

Motion Controller for ORMEC IEEE 1394 and Copley CANopen Intelligent Drives

NI SoftMotion Controller

- Works with CANopen and IEEE 1394-based intelligent drives
- Develop powerful applications using LabVIEW or C with NI Motion Assistant
- Ideal for distributed motion applications

Operating Systems

- Windows 2000/XP with
 - LabVIEW Real-Time RTX for IEEE 1394 intelligent drives (includes run-time engine)
 - LabVIEW Real-Time ETS for CANopen intelligent drives (includes run-time engine)

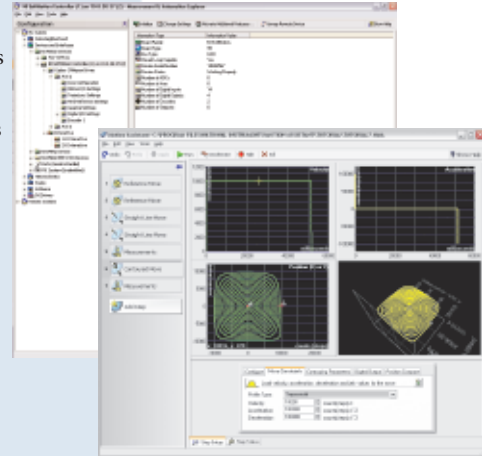
Recommended Software

- LabVIEW
- LabWindows/CVI
- NI Motion Assistant

Driver Software

- NI-Motion 7.0

NEW



The NI SoftMotion Controller is a soft motion interface between NI-Motion driver software and IEEE 1394 and CANopen distributed intelligent drives. You now can program IEEE 1394-based ServoWire SM drives from ORMEC, and CANopen-based Accelnet and Xenus drives from Copley with the easy-to-use NI-Motion API in National Instruments LabVIEW or C. You also can rapidly prototype your distributed motion application using NI Motion Assistant.

NI SoftMotion Controller Architecture

The NI-Motion architecture for the NI SoftMotion Controller uses standard PC-based platforms and open standards to connect intelligent drives to a real-time host. In this architecture, the software components of the motion controller run on a real-time host and all I/O is implemented in the drives. This separation of I/O from the motion controller software components helps lower system cost and improve reliability. You can use open standards, such as IEEE 1394 and CANopen, to connect these components.

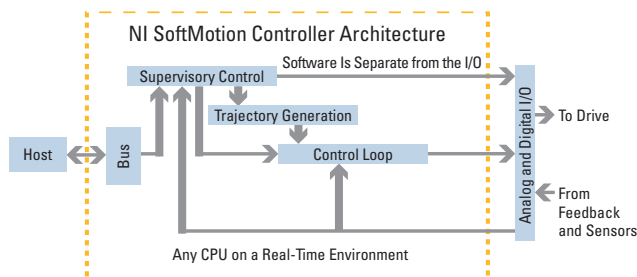


Figure 1. NI SoftMotion Controller Functional Architecture

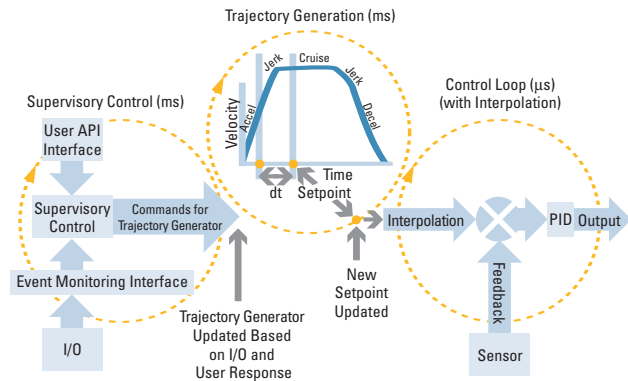
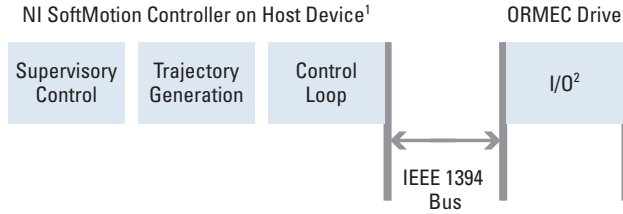


Figure 2. NI Motion Controller Functional Architecture

NI SoftMotion Controller for IEEE 1394

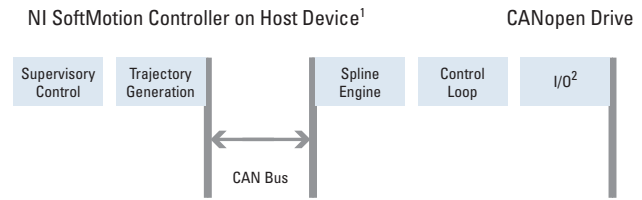
When you use the NI SoftMotion Controller with an ORMEC device, you can daisy-chain up to 15 drives together and connect them to the real-time host. The real-time isochronous mode of the IEEE 1394 bus transfers data between the drives and the host. Figure 3 shows the NI SoftMotion Controller component architecture that applies when you use the controller with an ORMEC device. The supervisory control and trajectory generation loops execute every millisecond. If the control loop is configured to execute faster than every millisecond, the trajectory data is interpolated before the control loop uses it.

