Zaber Technologies Inc.
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1-604-569-3780 *Direct*
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E-MCC Series Datasheet



- 1-3 Axis options
- Plug and play compatibility with Zaber stages and actuators
- CiA 402 drive profile ensures wide-ranging compatibility with EtherCAT masters
- High performance control of stepper and linear servo motors up to 6 A (10 A peak)
- Intuitive, free software simplifies setup and tuning
- Hardware E-Stop provides STO functionality
- Digital and analog I/O

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E-MCC Series Overview

Zaber's E-MCC motor controllers bring Zaber's stages into the EtherCAT ecosystem. These 1-3 axis controllers have plug-and-play functionality with Zaber's peripheral stages, including hundreds of linear stages, rotary stages, and many more. Thanks to autodetect functionality, no configuration is required to get Zaber actuators up and running with the E-MCC.

The CANopen CiA 402 drive profile allows seamless communication with almost any EtherCAT master at cycle rates up to 1 kHz. Distributed clocks functionality provides precise synchronization with the entire EtherCAT network, enabling complex multi-axis applications and synchronization with other third-party devices. Setup is a breeze: plug in your stage, plug in your favorite EtherCAT master, and start moving!

The E-MCC can also control a wide variety of third-party axes. Thanks to advanced 10 kHz control algorithms, the E-MCC can smoothly control stepper motors with currents up to 6 amps. Our free advanced hardware setup tool makes configuring third-party devices straightforward.

For more information visit: https://www.zaber.com/products/controllers-joysticks/E-MCC

E-MCC Series Part Numbering & Options

E-MCC 1 _ _ _

Number of Axes

- **1** — 1-Axis
- **2** — 2-Axis
- **3** — 3-Axis

Encoder Output Type

- **None** — None
- **-T7** — Single-ended encoder to single-ended output
- **-T15** — Differential digital encoder to differential digital output
- **-T16** — Single-ended encoder to differential digital output

Number of Axes with Encoder Output

- **None** — None
- **N1** — 1-Axis
- **N2** — 2-Axis
- **N3** — 3-Axis

E-MCC Series Drawings

- E-MCC1 (Drawing for the E-MCC1)
- E-MCC2 (Drawing for the E-MCC2)
- E-MCC3 (Drawing for the E-MCC3)
- View all drawings and documents at zaber.com

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E-MCC Series Specifications

Overview

Specification	Value
AutoDetect	Yes
Manual Control	Indexed knobs with push switches

Encoder & Sensing

Specification	Value
Limit Sensors per Axis	3

Motor

Specification	Value
Motor Connection	D-Sub 26 female

Power and Communication

Specification	Value
Communication Interface	Dual EtherCAT (100BASE-TX), USB 2.0
Communication Protocol	CANopen over EtherCAT (CoE), Zaber ASCII
Data Cable Connection	Dual RJ-45, USB-B
Power Supply	24-48 VDC
Power Plug	2-pin 5.0 mm screw terminal
Maximum Current Draw	Motor and supply voltage dependent
Controller Maximum Current Per Phase	6 Arms (1 A peak)
EtherCAT Cycle Rates	1 kHz max, 100 Hz min
EtherCAT Synchronization Modes	Distributed Clocks (DC)
Device Profile	CiA 402 Drive Profile (IEC 61800-7)
CiA 402 Modes of Operation	Cyclic Synchronous Position (CSP), Homing (HM)

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EtherCAT Process Data	User-configurable mapping, up to 64 bytes/cycle
External Regen Resistor	5 Ω, 300 W

Analog & Digital I/O

Specification	Value
Isolated Digital Input	4
Isolated Digital Output	4
Analog Input	4
Analog Input Range	0-10 V
Analog Input Resolution	1 mV
Analog Output	1
Analog Output Range	0-10 V
Analog Output Resolution	2.5 mV
Analog Output Impedance	100 Ω
E-Stop Input Range	12-48 V

Environmental & Compliance

Specification	Value
Operating Temperature Range	0 to 50 °C
CE Compliant	Yes
Vacuum Compatible	No

