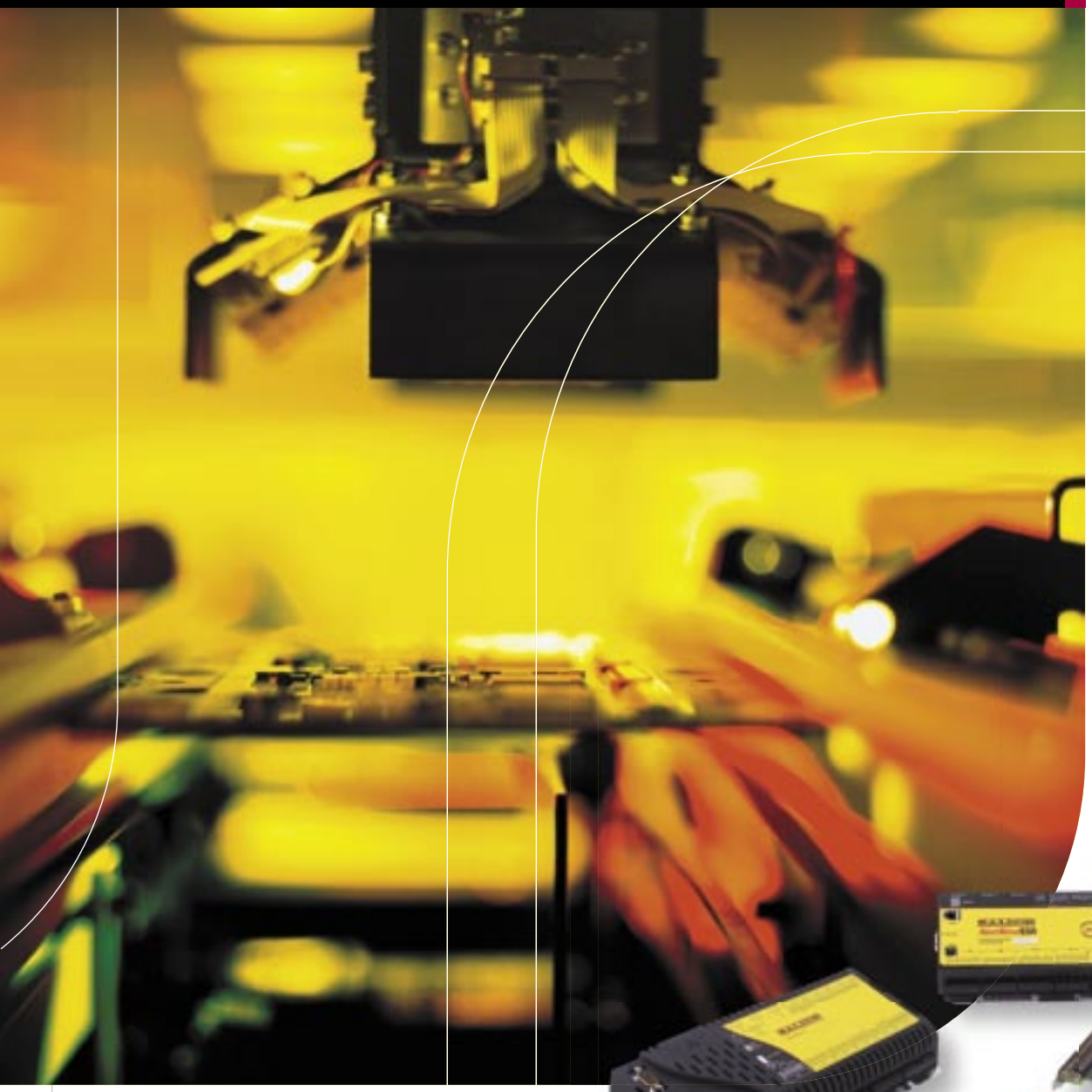
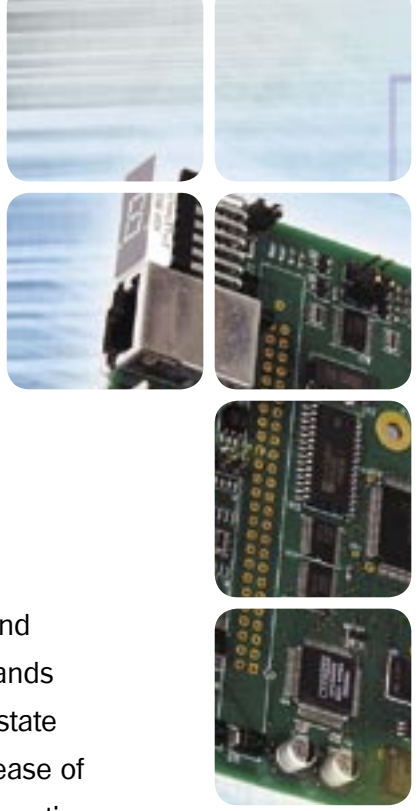
BALDOR



# NextMove

## Multi-axis Motion Controllers



# NextMove Motion Control Solutions

## Motion control solutions today to meet tomorrow's demands

With today's automation applications demanding increasing speed and flexibility to stay ahead, finding a control solution to meet those demands can be difficult. Baldor has the answer. Utilizing a high performance, state of the art processor core and coupled with the power, flexibility and ease of use of Baldor's Mint® programming language, the NextMove range of motion controllers can take on the most demanding of multi-axis applications.

## A History of Success

Baldor's motion controllers have been at the heart of automation machines for nearly two decades. The NextMove motion controller family is synonymous with power, flexibility and versatility. Operating around the world, NextMove has met the demands of a rapidly developing automation world, providing increased productivity, reliability and flexibility.

## Flexible Programming

At the heart of NextMove's success and proven capability is Baldor's highly acclaimed motion programming language, Mint®. Mint provides a high level, easy to use programming language that encapsulates the needs of multi-axis motion, HMI, communications, I/O machine control and more. Mint allows the NextMove motion controllers to operate in a stand-alone capacity without the need for a PC or PLC. Mint ActiveX® controls also allow complete freedom to program motion, I/O sequencing and monitoring from any Windows application. ActiveX applications can be run in parallel to the embedded Mint application for increased flexibility.

P10

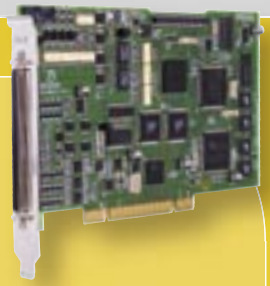
**NEXTMOVE e100**

16-axis stand-alone Ethernet based motion controller.

P12

**NEXTMOVE ESB**

7-axis stand-alone servo and stepper motion controller.



P14

**NEXTMOVE PCI-2**

1-12 axis PCI-bus servo and stepper motion controller.


P16

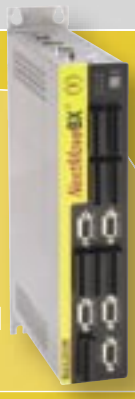
**NEXTMOVE ES**

6-axis Euro card stepper and servo motion controller.

P18

**NEXTMOVE ST**

3 axis stepper motor driver and motion controller.



P20

**NEXTMOVE BX-II**

2-4 axis stand-alone servo motion controller.

## Total Automation Solutions

**HMI**

- Text Displays
- Touch Panels
- Graphics panels
- PC Software

**Motion**

- PCI Cards
- Panel Mount
- Ethernet
- 3u Rack mount

**Drives**

- Servo
- Programmable
- Vector
- Inverter

**Motors**

- Rotary / Linear
- Servo
- Induction
- Stepper

**Accessories**

- Cables
- Power supplies
- Filters
- Gearboxes

Baldor is one of the industry leaders in providing a complete solution for multi-axis automation applications. The full range of multi-axis motion controllers, high performance servo drives, rotary servo motors and linear motors are designed to seamlessly interface with each other. This allows you to get on with the important task of bringing your machine to market.

## Flexible Processor Architecture

The NextMove architecture uses the latest floating point Digital Signal Processor (DSP) technology coupled with a Field Programmable Gate Array (FPGA). The FPGA handles those functions normally reserved for external discrete logic devices, such as I/O, encoder feedback and stepper pulse generation. In using an FPGA, the NextMove architecture becomes much more flexible. Changes can be made at a 'hardware' level, without the need to change the physical hardware since these functions are programmed into the device. This provides flexibility to meet bespoke, custom applications. Examples have included re-configuring NextMove ES to control 6 axes of stepper and customizing NextMove PCI-2 to handle a 2D position compare output.

Combined, the DSP and FPGA core allow NextMove to tackle the most demanding of applications with ease.

## Choice of Open or Closed Loop Control

NextMove supports the control of both open loop (steppers) and closed loop (servo and vector) axes giving you versatility and cost saving options where you need them. Open loop control is provided by means of Pulse and Direction signals. These are supported by external stepper drivers, including Baldor's own DSM series of integrated stepper motor/driver. Pulse and Direction inputs are also available on Baldor's range of servo drives.

Closed loop axes are controlled using the industry standard ±10V and encoder feedback signals. These can be used to control servo, vector or hydraulic axes. A fast 6 term PID loop ensures accurate positioning, precise control and smooth operation of the axis.

Baldor's latest NextMove controllers, the NextMove e100 supports the real-time Ethernet protocol, ETHERNET Powerlink. Using a standard Ethernet cable, up to 16 axes can be connected together and their motion interpolated. All necessary data such as command reference and position feedback is sent over the Ethernet cable, helping to reduce cost, set-up time and improved system diagnostics

## Flexible Machine Control I/O

NextMove's I/O structure provides a flexible interface to external machine control. I/O points are configured in software for functionality such as safety limits, datum switches, error input and error outputs. You only define the I/O you need for your machine. All I/O can be controlled within the Mint programming language allowing NextMove to handle those tasks typically undertaken by an external PLC. I/O is easily expanded using the onboard CANopen port.

NextMove's I/O capability is further enhanced by Mint's Event structure which deals with time critical responses to the change of state of a digital input. The Mint program can respond quickly and effectively without the need to poll the input state.

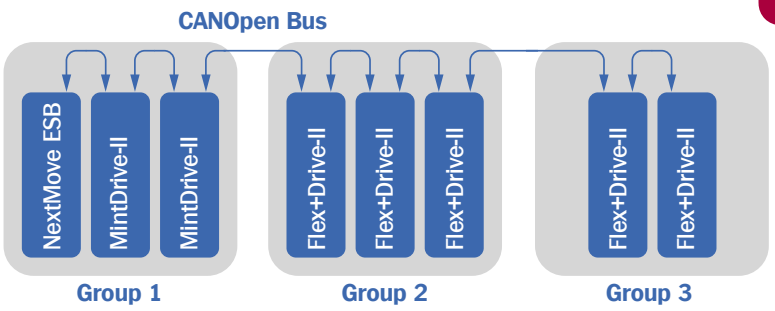
## High Speed Registration Inputs

For high speed registration applications, a number of the digital inputs can be defined to latch position to less than 1 micro-second. This real-time data can be used to make decisions about product position and is ideally suited to applications such as labeling, packing machines and printing lines.

