World record
Axioline
sercos
the world's fastest
I/O system

EasySlave
FPGA-based single-chip
controller

Precise and fast
NOVA M12 grinding
machines rely on sercos

Texas Instruments
New microprocessors
for sercos

sercos – the automation bus

Good technology is multifunctional, yet user-friendly. Modern smart phones show the way: They offer so much more than just making calls on the go. Today's multitalents combine the functions of an organizer, GPS system, digital camera and personal assistant all in one handy gadget. Despite all these features, they are still easy to operate.

In the past few years, industrial communication has come up with a comparable development: sercos is a universal and very flexible real-time Ethernet bus system that has evolved from individual, specific field bus systems. Any automation devices, whether controllers, servo drives, decentral I/O peripherals, sensors, or camera systems, can be reliably networked with sercos. Users now only need one solution and a single cable for all their applications.

Just like smart phones, the success of a bus system also depends on how easy it is to operate. sercos is setting standards thanks to its uniform engineering, simple commissioning, and efficient diagnosis, as well as reliable interoperability with components from different manufacturers. It allows machine engineers and system manufacturers to refocus on what they do best: their core business.

Various application and technology reports in this issue of sercos News illustrate the benefits of using sercos and how easy and inexpensive it is to implement a sercos interface.

Have fun reading!

Peter Lutz, Managing Director of sercos internation e.V.

S Contents

FPGA-Based Single-Chip Controller for Simple and Inexpensive Slave Devices

The new EasySlave is an FPGA-based single-chip controller for simple slave devices. The IP core is provided as a netlist for the Spartan-6 FPGA family from Xilinx. The IP core contains all the functions of a sercos slave connection, including the associated software library for own I/O devices (e.g. analog inputs, encoders). Various licensing models are available. sercos international member companies are offered special prices. Furthermore, a non-license IP core variant with a defined function is available as a bit stream (EasyIO). Technical support for the EasySlave is provided by Steinbeis Transfer Center for Systems Technology (TZS) in Esslingen, Germany. TZS also offers an evaluation kit for the EasySlave that is particularly suited for a fast and easy start to sercos slave development. The evaluation kit includes a development board based on a Spartan-6 XC6SLX9, as well as all other required material and documents (Ethernet cable, power supply unit, documentation, CD).
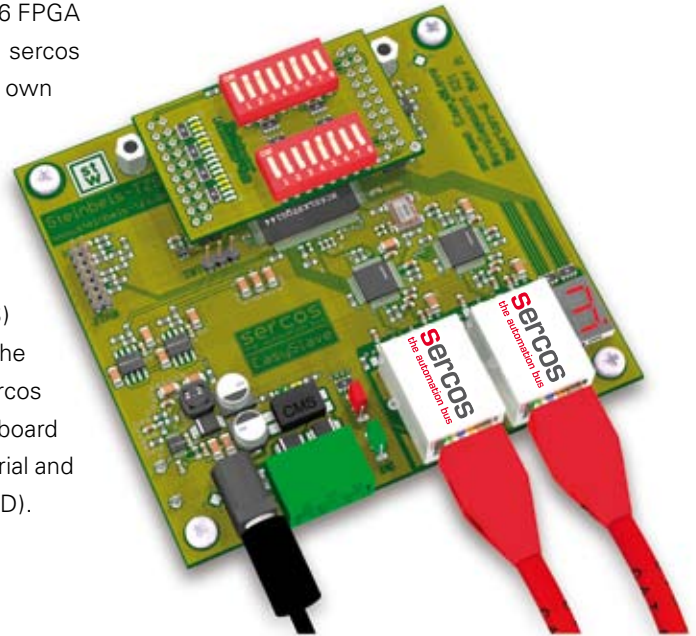
More information: www.steinbeis-tzs.de

The New Website Will Soon Be Online

sercos international will go live with the new website at the end of 2011. It includes a wealth of information, such as news, background articles, a product database, and case studies. Users, interested parties and members can all find interesting information on the sercos automation bus at www.sercos.de. A modern layout with a new sercos look and feel, plus optimized user navigation help you find the right information quickly and easily. A clear presentation of contents including summaries facilitates navigation. The comprehensive product database offers a targeted overview of sercos components for all application cases and industries. In the private section, registered members of the sercos international user association can find the latest specifications, white papers and marketing material. Initially, the website will be available for the European market in German and English while international sites for Asia and North America will be successively changed to the new layout and concept.

We are looking forward to your visit at www.sercos.de

Brisk Interest in the 8th Plug Festival

The 8th annual plug fest for sercos III implementations took place on October 29th at the Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW) at the University of Stuttgart. Numerous companies took the opportunity to test their latest sercos developments and prototypes for interoperability with devices from other manufacturers. A well-balanced mix of master and slave devices made it possible to test a number of different scenarios. Participants not only thoroughly tested various interactions between netX and FPGA-based hardware platforms, but also the compatibility of various communication functions (hot-plugging, ring redundancy) and different function profiles

(FSP Drive and FSP IO). Many slave manufacturers also took the opportunity to run a test with the manufacturer-independent reference system – the sercos Slave Conformizer – in order to prepare for upcoming certification of their devices. The 9th plug fest is planned for May 23/24, 2012.

Global Presence of sercos Continues to Grow

sercos international has responded to a dramatic increase in interest in the sercos automation bus by enhancing its international presence. Interest in high-performance bus systems is especially high in China. After the Hannover Messe, sercos international (SI) participated in the FA/PA in Beijing, China, the AutomationExpo in Chennai, India, the SPS Italia in Parma, Italy, the Automation 2011 in Mumbai, India, the Industrial Automation Show in Shanghai, China, the System Control Fair in Tokyo, Japan and the SPS/IPC/DRIVES in Nuremberg, Germany. Presentations and user and developer seminars were held in parallel to all of these exhibitions.

sercos Specification Update Version 1.3

The sercos international technical working groups have come up with a specification update (version 1.3) that includes many profile and protocol expansions for the third generation of sercos. All of the expansions are completely compatible with the existing specification. Profiles for drives and decentral I/Os have been extended by new functions and classifications. Two new function profiles have been included: the energy profile and an encoder profile for absolute value and incremental encoders. Supplementary services have also been specified for the protocol level: a process for oversampling defines a method for recording and outputting equidistant process values faster than the configured bus and connection cycle. A time stamp process is used for event-controlled recording of actual values with the associated time stamps as well as time stamp-dependent output of specified values. The specification update is rounded off by installation guidelines that specify cabling with copper cables and fiber optic cables both with protection category IP20 and IP65/67.

Let the Music Play

sercos turns machines into musicians. A robotic guitarist had its big debut at the Hannover Messe trade show at the beginning of this year. Now a keyboarder has joined the band. The robotic musicians were developed and constructed by students at the University of Stuttgart with the assistance of the Institute for Control Engineering and Bosch Rexroth. The keyboarder has two hands, each with 16 fingers. They move across the keyboard on separate rails, allowing them to cross each other. To exactly hit the keys, fast horizontal movements with precise stops were a special challenge. The students installed Bosch Rexroth linear inverters, IndraDrive CS drives and bus couplers. The complex sequences are coordinated by the sercos automation bus. The keyboarder and guitarist will be appearing together at several exhibitions. You can find their tour dates at www.sercos.de.

FDT Specification Adopted by the FDT Group

The adoption of the FDT/DTM specification for sercos III by the FDT Group now provides a uniform and universally applicable XML scheme for implementing device managers (DTM) for third-generation sercos devices in an automation network. A joint working group made up of the FDT Group and sercos international has created a specification draft that has been tested and verified by two independent implementations at Hilscher GmbH and Bosch Rexroth AG. As the first high-performance real-time Ethernet communication standard, sercos supports the FDT technology used by numerous manufacturers to integrate field devices in the most varied software environments. The expansion of the FDT specification underlines sercos' flexibility as a real-time universal bus for automation. The FDT specification for sercos III can be downloaded from the FDT Group's website (www.fdtgroup.org).

Axioline: The World's Fastest I/O System

With a maximum local bus runtime of one microsecond per I/O module, the Axioline from Phoenix Contact is currently the world's fastest I/O system. When combined with the new sercos bus coupler, cycle times can be achieved that set a new speed record for automation. sercos news talked to Phoenix Contact about speed, modularity and future-proof technology.

sercos news: Congratulations on your world record. The speeds achieved were no coincidence. What is the concept behind Axioline?

Stefan Pollert, Product Management, I/O Systems at Phoenix Contact: Axioline deals with two considerations: The first one is the increased demand on the market for an I/O system that is easy to operate, but still robust and very fast.

sercos news: And the second one?

Christian Gemke, Group Leader, Market Management, I/O Systems at Phoenix Contact: Right now you can see a paradigm shift on the market. High speeds and synchronicity in networks and controls are only possible thanks to the introduction of Ethernet-based networks such as sercos. This trend continues up to the master I/O system. Axioline is our response to these two central challenges.

sercos news: You are using the sercos automation bus. Why?

