

Books on Demand

Despite electronic media and all the hype about the paperless office – printed paper is not about to die out. Quite the contrary, the results of international analysis paint an entirely different picture. The printing industry is experiencing more than 1 % growth yearly. Indeed, the trend is clearly moving towards smaller quantities, individual design and updated content. Publishers are being forced to minimize their sales risk and stock. One-to-one marketing demands personalized print runs. Manuals and educational books, handbooks, brochures and reports must constantly be updated. This trend has its effects on the type of printing techniques being used: Offset printing has remained stable, gravure printing procedures are declining, and digital printing is demonstrating solid growth. Digital printing has already become more profitable for small print runs than the offset procedure. With speeds constantly increasing, digital printing is penetrating further and further into the domain of offset printing.

A complete line for “book on demand”

Müller Martini, worldwide market leader in print finishing, set this challenge for themselves with the new SigmaLine. The goal of this development was to find a complete solution for Book on Demand (BoD), which could meet the tough demands of the graphics industry. This means that print products are produced profitably even in the smallest printing runs, from the preliminary stage data and digital printing up to the finished perfect bound or saddle stitched products. The SigmaLine is the first complete industrial BoD solution, which produces print products in a single process. Development began in 2001, and the SigmaLine was already making

its debut at the drupa 2004.

The basic principle of the high-performance system is amazingly simple: The preliminary stage data is continuously processed on the digital printing machine. The paper is printed in one color and on both sides right off the roll. It is then cut inline, folded and further processed on an integrated perfect binder or saddle stitcher exactly according to the template. The task data taken from the preliminary stage is used for the fully-automatic setting of the entire system.

Streamlined development

An important goal was to keep the development time of the SigmaLine as short as possible and to streamline the

system using standard components. “To start with, uniform platforms had to be developed, which could be used in all parts of the machine”, explains Günther Silberbauer, technical manager of the Müller Martini OnDemand Solutions. “We standardized all of the recurring features of the individual components. This enabled us to base 60 -70 % of the control software on the same modules. The remaining 30 % are the individual application programs for the components.”

B&R Automation Studio provided the ideal basis for the development of all program areas including visualization, process control and drive systems. Müller Martini uses Automation Basic and ANSI C to program the SigmaLine.

The user interface on the operator panels distributed throughout the machine was developed using B&R Visual Components, an integral part of Automation Studio. The visual framework is even identical for all machine modules.

Modular and cost-effective

The SigmaLine can be modularly configured in three designs according to the customer's demands – for perfect binding, for saddle stitching and hybrid for both perfect binding and saddle stitching. Profitability is further increased because parts of machine can be used at the same time, even when off-line.

Each module in the line has its own controller. The modules are connected with the central line controller, SigmaControl, via Ethernet. CP430 and CP474 CPUs from the B&R System 2003 family are used. An industrial PC runs in the SigmaControl for managing all tasks and operating data, as well as a B&R CP340 for all time-critical tasks. All SigmaLine



“The over 12 years of excellent cooperation with B&R has proven its value repeatedly and has contributed significantly to success in countless situations.”

Daniel Langenegger, Corporate Technology Manager

modules are connected to the SigmaControl via Ethernet.

It is also possible to connect a company network in this manner. “The printing tasks and data are loaded via the network using the printing industry standard, CIP4 JDF format”, describes Silberbauer. “The book pages are scanned and stored digitally in the RAID system of the printing machine. The pages are then transferred from the memory to the printer as needed and printed.” Müller Martini is the first manufacturer in the world to firmly

