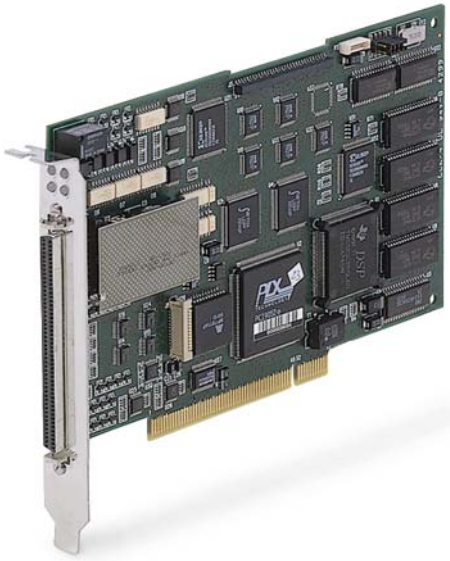
BALDOR
MOTION PRODUCTS

NextMovePCI

PCI-bus 1-12 Axis Machine Controller

- 1-12 axis PCI-bus servo/stepper motion controller
- High speed DSP processor
- Onboard digital and analog I/O
- CAN for distributed control
- High speed PCI bus interface
- Multi-tasking MintMT or 'C'



NextMove PCI is a high performance PCI card motion controller for 1 to 8 axes (12 axes with optional expansion card) of servo or stepper control providing high speed interpolation between all axes, or synchronization with an external master encoder.

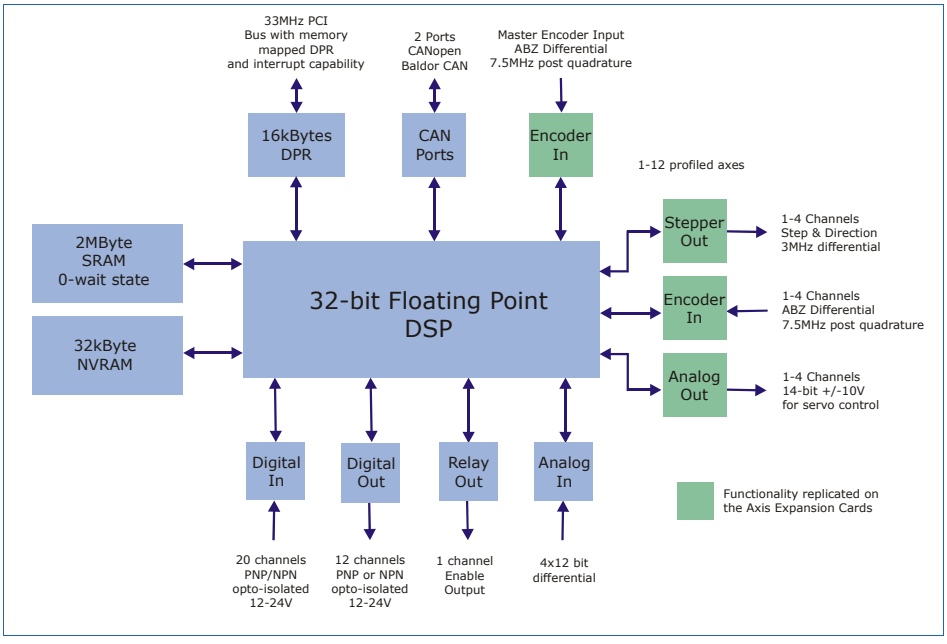
The motion control capability is based on a high-performance DSP core running the latest multi-tasking version of the Mint language - MintMT. An onboard I/O complement of 20 digital inputs, 12 digital outputs, four 12-bit differential analog inputs, allows users to employ the module for machine control as well - eliminating the need for a separate I/O controller such as a PLC. This I/O may be expanded easily by means of the controller's CANbus ports, supporting both CANopen and Baldor CAN devices, or alternatively using the axis expansion card which provides the same complement of I/O as the main NextMove PCI controller.

Servo axes are controlled from the industry standard ±10V analog outputs (14-bit) and encoder feedback. The NextMove PCI has a 6 term PIDVFA loop for fine control of the servo axes.

NextMove PCI is ideally matched with Baldor's FlexDrive^{II} and MicroFlex range of servo controls and BSM servo motor range for a complete servo control system.

Stepper axes are controlled from pulse and direction outputs, capable of 3MHz output frequency.

