VISCOM vision technology

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Newsletter

Editorial

Volker Pape

Dr. Martin Heuser

Dear Readers,

Viscom has already brought several innovations to the market in 2013/14. With excitement, we have watched how our users reacted to them – and today we are more convinced than ever. All these developments are right on the pulse of the times. The 3088 *ultra* 3D with XM module, our FastFlow handling, the Quality Uplink and last but not least, the CCI system for inspecting conformal coatings, have been very well received. Equally, the useful system extensions, the increase in performance and the ever-stronger consideration of the overall process are exactly what the users rate very highly. We will continue on this course in 2015 as well, with a concentration on the topic of in-line AXI.

Best regards,

Volker Pape
Executive Board
Viscom AG

Dr. Martin Heuser
Executive Board
Viscom AG

Danfoss Silicon Power inspects with Viscom X7056BO

Effective wire-bond inspection with combined AOI/AXI inspection

The Danfoss Silicon Power GmbH, based in Flensburg, Germany, is a subsidiary of the Danish Danfoss Group. Among other products, the company delivers power modules for frequency converters to customers from the industrial, automotive and renewable energy sectors. Especially because of the growing automotive business and its increasing demands, Danfoss Silicon Power has introduced several inspection systems from Viscom since 2006. First, three Viscom X8051 X-ray inspections were deployed. By now, four Viscom X7056BO systems which combine X-ray and AOI inspection in one system have been added to them. Danfoss Silicon Power uses the Viscom X7056BO inspection systems to check wire-bond connections and active components. The strengths of the combi-systems lie in reduced acquisition costs, low pseudo defect rates and a high productivity.

Danfoss Silicon Power: Effective production at the Flensburg location

Danfoss Silicon Power GmbH has been manufacturing at Flensburg since 2012. Prior to that, the electronics manufac-

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turing was established at the Schleswig location in Germany. The relocation was used to build up an ultra-modern and intelligently automated production on the basis of the extensive experience gained in Schleswig. This starts with the well-equipped sample and small series production, goes through effective automation systems and up to a modern warehouse with capacity for 1300 euro-palettes. About 300 employees are occupied at Flensburg, including specialists for electrical development, process development, component selection, production and quality assurance. After the company had first established a name with standard industrial projects, for example, with the production of power modules for frequency converters, in 2003 they entered the automotive sector and later added renewable energies (solar and wind energy) as a third pillar. Then, in 2006, the successful expansion of the automotive sector led to the decision to introduce automatic in-line X-ray inspection.

Pseudo defect rate below one percent

"In the manufacture of our products, X-ray and automatic optical inspections are a matter of course", says Torsten Hansen, Manager Production Equipment at Danfoss Silicon Power. "We continually check all technical processes throughout series production." The company inspects every single wire bond with AOI, and all active components with X-ray inspection. For bond processes, there is an additional 100 % visual inspection.

Before acquiring the X7056BO systems, Danfoss Silicon Power intensively analyzed the market offering for X-ray and AOI systems and tested different systems. "First we wanted to settle on two separate machines: one AOI and one X-ray inspection system", reports Torsten Hansen. "Until we determined that with Viscom, both technologies can be integrated very well."

F. l. t. r.: Wolfgang Dreesen and Torsten Hansen, Danfoss Silicon Power, in front of X-ray inspection system X8051

After that the company decided for the X7056BO combi-system very quickly and matched it to their line concept. The solution of covering both inspection technologies with one machine, previously unique for wire-bond inspection, was convincing. The resulting high inspection speed was also an important bottom-line criterion.

"The realization was demanding", reports Torsten Hansen. "The concept of the Viscom X7056BO system was new and first had to be adapted to our requirements. But after the commissioning, Viscom was always at our side." However, already during the course of the test phase, Danfoss Silicon Power quickly recognized that the initial expectations for inspection quality and speed could be even further exceeded by minor adjustments and adaptations.

