

Highly Efficient PCB Repair

IR heating emitter in a HR 200 rework system

Ersa successfully uses Elstein IR-technology for its Rework systems

With doubt and trepidation were the reactions when Ersa revolutionized professional SMT/BGA rework by using IR technology about 20 years ago. Today we know: This works, indeed! Over the years, Ersa has established its permanent place among the leading manufactu-

ers of rework systems. The systems from Wertheim enjoy great popularity among customers all around the world. Excellence in availability, process security and flexibility are often mentioned keywords and proof for their established technology.

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IR-TECHNOLOGY EXCELS IN REWORK APPLICATIONS

By the end of the 1990s, many users had negative experience with IR emitters in reflow soldering systems. The quartz heaters from the reflow ovens were mistakenly equated with those built-in in Ersa Rework Systems. In contrast to those quartz heaters of the early soldering systems, the ceramic IR emitters produced by the German manufacturer Elstein use a medium to dark IR spectrum (2 – 8 µm wavelength). The Elstein Company has engaged itself in the topic of the technical usage of radiant heat since the 1950s and has established a unique reputation as a manufacturer of heating elements for industrial applications. The ceramic IR emitters are excellently suited for heating up materials of PCBs and components like metals, plastics and ceramics.

The absorption of a PCB (FR4) is best above a wavelength of 2.5 µm. Ceramics absorb best at 8 µm (about 80% of the radiation are taken at this wave length).

In 1997, Ersa GmbH successfully introduced the first IR rework system using Elstein emitters to the market.

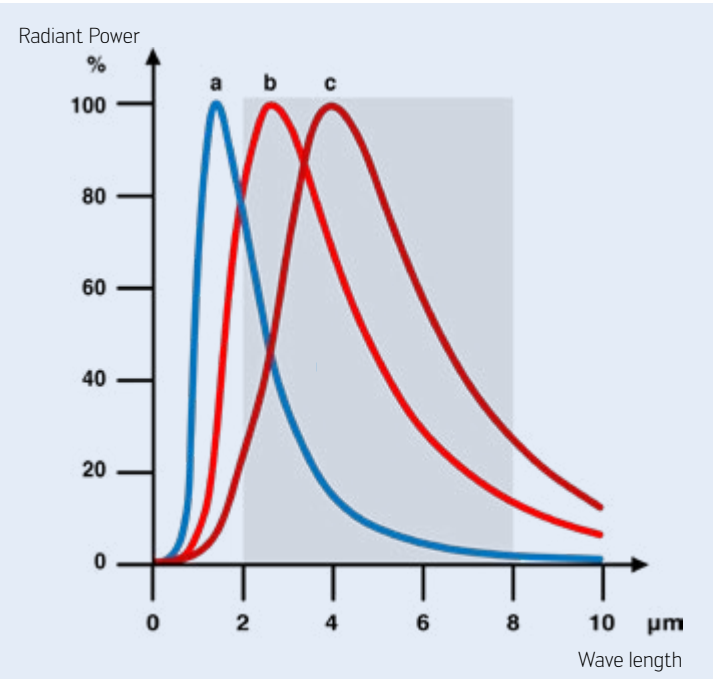
The daily soldering experience with the IR500 showed users that homogeneous heating of almost any kind of component and geometry is possible. PCB substrates and components have left this selective soldering process unharmed. It became obvious very quickly: IR rework is a true alternative to the hot-air rework systems common at this time.

Infobox

Radiant Power

The radiation spectrum of (2-8 µm) mid-wave IR emitters is suitable for the efficient and homogeneous heating-up of materials used in electronic manufacturing. The radiation maximum of halogen emitters on the other hand ranges in the short-wave range and can cause uneven heating during PCB repair.