Volker Lutz, Group Leader, Development, I/O Systems at Phoenix Contact: Developing a bus coupler for sercos was an obvious step. Speed and synchronization have always played a large role with sercos. The third generation bus enables cycle times of 31.25 microseconds, whereas other systems are only just starting to come close to this speed. This allows us to offer high-performance solutions where speed has become irrelevant.

sercos news: Could you explain this paradox statement a bit more precisely?

Pollert: Gladly. Axioline enables such high speeds that the developer does not even have to worry about the speed of the subordinate modular I/O system. It is simply so fast that you don't have to think about it and don't notice any difference to parallel cabling. Only the master network or control system determines the system runtime. This simplifies the design of such systems enormously and the modular units are just as fast as the block modules.

sercos news: *Speed is increasing in importance and one key word is oversampling. Is Axioline also prepared for future developments?*

Lutz: This is actually an important topic. Future-proofing plays a central role for Phoenix Contact. Our customers think in spans of 15 to 20 years. An I/O system that is already stretched to its limits today doesn't offer any flexibility for new technologies. This is why Axioline was purposely designed with an open structure. It's true that we are already planning for oversampling since there is growing customer interest in this topic.

sercos news: *What strategic role does sercos play for you?*

Lutz: sercos provides us with an automation bus that is well-equipped for the future thanks to a clever roadmap. While developing the bus coupler, we stayed very close to the current specification 1.3. We are the first that are able to support in one unit the new synchronization modes, i.e. cycle synchronous mode and clock-synchronized mode. This is the basis for time-critical, flexible applications that were previously impossible. In short, sercos perfectly implements all of the advantages offered by Axioline. In this respect, sercos was our first choice. Other systems are only just starting to move in this direction and we will have to see how well they actually develop.

sercos news: *Which portfolio will you start off with?*

Pollert: We are starting off conventionally with various sizes of I/O modules for analog and digital input or output. Alongside this, we have other modules. For example, a temperature module with eight inputs, a function module with two counter and incremental encoder inputs each that records pulses of up to 300 kHz, and even an SSI module with an analog output for set point selection. We will also continue to expand our portfolio.

sercos news: *What are your criteria for expansion?*

Gemke: First of all, we do not want to rule out any application. The market provides us with the direction to go in. We are constantly comparing our plans with market demands. We are trying to position Axioline as a universal I/O system. Both Axioline and sercos have all the prerequisites to be all-rounders.

sercos news: *When will the bus coupler and I/O system be available?*

Pollert: The sercos bus coupler for Axioline will be available from the 1st quarter of 2012. The I/O system is already available now. The same applies to the already mentioned I/O modules and function modules.

sercos news: *Which industries are you focusing on?*

"Axioline enables such high speeds that the developer does not even have to worry about the speed of the subordinate modular I/O system."

Stefan Pollert
Product Management, I/O Systems at Phoenix Contact

sercos news: *Is the Axioline + sercos combination already in use?*

Pollert: We have already created several customer prototypes. The response has been very positive and users are very satisfied. Applications from various industries have been working perfectly under real conditions. The sercos bus coupler has also been put through numerous tests by us and our customers, so we're ready for series start.

Gemke: Right now we are focusing on machinery and plant engineering. Axioline is particularly beneficial to applications needing short response times and reliable synchronicity of all processes. In conjunction with the sercos automation bus, our I/O system is the perfect basis for fast and stable applications.

sercos news: *How does Axioline behave in industrial applications?*

"In conjunction with the sercos automation bus, our I/O system is the perfect basis for fast and stable applications."

Christian Gemke

Group Leader, Market Management, I/O Systems at Phoenix Contact

Lutz: Axioline can easily withstand ambient temperatures from -25°C to 60°C, heavy mechanical loads of up to 25 g and EMC disturbances. The I/O system is thus ideal for applications with very demanding ambient conditions. Axioline meets the EN 60068-2-standards for vibration, shock, bump and broadband random vibration. We are already in line with limit values for electronic irradiation and emission that will only come into force in a few years. This is part of our approach to future-proof the system.

sercos news: How do you support users during commissioning?

Pollert: We provide the free software Startup+ which supports users during commissioning by performing a simple wiring check, making troubleshooting much easier. In addition, this tool can be used to diagnose Axioline stations (without the need for a control unit) by connecting them to a laptop. Analog set points can also be specified and data transmitted via the digital inputs and outputs in order to test the wiring. Plus, the use of sercos makes commissioning even simpler.

sercos news: How?

Gemke: The trend is to commission offline as far as possible before the actual system is standing. We have sercos device descriptions for all modules. These offline representations can be used in advance to create the system configuration, prepare for device parameterization and make it available to the engineering system. This data can also be used for diagnosis and troubleshooting once the system has been set up.

sercos news: Not all applications demand the best in speed, robustness and simplicity. Isn't Axioline a bit much for „normal" applications?

"sercos provides us with an automation bus that is well-equipped for the future thanks to a clever roadmap."

Volker Lutz

Group Leader, Development, I/O Systems at Phoenix Contact

Gemke: Not at all. We are aware that financial aspects play an important role in addition to technical criteria. We are in a position where we can offer Axioline on the market at attractive conditions. Our pricing is comparable to common devices that are not realtime-capable, doing away with the preconception that sercos is expensive. When used with a sercos automation bus, the modular system is extremely future-proof. This aspect really shouldn't be underestimated.
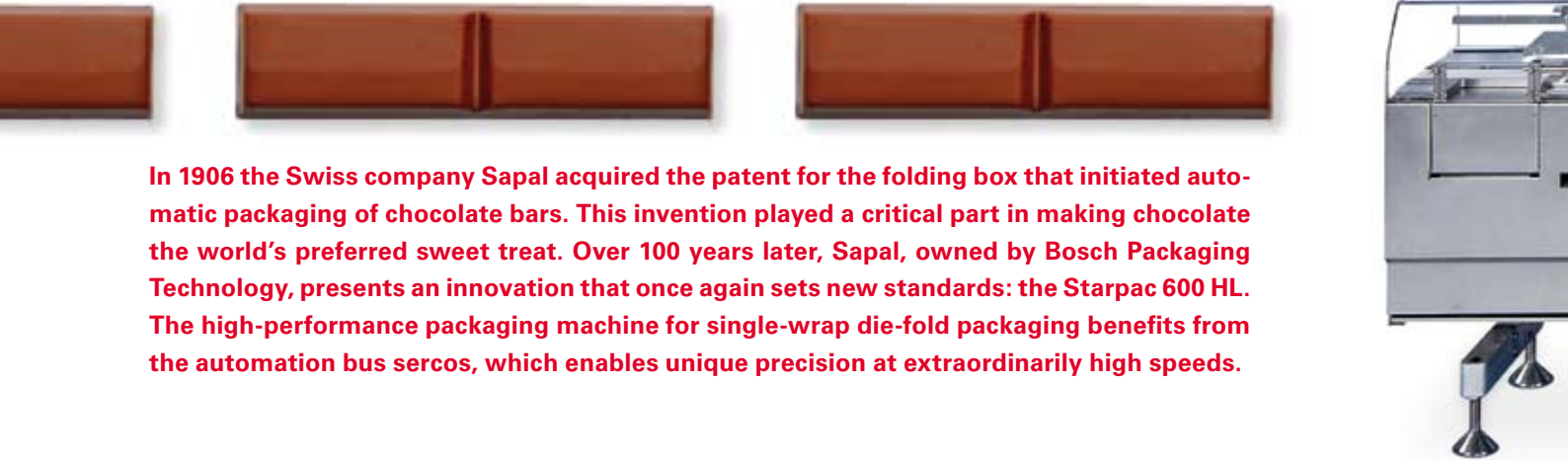
sercos news: Thank you very much for this interview. ■

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Industrial Ethernet with sercos

The "Sweet Side"
of Automation Technology

In 1906 the Swiss company Sapal acquired the patent for the folding box that initiated automatic packaging of chocolate bars. This invention played a critical part in making chocolate the world's preferred sweet treat. Over 100 years later, Sapal, owned by Bosch Packaging Technology, presents an innovation that once again sets new standards: the Starpac 600 HL. The high-performance packaging machine for single-wrap die-fold packaging benefits from the automation bus sercos, which enables unique precision at extraordinarily high speeds.

Used to package small chocolate bars, the new packaging machine Starpac 600 HL combines the best of two worlds: thanks to hermetic sealing and gentle processing, it maximizes product quality and extends shelf lives. At the same time, precise single-wrap die-fold packaging produces a visual effect comparable to that of premium products.

Absolute precision
The centerpiece of the Starpac 600 HL packaging machine is the "folding box," which is responsible for the high-quality look of the fold wrapping: the small chocolate bars are fed in from the side; two transfer turrets ensure the rapid movement of the product through the folding and sealing process. The folding box implements all folds simultaneously, thus guaranteeing symmetrical side and longitudinal seals. Symmetry can be achieved because even elastic packaging materials are held at a precisely defined position in the folding box. This represents a fundamental difference between Starpac and combined packaging stations which, due to their design, are not able to consistently achieve the precision required for this level of flawless packaging.

High-performance automation
The basis for unvarying symmetry at high speeds is the seamless interplay between the servomotors, drives and pneumatic components from Rexroth, which communicate via the sercos automation bus.