During the introductory phase, Danfoss Silicon Power received support through on-site training. Even after commissioning, the applications engineers from Viscom helped out with the further optimization. "Today, the pseudo defect rate in many areas is better than the rate Viscom originally confirmed", reports Torsten Hansen with satisfaction. "Normally, we are below one percent. Defect escape is nearly zero."

Combined AOI/AXI inspection process

First, the AOI inspection checks the quality of the bond connections. The X-ray inspection connects itself seamlessly, particularly to inspect active surfaces

An excerpt from the Danfoss Silicon Power product range

beneath soldered chips. On the bond wires, for example, irregularities caused by wear on the bonding tool may occur. "It is especially difficult to keep the pseudo defect rate down here", explains Torsten Hansen. "With the Viscom X7056BO system, we are in the position to restrict the bandwidth of potential defects and so minimize the pseudo defects."

First the AOI system inspects the course of the wire in wire bond connections. The inspection system recognizes the bond feet and uses them to analyze how the wire must lie. In the process, position, form, tail length and bond tool imprints on the bond feet are analyzed along with other features. Glossy surfaces and a straight-line course are the essential parameters for the wire. Classical areas of the AOI area such as component position and surface evaluation are also realized.

Danfoss Silicon Power deploys the X-ray inspection primarily to inspect solder surfaces beneath the active components for interfering surfaces. Pores, resulting from inclusions of liquid or air, are typical defects. The X-ray inspection reliably recognizes these defects, because such surfaces absorb less radiation and appear as light surfaces in the image.

View of the production at Danfoss Silicon Power in Flensburg

"The good/bad part analysis which the system transfers to the downstream machines in the process is very helpful", explains Torsten Hansen. "This allows the process to be further accelerated." If the Viscom X7056BO recognizes an AOI or an X-ray defect, the parts are automatically sorted out in subsequent process steps, based on the data from the Viscom X7056BO system.

One post-qualification work station for three inspection systems

A post-qualification work station for three inspection systems

"The savings gained through the Viscom X7056 are considerable", says Torsten Hansen. "For one, the acquisition costs already are significantly less in comparison to two individual machines. For another, productively has distinctly increased."

With the combined AOI and X-ray system, Danfoss Silicon Power needs fewer personnel for post-classification. Each Viscom X7056BO system has a HARAN verification station, where the results of both inspection processes appear on a single monitor screen.

"We had already become familiar with the HARAN post-qualification station with the first systems and learned to value it. Now, because of the combined processes, we only need one HARAN and have noticed that when we keep the pseudo defect rate down, even all three lines can be attended to by just one employee. Naturally this is a great advantage in productivity", explains Torsten Hansen. And adds, "During the past years we have added a system from Viscom nearly every year. By now, we have deployed three X8051 X-ray systems and four X7056BO combi-systems. This points out how satisfied we are." ■

The special Service offer

Optimize system performance with 8M and XM upgrade

In the past, Viscom has already offered upgrades with which the older systems can be brought to the current hardware status and thereby to the most up-to-date level of performance. Therefore, already shortly after the development and market introduction of the 8M camera technology in our AOI systems, we had conversion/upgrade kits for older systems on offer. By now many customers have ordered the upgrade and profit from the evident speed increase. With minimal investment, your well-maintained inspection system offers more flexible use and is equipped for current demands. Upgrade kits to the 8M technology have previously been available for the S6055-I, S6055-II and S6056 systems with 4- and 6M modules. Since the beginning of the year, a kit for the S3088AV has also been in the program. To commemorate our 30-year anniversary, we have put together a special Service package which provides especially favorable conditions for these conversions.

Now, after our high performance sensor, the XM module, has been available for some time, here too we have not hesitated to think about upgrade possibilities for older systems. After an intensive testing phase, during the early summer of this year we were able to complete the first upgrade of an older system to XM technology. Since then, many more upgrades have been successfully completed.