## Choice of Communication Interfaces

NextMove is equally at home operating stand-alone or interfacing directly to a PC or PLC via RS232/485 serial ports, USB, PCI-bus and Ethernet TCP/IP. Baldor gives you the choice to suit your application. PCI-bus is ideally suited for those applications that require large amounts of data transfer between the PC and motion controller. USB handles fast and reliable data transfer between the PC and NextMove with the convenience of an external motion controller.

Every NextMove controller is equipped with a CANopen communication interface. This can be used for I/O expansion (using industry standard DS401 I/O devices), for interfacing to Baldor's HMI devices or for communications with other Mint controllers.




*Example network showing 3 groups of Mint controllers connected via the CANopen network.*

## Peer-to-peer Communications

Built into the Mint programming language is the ability for any Mint based controller, such as a NextMove controllers or Baldor's versatile programmable servo drives, Flex+Drive®-II or MintDrive®-II, to communicate with each other over the CANopen network. Unlike many other networks, peer-to-peer communications can take place between each node on the network. This can be used to exchange data or implement a hierarchical control network. This communication capability allows additional axes to be added to a machine for expansion or machine variants.

## Ethernet Communications

NextMove e100 is our latest generation motion controller to join the NextMove family. NextMove e100 sports a real-time Ethernet link, utilizing ETHERNET Powerlink. This allows up to 16 axes of interpolated motion and over 200 axes of indexing motion. Alternatively, NextMove e100 can be configured for standard TCP/IP mode for interfacing with the factory network for remote diagnostics or recipe data updates.

ETHERNET POWERLINK STANDARDIZATION GROUP

**Refer to catalog BR1202-I for full information on Baldor's real-time Ethernet Solution**

# Mint® – The Programming Language for Automation

- High speed compiled BASIC programming language for motion and machine control
- Multitasking capability for motion, I/O, HMI and communication tasks, allows complex applications to be broken down into simpler, more manageable sub-tasks
- Modular programming capability, including functions and subroutines, allows for code re-use and ease of debugging
- Common programming interface for both NextMove and Baldor's intelligent drives, reduces the learning curve
- Comprehensive library of motion types including interpolated moves, cam profiling, flying shears, gearing and more
- Comprehensive Windows tools including color keyword highlighting in the editor, software oscilloscope, online help, drive configuration wizard and auto-tuning
- ActiveX components (supplied free of charge) aid in the development of Microsoft Windows® front end applications

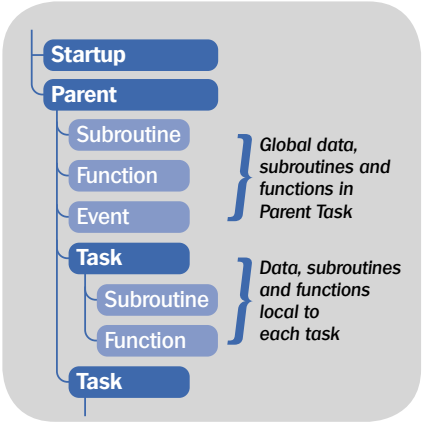
## BASIC – the de-facto Programming Language

With nearly two decades of history, Mint® was designed from the outset around the BASIC programming language. It was understood then, and is still true today, that BASIC is the de-facto programming language around the world. Now in its fifth generation, Mint fully embraces all the modern BASIC programming functionality including features such as multitasking, functions and subroutines, data types and local data. This functionality makes it simple to write and develop modular programs that are easily understood by others, easily maintained and easily re-used across different applications. Mint's new Code Library makes code re-use even easier by allowing snippets of code to be stored and used for other projects. This is just one of the many features in the Mint development front end, Mint WorkBench, which are designed to get you up and running quickly.

## More than just motion control

Mint excels in motion control applications, but is equally at home in HMI interaction, communications, I/O handling and complex mathematical functions. While some choose a standard 'open' PLC language platform that offers a 'standard' set of motion features, those looking for an edge will find it in the advanced motion capabilities of Mint. Many industries at the cutting edge of motion control realize this and find PLC technology limited in its capabilities for motion control.

Realizing that today's applications are more demanding, more precise, more dynamic and more complex, Mint focuses on providing creative features, advanced motion capabilities and features for the user to innovate in the application solution.




## Multitasking Streamlines Program Flow

With many devices to control and machine functions to coordinate, it often helps to be able to structure code into specific tasks and allocate them resource dynamically at runtime. Multitasking is one of the key features of Mint. Numerous software tasks can be written, initiated, suspended, terminated and prioritized at will, to optimize workflow and improve machine performance. In its simplest form consider that separate program tasks can be allocated to functions of motion control, HMI interaction, I/O control, communications and much more, producing a structured programming solution and ensuring more dynamic program flow.

## Time Critical Functions Handled with Ease

Time critical functions, such as responding to the change of state of inputs are handled with ease by Mint's event structure. Using the event structure within Mint is more efficient and faster than polling the state of an input. Events can be triggered for digital inputs, move buffer low, errors, position latches and more.

With a large onboard memory, the multitasking capabilities of Mint can also be used to store multiple programs, for example, to define machine recipes. Each task can have its own independent data storage, functions and subroutines.

# Comprehensive Library of Move Types

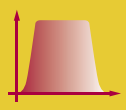


## Move Buffer Enables Continuous Motion

All axes have a flexible and powerful move buffer system that allows multiple move commands to be loaded and the executed. Each entry in the move buffer can contain a unique identifier, independent Speed, Acceleration, Deceleration and Jerk settings. A configurable *Move buffer low* system event will trigger either a Mint routine or ActiveX service which you can customize to refill the buffers. Output transitions states and pulse times and even dwell times can be loaded into the move buffer to ensure they are synchronous to the axes motion.

## Motion Profiles – Positional Moves

Mint offers many flexible move types 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.

**Tangential knife:** Combined with interpolated motion, one axis can be defined as a knife axis and will follow the tangent to any 2D application.

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

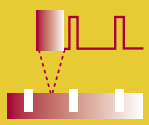
**Speed control:** A jogging function allows the motor to run indefinitely at a defined speed, in position control.

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

## Motion Profiles – Master/Follower

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

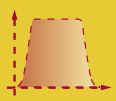
**Electronic Gearbox & Clutch:** Enables two or more shafts to be linked with a programmable ratio. Any axis can be geared to any other axis. Clutch allows precise start and stop distances when synchronizing.



**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 or by Mint.

**Electronic Cam:** Replaces traditional mechanical cams with servo/vector/stepper 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.



**Virtual Axes:** Allows a profiled move to be executed without connection to external hardware. Can be used to test applications or as a virtual master.

**Refer to Catalog BR1202-B for further information on the Mint programming language.**

## Embedded C support

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 Mint and the ActiveX control, making multi-platform development simple, with only one Mint API name to remember.

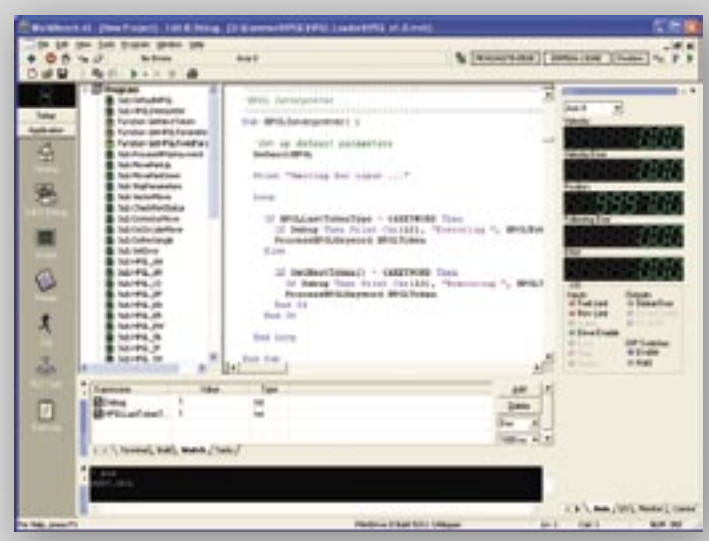
An open architecture built within the C programming libraries even allows for custom motion profilers and control algorithms to be embedded within the real-time code.

A third party Texas Instruments compiler must be purchased in order to program the NextMove controllers in C.

## Windows® Programming via ActiveX®

The Mint ActiveX tools provide a toolkit for PC based automation. Use Visual Basic®, Visual C++, Delphi™, LabVIEW or any other ActiveX compliant development tool to implement PC based control of Mint applications. From simple HMI display aspects of machine control, through to calculation of multi-axis trajectory data and streaming via PCI or USB to the controller.

The Mint ActiveX control shares a common Application Programming Interface (API) with the Mint language. The same keyword in Mint can be found within the ActiveX library making migration of programs simple, reducing the learning curve when developing in different languages. In addition to providing access to the Mint commands, the ActiveX control provides access to diagnostics, events, system configuration and maintenance features such as firmware and program download.



## Application Development Tools

Mint® WorkBench is a Windows front end which is common across Baldor's range of NextMove 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:**

- Program Navigator for rapid program development
- Mint code library for re-use of commonly used Mint code sections
- Spy window to monitor common motion variables and I/O
- Software oscilloscope eases tuning and diagnostics
- Watch window for variable and task monitoring
- Command line interface to interrogate the controller even when the program is running
- SupportMe function with automatic e-mail generation for rapid technical support
- Web updates of firmware within Mint WorkBench
- Easy management of firmware files

# HPGL – Low Cost, Industry Standard Interpolation

HPGL (Hewlett Packard Graphics Language) is an open standard that describes 2D vectored drawing and is typically used in plotters. With many CAD and drawing applications offering HPGL output, Baldor's HPGL interpreter is ideally suited for low cost XY and 2.5D applications such as pen plotters, routers, engravers and knife cutters.


## Standard Commands

Baldor's HPGL interpreter is able to take standard commands sent over the serial interface (including USB and PCI-bus) and interpret these in real-time. Commands in HPGL allow straight lines, circles and rectangles to be executed.

## Fast Profiling

Full use is made of Mint's move buffer to provide fast and accurate profiling. Features such as inter-vector angle allow Mint to make decisions about when to slow down or stop for corners. Feedrate control allows the machine speed to be controlled by the operator using, for example, an analog pot.

## Mint – Power and Flexibility

Baldor's HPGL interpreter is written in Mint, demonstrating not only the power and flexibility of the programming language, but also providing a fully customizable solution. The HPGL interpreter is available as Mint source code and can be tailored to suit applications such as:

- Routers and engravers with different Z depth
- Pen plotters
- Knife cutting with tangential knife control
- Glue laying
- And more ...

The HPGL interpreter is supported on all NextMove controllers and is available to download from the Baldor motion website **www.baldormotion.com.**

# Mint®NC – CAD to Motion

- **HPGL, DXF and G-Code to motion**
- **No graphic or CNC programming language to learn**
- **Offline mode for planning and object ordering**
- **Graphical interface allowing re-ordering of geometry**
- **Machine control panel for direct machine control**
- **Interfaces to NextMove motion controllers**

Mint®NC is a comprehensive front end for XYZ type applications, such as plotters, laser cutters, glue laying and routers. Full control of any job is provided both on and offline.

