OMS MOTION, Inc.

The Company in Motion®

Product Catalog
2023

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About OMS Motion

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Originally founded as Oregon Micro Systems, OMS Motion evolved as a leader in the motion control industry, based on patented technology that provides superior advantages in the industry, as well as the company's philosophy that there is no success without the customer's success.

OMS Motion, Inc. has been successfully producing motion controllers and product for more than 35 years. Founded in the early 80's OMS developed off the shelf products for applications in many evolving markets, such as semiconductor equipment, medical diagnostics, factory automation and others. In the mid 90's OMS was acquired by a publicly traded company focused on the medical device industry. As a subsidiary of the parent company OMS supported both the medical device business while continuing with the motion control business. In early 2017 OMS separated from the public company and returned its focus on the motion control industry.

OMS products were designed to be easy to commission and provide superior performance. OMS Motion's strong commitment to their customers has driven support of some applications for more than 25 years. OMS has earned a strong reputation for reliable and quality motion control products and service that is trusted throughout multiple industries worldwide.

OMA-21

Advanced Information

Servo Amplifier & Controller

Description

The OMA-21 is a small formfactor (2.2” x 2.2”) servo amplifier and controller capable of Sensorless, Hall sensors, Incremental or Absolute Encoders (BiSS). Ideal for managing motor of 6 amps or less in a tightly controlled feedback loop for superior performance. The OMA communication is through USB virtual com port and offers several motion commands for a large variety of performance requirements. The OMA operates from a single power supply of +15 to +50 VDC and is internally monitored for overcurrent and overvoltage. Overtravel limit and home inputs included as well as 8 optically isolated general purpose I/O.

FEATURES

- Highly integrated motion controller and amplifier for BLDC servo motors
- 2 Differential Quadrature Incremental Encoders, or Absolute Encoder combination
- Incremental Encoder rate up to 16M steps per second
- Support for dual-loop position maintenance for load position control
- Cascaded PID control loop for torque or velocity command mode
- Communications via USB (USB mini connector)
- Over 150 commands for simple or advanced motion control capabilities
- Commands are intuitive ASCII characters
- Up to 20 general purpose I/O, including Home and +/- Limits
- Single supply voltage +15 to +50VDC
- Position range = +/-562,949,953,421,311 counts
- Screw-terminal connector plugs for convenient wiring
- LED indicator for status
- Power-up default parameters can be modified for custom requirements

PCIEx

Features

- Up to 4-axis control of servo or stepper
- Backwards compatible to the popular PCIx controller
- Optically isolated I/O, +/- limit switched and home inputs, and differential encoder feedback inputs
- Independent and coordinated motion of all axes
- A single shielded connect shares a common pin-out and configuration with other OMS controllers
- Constant velocity linear interpolation (all axes)
- Custom, Parabolic, S-Curve, & Linear trajectory profiles
- Compatible with the IO68-M breakout board
- Circular interpolation
- Backlash Compensation

Description

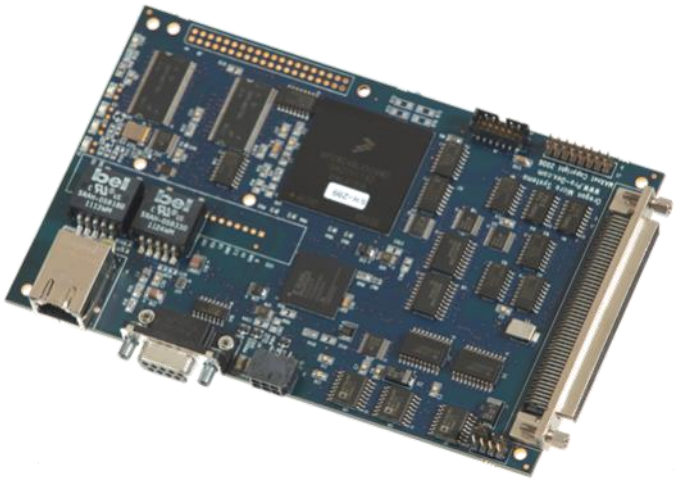
The PCIEx is a PCI-Express bus 4-axis motion controller that is completely backwards compatible to the popular PCIx controller. The PCIEx is a four-axis controller for either servo or stepping motors. It supports 12 general purpose bits which are opt-isolated for optimum noise immunity. The home and over travel inputs are opt-isolated. The architecture of the PCIEx is compatible with version 4.4 of the PCI Express bus standard for a robust high-speed communications interface.

The servo output is a +/- 10V or 0-10V signal that is driven by a 16 bit DAC. The servo control loop is a PID filter with feed forward coefficients. The step pulse is a TTL level 50% duty cycle square wave that supports velocities of 0 through 1,044,000 pulses per second. The encoder feedback functionality supports quadrature incremental encoders up to 4 MHz at a 4 times resolution, and is used as the servo feedback, as feedback for the stepper axes or as independent position feedback. Additionally the PCIEx supports absolute encoders for SSI and BiSS. Absolute encoders up to 48-bit is supported. The encoder feedback can provide slip or stall detection. Every axis includes dedicated +/- over travel inputs, a home input, and an auxiliary output. The PCIEx is available in several different models at several different prices so that you don't have to pay for a lot of functionality that you don't need.

Programming

PCIEx motion controller is compatible to the standard OMS command set, which is made up of ASCII character commands. The commands are combined into character strings to create sophisticated motion profiles and are passed to the PCIEx data I/O register. A separate FIFO command queue for each axis is used to store the parsed commands by the PCIEx until they are executed allowing the host to send a complex command sequence and attend to other tasks while the PCIEx manages the motion process. These command queues store 800 command and parameter words and include a command loop counter which allows multiple executions of any command string.