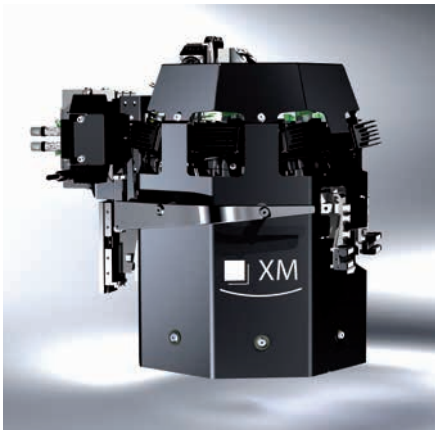
If you are looking at a machine for the upgrade, we strongly recommend that you allow us to examine it thoroughly once again. In such an examination, we generally check the machine for its overall condition. This also includes carrying out an MFU to find, for example, worn bearings/guides which could then be exchanged at the same time sensor technology is upgraded. Also to be ascertained is that the machine is free of any possible modifications which might stand in the way of an upgrade.

Conversion to 8

In many cases, older systems with 4M and 6M modules can not be upgraded directly to 8M technology. Yet the 8M solution already offers a substantial gain in throughput and flexibility. With the conversion to 8M, the customer may select between the modules with 4 orthogonal as well as 4 or 8 angled cameras.

System types	Image rate old vs. 8M	Software old vs. 8M	Orth. resolution old (µm/pixel)	Orth. resolution. 8M (µm/pixel)
S6055-I	12/20 fps	W2K/W7	22.5	23.4 (SR)/11.7 (HR)
S6055-II	12/20 fps	W2K/W7	22.5	23.4 (SR)/11.7 (HR)
S6056	16/20 fps	W2K, W-XP/W7	22.5	23.4 (SR)/11.7 (HR)
S3088AV	12/20 fps	W2K/W7	22.5	23.4 (SR)/11.7 (HR)

The conversion can be done on site; if needed, even in the line, and including the complete calibration, takes about 2 - 3 days to implement. In addition to the module and various add-on parts/cables, the system computer is also exchanged. Increased computing power and an up-to-date operating system (Windows 7), combined with the new sensor module, enable the old system to achieve a considerable increase in efficiency.



A cycle time comparison from one customer's practical experience:

Cycle time in s.	Old (4M)	New (8M)
Product A	29	17
Product B	42	25
Product C	26	19
Product D	18	15
Product E	25	16

Conclusion: Average cycle time reduction of > 30 %.

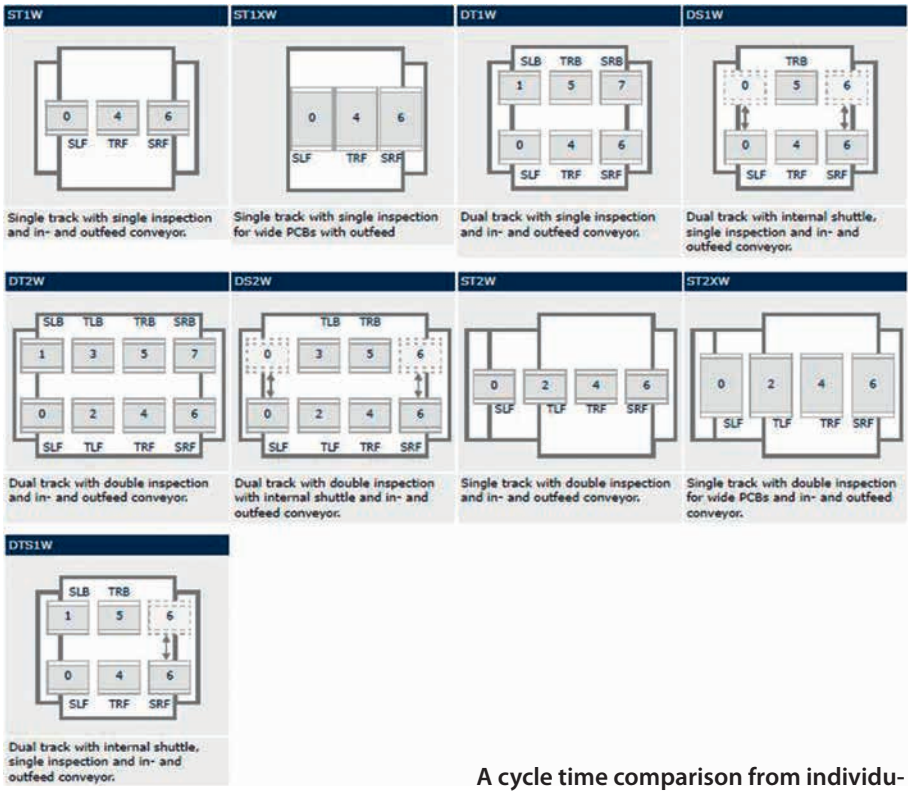
Your benefits and advantages after conversion to 8M:

