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Find the *Newport MM4006* at our website: ***Click HERE***

Multi-Axis High-Performance Motion Controller/Driver



The MM4006 is a high-performance, integrated Motion controller and driver offering outstanding trajectory accuracy and exceptional programming functionality. It combines simplicity of operation with advanced features to precisely control the most diverse displacement and synchronize them via measurement, command, or external acquisition strings. Supplying 500 W of motor drive power, the MM4006 can simultaneously handle up to eight axes of motion using any combination of Newport's motorized products in DC or stepper motor variants (except PM500 series).

Technology

Designed with upward migration in mind, the MM4006 uses an 80-bit floating point, 133 MHz microprocessor for highest resolution computation. A digital PID-FF (feed-forward) servo loop updates all axes with a cycle time of 300 µs for precise velocity profile tracking and most accurate positioning (500 µs cycle time for 5-8 axes). Smoothest motion is supported by a precision 16-bit DC motor command output. Low-noise PWM amplifiers are performance optimized for each individual stage and contain additional protection circuitry to improve security of your equipment. Each MM4006 is factory configured and tested to ensure highest reliability for your most demanding motion application.

Motion

The MM4006 provides several modes of positioning including synchronized and non-synchronized point-to-point, jogging, linear or circular interpolation. Continuous path contouring is accomplished easily, without the need to be experts in multi-axis command programming. Trajectories, even complex ones, can be simply broken down into straight and curved segments. The controller does the rest, including precise monitoring of the speed and the acceleration all along the trajectory.

Key Features

- 1–8 *axes Motion Controller/Driver with 500 W motor drive power*
- 80 *bit math ensures highest precision trajectory control*
- 2D *contouring for complex motion profiling*
- 4 *channel analog input for data and position acquisitions*
- *Synchronizes external functions with the executed motion*
- *Extensive command set including variables and loops*
- RS-232-C, IEEE-488 *or* RS-485 *interfaces*
- *User-configurable front panel for interactive control*

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This capability is critical for applications like laser-scribing, micro-ablation, or ultra-sonic measurement inspection. In addition, any axis of the MM4006 can be "slaved" to any other axis, even if they have different motor/gearhead ratios or lead screw pitches (electronic gearing). This feature is essential when multiple stages are required to move large or over-sized loads such as in gantry systems.

Inputs/Outputs

The MM4006 also masters exact synchronization with external data capturing tools that can be triggered by position or distance interval. An integrated 4-channel, 12-bit analog input allows for simultaneous data and position acquisition through the MM4006. An optional 4-channel analog output can be used to track motion-related data like position, speed, or following error. An additional parallel TTL I/O port offers 8 lines of inputs and outputs for monitoring, controlling, or synchronizing with external devices such as shutters, lasers, valves, or relays. Valuable examples include stopping a motion or executing an internally stored program dependent on an input bit, or supplying the status of a motion to the output bits. A watchdog timer and remote interlock are incorporated as well for added system safety.

Programming

The MM4006 makes programming complex motions easy using a powerful set of over 150 intuitive, 2 letter commands. 120 variables are available that can be added, negated, multiplied, divided, displayed, or read to build complex motion applications. The 4 soft-keys of the front panel and the display itself can be user-configured for versatile interactive operations. Special commands for conditional jumps, do-while operations, if/then/else statements, wait-for routines, and tell-status commands are incorporated as well to perform high performance tasks without host PC control. 64kB Flash non-volatile user program memory allows for storing up to 100 user defined programs for computer independent usage.

Other sophisticated capabilities include on-the-fly position, velocity, or trajectory changes for complex motion and alignment routines. Software limits can be set to improve systems safety. A precision origin search routine is provided for precise homing and works with or without encoder index pulse consideration (top zero signal). Backlash and linear error compensation are available to eliminate repeatable system errors.

Computer Interfacing

The MM4006 is available with RS-232-C and IEEE-488 (GPIB) or RS-485 computer interfaces. Basic LabVIEW™ drivers and sample programs and a 32-bit DLL communication for Windows 95/98/NT are provided and get constantly updated through our website at www.newport.com. Additional available MOTION Suite 32 software utilities contain a terminal program and PID tuning software for quick start-up and application development.

Options

The MM4006 options include a large backlit LCD display with 4 user-configurable soft-keys and a programmable status display. An optional 8-axis analog joystick provides manual speed and direction control.