Ethernet/RS232 Motion Controls MAXnet



Features

- 1 to 5-axis of motion control
- Update rate of 122 µs on all axes, all signals
- 266 MHz, 32-bit RISC processor
- 5 analog outputs and 1 analog input at 16-bit resolution
- Encoder feedback up to 16MHz
- Absolute encoder
- Advanced control: Backlash compensation, Circular interpolation, Feed forward coefficient
- Real-time encoder position capture

Description

The MAXnet is a 5-axis motion controller for automated equipment, robotics, and applications requiring accuracy, precision, and flexibility. The Ethernet interface utilizes standard TCP/IP protocol for compatibility and can virtually be controlled and/or monitored from almost anywhere. A high-speed RS232 serial interface is included at baud rates of 9600 to 115.2K. In addition to the limits, home and motion control signals the MAXnet includes 8 bi-directional I/O, 5-outputs, 2-analog inputs and 1-analog output (the ½ axis). OMS motion controllers have a 35+ year reputation of reliability and performance and the MAXnet is no exception.

On-board Flash memory can store macro programs for stand-alone applications. The MAXnet firmware can be upgraded through the Ethernet or serial interfaces allowing the controller to be embedded in systems without the need for removal. The IODnet interconnect module stacks on the MAXnet for a compact system with convenient screw terminal connection.

A key feature of the MAXnet is the expansion interface for daughter boards that provide unmatched flexibility and help minimize the need for third party controls. This interface utilizes the Port-X interface of the on-board PowerPC to control these specialized add-on solutions that are tightly coupled to the motion for most any application. Requirements that fall between a custom daughter board and the need for additional features OMS can customize the controller to provide a competitive advantage that could not otherwise be realized.

Programming

MAXnet motion controllers are easily programmed with ASCII character commands through an extensive command structure. The commands are combined into character strings to create sophisticated motion profiles and are passed to the Ethernet or Serial port. A separate FIFO command queue for each axis is used to store the parsed commands by the controller until they are executed allowing the host to send a complex command sequence and attend to other tasks while the MAXnet manages the motion process. These command queues store 2560 command and parameter words and include a command loop counter which allows multiple executions of any command string.

Ethernet/RS232 Motion Controls MAXnet10

- 1 to 10 axes of motion control
- Update rate of 122 µs on all 10 axes simultaneously
- Each axis has an incremental encoder input
- Small form-factor, 4”x6.5”
- Real-time encoder position capture
- 16 bit DAC analog resolution
- Internal watchdog timer for safety
- Custom power-up defaults
- Stand alone capability
- Encoder feedback up to 16 MHz, 266 MHz, 32-bit RISC processor

Description

The MAXnet family of Motion Controllers along with the DBnet daughter board provides an unmatched 10-axis of motion control of stepper and/or servo motors. This bring a new level of technology to servo applications as well as stepping motors. A much more powerful 2266 MHz 32-Bit RISC processor (PowerPC) provides the capability and power for better and more sophisticated application control. The newest generation of motion control products provides up to 10 axes of motion control on a two-board stack measuring 4 x 6.5 inch card. Each axis can be selected by the user to be an open or closed stepper or a high capability servo axis. In addition, independent analog inputs are provided to enable integration of analog parameters, such as velocity override, temperature, pressure, etc., under the control of the running application. An additional general purpose analog output is also available.

Out puts are provided for 16-bit analog servo output as well as step and direction for stepper system applications. The servo loop is a PID filter with feed forward coefficients and an update rate of 122 µs on all 10 axes. Independent plus and minus limits, a home switch input, and an auxiliary output provided for each of the 1- axes so that the state of any of them can be monitored by the system at any time. An additional 16 user definable I/O is available for synchronization and control of other events. Incremental encoder feedback, differential or single ended, is used for all servo axes and is available for position feedback and may also be used for slip or stall detection.

Programming

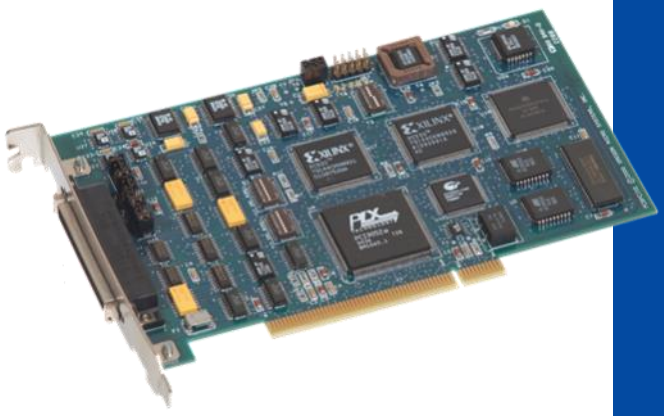
The MAXnet motion controllers are easily programmed with character ASCII commands through an extensive command structure. The commands are combined into character strings to create sophisticated motion profiles, with features such as IO and other functionality. A separate FIFO command queue for each axis is used to store the commands once they are parsed in the MAXnet. These commands are then executed sequentially, allowing the host to send a complex command sequence and attend to other tasks, while the MAXnet manages the motion process. These command queues can store 2559 command values and can include a loop counter that allows multiple execution of any string.

PCI Motion Controls

PCIx

Features

- Optically isolated I/O, +/- limit switched and home inputs, and differential encoder feedback inputs
- Independent and coordinated motion of all axes
- A single shielded connect shares a common pin-out and configuration with other OMS controllers
- Constant velocity linear interpolation (all axes)
- Custom, Parabolic, S-Curve, & Linear trajectory profiles
- Compatible with the IO68-M breakout board
- Circular interpolation
- Backlash Compensation



Description

The PCIx is a PCI 4 axis motion controller that conforms to the PCI Rev. 2.2 specification. The PCIx is a four -axis controller for either servo or stepping motors. It supports 12 general purpose bits which are opt-isolated for optimum noise immunity. The home and over travel inputs are opt-isolated. The architecture of the PCIx includes a dual-port Ram for special functions where fast collection of large amounts of data is required, such as profile capture.

