

Mint^{MT} Multi-Tasking Application Note**AN00149-000 – Comparison of NextMove PCI and NextMove PCI-2****Related Applications or Terminology**

- **NextMove motion controllers**

Supported Controllers

NextMove PCI	<input checked="" type="checkbox"/>
NextMove PCI-2	<input checked="" type="checkbox"/>

Definitions:

ASIC - Application Specific Integrated Circuit
CAN - Controller Area Network
DSP - Digital Signal Processor
FPGA - Field Programmable Gate Array
PCI – Peripheral Component Interconnect

Overview

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

This is achieved through the use of a faster variant of the same DSP. The ASICs have been replaced by an FPGA, providing both higher performance and increased flexibility.

The two CAN ports have been reduced to a single port - CANopen or Baldor CAN is selectable with firmware.

The pluggable digital output module (for either PNP or PNP) is no longer supported. The digital output driver components are now fitted to the control card, thus improving reliability and reducing manufacturing cost. The output type must be specified at the time of ordering.

The main 100-way connector and pin-out is identical, allowing the same cables and breakout boards to be used on both NextMove PCI and NextMove PCI-2. The same expansion boards may be used but a different bridge board must be used.

Software Comparison

This application note makes comparisons with NextMove PCI running Mint v5. If porting a Mint v4 application from NextMove PCI to NextMove PCI-2, contact technical support for advice.

PCI Bus Specification

NextMove PCI-2 is compatible with the 'PCI' Local Bus specification v2.2 and requires both 3.3V and 5V support. It is not compatible with 'PCI' Local Bus specification v3.0, 'PCI-X', 'PCI-Express', 'Mini PCI', 'CompactPCI' or 'PCI-104' Bus systems.

Mint^{MT} Multi-Tasking Application Note***Device Driver***

NextMove PCI-2 has its own device driver. Versions are available for Microsoft Windows 95 / 98 and Windows NT / 2000 / Server 2003 / XP. Windows Vista is not currently supported. The drivers may be downloaded from www.baldormotion.com.

Mint WorkBench

Mint WorkBench v5.5 should be used with NextMove PCI-2. Mint WorkBench v5 (from build 5233) does support NextMove PCI-2 but Mint WorkBench v5.5 provides many improvements including Mint debugging support. 'Mint WorkBench v5.5 & Mint Motion Center' can be downloaded from www.baldormotion.com.

Firmware and FPGA

Like NextMove PCI, NextMove PCI-2 has its own firmware which must be downloaded after system power up. NextMove PCI-2 also uses an FPGA which, as with firmware, must be downloaded after the system is powered up. Firmware is distributed as a Mint System File (MSX) which contains all the required components. When using Mint WorkBench v5.5, downloading firmware will automatically download all required components. From a host application, the ActiveX method 'DoDownloadMintSystemFile()' can be used.

The 'NextMove PCI(2) Wizard' application, installed with Mint WorkBench v5.5 & Mint Motion Center can be used to download firmware and Mint program files automatically on Windows startup.

Using NextMove PCI Expansion Cards

NextMove PCI expansion cards may be used with NextMove PCI-2 to expand the number of servo and stepper axes up to 12. The interconnect card used to connect the expansion cards is different for NextMove PCI-2.

Only the latest revisions of NextMove PCI-2 and NextMove PCI expansion cards are compatible. Please check the following requirements if using existing cards:

NextMove PCI-2 must be Issue 3 or above:
CPLD version 55 or above. (Labelled on PCB G454-3 or view in SupportMe in Mint WorkBench).
Bootloader v1.2 or above.
Firmware build 5401 or above.

NextMove PCI expansion card must be Issue 4 or above:
Decode CPLD v4 (Labelled on PCB F604-4 or view in SupportMe in Mint WorkBench)
IO CPLD v1 (Labelled on PCB F605-1 or view in SupportMe in Mint WorkBench)

ActiveX Control

To connect to NextMove PCI-2 from a host application, the ActiveX method 'SetNextMovePCI2FastLink' is used.

