

MP4U



8-Axis Modular EtherCAT Drive Module

- > Integrated 8 EtherCAT drives and supplies
- > High performance and economical type of drives
 - > **NanoPWM™** drives (NPM3U) for sub nanometer jitter and following errors
 - > PWM (UDM3U) for less demanding axes
- > Wide range of current and voltage
 - > Current: 3.3/10A to 13.3/40A (cont/peak)
 - > Voltage: 48Vdc and 96Vdc
- > 1.6 kW and 3.2 kW power supply with AC input
 - > 96Vdc/32A
 - > 48Vdc/32A or 48Vdc/ 64A
 - > Both 96Vdc/32A and 48Vdc/32A
- > Safe Torque Off (STO) option
- > All connectors are located on the back of the enclosure
- > Built-in fans draw air from the front and extract it from the back of the enclosure
- > ACS field proven robustness and reliability

The MP4U is an 8-axis modular EtherCAT drive module that enables the user to tailor the specific drive for each axis. Different drives can be selected for each pair of axes as well as the power supplies. Two types of drive module can be specified: The **NanoPWM™** (NPM3U) drives for the highest performance of position jitter and following error demanding axes, and the more economical PWM (UDM3U) drives for the less demanding axis. Each module (two or one axis) can be specified for 3.3/10A (cont/peak) to 13.3/40A and can be connected to either 96Vdc or 48Vdc. The power supply is made of one or two plug-in modules, each fed by a single phase AC input and generating 48Vdc/32A output. The system can be ordered with one supply module providing 48Vdc/32A or two modules, connected either in parallel and providing 48Vdc/64A, or connected in series and thus providing 96Vdc/32A as well as 48V/32A. For each of the four drive modules it can be specified by which voltage it is fed (when both 48Vdc and 96Vdc voltages are available). Each drive is available with optional motor shortening relays, absolute encoder, as well as 50kHz SIN-COS encoder interfaces. The **NanoPWM™** is also available with a 10MHz SIN-COS encoder interface for laser type encoders. STO is an option that is specified for either none or for all drives.

The basic configuration consists of a power management module, which includes a logic supply that is fed by a dedicated AC input connector, and a regeneration module.

The user can select the power supply configuration, the type of each of the four drive modules, its current and which voltage (48Vdc or 96Vdc) to feed it.

(Note: Soon the MP4U will be available with an optional built-in motion controller and EtherCAT master. Consult ACS for availability. Currently it can be operated with an ACS controller, such as the SPiiPlusEC, SPiiPlusES, and any of the SPiiPlusCMxx control modules.)

Dimensions

19" Enclosure

Height [mm]	260 (6U)
Width [mm]	
With no ears	440
With ears	483
Depth [mm]	
Without handles	266
With handles	306

Weight [Kg]

4-axes: 11.8
8-axes: 13.3

EtherCAT® Communication

To connect to an ACS motion controller
Two ports: In and Out, 100 Mbit/sec, RJ45 connector

Accessories

PN MP4U-ACC1: 4-axes mating connectors kit
PN MP4U-Acc2: 8-axes mating connectors kit



Power management module



2 axis Drive module



Regeneration module



Power supply module

CE, UL (Pending), RoHS compliant

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany

Contact us: sales@acsmotioncontrol.com | www.acsmotioncontrol.com

In-Position
Technologies
www.iptech1.com

ACS
MOTION CONTROL

Plug-in Modules

Power Management

The MP4U is fed by two separate AC inputs. DRIVE SUPPLY to feed the selected drive supplies and CONTROL SUPPLY to feed the built-in 24V control supply

Drive Supply

100 to 240Vac, single-phase, 50-60Hz

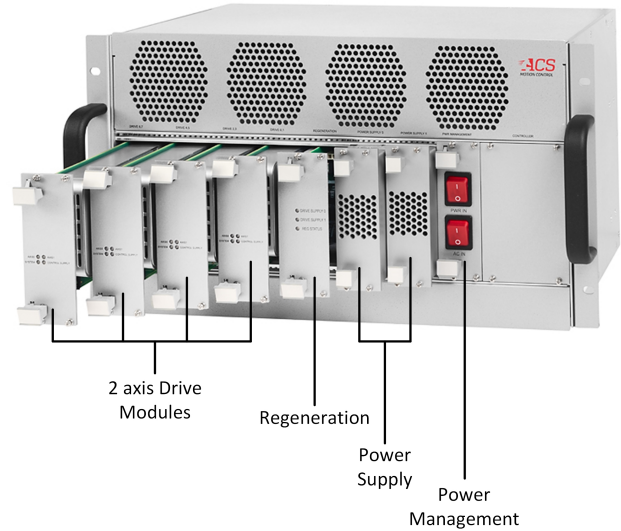
Control Supply

100 to 240Vac, single phase, 50-60Hz

Regeneration

Regeneration control circuit with built-in regeneration
12Ω/100W resistor

An external regeneration resistor with high power can be connected. It must be with a minimum 12Ω resistance
The circuit is short circuit and over-temperature protected