The servo output is a +/- 10V or 0-10V signal that is driven by a 16 bit DAC. The servo control loop is a PID filter with feed forward coefficients. The step pulse is a TTL level 50% duty cycle square wave that supports velocities of 0 through 1,044,000 pulses per second. The encoder feedback functionality supports quadrature encoders up to 4 MHz at a 4 times resolution and is used as the servo feedback, as feedback for the stepper axes or as independent position feedback. The encoder feedback can provide slip or stall detection. Every axis includes dedicated +/- over travel inputs, a home input, and an auxiliary output. The PCIx is available in several different models at several different prices so that you don't have to pay for a lot of functionality that you don't need.

Programming

PCIx motion controllers are easily programmed with ASCII character commands through an extensive command structure. The commands are combined into character strings to create sophisticated motion profiles and are passed to the PCIx data I/O register. A separate FIFO command queue for each axis is used to store the parsed commands by the PCIx until they are executed allowing the host to send a complex command sequence and attend to other tasks while the PCIx manages the motion process. These command queues store 800 command and parameter words and include a command loop counter which allows multiple executions of any command string.

USB Motion Controls

UMX

Features

- Four axes of stepper control with encoder feedback or servo control
- 32 bit processor for extensive co-processing
- 16 bit DAC analog resolution
- Encoder feedback to 12MHz
- Flash firmware-Field upgradeable firmware within Windows operating systems
- Motion Control Output is +/-10V or 0-10V Servo or Step & Direction
- Small size (3.3” x 3.5”)

Description

The UMX controller communicates through a standard USB port and is compatible with the PC78 and PCIx controller families with 2-4 axes control. The UMX supports up to 12 general purpose TTL I/O bits, eight of which are user definable. Measuring about 3.3” x 3.5” the UMX is a very compact controller and the USB port makes communications very simple. The UMX can control up to 4-axes of open-loop stepper motors, closed loop stepper motors, or servos on the single control board and is available with an optional enclosure.

The step pulse is a TTL level 50% duty cycle square wave that supports velocities of 0 through 1,044,000 pulses per second. The encoder feedback functionality supports quadrature encoders up to 12 MHz at 4 times the encoder line resolution and is used as closed-loop feedback for the stepper axes or as independent position feedback. The encoder feedback can provide slip and/or stall detection. Each axis includes dedicated +/- over travel inputs, a home input, and an auxiliary output.

Programming

UMX motion controllers are easily programmed with 2 and 3 character ASCII commands through an extensive command structure. These commands are compatible with all other OMS controllers and are combined into character strings to create sophisticated motion profiles and are passed to the UMX controller. A separate ‘FIFO’ command queue for each axis is used to store the parsed commands by the UMX until they are executed allowing the host to send a complex command sequence and attend to other tasks while the UMX manages the motion process. These command queues store 200 command and parameter words and include a command loop counter which allows multiple executions of any command string.

PC104/RS232 Motion Controls

PC78

Features

- Four axes of Stepper or Servo control
- Stand-alone with high speed RS232 port
- 16 bit DAC analog resolution
- Configurable PID filter with feed forward coefficients
- Encoder feedback available for stepper axes
- Two limits, one home, and one auxiliary output are standard per axis
- Up to 8 “user definable” I/O
- Constant velocity linear interpolation (all axes)
- Compatibility to UMX and PCIx

Description

The PC78 is both a PC/104 controller that supports the PC/104 ISA bus standard as well as a stand-alone controller via a high speed RS-232 communication port. Originally planned as a replacement for the popular PC68 controller, the PC78 controller incorporates some additional features such as 12MHz encoder feedback, a recessed I/O connector for PC/104 enclosure compatibility, new and advanced components, expanded command queue and others. The PC78 supports up to 12 general purpose TTL I/O bits. The architecture of the PC78 includes an additional board to board bus architecture that is separate from the PC/104 J1 and J2 bus connectors where the microcontroller of the PC78 is the master. This provides the opportunity for custom add-on boards that can expand the capability of the controller to optimize the equipment that the PC78 is being installed.

The step pulse is a TTL level 50% duty cycle square wave that supports velocities of 0 through 1,044,000 pulses per second. The encoder feedback functionality supports quadrature encoders up to 12 MHz and is used as feedback for the servo or stepper axes or as independent position feedback. The encoder feedback can provide slip or stall detection. Every axis includes dedicated +/- over travel inputs, a home input, and an auxiliary output.

Programming

PC78 motion controllers are easily programmed with double character ASCII commands through an extensive command structure. The commands are combined into character strings to create sophisticated motion profiles and are passed to the PC78 data I/O register. A separate ‘FIFO’ command queue for each axis is used to store the parsed commands by the PC78 until they are executed allowing the host to send a complex command sequence and attend to other tasks while the PC78 manages the motion process. These command queues store 200 command and parameter words and include a command loop counter which allows multiple executions of any command string.

VME BUS Motion Controls

MAXv

Features

- System update rate of 122 µs includes PID on all 8 axes
- VME64 bus Specification ISO/IEC 15776:2001 (E)
- 266 MHz, 32-it RISC processor
- Additional I/O includes: 2 analog outputs, 2 encoder inputs, 6 analog inputs and 16 digital I/O
- Signals are on one 50 pin and Two 68 pin SCSI type connectors on the front panel and P2 on back panel
- Configurable PID filter with feed forward coefficients
- Real time encoder position capture
- Absolute and incremental

Description

MAXv motion controllers use a 266-MHz, 32-bit Risc processor (PowerPC to run eight axes on a single card in VME and VME64 (64-bit) compatible computers. VME format boards typically find use in defense and R&D instrumentation. User-selectable axes types include open or closed stepper and 16-bit analog servo. Independent analog inputs bring parameters such as temperature and pressure under the control of the running application. Two additional encoder inputs boost precision and control.

The servo loop consists of a PID filter with feed-forward coefficients and an update rate of 122 µs for all axes. Independent plus and minus limits, a home switch input, and an auxiliary output monitor axes state. An additional 16 user-definable I/O synchronize and control other events at the same 122 µs update rate. Electronic gearing can either track another motor or manual input device such as an independent encoder. The bus interface uses shared memory technology to communicate both commands from the host and feedback of motion control parameters, eliminating the communication bottlenecks of single-address, port based approaches.

