

Graphic Access to all Machine Functions - a New Trend for Book Production!

In Leipzig, two entrepreneurs in the field of engineering required only 15 months to develop a completely new book jacketing machine. The highly innovative book production system provides excellent graphic user guidance and has exceptionally short changeover times. Both are based on a remote B&R PCC network and PC powered visualization systems.



You rush out to get the latest best seller, naturally the hard cover edition, complete with book jacket. You may have thought that putting a book jacket on a hard cover book is simple. However, there is a little more to it!

Engineering from the Initial Design to the First Production Series

The highly efficient solution was recently created and can be seen in the brand new Leipziger Gewerbetpark (industrial estate) on the Mommsenstraße. Paltec Maschinenbau GmbH is located there, a relatively young company that has developed and manufactured a new book jacketing machine under the name "Jack Plus". A procedure is used that has been around for some time, but was developed in a way that is exceptionally efficient for this machine.

Who is Paltec? The company is a member of the Book Technology Group, a group of companies that provide and produce complete production lines for book binding tasks.

The two graduate engineers Thomas Friese, machine manufacturer and present company manager, and Ulrich Schlegel, automation engineer, received an order in April 1997 to found the Leipziger branch of the company Paltec and to develop the book jacketing machine.

Now Paltec's new machines are successfully applying book jackets - and not just in Germany. In the last 18 months, Jack Plus machines can be found in book production facilities in many countries such as France, Italy, Denmark, Austria and even in the USA. Large and renowned companies such as Bertelsmann publishing have become regular customers.

Tight and Precise Fitting Book Jackets

The purpose of the machines is to put tight fitting and precisely placed jackets on new hard cover books in one of the final production phases near the end of the book production line.

To do this, a special timing unit separates the incoming books, moves them individually into the system standing on their spine at a set speed and synchronizes them with the machine timing. In the paper feeding station, the jackets are separated from below using suction cups. This allows jackets to be continually added. After separation, the jackets are exactly placed, then held in position during transport on a conveyor. Two pneumatic scoring tools in the preheated scoring station (predefined temperature) are used to make long-lasting folds. This procedure

allows many different materials to be used and guarantees that the book jackets will fit precisely.



Paper feeding station adds the jackets automatically.

In the next step, it is important that the book and jacket are placed together and aligned exactly. Both book covers are opened using opening knives, then transport belts with pins move books and jackets through the machine.

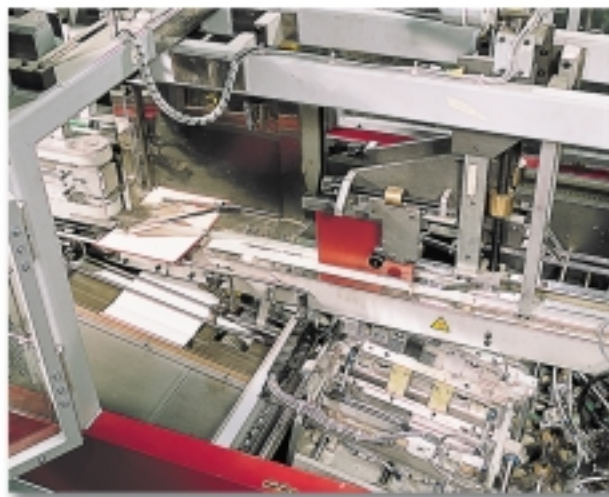
In the next step, shaping rods fold the edges of the jackets in and rollers press them in place. After Closing, the finished books now leave the system at the end of the machine on a transport belt lying on their sides and with the spine facing forward.

All functions can be set and monitored on a central operator station.

Drive Coupling using Electronic Cams

The mechanical capacity of the "Jack Plus" is up to 60 books per minute (variable). The Paltec machine can handle books ranging from 10 mm to 80 mm thick and up to 390 x 300 mm (length x width). The book jackets can be up to 900 mm x 390 mm (jacket open). The jacket material can be 60 g/m² to 250 g/m²

thick printing paper with finished, unfinished, glossy, foil coated or even fabric surfaces.



The jacket is placed on the book from below after separating the book covers from the book block.

The drive concept for the machine is based on eight separate drive sections. The transport system for incoming books, the feed for

book jackets and the transport system for finished books and jackets all use servo technology and are coupled together using an electronic cam. The synchronization of the three conveyor systems is one of the main tasks of the electronic control system. The exact position of the individual transport systems in relation to each other can be changed using an offset value. This is a decisive advantage of the electronic cams. This allows the alignment of books and jackets to be adjusted exactly. Mr. Friese states, "This allows tight fitting and precisely placed jackets, which results in excellent quality".

Format Changes in less than 2 Minutes

With such a large format range as on the Jack Plus, it is important that the entire system can be set to the proper book format in a very short time.