Part Number	Axes of Motion	Weight	Encoder Output Axes	Encoder Output Type
E-MCC1	1	0.5 kg (1.102 lb)	0	None
E-MCC1-T15N1	1	0.5 kg (1.102 lb)	1	T15 - RS422 Encoder Output From -DE Peripherals

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E-MCC1-T16N1	1	0.5 kg (1.102 lb)	1	T16 - RS422 Encoder Output From -E Peripherals
E-MCC1-T7N1	1	0.5 kg (1.102 lb)	1	T7 - TTL Encoder Output From -E Peripherals
E-MCC2	2	0.7 kg (1.543 lb)	0	None
E-MCC2-T15N1	2	0.7 kg (1.543 lb)	1	T15 - RS422 Encoder Output From -DE Peripherals
E-MCC2-T15N2	2	0.7 kg (1.543 lb)	2	T15 - RS422 Encoder Output From -DE Peripherals
E-MCC2-T16N1	2	0.7 kg (1.543 lb)	1	T16 - RS422 Encoder Output From -E Peripherals
E-MCC2-T16N2	2	0.7 kg (1.543 lb)	2	T16 - RS422 Encoder Output From -E Peripherals
E-MCC2-T7N1	2	0.7 kg (1.543 lb)	1	T7 - TTL Encoder Output From -E Peripherals
E-MCC2-T7N2	2	0.7 kg (1.543 lb)	2	T7 - TTL Encoder Output From -E Peripherals
E-MCC3	3	0.9 kg (1.984 lb)	0	None
E-MCC3-T15N1	3	0.9 kg (1.984 lb)	1	T15 - RS422 Encoder Output From -DE Peripherals
E-MCC3-T15N2	3	0.9 kg (1.984 lb)	2	T15 - RS422 Encoder Output From -DE Peripherals
E-MCC3-T15N3	3	0.9 kg (1.984 lb)	3	T15 - RS422 Encoder Output From -DE Peripherals

E-MCC3-T16N1	3	0.9 kg (1.984 lb)	1	T16 - RS422 Encoder Output From -E Peripherals
E-MCC3-T16N2	3	0.9 kg (1.984 lb)	2	T16 - RS422 Encoder Output From -E Peripherals
E-MCC3-T16N3	3	0.9 kg (1.984 lb)	3	T16 - RS422 Encoder Output From -E Peripherals
E-MCC3-T7N1	3	0.9 kg (1.984 lb)	1	T7 - TTL Encoder Output From -E Peripherals
E-MCC3-T7N2	3	0.9 kg (1.984 lb)	2	T7 - TTL Encoder Output From -E Peripherals
E-MCC3-T7N3	3	0.9 kg (1.984 lb)	3	T7 - TTL Encoder Output From -E Peripherals

Contact

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X-MCC Series Datasheet



• Universal drive allows control of 1, 2, 3, or 4 axes, including bipolar stepper motors, linear motors, or voice coil motors with up to 6 Arms (10 A peak) per phase
• Allows different control modes, including independent axis control with trapezoidal velocity profiles or interpolated multi-axis control with line, arc, or circle primitives
• Uses AutoDetect to identify and configure attached Zaber AutoDetect peripherals
• One high speed differential quadrature encoder input, one single-ended encoder input and 3 limit switch inputs per axis
• 4 isolated digital inputs, 4 isolated digital outputs, 4 analog inputs, and 1 analog output
• Multiple communications options: Ethernet, USB, and RS-232
• Intuitive ASCII protocol, programmable triggers, and macros simplify complex automation tasks
• Designed for easy mounting to panels, breadboards, lab benches, and enclosures
• Axes can be locked together to move simultaneously as if they were a single axis, carrying out all motion in parallel
• E-Stop input allows for immediate interruption of power to the motor(s) in an unsafe situation
• Internal regenerative resistor dissipates excess power during hard braking which can be augmented with an external regen resistor if required
• Encoder outputs available on up to 4 axes for easy synchronization with other systems. See our article for details

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X-MCC Series Overview

The X-MCC is Zaber's full feature multi-axis universal drive controller and is available in 1, 2, 3, and 4 axis options. The universal drive is capable of controlling stepper motors, linear motors, and voice coil motors on any axis. Each axis may be equipped with its own encoder (digital or analog, single-ended or differential) and up to three limit sensors, including home and away.