Programming

The MAXv motion controllers are easily programmed with character ASCII commands through an extensive command structure. The commands are combined into character strings to create sophisticated motion profiles, with features such as IO and other functionality. A separate FIFO command queue for each axis is used to store the commands once they are parsed in the MAXv. These commands are then executed sequentially, allowing the host to send a complex command sequence and attend to other tasks, while the MAXv manages the motion process. These command queues can store 2559 command values and can include a loop counter that allows multiple execution of any command string.

OMDE2

Drive/Controller with Encoders Incremental, SSI & BiSS

Description

The OMDE2 is an advanced stepper motor drive and motion controller with encoder feedback input in one small compact size. Through a simple RS485 communications interface you can control a stepper motor with exceptional capabilities and accuracy with simple ASCII character commands. Incremental encoder feedback provides high resolution and speed for critical applications. Selectable velocities up to 2M steps/sec. Motor step size resolution is selectable up to 1/256 microstep. Its small design is compatible to mount on a NEMA 23 stepper motor or remotely, and includes a hole in the center so the shaft of a linear actuator motor can pass through when mounted on the motor.

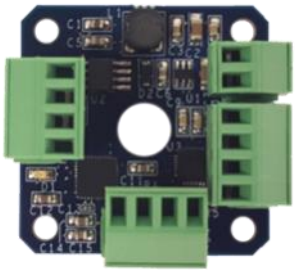
FEATURES

- Advanced motion control capabilities
- Absolute Encoders (BiSS & SSI, 36+ bit resolution)
- Simple communications through RS485 interface (Modbus option)
- Commands are intuitive ASCII characters (Modbus RTU option)
- Communication speed = 115.2K Baud
- Velocity = 0 to 2M steps per second
- Differential Quadrature Incremental Encoder up to 16MHz
- Microstep resolutions include full, 1/2, 1/4, 1/8, 1/16, 1/64, 1/128, 1/256
- Exceptional accuracy: +/- 0% position (full-steps)
- 6 TTL input/output, including Home and +/- Limits
- Single supply voltage +12V to +50V
- 0 to 2.5 amp phase current for high torque motors
- Center pass-through hole for linear actuator stepper motors
- No heat-sink required for typical current
- Motor current set through the interface
- Matches the NEMA 23 dimension for direct motor mounting
- Use existing motors or select optimum motor for the application for cost control and best performance
- Screw-terminal connector plugs for convenient wiring

Stepper Drive/Controller OMD18

Features

- Advanced motion control capabilities
- RS485 communications interface
- Communication speed = 115.2K Baud
- Velocity = 0 to 2M steps per second
- Step resolutions: full, 1/2, 1/4, 1/8, & 1/16
- 0 to 1.5 amp phase current for high torque motors (1.7A peak)
- No heat-sink required for typical current
- Use existing motors or select the optimum motor for the application
- Screw-terminal connector for convenient wiring
- LED indicator for status



Description

The OMD18 is a single axis stepper motor driver and motion controller in one very small package. The outside dimensions match the NEMA size 17 motor so that the OMD18 can be mounted directly to the stepper motor, and the center hole is intended as pass-through of Linear Actuator motor shaft. The OMD18 uses screw-terminal connectors for simple and reliable wiring.

The OMD18 communicates through a simple RS485 serial interface at a speed of 115.2K baud. It supports step resolutions of full, 1/2, 1/4, 1/8 and 1/16th steps which can be set through the communications interface as well as the motor phase current setting. The OMD18 can support up to 1.5 Amps typical of phase current without a heatsink with a peak of 1.7 Amps. In elevated temperature environments some considerations for forced air flow or heat-sinking may be required. The OMD18 supports overtravel limits for both positive and negative travel as well as a home input. This highly integrated drive/controller was designed for performance and reliability and can handle most any project within the designed parameters.

Programming

The command set for the OMD18 follows the same convention as the other OMS motion controls which are easily programmed with double character ASCII commands. These commands are combined into character strings to create sophisticated motion profiles and behaviors. It includes an 800 command and parameter buffer and a command loop counter which allows multiple executions of most command strings.

Stepper Drive/Controller
OMD24

Features

- Integrated Microstep Driver with Controller
- RS485 communications with Modbus option
- Velocity = 0 to 2M steps per second
- Step resolutions from full to 1/256.
- Single supply voltage +12V to +50V
- Up to 2.5 Amp phase current
- Center pass-through hole for linear actuator stepper motors
- Matches the NEMA 23 dimension for direct motor mounting
- Optional travel limit for additional protection

Description

The OMD24 is a stepper motor microstep driver integrated with an advanced motion controller. Capable of microstepping up to 1/256 steps the OMD24 can support 2.5 Amp of motor phase current for high torque application. Its small design is compatible to mount directly on to a NEMA 23 stepper motor, and includes a through-hole in the center so the shaft of a linear actuator motor can pass through when mounted on the motor. The connectors are screw terminal plugs for easy and secure wiring.

The OMD24 utilizes an ARM based microcontroller, configured to operate as an efficient and powerful co-processor with a PC host via RS485 at 115200 baud. Optional Modbus interface is available (consult factory). The OMD24 can provide motion information such as axis position and velocity, as well as the state of the over travel limits, home switch inputs and done interrupt flags and more. The OMD24 command set employs two or three ASCII character commands which can be combined into character strings. Using virtually any programming language, the ASCII command strings can be sent to the OMD24 over an RS485 COM port.

In addition to the overcurrent and over heat protection the OMD24 supports axis limit inputs for additional protection of the axis implementation. The OMD24 includes LEDs for status indication of the axis for seven different status states, including Drive Disabled, Motor Disabled, Power On, and more. An automatic current decay mode allows detection of when a motor is about to stall.

