

Ersa Hybrid Rework System HR 550 – High performance Rework for Professionals!

For many decades, the repair of printed circuit board assemblies has been considered – particularly the repair of SMD's with a multiple of balls – as a critical, difficult to control and adventurous process. But users and manufacturers of rework systems have since learned, and they have

been able to substantially raise the level of reliability and reproducibility. Now, with the introduction of the Ersa HR 550 Hybrid Rework System, the process of board repair has finally left its unloved niche existence!

Author
Jörg Nolte,
Product Manager
Soldering Tools,
Rework and Inspection
Systems, Ersa GmbH

published in
productronic 11/2016
in Germany

While the challenges in board assembly repair have not changed over time, the tolerance window for permissible deviations have become smaller. If the temperatures or the temperature deviations on the board to be worked on are too large, the board or the components or both may get damaged. Everyone who had to remove a BGA without tooling adequate for the job has probably already made this painful experience. The high process temperature (230 – 240 °C) of lead-free solders reduces the tolerance range for the maximum permissible temperature of the component to around 260 °C. A modern rework system must be able to maintain the required maximum temperature during the process.

At the same time, the increasing miniaturization and new package designs are continuously raising new questions: How can the new component shapes be handled, how can fluxes and solder pastes be applied? The largest possible amount of flexibility and modularity in the design of the system will provide important answers.

TEMPERATURE CONTROLS

As in other Ersa rework systems, in the HR 550 the board assembly will be heated up very gently and homogeneously. Process monitoring is performed in a closed loop control circuit. For this monitoring, the user has contacting sensors and digital IR sensors available. The system features a 1.500 W hybrid high performance heating element, with which SMT components up to a size of 70 x 70 mm can be removed and re-soldered again. IR radiation combined with a defined proportion of heated convection permits highly dynamic heating processes.

In the bottom heating unit with 3 zones, medium wave length IR emitters with 2.400 W ensure the homogeneous heat

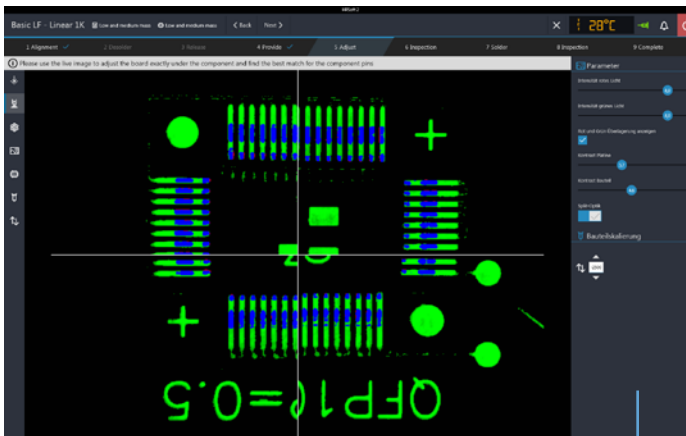
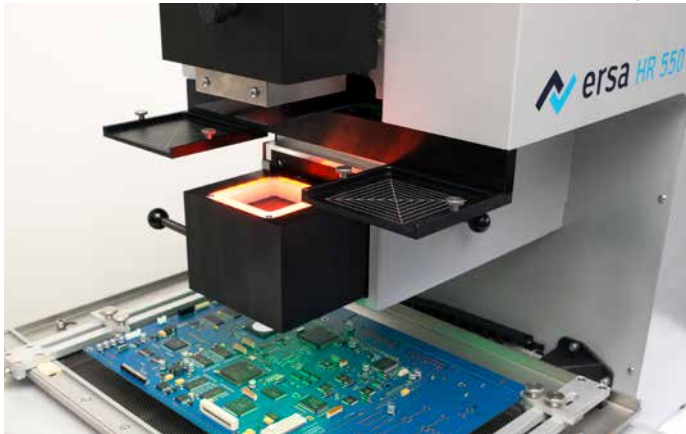


Ersa HR 550 Hybrid Rework System – Rework on the highest level

up of the complete board assembly. With a nominal profile, the user defines how the heat warming the assembly should be distributed across the board. Light and low mass PCB's can thus be processed with a different "balance" than heavy boards.

An important criterion for many customers, when selecting a rework system, is the following aspect: The first and the nth board assembly repaired have to exhibit the same excellent solder results. The process controls of the HR 550 answer this demand, as they permanently monitor the temperatures of the components and of the preheaters of the system. This results in a previously not achieved reliability and repeatability of the solder process.

Ersa HR 550 Hybrid Rework – Highly precise component placement with placement force sensing and ergonomically favorable arrangement of the operating controls at the front of the tool.



Ersa HRSoft 2 - QFP aligning with the digital split optic

COMPONENT PLACEMENT

Aside from the thermal process, the reliable and precise placement of the components also plays a decisive role in deciding whether the repair is a success or a failure. Particularly for miniaturized components with a high number of balls and with hidden connections (bottom terminal component, BTC), an imprecise placement very often is the cause for a defective solder connection, exhibiting, for example, bridging or open connections.

To overcome this difficulty, the HR 550 offers a number of technical solutions: The high-resolution 5 MPix camera with a preceding special optic offers the user high-contrast images of chips from the

size 01005 right up to large components of up to 70 x 70 mm. A unique feature of the HR 550 is the optical shift to two different zoom levels for large and for very small components.