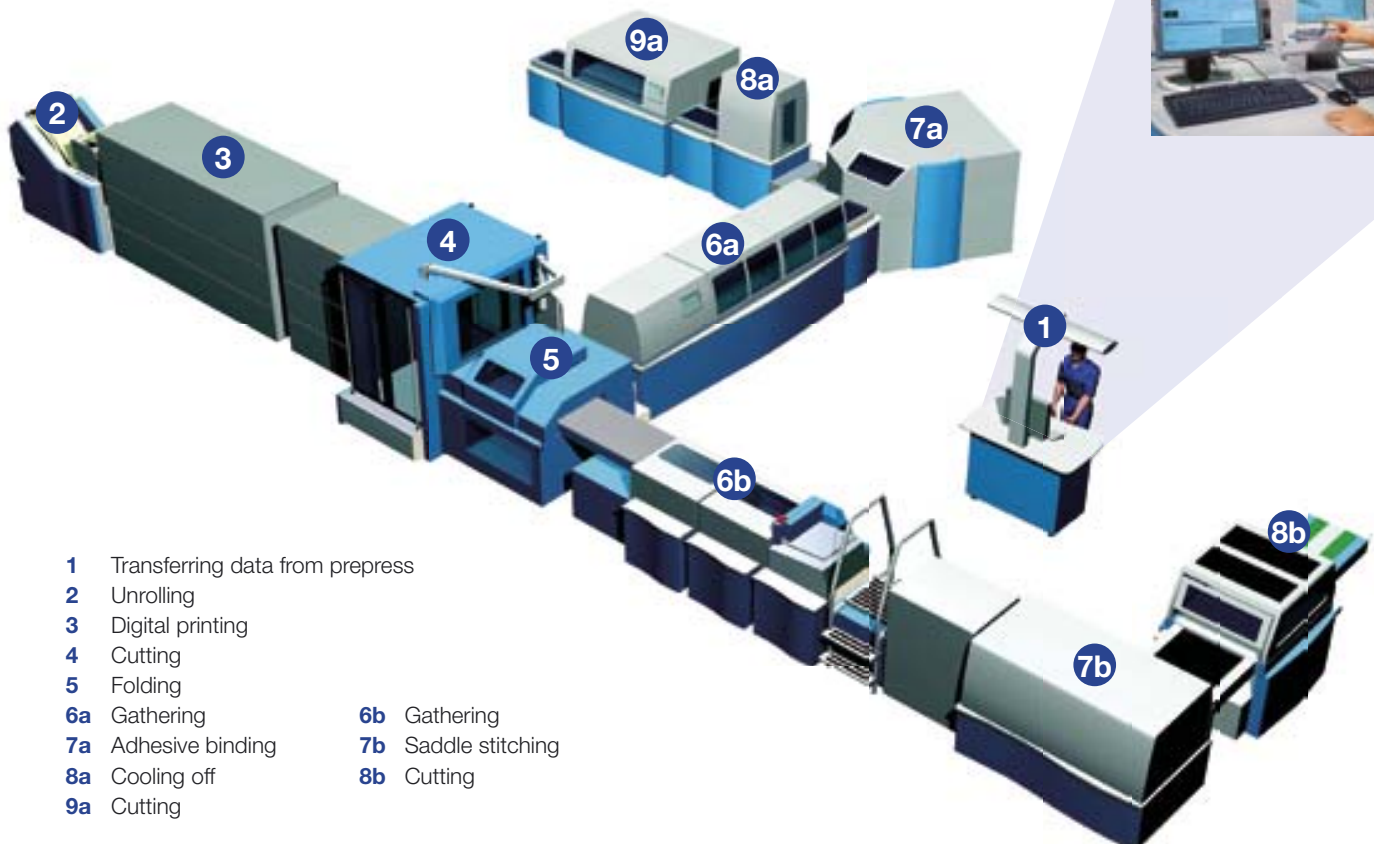
support JDF for a Book on Demand system (see figure).

Universal networking

All components within the machine modules were networked using ETHERNET Powerlink to achieve the highest performance and precise real-time behavior. The open, real-time Ethernet network quickly proved itself as the ideal communication medium for the high demands of the printing industry. As a result, all of the drives and input/output units are connected with the module controllers in

In the SigmaLine, the paper is printed on both sides right off the roll. It is then cut inline, folded and further processed on an integrated perfect binder or saddle stitcher exactly according to the template.

The complete line controller, SigmaControl, is the heart of the SigmaLine. It unites and coordinates all functions of the task and line management of the system.





Günther Silberbauer, technical manager of the Müller Martini OnDemand Solutions, at the debut of the SigmaLine during the drupa 2004.



With Book on Demand, books, brochures, catalogs, financial reports, documents and instruction manuals can be produced quickly and economically.

a manner allowing maximum flexibility. CAN bus is still being used for areas with lower demands on dynamics.

The developers at Müller Martini enthusiastically use the possibility to connect with every automation component in the entire line from every point on the machine during the development process. B&R's Automation Net provides transparent communication regardless of the network media.

“In our industry, innovation is continuing to shift from traditional machine manufacturing to more process automation, digital networking and services.”

Daniel Langenegger, Corporate Technology Manager

Many Müller Martini customers are also happy about the chance to connect with the machine via the Internet or modem. The seamless transfer of task and diagnosis data as well as the integration of new functions and software updates means the platform is already prepared for future applications and services.

High-performance system with a future

“Currently, the SigmaLine still prints in black/white”, says Silberbauer. “But as soon as suitable color printing systems are available, we will be producing in color as well. Today, the SigmaLine is already setup for that new development.” The entire system is designed for a very high throughput. The SigmaLine can handle a maximum of 1,000 books per hour depending on the format size – fully printed, bound and cut. In many cases, the book thickness can be changed on-the-fly.

With these characteristics, the SigmaLine is currently the highest performance BoD line on the market and also

meets the highest demands from publishers and printing-service providers.

Longstanding partnership

B&R Switzerland AG has been house supplier at Müller Martini for many years. The cooperation proved itself once again with the SigmaLine project. “B&R supported us right from the start with experienced application engineers”, confirms Günther Silberbauer. “We were able to profit enormously from the B&R automation know-how especially when it came to complex tasks. Our demand peaks in the development process were also able to be handled optimally on short notice thanks to the cooperation.”

“As the world’s leading supplier of complete systems for print finishing, it is of central importance for Müller Martini to have an innovative, qualified and reliable partner on their side in the area of automation technology.”

Daniel Langenegger, Corporate Technology Manager

The ACOPOS servo drive family from B&R received especially good grades from the Müller Martini engineers. The scope of functions, the integrated intelligence and ease of programming as well as the excellent diagnostics options in connection with ETHERNET Powerlink make the development process considerably easier. Advanced products such as this one and the complete range of automation components reinforce Müller Martini’s decision to count on B&R for all of their new projects. 