Drivers / Amps

Microstep Motor Drive, OMD17b

- Step resolutions include full, 1/2, 1/4, 1/8 & 1/16
- Single motor supply voltage +8V to +35V
- 0.0 to 1.5Amp phase current (adjustable)
- Control voltage +5V to 20V (+10V to 30V option)
- Easy wiring with screw-terminal connectors
- No head-sink required

The OMD17b is an advanced Stepper Motor Microstep Drive that supports selectable step size resolution from full step up to 1/16 microstep. It's small package size is design to mount on the back of a NEMA 17 size step motor or can be mounted remotely.

Microstep Motor Driver, OMD23b

- Step resolution from Full to 1/256 microsteps
- Bi-polar chopper drive
- 0.0 to 2.5 Amp phase current
- Microstepping and phase current are selectable
- Electrically isolated control signals
- Easy wiring with screw-terminal connectors

The OMD23b is an advanced Microstepping motor drive for bipolar stepper motors. This drive is capable of microstepping from full steps up to 256 microsteps per step. The small size (1.55 x 1.55") supports 2.5 Amps and utilizes a screw-terminal connectors for ease of wiring. In typical application no heat-sink is required.

Drivers / Amps

Microstep Motor Driver, OMD34b

- Step resolution from Half to 1/256 microsteps
- Bi-polar chopper drive
- Single +18V to +80V motor supply input
- 0.0 to 7Amp phase current
- Microstepping and phase current are selectable
- Electrically isolated control signals
- Easy wiring with screw-terminal connectors

The OMD34 is an advanced Microstepping motor drive for bipolar stepper motors. This drive is capable of microstepping from half steps up to 256 microsteps per step. The small size (3" x 3.25") is mounted on a flat heat -sink plate and utilizes a screw-terminal connectors for ease of wiring.

Integrated Controller/Driver, OMD35

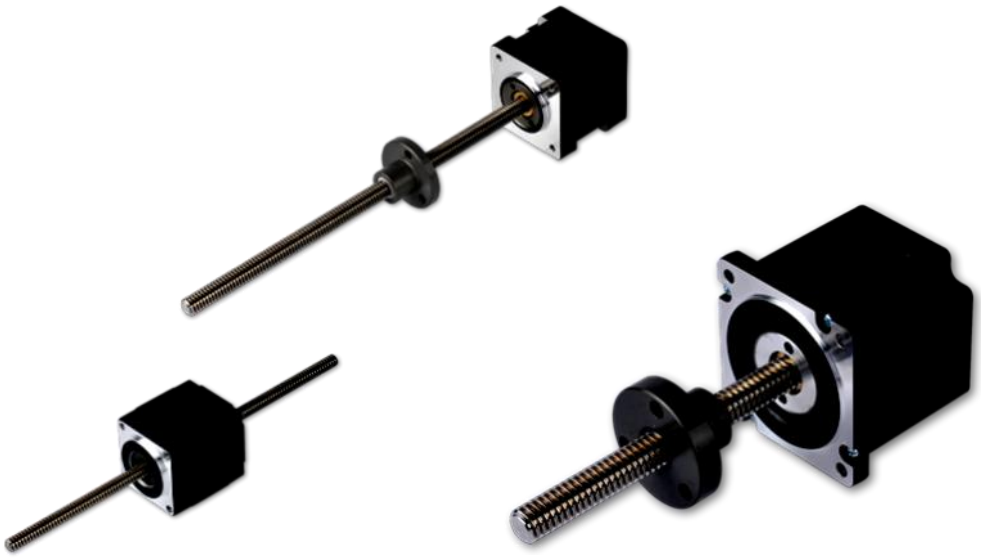
- Integrated Stepper Motor Drive and Controller
- RS485 communications (ModBus optional)
- 8 Step resolutions: full step to 1/256.
- Single supply voltage +18VDC to +80VDC
- Up to 7.0 Amp phase current for high torque motors
- Up to 4 Amps without a heat-sink
- Current & microstepping set through the interface
- Small size matches the NEMA 23 dimension

The OMD35 is a microstep motor driver integrated with an advanced motion controller and will calculate the optimum velocity profile to reach the desired destination. The OMD35 can provide motion information such as axis position and velocity, as well as the state of the over-travel limits, home switch inputs and done interrupt flags. Without the heat-sync the OMD35 will support up to 4 Amps.

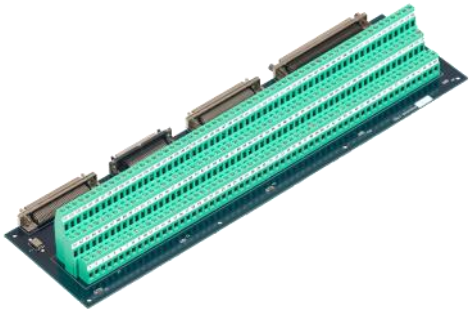
PLM Motors

The PLM Motors are linear actuator stepper motors that are available in many sizes and thread pitch for a large variety of options. Standard shaft lengths can be customized to the application for increased performance.

- Eliminates additional shaft couplings
- Reduced tolerance stack-up
- Improves performance
- Customizable to unique requirements
- External Linear (rotating shaft)
- Non-captive (internal rotating chuck)
- Available in sizes 8, 11, 14, 17, 23, and 34



I / O Accessories

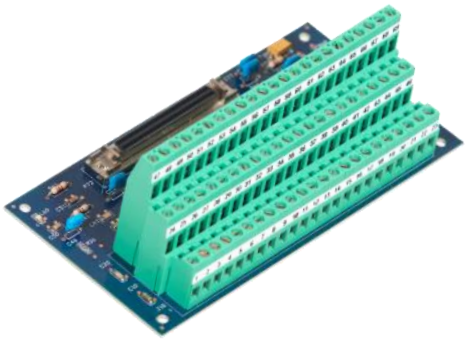


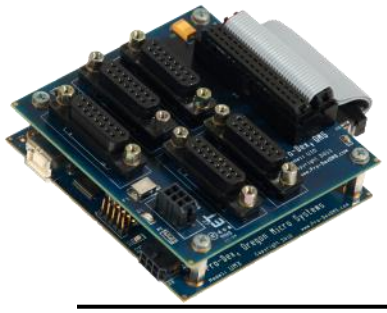
IOvMAX

The IOvMAX will connect to the MAXv series of motion controllers via our 68-pin cables(CBL68-10) and 50-pin cables (CBL50-10). IOvMAX contains screw terminals for easy custom wiring and is equipped with over current circuitry on the supply voltage.