Motion Controller for ORMEC IEEE 1394 and Copley CANopen Intelligent Drives



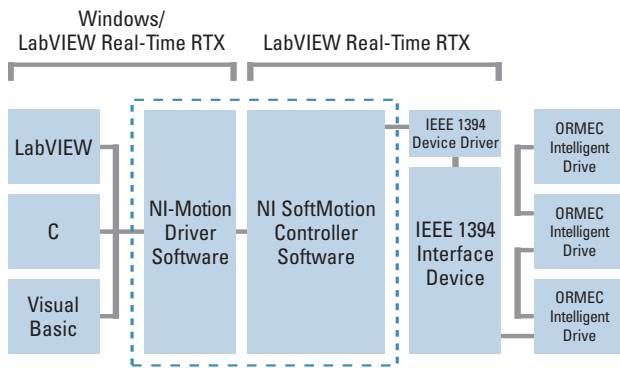
¹Host device is a PC or PXI chassis running the LabVIEW Real-Time Module (RTX) targets
²I/O includes encoder implementation

Figure 3. NI SoftMotion Controller Functional Architecture for ORMEC



¹Host device is a PC or PXI chassis running the LabVIEW Real-Time Module
²I/O includes encoder implementation

Figure 5. NI SoftMotion Controller Functional Architecture for CANopen



The NI SoftMotion Controller for ORMEC ServoWire includes the NI SoftMotion Controller activated for two axes of ORMEC ServoWire intelligent drives and the NI-Motion driver.

Figure 4. NI SoftMotion Controller for IEEE 1394

NI SoftMotion Controller for CANopen

When you use the NI SoftMotion Controller with a CANopen device, you can daisy-chain up to 15 drives together and connect them to the real-time host. The real-time process data objects (PDOs) defined by the CANopen protocol transfer data between the drives and host.

All I/O required by the motion controller is implemented by CANopen drives using Device Profile 402 for Motion Control. Currently, the NI SoftMotion Controller works with only CANopen drives from Copley Controls Corp. When used with CANopen devices, the supervisory control and trajectory generation components of the NI SoftMotion Controller execute in a real-time environment running the LabVIEW Real-Time Module (ETS). If your motion control system is using eight axes or fewer, the supervisory control and trajectory generation loops execute every 10 ms. If your motion control system is using more than eight axes, the supervisory control and trajectory generation loops execute every 20 ms. When you are using the NI SoftMotion Controller with a CANopen drive, the drive implements the control loop and interpolation.

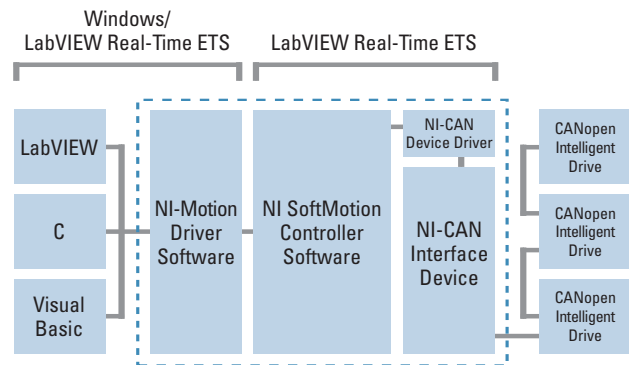
In this configuration, the I/O and the NI SoftMotion Controller use an NI CAN interface device to communicate to the CAN bus.

NI SoftMotion Controller Communication Watchdog

The supervisory control in the NI SoftMotion Controller continuously monitors all communication with the drives connected to the host. If any drive fails to update its data in the host-loop update period, the axis corresponding to that drive is disabled and the communication watchdog status bit, which is returned by the Read-Per-Axis Status function, is set to TRUE. Similarly, all drives connected to the NI SoftMotion Controller are configured to go into a fault state if the data from the NI SoftMotion Controller is not updated every host-loop update period on the drives. The communication watchdog functionality ensures that the NI SoftMotion Controller operates in real time.

Onboard Program Usage with the NI SoftMotion Controller

To use onboard programs with the NI SoftMotion Controller, use the LabVIEW Real-Time Module to target your application to run in the same environment as the NI SoftMotion Controller. Note that the NI SoftMotion Controller onboard program shares the same processor and system resources with the NI SoftMotion Controller. System jitter increases with the number of devices you use in your real-time system. Enable only the devices you need to use for the current application, especially when using onboard programs.



The NI SoftMotion Controller for CANopen includes the NI SoftMotion Controller activated for two axes of Copley Controls Accelnet/Xenus intelligent drives, the NI CAN interface device, and the NI-Motion driver.

Figure 6. NI SoftMotion Controller for CANopen

Motion Controller for ORMEC IEEE 1394 and Copley CANopen Intelligent Drives

Ordering Information

NI SoftMotion Controller for CANopen (2-axis) with		
PXI interface		
2 ports.....	779330-02	
1 port	779330-01	
PCI interface		
2 ports.....	779328-02	
1 port	779328-01	
NI SoftMotion Controller for ORMEC ServoWire		779326-03
NI SoftMotion Controller Upgrade ^{1,2}		
8-axis.....	779332-08	
4-axis.....	779332-04	
2-axis.....	779332-02	

¹Activated with Measurement & Automation Explorer

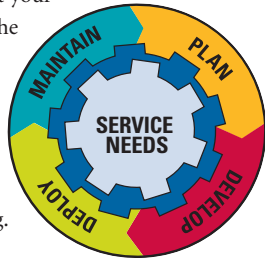
²Upgrade for either CANopen or IEEE 1394 intelligent drives

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