

Third-generation rework station is setting a new standard in safe processing

The successful predecessor topped

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The repair station Ersas IR/PL 650 A is the latest addition to a world renowned and tremendously successful IR (infrared) rework platform. This third-generation IR rework system tops its award winning and patented predecessors by offering three new technological innovations which are called DynamicIR, Multi True Closed Loop Control and IntelligentIRS.

Benefiting from an installed base worldwide of more than 5,000 IR rework systems, Ersas's latest system was specifically designed to handle the most difficult rework applications on heavy-mass PCBs and large-format SMT assemblies (18 x 20 inch or 460 x 560mm) in a lead-free environment. Ease of use, rapid rework cycle times, widest variety of rework applications and lowest operational costs or cost of ownership, respectively – these are the user advantages of these IR rework systems that can now be afforded to the most demanding of customers.

DynamicIR principle: for selective reflow

True temperature control on the board and component is the ultimate goal in rework. Ersas approaches the problematic of selective reflow for rework in a completely new and unique manner

with its IR650 (figure 1). The safe and proven medium wavelength IR heating technology allows for uniform heat distribution from the top and bottom side across the PCB and component. Ersas's DynamicIR technology allows for the fully automatic dynamic control of the top (1400W power and size 60mm x 120mm) and bottom (3200W power and size 350mm x 450mm) IR heaters depending on the actual temperature of the component and where it is in the temperature profile. The total available power to the selective reflow system is spread across four separately switchable heating zones on the top and five zones on the bottom. Depending on board size, the thermal mass of the substrate and component size, the DynamicIR technology guarantees that the required heat energy is delivered at the precise time and location in order to ensure that the component and board exactly follow the prescribed temperature profile. Combined with the enhanced capability to run an



Figure 1: The IR/PL 650A is a rework station for big boards, lead-free and other demanding SMT/BGA applications

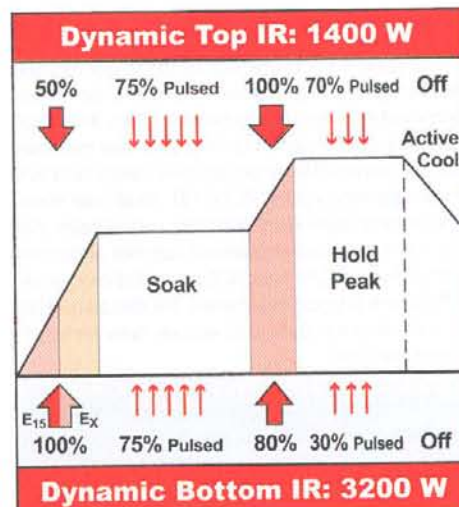


Figure 2: The principle of Dynamic IR Heating

ZUSAMMENFASSUNG

Obwohl in der Fertigung als eines der unbeliebten Themen betrachtet, ist die Reparatur von Baugruppen eine praktisch überall institutionalisierte Notwendigkeit. Sie wird jedoch mit SMT, Advanced-Packaging, Bleifrei-Prozessen und weiterer Miniaturisierung alles andere als einfacher. Folglich präsentieren hier die Anbieter fortlaufend adäquate Lösungen. Mit der Ersas Rework-Station IR/PL 650 steht den Anwendern in dieser erfolgreichen Serie von circa 5000 weltweit installierten Geräten eine Lösung für diesen anspruchsvollen Aufgabenbereich zur Verfügung.

RÉSUMÉ

Bien que considérée comme un sujet qui fâche dans le domaine de la fabrication, la réparation de groupes modulaires constitue une nécessité très largement institutionnalisée. Cependant, la technique du montage en surface (TMS), l'Advanced Packaging (encapsulation avancée), les processus de production sans plomb et la miniaturisation croissante ne contribuent pas à la simplifier, bien au contraire. C'est pourquoi les fournisseurs de ce secteur proposent en permanence des solutions adaptées. Avec la station Ersas Rework IR/PL 650, dernière née d'une gamme déjà riche d'environ 5000 appareils installés dans le monde, les utilisateurs bénéficieront d'une solution idéale dans ce domaine particulièrement exigeant.

