

## SYSTEM INTEGRATION

In test engineering, new opportunities result from consistent system integration. Test engineering is geared to the intersection of highly precise testing and cost efficiency. The target is to achieve highly precise testing of components shortly at extremely low costs. There are solutions also for such complex requirements. In test engineering, a system is required which proves to be very powerful with a view to a concrete requirement.

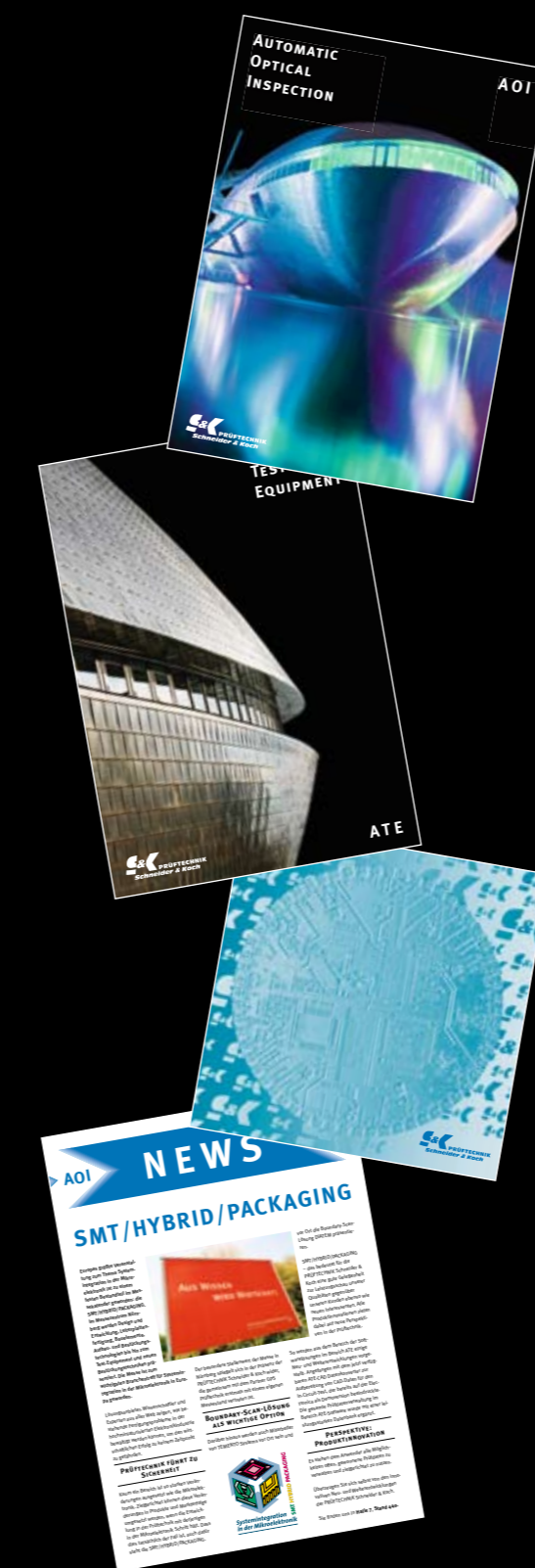
This is possible only by using a combination of individual devices and highly up-to-date software which only in common constitute a whole that is geared to a solution.



The solution has features which cannot be achieved by the individual elements alone. It is about more than the sum of individual parts.

### RENDERING VISIBLE ADDITIONAL BENEFITS

In test engineering, each device must offer outstanding and specific performances within a process chain in order to support a uniform total system as an integrated component. During the process, components which as a whole ensure noticeable additional benefits and an enhanced and comprehensive functionality are specifically used for the processes. Apart from this, over and over modified requirements shall be implemented by using new models and high packing densities. Moreover, PCB fitters must find new ways to increase their flexibility in order to respond to changes and capitalise on them.



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# AUTOMATIC OPTICAL INSPECTION



May the technical demands on a state-of-the-art test engineering already be demanding enough, the costs shall be reduced in addition by using these devices. In order to take on this challenge, innovative systems and tools are required which offer enhanced capabilities while being less complex.

Up-to-date equipped companies already use versatile systems in order to support operational procedures in production thus improving their competitive position. Applications such as traceability, close loop, paperless repair and the use of statistics for a continuous improvement process have considerable influences on the productivity of companies. During the process, individual devices with task-specific features and functions can be used further on, or – with a view to a consistent system integration – state-of-the-art test engineering devices are increasingly used that ensure a convergent and universal solution.

### STATE-OF-THE-ART TEST PROCEDURES

Independent of the structural sizes, the assembly and the electrical access, it must be possible for test procedures to be used quickly and easily. Automated optical test procedures meet these requirements. They do not rely on electrical contacting and allow for tests which so far could not be realised using electronic methods. Furthermore, the otherwise common visual check becomes dispensable.

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#### SEPARATE REPAIR PLACE

Test results together with date and time as well as information about the program version used and the machine number are recorded in a result file. That way, the details of a test carried out are recorded and traceable at any time as required in the ISO 9000 standard and the Product Liability Act.

The LVBoard application for localising errors runs parallel to LVRepair and can be easily used in connection with the LaserVision software or also separately. Based on the CAD data and the PCB image, the position of a component on the printed circuit board as well the designation and the warehouse number can be displayed. Rapid finding of errors makes it thus possible to clearly increase productivity in the repair area.



#### UNLOADER – SORTING STATION

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The demands on the further handling in a state-of-the-art production are quite different depending on the relevant complexity and the number of pieces.

In many cases, isolated applications are implemented, where production takes pace from the warehouses or into it. Depending on specific requirements and planned budget, a potential solution can be scaled, planned and implemented.



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#### CHECKLIST – Production processes optimally supported?

By using the six decisive questions you can rapidly find out whether the workflows and production processes used in your company are in a current, professional state and if the existing operational equipment is really sufficient. Or have essential opportunities been neglected so far?

- 1) Are further sources of error in the production processes identified on an ongoing basis, thus increasing the operational performance and reducing costs? Yes  / No
- 2) Are test results achieved used for intelligent closed loops or does a continuous improvement process take place? Yes  / No
- 3) Are potential synergies consistently used by combining test technologies? Yes  / No
- 4) Are efficiency and productivity gains realised due to previous investments in test engineering devices? Yes  / No
- 5) Is it tried to gradually integrate isolated applications in the entire system? Yes  / No
- 6) Is the existing test equipment continuously adjusted to the production processes? Yes  / No

Total: Yes  / No

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#### REPAIR TAPE

The repair place serves to verify and remove errors detected. The core is the system-internal software LVRepair. It not only generates a detailed view of each error on a monitor, but also an overview image of the whole board with regard to its error localisation.

Only a steady throughput ensures high productivity. If a defect occurs, the test system must by no means stand still during its repair. The LVRepair-inline-station offers the appropriate solution: A smart PCB buffer separates inspection and correction of defects from each other in terms of time. It records the defective boards in between and channels defective ones on to the discharge conveyor segment.



#### LOADER – INPUT STATION

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When assembly groups from the production process to be tested are to be loaded for further test steps, this can take place fully automatically – as in-line operation – or directly from a warehouse.

For this, prefabricated solutions are available in different stages of extension. Likewise, it may be significant to ensure an additional manual feed in order to insert assembly groups from a conventional equipment, for instance. Another possibility would be to complement the input station with a transverse shuttle in order to produce fully automatically from two production lines to one AOI system.