The packaging machine uses specially developed, highly dynamic MSK043 servomotors, which, together with the IndraDrive drives, are able to achieve the extremely short start/stop cycles that are common in this application area. Because the highly synchronous movements inside the folding box demanded bidirectional, real-time communication, sercos was the clear choice as the automation bus for this innovative packaging machine. Thus, it was quickly apparent to the developers that simply forwarding a specific position to the drive control would not be enough. Only by ensuring that the drive reaches its exact position, even with the added element of elastic packaging material, can the highly complex packaging process be carried out with the desired level of precision. sercos already supports standard real-time Ethernet in accordance with IEC 61158 and 61784 and was thus able to fully comply with the developer's rigorous demands.
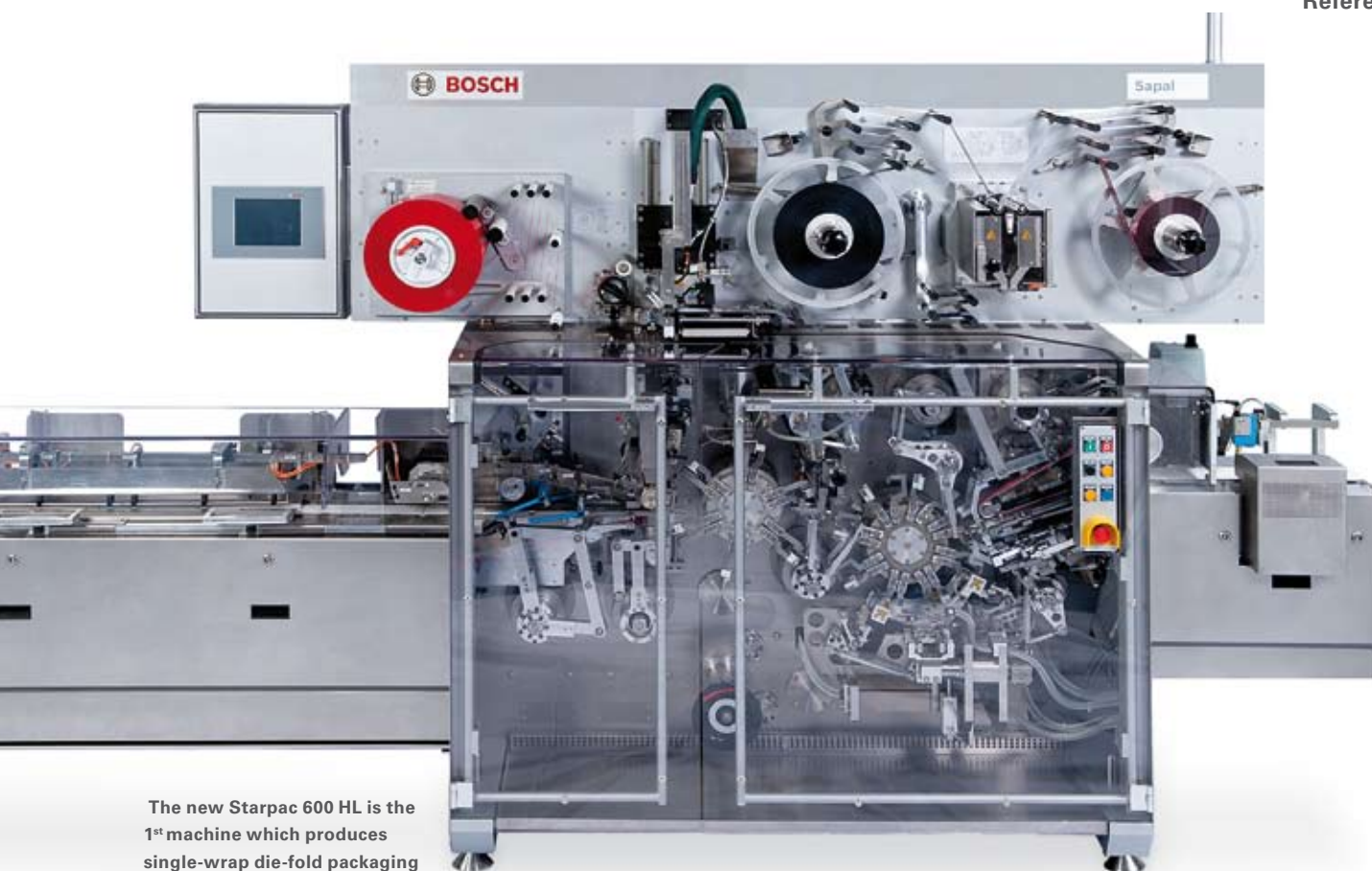
**The new Starpac 600 HL is the 1st machine which produces single-wrap die-fold packaging with hermetic seals**

Real-time control

An IndraMotion MLC motion-logic control system from Rexroth is implemented to control the drives, pneumatic components and I/O bus couplers, thereby permitting the regulation of up to 64 drives. sercos is "on-board" as part of the standard equipment for all components – additional hardware, e.g. converters or similar components, is not required. The automation bus allows the control to achieve high-speed cycle times. The minimum update time for the drives, for example, is just one millisecond; i.e. in this interval the control can retrieve information from the drive and reset its parameters. sercos makes it possible for each axle on the Starpac 600 HL to be individually queried in real time and adjusted using new parameters if necessary.

All relevant data are transferred in real time via sercos. Without the real-time communication of all time-sensitive processes, high outputs could not be achieved. Because the modular pneumatic valve terminal system HF04 is also equipped with sercos, the Starpac uses sercos as its sole automation bus. This reduces the number of different field bus systems and the amount of wiring needed. For networking, sercos uses standard Ethernet components which have proven themselves in numerous industrial applications.
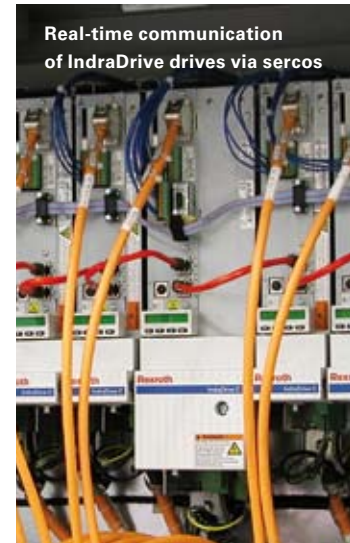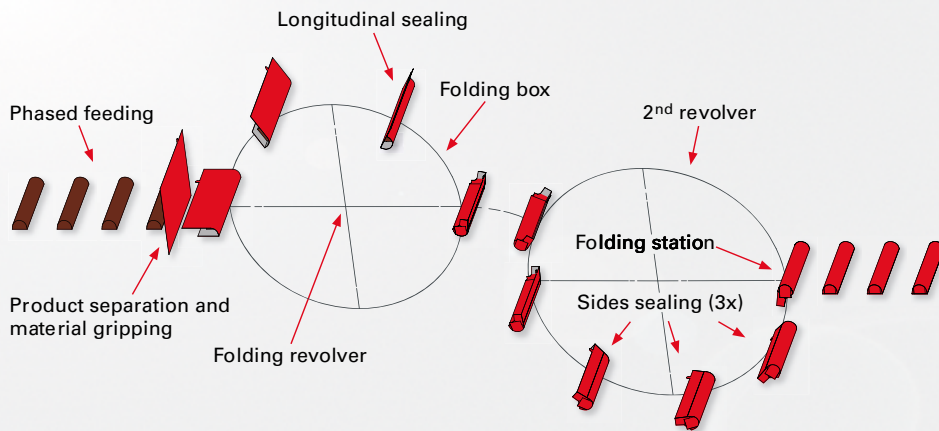
You'll never walk alone

The hit from the Broadway musical Carousel is not only highly popular in soccer stadiums around the globe. For the planning and operation of systems and production lines, a seamless interplay of all components is essential to success. Bosch Packaging Technology therefore designed the new packaging machine to enable optimum integration in production lines. The feed system, for example, has a modular structure. The feed section can have different lengths depending on the speed at which the chocolate bars are fed in. Local I/Os, also connected via sercos, guarantee precise, consistent spacing of the incoming products.
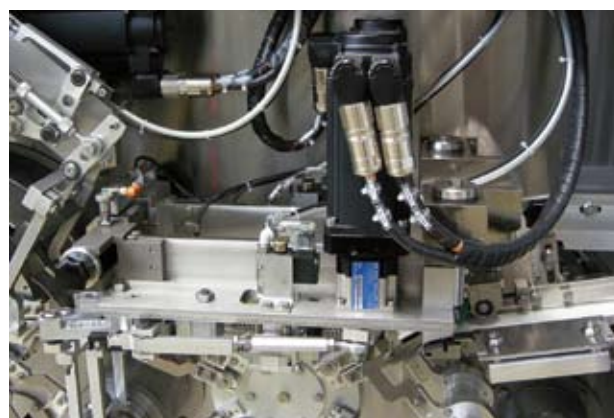
Highly dynamic servomotors for extremely short start/stop cycles

The packaging process with the Starpac 600 HL

Longitudinal sealing

Folding box

2nd revolver

Phased feeding

Product separation and material gripping

Folding station

Folding revolver

Sides sealing (3x)

Real-time communication of IndraDrive drives via sercos

With the open-style, modular concept, solutions for secondary packaging – in cartons or trays, for example – can be provided by Bosch Packaging as well as third-party manufacturers.

