Lead-Free Rework of PTH Components on Large, High Thermal Mass Assemblies

PCBRM100

Next Generation Solder Fountain Technology

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The iNEMI (International Electronics Manufacturing Initiative) Technology Roadmap cites lead-free rework of plated-through-hole (PTH) components on large, high thermal mass assemblies as one of the key challenges facing the electronics industry.

Solder fountain technology, which has been the industry standard for reworking tin-lead and low complexity lead-free applications for over forty years, lacks the capability to rework these significantly more challenging assemblies, even when low dissolution solder alloys are used.

The PCBRM100 is next generation solder fountain technology, designed specifically for lead-free rework of PTH components on large, high thermal mass assemblies. It provides the ability to rework large, high thermal mass assemblies using proprietary technology that significantly reduces copper dissolution. It's a large system compared to the traditional mini-pot with a footprint measuring 120″L x 52″D x 77″H.

Summary of Key Features

- 24″ x 26″ fixtureless board carrier with programmable "X" and "Z" axes
- 28″ x 28″ quartz composite top and bottom preheater with programmable z-axis
- EZ Line Alignment System
- Cast iron solder pot with servo-motor driven titanium pump and programmable "Y" axis
- Top and bottom Focused Convective Heating System (FCH) including hot gas head with independent "Z" axis
- Non-Contact Barrel Cleaning System
- Fume enclosure
- Laser Distance Sensor (automatic nozzle squaring)
- Proprietary heater stabilization routines (thermal repeatability)
- Eight travelling thermocouple channels (on-machine thermal profiling)
- Flexible, user-friendly software with PC and touch screen monitor
- Heating Power for the Most Challenging Applications:
  - Solder pot: 6 Kw
  - Preheater: 16.5 Kw
  - Top convective heater: 2 Kw
  - Bottom convective heaters: 7 Kw

Board Carrier
24" x 26" fixtureless board holder with adjustable center supports, ergonomic load/unload, tilt up access, spring loaded arms for thermal expansion and programmable "X" and "Z" axes.

Alignment
EZ-Line Alignment System *(figure 1)* features a down-looking digital camera with zoom lens mounted on a programmable "Y" axis that superimposes the image of the solder stack over the top side of the board. X/Y joystick controls provides fast, accurate alignment.

Preheater
28" x 28" Quartz composite top and bottom IR preheater (16 Kw) with 25 watts per square inch heating density, independent temperature control and programmable "Z" axes. A thermocouple attached to the board provides temperature-based preheating for process repeatability.

Solder Pot
Cast iron solder pot *(figure 2)* with 90 pound solder capacity, servo-motor driven titanium pump with programmable "Y" axis, internal chambering for laminar flow and thermal uniformity, nitrogen inerted, titanium solder stacks and quick electrical disconnects (spare pots with alternate alloys).

Focused Convective Heating (FCH)
Top and bottom Focused Convective Heating (FCH) makes the PCBM100 truly unique. After the board is preheated, it moves automatically to a position just above the solder wave. A nozzle in the hot gas head with programmable Z-axis heats the component from the top side, while two universal heating blades heat the component leads from the bottom. The FCH stage reduces the required solder contact time by over 50%, which significantly reduces copper dissolution.

Barrel Cleaning
After the component is removed, the board remains in place and continues to be heated by the bottom side convective blades. The barrel cleaning nozzle applies heat and vacuum to remove the solder. Force-controlled touch off is followed by non-contact solder removal using the X/Y joystick controls.

Please refer to our website at www.air-vac-eng.com/pcbrm100.html for further information. User restricted video clips are also available on the web - please contact Air-Vac directly.

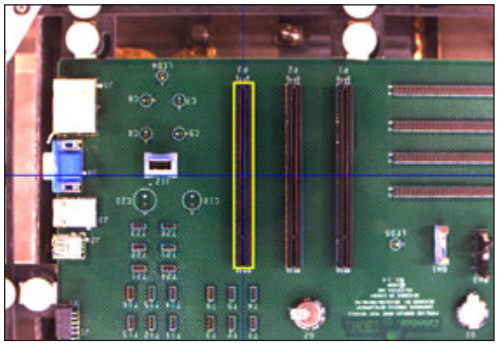

Figure 1. EZ-Line Alignment System

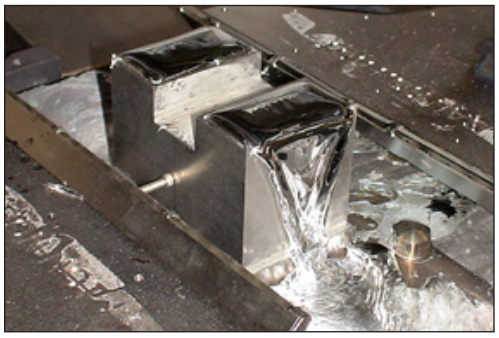

Figure 2. Solder pot with titanium solder stack

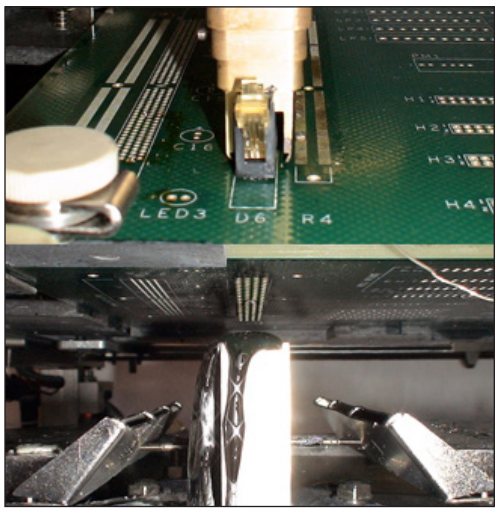

Figure 3. Focused convective heating.

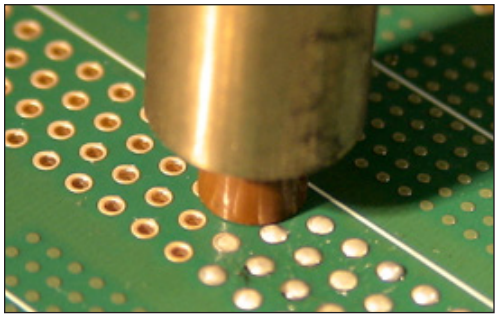

Figure 4. Barrel cleaning

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