When integrated into a book production line and with decreasing batch sizes, fast changeover times become very important: Resetting the book jacket machine cannot take longer than resetting the

other machines in the production line. Setting up the complete system for the current task is carried out by positioning the 16

adjustable axes. The automatic movement of the axes to the respective positions can take place separately or at the same time.

The dimensions of the books and jackets can be taken from a book and entered in the graphic user interface manually or, simply load the data a previous production order. The dimensions can also be taken from a preceding machine in the production line or from the central control station.

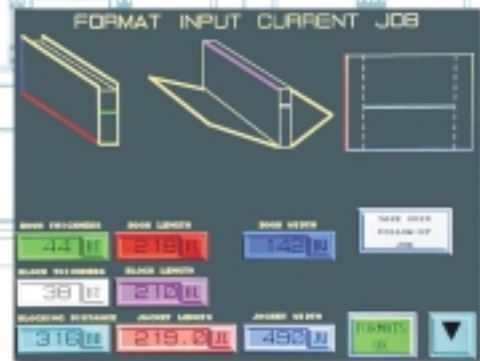
Graphic User Interface for all Machine Functions

Largely automated format changes with clear color graphic support initiated from an operator panel is a must for modern book production. The machine operator is assisted by a graphic user interface for all machine functions. This visualization system clearly shows what is happening with

all parts of the machine. Correction possibilities are also possible for each axis - individually or as a group. Thomas Friese confirms, "Especially group corrections allow fast optimization of the spine title position by correcting 5 axes with one positioning command".

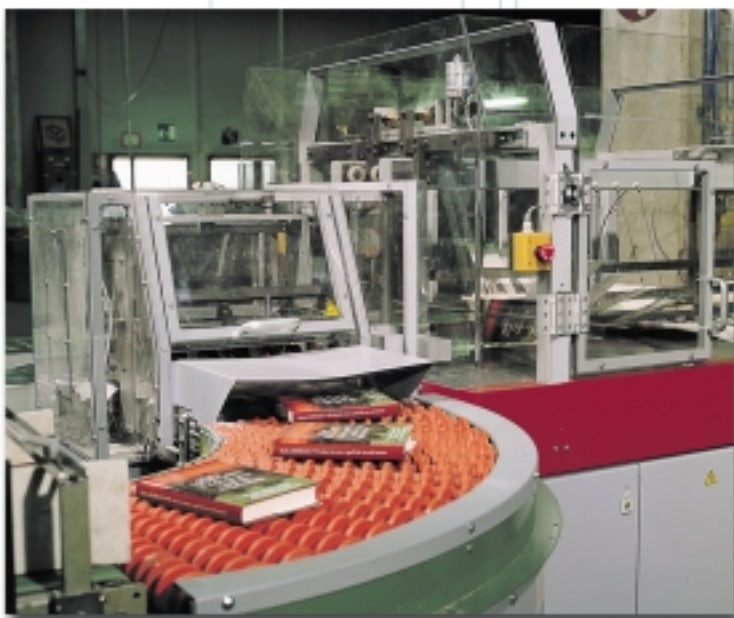
"For many products, format changes are still made using mechanical hand wheels. We have purposely chosen an automatic solution. Our clear and simple operation on the central, color touch screen, which is aided by extensive help, diagnosis and service functions, has been acknowledged as a welcome improvement by machine operators.", states Ulrich Schlegel about the selected solution.

The automatic book jacketing machine is set and operated by making entries on the central operator panel. Interaction with the machine is done using a color Touch Screen and **B&R PROVIT 5000 IPC**. The IPC is in the switching cabinet and is directly



After entering the book and jacket dimensions, the machine automatically sets the format in less than 2 minutes.

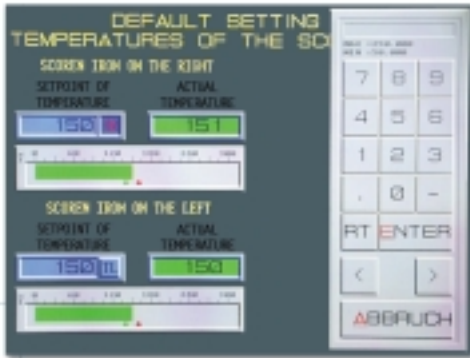
connected to a **B&R 2005 CPU** via an RS485 interface. The CPU also functions as master in the **CAN network** configuration.



The machine is available with left or right outlet where the books are placed on a transport belt with the spine facing forward.

The modularization of then individual functional groups was always a priority during construction of the system.

A **B&R 2003**, which is separated from the central controller, is used for remote I/O operation of the timing, feeder and scoring stations. Another six frequency inverters and servo drives are connected via CAN bus for various motion tasks. The CAN interfaces also allows a connection to be made to a process control workstation or other book production machines.