Because the components are usually equipped with a separate control, a central line control is responsible for the transfer of important information – e.g. "stop" – if machine failure leads to a production standstill. The communication of the line control is often implemented based on Ethernet TCP/IP socket connections. The use of sercos lends itself here as well: a PLC system such as IndraLogic XLC from Rexroth enables real-time communication for the entire system via sercos, which in turn contributes to increased operational safety.

Safety first!
Compared to previous packaging machines, the extraordinary output of up to 600 units per minute makes it necessary to implement corresponding safety measures for the Starpac 600 HL in order to prevent damage to the machine, for example due to blocked drives or jammed parts. Drives from the IndraDrive series from Rexroth thus provide TÜV-certified safety functions. They guarantee, among other functions, a secure rotating direction (e.g. always clockwise) or a specific, pre-defined speed if the machine is in service mode. Actuation currently still occurs via sensors and actuators that are wired directly to the drives. The CIP Safety protocol on sercos will replace this discrete "wiring" in one of the next expansion stages. With the next configuration, an additional safety bus will be omitted since the safety-relevant signals will simply be clocked into the sercos automation bus in real time alongside the standard data. Because sercos supports the ODVA machinery initiative as a partner organization, users receive access to a modern, highly capable safety network, as well as the option to integrate

their machines simply and easily in production processes and system structures at customer sites.

Efficient engineering
The engineering framework IndraWorks from Rexroth provides a software environment that allows all tasks from planning and programming to the visualization of user interfaces and diagnosis to be consistently mapped in a single tool. With IndraWorks, developers have quick, transparent access to the functions and data for all components. Components that are connected via the sercos automation bus, such as IndraDrive drives, are detected automatically and integrated in IndraWorks – a significant advantage, especially in the engineering phase. In this vein, during the development of the Starpac 600 HL, the movement and PLC functions of drives and pneumatic components as well as the configuration of decentralized I/O modules could be fully implemented within a uniform software environment, thereby reducing development time considerably. The integrated project management is multi-user-capable, which simplifies engineering in teams.

Conclusion
Automation tasks in the field of packaging are becoming increasingly complex. A flexible automation bus such as sercos simplifies engineering and ensures that the operation of high-performance applications is both failsafe and low-maintenance. ■

A Sugar Stick Every 0.5 Seconds

Italian filling machine with real-time automation from Rexroth

They can be found everywhere from gastronomy to offices: various forms of sugar packets and sugar sticks are a must for hot drinks. In Europe alone, consumers use several hundred million of these packets every year. At a unit price of under 0.5 cents, low costs and the highest throughput are essential for production. The Italian company M.F. snc Macchine automatiche now offers a new, high-performance machine for filling these small packets. M.F. relies on lean automation from Rexroth with real-time communication via a sercos automation bus.
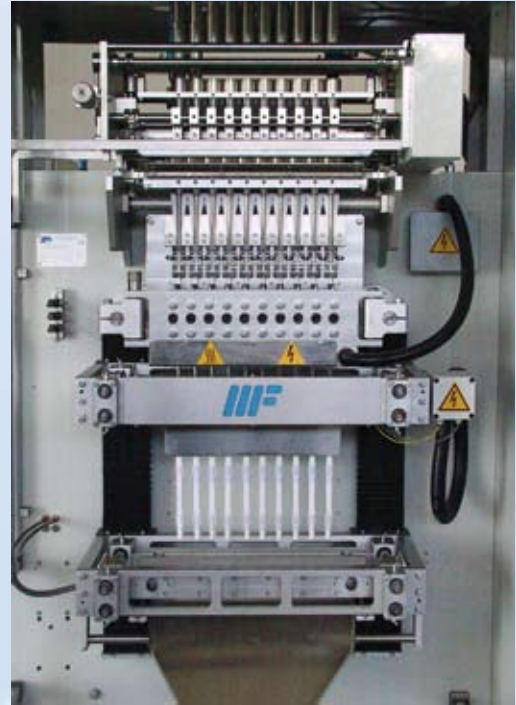
Flexibility is the key. sercos is already well established in the food and packaging industries

The company specializes in the production of packaging machines to proportion products of various consistencies into individual heat-sealed packets. The machines can deal with all types of products and consistencies, whether granulated, such as sugar, powdered, liquid, or creamy, as well as single units. M.F. has also taken into account the special features found in sugar processing. The small white grains and particles are extremely abrasive and turn into a sticky syrup if there is too much humidity. This is why the Italian packaging specialist has replaced mechanical synchronization elements with individual electric drives wherever possible to increase uptime and reduce maintenance costs.

"The packaging industry often requests individual solutions. This is why we exactly adapt our machines and systems to the customer's needs," notes Fabio Fuzzi, owner and Managing Director of M.F. The new metering machine Stick Pack used to fill long sugar sticks offers powerful and lean automation with excellent flexibility at high speeds: It fills up to 600 sugar packets every minute on ten tracks. To change the product to other quantities or packaging sizes, almost all you need to do is select a different recipe in the control.

A working cycle of only 0.6 seconds demands highly precise coordination of the involved servo axes. M. F. relies on the automation solution IndraMotion for Packaging from Rexroth to do just this. Logic and motion functions are integrated in a scalable hardware. For the compact Stick Pack, the owners chose on the variant with an IndraMotion MLD drive-based control. It reduces cabling and the master drive can control up to nine further servo drives. An open PLC in accordance with IEC 61131-3 regulates the process sequence and takes over all visualization of the system. Rexroth has expanded on the embedded motion libraries in the PLCopen with its own functions that are geared towards packaging applications. This means that the IndraMotion for Packaging has replaced much of the complex programming tasks through fast parameterization.

Simple engineering thanks to CamBuilder

The sugar is delivered in sacks weighing between 500 and 1000 kg and is then sent to a funnel via a suction line. A capacitive sensor keeps the funnel filled at the same level throughout operation. The machine stops as soon as there is no more sugar in the funnel to avoid producing empty packets. The sugar goes through the funnel into the metering system. "The sugar packets are filled using a vibrating cup-type volumetric filler, so the product volumes can be easily increased or decreased," explains Fabio Fuzzi. A scale ensures a high level of repetitive accuracy. "With the scale we are able to achieve a tolerance value of one percent," the owner proudly states. The next station is in charge of heat-sealing the packet on up to three sides.

M.F. uses the engineering environment IndraWorks to implement fast and highly-dynamic movements in all axes. It includes all of the required software tools for programming, parameterizing, commissioning and diagnosis of the control and drives. At the same time, innovative functions such as CamBuilder simplify work. The Italian engineers were able to create a quick graphic illustration of the cam disks and the software automatically generated the machine code. If a parameter is changed, the movements of the other axes adjust themselves accordingly. M.F. supplies the Stick Pack with 200 recipes that the user can easily select from. The entire drive data and PLC data is backed up on a memory card.

sercos: redundancy ensures data flow even when a cable breaks

The extremely short cycle time demands hard real-time communication between the control and drives. The sercos automation bus offers the right capacity thanks to deterministic transfer. Above all, it extends the robustness of the machine. The redundant ring structure ensures that communication is maintained even if a cable breaks. If the ring is disconnected, sercos switches directly to a double-line topology. Along with an increasing number of manufacturers, M.F. uses sercos as an automation bus: the Stick Pack links all of the machine peripherals equipped with standard Ethernet via a channel that is separate from the real-time communication.

In addition, the combination of sercos with IndraMotion for Packaging enables integration of further modules, such as box formers or automatic heat-sealing machines, in the process with little effort. To do this, M.F. links the controls of the respective modules to the machine via an Ethernet cable. The connected automation modules are synchronized to the machine cycle via IndraMotion MLD.

For Fabio Fuzzi, the close cooperation with Rexroth had a clear aim: "We are growing along with Rexroth. Our products are always innovative and we are constantly faced with change, which is necessary to get ahead. Thanks to this cooperation we are able to integrate innovations right away in the next machines." ■

The NOVA M12 Grinding Machine:
Greater Precision and Speed with Simplified Architecture

For its new NOVA M12 system, MECCANICA NOVA, a leading manufacturer of grinding systems worldwide, implemented sercos as the universal bus for the entire automation, combining its precision and speed with systems from Bosch Rexroth. More flexible, quicker and easier, the third generation of sercos improves the overall production process with its innovative machine philosophies.

For over 70 years, MECCANICA NOVA has been a world leader in the design and implementation of internal and external grinding systems for various industries and products: in automobiles, aeronautics, geared motors, standardized speed-change drive units and bearings. The Bologna company acquired its earliest expertise in the area of grinding of bearings thanks, in no small part, to the support of a multinational partner, the German Schaeffler Group.

The company offers a wide range of machines for internal, external and combined grinding of parts ranging from 5 mm to 1000 mm.