Motor Power Supply

- > 48V/32A
- > 48V/64A
- > 96V/32A
- > Both 96Vdc/32A and 48Vdc/32A

Feature	Description			
Input voltage range [Vrms] Single-phase	100 -240			
Input frequency, nominal [Hz]	50-60			
Configuration	48Vdc/32A	48Vdc/64A	96Vdc/32A	48Vdc & 96Vdc
Minimum continuous/peak output voltage [Vdc]	46.14/45.54	46.14/45.54	93.18/92.58	46.14/45.54 & 93.18/92.58
Maximum continuous/peak output current @100Vac supply [Adc]	15.13/24	30.29/48	15.13/24	Total not to exceed 15.13/24A
Maximum continuous/peak output current @240Vac supply [Adc]	32/32	64/64	32/32	Total not to exceed 32/32
Maximum continuous/peak input current @100 Vac supply [Arms]	16/25.83			
Maximum continuous/peak input current @240 Vac supply [Arms]	13.97/13.97			
Efficiency [%] with 100Vac input	90-92			
Efficiency [%] with 240Vac input	93-95			
Maximum continuous/peak output power with 100Vac input [W]	1410/2222			
Maximum continuous/peak output power with 240Vac input [W]	2962/2962			
Maximum continuous/peak input power with 100Vac inpput [VA]	1600/2583			
Regeneration circuit	Regeneration control with built-in regeneration resistor, 12Ω, 100W, 1.5KW peak Protection: Over temperature for the built-in regeneration resistor Regeneration resistor short circuit			
Certification	CE (EMC, Safety) and UL, Pending RoHS compliant			

Drive

Each plug-in drive module includes one or two identical drives. Both high performance **NanoPWM™** drives (NPM3U) as well as PWM economical (UDM3U) are available. When both 96Vdc and 48Vdc are present, then it can be specified for each plug-in module by which voltage it is fed.

Per drive	NPM3U / UDM3U drive module			
Number of axes	1 or 2			
Drive voltage input range [Vdc]	48 or 96			
Continuous/Peak current Sine amplitude [A]	3.3/10	6.6/20	10/30	13.3/40
Maximum continuous/peak output power per axis @48Vdc [W]	111/317	222/633	336/950	447/1266
Maximum continuous/peak output power per axis @96Vdc [W]	229/675	459/1350	695/2025	924/2700
Maximum continuous/peak output voltage 48Vdc drive supply [Vrms]	27.47/25.85			
Maximum continuous/peak output voltage 96Vdc drive supply [Vrms]	56.74/55.12			
Peak current time [sec]	1			
Minimum load inductance at 96Vdc [μ H]	50			
Per module				
Drive voltage input range [Vdc]	48 or 96			
Continuous/Peak current Sine amplitude [A]	3.3/10	6.6/20	10/30	13.3/40
Maximum continuous input current per plug-in drive module (i=1 or 2 number of drives) [Arms]	i x 2.5	i x 4.9	i x 7.5	i x 10.0
Maximum heat dissipation per plug-in drive module (i=1 or 2 number of drives) [W]	7 + i x 0.9	7 + i x 2.1	7 + i x 3.7	7 + i x 5.6
Maximum heat dissipation by the drive supply per plug-in drive module (i = 1 or 2 number of drives) [W]	i x 12	i x 24	i x 37	i x 49
Maximum total output power continuous/peak with 100Vac input (all axes operating) [W]	1371/2144 @ 48Vdc drive supply 1395/2201 @ 96Vdc drive supply			
Maximum total output power continuous/peak with 240Vac input (all axes operating) [W]	2931/2931 @ 48Vdc drive supply 2931/2931 @ 96Vdc drive supply			

Drives

Up to 4 3U plug-in drive modules can be installed in a MP4U enclosure
Up to 8 drives with two drives per one 3U plug-in driver module
The two motor drives on a 3U drive module must drive the same type of motor

Type: three-phase bridge

Switching method: Advanced unipolar PWM

Protections: Short current, over current, over temperature, over voltage, under voltage

Built-in motor phase shortening relays (optional): disconnects the motor phases from the drive and shortens the phases of the motor