a short-wave halogen emitters
b Ersa IR upper heating
c Ersa IR lower heating



FURTHER DEVELOPMENT OF THE TECHNOLOGY

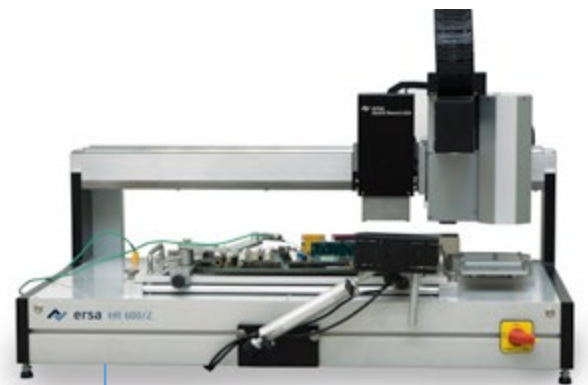
Alongside the introduction of lead-free technology and the spreading of new component types like BTC (bottom-terminated component) the demands on the heat input into the PCB increased. Lead-free solders with their higher melting points requires a homogeneous heating also from the bottom side to ensure successful PCB repair.

Whereas the Ersa IR550 is equipped with ceramic emitters in HTS design, the larger IR650 uses the more responsive lower heating with HRS emitters. This enables an even more efficient preheating of the PCBs and shorter process times.

For the further development of Ersa Rework Systems Elstein established the new SFH emitters in 2007. These have proven themselves to be the ideal IR lower heating up to now, f. e. with the HR 600/2 or the recently introduced Ersa HR 550.



„Out-of-the-Box“ – Compact Ersa Hybrid-Rework-System HR 200



Automatic Ersa Hybrid-Rework-System HR 600/2

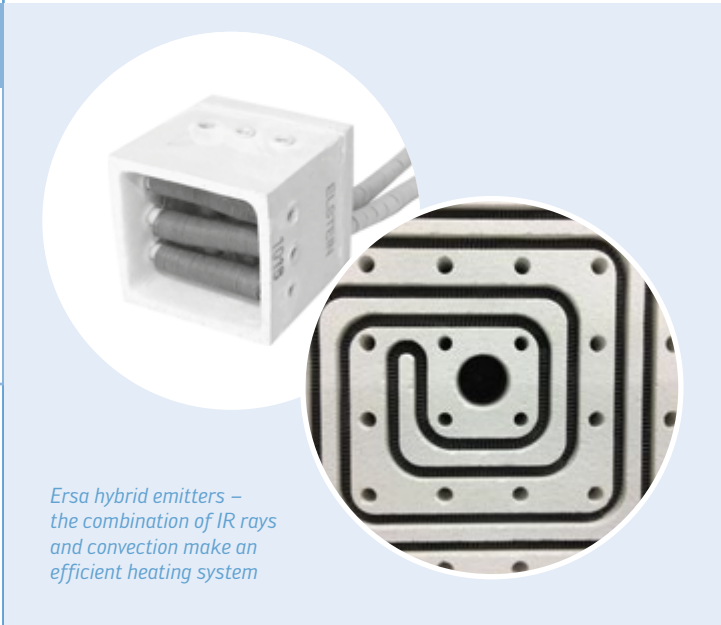


IR-emitters in the designs HTS, HSR and SFH (left to right)

Infobox

Hybrid Heating

In difference to true IR technology in hybrid heating processes, the radiant heat is complemented with a share of convection heat, which makes the thermal transfer even more effective.



Whereas the homogeneous heating of the PCBs lower side is done with IR emitters only, the HR 600/2 as the first automated Ersa Rework System is additionally equipped with a hybrid heating head. The hybrid technology combines the reliable radiant heat with a percentage of convection heat.

Like in true IR systems, it is very easy with hybrid systems to shield sensitive areas of the PCB to keep them below melting temperature. They can be covered with a protective foil or heat absorbing material. In combination with the closed-loop control Ersa Rework Systems currently offer the most sensitive technology for the repair of modern SMT assemblies. There are almost no limits in application: metal protection shields and SMD plugs, as well as sockets, are as easily processed as large BGA components, small MLFs or sensitive LEDs.

The cooperation of two long-established companies enabled this and several thousands of installed Ersa Rework Systems confirm the technological advantage of controllable radiation heat in the rework processes of customers. ■

The additional heat input by hot air enables a faster and more focused temperature increase of the components. Which results in faster and more reliable repair processes for the user. Remarkably, it is possible to keep the hot-air flow at a minimum. Neighboring components neither are damaged by emissive jets nor are remelted chips moved out of their position.

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