IO68

The IO68 connects directly to the PC78, PCIx, and UMX via a 68-pin, standard, SCSI-3 cable (CBL68-10) which will keep costs at a minimum. It is available in 2 versions: the IO68-M for use as a standard breakout module with any PC78, PCIx, or UMX ; and the IO68-I for use as an IO signal breakout module when used with a Px610 PC68 Series expansion module.



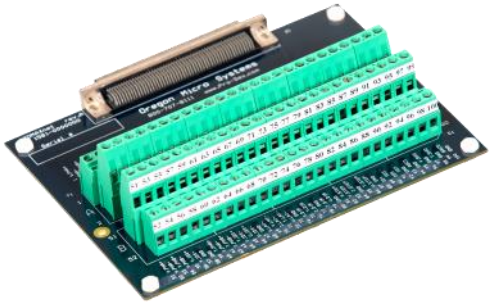


UIO

The UIO connection board is used with the UMX motion controller and is a compact alternative to the screw-terminal board (IO68). It uses standard 15-pin D-sub connectors on each axis and the GPIO is on a separate connector. The UIO uses our CBL15-5 cable with has open leads at one end.

IODnet

The IODnet is an interconnect board designed to be mounted on top of a MAXnet controller for easy connectivity. The IODnet supports up to five (5) axis and is typically sold with the MAXnet and installed at the factory. There is an optional vertical mount power connector on the top of the IODnet that can power the IODnet and MAXnet in place of the MAXnet power connector.



IOMAXnet

The IOMAXnet will connect to the MAXnet series of motion controllers via our 100-pin cable (CBL58-3M). IOMAXnet contains screw terminals for easy custom wiring and is equipped with over current circuitry on the supply voltage. The IOMAXnet is compatible with the MAXnet family of motion controllers.

OMS MOTION CONTROLLER COMMANDS

The OMS Motion controllers command set (OMS-EZ™) has been developed over the course of 35+ years. For the most part the commands are universal across the controller families, though in more recent years new controllers have required some unique commands. OMS controllers are used in vast array of application, from super precision required for an electron microscope to the flexibility needed in assembly line packaging, and OMS controllers cover it all.

The power of the OMS-EZ™ command set is its intuitive logic and versatility. The value of the OMS command set is realized by a rapid time-to-market through quicker development cycles and easy maintenance without the need for a month long training course. There are currently more that 250 commands that can be mixed and matched to provide lots of flexibility for unique applications, or with the used of just a few commands build a very simple motion routine.

OMS-EZ™ commands are composed of 2 and 3 ASCII characters followed by an ASCII argument (variable), such as MR1000 (meaning Move Relative 1000 steps) followed by a GO command. A complete motion control project may often be accomplished using a simple text editor or word processor. Just type the desired command sequence into the text editor and send it off to an OMS controller. Some commands support the use of the "?" as a request response, for example AC? returns the currently set Acceleration for the specific axis.

Our OMS Suite is a utility to interact with the OMS controllers and provide an interactive window where you can compile strings of commands and send to the controller or send text files of commands. It is a great tool for learning about the controller and the commands. Interactive applications combining data acquisition boards, pumps, lasers, etc., can be written using C/C++, Visual Basic or any other programming language. Drivers, DLLs and example code are available at no charge on CD or from our Web page on the Internet (www.OMSmotion.com).

The following pages outline simple application examples for OMS controllers and OMS-EZ™ commands to perform the tasks.