MECCANICA NOVA's uniqueness can be attributed to its long-term success in creating customized solutions based on customer requirements, as Massimo Martina,

MECCANICA NOVA's CNC software developer, explains: "Our machines start out as standard solutions but are then customized to meet individual requirements – so that no two are ever the same. The customer asks us to meet certain technical specifications and we must remain highly flexible in order to do this."

Besides flexibility, the company targets innovation, which it optimizes by combining electronic and mechanical technologies with the primary goal of enhanced machine operation. MECCANICA NOVA is thus able to offer sound technical solutions that solve a variety of production issues. The products are equipped with cutting-edge technology and offered at fair rates.

MECCANICA NOVA's grinding machines offer a high production output with very short cycle times for machining.

MECCANICA NOVA manufactures its own numerical control and installs it on the machines, which is the secret behind the high performance and speed of its electronics. "Thanks to the consolidated experience and collaboration of innovative partners such as Bosch Rexroth, a company that is synonymous with reliable, high-level components, we can guarantee a rapid execution of programs," explains Martina.

Bosch Rexroth has been supplying the Bologna based company with the components to control the first generation of the sercos communication interface since the year 2000. All machines with this solution installed will be upgraded to the third generation of sercos starting in March and April of next year. The first machine to have undergone this upgrade is the M12, the NOVA numerically controlled grinding machine for combined grinding work on inside diameters, outside diameters and front surfaces with separate grinding wheels, intended for the universal machining of gearbox components in the automotive industry.

"The challenge is to integrate our sercos Ethernet board in the NOVA numerical control architecture while main-

taining and guaranteeing top performance in terms of the speed and precision required of the machine," explains Dario Dallefrate, product control manager at Bosch Rexroth Italy.

MECCANICA NOVA has greatly appreciated the infinite potentials of the third generation of sercos. First of all, this solution simplifies machine architecture thanks to reduced hardware: it has gone from two boards to just one. The number of drives that can be actuated without the installation of an additional board was also increased. "We now have up to 24 drives compared to 16 in the previous solution," Martina points out. "Once again in relation to the simplified architecture, with the third generation of sercos we have done away with optical fibers and also reduced the wiring by opting for an Ethernet cable."

As an additional positive feature, we have eliminated the old board that required programming using external software since the new Bosch Rexroth Sercans03 board is programmed directly by the Nova CNC. This is especially an advantage when it comes to spare parts: service personnel no longer have to reprogram the board manually if it needs to be replaced.

More flexible, quicker and easier, the third generation of sercos improves the overall production process with its innovative machine philosophies.

With regard to speed, although the first generation of sercos was very good in this respect, the latest generation is even better. With the third generation of the sercos Motion Control profile, it is now possible to whittle sampling cycle times down to 0.5 milliseconds. This time determines machine performance, i.e. the machine has become even more precise.

Besides the Motion Control profile, the communication profile – for I/O device management – and the profile for the safe transmission of automation data have also been developed on the third generation of sercos. The latter profile, as Dallefrate tells us, "is called sercos Safety and has been implemented in view of the safety standard that will take effect in 2012. The CNC must be able to safely transfer data. The communication channel, i.e. the field bus, must therefore be equipped with this capability: not only to enable data to reach its destination within the time specified, but also without any alteration of its content in order to prevent any safety hazards to operating personnel."

MECCANICA NOVA plans to transfer these profiles inside the bus, which would allow an even greater streamlining of the control architecture, eliminating components from the electrical cabinet. None of these measures will decelerate the communication involved in controlling the Motion Control since MECCANICA NOVA is consistent in its pursuit of speed and accuracy.

This high level of accuracy is one of sercos' strong points. "The synchronicity of the sercos bus allowed MECCANICA NOVA to create the M12, a grinder with excellent machining precision," adds Giovanni Cicala, the Bosch Rexroth application technician. "When we have several axes and several motors that have to move in coordination, the drives must actuate the command for what needs to occur simultaneously. The control unit first

transfers the data to the drives and then gives a signal to work in a synchronized manner, all very rapidly. This is also because these machines have to guarantee accuracies to the order of a micron for final machining and a tenth of a micron for positioning axes." The result? With the Rexroth drives, MECCANICA NOVA achieves positioning accuracy to a tenth of a micron!

Besides sercos III, the NOVA M12 is equipped with 7 electric Rexroth Indradrives that are used to position the axes and the spindle. The new generation of high frequency Indradrive HFs is used for the grinding wheels. These Indradrives feature safety on board functions with the new IEC61800 certification conforming to the Machinery Directive. MSK brushless electric motors are used on the NOVA M12.

"Our success is the result of teamwork through our support for Rexroth technology with its sturdy mechanics and Rexroth's guarantee of reliable products. Besides all the advantages listed here, we are confident that sercos still has a lot more to offer in terms of potential, which we will be implementing in the following months on the machines to be converted to this new technology. With Bosch Rexroth we have found a partner that has always stood by us, that is flexible in meeting our requirements and always ready to work on a new "ad-hoc design!" concludes Martina. ∎

Servo Technology Is Key to More Cost-Effective Machine Building

This year's interpack saw the introduction of the Fawema FA 217, a brand-new bag filling and closing machine for pre-made bags. The new machine, which is equipped with automation technology from Schneider Electric, demonstrates that modern servo drive solutions can do more than just increase flexibility. With the FA 217, the company was also able to reduce manufacturing and operational costs at the same time.

When it comes to innovative bag filling and packaging machinery, Fawema is the company to turn to. This entrepreneurial machine builder, with approximately 100 employees has been in business for over 90 years. Fawema used interpack 2011 as the platform for introducing the FA 217, a brand-new bag filling and closing machine for packaging dry powders and granulates such as flour, sugar and tea. The FA 217 can be combined with net weighers, auger fillers or cup fillers and can handle quantities ranging from 0.5 to 5 kg (or up to 7.3 liters) in pre-made paper block bottom bags, coated block bottom bags or side gusset bags. It can process up to 80 bags per minute, regardless of package size. Fawema received financial assistance from the Federal Ministry of Economics and Technology to develop the new machine as part of a program approved by the German Bundestag.

Independent single drives for increased flexibility

The FA 217 takes the functional principle of the line shaft drive, a technology that has been tested and proven in older machines for more than two decades and transfers it to modern servo technology. Thomas Krimmel, Electri-

cal Department manager at Fawema, explains the various reasons for this approach: "One aspect was of course the greater flexibility this gave the machine. Compared with its predecessor, the FA 217 can work with a larger range of weights. The drive design with single drives also allows the ratio of filling time to transport time to be adjusted if necessary. For example, we can increase the filling time for sensitive products such as tea and then, to compensate for this, we can reduce the bag transport time as needed."

The FA 217 is a compact machine with a chamber transport system. It can fill and close two bags (e.g. 1 kg) at a

"The new FA 217 generation of machines is an important step for us and will allow us to continue offering our customers high-quality packaging machines designed using the latest technology."

Peter Steindl, Managing Director and owner of Fawema/Engelskirchen
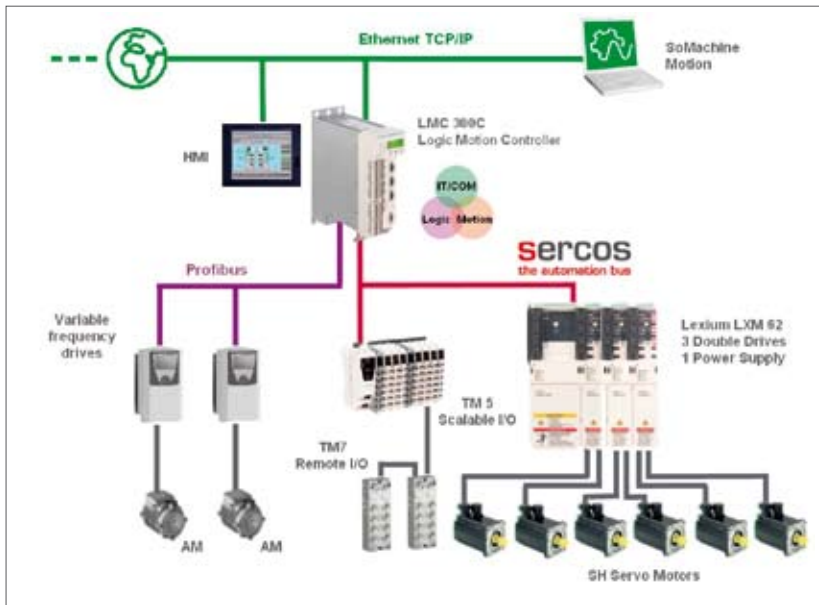
Architecture of the PacDrive 3 automation solution: In addition to sercos III as the drive bus, Profibus was installed to connect the I/O level, the variable frequency drives, and motor starters

controlled by the TeSys U motor starter. The motor starters, which are connected with the central PacDrive Logic Motion Controller LMC 300 via Profibus, also enhance the available options for power monitoring and diagnostics. The variable frequency drives for the two speed-controlled AC motors are also coupled with the PacDrive controller via Profibus. The PacDrive controller communicates with the drives and with the I/O level via sercos III, the Ethernet-based automation bus in PacDrive 3. The Magelis XBT GT control panel is connected with the controller via Ethernet TCP/IP. The machine program is based upon the PacDrive template. With its consistent use of modular software structures and standardized programming, this template allows greater reusability of portions of the machine program in other equipment or in successor machines.

time or only one bag in the case of larger filling weights, such as 5 kg. Two parallel magazines for the pre-made bags are located in front of the filling station and bags are fed from these magazines simultaneously. The transport system spreads the bags open and guides them to the filling station where the filler is located. The filler, which is equipped with its own servo drives, can be adapted with a height setting to accommodate different package sizes. Krimmel points out that "because of the height-adjustable filler, we no longer need to have a height-adjustable conveyor belt. This reduces the amount of mechanical effort needed and above all decreases space requirements, which allowed us to significantly reduce the size of the machine housing compared with the predecessor system."