When connected to the X-MCC, Zaber's AutoDetect peripherals will be automatically identified and the axis will be configured with optimized drive settings for the specific device. No additional user input is needed.

The controller provides for 4 channels each of isolated digital inputs, isolated digital outputs, and non-isolated analog inputs. There is also a single analog output channel available.

An intuitive ASCII interface allows the user to easily communicate with the device using our free software, either Zaber Motion Library with APIs for several popular languages or Zaber Launcher. Third-party terminal programs that can communicate over a serial port can also be used.

The X-MCC uses lines, circles, arcs, and helices as geometric primitives while obeying velocity, acceleration, and timing constraints. The result is an easy-to-use set of 2D commands and a seamless transition between lines and curves.

An E-Stop interface is available on the X-MCC series that will stop current flow to all motors. The E-Stop is implemented fully in hardware to guarantee torque is removed from all motors.
The X-MCC series is compatible with all of Zaber's existing X-Series products. When daisy-chained with several units, the X-MCC can also share a single power supply with multiple X-Series products.

Click here to see the list of devices the X-MCC can control.

For more information visit: https://www.zaber.com/products/controllers-joysticks/X-MCC

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X-MCC Series Part Numbering & Options

X-MCC 1 _ _

Number of Axes

1 — 1-Axis
2 — 2-Axis
3 — 3-Axis
4 — 4-Axis

Encoder Output Type

None — None
-T7 — Single-ended encoder to single-ended output
-T8 — Differential analog encoder to interpolated differential digital output
-T15 — Differential digital encoder to differential digital output
-T16 — Single-ended encoder to differential digital output

Number of Axes with Encoder Output

None — None
N1 — 1-Axis
N2 — 2-Axis
N3 — 3-Axis
N4 — 4-Axis

X-MCC Series Drawings

- X-MCC1 (Drawing for the X-MCC1)
- X-MCC2 (Drawing for the X-MCC2)
- X-MCC3 (Drawing for the X-MCC3)
- X-MCC4 (Drawing for the X-MCC4)
- View all drawings and documents at zaber.com

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X-MCC Series Specifications

Overview

Specification	Value
AutoDetect	Yes
Manual Control	Indexed knobs with push switches

Encoder & Sensing

Specification	Value
Limit Sensors per Axis	3

Motor

Specification	Value
Motor Connection	D-Sub 26 female

Power and Communication

Specification	Value
Communication Interface	RS-232, USB 2.0, Ethernet (10/100 Mbit/s)
Communication Protocol	Zaber ASCII (Default), Zaber Binary
Data Cable Connection	Locking 4-pin M8, USB-B
Power Supply	24-48 VDC
Power Plug	5.0 mm screw terminal
Maximum Current Draw	Motor and supply voltage dependent
Controller Maximum Current Per Phase	6 Arms (1 A peak)
External Regen Resistor	5 Ω, 300 W
2D Primitives Supported	Lines, Arcs, Circles, and Helices

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Analog & Digital I/O

Specification	Value
Isolated Digital Input	4
Isolated Digital Output	4
Analog Input	4
Analog Input Range	0-10 V
Analog Input Resolution	1 mV
Analog Output	1
Analog Output Range	0-10 V
Analog Output Resolution	2.5 mV
Analog Output Impedance	100 Ω
E-Stop Input Range	12-48 V

Environmental & Compliance

Specification	Value
Operating Temperature Range	0 to 50 °C
CE Compliant	Yes
Vacuum Compatible	No

Part Number	Axes of Motion	Weight	Encoder Output Axes	Encoder Output Type
X-MCC1	1	0.5 kg (1.102 lb)	0	None
X-MCC1-T15N1	1	0.5 kg (1.102 lb)	1	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC1-T16N1	1	0.5 kg (1.102 lb)	1	T16 - RS422 Encoder Output From -E Peripherals