A PARTIAL SAMPLE LIST OF BUILT IN OMS-EZ™ COMMANDS

AA	AXIS ALL
AC#	ACCELERATION
AF#,#	AUXILIARY OFF
AM	AXIS MULTITASKING
AN#,#	AUXILIARY ON
AR	AXIS R
AS	AXIS S
AT	AXIS T
AU	AXIS U
AV	AXIS V
AX	AXIS X
AY	AXIS Y
AZ	AXIS Z
BH#	BIT HIGH, USER I/O LINE #
BI	BIPOLAR SERVO
BL#	BIT LOW, USER I/O LINE #
BX	BIT STATUS REQUEST IN HEX
CA	CLEAR AXIS DONE FLAG
CD#,#;	CONTOUR DEFINE
CE	CONTOUR END
CK	CONTOUR END AND KILL
CN	COSINE ON
CR#,#,#	CIRCULAR INTERPOLATION
CV#	CONTOUR CONSTANT VELOCITY
CW	CLEAR WHILE
CX	CONTOUR EXECUTE
EA	ENCODER STATUS
EF	ECHO OFF
EN	ECHO ON
ER#,#	ENCODER RATIO
ES#	ENCODER SLIP TOLERANCE
ET	ENCODER TRACKING
HD#	HOLD DEADBAND
HE	HOME ENCODER
HF	HOLD OFF
HG#	POSTION MAINTENANCE (HOLD)
HH	HOME HIGH
HL	HOME LOW
HM#	HOME
HN	HOLD ON
HR#	HOME REVERSE
HS	HOME SWITCH
HV#	HOLD VELOCITY
IC	INTERRUPT CLEAR
ID	INTERRUPT DONE
II	INTERRUPT INDEPENDENT
IN#	INTERRUPT NEARLY DONE
IP	INTERRUPT WHEN IN POSITION
IS	INTERRUPT ON SLIP
KA#	ACCELERATION FEED FORWARD COEFFICIENT
KD#	DIFFERENTIAL GAIN COEFFICIENT
KI#	INTEGRAL GAIN COEFFICIENT
KL	KILL
KM	HOME AND KILL
KN#	INTEGRATION INTERVAL COEFFICIENT
KO#	OFFSET COEFFICIENT
KP#	PROPORTIONAL GAIN COEFFICIENT
KR	HOME REVERSE AND KILL
KV#	VELOCITY FEEDFORWARD COEFFICIENT
LE	LOOP END
LF	LIMITS OFF
LH	LIMIT HIGH
LL	LIMIT LOW
LN	LIMITS ON
LP#	LOAD POSITION
LS#	LOOP START
MM	MOVE MINUS MODE
MP	MOVE POSITIVE MODE
MT#,#	MOVE TO ABSOLUTE POSITION
MV#,#	MOVE VELOCITY
PA#	POWER AUTOMATIC
PF	PARABOLIC OFF
PN#	PARABOLIC ON
QA	QUERY AXIS STATE
QI	QUERY INTERRUPT STATUS
RA	RETURN AXIS INTERRUPT STATUS
RB	RETURN OUTPUT BITS
RC	REQUEST ACCELERATION
RE	REQUEST ENCODER POSITION
RI	RETURN INTERRUPT STATUS
RL	RETURN SLIP STATUS
RP	RETURN PROGRAMMED POSITION
	7
RQ	REQUEST QUEUE STATUS
RS	RESET
RU	REPORT POSITION IN USER UNITS
RV	REQUEST VELOCITY
SB#	SET BAUD RATE
SE#	SETTLING TIME
SF	SOFT LIMIT OFF
SL	SOFT LIMIT ON
SP#	STOP AT POSITION
SW#	SYNC WAIT TO I/O BIT #
TF	SLIP TOLERANCE KILL OFF
TN	SLIP TOLERANCE KILL ON
UF	USER UNITS OFF
UN	UNIPOLAR SERVO (0 TO+10)
UU#	USER UNITS
VB#	VELOCITY BASE
VL#	VELOCITY
WA	WAIT FOR AXES
WD	WHILE TERMINATE LOOP
WG	WHILE FLAG END
WH	WHILE LOOP
WQ	WAIT FOR QUEUE TO EMPTY
WS#	WHILE SYNC TRUE
WT#	WAIT TIME
WY	WHO ARE YOU

Examples

The stamping machine in **Figure 1** requires simple **repetitive motion** on one axis. This example assigns acceleration and maximum velocity to the linear actuator attached to the X axis. The machine will stamp a part as long as the switch connected to I/O bit 1 is held low. A "While" loop encapsulates motion commands that advance and retract the stamp.

```
AX;                 * Address the X axis
AC100000;           * Set Acceleration to 100,000 steps/sec/sec
VL25000;            * Set Velocity to 25,000 steps/sec
WS1;                * While I/O bit 1 is low, perform loop
MR80000;GO;         * Move Relative +80,000 steps
MR-80000;GO;        * Move Relative -80,000 steps
WD;                 * Test I/O bit 1, wait here if high
```

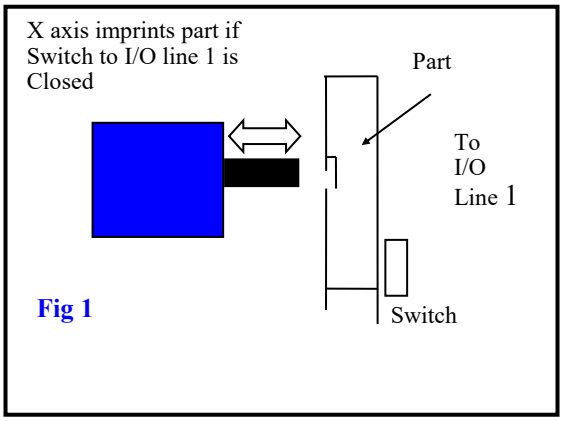


Fig 1

The illustration in **Figure 2** suggests **movement of an X-Y stage** as it positions to accept small parts into an egg-crate container of 4 rows by 8 columns. There are 2000 steps from cell to cell. This example introduces "nested loops" and the use of User I/O lines, available on all OMS controllers.

```
AA;                 * Address All axes
AC100000,100000;          * Set acceleration of X & Y axes
VL25000,25000;      * Set max velocities of X & Y axes
LS8;                * Loop Start, execute 8 times (columns)
LS4;                * Loop Start, execute 4 times (rows)
MR2000;GO;          * Move Relative, X only, 2,000 steps
BH2;WT1000;BL2;           * Set Bit 2 High, Wait 1 sec, lower bit 2
 LE;                * Loop End, 4 vertical slots are filled
MR-8000,2000;GO;          * Move X to start and Y left 1 column
LE;                 * Loop End, all 32 slots will be filled
MR0,-16000;GO;      * Move Relative, back to 0,0 point
```

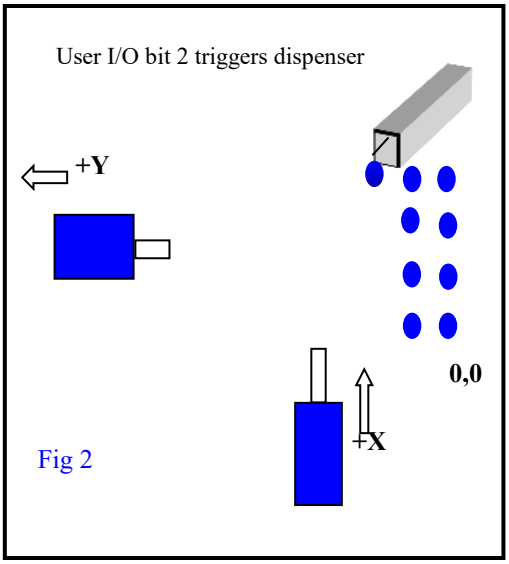
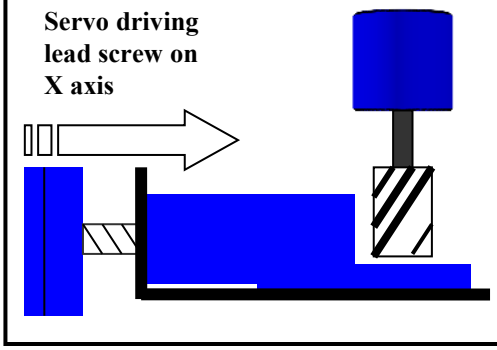