After a bag has been filled, and as it is being transported through the system, it is subjected to much more effective product vibration than was possible in the predecessor machine, thus achieving better compaction of the contents. The bag opening is then pre-folded, closed and sealed. The machine can perform flat-top, flat-fold or vertical closures.

The automation solution in the FA 217 is based upon PacDrive 3, the latest generation of Schneider Electric's proven control technology. The servo drive solution uses the single and double drives of the Lexium LXM 62 multi-axis solution, powered by a shared power supply, two single drives and one double drive for the basic machine, and additional drives depending upon the selected variant. The fixed-speed AC motors, which can also vary in number, are

Server technology to reduce the cost of production

By switching over to server technology, Fawema is not only pursuing its goal of greater flexibility but is also clearly aiming to reduce its manufacturing and operational costs. By eliminating the line shaft and cam discs, for example, it was able to reduce the number of parts required and thus considerably simplify the machine design. "We also made sure that the automation solution and the electrical components fully exploited every opportunity for reducing installation times," reports Krimmel, adding that "after a thorough comparison of costs for the relevant automation solutions currently on the market, we decided to use the PacDrive technology from Schneider Electric. Key factors in the decision included not only hardware costs but also aspects such as space requirements in the control cabinet and installation costs."

The multi-axis servo drives of the Lexium LXM 62 series servo solution in particular contribute significantly to cost savings. The ability to power drives from a shared power supply is not only more efficient for multiple axes than using drives with individual power supplies, it also reduces installation costs: In a serial configuration, no backplane connections are required for connection to the power source and the ground wire or to integrate the unit into the DC bus. The modules are connected with the power supply and with one another using front-side quick-connect slides with integrated stop screws for solid contact. Pluggable cables on the motors that can be attached from below make the connections to the power supply, motor brake, and thermoelement.

Two bags are filled and closed in parallel (picture shows the multi-stage folding and closing process)

The PacDrive 3 automation solution: The new LMC-series controller is on the left, next to it on the right is the shared power supply with LXM 62 servo drives arranged upon it; above this, a row of TeSys U motor starters

Parameterization of the servomotors and drives is largely automatic, based upon electronic name plates. Upon the first use or change-out of a device, both motors and drives are identified by the central controller and are then configured based upon the specified parameters. Because sercos III offers Ethernet-based communication, there is also no need for hardware to set bus addresses.

Thomas Krimmel sees even greater future potential for savings in ILM servo modules. These servomotors with integrated control technology are currently being readied for market introduction by Schneider Electric. ILM servo modules use a flexible approach to networking that incorporates pre-terminated hybrid cables and distribution boxes and they further reduce the already low space requirements in the control cabinet permitted by the LXM 62 servo drives. The same power supplies can be used for both ILM servo modules and LXM 62 servo drives. This allows the two drive series to be combined in mixed configurations as well. Krimmel summarizes the prospects for this technology by pointing out that "we can use the ILM series like the PacDrive modular programming concept to further refine our design concepts for independent mechatronic machine modules. This will also significantly lower the costs of producing different versions of our equipment designs."

Lower changeover and maintenance costs

Krimmel emphasizes that machine operators will also benefit from this servo-based machine design. "Not only were we able to position the FA 217 in an attractive price segment, the servo technology also reduces the number of format-specific parts. A complete set of parts costs only 30 % of what it cost for the predecessor machine." Retooling times are also reduced accordingly, as Krimmel confirms: "With a little motivation, operators can achieve retooling times in the range of 30 minutes instead of the previous 90 minutes."

Servo technology in general and PacDrive 3 in particular also helps to reduce maintenance expenditures. For example, the elimination of mechanical cam discs and their need for lubricating oil lengthens maintenance intervals. The absence of mechanical drive shafts also improves accessibility to individual functional units. Together with the use of electronic name plates to automate commissioning of parts, the pluggable connections used in PacDrive technology can shorten downtimes when changing out parts. ■

serie mega HP

Injection Molding Machines from Sandretto do Brasil with Automata Control Systems: sercos Establishes Itself in the Plastics Machinery Industry

Mega series machine from Sandretto do Brasil

Sandretto do Brasil is one of South America's leading manufacturers of injection molding machines. The company's main strength is its use of innovative automation technology that takes the special cost situation on the local market into account. The most important specifications while creating the design of the new Meglio und Mega machine series were standardization of the control components by implementing an open and future-oriented system bus and an increase in machine performance. Another goal was to substantially reduce costs for electrical equipment in the machine. The F3 control system from Automata with a sercos communication bus perfectly fulfills the technical requirements. A further plus: besides its improved system performance it also reduces costs in comparison to the previously-used solution.

Why use sercos?

Due to the modular design of injection molding machines and the substantial mechanical dimensions related to the size and weight of the workpiece to be manufactured, a field bus is commonly used to connect I/Os and drives to the central control. However, the previously-used CAN technology can no longer fulfill the requirements for transmission speed and reproducibility of various process values. As a consequence, sensors and actuators distributed throughout the machine had to be connected to the central control, even though there was a field bus. This resulted in an increase in wiring and was a contradiction to the machine's modular architecture. In such situations, sercos is the perfect solution. Thanks to short cycle times and highly synchronous sensing and activation of the inputs and outputs, all values can be transferred via the system bus. sercos' ring redundancy also provides additional transmission security. The central control no longer

needs to be equipped with local I/Os. The oversampling and probe & compare functions introduced in sercos V1.3 also offer additional options, making it possible to move monitoring of pressure and position threshold values and thereto responses to the I/O level. This takes a load off the control, enabling an increase in machine performance and, most importantly, reproducibility of the production process. Standardization of these functions were decisive factors for selecting sercos for this application. There is no need for proprietary solutions or extensive in-house development and the company remains independent from component manufacturers.

Why use F3?

The F3 control system from Automata consists of a PC-based basic unit, decentral I/Os and a series of different operating panels. The basic unit is equipped with an Intel Atom CPU and a sercos III master interface that is
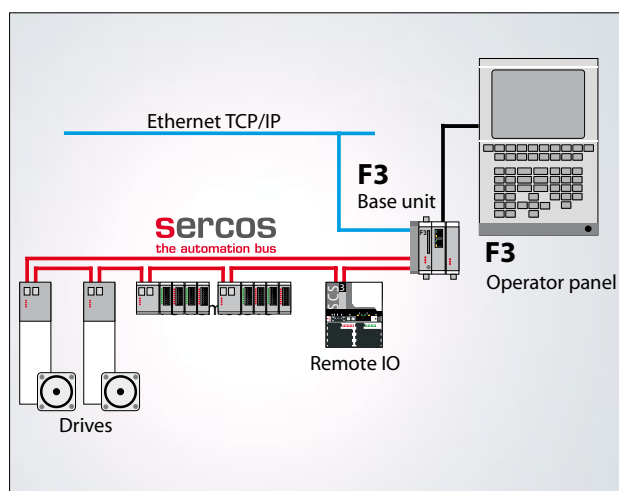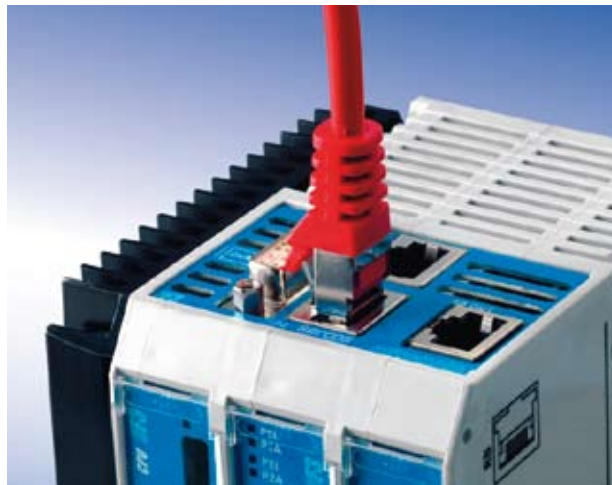
Meglio series machine from Sandretto do Brasil

F3 basic unit with detailed view of sercos

Diagram of the F3 control system

machine series. To connect the control panel to the basic unit, you only need one cable for video, keyboard, touch screen, USB, power supply, buttons and lamps, making it a very inexpensive and easy solution.