Digital I/O

General Purpose Inputs

Two per axis, 5/24V*, opto-isolated, Default: 24V

Limit inputs

One left and one right limit per axis

Single-ended, 5/24V, sink/source*

Default: 24V, source, Opto-isolated, Input current: 4-14mA

MARK

Two per axis (one primary and one secondary)

Two terminals, 5/24V*, opto-isolated, Default: 24V

Can be used as general purpose digital input

General Purpose / Motor Brake Outputs

One per axis, Opto-isolated, 0.1A per output

Single-ended, 5/24V, sink/source*, Default: 24V, source

Protection: short circuit

PEG (Position Event Generation)

One per axis, PEG Pulse or PEG State

Differential, RS-422

Max. rate: RS422: 10MHz

Programmable pulse width: 26nSec - 1.75msec

Can be used as general purpose outputs

STO (optional)

Two inputs, 24Vdc, 2A supply output for the external drives
Standards (NPM3U): IEC61800-5-2:2016, EN 62061:2005, EN ISO 13849-1:2008

Motor Types

Two- and three-phase permanent magnet synchronous (DC brushless/AC servo), DC brush, Voice coil, Two- and three-phase stepper (micro-stepping open or closed loop)

Feedback

The following feedback types are supported:

Incremental Digital Encoder

Two per axis (one primary and one secondary), AqB/I and Clk/Dir, I RS-422

Maximum input frequency: 50 million encoder counts/sec

Protections: Encoder error, not connected

Incremental Analog SIN-COS Encoder (optional)

Two per axis (one primary and one secondary)

1Vptp, analog differential, 16-bit resolution

Maximum speed – NPM3U: two options: 500kHz or 10MHz

– UDM3U: 500kHz

Protections: Encoder error, not connected

Squared SIN-COS output

One per axis, RS-422

Sharing pins with the corresponding incremental primary incremental encoder

Absolute Encoder (optional)

One per axis, RS-485

Type: EnDat 2.2 & 2.1 digital only, Smart-Abs, Panasonic, Biss-A/B/C, SSI, Sanyo Denki ABS

Hall inputs

One set of three per axis, 5V, source, isolated

Input current: <7mA

Analog I/O

Inputs: Four per drive module, \pm 10V, differential, 12 bit resolution, maximum input frequency 1KHz

Outputs: Four per drive module, \pm 10V, differential, 16 bit resolution, maximum output frequency 5KHz

*Contact ACS for ordering options for the different configurations.

A Complete System Tailored to Your Exact Needs

When ordering, please specify the following:

- > The drives: type, voltage, current and additional features
- > The motor power supply

Component / Feature	Options
Motion Controller	Future Option
Number of axes	A - 2, B - 4, C - 8, D - 16, E - 32, F - 64
ServoBoost, number of axis supported	N - 0, A - 4, B - 8, C - 12, P - 60, Q - 64
Number of ACSPL+ buffers	A - 10, B - 16, C - 32, D - 64
Maximum MPU cycle rate (kHz)	1kHz (64 axes), 2kHz (up to 32 axes), 4kHz (up to 16 axes), 5kHz (up to 8 axes)
NetworkBoost, Flexible configuration	N - None, A - NetworkBoost, B - Flexible configuration, C - Both
Input shaping	Y - Yes, N - No
EtherCAT master to master bridge	Y - Yes, N - No
G-Code	Y - Yes, N - No
STO	Y - Yes, N - No
Limit switches	A - 5V, Source/PNP B - 5V, Sink/NPN C - 24V, Source/PNP D - 24V, Sink/NPN
Digital Inputs	A - 5V, Two terminal B - 24V, Two terminal
Digital Outputs	A - Source/PNP, 5V & 24V B - Sink/NPN, 5V & 24V
Motor Power supply	A - 48V, 32A, B - 48V, 64A, C - 96V, 32A, D - 96V & 48V
Drive module per slots 1-4	U - UDM, P - NPM
Number of drives	1, 2
Current	A - 3.3/10A, B - 6.6/20A, C - 10/30A, D - 13.3/40A
Connected voltage	A - 48V, B - 96V
500kHz SIN-COS encoder interface	For UDM: 0, 1, 2 For NPM: 0, 1, 2, 3, 4
10MHz SIN-COS encoder interface	For UDM: 0 For NPM: 0, 1, 2, 3, 4
Absolute encoders type	N - None, E - Endat 2.2 & 2.1 digital only, S - Smart Abs, P - Panasonic, B - BISS-A/B/C, I - SSI, A - Sanyo ABS
Number of absolute encoders interface	0, 1, 2
Motor relays	Y - Yes, N - No

Future Option