



AOI: trendsetting investment for a small firm



Case Study AOI

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MINEL AG, in Buttikon, Switzerland, assembles printed circuit boards for customers from widely varying industrial branches. This company specializes in very small piece counts with extremely demanding, complex placement. Here, product quality is the basic precondition for success and so at MINEL, is written in capital letters. Even with low volume, high mix production and a staff of 15, the company is convinced that with professional AOI, they can further raise the bar on quality standards and significantly reduce production costs. Thus, MINEL is exploiting the current crisis as an opportunity to introduce an AOI system.

MINEL: Individual and flexible customer solutions

MINEL was founded in 1971 as a department of RUOSS-KISTLER AG in Buttikon, Switzerland. To facilitate optimal market entry, today's MINEL AG was spun off as an independent corporate entity. Currently the company is in family ownership, with 15 employees. The primary business of this EMS is highly flexible and complex printed circuit board assembly at very low lot sizes, along with production and testing of electronic devices and assemblies under customer contracts. In addition to THD and conventional assembly, this EMS service provider has been occupied with automatic SMD assembly since 1986. Their customer base comprises branches ranging from the communication industry through medical technology, to the foodstuffs industries. Their challenging products include motors, food vending machines, hearing aids, submersible electronics and monitoring systems. MINEL's uppermost goal is to offer their customers qualitatively high value complete solutions from one source.

Advantages of an appropriate AOI system

"Quality is the precondition for an EMS service provider. More than anything, our customers demand peak quality. We work very closely with our customers and strive for a durable, long-term partnership", states Jack Schlappi, business manager at MINEL AG. Because of the high population density, ongoing miniaturization and the ever-shrinking amount of surface on the PCB, quality assurance by visual inspection has run up against its limits. "Because of its flexibility and economic benefits, only an AOI system corresponds to the high requirements set by low volume, high mix production. ICT, Flying Probe or functional test are for us of less advantage, because their setup is very expensive and has limited flexibility", explains Jack Schlappi. All things considered, two reasons to invest in an AOI sys-

tem emerge. First: securing quality to guarantee defect-free delivery. Second: optimized costs through increased efficiency.

"Our goal in acquiring an AOI system was not to replace employees, but to raise productivity with our existing staff. This results in higher throughput with the same number of employees", says the business manager.

MINEL not only scrutinized the AOI market extensively, but also tested systems on site. In 2008, a final benchmark between two suppliers was arranged. Early in 2009, the bid was awarded to the system S3088-II from Viscom. Jack Schlappi explains the reasons why: "Even though Viscom systems are not the cheapest where price alone is concerned, they are very professional and more importantly, very flexible. Their high inspection depth and mature hard- and software were especially convincing. Naturally, the longstanding continuity of the company also played a role."



F. l. t. r.: Felix Senn, Development and Jack Schlappi, business manager, both MINEL, in front of the Viscom AOI-System

In addition, acquisition of an AOI system provides MINEL with a decisive distinguishing feature compared to other small EMS operators in Switzerland. MINEL produces in lots from single units to 8 - 10,000 pieces with a wide range of variants. SMD components including BGAs, fine pitch, QFP and others, down to a component size of 0402, are processed. In addition to the challenging placement of small lots, the company also distinguishes itself by processing Starflex boards. The pronounced bending in these products presented fresh challenges to the AOI system. Here, however, the highly developed Viscom technology proved itself to advantage. A suitable PCB support and program settings provided reliable, hassle-free inspection.

From a struggle with symptoms to process optimization

Currently the S3088-II is deployed as a stand-alone solution equipped with automatic in- and outfeed systems. It is equipped with four orthogonal and four angled cameras. The system is also equipped with two repair stations, an offline programming station and statistical process control. Reading data matrix codes and recognizing OCR text is also possible.

The AOI system is used to inspect PCBs populated with SMD components, THD solder joints and miniaturized components, as well as PCBs with high placement density after soldering. The inspection scope covers short circuits, presence, solder joints, polarity and text recognition on ICs.



The MINEL Team

Because many solder joints can no longer be inspected from above, angled view is frequently employed. Jack Schlappi accentuates the utter importance of an angled view: "When configuring the system, we consciously decided on a flexible combination of orthogonal and angled cameras, so we are positioned to inspect highly unique components. This was the only way for us to cover future customer demands without further investment, to best equip us for the future."

After an AOI inspection, repair is done on a repair station. Products are not sorted into good or bad; instead the PCBs are taken from a magazine for inspection and then returned to the same slot in the magazine. Sorting is first done at the repair station. There, the 2D matrix code on each PCB is scanned to identify the PCB so the inspection data can be called up. This is when the employee finds whether the PCB has been inspected or not

and whether it is good or bad. Up to now, the defects identified by the AOI are recognized and repaired. "Our goal is to constantly monitor and optimize our process with Viscom's statistical process control. This is our next concern. We need to determine which components cause problems during production, so we can respond deliberately. VPC offers us comprehensive feedback over production errors", according to Jack Schlappi.



Viscom repair station

Now, the AOI is still in its initial application. However, MINEL is exploiting the current economic downturn as opportunity to further optimize its processes. According to Jack Schlappi, "we are currently orienting our employees so they will be equipped to fully exploit all the benefits AOI brings once the economy recovers. Then we will offer these services as a distinguishing point. We are forging against the cycle."

Armed for the future

To further its success in the future, MINEL could not avoid investing in an AOI system. Miniaturization will only increase, along with placement density and complexity in components and assemblies. Last but not least, in this company's experience, customer contracts are only becoming more and more individualized. Consequently, the result - as far as MINEL is concerned - is an even stronger customer orientation. These upcoming developments and exceptional experiences with AOI have firmly established themselves in Jack Schlappi's considerations: "We can no longer do without AOI. In these challenging times, we have chosen to invest in the future so that we, as a small company, can remain at the forefront in the hotly contested EMS market."

Are you interested in more details on this application or do you have any question regarding automatic optical inspection? The Viscom SP Division will be glad to help you.

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