Mid-Range Stepper/Servo Motion Controllers

NI 7340 Series

- Up to 4 axes of motion
- Each axis configurable as stepper or servo axis
- 3D linear and circular interpolation
- 3D contouring
- 62 ms PID loop update rate

Models
- NI PCI-7344
- NI PXI-7344
- NI FW-7344
- NI PCI-7342
- NI PXI-7342

Operating Systems
- Windows 2000/NT/XP
- Real-time performance with LabVIEW (page 134)

Recommended Software
- LabVIEW
- NI Motion Assistant
- LabWindows/CVI
- Measurement Studio
- Motion Control Module for Measurement Studio

Other Compatible Software
- Visual Basic
- C/C++

Driver Software (included)
- NI-Motion

Overview and Applications

The National Instruments 7340 series motion controllers are for end-users and machine builders who need to develop powerful applications quickly and easily. NI optimizes this software to help you get your advanced motion profiles up and running as quickly as possible. With the proper drive, you can use NI 7340 motion controllers for stepper/servo motor control and piezoelectric control. These devices also have four general-purpose analog inputs that you can use in simple monitoring applications or as feedback for closed-loop control.

Features

NI 7340 devices consist of advanced technology controllers for motion applications, giving you capability for the most sophisticated requirements. These controllers give you blended motion trajectory control and fully coordinated circular, linear, point-to-point, gearing, and vector-space control in either embedded motion operation or host-centric programming environments. We also offer contouring capability for more complex moves.

NI 7340 controllers use a high-performance motion controller architecture. The CPU and DSP components operate together to optimize closed-loop control, automate systems control, and motion command processing functions. The onboard CPU uses an embedded real-time operating system that has event-driven multitasking control. With this state-of-the-art approach, several motion control programs and processes can operate simultaneously on the controller, independently of the host PC and with no outside program interaction unless the host program or user configuration initiates it.

Distributed Control with LabVIEW Real-Time

You now can use NI-Motion driver software in LabVIEW Real Time. This technology enables you to create powerful, distributed motion control systems using a PXI RT Series controller, LabVIEW Real-Time, and a PXI-7340 motion controller. This type of system can be programmed using LabVIEW on a separate computer. The main advantages of LabVIEW Real-Time are high reliability and the capability to create powerful distributed motion control solutions that connect to the main PC using standard Ethernet.

Feature	NI 7340 Series
Maximum number of axes	4 axes
Servo control	✓
Closed loop stepper control	✓
Linear interpolation	✓
Configurable auxiliary DIO	✓
RTSI	✓
S-curve	✓
Configurable move complete criteria	✓
Software limits	✓
High-speed capture	✓
Blending	✓
Upgradeable firmware	✓
NI Motion software API	✓
Circular, spherical, and helical interpolation	✓
Contouring	✓
Electronic gearing	✓
On-board programming functionality	✓
Static friction compensation	✓
Number of axes per 62.5 microsecond PID rate	1
Static PWM outputs	2
DIO	32 bits
Digital-to-analog converter	16-bit D/A
Analog-to-digital converter	12-bit A/D
Step output rate	4 MHz maximum
Encoder rate	20 MHz maximum
PCI	✓
PXI	✓
FireWire (IEEE-1394)	✓

Figure 1. NI 7340 Series Features

Mid-Range Stepper/Servo Motion Controllers

Technical Support for Motion Software

As a complement to your motion software product, consider:

Technical Support – FREE through applications engineers worldwide, Web resources, and Premier Support – ***ni.com/support***

Motion Control Fundamentals Training – Instructor-led courses – ***ni.com/training***

Professional Services – Feasibility, consulting, and integration through our Alliance Program members – ***ni.com/alliance***

For more information on NI services and support, visit ni.com/services

Ordering Information

NI PCI-7344 (4-axis stepper/servo) 777934-01
NI PXI-7344 (4-axis stepper/servo) 777935-01
NI FW 7344 (4-axis stepper/servo).....778113-01
NI PCI-7342 (2-axis stepper/servo) 778665-02
Includes hardware and NI-Motion software, libraries, and examples.