In summary, the following arguments persuaded Sandretto do Brasil to use a sercos system bus:

- Fast and highly synchronous transmission of decentral process values such as pressures, closing forces and positions of the individual machine modules.
- Increase in reliability thanks to ring redundancy
- High degree of standardization even for complex functions such as oversampling and probe & compare and the ability to avoid proprietary solutions or in-house developments in the future
- Open and independent of manufacturer

These features, the performance of the control and comprehensive software libraries for injection molding applications all facilitate fast and simple introduction of the new control generation with a sercos system bus. ■

connected to the processor via PCIexpress. This makes it easy to produce the I/O update rate and synchronicity required by the injection molding process. The control is programmed with CoDeSys in IEC 61131-3 languages. Comprehensive libraries with function modules to control the individual machine functions and configurable process sequences are available specifically for use in injection molding machinery. The visualization software is Win-MachLite from Automata, which also comes with comprehensive templates specially designed for machines that process plastics. Both of these software components and the associated extensions enable simple adaptation to the wide range of machines in the Meglio and Mega series. As a result, workpiece-specific or customer-specific adjustments can be implemented very quickly.

The F3 panel interface makes a major contribution to achieving the cost target for the new Sandretto do Brasil

What Role Does sercos Play in the Strategic Orientation of We Decided to Find Out.

Dr. Steffen Haack
Sales Manager for
Factory Automation
at Bosch Rexroth AG

Dr. Bernd-Josef Schäfer
Technical Manager for
Electrical Drives and Controls
at Bosch Rexroth AG

Rexroth
Bosch Group

"Future-proof and highly productive"

Rexroth develops and produces innovative system solutions for a wide variety of industries. We asked them how they profit through the use of sercos.

Dr. Steffen Haack: The speed at which changes take place in mechanical engineering has increased substantially. Machine manufacturers are under a lot of pressure to come up with new concepts ahead of the competition. Plus, machine users expect high-performance future-proof solutions. This is why Rexroth uses sercos as its automation bus.

sercos stands for true openness, both in terms of communication and its own organization structure. sercos international offers all automation providers, machine manufacturers and users an equal voice. Rexroth uses this exchange of information to identify new requirements and to convert them into innovative solutions and products. sercos fosters an open competition of the best ideas like no other standard. The benefits for machine manufacturers and users: higher productivity and future-proof communication.

What strategic importance does the sercos automation bus have in your company?

Dr. Bernd-Josef Schäfer: As an independent standard, sercos has set the benchmark for hard real-time communication for over 25 years. Its deterministic approach, combined with very high transfer rates, ensures maximum productivity. Furthermore, as an open real-time standard, sercos offers continuous profiles for e.g. electric and hydraulic drives. At the same time, it supports central and decentral concepts and opens up new degrees of freedom for innovative machine concepts through its use as an automation bus. ∎

Manufacturers?

Schneider Electric
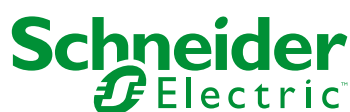
Clemens Blum
Executive Vice President of the
Schneider Electric Industry Business Unit

"On the way to more sustainability"

What strategic importance does the sercos automation bus have for Schneider Electric?

Schneider Electric needs future-oriented, Ethernet-based communication solutions. We selected sercos III as the automation bus for our latest generation of PacDrive technology, making it the company-wide standard for automation solutions involving motion. And we had good reasons for it:

sercos III is one of the most powerful Ethernet-based bus systems on the market. It is the key to universal communication via a single medium: Motion, PLC, I/O, TCP/IP, and safety communication are all possible with just one bus that covers every part of an automation solution. sercos also has a high degree of standardization, both in the protocol and profiles.

sercos provides us with a manufacturer-independent technology whose future doesn't rely on a single company. This means that, whatever reason there may be, there is no danger of questions arising related to long-term investment security. Today, sercos is widely supported, with the spectrum ranging from small companies to international corporations.

Schneider Electric highly values sustainability and energy efficiency. What role does sercos play here?

Schneider Electric's company motto is 'The global specialist in energy management'. sercos fits our motto perfectly: sercos international e. V. has defined an energy profile which greatly facilitates implementation of strategies for improved energy efficiency in machines. We've laid the hardware and software foundation to measure and visualize energy consumption on the machine level and were able to present our initial findings back in spring at the interpack 2011. Thus, we've already implemented important basic functions for the sercos energy profile in the PacDrive 3! ■

sercos Solution

Industrial Communications Design with TI Sitara™ AM335x ARM® Cortex™-A8 Microprocessors

TEXAS INSTRUMENTS

The Sitara™ AM335x ARM® Cortex™-A8 microprocessors from Texas Instruments Incorporated (TI) are the industry's first low-power ARM Cortex-A8 devices to incorporate multiple industrial communication protocols on a single chip. The six pin-to-pin and software compatible devices in this generation of processors, along with industrial hardware development tools, software and analog components, provide a total industrial system solution. Using this solution, developers can get to market faster with their industrial automation designs, including input/output (I/O) devices, human machine interface (HMI) and programmable logic controllers (PLCs).

Key Features and Benefits

- Multiple, on-chip, production-ready industrial Ethernet and Fieldbus communication protocols with master and slave functionality including sercos III - SERCOM 100 compatible SW IP Core
- Unique Programmable Real-time Unit (PRU) + ARM architecture eliminates the need for an external ASIC/FPGA to reduce system complexity and save on bill of materials (BOM) costs by more than 30 percent
- One scalable ARM® Cortex™-A8 processor platform (275 MHz to 720 MHz) for many different industrial automation applications enables reuse with pin-to-pin and software compatible devices
- Quick and easy time to market with industrial specific reference designs, production-ready comprehensive software, including communication protocols and signal chain solution
- Running automata stack
- StarterWare™ software suite eases design with a microcontroller-like development environment without requiring an operation system (OS)
- Software frameworks for SYS/BIOS™ realtime kernel
- Broad software support for Linux, Android™, and Windows® Embedded Compact 7, in addition to a variety of third-party RTOS offerings providing design flexibility

- Fully integrated solution including other key industrial peripherals such as CAN, 2-port Gigabit Ethernet switch, USB+PHY and LPDDR1/DDR2/DDR3 reduces BOM costs
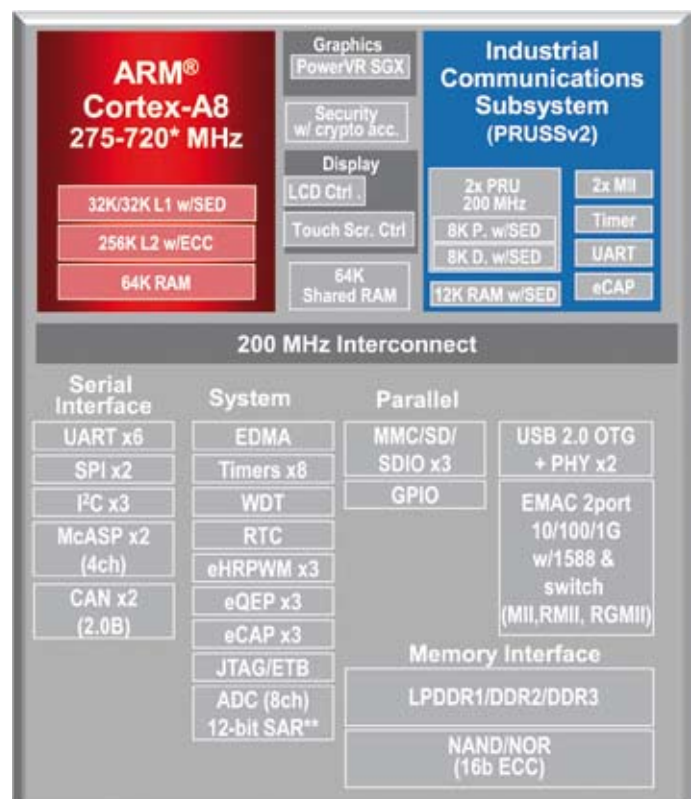
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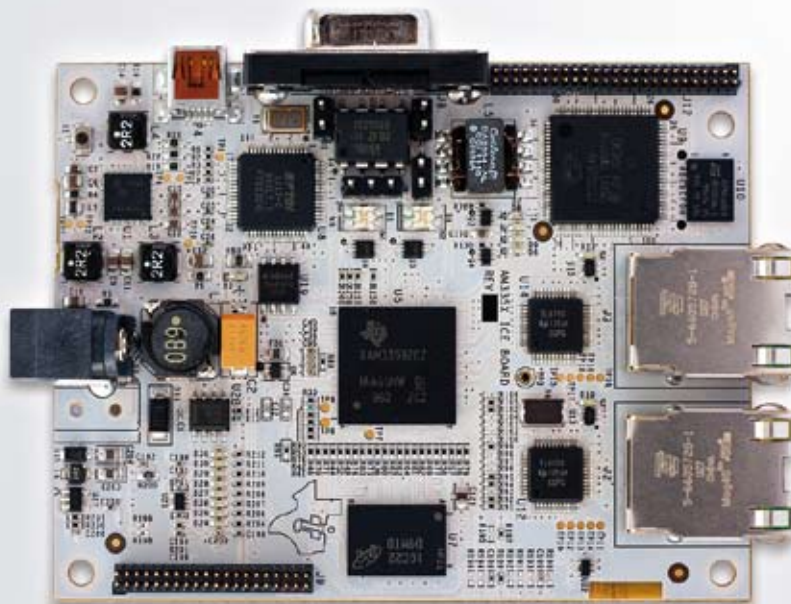
30 percent BOM reduction

The AM335x ARM Cortex™-A8 microprocessors include a programmable real-time unit (PRU) interface created specifically to enable real-time industrial communications capability (master and slave) supporting popular protocols such as sercos III. This unique PRU+ARM architecture in the AM335x ARM microprocessors eliminates the need for an external ASIC or FPGA to reduce system complexity and save on bill of materials (BOM) costs by more than 30 percent. The AM335x ARM microprocessors also include other key industrial peripherals on-chip including CAN, ADC, USB + PHY and two-port Gigabit Ethernet with IEEE1588 to enable fast network connectivity and rapid data throughput as well as connection to sensors, actuators and motor control.