Using the machine control front end, full machine control is possible, allowing axes to be homed and jogged to new positions. Alternatively, Mint®NC can be used to translate different CAD and CNC formats to Mint code which can be executed directly on the motion controller.

Machine configurations are easily dealt with using Mint. This acts as a scripting language for complete machine configuration. Whether a start-up sequence or new tool sequence is required, Mint provides complete control over I/O and motion.

## Customization through ActiveX

Where a simpler operator interface is required, a developer's library is available using ActiveX technology. This allows custom front ends to be quickly and easily realized in applications such as Visual Basic and Visual C++.

MintNC interfaces directly to the NextMove controller through either the USB or PCI interface.

A demonstration version of MintNC is available to download from the Baldor motion website **www.baldormotion.com.**

# NextMove e100

## Real-Time Ethernet Motion Controller

- ETHERNET Powerlink - integrated hub
- 16 axes of interpolated motion
- Connect up to 240 Ethernet devices including drives, I/O and encoders
- CANopen network manager for low cost expansion
- RS232/485 and USB communications
- Multitasking Mint®, ActiveX or C programmable

The NextMove e100 builds on the proven NextMove controller family and now integrates management of a real-time Ethernet network. Drives, I/O devices, sensors, absolute encoders and more can be added to the Powerlink network and controlled from the Mint programming language. This greatly simplifies system design and installation, and simultaneously expands the capabilities of the NextMove e100 as a machine control platform.

### Interpolation on 16 Axes

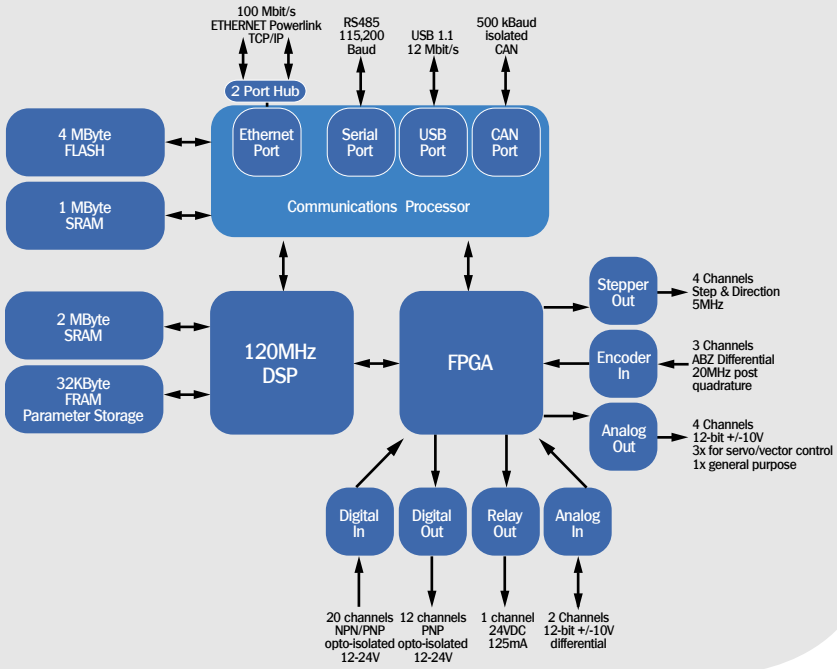
NextMove e100 can perform interpolation on 16 axes, as either a single coordinate group or as multiple coordinate systems operating independently, with their own scale factors and move buffers. Alternatively all 16 can operate as independent axes.

### Manage up to 240 Positioning Drive Axes

Up to 240 devices can be connected on ETHERNET powerlink. DS402 positioning drives, such as the MicroFlex e100 provide additional axes of control. These additional axes provide simple point to point motion, homing sequences, jog control and torque demand functions. Examples include guide axes, indexers, conveyors, tension rollers etc.

## Technical Data

| | |
|---|---|
| **Number of Axes** | 16 interpolated axes in single or multiple coordinate groups.<br>Manage up to 240 independent DS402 positioning Drives (non interpolated). |
| **Axis Type** | ETHERNET Powerlink (EPL) v2<br>3 off closed loop axes ±10v interface with 5vTTL incremental encoder inputs<br>4 off open loop axes - Stepper interface (Step & Direction outputs) 5V differential line driver (Darlington) (5MHz) or 5V open collector single ended (500KHz max) selected by order option |
| **Powerlink Device Type Support** | EPL DS401 I/O devices for I/O expansion<br>EPL DS402 Positioning Drives such as MicroFlex e100<br>EPL Absolute Encoders<br>Manage up to 240 devices per network (approx)<br>Contact Baldor for information on additional 3rd party products supported. |
| **Ethernet** | Specification: 100Mbit - IEEE802.3u compliant<br>Protocol : ETHERNET Powerlink V2 (EPL) and IP protocols TCP/UDP<br>Interface : Integrated 2 port Hub for daisy chain connection<br>Cable type : CAT5e Shielded cable, RJ45 connectors, Max 100m(330ft) each.<br>Address: 2 off rotary HEX switches sets node and private device IP address |
| **On-Board Memory** | 4MByte Flash for firmware and non-volatile program storage. 3MByte SRAM<br>32kByte FRAM for non-volatile variable data storage |
| **Digital Inputs** | 20 opto-isolated 24VDC. 1mS sample rate. All inputs Interrupt capable.<br>May be connected positive or negative common (for use with NPN or PNP output transistors)<br>Software configurable for limits (forward and reverse), home, stop and drive error |
| **Fast Inputs** | The first 4 of digital inputs can be configured for high speed position capture of axis position<br>1µsec capture time |




## Integrated Two Port Ethernet Hub

Connecting multiple devices on the Ethernet network is simplified by an integrated 2 port hub. Simply daisy chain the connection to the next device in the system.

## TCP/IP Communications via ActiveX®

In addition to the deterministic mode of ETHERNET Powerlink, the NextMove e100 can also operated in an open mode, using TCP/IP messaging. This features is supported by Baldor's Mint ActiveX tools, which can provide control of a network of drives from a Windows based PC. In this mode the Ethernet interface acts as a standard TCP/IP network port.

## Ordering Information

| Catalog Number | Description |
|---|---|
| **NXE100-1616** | NextMove e100 16 axis motion controller: Differential stepper outputs |
| **NXE100-1616S** | NextMove e100 16 Axis: Single ended open collector stepper outputs for use with DSM integrated stepper/driver motors |
| **CBL001-501** | RS232 serial cable<br>Note: 2m (6.6ft) USB cable supplied |

See **page 24** for the complete Product Ordering Information.

## State of the Art Design

The e100 family utilizes a separate processor to deal with all communications requirements, leaving the main Digital Signal Processor (DSP) to handle time critical motion tasks. A Field Programmable Gate Array (FPGA) core provides flexibility of design allowing updates to hardware to be issued by firmware and not fixed in design as they would be with ASICs or any other discrete logic devices.

**Refer to catalog BR1202-I for full information on Baldor's real-time Ethernet Solution**

| | |
|---|---|
| **Digital Outputs** | 12 opto-isolated 12-24VDC PNP<br>Software configurable for drive enable<br>50mA typical per channel, 350mA max load for single channel up to 500mA total for 8 channels |
| **Relay Output** | Single output for drive enable. Form C (SPDT) relay rated at 24V (150mA)<br>Common, normally open, normally closed. Fail safe operation-relay de-energized on an error.<br>Function defined in Mint |
| **Analog Outputs** | 3 outputs for drive command signals. ±10V, 12-bit resolution<br>1 general purpose ±10V 12-bit output |
| **Analog Inputs** | 2 off differential ±10V operation 12 bit resolution. |
| **Serial Port** | User selectable RS485/232 via 9 pin Sub-D. Maximum baud rate 115,200<br>USB1.1 (12Mbit/sec) supported on Windows 2000/XP. A 2m (6.6ft) cable is supplied |
| **CANbus Port** | Single CAN port via standard 9 pin Sub-D connector. CANopen DS301:<br>Support for CANopen DS401 I/O devices, Master functionality for peer-to-peer communications with other Mint nodes<br>DS402 Positioning drives management |
| **Power Requirements** | 24VDC ±10% : 70W |
| **Environmental Limits** | Operating Temperature 0°C to 45°C (32°F to 113°C) |
| **Weight** | 0.85Kg (1.87 lbs) |
| **Dimensions** | L 262mm (10.3") : W 135mm (5.32") : H 45mm (1.77") |
| **Programming** | Mint® - Multitasking Motion Basic.<br>Embedded C. Texas Instruments compiler must be purchased separately<br>Windows 9X/NT/2000/XP via ActiveX control (Note: USB only supported on Windows 2000/XP)<br>All Windows and embedded programming libraries supplied free of charge. |

# NextMove ESB

## Flexible Machine Controller


- 7-axis stand-alone servo/vector and stepper motion controller
- Fast floating point processor
- Onboard digital and analog I/O
- CANopen for distributed control
- RS232/485 and USB communications
- Multitasking Mint®, ActiveX or C programmable

NextMove ESB is an economic stand-alone motion controller, running multitasking Mint or C programs, for up to 3 axes of servo/vector and 4 axes of stepper. Application versatility is boosted by onboard I/O and a CANbus interface for implementing PLC-style machine control functions.

NextMove ESB's complement of onboard digital and analog I/O allows the controller to be employed as a complete machine controller, in many cases eliminating the need for an external PLC or other host device. The I/O can be expanded easily by means of the controller's CANbus port. CAN I/O devices are available from Baldor or alternatively, using the standard CANopen protocol, industry standard DS401 CAN analog and digital I/O can be used.

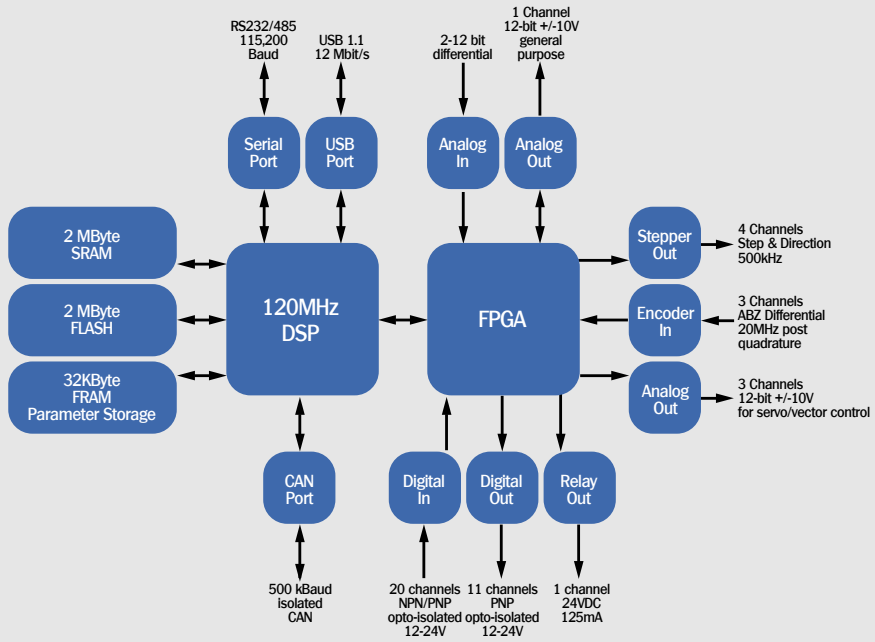
The controller's low profile, form factor and two part screw terminal connectors makes it simple to wire into a control panel. Where panel space is at a premium, NextMove ESB can even be mounted on the panel door. The onboard USB port is easily accessible for system setup and configuration providing a fast and reliable connection to the PC.

