Everything Started with Microswitches

Figure 1: Cherry's headquarters in Auerbach

Bayerischer Qualitätspreis 2008 (Bavarian Quality Award), Automotive Lean Production Award 2006, Best European Factory 2005 - these are just some of the well-respected industry awards recently presented to the company in Auerbach in the Upper Palatinate. The small town between Nuremberg and Bayreuth at the edge of the "Frankish Switzerland" area in the German state of Bavaria houses the headquarters of the company, which has been successful on the world market for the last four decades. At Cherry, the largest employer in this region, which is generally considered to be structurally weak, about 1,400 employees develop and produce microswitches, keyboards, components for the automobile industry, and controls for household appliances. At the subsidiary in Wolfsbach near Bayreuth, which won an award in 2008, and a factory near Klasterec in the Czech Republic, the manufacturer also has 700 additional employees.

Production Around the Clock

Figure 2: Manufacturing line for keyboards

At present, about 10,000 keyboards, 30,000 automobile components, and 600,000 microswitches leave the factory in Cherrystrasse day after day. In the process, Cherry performs a balancing act. The company develops sophisticated mechatronic solutions for the automobile industry and successfully completes for awards worldwide with its simpler products. All well-known PC manufacturers, for example, purchase Cherry keyboards, in particular due to its extremely short-term disposition times for all kinds of key layouts. In addition, 80% of all cars produced in Germany have parts with the Cherry logo.

The fact that the company founded in this region for the production of microswitches by American Walter Cherry in 1964 has been so successful over the decades particularly lies in the constant readiness to be innovative. This has been demonstrated most impressively in the development of new manufacturing methods, for example, in the early use of laser technology.

ROFIN and Cherry - Lasers Meet Computer Keyboards

When Head of Production Heribert Hammerl and his colleagues visited a number of laser companies at the beginning of the 1990s, he had an interesting new task. A decade before, Cherry had started manufacturing computer keyboards and had quickly become the world market leader as a result. A second method was already in use for the labeling of the keys. The keys, however, originally injection-molded in two colors, soon provided to be too expensive for the emerging mass PC market. The sublimation labeling method introduced after that increasing posed problems for the constantly growing number of country and function variants since special sublimation paper had to be kept available for the labeling of each individual character.

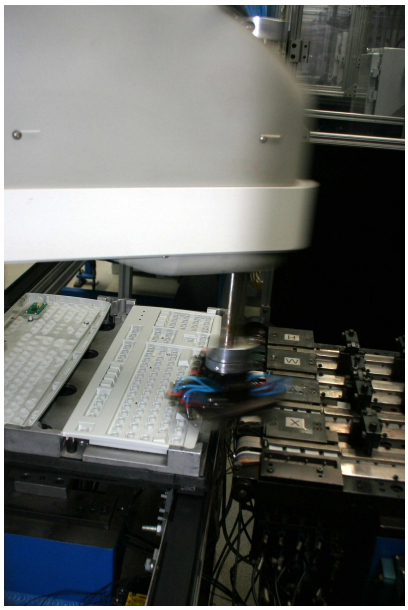

Figure 3: Equipping of the keyboard using industrial robots

On the search for alternatives for a more flexible labeling of the keyboard keys, the company in Auerbauch discovered plastic marking by laser. When properly parameterized, Nd:YAG solid-state lasers generate a high-contrast marking through a color handling of the materials in a number of plastics. In contrast to printing, marking is absolutely anti-abrasive, even in case of extremely intensive use. In the process, the flexible deflection of the laser beam by galvo scanner heads provides every conceivable freedom of form and marking content. The required cycle time in connection with the size of the marking area, however, created a headache for Cherry. The processing area of a scanner head only covers half the width of the keyboard and a mechanical repositioning of the keyboard or laser head is not possible due to the 20 second time window per marking procedure.

ROFIN's Decisive Solution

In Bergkirchen, north of Munich, the solution was finally found. The laser specialists of Rofin-Sinar suggested an assembly with a laser, a beam splitter, and two deflection heads. The beam splitter would guide the laser beam through the scanner heads successively. These heads would then each mark half the keyboard within ten seconds. Rofin-Sinar, which had already been in the laser technology and laser marking business for about 20 years at that time, was confident that it would be able to realize this sophisticated assembly reliably for constant operation. After all, Cherry manufactured in three-shift operation seven days a week. It did not want to experience downtimes due to the initial teething problems of a new technology.

When Cherry's technicians returned to Auerbach, they had the concept for a new marking procedure in the bag. The prototype that arrived a while later from Bergkirchen fulfilled all expectations. Cherry optimized the composition of the plastics used for the best possible marking results, thus ultimately becoming one of the first suppliers worldwide able to offer the new, flexible, high-quality marking method for keyboards. As a result, laser marking was established as the standard method.

Figure 4: Extremely flexible lasers mark in both Bavarian and Frankish layouts

Today, Up to Three Lasers Work Simultaneously

Today at Cherry, up to three lasers mark a keyboard at once - two at the top and one at the bottom. In this way, the complicated adhesion of a label to the bottom of the keyboard is not necessary. If desired, monochrome manufacturer logos or text are applied at the same time. If necessary, the complete marking procedure is completed in 4-5 seconds. On some of its five assembly lines, the company is producing value-added keyboards with integrated barcode or chip card readers and fingerprint or RFID sensors more and more often.

Figure 5: Marking of dark keyboards with end-pumped lasers

About 20 Rofin-Sinar second-generation diode-pumped lasers are currently in use in Auerbach: diode end-pumped beam sources. These lasers also permit marking of black keyboards using a bright color handling. Heinz Freiberger, Head of Keyboards, emphasizes there are almost no downtimes. The lasers run reliably and malfunction-free around the clock.

Complex Mechatronics for the Automobile Industry

The Automotive division is now the highest revenue-generating division of the company with about 60%. Here, Cherry has systematically developed into one of the leading Tier 2 suppliers for complex modules for switching and controlling. The product range extends from locking systems, switches, and controls for the inside of vehicles, shift gates, immobilizers, and brake assistants to electrical ignition locks or components for adaptive chassis.

Figure 6: Marking of automobile components

Especially in the automobile market, innovative strength is the key to success. Cherry's corporate culture motivates employees with its own ideas for new, better production methods. Even the automotive industry needs laser markers. Bar codes and ID and serial numbers - the perfect tracking of the production of each component and process step is particularly essential in this industry. In this case, the laser generates individual markings that can lastingly resist unfavorable conditions such as heat, moisture, or contact with oils on plastic or metal housings within an extremely short period of time.

Success Due to Constant Further Development

Cherry's innovation tempo has resulted in production lines practically being continuously converted or redesigned in the factory halls. In the process, the entire spectrum of automated manufacturing technology is in demand: production lines, industrial robots, equipping systems, solder baths, cable assembly, the waterproof casting of housings, and so on. If new marking solutions that take the internal know-how to the limits must be developed in the process, ROFIN's laser specialists and their own application laboratory are ready for the evaluation of new methods at short notice. Its intensive cooperation with the laser manufacturer is one of the factors that lets Cherry meet the next challenges with confidence.

Contact person:
Laura Miller
Marketing
ROFIN-SINAR Laser GmbH'
Dieselstr. 15 D-85232 Bergkirchen
Germany
Tel.: +49-(0)-8131-704-234
Fax: +49-(0)-8131-704 404
l.miller@rofin-muc.de