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Specifications

Number of Axes	1–8 axes of any combination of stepper and DC motors
Computing Power	300 µs servo cycle up to 4 axis (500 µs for 5–8 axis)
	80 Bit, AMD 5X86, 133 MHz processor
	Digital PID servo loop with pre-calculated velocity and acceleration feed forward
Motion	Trapezoidal and s-curve velocity profile
	Synchronized and non-synchronized point-to-point
	Jogging, Continuous moves
	8D Linear interpolation, 2D Circular Interpolation
	Master-slave(s), Electronic gearing on any axis
	On-the-fly changes of target position, speed, acceleration, PID
Contouring	2D Contouring with trajectory pre-check
External Event Synchronization	On-the-fly data acquisition of up to 8 position counters and 4 analog channels per servo cycle (approx. 30 µs latency per analog channel)
	Trigger output on axis position and distance interval
	Command execution depending on TTL I/O status
Operating Modes	Real-time command execution via computer interfaces
	Stand-alone execution of stored programs
	Front panel manual motion command execution (optional)
	Analog joystick (optional)
Programming	150+ intuitive, 2 letter ASCII commands
	Command set includes: Manipulation of variables, conditional jumps, do-while operations, if/then/else statements, wait-for routines, tell-status commands, front panel key and display programming, user defined units, software limits, home search (with and w/o top zero), backlash compensation, etc.
Software Drivers	Communication DLL for Windows 95/98/NT
	Basic drivers and sample programs for LabView 5.1
	Terminal program and PID tuning software compatible with Windows 95/98/NT
Computer Interfaces	RS-232-C, IEEE-488-1 (optional), RS-485 (optional)
I/O	8 opto-isolated TTL inputs, 8 open-collector TTL outputs
	4 channel 12-bit analog input with programmable ranges: +/-5V, +/-10V, 0-5V or 0-10V Optional: 4 channel 12-bit analog output +/-10V
	"Watchdog" timer and remote interlock
Memory	32 kB Flash non-volatile user program memory (last for approx. 3,000 commands)
	Data storage buffer for up to 4000 lines (up to 8 axis position plus 4 analog inputs)
	8 MB Flash non-volatile firmware memory
Front Panel Display (Optional)	Backlit LCD display (240 x 64 res.), 6 lines x 30 characters, Active viewing area: 40 mm x 130 mm, adjustable brightness and contrast
DC Motor Control	Closed-loop operation only
	Precision 16-bit DAC resolution
	25 MHz max. encoder input frequency
Stepper Motor Control	Full- and micro-step capable
	Open- or closed-loop operation
	1 MHz maximum pulse rate
Total Available Motor Power	500 W, for max. power consumption of driven stages (see page 1112)
Power Requirements	90-264 V, 50/60 Hz with PFC (power factor corrector) 100 VA motors off, 570 VA motor on
Dimensions (W x D x H)	19 x 15.6 x 5.28 in. (483 x 395 x 134 mm) + 0.5 in. (12.7 mm) bottom and upper clearance
Weight	8 kg max

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Ordering Information

The MM4006 is configured by first specifying the driver options for axes 1 to 4 (A1 to A4), followed by options for the chassis configuration (CH), the user manual options (UM), the display options (FP), and the communications interface options (CP). When more than 4 axes are used, a second line reference is needed to specify driver options for axes 5 to 8 (A5 to A8) and a link code (CL). This code links the axis options 5 to 8 to the appropriate options for axis 1 to 4 and avoids any mismatch if several MM4006 controllers are purchased on the same order:

First line reference: **MM4006-OPT A1 A2 A3 A4 CH UM FP EX CL**

Second line reference*: **MM4006-AX A5 A6 A7 A8 CL**

*only needed if more than 4 axes are used

Also, please refer to the max. motor driver power consumption table (see page 1112) when configuring your system. The total power consumption of all stages must be smaller than the available drive power of the MM4006 (240 W or 500 W) in order to operate all stages simultaneously and at maximum speed.

Examples:

For a 2-axis MM4006 controller equipped with drivers 1A & 1H, French documentation, blank front panel and RS-232-C & IEEE-488 interfaces, the reference is:
MM4006-OPT 1A 1H NN NN 20 0F 0B 01 0N 0N

For a 6-axis MM4006 controller equipped with drivers 1A, 1H, 7G, 64, 01 & 62, English documentation, front panel with display and RS-232-C/RS-485 converter interface:
MM4006-OPT 1A 1H 7G 64 60 0E 0D 03 0N 01

MM4006-AX 01 62 NN NN 01

Accessory



An optional analog joystick with 2.9 m cable length provides manual speed and direction control.

Ordering Information: Joystick—RC4006

Phone: 1-800-222-6440 • Fax: 1-949-253-1680

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MM4006-OPT 1A 1H NN NN 20 0E 0B 01 0N 0N

Axis 1 Driver
Axis 2 Driver
Axis 3 Driver
Axis 4 Driver

Code Link
- 0N No link: ≤4-axis controller
- 01-09: A number for 5- to 8-axis controller

Extension Option
- 0N Not used

Communication Interface Option
- 01 RS-232-C & IEEE-488
- 02 RS-232-C & RS-485
- 03 RS-232-C, RS-485 & RS-232-C/RS-485 converter

Display Option
- 0B Black front panel
- 0D Front panel with display

User's Manual Option
- 0E English documentation on paper
- 0F French documentation on paper
- 0N English & French documentations on CD-ROM

Chassis Option
- 20 2-axis chassis: 240 W
- 40 4-axis chassis: 500 W
- 60 6-axis chassis: 500 W
- 80 8-axis chassis: 500 W
- 21 2-axis chassis: 240 W & Digital/Analog output
- 41 4-axis chassis: 500 W & Digital/Analog output
- 61 6-axis chassis: 500 W & Digital/Analog output
- 81 8-axis chassis: 500 W & Digital/Analog output

See page 1118 for list of driver options.
Specify NN for all unused axes.