Scalability

Designers can take advantage of the pin-to-pin and software compatibility of the AM335x ARM Cortex-A8 microprocessors and design several end equipments with the devices that best fit their industrial automation need, such as:

- **Drives and I/O-level devices:** specifically targeted to enable sensors, actuators, motor drives, communi-

cations modules and gateways needing industrial slave communications, the AM3357 and AM3359 ARM microprocessors offer a low-performance 275 MHz solution. These two devices do not require an external memory or an operating system, making the system solution simple and compact.

- **Industrial PLC applications:** Offering high performance of up to 720 MHz, the AM3356 and AM3357 ARM microprocessors are well-suited for high-performance PLC applications that need to control various I/O devices in an automation system such as electric motors, pneumatic or hydraulic cylinders, magnetic relays solenoids and more.

- **HMI products:** Perfect for designing HMI products, the AM3354, AM3358 and AM3359 ARM microprocessors offer an on-chip 3D graphics accelerator, which, combined with the integrated touch screen controller, enables rich and intuitive graphical user touch screen interfaces. For HMI applications not requiring integrated industrial communications, the AM3354 and AM3352 and ARM microprocessors offer low-cost options.

**AM3359 Industrial Development Kit (IDK)
(TMDXIDK3359)**

Industrial hardware and software tools

Accompanying the AM335x ARM microprocessors are two industrial hardware development tools to enable customers to easily incorporate industrial communication standards in their industrial automation products:

1. **AM3359 Industrial development kit (IDK)**

   from TI is available for $895. The IDK is an extensive development platform enabling customers to evaluate all popular industrial communications and motor control applications. IDK has many different evaluation features such as 512 MB of DDR2 memory, dual motor drivers, digital I/O, a C2000™ Piccolo microcontroller with integrated analog to digital converters, a Stellaris® ARM Cortex-M3 microcontroller, USB, Ethernet, SPI, 12C and much more.

2. **AM3359 Industrial communications engine (ICE)**

   from TI is available for $99. It is a pocket-sized, cost-optimized and form-factor optimized reference design for I/O devices and sensors that need quick and easy incorporation of industrial communications.

TI offers the ability to complete an entire industrial system design with TI analog ICs, including industrial Ethernet and isolated CAN transceivers, motor drivers, temperature sensors and power management devices, plus wireless connectivity options to complement the AM335x ARM microprocessors.

Community support

TI's online community at e2e.ti.com supports AM335x ARM Cortex-A8 MPUs. Ask questions, share knowledge, explore ideas and help solve problems with fellow engineers. ∎

Decentral Servo Drives from AMK

AMK
Control your Motion.

The iX series includes servo controllers with high-voltage intermediate circuits in a range from 2 kVA to 5 kVA and comes with an excellent level of protection and vibration resistance. In the iDT series, the servo controller is directly installed on the motor. These extremely compact servo controllers are ideal for modular machines. Installation on the motor substantially reduces the space needed in the central control cabinet as well as wiring. Real-time Ethernet communication takes place via the sercos automation bus.

Instead of using a specially made hybrid cable, AMK decided on a system with a separate power supply and fast communication via real-time Ethernet. Multifunctional I/Os in each servo controller are available for sensors and actuators in the machine. The AMK system does not require an expensive distributor box so that additional field bus components can be looped in at any time and any place in the machine. This makes it ideal for use in linear axes or on a carrousel. ■
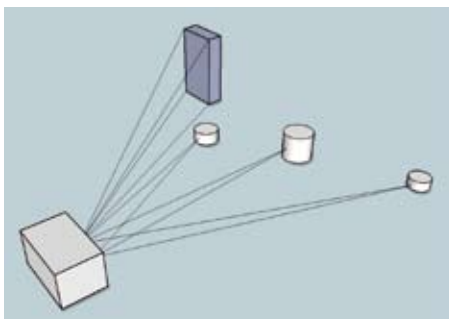

The ix and iDT servo drives support STO (Safe Torque Off) and are optionally available with a functional safety feature.

S Contact

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opdi-SK kompakt – Stereo Camera with Integrated sercos Interface

The opdi-SK stereo camera covers a range of 400 – 2,500 mm

Complex machines and systems require numerous sensors to detect the orientation and position of system parts and/or products. Conventional image processing systems are often too slow and inflexible if adaptable arrangement of measuring points and easy system conversion are required. Opdi-Tex GmbH's stereo camera offers numerous options for production and tool monitoring. It may be used as a stereo camera with pattern recognition or as a multiple photoelectric switch, replacing up to 30 photocells at once. Unlike common reflex switches, the camera is able to detect and track the distance to an object. The complete two-eye camera system contains integrated multi-color LED illumination with a special controller for a fully synchronized image acqusition from both cameras. Without moving parts this camera is very suitable for use in industrial environments. Communication with machines and systems takes place via a sercos interface with the stereo camera responding like a sensor. ■

S Contact

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Portable Safety Stack for CIP Safety on sercos

IXXAT offers a platform-independent stack software for the CIP Safety on sercos safety protocol. This software can be used to implement both secure CIP safety originator and target devices. Programmed in the programming language C, the stack is based on SMP (sercos messaging protocol), which enables mapping of CIP data and services to configured, cyclical data containers in the sercos telegram. The stack software can be used for both sercos masters and slaves. It consists of a CIP Safety layer and a "CIP Safety on sercos" adaptation layer that, along with the subordinate sercos communication protocol, is considered a part of non-safety-relevant transfer. An adaptation layer for EtherNet/IP, which links the identical CIP Safety layer to a subordinate "non-secure" EtherNet/IP communication stack, is optionally available. Various licensing models and maintenance agreements are provided for the safety stack. ■

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Servo Position Controllers with sercos II and sercos III Interface

Metronix has developed and produced innovative control technology with a focus on intelligent servo position controllers for more than 30 years.

In order to satisfy the continuously growing requirements for shorter cycle times and to support highly dynamic applications in the future, Metronix launches the new ARS 2000 device series. In addition to a considerable performance increase, the new ARS 2000 servo position controller meets the high safety technology requirements according to EN 61800-5-2 in modular design. In this connection, support of current communication interfaces like Ethernet and USB is a matter of course.

Controllers provided with optional sercos II or sercos III interfaces can be integrated in the fieldbus structure as slaves. Thus, a fail-safe, powerful and manufacturer-independent bus technology is available to the machine manufacturer, efficiently supporting highly dynamic automation processes. That's why servo position controllers with the sercos interface are particularly suitable for applications in demanding growth markets like packaging, solar technology, LCD panel and wafer production. Currently, more real-time Ethernet-based protocols are under development. ■

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Out Now:
Product and Manufacturer's Guide

The sercos Product Guide is the official product brochure for the sercos automation bus. It contains products from all sercos generations. It is geared towards chief engineers in machinery and plant manufacture and contains all important information on products and manufacturers related to sercos. The Product Guide presents a compilation of all new products and features.

Further information and order:
www.sercos.de

S **Exhibitions 2012**

Automatisierungstreff 2012
March 20.-22. Boeblingen/
Germany

Hannover Messe 2012
April 23.-27. Hannover/
Germany

SPS Italia
May 22.-24. Parma/Italy

Industrial Automation
June 20.-22. Beijing/China

Automation
September 7.-10. Mumbai/India

Industrial Automation
September 10.-15. Chicago/USA

IAS 2012
November 6.-10. Shanghai/China

SPS/IPC/DRIVES
November 27.-29. Nuremberg/
Germany

Tough Application
Ingenious Solution } Exactly

Mastering challenges together – Rexroth makes it easy to implement automation.
Our many years' experience in a wide range of industries has given us extensive application knowledge. We offer this comprehensive understanding to the tasks you bring us, leading to ingenious solutions.

Regardless of the drive technology used, we thought ahead and integrated intelligence throughout. This consistency makes you more efficient – from planning to start-up and daily operation. Your benefits are real: Increased productivity, improved energy efficiency and maximum machine safety. You can count on Rexroth to have the appropriate drive and control solution to meet your needs exactly.

The Drive & Control Company

Rexroth
Bosch Group

Bosch Rexroth AG
www.boschrexroth.com