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X-MCC1-T7N1	1	0.5 kg (1.102 lb)	1	T7 - TTL Encoder Output From -E Peripherals
X-MCC1-T8N1	1	0.5 kg (1.102 lb)	1	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC2	2	0.7 kg (1.543 lb)	0	None
X-MCC2-T15N1	2	0.7 kg (1.543 lb)	1	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC2-T15N2	2	0.7 kg (1.543 lb)	2	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC2-T16N1	2	0.7 kg (1.543 lb)	1	T16 - RS422 Encoder Output From -E Peripherals
X-MCC2-T16N2	2	0.7 kg (1.543 lb)	2	T16 - RS422 Encoder Output From -E Peripherals
X-MCC2-T7N1	2	0.7 kg (1.543 lb)	1	T7 - TTL Encoder Output From -E Peripherals
X-MCC2-T7N2	2	0.7 kg (1.543 lb)	2	T7 - TTL Encoder Output From -E Peripherals
X-MCC2-T8N1	2	0.7 kg (1.543 lb)	1	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC2-T8N2	2	0.7 kg (1.543 lb)	2	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC3	3	0.9 kg (1.984 lb)	0	None
X-MCC3-T15N1	3	0.9 kg (1.984 lb)	1	T15 - RS422 Encoder Output From -DE Peripherals

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X-MCC3-T15N2	3	0.9 kg (1.984 lb)	2	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC3-T15N3	3	0.9 kg (1.984 lb)	3	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC3-T16N1	3	0.9 kg (1.984 lb)	1	T16 - RS422 Encoder Output From -E Peripherals
X-MCC3-T16N2	3	0.9 kg (1.984 lb)	2	T16 - RS422 Encoder Output From -E Peripherals
X-MCC3-T16N3	3	0.9 kg (1.984 lb)	3	T16 - RS422 Encoder Output From -E Peripherals
X-MCC3-T7N1	3	0.9 kg (1.984 lb)	1	T7 - TTL Encoder Output From -E Peripherals
X-MCC3-T7N2	3	0.9 kg (1.984 lb)	2	T7 - TTL Encoder Output From -E Peripherals
X-MCC3-T7N3	3	0.9 kg (1.984 lb)	3	T7 - TTL Encoder Output From -E Peripherals
X-MCC3-T8N1	3	0.9 kg (1.984 lb)	1	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC3-T8N2	3	0.9 kg (1.984 lb)	2	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC3-T8N3	3	0.9 kg (1.984 lb)	3	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC4	4	1.1 kg (2.425 lb)	0	None

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X-MCC4-T15N1	4	1.1 kg (2.425 lb)	1	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC4-T15N2	4	1.1 kg (2.425 lb)	2	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC4-T15N3	4	1.1 kg (2.425 lb)	3	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC4-T15N4	4	1.1 kg (2.425 lb)	4	T15 - RS422 Encoder Output From -DE Peripherals
X-MCC4-T16N1	4	1.1 kg (2.425 lb)	1	T16 - RS422 Encoder Output From -E Peripherals
X-MCC4-T16N2	4	1.1 kg (2.425 lb)	2	T16 - RS422 Encoder Output From -E Peripherals
X-MCC4-T16N3	4	1.1 kg (2.425 lb)	3	T16 - RS422 Encoder Output From -E Peripherals
X-MCC4-T16N4	4	1.1 kg (2.425 lb)	4	T16 - RS422 Encoder Output From -E Peripherals
X-MCC4-T7N1	4	1.1 kg (2.425 lb)	1	T7 - TTL Encoder Output From -E Peripherals
X-MCC4-T7N2	4	1.1 kg (2.425 lb)	2	T7 - TTL Encoder Output From -E Peripherals
X-MCC4-T7N3	4	1.1 kg (2.425 lb)	3	T7 - TTL Encoder Output From -E Peripherals
X-MCC4-T7N4	4	1.1 kg (2.425 lb)	4	T7 - TTL Encoder Output From -E Peripherals

X-MCC4-T8N1	4	1.1 kg (2.425 lb)	1	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC4-T8N2	4	1.1 kg (2.425 lb)	2	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC4-T8N3	4	1.1 kg (2.425 lb)	3	T8 - Interpolated RS422 Encoder Output From -AE Peripherals
X-MCC4-T8N4	4	1.1 kg (2.425 lb)	4	T8 - Interpolated RS422 Encoder Output From -AE Peripherals

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