MM4006-OPT 1A 1H 7G 64 60 0E 0D 03 0N 01
MM4006-AX 01 62 NN NN 01

Axis 1 Driver
Axis 2 Driver
Axis 3 Driver
Axis 4 Driver

Code Link
- 01-09: A number for 5- to 8-axis controller

See page 1118 for list of driver options.
Specify NN for all unused axes.

NOTE: *In order to operate all stages simultaneously and at maximum speed, the total power consumption of all stages must be less than the available drive power of the* MM4006 *power supply* (240W *or* 500W). *See page 1112 for motor drive power consumption of each Newport stage.*

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Driver Modules

The motor drive modules that integrate with the MM4006 are indicated as option codes and specified for each motorized stage. Please use the following options:

TSP *Series*
page 925



TSP, TSPW—OPT 7T

VP-25XA *Series*
page 931



VP-25XA—OPT 7S

VP-5ZA *Series*
page 934



VP-5ZA—OPT 7S

TSV *Series*
page 937



TSV—OPT 1M

IMS *Series*
page 940



IMSPP—OPT 41 NN*
IMSCC & CCHA—OPT 7L
**This drive takes space for two slots in the MM4006 mainframe. That's why the next following drive option must be coded "NN".*

ILS *Series*
page 944



ILSPP—OPT 40
ILSCC—OPT 7J
ILSCCHA—OPT 7U

MTM *Series*
page 948



MTMPP1—OPT 1A
MTMPP.1—OPT 12
MTMPE1 & PE.1—OPT 1H
MTMPE1V6 & PE.1V6—OPT 1S
MTMCC1—OPT 7H
MTMCC.1—OPT 7G

UTM *Series*
page 952



UTMPP1HL & PP.1—OPT 12
UTMPE1 & PE.1—OPT 05
UTMPE1V6 & PE.1V6—OPT 07
UTMCC.1—OPT 71
UTMCC1HL & CC.5HA—OPT 7G
UTMCC1DD & CC.1DD—OPT 64

CTS25 *Series*
page 956



CTS25—OPT 7K

MFN *Series*
page 958



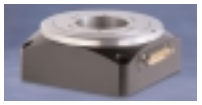
MFNPP—OPT 01
MFNPPV6—OPT 1T
MFNCC—OPT 61

UZM *Series*
page 960



UZM80PP.1 &
UZM160PP.05—OPT 12
UZM80PE.1—OPT 05
UZM80PE.1V6—OPT 07
UZM160PE.05—OPT 1H
UZM160PE.05V6—OPT 1S
UZM80CC.1—OPT 64
UZM160CC.05—OPT 7G

RGV100
page 1003



RGV100—OPT 80

RV *Series*
page 1006



RV80PP—OPT 12
RV120–350PP—OPT 1A
RV80PE—OPT 05
RV80PEV6—OPT 07
RV120PE—OPT 12
RV120PEV6—OPT 1K
RV160–350PE—OPT 1A
RV160-350PEV6—OPT 1Q
RV80CC—OPT 3A
RV120-350CC—OPT 3B
RV120-350HAT—OPT 7P
RV80CCHL—OPT 64
RV120CCHL—OPT 3A
RV120HAHLT—OPT 7M
RV160-350CC—OPT 3B
RV160-350HAHLT—OPT 7P

URM *Series*
page 1014



URMPP—OPT 12
URMPEV6—OPT 07
URMPE—OPT 05
URMCCHL—OPT 7G
URMCC—OPT 64

495CC *Series*
page 1020



495CC *Series*—
OPT 64

SR50 *Series*
page 1022



SR50PP—OPT 06
SR50CC—OPT 61

PR50 *Series*
page 1024



PR50PP—OPT 06
PR50CC—OPT 62

BGM *Series*
page 1027



BGM50PP & BGM80PP—OPT 12
BGM50PEV6 & BGM80PEV6—OPT 07
BGM120PP—OPT 15
BGM160PP & BGM200PP—OPT 1A
BGM50PE & BGM80PE—OPT 05
BGM120PE–BGM200PE—OPT 1H
BGM120PEV6-BGM200PEV6—OPT 1S
BGM50CC & BGM80CC—OPT 64
BGM120CC–BGM200CC—OPT 7H

VP-25AA *Series*
page 1091



VP-25AA—OPT 7S

VM *Series*
page 1096



VMPPE—OPT 01
VMPPV6—OPT 1T
VMCCE—OPT 62

850G *Series*
page 1098



850G & 850GV6—OPT 7D
850G-LS & 850G-LSV6—OPT 7E
850G-HS & 850-HSGV6—OPT 7F

CMA *Series*
page 1100



CMA-12PP—OPT 09
CMA-25CCCL—OPT 7A

EM *Series*
page 1103



EM31CC—OPT 64
EM41PP—OPT 12

Other Passthrough board to connect external drives—OPT XX

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