### Stand-alone Operation

Onboard flash memory and NextMove's Mint or C programming capabilities allows the controllers to be operated stand-alone without the need for an external PLC or PC. The onboard communications channels, including RS232/485, CANopen or USB make it easier to interface to these devices should the application dictate. A simple ASCII protocol allows data transfer between the host and the NextMove controller.

## Technical Data

| | |
|---|---|
| **Number of Axes** | 7 total: 3 servo/vector, 4 stepper |
| **Axis Type** | Closed loop servo/vector: PID with velocity and acceleration feed forward terms. 100µsec update<br>Open loop stepper: pulse/direction. 500kHz max. frequency. Differential or 5V open collector option avialable |
| **Position Feedback** | Servo/Vector: Incremental encoder: RS422 differential AB signals with index (Z) pulse. 20MHz max. frequency<br>Can be used as a master position reference for following applications |
| **On-board Memory** | 2MByte Flash for firmware and program storage<br>2MByte SRAM<br>32kBytes FRAM for parameter storage |
| **Connector Types** | Two part screw terminals and D-type connectors |
| **Digital Inputs** | 20 opto-isolated 24VDC. 1ms sample rate<br>May be connected to positive or negative common (for use with NPN or PNP output transistors)<br>Software configurable for limits (forward and reverse), home, stop and drive error |
| **Fast Position Latch Inputs** | The first 4 of digital inputs can be configured for high speed position capture of axis position<br>1µsec capture time |
| **Digital Outputs** | 11 opto-isolated 12-24VDC PNP<br>Software configurable for drive enable<br>50mA per channel, 350mA max source per channel, 500mA max for 8 channels |
| **Relay Output** | Single output for drive enable. Form C (SPDT) relay rated at 24V (150mA)<br>Common, normally open, normally closed. Fail safe operation-relay de-energized on an error |




## Flexible Programming

Programming flexibility is further enhanced with the ability to develop Windows applications using the supplied ActiveX® control. The ActiveX control allows motion and I/O sequencing to be performed in any Windows programming tool, such as Visual Basic.

## Closed Loop Control

Servo and vector axes are controlled from the industry standard ±10V analog outputs and encoder feedback. The NextMove ESB has a fast 6 term PID loop for fine control of the servo axes.

NextMove ESB is ideally matched with Baldor's FlexDrive-II and MicroFlex™ range of servo drives, BSM servo and linear motor range for a complete servo control system.

## Open Loop Control

Stepper axes can be controlled from any of the four step and direction outputs. The stepper outputs can also be used to interface to Baldor's FlexDrive-II or MicroFlex™ servo drives, which combined with the 3 closed loop axes, can give up to 7 axes of servo control.

Baldor's new range of DSM integrated stepper motors/drivers are ideally suited for use with NextMove ESB. The DSM motor/driver combination requires only power and pulse/direction in order to operate.

## Ordering Information

| Catalog Number | Description |
|---|---|
| **NSB002-501** | NextMove ESB controller with USB and RS232. Differential stepper outputs |
| **NSB002-502** | NextMove ESB controller with USB and RS485. Differential stepper outputs |
| **NSB003-501** | NextMove ESB controller with USB and RS485 interface. 5V open collector stepper outputs for use with DSM integtrated stepper/ driver motors |
| **NSB003-502** | NextMove ESB controller with USB and RS232 interface. 5V open collector stepper outputs for use with DSM integtrated stepper/ driver motors |
| **CBL001-501** | RS232 serial cable<br>Note: 2m (6.6ft) USB cable supplied |

See **page 24** for the complete Product Ordering Information.

| | |
|---|---|
| **Analog Inputs** | 2 differential inputs. ±10V operation. 12-bit resolution |
| **Analog Outputs** | 3 outputs for drive command signals. ±10V, 12-bit resolution<br>1 general purpose ±10V 12-bit output |
| **Serial Port** | RS232 via 9-pin D-type. Maximum Baud rate 115,200<br>Optional RS485 port via 9-pin D-type<br>USB 1.1 (12 Mbit/sec) supported by Windows 2000/XP. A 2m (6ft) USB cable is supplied |
| **CANbus Port** | Single CAN port via RJ45 connector. Software configurable for CANopen or Baldor CAN<br>CANopen DS301: Support for CANopen DS401 I/O devices<br>Master functionality for peer-to-peer communications with other Mint nodes<br>Baldor CAN: Support for Baldor's range of digital I/O expansion units<br>Maximum of 63 nodes supported on the network |
| **Power Requirements** | +24VDC ±10% - 70W |
| **Environmental Limits** | Operating temperature 0°C to 45°C (32°F to 113°F) |
| **Weight** | 0.85kg (1.87 lbs.) |
| **Dimensions** | L: 262mm (10.31"); W: 135mm (5.32"); H: 45mm (1.77") |
| **Programming** | Mint® - Multitasking Motion Basic<br>Embedded C. Texas Instruments compiler must be purchased separately<br>Windows 9X/NT/2000/XP via ActiveX control (Note: USB only supported on Windows 2000/XP)<br>All Windows and embedded programming libraries supplied free of charge |

# NextMove PCI-2

- 1-12 axis PCI-bus servo/stepper loop motion controller
- Fast floating point processor
- Onboard digital and analog I/O
- CANopen for distributed control
- High speed PCI bus interface
- Multitasking Mint®, ActiveX or C programmable

NextMove PCI-2 is the latest generation PCI based controller from Baldor. Based around the popular NextMove PCI controller, NextMove PCI-2 offers a pin compatible product with over twice the performance.

NextMove PCI-2 is a high performance PCI card motion controller for 1 to 8 axes (12 axes with optional expansion card) of open (stepper) or closed (servo/vector) loop 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 multitasking version of the Mint® language. An onboard complement of digital I/O and analog I/O allows NextMove PCI-2 to be employed for machine control, eliminating the need for a separate I/O controller such as a PLC. The onboard I/O can be easily expanded by means of the controller's CANbus port, supporting either CANopen and Baldor CAN devices. Alternatively, the axis expansion card provides the same complement of I/O as the main NextMove PCI-2 controller.

## High Speed PC Interface

NextMove PCI-2 provides a high speed data interface between the motion controller and PC by means of Dual Port RAM (DPR). With 16kBytes of shared memory, this can be used for high speed data transfer. Reserved locations within DPR are used to provide diagnostic information such as axis position and error codes and are instantly accessible.

## Industry Standard Interface

Servo or vector axes are controlled from the industry standard ±10V analog outputs (16-bit) and encoder feedback. Stepper axes are controlled through pulse and direction outputs. Axes can be mixed in any application.

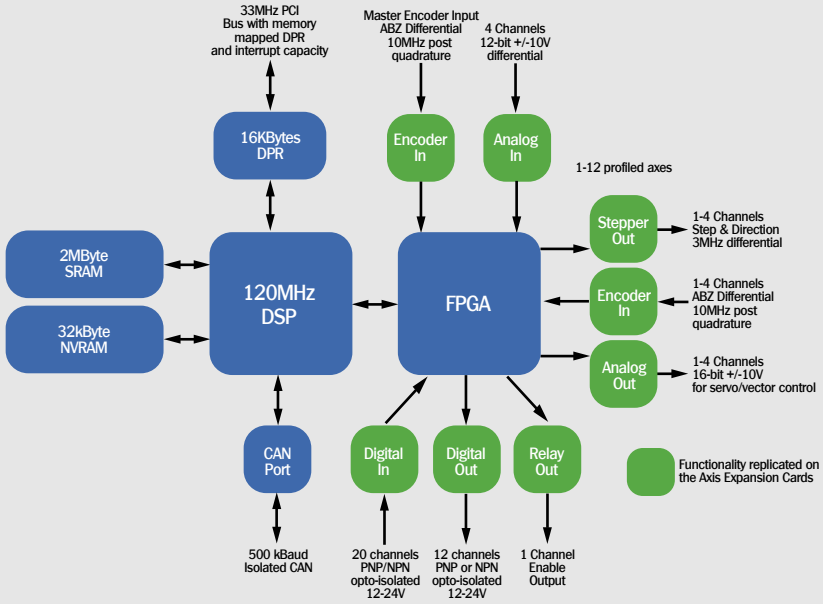
## Flexible Axis Configuration

NextMove PCI-2 is available in axis variants from 1 through to 4 axes, or as an 8 axis variant, to suit the application. A 4 axis NextMove PCI-2 will allow control of up to 4 axes, servo or stepper. The 8 axis NextMove PCI-2 provide controls all 8 on-board axes - 4 servo and 4 stepper.

The optional axis expansion board adds a further 4 axes of control, servo or stepper. Up to 2 expansion cards are supported for a total of 12 axes.

## Technical Data

| | |
|---|---|
| **Number of Axes** | 1-4 axes of servo/vector and stepper on each NextMove PCI-2 card. Expansion card provides a further 4 axes of servo and stepper control. Up to 2 expansion cards are supported for a total of 12 axes |
| **Axis Type** | Closed Loop: (servo/vector), PID with velocity and acceleration feedforward terms. 100µsec update rate for 4 axes<br>Open Loop: Stepper with differential step and direction outputs to 3MHz |
| **Position Feedback*** | 4 channels of incremental encoder: RS422 differential AB signals with index (Z) pulse<br>10MHz max frequency (7.5MHz on expansion board) |
| **On-board Memory** | 2MBytes high speed SRAM for firmware, program storage and user data<br>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<br>May be connected to positive or negative common (for use with NPN or PNP output transistors)<br>Software configurable for limits, home, stop and drive error |
| **Fast Position Latch*** | 4 inputs for high speed position capture of axis and master encoder positions<br>Assigned from the 20 digital inputs. ‹ 1µsec capture time per input |
| **Digital Outputs*** | 12 opto-isolated 12-24V PNP (Darlington) or NPN (FET) outputs<br>Software configurable for drive enable<br>50mA per channel, 350mA max source per channel, 500mA max for 8 channels |
| **Relay Output*** | Single output for drive enable. Form C (SPDT) relay rated at 24V (150mA)<br>Common, normally open, normally closed. Fail safe operation: relay de-energized on an error |
| **Analog Inputs*** | 4 differential inputs<br>12-bit resolution ±10V operation with second order Butterworth filter (cut off frequency of 1kHz) |




## Expandable Axes and I/O

The number of axes and I/O are easily expandable using the NextMove PCI-2 expansion card. Occupying a single PCI slot, each expansion card offers a further 4 axes of servo (closed loop) and 4 axes of stepper (open loop). The same complement of I/O as the main card is also supported. Axes and additional I/O are brought out to a 100-way connector and can be used with the NextMove PCI-2 breakout board

Up to 2 expansion cards are supported by NextMove PCI-2 for a total of 12 axes of servo (closed loop) and stepper (open loop) control.