Mint^{MT} Multi-Tasking **Application Note*****Controller Enumerations***

Each controller has a number of enumerations as follows:

	NextMove PCI	NextMove PCI-2
ControllerType	9	29
Platform	9	29
NodeType	22	36

Analog Inputs

There are four 12-bit ADC channels on NextMove PCI which are configurable for $\pm 10V$, $\pm 5V$, 0-5V and 0-10V operation using the ADCMODE keyword.

On NextMove PCI-2, there are four 12-bit ADC channels but they only support $\pm 10V$. To provide compatibility, $\pm 5V$, 0-5V and 0-10V modes are supported with software emulation. This causes the effective resolution of the analog inputs to be reduced to 10-bit for 0-5V mode and 11-bit for $\pm 5V$ and 0-10V modes. ADCMODEs 8-11 are not supported. ADC channels are sampled at a fixed rate of 2.5 kHz.

When using NextMove PCI expansion cards, the ADC channels are as NextMove PCI. Channels are sampled every 1 ms. The number of expansion card channels turned on affects the conversion rate of a channel. With four expansion card channels turned on, the update rate of each channel is 0.25 kHz.

Analog Outputs

The four DAC channels on NextMove PCI-2 are 16-bit compared with 14-bit on NextMove PCI. The DACMODE keyword controls the effective output resolution. The default mode is 12-bit.

The DAC channels on NextMove PCI-2 are zero calibrated to remove any offset in the analog circuitry.

CANopen and Baldor CAN

NextMove PCI-2 has only one CAN channel. There are two variants of firmware, one which supports CANopen and one which supports Baldor CAN. The CAN bus is still referenced as Bus 1 for CANopen and Bus 2 for Baldor CAN. The hardware automatically switches the hardware CAN channel used depending on the firmware variant.

Encoder Transition Warnings

Encoder Transition Warnings are not supported on NextMove PCI-2, on both the main card and expansion cards.

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Default Axis Assignments

NextMove PCI has a set of default axis configurations and channel assignments. For example, axis 0 is configured as a servo axis using encoder channel 0 and DAC channel 0.

NextMove PCI-2 has a set of default channel assignments but no default axis configurations. The user must setup their required mappings using the AXISCHANNEL and CONFIG keywords. The Mint WorkBench 'Axis Config' wizard can also be used.

CAN LEDs

NextMove PCI-2 does not have the two CAN status LEDs on its backplate. These have been replaced with four LEDs on the PCB. See the Mint help file topic 'LED Status symbols' for more information.

Order Codes

The following table shows the order codes for NextMove PCI-2 compared to NextMove PCI.

Description	NextMove PCI	NextMove PCI-2
1 axis controller with PNP outputs	PCI001-501	PCI201-501
1 axis controller with NPN outputs	PCI001-510	PCI201-511
2 axis controller with PNP outputs	PCI001-502	PCI201-502
2 axis controller with NPN outputs	PCI001-511	PCI201-512
3 axis controller with PNP outputs	PCI001-503	PCI201-503
3 axis controller with NPN outputs	PCI001-512	PCI201-513
4 axis controller with PNP outputs	PCI001-504	PCI201-504
4 axis controller with NPN outputs	PCI001-508	PCI201-514
8 axis controller with PNP outputs	PCI001-505	PCI201-508
8 axis controller with NPN outputs	PCI001-513	PCI201-518
CANopen Master version	PCI004-501	No direct replacement ¹
Breakout unit (1 part connector)	PCI003-501	PCI003-501
Breakout unit (2 part connector)	PCI003-502	PCI003-502
Controller to breakout cable 0.5m	CBL021-504	CBL021-504

¹ All variants can act as a CANopen master. Connection to the CAN bus is required through breakout unit.

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Controller to breakout cable 1.0m	CBL021-501	CBL021-501
Controller to breakout cable 2.0m	CBL021-502	CBL021-502
Controller to breakout cable 3.0m	CBL021-503	CBL021-503
Controller to breakout cable 5.0m	CBL021-510	CBL021-510
4 axis expansion card with PNP outputs	PCI002-501	PCI202-504
4 axis expansion card with NPN outputs	PCI002-503	PCI202-514
Single expansion interconnect	OPT025-504	OPT225-504
Dual expansion interconnect	OPT025-505	OPT225-505