Applications include high speed printing, packaging and machine tools, and common automation needs including robotics, rotary knives and X-Y systems.

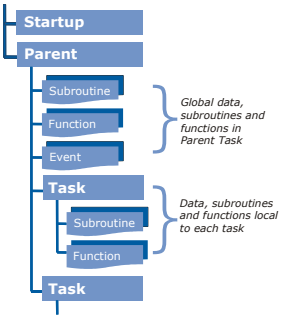


Total Programming Flexibility

Baldor's Mint languages offers total flexibility for the machine designer to satisfy different performance and operational requirements.

Features of MintMT include:

- Subroutines and functions with parameter passing and local variables
- User named variables and arrays
- Multiple, independent tasks limited only by available memory
- Compiled source code for high speed program execution



▲ *Modular programming with independent tasks, subroutines and data, makes code re-use easy.*

Mint provides flexible Basic-style programming for automation builders which allows motion programs to be developed and tested in minutes. Keywords provide ready-to-use software for movement tasks from simple profiles to advanced profiles such as software cams and flying shears. Also incorporating I/O, HMI and communication functionality, Mint provides a complete automation solution which can run autonomously.

Multi-tasking further simplifies development, allowing complex requirements such as machine control to be divided into small, manageable tasks such as motion, human-machine interfacing, and I/O handling.

'C' Programming

For optimum performance, programs can be written in 'C' and embedded for advanced real-time performance via a library of Mint-compatible 'C' language routines. The function library shares the same Application Programming Interface (API) as MintMT and the ActiveX control, making multi-platform development simple, with only one Mint API to remember.

With it's open architecture the 'C' programming libraries even allow for custom motion profilers and control algorithms to be embedded deep within the real time code.

Motion Profiles—Positional Moves

Mint offers many flexible move type to suit your application requirements.

Absolute and Relative: with its own speed, acceleration and deceleration defined (including trapezoidal and S-ramp profiles).

Interpolated moves: using the deep move buffer, multiple linear and circular moves can be blended to create continuous complex motion paths. Inter-vector angle control allows complex paths to be executed with minimum disturbance. Feedrates and digital outputs can be loaded with each move for complete synchronization.

Helical interpolation: For 3 axes, defining a helical move in 3D space.

Speed control: A jogging function allows the motor to run indefinitely at a defined speed, in position control.

Splining: Allows a stream of moves, defined in terms of position, velocity and time, to be blended for continuous, smooth motion.

Motion Profiles—Master/Follower

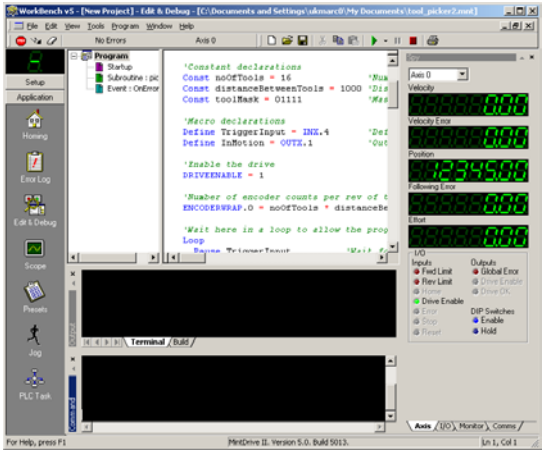
Master follower applications can be geared off any of the encoder inputs, Pulse/Dir input or virtual axes.

Electronic Gearbox & Clutch: Enables two or more shafts to be linked with a programmable ratio. Any axis can be geared to any other axis. Clutch allows precise start and stop distances when synchronizing.

Registration on the fly, An offset move can be superimposed on the gearing move for position correction. This can be triggered from any of the 4 registration inputs.

Electronic Cam: Replaces traditional mechanical cams with servo/vector motor and software programmable profiles (relative or absolute).

Flying Shear: Allows position synchronization of a slave axis to a master, with defined acceleration and deceleration profiles - all linked by software to product movement.



◄ Program Development Tools

The Mint WorkBench is a common Windows front end compatible across of Baldor's range of motion controllers and servo drives. Mint WorkBench offers an easy to use Windows development front end for Mint programming, with its color highlighting of keywords and context sensitive help. The Program Navigator makes it a breeze to navigate the source code, no matter how complicated.