## Breakout Board eases Wiring

The optional breakout board connects to the NextMove PCI-2 via a 100-way cable (available in lengths up to 3m/9ft) and provides screw terminal connectors the I/O and D-type connectors for the encoder signals. The breakout board is available with two part or single part connectors.

## Ordering Information

| Catalog Number | Description |
|---|---|
| **PCI201-501 (-511)** | NextMove PCI 1 axis servo/stepper controller PNP outputs (-NPN) |
| **PCI201-502 (-512)** | NextMove PCI 2 axis servo/stepper controller PNP outputs (-NPN) |
| **PCI201-503 (-513)** | NextMove PCI 3 axis servo/stepper controller PNP outputs (-NPN) |
| **PCI201-504 (-514)** | NextMove PCI 4 axis servo/stepper controller PNP outputs (-NPN) |
| **PCI201-508 (-518)** | NextMove PCI 8 axis (4 servo + 4 stepper) controller. PNP outputs (-NPN) |
| **PCI202-504 (-514)** | 4 axis Expansion card— 4 servo/4 stepper (-NPN) |
| **OPT025-505** | Dual Expansion Board Interconnect |
| **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 (3ft) 100-pin cable (for use with controller and breakout) |
| **CBL021-502** | 1.5m (4.9ft) 100-pin cable |
| **CBL021-503** | 3m (9.8ft) 100-pin cable |

Notes:

1) To control between 5 and 8 axes of servo (or stepper), order the 4 axis expansion card plus the appropriate number of axes on the NextMove PCI-2 controller. For example, for 6 axes of servo, order **PCI202-5x4** + **PCI201-5x2**

2) To control more than 8 axes (for example 9 to 12 servo axes), order 2x axis expansion cards plus the appropriate number of axes on the NextMove PCI-2 controller. For example, for 9 axes of servo + 2 stepper (11 axes), order 2x **PCI202-5x4** + **PCI201-5x3** + **OPT025-505**

See **page 24** for the complete Product Ordering Information.

| | |
|---|---|
| **Analog Outputs*** | 4 outputs for drive command signals. ±10V, 16-bit resolution. Programmable sign bit<br>Programmable for 16, 14 and 12-bit operation. |
| **Master Encoder*** | One channel for synchronization and following applications<br>Incremental encoder: RS422 differential AB signals with index (Z) pulse. 20MHz max frequency (7.5MHz on expansion card) |
| **Communication Interface** | 33MHz PCI bus<br>16kByte memory mapped Dual Port RAM (DPR) with interrupt capability |
| **CANbus Port** | Single CAN port via RJ45 connector. Software configurable for CANopen or Baldor CAN via firmware download<br>*CANopen* DS301. Support for CANopen DS401 I/O devices<br>Master functionality for peer-to-peer communications with other Mint nodes<br>*Baldor CAN*. Support for Baldor's range of digital I/O expansion units<br>Maximum of 63 nodes supported on the network |
| **Power Requirements** | +3.3V @1A<br>+5V @ 350mA (additional current required when powering the encoders from the +5V supply)<br>±12V @ 250mA<br>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** | Mint® - Multitasking Motion Basic or Embedded C. Texas Instruments compiler must be purchased separately<br>Windows 9X/NT/2000/XP via ActiveX control<br>All Windows and embedded programming libraries supplied free of charge |

*I/O is replicated on the optional axis expansion card.

# NextMove ES

## Intelligent 6-Axis Machine Controller

- 6-axis stand-alone stepper and servo motion controller
- Fast floating point processor
- Onboard digital and analog I/O
- CANopen for distributed control
- Mint®, C or ActiveX programmable
- RS232/485 and USB communications
- Eurocard rack format

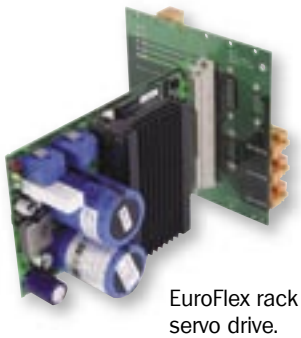
NextMove ES is an economical rack mounted motion controller, running the multitasking Mint motion language or C programs, for up to 2 axes of servo/vector and 4 axes of steppers . Application versatility is boosted by onboard I/O and a CANbus interface for implementing PLC-style machine control functions.

NextMove ES's complement of onboard digital and analog I/O allows the controller to be employed as a complete machine controller, in many cases eliminating the need for an external PLC or other host device. The I/O can be expanded easily by means of the controller's CANbus port. CAN I/O devices are available from Baldor or alternatively, using the standard CANopen protocol, industry standard DS401 CAN analog and digital I/O can be used.

### Industry Standard Interface

Servo and vector axes are controlled from the industry standard ±10V analog outputs and encoder feedback. The NextMove ES has a fast 6 term PID loop for fine control of the servo axes.

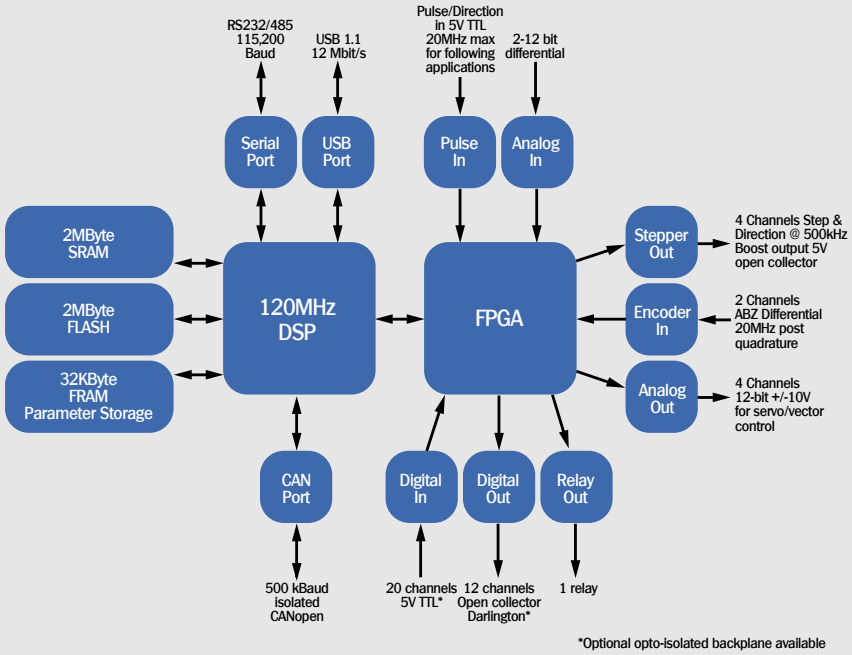
NextMove ES is matched ideally to the EuroFlex servo drive. EuroFlex™, a rack mount EuroCard format drive can sit alongside any NextMove ES controller within a standard rack mount chassis.



EuroFlex rack mount servo drive.

## Technical Data

| | |
|---|---|
| **Number of Axes** | 6 total: 2 servo/vector, 4 stepper |
| **Axis Type** | Servo/Vector: PID with velocity and acceleration feedforward terms. 100µsec update rate for 2 axes<br>Stepper: pulse and direction. 500 kHz max. frequency. 5V open collector Darlington |
| **Position Feedback** | Servo/Vector: Incremental encoder: RS422 differential AB signals with index (Z) pulse. 20MHz max frequency<br>Can be used as a master position reference for following applications |
| **On-board Memory** | 2MByte Flash for firmware and program storage<br>2MByte SRAM. 32kBytes FRAM (non-volatile RAM) for parameter storage |
| **Connector Types** | 96-pin DIN41612<br>Optional breakout board with two part screw terminals and D-type connectors |
| **Digital Inputs** | 20 inputs. 5V TTL. 1ms sample rate<br>Opto-isolated backplane available<br>May be connected to positive or negative common (for use with NPN or PNP output transistors)<br>Software configurable for limits, home, stop and drive error |
| **Fast Position Latch** | First 4 of digital inputs can be configured for high speed position capture of axis positions<br>‹ 1µsec capture time |
| **Digital Outputs** | 12 opto-isolated. 5V open collector Darlington. Opto-isolated backplane available<br>Software configurable for drive enable<br>50mA per channel, 350mA max source per channel, 500mA max for 8 channels |
| **Relay Output** | Single output for drive enable. Form C (SPDT) relay rated at 24V (150mA)<br>Common, normally open, normally closed. Fail safe operation: relay de-energized on an error |




## Open Loop Control

Stepper and open loop axes can be controlled from any of the four step and direction outputs. The stepper outputs can also be used to interface to Baldor's FlexDrive-II and MicroFlex™ drives. Alternatively, Baldor's new range of integrated stepper motor/drivers, the DSM series, can be used.

## Fast PC Communications

NextMove ES's USB interface provides a fast and reliable connection to the PC. An RS232 or optional RS485 port is available for connection to PLCs and HMI units, in addition to the PC.

## Choice of Backplanes

A choice of backplanes are available for use with NextMove ES. These provide two part screw terminals for the logic signals and 9-pin D-type connectors the encoder signals. Backplanes are available with and without opto-isolation.

NextMove ES's 96-pin connector is fully documented to allow development of custom backplanes.

