter [mm]	0	0.28	0.35	0.45	0.55	0.65
	Weight [mg]	0	0	0	0	0	0
✔	Dispensing Z height [mm]	2	0.2	0.2	0.3	0.3	0.3
✔	Open time [ms]	0.5	0.13	0.35	0.3	0.55	0.65
✔	Raising time [ms]	0.3	0.3	0.3	0.3	0.3	0.3
✔	Falling time [ms]	0.1	0.22	0.15	0.15	0.15	0.15
✔	Needle lift [%]	80	90	90	90	90	90
✔	Waiting after dispensing [ms]	0	0	0	100	0	0
✔	Retract Z distance [mm]	0.5	0.8	0.5	1	0.5	0.5
✔	Retract Z speed [mm/s]	100	50	100	50	100	100
	Waiting after retract [ms]	0					
✔	Number of shots	1	1	1	2	1	1
	Delay between shots [ms]	0.1					
✔	Number of dots	1	1	1	1	3	3
	Delay between dots [ms]	0					
	Height between dots [mm]	0					

Optimized jetting parameters for best adhesion

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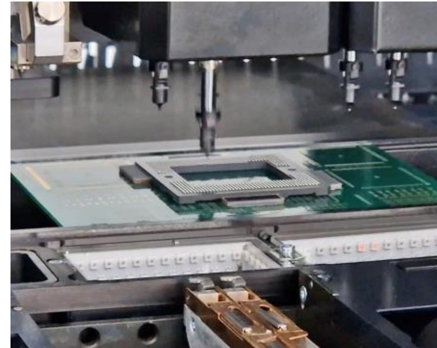
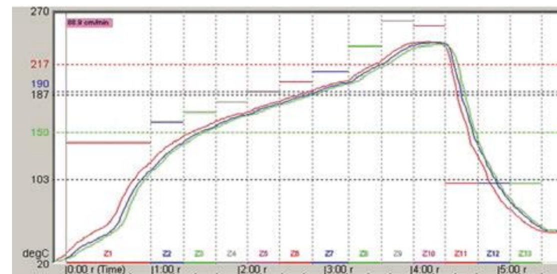
4. Applying new solder balls:
Solder balls of the correct size and composition are applied in one run with the flux dispensing to the BGA component using the specialized Essemtec equipment. The accurate ball placement is critical for proper connections and functionality.

Specific settings in ePlace for accurate placement



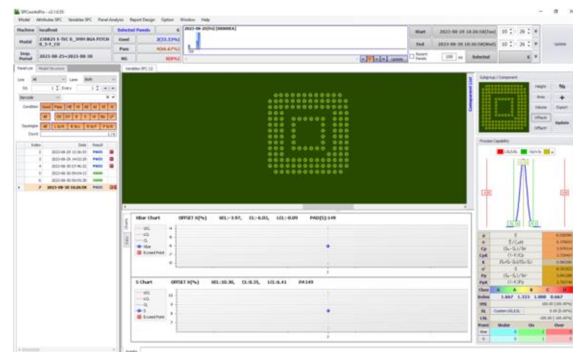
Pick and Place of new solder balls

5. Reflow process: (not part of Essemtec process)
The BGA component with the newly applied solder balls is heated in a reflow oven with a precisely defined temperature curve. This melts the solder and creates a strong connection between the component and the PCB.



Example of temperature curve in the reflow oven

6. Inspection and testing:
After the reflow process, the BGA component is visually inspected and various test methods are used to ensure that all solder balls are correctly placed and have good connections.



Final inspection

Available for

Conclusion

- With the correct jetting parameters as well as ePlace specifications and Reflow profile, reproducibility could be achieved for this BGA reballing process.
- It should be noted that the quality of the pads is a relevant issue to achieve excellent results of the jetting and placement by Essemtec machines.

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