All functions which support the user with methods of the image processing are summarized under the term Computer Aided Placement (CAP): If components are being aligned, the live image will show, in virtual colors, the connections of components (red) and the terminal pads (green). The user recognizes the optimal superimposition of joints and pads by a blue coloring. Another tool is the digitally split optic which assists when aligning components, such as, for example, large QFP's.

With the rotational adjustment and the x-y micrometer adjustment features, each component can be placed precisely on its designated pad. Particularly advantageous for the user is the placement of the operating controls at the front of the system.

After being aligned, the components are placed with a highly precise vacuum pipette integrated in the heating head. For component removal, the same pipette lifts the component gently off from the board. The heating head and the vacuum pipette are each controlled by a precise stepper motor. An integrated force sensor recognizes contact with the board while the components are being placed.

PROCESS CONTROL WITH NEW SOFTWARE PLATFORM

The HR 550 features a newly developed software platform HRSoft 2, which impresses with its clarity and functional arrangement.

All process steps of the rework procedure are logically displayed, and they can easily be configured and executed.

FLEXIBILITY AND MODULARITY

The operator guidance (Enhanced Visual Assistant – EVA) takes the user through the rework routine, starting with the selection of a profile for de-soldering a component as well as the subsequent alignment and placement of the new component, right up to the soldering process.

The applications of solder paste on the component through the use of a printing template, or the flux Dip-In process are optionally supported.

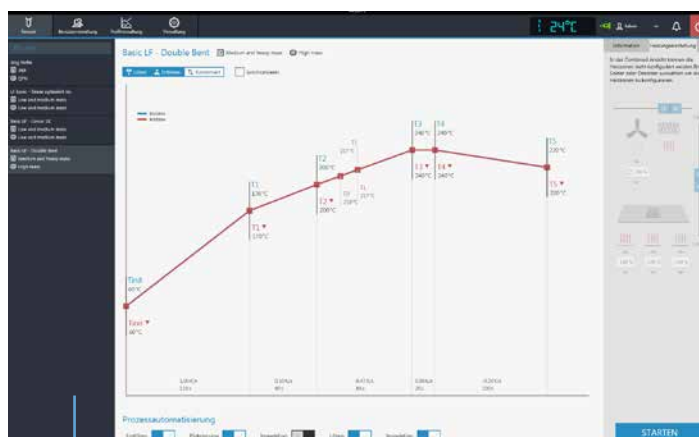
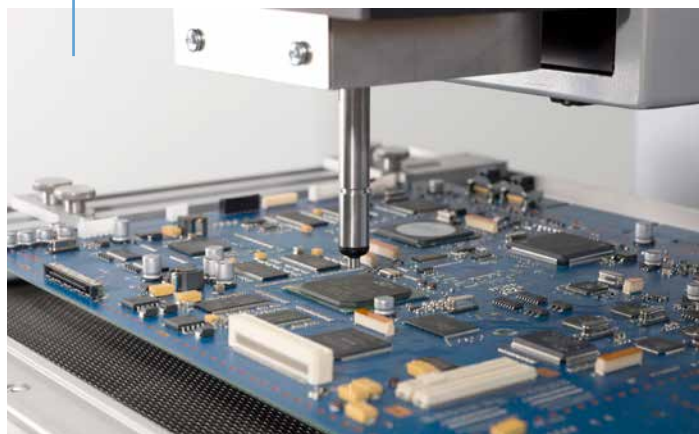
All rework processes, together with the solder and de-solder parameters, are naturally documented and archived, so that the full traceability of all rework processes is ensured.

The new system platform HR 550 orients itself on demands placed on rework systems today as well as in the future. Its modular and flexible design ensures the future viability of the system:

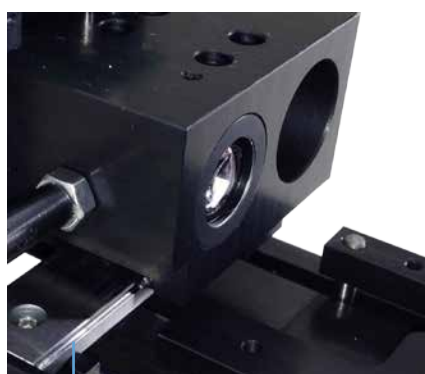
- Exchangeable hybrid heating head – facilitating service and for future heating head versions
- Process guidance through thermocouples or non-contact IR sensor
- Bottom side heater with three separate process zones
- Vision box with two different magnifications – component sizes from 01005 to 70x70 mm
- Image processing for Computer Aided Placement (CAP)
- Ready for operation with the Ersa Dip & Print Station
- Optional high resolution RPC camera for process observation
- Modern operating software HRSoft 2 with user guidance

The HR 550 is directed at all those users which place the highest demands on precision and safety when reworking electronic assemblies. Today, board assembly repair is a controllable and stable process. ■

Integrated vacuum pipette for component removal and placement



Ersa HRSoft 2 Profile selection and start of the 5 controlled process steps



Switchable optic for variable zoom

Ersa GmbH
Leonhard-Karl-Str. 24
97877 Wertheim
Phone: +49 9342 800-0
info@ersa.de
www.ersa.com

Ersa North America
info-kna@kurtzersa.com

Ersa Shanghai
info-esh@kurtzersa.com

Ersa Asia Pacific
info-esh@kurtzersa.com

Kurtz Ersa Mexico
info-kmx@kurtzersa.com