## Ordering Information

| Catalog Number | Description |
|---|---|
| **NES002-501** | NextMove ES controller with USB and RS232 |
| **NES002-502** | NextMove ES controller with USB and RS485 |
| **BPL010-501** | Non-isolated backplane |
| **BPL010-502** | Isolated backplane PNP |
| **BPL010-503** | Isolated backplane NPN |
| **CBL001-501** | RS232 serial cable<br>Note: 2m (6.6ft) USB cable supplied |

See **page 24** for the complete Product Ordering Information.

| | |
|---|---|
| **Analog Inputs** | 2 differential inputs. ±10V operation. 12-bit resolution |
| **Analog Outputs** | 4 outputs: 2 for drive command signals plus 2 spare. ±10V, 12-bit resolution. Programmable sign bit |
| **Pulse/Direction Input** | Accepts pulse train input with direction. For following type applications<br>5V TLL level inputs. 20MHz max. input frequency |
| **Serial Port** | RS232 via 9-pin D-type. Maximum Baud rate of 115,200<br>Optional RS485 port via 9-pin D-type<br>USB 1.1 (12 Mbit/sec) supported by Windows 2000/XP. A 2m (6ft) USB cable is supplied |
| **CANbus Port** | Single CAN port via RJ45 connector. Software configurable for CANopen or Baldor CAN via firmware download<br>*CANopen* DS301. Support for CANopen DS401 I/O devices<br>Master functionality for peer-to-peer communications with other Mint nodes<br>*Baldor CAN*. Support for Baldor's range of digital I/O expansion units<br>Maximum of 63 nodes supported on the network |
| **Power Requirements** | +5VDC @ 1A, ±12VDC @ 100mA |
| **Environmental Limits** | Operating temperature 0°C to 45°C (32°F to 113°F) |
| **Weight** | 100g (0.24lb.) approx. |
| **Dimensions** | L: 160mm (6.30"); H: 100mm (3.94") |
| **Programming** | Mint® - Multitasking Motion Basic<br>Embedded C. Texas Instruments compiler must be purchased separately<br>Windows 9X/NT/2000/XP via ActiveX control<br>All Windows and embedded programming libraries supplied free of charge |

# NextMove ST

## Intelligent 3-Axis Stepper Control

- 3 axis stepper motor control and motion controller
- Control for 4th external axis
- Fast floating point processor
- Onboard digital and analog I/O
- CANopen for distributed control
- Mint®, C or ActiveX programmable
- RS232/485 and USB communications

NextMove ST is an economic, 'all in one' three-axis drive for stepper motors, incorporating a high-performance motion controller which runs the multitasking Mint motion language or C programs.

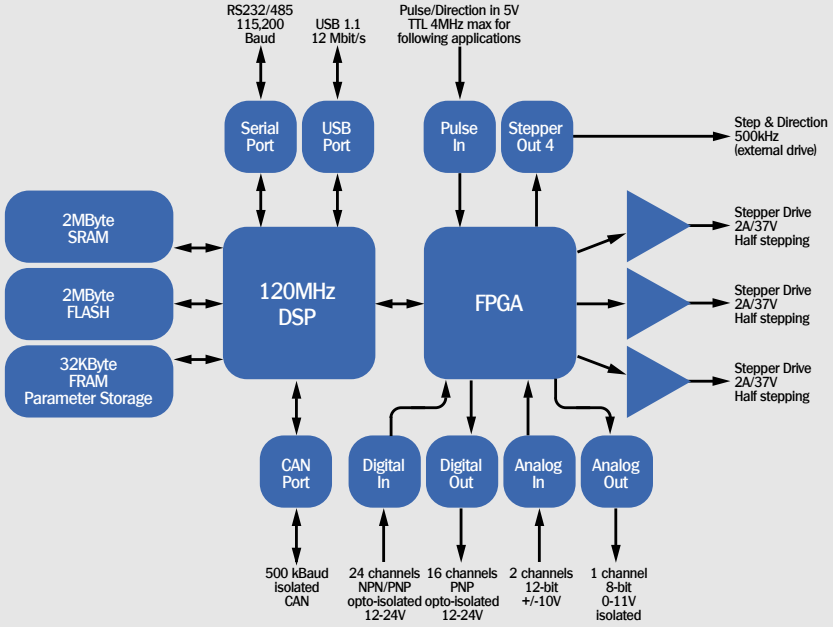
### Integrated Stepper Drives

The NextMove ST intelligent drive is provided in the form of a PCB module incorporating its own AC-DC power supply for simple integration. Each of its three axes for stepper motors is capable of providing half-stepping control, with a power stage capable of delivering 1.8A at 37V. If higher powers are required, the stepper control signals can be routed to external drives via a header connector.

Application versatility is boosted by the ability to control a fourth external stepper motor drive - for associated automation tasks such as materials feed/product positioning -plus onboard I/O and a CANbus interface for implementing PLC- style machine control functions.

## Technical Data

| | |
|---|---|
| **Number of Axes** | 3 internal stepper, 1 external stepper (step & direction @ 500 kHz) |
| **Axis Type** | Stepper control with 3 built in stepper drives: 1.8A @ 37VDC, half stepping<br>Provision to drive 4 external axes via header-pulse, direction and boost. 500 kHz max. frequency<br>5V open collector Darlington |
| **On-board Memory** | 2MByte Flash for firmware and program storage<br>2MByte SRAM. 32kBytes FRAM (non-volatile RAM) for parameter storage |
| **Connector Types** | Two part screw terminals |
| **Digital Inputs** | 24 inputs. 5V TTL<br>Software configurable for limits, home, stop and error. First 4 inputs configurable for fast position latch<br>Software configurable level and edge triggered<br>1ms sample rate |
| **Digital Outputs** | 16 outputs. 5V open collector Darlington<br>Software configurable for drive enable<br>50mA per channel, 350mA max. current sink per channel, 500mA max. for 8 channels |
| **Analog Inputs** | 2 differential ±10V inputs<br>12-bit resolution |
| **Analog Outputs** | 1 output 0-11V at 8 bit resolution<br>Optically isolated |
| **Pulse/Timer Input** | Accepts pulse train input with direction. Used for following type applications<br>5V TLL level inputs. 4 MHz max. input frequency |




## Machine Controller

NextMove ST's complement of onboard digital and analog I/O allows the controller to be employed as a complete machine controller, in many cases eliminating the need for an external PLC or other host device. The I/O can be expanded easily by means of the controller's CANbus port. CAN I/O devices are available from Baldor or alternatively, using the standard CANopen protocol, industry standard DS401 CAN analog and digital I/O can be used.

## Fast PC Communications

The USB interface provides a fast and reliable connection to the PC. An RS232 port (RS485 optional) is also available for connection to PLCs and HMI units, in addition to the PC.

## Applications

Coupled with Baldor's HPGL interpreter, NextMove ST is ideally suited for low cost routing and engraving machines. It is also ideal for controlling ancillary axes, such as guide rails where a closed loop control system is not required.

## Ordering Information

| Catalog Number | Description |
|---|---|
| **NST002-501** | NextMove ST controller with USB and RS232 |
| **NST002-502** | NextMove ST controller with USB and RS485 |
| **CBL001-501** | RS232 serial cable<br>Note: 2m (6.6ft) USB cable supplied |

See **page 24** for the complete Product Ordering Information.

| | |
|---|---|
| **Serial Port** | RS232 via 9-pin D-type. Maximum Baud rate of 115,200<br>Optional RS485 port via 9-pin D-type<br>USB 1.1 (12 Mbit/sec) supported by Windows 2000/XP. A 2m USB cable is supplied |
| **CANbus Port** | Single CAN port via RJ45 connector. Software configurable for CANopen or Baldor CAN via firmware download<br>CANopen DS301. Support for CANopen DS401 I/O devices<br>Master functionality for peer-to-peer communications with other Mint nodes<br>Baldor CAN. Support for Baldor's range of digital I/O expansion units<br>Maximum of 63 nodes supported on the network |
| **Input Voltage: Drive Stage** | 12-37VDC @ 150W<br>9-30VAC @ 150VA |
| **Input Voltage: Control Logic** | 24VDC @ 60W |
| **Environmental Limits** | Operating temperature 0°C to 40°C (32°F to 104°F) ambient |
| **Weight** | 0.98 kg (2.16 lb.) |
| **Dimensions** | L: 262mm/10.3"; W: 140mm/5.5"; H: 54mm/2.13" |
| **Programming** | Mint® - Multitasking Motion Basic<br>Embedded C. Texas Instruments compiler must be purchased separately<br>Windows 9X/NT/2000/XP via ActiveX control<br>All Windows and embedded programming libraries supplied free of charge |

# NextMove BX-II

## Stand-alone 2-4 Axis Machine Controller

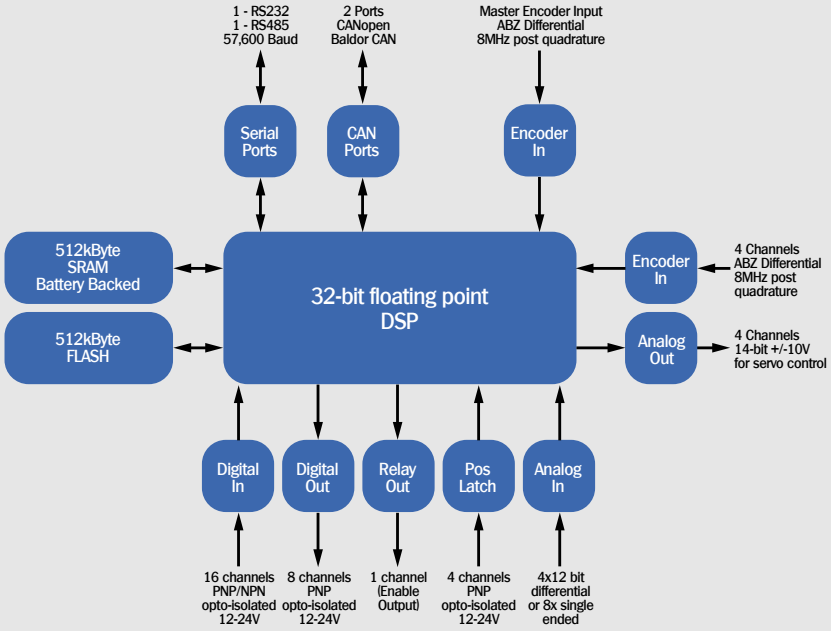

- 2-4 axis stand-alone servo motion controller
- Fast floating point processor
- Onboard digital and analog I/O
- CANopen for distributed control
- RS232 and RS485 serial interfaces
- Multitasking Mint®, C or ActiveX programmable

NextMove BX-II is a high performance stand-alone motion controller for 2 to 4 axes of servo control providing high speed interpolation between all four axes, or synchronization with an external master encoder or virtual axis.

The motion control capability is based on a high-performance Digital SIgnal Processor (DSP) core running the latest multitasking version of Baldor's Mint language. An onboard I/O complement of 16 digital inputs, 8 digital outputs and 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.

## Technical Data

| | |
|---|---|
| **Number of Axes** | 2, 3, or 4 servo/vector |
| **Axis Type** | Servo: PID with velocity feedback/feedforward and acceleration feedforward terms. 500µsec update rate |
| **Position Feedback** | Incremental encoder: RS422 differential AB signals with index (Z) pulse. 8MHz max frequency |
| **On-board Memory** | 512kBytes Flash for firmware and program storage<br>512kBytes battery backed SRAM. 256kBytes available for programs |
| **Connector Types** | Two part screw terminals and D-type connectors |
| **Digital Inputs** | 16 opto-isolated 24V. 1ms sample rate<br>May be connected to positive or negative common (for use with NPN or PNP output transistors)<br>Software configurable for limits, home, stop and drive error |
| **Digital Outputs** | 8 opto-isolated 12-24V PNP<br>Software configurable for drive enable<br>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<br>1x 30µsec input, 3x 1ms inputs<br>Opto-isolated 12-24V |
| **Relay Output** | Single output for drive enable. Form C (SPDT) relay rated at 24V (150mA)<br>Common, normally open, normally closed. Fail safe operation: relay de-energized on an error |




## Industry Standard Interface

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

NextMove BX-II is ideally matched with Baldor's FlexDrive-II, MicroFlex™ and H2 range of servo drives, BSM servo and linear motor range for a complete servo control system.