Hard/Software:

- The modern operating system adds future-proofing
- The high performance computer holds ready reserves
- Resolution switching „OnDemandHR" raises flexibility
- Newest frame grabber technology (VEG101) guarantees stability

Applicative:

- Increased homogenity through advanced calibration process
- Mastery of new technologies (e. g. reliable defect analysis of smaller components such as 01005)
- Improved display at classification station through color readout
- Detection of faulty tinning (copper exposure) and recognition of coding (MELF, polarity)



Conversion to XM

With the conversion to XM, a selection can be made between the modules with 4 (XM4) or 8 (XM8) angled cameras. Further, the 3D option can be added immediately or later.

System types	Image rate old vs. XM	Software old vs. XM	Orth. resolution old vs. XM
S6056 6M (w-type) S6056 8M (w-type)	16/70 fps 20/70 fps	W2K, XP/W7 XP/W7	22.5 vs. 16/8 µm 23.4/11.7 vs. 16/8 µm

Due to the larger dimensions of the XM module and the associated travel ranges, W-types, such as S6056 DS1W, are better suited for the conversion and, as far as possible, should be prioritized (see graphic). However, as needed, other types can also be correspondingly modified.

The XM conversion can be done at Viscom or on site. If the system is in the line, it should be taken out of the line for the duration of the conversion because access from all sides is necessary. The entire conversion time is 5 days including the calibration. In addition to the module and various add-on parts/cables, here too the system computer is exchanged, and an auxiliary axis which ensures precision under the high weight of the sensor head is integrated.

After the conversion, a rapid increase in efficiency and an enormous reduction of inspection times can be expected. Already in compatibility mode, an evident gain in these areas is achieved. In order to fully exploit the potential, the libraries should be minimally adaptated. This applies to converted 8M, and all the more so to previous 6M systems.

A cycle time comparison from individual customers' practical examples:

Cycle time in s.	Old (8M)	New (XM)
Product A	28	14
Product B	53	22
Product C	20	11
Product D	61	21
Product E	64	33

Conclusion: Average cycle time reduction of about 55 - 60 %; for 6M systems, up to 75 %.

Your benefits after conversion to XM:

In addition to the significant gains in productivity, precision and analysis capabilities (see also Newsletter No. 31 from 4-2014), right from the start the XM module is also oriented to easy serviceability. Individual cameras and their illumination units can, when needed, be exchanged and calibrated on-site. Integrated control and monitoring functions for illumination and camera modules are still available. ■

Information

Further details and information are available upon request :
service@viscom.de

Reliable Inspection with S3088 CCI

Viscom Conformal Coating Inspection with Extended Inspection Scope

Transparent protective conformal coating protects electronics assemblies against damage from moisture and wetness. Typical defects include cracks, flaws, layers that are too thin or too thick, smearing, impurities or splashes, among others. The S3088 CCI checks the entire range of defect features quickly and reliably.

The system works with efficient ultraviolet illumination, which highly contrasts the UV-reactive protective conformal coating against the background material. With the corresponding spectrally sensitive cameras, the system clearly recognizes the characteristics of the conformal coating. With a resolution of 11.7 or 23.5 µm/pixel, even the smallest flaws are easily visible. The system identifies these flaws and classifies them as defects. At the same time, various indicators that can be used for optimizing the coating process are evaluated. The inspection system ensures that the IPC-CC-830 directive for qualification and performance of electrical insulating compounds for printed circuit boards is maintained.