Touch screen visualization provides the user on the main operator panel with clear access to all machine functions.

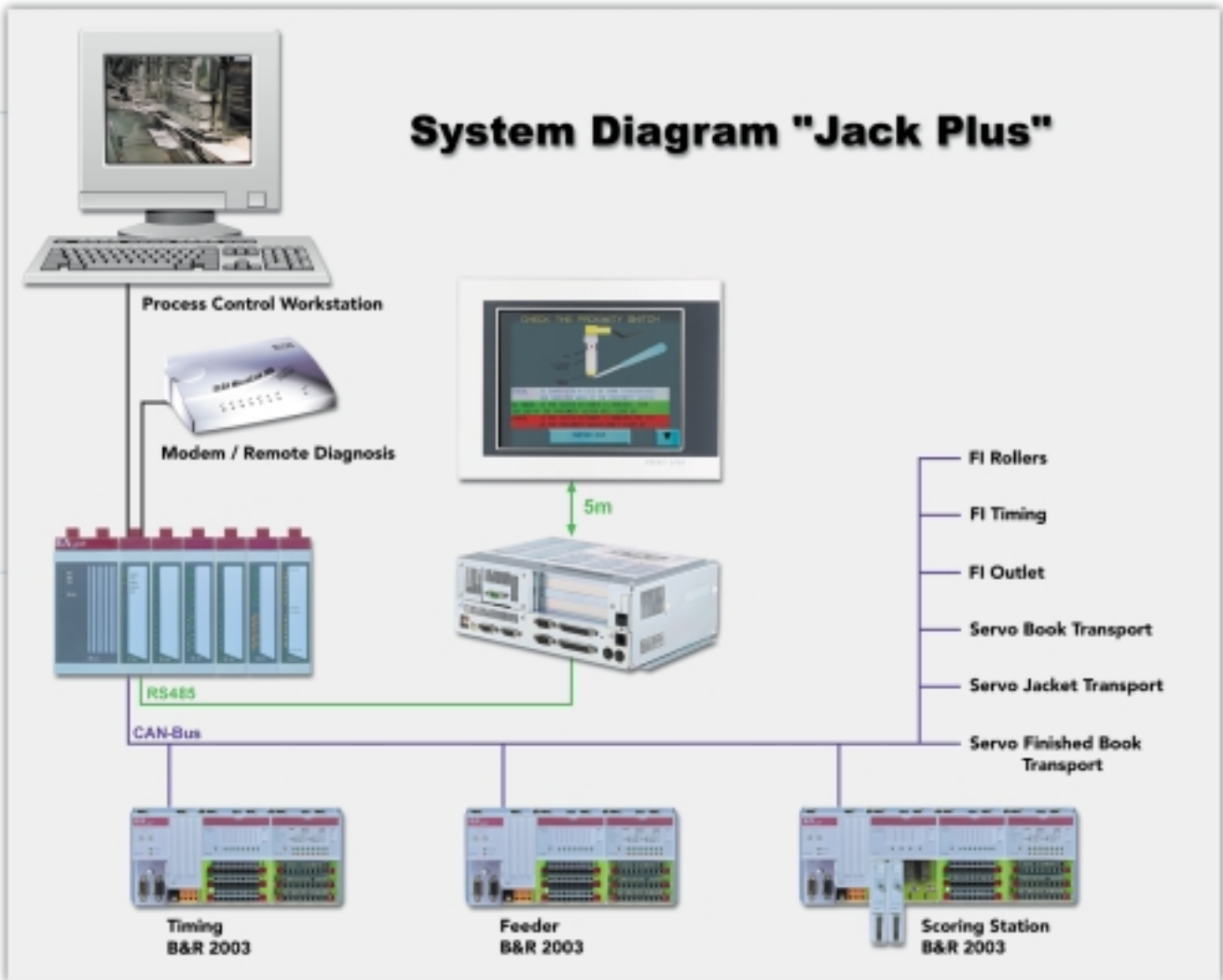
The Jack Plus automation concept uses a distributed and modular

control structure which is based on the B&R's high performance PCC (programmable computer controller) used with the B&R Automation Software™ components: B&R Automation Studio and PVI. Well received features for book production facilities internationally, in addition to the clear function principles and high speed automated format changes, are the CAN bus con-

nection possibilities for a central control station. A **modem connection** for remote diagnosis is standard on the machines from Paltec and the B&R PCCs.

Another important argument for Mr. Schlegel from the standpoint of an automation engineer is: "We received the high speed automation modules we required from B&R with excellent technical support at a competitive price."

System Diagram "Jack Plus"



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