Features include:

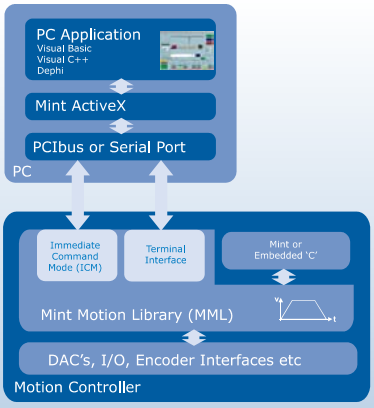
- Command line interface to interrogate the controller even when the program is running
- Spy window to monitor common motion variables and I/O
- Software oscilloscope
- Watch window for variable and task monitoring
- SupportMe function with automatic email generation for rapid technical support
- Web updates of firmware within the WorkBench
- Easy management of firmware files

Windows Programming

Using the supplied ActiveX™ controls, programmers can call high level Mint language functions on the motion controller from popular high-level 'rapid application development' environments for Windows™ such as Visual Basic, Visual C++, Delphi and LabVIEW.

The ActiveX control provides access to all the motion control and I/O functions on the controller, allowing a Windows front end to act as a machine controller. All Mint based events are supported, allowing for example an input to event the executing Windows program. In addition, an ActiveX developed front-end can operate in parallel with a Mint or Embedded 'C' application.

All ActiveX commands share the same Application Programming Interface (API) names as Mint, making it easy to switch between languages on the controller and PC.



CAN Interface

NextMove PCI sports a dual CAN interface conforming to the CANopen specification and Baldor CAN. Available through a standard RJ45 connector, the CANopen interface allows for digital and analog I/O expansion using any available DS401 compliant I/O device. Alternatively, a range of digital CAN I/O devices are available from Baldor confirming to a Baldor CAN protocol. These can be operated from the second CAN channel.

The CANopen port can be used to interface to other Mint controllers, including Baldor's intelligent drives providing the ability to create loosely coupled multi-axis configurations, beyond the 12 axes supported by NextMove PCI. Data can be passed easily between connected nodes using the Mint Comms Array. With one node designated as the bus master, nodes can communicate with each other in a full peer-to-peer network.

The second CAN channel, Baldor CANbus, allows the digital I/O to be expanded via cost effective I/O modules.

Accessories

Breakout Board

Screw terminal connectors for ease of installation. Available with single or two part connectors.

Axis Expansion Board

Expands the servo and stepper axes by 4 each, with up to 2 cards supported by NextMove PCI for a total of 12 axes (servo or stepper).

Axes and additional I/O are brought out to a 100-way connector and can be used with the NextMove PCI breakout board

Accessories ...

A range of digital I/O devices are available to expand the I/O capability of the NextMove controller. These DIN rail mounted modules are controlled over the Baldor CANbus. Up to 63 devices are supported on CANbus.

CAN Expansion 8 Digital Inputs
- 8 Digital opto-isolated inputs
- 12-24V PNP/NPN operation

CAN Expansion 8 Digital Outputs
- 8 Digital opto-isolated outputs
- PNP operation
- 50mA source on all channels
- 500mA max outputs for 8 channels

CAN Expansion 8 Relay Outputs
- 8 relay outputs
- Form C (SPDT) relays rated at 0.5A @ 125VAC, 2A @ 30VDC

CAN Expansion 24 Inputs, 24 Outputs
- 24 opto-isolated inputs (PNP/NPN)
- 24 opto-isolated outputs (PNP)

Human Machine Interfaces

CAN Keypad
- Operates over Baldor CAN
- 20 character x 4 line backlit display
- Programmable keys

Operator Panels
- CANopen and serial bus
- Programmable panels with intuitive software
- Comprehensive range available
- LCD character and 1/4 VGA displays available

Technical Data:

