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IPTE depaneling with more efficiency: Frameless routing for IPTE FlexRouter II

“Frameless routing” is a new option to increase efficiency of depaneling with the IPTE depaneler FlexRouter II. With “frameless routing”, depaneling of printed circuit boards without a frame, no PCB waste is left after milling. This technology increases the efficiency concerning ecological aspects by reducing not usable PCB waste. Therefore a new transport solution was developed for PCBs without a frame, to realize fast, stress free and precise depaneling with a milling spindle.

The FlexRouter II aims especially to middle-sized to high volume production lots featuring a high variety of different PCB versions, these are the demanding high-mix depaneling tasks based on short machine set-up procedures. Despite the very small footprint (machine width is only one meter), boards with sizes of up to 330 mm x 400 mm (length x width) can be processed without difficulties. Four of the seven machine axes in total are integrated as extremely precise linear drives of latest technology.

In the FlexRouter II the PCB panel will be fed in, securely clamped and its position precisely identified and adjusted by use of a precise measurement system. Since a freely programmable servo-gripper is used for clamping during the cutting operations a panel-specific gripper is usually not needed, and there are no additional gripper-tooling costs. The gripper mechanism features a Cartesian 3-axes system assembled on a rotating axis. The milling spindle under the panel is also positioned by a Cartesian 3-axes system and can be equipped with different spindle types. With these functions sophisticated applications can be realized without intricacy. As the gripper

fingers are exchanged automatically the change-over from one product to another is remarkably fast and easy.

After the milling spindle has cut a single PCB from the panel the board is set aside clamped by the gripper. For this step, a wide variety of different PCB stacking options are obtainable according to customer requirements in order to receive an optimum process flow, such as dual and single tape conveyor feeder, tray module to a size of maximal 600 x 400 mm, work-piece holder, linear shuttle or rotating table for the subsequent and individual customer procedures. Also available as an option is the accurate measuring of the singulated PCB by AOI (automated optical inspection) technology.

The generation of new routing programs will be aided and made faster through the use of a camera-based system or the integrated DXF-converting software which supports the fast and uncomplicated CAD data acquisition. The machine user-interface is designed for the intuitive and easy execution of all necessary functions of the FlexRouter II. And of course there are many more special standard features implemented in the new FlexRouter II, such as a provision for the usage of various sections of the milling head in order to reduce the costs for this consumable, the automated exchange of milling tools and a detection function for their possible breakdown.

For more than 20 years IPTE, one of the world's leading suppliers of automated production equipment for the electronics and mechanics industry, has been successful in the product category of depaneling machines. The machines prove themselves every day in practice in numerous installations and applications in production around the globe. Besides the machines themselves, numerous individual gripper/fixture mechanism projects have been realized by IPTE as well.

The main focus in developing and enhancing the IPTE depanelers is to fit the requirements of the market's and customer's needs. By doing so the performance and the quality are on a very high level. With the model SpeedRouter, launched 1998, IPTE has made highly flexible machine configurations possible, which are capable of in-line integration allowing an absolutely reliable and low stress routing process of

large panels containing multiple boards. According to the PCB layout the routing can be done with milling and sawing actions, or by a combination of both cutting methods. IPTE's large portfolio of options and add-ons for the system periphery efficiently support the integration in already existing lines. IPTE's depaneling machines are best suited for specific requirements in applications where tight tolerances are of essence.

IPTE can provide the appropriate solution for practically every depaneling application from its full-sized set of different router systems, depending on product-mix, the manufacturing quantity and the degree of automation needed on the shop floor. The enhanced system portfolio now consists of the EasyRouter, TopRouter, FlexRouter II and SpeedRouter. Through continual enhancements and upgrades of the machine technology and concepts, IPTE's depanelers clearly stand for "state-of-the-art" in this equipment category. All machines are acting very energy-efficient; they have an extremely high availability and very small footprints. Furthermore, the machines are industry 4.0-ready. Optionally integrated AOI solutions including a 100 % control of the process complete the portfolio.

IPTE's wealth of experience acquired over the very long time of more than 20 years in the engineering and application of depanelers (and of other equipment of course) results in an installed base for a large variety of applications, and becomes also apparent in the design of the dust-suction system for the minimization of milling particles and the air ionization. High-level hardware and software solutions have been optimized and designed for the individual product and the production process for a very high throughput and availability. The following functions are available to be installed to IPTE's depaneling machines: process statistic and monitoring pages, direct import of customer DXF-files for the cutting program generation and easy integration to work on a wide variety of MES systems.

IPTE offers complete and individually configured turnkey solutions for the successive handling of the singulated PCBs and board assemblies, component insertion and many other back-end processes up to electrical testing and final product packing as further useful equipment additions to the router portfolio.

Company Background IPTE:

IPTE was founded 1992 in Belgium. IPTE is a worldwide supplier for individual, flexible and high-technology automated product equipment. The company designs standard machinery and turnkey-automation systems of all kinds for production, test and further processing of printed-circuit boards, as well as of board assemblies and final products. IPTE runs 14 sites in Europe, America and Asia with currently more than 800 employees. The IPTE Group's client list includes considerable manufacturers of the telecommunications industry, the consumer electronics branch, the industrial and motor vehicle electronics as well as producers from the assembly technology and the manufacturing sector. IPTE's headquarters is located in Genk, Belgium. Other important sites are located in Germany and France.

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