

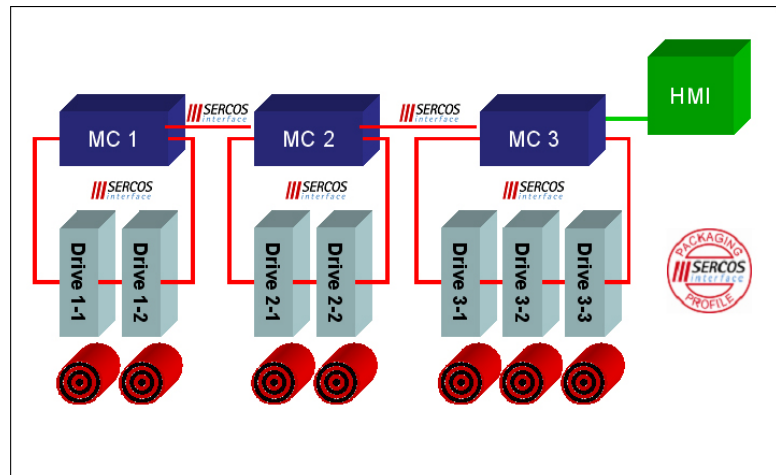


SERCOS Interoperability Demo

The demo shows how SERCOS meets the following OPW Guidelines for Pack Connect:

- Motion Control and Servodrive Interoperability via the SERCOS Packaging Profile
- Controller-to-Controller Network Requirements
- Controller-to-Controller Motion Bus Structures

The SERCOS interface® trade associations are exhibiting an Interoperability Demo at Pack Expo 2006, Oct. 29 – Nov. 2, in Chicago. The exhibit, demonstrating interoperability of SERCOS interface products from multiple vendors, is in the OMAC Packaging Workgroup booth, number C64, strategically located in the upper-level concourse of McCormick Place North.



The demo consists of three individual interconnected servo systems with interoperable SERCOS components from five different vendors. It illustrates interoperability of both new SERCOS III products using Industrial Ethernet for communication and SERCOS II products using fiber optics for communication.

Demonstration of Controller-to-Controller Communications

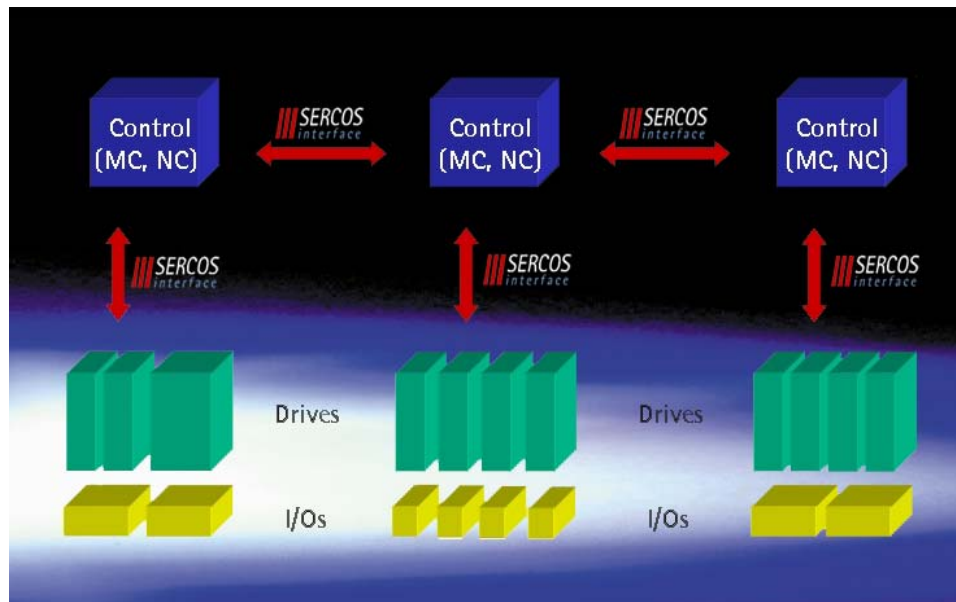
The first system consists of a controller from AMK using SERCOS III in controller-to-controller communication, operating as a slave to a Bosch Rexroth SERCOS III controller. The AMK controller also acts as a SERCOS II master running SERCOS II servodrives from AMK and Bosch Rexroth as slaves in a second ring.