With an onboard master encoder input, NextMove BX-II is ideally suited to applications such as printing, packaging and labeling where axes need to follow an external position reference.

## Ordering Information

| Catalog Number | Description |
|---|---|
| **NMX004-501** | NextMove BX-II 2 axis controller |
| **NMX004-502** | NextMove BX-II 3 axis controller |
| **NMX004-503** | NextMove BX-II 4 axis controller |

See **page 24** for the complete Product Ordering Information.

| | |
|---|---|
| **Analog Inputs** | 4 differential or 8 single ended inputs. Programmable for ±10V, ±5V, 0-10V or 0-5V. 12-bit resolution |
| **Analog Outputs** | 4 outputs for drive command signals. ±10V, 14-bit resolution. Programmable sign bit |
| **Master Encoder** | One channel for synchronization and following applications<br>Incremental encoder: RS422 differential AB signals with index (Z) pulse. 8MHz max frequency |
| **Serial Ports** | RS232-max. Baud rate 57,600 for programming<br>RS485-max. Baud rate 19,200 for programming and multi-drop communications (32 devices) |
| **CANbus Ports** | 2 CAN ports via two RJ45 connectors allowing daisy chaining of units<br>CAN-1-CANopen DS301. Support for CANopen DS401 I/O devices<br>Master functionality for peer-to-peer communications with other Mint nodes<br>CAN-2 Baldor CAN. Support for Baldor's range of digital I/O expansion units<br>Maximum of 63 nodes supported on the network. |
| **Power Requirements** | +24VDC (850mA) |
| **Environmental Limits** | Operating temperature 0°C to 45°C (32°F to 113°F) |
| **Weight** | 1.35kg (2.98lb.) |
| **Dimensions** | H: 312mm (12.38"); W: 58.5mm (2.30"); D: 189.6mm (7.45") |
| **Programming** | Mint® - Multitasking Motion Basic<br>Embedded C. Texas Instruments compiler must be purchased separately.<br>Windows 9X/NT/2000/XP via ActiveX control<br>All Windows and embedded programming libraries supplied free of charge |

# Product Overview

| | NextMove e100 | NextMove ESB | NextMove PCI-2 | NextMove ES | NextMove ST | NextMove BX-II |
|---|---|---|---|---|---|---|
| **Physical Format** | Panel Mount | Panel Mount | PCI | EuroCard | Panel Mount | Panel Mount |
| **Number of Axes** | 16 (2) | 7 | 1 - 12 | 6 | 4 | 2 - 4 |
| **Servo/Vector Axes (Closed Loop)** | 3 (±10V)<br>16 (Powerlink) | 3 | 1 - 12 | 2 | 0 | 4 |
| **Stepper Axes (Open Loop)** | 4 | 4 | 1 - 12 | 4 | 4 | 0 |
| **Processor Speed** | 120 MHz | 120 MHz | 120 MHz | 120 MHz | 120 MHz | 32 MHz |
| **FLASH Memory** | 4 MByte | 2 MByte | - | 2 MByte | 2 MByte | 512 kByte |
| **RAM** | 3 MByte | 2 MByte | 2 MByte | 2 MByte | 2 MByte | 512 kByte |
| **Battery Backup** | No | No | No | No | No | Yes |
| **Non-volatile memory** | 32 kBytes FRAM | 32 kBytes FRAM | 12kBytes NVRAM | 32 kBytes FRAM | 32 kBytes FRAM | - |
| **ETHERNET Powerlink** | Yes | No | No | No | No | No |
| **Ethernet TCP/IP** | Yes | No | No | No | No | No |
| **RS232 Ports** | User Select | 1 | 0 | 1 | 1 | 1 |
| **RS485 Ports** | User Select | Optional | 0 | Optional | Optional | 1 |
| **USB Ports** | 1 | 1 | 0 | 1 | 1 | 0 |
| **CANopen Ports** | 1 | 1 | 1 | 1 | 1 | 1 |
| **CANopen DS401 Master** | Yes | Yes | Yes | Yes | Yes | Yes |
| **CANopen DS402 Master** | Yes | No | No | No | No | No |
| **Baldor CAN Port** | Firmware Option | Firmware Option | Firmware Option | Firmware Option | Firmware Option | 1 |
| **PCI Interface** | No | No | Yes | No | No | No |
| **Digital Inputs** | 20 | 20 | 20 (1) | 20 | 24 | 16 |
| **Opto-isolated** | PNP/NPN | PNP/NPN | PNP/NPN | option | No | PNP/NPN |
| **High Speed Position Latches** | 4 (5) | 4 (5) | 4 (1)(5) | 4 (5) | 4 (5) | 1 |
| **Digital Outputs** | 12 | 11 | 12 (1) | 12 | 16 | 8 |
| **Opto-isolated** | PNP | PNP | PNP/NPN | option | No | PNP |
| **High Speed Position Compare Ourputs** | 4 (6) | 4 (6) | 4 (6) | 4 (6) | 4 (6) | 0 |
| **Analog Outputs** | 4 x 12 bit | 4 x 12 bit | 4 x 16 bit (1) | 4 x 12 bit | 1 x 8 bit | 4 x 14 bit |
| **Analog Inputs** | 4 x 12 bit | 4 x 12 bit | 4 x 12 bit | 2 x 12 bit | 2 x 12 bit | 4 x 12 bit |
| **Relay Outputs** | 1 | 1 | 1 (1) | 1 | 0 | 1 |
| **Master Encoder Inputs** | 0 (3)(4) | 0 (4) | 1 (1) | 0 (4) | 0 | 1 |
| **MintNC Supported** | Yes | Yes | Yes | Yes | Yes | No |
| **HPGL Supported** | Yes | Yes | Yes | Yes | Yes | Yes |

(1) I/O can be expanded with the optional Axis and I/O expansion card
(2) Support for up to 16 axes of coordinated motion and over 200 axes of non-coordinated axes (DS402)
(3) ETHERNET Powerlink encoders supported
(4) Local axis encoder can be configured for use as a master encoder
(5) Uses first 4 digital inputs for fast position latch
(6) Uses first 4 digital outputs for fast position compare

# NextMove Accessories

## HMI Panels

**Refer to catalog BR1202-H for full information.**

Baldor's range of programmable HMI panels offers everything from simple text displays through to large color touch screen panels.

- Text displays from 4x20 character displays to 8x40 with keyboard entry
- Touch screen displays from mono 3.8" to color TFT 12.1"

All displays are programmable with an easy to use Windows front end, removing the burden of handling the HMI task from the motion controller. Communications to NextMove is via serial or CANopen communications.

## CAN I/O Modules

CAN I/O modules are available to expand the NextMove's digital I/O. These devices are available in DIN rail format for easy mounting within the machine. Operating over the Baldor CAN protocol*, Mint has full control over the setting and reading of the digital I/O points.

**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)

* CANopen protocol is installed as standard on the NextMove controller. Baldor CAN must be installed from the accompanying CD-ROM that accompanies the product.

## Cables

A range of cables, both pre-made and raw, are available to match the NextMove motion controller to Baldor's range of servo drives. Available in different lengths, the pre-made cables are fitted with appropriate connectors at both ends, reducing set-up time and costs.

## Power Supply Units

Baldor offers a range of 24V power supply units (PSU) that are ideal for powering NextMove controllers and the control electronics of the Baldor servo drives. With a universal 110-240 VAC input, the PSU's are available with current ratings of 3.2A (75W), 5A (120W) and 10A (240W). A 120W unit is capable of powering a single NextMove ESB and 3 MicroFlex servo drives.

## Encoder Splitter Boards

Baldor encoder splitter boards take a single encoder input signal (typically from a master encoder) and splits the signal to multiple drives or motion controllers.

# Ordering Information

## NextMove e100

| Catalog Number | Description |
|---|---|
| **NXE100-1616** | NextMove e100 ETHERNET Powerlink controller. Differential stepper outputs |
| **NXE100-1616S** | NextMove e100 ETHERNET Powerlink controller. 5V open collector stepper outputs for DSM stepper/ driver motor |

## NextMove PCI-2

| Catalog Number | Description |
|---|---|
| **PCI201-501 (-511)** | NextMove PCI-2 1 axis controller PNP outputs (-NPN) |
| **PCI201-502 (-512)** | NextMove PCI-2 2 axis controller PNP outputs (-NPN) |
| **PCI201-503 (-513)** | NextMove PCI-2 3 axis controller PNP outputs (-NPN) |
| **PCI201-504 (-514)** | NextMove PCI-2 4 axis controller PNP outputs (-NPN) |
| **PCI201-508 (-518)** | NextMove PCI-2 8 axis (4 closed loop plus 4 open loop) controller PNP outputs (-NPN) |
| **PCI202-504 (-514)** | 4 axis Expansion card— servo/stepper (-NPN) |
| **OPT025-505** | Dual Expansion Board Interconnect (3) |
| **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 (3 ft) 100-pin cable (to connect NextMove PCI-2 to the breakout unit) |
| **CBL021-502** | 1.5m (4.9ft) 100-pin cable |
| **CBL021-503** | 3m (9.8ft) 100-pin cable |

Notes:
1) To control between 5 and 8 axes of servo or stepper, order the appropriate NextMove PCI-2 controller plus the 4 axis expansion card. For example, for 6 axes of servo, order PCI201-5x2 + PCI202-5x4
2) To control more than 8 axes (for example 9 to 12 servo axes), order PCI201-5x8 + 2x PCI202-5x4 + OPT025-505
3) Only required if two Axis Expansion Cards are used.