SOMMARIO

Anche se nell'ambito delle fabbricazioni è considerato uno degli argomenti più spiacevoli, la riparazione dei gruppi costruttivi è una necessità istituzionalizzata praticamente ovunque. Con la SMT, l'advanced packaging, i processi privi di piombo e l'ulteriore miniaturizzazione la situazione si è ulteriormente complicata. Per questo la ditta presenta soluzioni sempre adeguate. La stazione Ersas Rework IR/PL 650, appartenente ad una serie di macchine di successo con circa 5000 apparecchi installati in tutto il mondo, offre agli utenti una soluzione in questo settore ricco di esigenze.

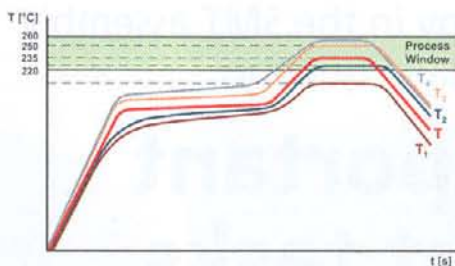
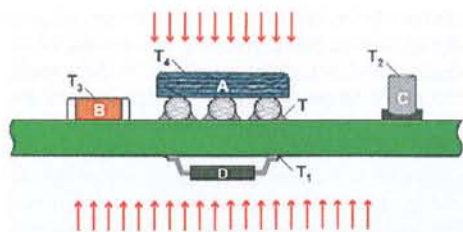


Figure 3a/3b: Multi True Closed Loop Control for highest process safety

extended or flat peak, this technology affords the lowest temperature-delta across the component, and greatly reduces PCB warpage (figure 2).

Principle of true closed-loop control

True temperature control on the board and component is a strategic advantage afforded by Ersas IR rework systems. True Closed Loop Control means that the actual component temperature is acquired, using the patented non-contact infrared sensor, and is used as the primary control mechanism for the heating system.

The so-called IntelligentIRS allows for a more precise temperature measurement by choosing from a component table or by component-specific calibration. Either the Ersas or a TC sensor of choice can be chosen to drive the DynamicIR heating technology, thus guaranteeing a perfect profile every time. Multi True Closed Loop Control builds on and enhances this principle by using up to four additional TC sensors. By assigning threshold values to these additional sensors (see figures 3a/3b), they are used to prevent the fully automatic DynamicIR heating system from undesired overheating of adjacent or bottom side components. A first-pass yield for rework is thereby guaranteed.

The result of lead-free safe heating

True temperature control on the board and component is the key to a safe lead-free process. The higher working temperature and the smaller process windows will make the lead-free rework procedure a much greater challenge. The risk of overheating adjacent or bottom-side com-

ponents during rework is greatly increased. The DynamicIR and Multi True Closed Loop Control principles afford the highest level of rework safety by literally making it impossible to overheat beyond an assigned threshold value. Thus, it is impossible to work outside a specified lead-free process window.

The complete system is broken down into four modules: the IR650 selective-reflow module (as described above), the RPC reflow-process camera module, the PL650 precision-placement module, and the IRSofT software module. The RPC module uses a high-power (up to 300x enlargement) motor-zoom camera, a controllable LED ring lighting system and an extremely robust, movable stand. The reflow process can be visualized from multiple angles on even the smallest of components.

The PL650 is a second-generation precision placement system designed for the largest range of components (from 1 x 1mm to 60 x 60mm in size), more automation and greater repeatability. A high-resolution camera with motor zoom permits highly precise alignment of component connections to pads with up to 300x enlargement, see figure 4. The excellent image quality is supported by a high-contrast, separately controlled two-color LED lighting system from four sides. The auto pick & place mode guarantees repeatable and precise ($\pm 0.001\text{mm}$ accuracy) results.

The IRSofT is the control and documentation software for the IR/PL 650. This user-friendly software provides both the interface simplicity required for less skilled operators, as well as the advanced profiling and documentation requirements of a highly trained user. This database-incorporated software offers a high level of flexibility and operator customization capability.

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Figure 4: The precision-placement module with auto pick & place function