The second system consists of a SERCOS III controller from Bosch Rexroth. This controller operates as a SERCOS III master in the controller-to-controller communication, with the other two controllers in the demo as slaves. It also controls two Bosch Rexroth SERCOS III servodrives.

This demonstrates the new SERCOS III Controller-to-Controller (C2C) profile, which provides cross-communication and synchronization of controls and servodrives in different parts of a packaging line. With cross-communication, every module can exchange data with every other module, independent of the master or the physical order of the modules in the SERCOS III ring.

For example, consider printing and packaging machines with a modular structure. Often each module of the machine has its own PLC or motion control, but the axes in each module must work synchronously, such as in four-color (or more) printing. With the C2C profile, every module in the system can perform a data exchange with every other module to insure synchronization, independent of the master or the physical order of the modules in the SERCOS ring.

The specification of communication and synchronization mechanisms between distributed motion controls takes into consideration the hardware redundancy and hot-plugging features of SERCOS III. In addition, the data and commands exchanged between controls are defined based on the existing SERCOS parameter model. This data includes control and state information, as well as relevant command values and actual values.



Demonstration of Interoperability via SERCOS Pack Profile

The third system consists of another Bosch Rexroth SERCOS III controller, running as a SERCOS III slave in the C2C ring. This controller also operates as a SERCOS II master with a second ring, running SERCOS II servo drives (using fiber optics) from AMK, Bosch Rexroth, Lust DriveTronics, Baumüller, Rockwell Automation and Yaskawa. There are several interpolators in the Bosch Rexroth controllers, acting as “virtual masters” for system synchronization. An HMI is connected to the third controller,

allowing the visitor to change the interpolator to show the real life performance of the drives, all accurate to better than 1 μ s.

The controller and drives conform to the SERCOS Pack Profile, a subset of the SERCOS interface functions defined specifically for multi-vendor servo interoperability for packaging machinery.

To create the Pack Profile, existing SERCOS function groups and the corresponding parameters have been mapped into profiles for three of the six OMAC-defined application classes. The profiles consist of mandatory and optional parameters for simple servo drives and frequency converters, and also for intelligent drives, which can be commanded by any of position, velocity or torque values. Thus, any servodrives/-controllers that implement the Pack Profile will be interoperable.

Benefits to Machine Builder and End User

The demo shows the flexibility of the SERCOS interface with both SERCOS II products communicating over fiber optics and SERCOS III products communicating over Industrial Ethernet running in the same system, interconnected and synchronized to an accuracy of better than 1 μ s.

The demo illustrates the benefits of utilizing OMAC guidelines for interoperability such as Controller-to-Controller communication and the SERCOS Pack Profile. It also illustrates a migration concept for SERCOS II devices and the SERCOS II Pack Profile to the new SERCOS III, based on Industrial Ethernet.

The demo clearly shows that different vendor's packaging machine control systems using the SERCOS interface, SERCOS Pack Profile and SERCOS Controller-to-Controller profile can work together to:

1. Allow the machine builder/user to choose "best in breed" components and easily integrate them into a system,
2. Enable interoperable packaging line integration,
3. Use machines with different control systems in a packaging line, yet maintain a familiar look and feel for operation and maintenance personnel in order to minimize learning curves, and
4. Improve the ease of communication between machines with different control systems in a packaging line.

Detailed Equipment List:

Panel #1

- AMK 1 SYMAC controller
- AMK 1 KW2 SERCOS II servodrive
- Bosch Rexroth IndraDrive SERCOS II servodrive

Panel #2

- Bosch Rexroth IndraMotion MLC controller
- Two Bosch Rexroth IndraDrive SERCOS III servodrives

Panel #3

- Bosch Rexroth IndraMotion MLC controller, with a Bosch Rexroth IndraControl VEP 30 HMI
 - AMK 1 KW2 SERCOS II servodrive
 - Baumuller b maXX 4400 SERCOS II servodrive
 - Bosch Rexroth IndraDrive SERCOS II servodrive
 - Lust DriveTronics ServoOne SERCOS II servodrive
 - Rockwell Automation Kinetix 6000 SERCOS II servodrive
 - Yaskawa Sigma II SERCOS II servodrive
- The control and all servodrives are compliant with the SERCOS Pack Profile.

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