## NextMove ESB

| Catalog Number | Description |
|---|---|
| **NSB002-501** | NextMove ESB controller with USB and RS232. Differential stepper outputs |
| **NSB002-502** | NextMove ESB controller with USB and RS485. Differential stepper outputs |
| **NSB003-501** | NextMove ESB controller with USB and RS485. 5V open collector stepper outputs for use with DSM stepper/driver motors. |
| **NSB003-502** | NextMove ESB controller with USB and RS232. 5V open collector stepper outputs for use with DSM stepper/driver motors. |

## NextMove ES

| Catalog Number | Description |
|---|---|
| **NES002-501** | NextMove ES controller with USB and RS232 |
| **NES002-502** | NextMove ES controller with USB and RS485 |
| **BPL010-501** | Non-isolated backplane |
| **BPL010-502** | Isolated backplane (PNP) |
| **BPL010-503** | Isolated backplane (NPN) |

## NextMove ST

| Catalog Number | Description |
|---|---|
| **NST002-501** | NextMove ST controller with USB and RS232 |
| **NST002-502** | NextMove ST controller with USB and RS485 |

## NextMove BX-II

| Catalog Number | Description |
|---|---|
| **NMX004-501** | NextMove BX-II 2 axis controller |
| **NMX004-502** | NextMove BX-II 3 axis controller |
| **NMX004-503** | NextMove BX-II 4 axis controller |

# Accessories

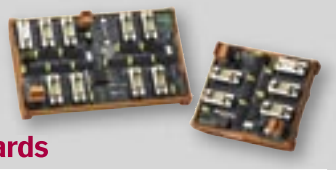
## Programmable HMI Panels

**Refer to catalog BR1202-H for full information.**

| Catalog Number | Description |
|---|---|
| **KPD-KG420-20** | 4x20 character text/graphic display with numerical keypad. |
| **KPD-KG420-30** | 4x20 character text/graphic display with numerical keypad and additional function keys. |
| **KPD-KG840-10** | 8x40 character text/graphic display with alpha-numerical keypad |
| **KPD-TS03M-10** | 3.8" mono touch screen |
| **KPD-TS05M-10** | 5.6" mono touch screen |
| **KPD-TS05C-10** | 5.6" color (STN) touch screen |
| **KPD-TS10C-10** | 10.4" color (TFT) touch screen |
| **KPD-TS12C-10** | 12.1" color (TFT) touch screen |
| **KPD-OPTC** | CANopen option card |

## CAN I/O Expansion and Operator Panels

| Catalog Number | Description |
|---|---|
| **ION001-501** | CAN 8 Input Expansion Module (Baldor CAN only) |
| **ION003-501** | CAN 8 Output Expansion Module (Baldor CAN only) |
| **ION002-501** | CAN 8 Relay Expansion Module (Baldor CAN only) |
| **ION004-501** | CAN 24 I/O Expansion Module (Baldor CAN only) |
| **KPD002-501** | CAN Operator Panel (with display + keypad) (Baldor CAN only) |
| **KPD002-505** | Extended CAN Operator Panel (Baldor CAN only) |



## Encoder Splitter Boards

| Catalog Number | Description |
|---|---|
| **OPT029-501** | 4 channel encoder splitter board (DIN rail mount) |
| **OPT029-502** | 8 channel encoder spliiter board (DIN rail mount) |

## Mint®NC

| Catalog Number | Description |
|---|---|
| **MNC001-501** | Mint®NC – CAD to Motion Windows front end |

## Power Supply Units

| Catalog Number | Description |
|---|---|
| **DR-75-24** | 24V Universal Power Supply. 75W/3.2A output |
| **DR-120-24** | 24V Universal Power Supply. 120W/5.0A output |
| **DRP-240-24** | 24V Universal Power Supply. 240W/10A output |

## Cables

| Catalog Number | Description |
|---|---|
| **CBL001-501** | RS232 serial cable |
| **CAN/Ethernet Cables** Suitable for both Baldor CAN nodes and Ethernet e100 products | |
| **CLB002CM-EXS** | 0.2 meter (0.8ft) Shielded RJ45 Cable |
| **CLB005CM-EXS** | 0.5 meter (1.6ft) Shielded RJ45 Cable |
| **CLB010CM-EXS** | 1 meter (3.2ft) Shielded RJ45 Cable |
| **CLB020CM-EXS** | 2 meter (6.5ft) Shielded RJ45 Cable |
| **CLB050CM-EXS** | 5 meter (16.3ft) Shielded RJ45 Cable |
| **CLB100CM-EXS** | 10 meter (32.7ft) Shielded RJ45 Cable |

**Motion Feedback Cables:** Motion feedback cables connect the drive encoder output signal to the NextMove encoder input, providing position feedback. Different lengths are available.

**Series II/MicroFlex to NextMove e100/ESB/ES/BX-II**

**CBLxxxMF-E3B** Motion feedback cable

Specify length: **005** (0.5m/1.6ft); **010** (1m/3.2ft); **015** (1.5m/4.8ft); **020** (2m/6.5ft); **030** (3m/9.8ft); **040** (4m/13.1ft); **050** (5m/16.3ft)

**Series II/MicroFlex to NextMovePCI/PCI-2/BX**

**CBLxxxMF-E3A** Motion feedback cable

Specify length: **005** (0.5m/1.6ft); **010** (1m/3.2ft); **015** (1.5m/4.8ft); **020** (2m/6.5ft); **030** (3m/9.8ft); **040** (4m/13.1ft); **050** (5m/16.3ft)

Motor power, motor feedback and raw cables are also available. Please refer to brochure **BR1202-H** for further details.

# Servo Drive Solutions

Whether you are looking for a simple servo drive or a fully programmable drive, Baldor has the answer. Baldor servo drives have been at the heart of automation for over 20 years and have been used in thousands of applications across the world. Our latest drives build on the reputation of quality and ease of use and are ideally matched to Baldor's range of NextMove motion controllers, rotary servo motors and linear servo motors. Commissioning and setup use the same acclaimed Mint® WorkBench Windows tool as the NextMove controllers, reducing the learning curve and improving productivity.

## MicroFlex™

**Refer to catalog BR1202-D for full information.**

Baldor's MicroFlex is a compact brushless servo drive capable of powering either rotary or linear motors, and is available in single phase 110-230VAC 50/60Hz or 3 phase 230VAC operation in current ratings of 3, 6 and 9 amps. Feedback is software programmable, accepting encoder, SSI (Synchronous Serial Interface) or Hall-effect sensors. Resolver feedback is available as an option. The new MicroFlex e100 offers a fully digital solution utilizing ETHERNET Powerlink to reduce wiring between the drive and motion controller (NextMove e100), increasing reliability and improving set-up time.

## FlexDrive-II, Flex+Drive®-II and MintDrive®-II

**Refer to catalog BR1202-D for full information.**

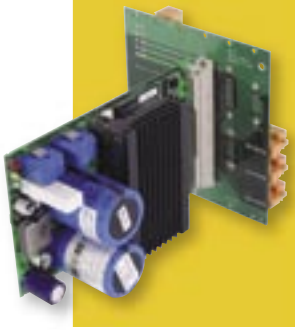
Baldor's Series-II servo drives offer high performance control of both rotary and linear brushless servo motors. This fully featured drive family offer different feedback options (resolver, incremental and absolute multi-turn encoders) and fieldbusses (CANopen, DeviceNet and Profibus-DP). Models are available with single phase 115/230VAC (2.5 to 7.5A) or universal three phase 180-460 VAC (2.5 to 27.5A) inputs.

The FlexDrive-II is a servo drive for connection to a motion controller or PLC accepting the industry standard ±10V analog interface. The Flex+Drive-II is a versatile indexing drive. In addition to setting position or speeds within a simple Windows front end, Flex+Drive-II is programmable in a single tasking version of Baldor's motion language, Mint®. The MintDrive-II provides the ultimate solution for single axis applications. Support the acclaimed multitasking version of Mint, MintDrive-II is ideally suited for following type applications requiring cam profiles, flying shears or positional offsets.

## H2™ Servo Drive

**Refer to catalog BR702 for full information.**

Baldor's new H2-series incorporates an easy to use keypad for setup, auto- tuning and operation. The keypad's graphical alphanumeric display provides full parameter names to simplify setup and operation, 14 keys provide tactile feel. Includes auto-tuning. Optional field installable expansion boards extend capability to suit application needs Models include internal power supply and are available in three phase ratings from 180-264 VAC (3 to 54A) and three phase 340-528 VAC (3 to 27A). Vector, encoderless vector and inverter drives are also available.



## Euroflex

**Refer to catalog BR1202-D for full information.**

A compact rack mount servo drive, EuroFlex offers the same ease of use and flexibility as the MicroFlex servo drive. With an encoder feedback is suitable for both rotary and linear servo motors, the industry standard ±10V command interface makes it compatible with any motion controller or PLC on the market today. EuroFlex's rack mounted format makes it the ideal partner for NextMove ES multi-axis motion controller. EuroFlex is available with a current rating of 5A (15A peak) and 80VDC/56VAC input.

# Motor Solutions



For over 20 years, Baldor has been manufacturing and supplying high reliability servo motor solutions to worldwide applications. Baldor's servo motors are designed for industrial applications, superior durability and proven reliability. Our range of rotary motors are available as a high performance, low inertia family, or as a higher inertia family for more cost effective applications. Baldor's new stainless steel motors lead the way in solutions for harsh and washdown environments.

With the widest range of linear motors and stages on the market today, Baldor's linear motors lead the way and are ideally suited to applications requiring higher speeds or improved accuracy.

## BSM Series Servo Motors

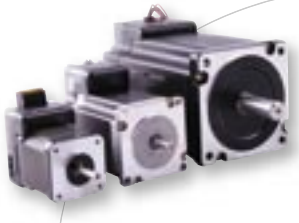
**Refer to catalog BR1202-E for full information.**

BSM motors are hard at work, increasing productivity, improving part quality, providing precision and reducing costs in many applications. These motors are available in two models, the BSM N-Series and the BSM C-Series. The N-Series motors provide low inertia for the highest performance. The C-Series motors have a higher inertia, with a cost effective design. All the motors are available with different feedback options including resolver, 2500ppr encoder, SSI (Synchronous Serial Interface) and EnDat. Motors are available from 0.4 Nm (4 lb.-in) through to 40 Nm (354 lb.-in).
Both motor families are available in a stainless steel configuration, offering the best protection for harsh environment. These motors are ideally suited for pharmaceutical and food applications.

## Linear Motors and Stages

**Refer to catalog BR1202-G for full information.**

Used in thousands of applications worldwide, Baldor provides industry with the widest range of linear motors and linear stages. Linear motors provide unique speed and positioning performance advantages. The direct-coupled motion eliminates mechanical transmission devices and offer substantial improvements over applications using ball screws, timing belts, etc. The rugged mechanical design provides accurate motion and precision positioning for millions of cycles.



## DSM - Integrated Stepper Motor and Drive

**Refer to flyer FL1851 for full information.**

Baldor's new DSM integrated stepper motor and microstepping drive provides a cost effective solution for stepper motor applications. The unique design integrates a high performance micro-stepping drive onto a stepper motor, providing a compact and reliable solution. Wiring is reduced to just pulse and direction plus power. The range is available in NEMA frames sizes 17, 23 and 34 with torque outputs from 22 to 748 N-cm (32 to 1061 oz-in)

## DC Servo Motors

**Refer to catalog BR1202-F for full information.**

The Baldor family of DC servo motors (PMDC) provide continuous torques from 0.21Nm to 6.55Nm (1.8 lb.-in to 58 lb.-in.) These high performance motors are designed to meet the demanding requirements of industrial motion control. A wide variety of windings and feedback devices are available for your application needs.

BALDOR

## Baldor's Motion Solutions Catalogs

**BR1202-A** Motion Control Solutions
**BR1202-B** Mint® Software and Applications
**BR1202-C** NextMove Multi-Axis Motion Controllers
**BR1202-D** AC Servo Drives
**BR1202-E** AC Servo Motors
**BR1202-F** DC Servo Motors and Drives
**BR1202-G** Linear Motors and Stages
**BR1202-H** Motion Product Accessories
**BR1202-I** Real-Time Ethernet Motion Solutions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