The new feature: The system can now be equipped with angled cameras. With them, the spaces between the components also can be reliably inspected for flaws. Additionally, wet inspection is now available as an option. Here, in addition to adaption of the inspection, the system has been ventilated and protected against solvents and moisture. This feature meets a strong market demand and enables optical inspection before the conformal coating has cured. As a result, defects can be recognized at an early stage. As a result of flexible algorithms, the system can be quickly adapted to different conformal coatings. Simple inspection programs can be created in just a few minutes. ■

Conformal Coating under UV light

Viscom extends product portfolio

The universal X-ray inspection system X8068

The new X-ray inspection system X8068

Viscom has extended its portfolio in the X-ray inspection range with a new, flexible inspection system. The new inspection system X8068 unites the high inspection quality and technology of the proven Viscom X-ray systems with an extended inspection scope for larger electronic assemblies. With this new inspection system, Viscom takes into consideration the increased demands on X-ray inspections in electronics manufacturing. The system offers a high flexibility especially to small and mid-sized companies, so they can react to the requirements of their ordering customers.

With the X8068, the entire spectrum of inspection objects up to a diameter of 722 mm can be reliably inspected. A sealed direct beam tube is also available as a system option.

The open X-ray tube ensures the highest resolution and detail recognition in first-class image quality. Thus even the smallest defective structures are reliably detected. The system convinces with a mature technology which demonstrates its full strength in the interaction of all the hardware and

software components. In order to cover the largest possible inspection area, the detector swivel range is up to 60 degrees. System operation is easy and convenient.

With the simultaneous availability of two inspection concepts on one system, Viscom has achieved a unique competitive feature regarding inspection scope. Thus, the Viscom XMC software is available for special inspections or non-standard components. Thanks to intuitive operation and comprehensive automatic analysis functions, any inspection objects can be quickly and precisely checked. Manual and semiautomatic inspections for the widest range of objects are implemented.

The proven SI software of the Viscom X7056 family is employed for the fully automatic X-ray analysis. It cumulates over 25 years' experience in assembly inspection and is specially oriented to SMD production. This means the unique Viscom Quality Uplink can also be used. Through the linking of inspection results from SPI, AOI, AXI and MXI, this function provides a simplified classification and effective process control.

The system develops as a top seller in the area of safety-relevant electronic assemblies, especially in the automotive electronics sector. ■

Viscom is celebrating its 30th anniversary

Open House Day at Viscom

It was not only a day to get acquainted with the company, the products and the Hanover location, but also a successful family day. A huge soccer tournament, face painting for children and a Bobby car race were on the program, just as were walk acts, a raffle and live music. Physical well-being was also excellently provided for. The families of Viscom employees and interested guests from the neighborhood did not want to let this offer pass by, and spent an entertaining Saturday afternoon on the Viscom AG premises in Badenstedt.

The presentations Viscom employees had prepared for the guests, to grant them a glimpse behind the curtains of development and production of the high-tech inspection systems, were not all to met a great deal of interest. The event for the Zinnober Museum for Children in Hanover was especially welcome. This association received the entire proceeds from the sale of foods, beverages and raffle tickets as a donation.

Large crowds by Viscom in Hanover

District Mayor Brigitte Schlienkamp and Volker Pape, Executive Board of the Viscom AG, opened the event. Volker Pape reiterated that the company had developed from a 2-man operation to a globally operating concern with numerous subsidiaries. Meanwhile, Viscom has come to deliver systems and solutions for quality assurance to well-known international companies in the electronics industry. District Mayor Brigitte Schlienkamp gave special praise to the company's local engagement in Badenstedt. Among many other projects, Viscom supports the association KiWiZ e. V. in their task of enthusing children and youth for technology and the natural sciences. ■

Viscom Technology Forum and User Meeting

Save the date

Viscom is extending invitations to the Technology Forum and User Meeting in Hanover. The event features top-class speakers who will offer insight into current trends and developments in the field of electronics manufacturing. ■

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