Accessories

NI Motion Assistant.....778553-01
Wiring Interface
- UMI-7764.....777978-01
- UMI-7772.....778556-01
- UMI-7774.....778558-01

Power Drives
- MID-7604.....777936-01
- MID-7602.....778003-01
- MID-7654.....778005-01
- MID-7652.....778004-01

Cables.....see page 645

BUY ONLINE!
Visit ni.com/info and enter pci7344, pxi7344, fw7344.

Specifications

Performance

PID update rate range ..... 62.5 to 500 µs/sample
- Maximum PID update rate ..... 62.5 µs/axis
- 4-axis PID update rate..... 250 µs total

Multiaxis synchronization ..... <1 update sample
Trajectory parameters
- Absolute position range ..... $\pm 2^{31}$ counts
- Maximum relative move size ..... $\pm 2^{31}$ counts
- Velocity range ..... Servo 1 to ±20,000,000 counts/s
- Velocity range ..... Stepper 1 to 4,000,000 steps/s
- Acceleration/deceleration..... 61 to 128,000,000 counts/s2
- Gear ratio..... ±32,767:1 to ±1:32,767

Servo-control loop modes ..... PID, PIVff, S-Curve, dual loop
- PID (Kp, Ki and Kd) gains..... 0 to 32,767
- S-curve time range ..... 1 to 32,767 samples
- Following error range ..... ±32,767 counts

Stepper outputs
- Maximum pulse rate ..... 4 MHz (full, half, and microstep)
- Minimum pulse width ..... 120 ns at > 2 MHz
- Step output mode..... Step and direction or CW/CCW
- Voltage range ..... 0 to 5 V

System Safety

Watchdog timer function ..... Resets board to startup state
Shutdown input..... Disable all axes and command outputs

Motion I/O

Servo command analog outputs
- Voltage range ..... ±10 V,16 bits (0.000305 V/ LSB)
- Programmable torque (velocity) limits
- Programmable offset..... ±10 V (-32,768 to + 32,767)

Encoder inputs..... Quadrature, incremental, single-ended
- Maximum count rate ..... 20 MHz

Forward, reverse, and home inputs
- Number of inputs..... 12 (3 per axis)
- Control ..... Individual enable/disable, stop on input, prevent motion, find home

Trigger inputs..... 4
- Maximum repetitive capture rate ..... 150 Hz

Breakpoint outputs
- Number of outputs ..... 4, programmable polarity

Inhibit/enable output
- Number of outputs ..... 4 (1 per axis), programmable polarity

Analog inputs ..... 4, 12-bit resolution, ±10 V range, 50 µs scan rate
Analog outputs..... 4, 16-bit resolution, ±10 V range

Digital I/O

Ports..... 4, 8-bit TTL ports, bit configurable, sink or source 24 mA
Open Loop PWM Outputs
- Number of PWM outputs..... 2, 32 kHz
- Clock sources..... Internal or external

Power Requirements

PCI and PXI
- +5 V (±3%)..... 1 A
- +12 V (±3%)..... 30 mA
- -12 V (±3%)..... 30 mA
- Power consumption..... 5.7 W, maximum

FW
- Voltage range ..... 9 to 25 VDC
- Power consumption..... 30 W, maximum

Physical

Dimensions (not including connectors)
- PCI..... 17.5 by 9.9 cm (6.9 by 3.9 in.)
- PXI..... 16 by 10 cm (6.3 by 3.9 in.)
- FW..... 30.7 by 25.4 by 4.3 cm (12.1 by 10.0 by 1.7 in.)

Connectors
- Motion I/O connector ..... 68-pin female high-density VHDCI type
- Digital I/O connector ..... 68-pin female high-density VHDCI type

Environment

Operating temperature..... 0 to 55 °C
Storage temperature..... -20 to 70 °C
Relative humidity range ..... 10 to 90% (noncondensing)