Filling a Gap in the Wire Bonder Market

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It is not a surprise to anyone even loosely associated with the semiconductor industry that the center of the assembly world shifted to Asia. It has long been common knowledge that high-volume production of everything electronic is located in the Far East.

With this shift, American and European companies with homeland assembly processes that include wire bonding have been facing the resultant, serious equipment challenges over the last decade.

Following the trend set by component and systems manufacturers, the companies that build the equipment for these industries have also headed east (witness Kulicke & Soffa's recent decision to relocate its headquarters to Singapore). There has been a steady migration of process and assembly equipment manufacturers leaving North America and Europe as well as Japan and Taiwan, for new centers on the Asian continent. After all, that's where the new foundries, contract assemblers, test houses and proprietary factories are located.

As wire bonding production and, more importantly, its technical support, leaves North America, maintaining existing equipment, upgrading older machines and investing in newer models is becoming more difficult, and the problem is multi-level.

The solutions are less than ideal. The question whether to buy expensive and new 'high-tech' tools or less expensive, used equipment may not have a right answer. There are very few choices for customers who need more than a manual bonder or a semiautomatic bonder but who aren't prepared to spend $150K to $250K for a new automatic system.

The high cost of ownership for automatic bonders with esoteric and marginally useful features can be fiscally irresponsible. This is especially true for low- to medium-volume production houses, job shops and product development groups that are looking for automatic equipment that, while offering a satisfactory level of capability and accuracy, must be affordable, easy-to-use and cost-efficient in the long run.

These users need automation, but everything available in more affordable price ranges is used or refurbished, and the uncertainty associated with used equipment is a down side of the available options.

Also, it is common knowledge that OEMs are less than enthusiastic about supporting their used equipment, especially if they did not sell it. When they choose to provide support, service rates can be, and generally are, exorbitant. Pricing for spare parts is sometimes a gouge.

With few exceptions, someone with a need for this mid-level capability either has to buy more than they need in an expensive new piece of equipment from an off-shore supplier, or they are forced to go to the used market and hunt for a reliable machine while somehow keeping a production capability available.

The obvious negative associated with buying used is that the customer is largely in the dark about what they're getting and any proffered warranty is going to most likely be "dust and deliver." For example, a company may offer a 30-day warranty on a piece of used equipment, but that warranty may only provide over-the-phone assistance for the first 30 days after purchase. This requires the customer to have his own in-house technical capability to deal with any breakdowns or issues. The more advanced the machine a customer buys, the more internal support he'll need.

The opportunity for something to go wrong increases with the equipment's age, and with used equipment the new buyer can't be assured that the machinery was properly maintained in the past.

One of the major issues with the new equipment available, on the other hand, is usually overkill for smaller and mid-volume production houses' applications and budget. It also creates an environment where the manufacturer, in effect, now owns the user. By definition, a single-source supplier means having to go to that specific source for support, service, and parts, and that means paying premium prices and operating on the supplier's delivery schedule no matter what the user's production line requires.

The opportunity, and requirement, for automatic wire bonders supporting smaller, specialty users and mid-volume production facilities has been created by the larger companies abandoning the market. The impact of the suppliers' exodus off-shore is that equipment selection choices have been minimized because companies have not been designing and building new machines for this market, and every year that goes by, the existing equipment is another year older. Less and less support is available, and customers are buying into obsolescence from the start.

There is a solution, however. With the evolution of this niche opportunity, some companies, like Questar Products, are developing and building automatic machines that offer the required performance without the unnecessary, and costly, features at a price point that is affordable to a smaller organization. This allows the customer to buy a tool to fit the specific need on a cost-effective price / performance basis.

Fine-pitch automatic wire bonders, designed with smaller, more agile organizations in mind, can solve the day-to-day challenges associated with small-to-medium lot sizes, multiple product variations and frequent job changeovers. By simplifying the machines to carry out the core of the automated wire bonding operation, these machines can provide a friendlier user interface, intuitive programming, fast changeover, and near-zero maintenance, all resulting in a low cost of ownership.

Now, with the ability to buy new equipment specifically designed for their applications, customers can buy from a supplier whose intention is to support them today, and as the needs change, support them tomorrow. If a customer needs something special done, if a software modification is required, if a new application must be implemented, there is now somewhere to go. Large OEMs cannot, or choose not, to cater to smaller buyers. Clearly, used equipment sellers are completely incapable of customized attention. Buying new from a company like Questar offers customers the flexibility and support to evolve and move forward.

There are other factors that are equally important for the day-to-day usability of any particular tool.

Having a robust, near-zero-maintenance system is a real advantage. However, having that machine designed and built using off-the-shelf components, completely freeing the user of being "owned" by the vendor, is considerably better yet. When a component does need replacing, it is reassuring to know the part is available from local distributors or other third-party suppliers.

Lack of field service options is another issue affecting most small and medium users. All OEMs want to keep control of their field service business. It's a profit center they don't want to share. This poses yet another problem for the user who does not have, or cannot afford, a full-time, in-house equipment technician. They may have a preferred local independent contractor. Most OEMs are, at best, reluctant to provide support to these contractors. Questar, as an example, will work with these independents to support its equipment and its customers.

In addition to a very friendly GUI, operator training should be a major consideration in choosing equipment. With a "point, click, bond" approach based on Windows software, a new operator with any PC experience is already well up the learning curve.

"Easy-to-use" is an often mis-used phrase, but "ease-of-use" does not cross all application boundaries. What makes an auto-bonder product dedicated, high-volume and flexible is different from what works for a machine that may do hybrid, DIPs, COBs, PGA, BGAs, and flex assemblies all in one day. Ease-of-use is defined by the end-use design.

To ensure that ease-of-use is not just a meaningless promise, the machine's work holders must be non-dedicated fixtures that provide the flexibility to quickly change out the multi-use, generic, device-specific or customizable top plates in minutes, as well as to make height adjustments to accommodate varied package thicknesses in just a few seconds. The other half of the solution is equally rapid access and loading of device programs. Once a programmed device is mounted on the workholder, in less than 30 seconds the assigned program can be located and loaded and the machine will be bonding.

There is a place where performance meets affordability, and it is open for business. The option of purchasing a new, application-capable, operator-friendly auto-bonder at an affordable price is now available.