Fig 2

The example in **Figure 3** deals with the use of **servo motor control** to push heavy stock of uneven density into a router blade. The task of the motion controller is to accept high speed input from a shaft position encoder and keep the motor tracking toward the desired final encoder count. PID filter parameters may be sent to an OMS servo controller at any time. Therefore, multiple sets of values may be kept on file and sent to the controller as needed, in milliseconds.

```
AX                  * Address the encoder/motor on the X axis
AC500000;           * Specify an acceleration of 500,000 encoder pps²
VL100000;           * Specify a constant velocity of 100,000 encoder pps
HD10;               * Set the dead band tolerance to ±10 counts
KP50; KI3; KD35.1;  * PID filter parameters for this motor/load
HN;                 * Enable PID filter position correction
MA20000;GO;         * Move Absolute 20,000 encoder counts into cutter
```

Fig 3



Examples

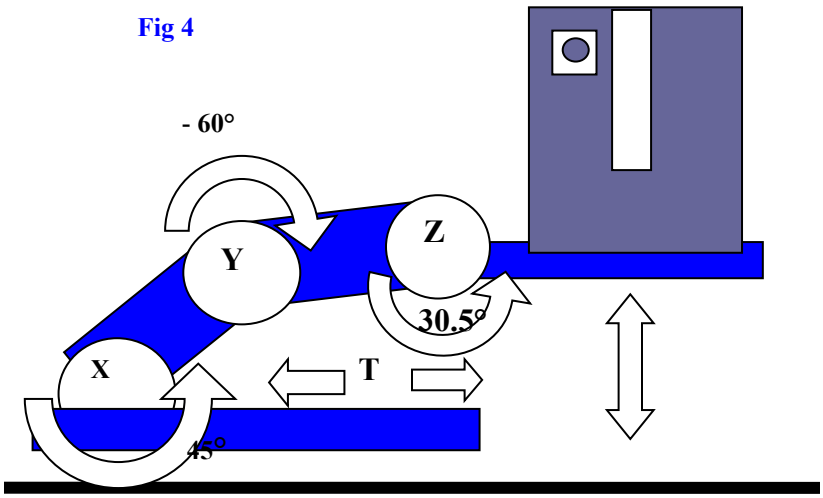
Figure 4 suggests **working in inches, feet, millimeters, degrees** rather than motor steps. The User Units command (UU) greatly simplifies programming and conversion tasks. Consider the job of this automated warehouse, package place and retrieval gantry. The part attached to rails on the floor moves back and forth in units of inches. The arms of the gantry are commanded in degrees of rotation. All we need know is the number of motor steps required to move one unit. If a motor takes 2000 steps to rotate 360 degrees then the ratio is 5.55555 **:** 1.

If the motor moving the gantry horizontally along the floor track moves 1 inch in 2000 steps its ratio is 2000 **:** 1. Once an OMS motion controller has been given the ratios the application programmer may command the gantry in familiar easy to understand terms.

```
AT UU2000;          * A linear motor, T, moves at 2000 steps per inch along the floor
AX UU5.55555;       * Motor on X axis requires 2000 steps to rotate 360 degrees
AY UU5.55555;       * Motor on Y axis requires 2000 steps to rotate 360 degrees
AZ UU5.55555;       * Motor on Z axis requires 2000 steps to rotate 360 degrees
AA                  * The following commands pertain to all axes
AC50,50,50,6.5;     * Accelerate X,Y,Z 50 deg/sec/sec, and T at 6.5 inches/sec/sec
VL15,15,15,10;      * At speed move X,Y,Z 15 deg/sec and T 10 inches/sec
CN                  * Accelerate all axes using a Cosine "S" curve for smoothest motion
MA,,,144.5; GO      * Advance the gantry (motor on T axis) from 0 to the 12.5 foot point
ML45,-60,30.5; GO   * Perform a coordinated linear motion on 3 axes simultaneously
                          * Note that X,Y,Z have been addressed in degrees
```

The application program controlling this automated warehouse may query an OMS controller at any time for the current position or velocity of any axes. A home command (HM) may be issued to each axis to assure machine alignment at startup or after slip detection. Moves may be instructed to interrupt the running application when the destination has been reached, thus freeing the host processor for other jobs. The commands shown above work equally well with stepper or servo motors whether they transport grams, gallons or tons.

Fig 4



Why OMS Motion

Proven successful performance for more than 35 years.

All OMS controllers receive 100% test and QC before shipping.

The exclusive OMS Rapid Turn-Around program for service when required.

Great price/performance value at the lowest installed cost to your project.

OMS motion command set is universal and intuitive for quick development.

Adjustments to your products no longer require a lengthy re-learning cycle.

Broad product line of controllers, motors, drives and software.

Customizing for unique requirements and optimum application performance.

OMS is a great business partner!

OMS Motion, Inc. began as *Oregon Micro Systems, Inc.* back in the early 80's and has been helping customers be successful ever since. We are a supplier of motion control, from the individual integrator to Fortune 500 companies, semi-conductor equipment manufacturers, medical research, automated packaging machine builders, government research facilities, and many other industries. A number of our customers are capable of developing their own motion control, though the big picture proves that this is not typically a the best fit due to time to market, materials management, etc. Along with our philosophy that there is no success without our customer's success, OMS is chosen because our reputation and we offer the right products, for the right price, at the right time and just as important, we are, easy to do business with… We are
"The Company in Motion"™.

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