Number of Axes	1 to 8 axes of servo or stepper control, expandable to 12 axes with optional expansion cards
Axis Type	Servo, PID with velocity and acceleration feedforward terms. 200µsec update rate for 4 axes Stepper with differential step and direction outputs to 3MHz
Position Feedback*	Incremental encoder: RS422 differential AB signals with index (Z) pulse. 7.5MHz max frequency
On-board Memory	2MBytes high speed SRAM for firmware, program storage and user data 32kBytes NVRAM (12kBytes available for parameter storage)
Connector Types	100-pin high density connector. Breakout board available with screw terminals and D-type connectors
Digital Inputs*	20 opto-isolated 24V. 1ms sample rate May be connected to positive or negative common (for use with NPN or PNP output transistors) Software configurable for limits, home, stop and drive error
Digital Outputs*	12 opto-isolated 12-24V PNP (Darlington) or NPN (FET) Software configurable for drive enable 50mA per channel, 350mA max source per channel, 500mA max for 8 channels
Fast Position Latch*	4 inputs for high speed position capture of axis and master encoder positions Assigned from the 20 digital inputs. 1µsec capture time per input
Relay Output*	Single output for drive enable. Form C (SPDT) relay rated at 24V (150mA) Common, normally open, normally closed. Fail safe operation: relay de-energized on an error
Analog Outputs*	4 outputs for drive command signals. ±10V, 14-bit resolution. Programmable sign bit
Analog Inputs*	4 differential inputs. Programmable for ±10V, ±5V, 0-10V or 0-5V. 12-bit resolution with second order Butterworth filter (cut of frequency of 1kHz)
Master Encoder*	One channel for synchronization and following applications Incremental encoder: RS422 differential AB signals with index (Z) pulse. 7.5MHz max frequency
Communication Interface	33MHz PCI bus 16kByte memory mapped Dual Port RAM (DPR) with interrupt capability
CANbus Ports	2 CAN ports CAN-1—CANopen DS301. Support for CANopen DS401 I/O devices Master functionality for peer-to-peer communications with other Mint nodes CAN-2 Baldor CAN. Support for Baldor's range of digital I/O expansion units Maximum of 63 nodes supported on the network.
Power Requirements	+5V @ 1.2A (additional current required when powering the encoders from the +5V supply) ±12V @ 250mA 15W power consumption
Environmental Limits	Operating temperature 0°C to 40°C (32°F to 104°F) ambient
Weight	0.31kg (0.67lb.)
Dimensions	Short PCI card (7")
Programming	MintMT—Multi-tasking Motion Basic Embedded 'C'. Texas Instruments compiler must be purchased separately. Windows 9X/NT/2000/XP via ActiveX control All Windows and embedded programming libraries supplied free of charge

Baldor's Motion Products

Baldor's product range offers powerful solutions for the control of servo and stepper motors, in optimized forms for OEMs and end users. Every controller is compatible with the powerful Mint programming language and development environment for embedded systems/PC applications—boosting development flexibility and speed. Products share a common API—keywords are the same whether programming in MintMT, 'C' or Windows—providing a versatile and cost saving platform for OEMs.

Contact Baldor today for more information on:

- Eurocard rack mounting controllers
- Intelligent servo drives
- Complete enclosed unit - ready to use panel mounting controllers
- Rotary servo motors
- High performance linear motors

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* I/O is replicated on the optional axis expansion cards PCI002-xxx. The axis expansion card shares the same pin-out as the main NextMove PCI controller board.

Ordering Information:

Catalog No.	Description
PCI010-501	NextMove PCI developers kit
PCI001-501 (-510)	NextMove PCI 1 axis controller PNP outputs (-NPN)
PCI001-502 (-511)	NextMove PCI 2 axis controller PNP outputs (-NPN)
PCI001-503 (-512)	NextMove PCI 3 axis controller PNP outputs (-NPN)
PCI001-504 (-508)	NextMove PCI 4 axis controller PNP outputs (-NPN)
PCI001-505 (-513)	NextMove PCI 8 axis controller PNP outputs (-NPN)
PCI002-501 (-503)	4 axis Expansion card—servo/stepper (-NPN)
PCI002-502 (-504)	8 axis Expansion card—4 servo + 4 stepper (-NPN)
PCI003-501	Breakout unit for controller and expansion card
PCI003-502	Breakout unit for controller and expansion card Two part screw terminals
CBL021-501	1m 100-pin cable (for use with controller and break-out)
CBL021-502	1.5m (4.9ft) 100-pin cable
CBL021-503	3m (9.8ft) 100-pin cable
ION001-501	CAN 8 input expansion module
ION003-501	CAN 8 output expansion module
ION002-501	CAN 8 relay expansion module
ION00X-501	CAN 24 input, 24 output expansion mod

Contact Baldor for a complete list of accessories, cables, servo drives and motors.

Local Distributor: