

Description

The MC4XDZP01 mounting card is designed to host up to four DZE series DigiFlex® Performance™ digital servo drives in the following configuration:

- ▲ **'DxM' Configuration** – *ADVANCED* Motion Controls exclusive 'DxM' technology allows connectivity of up to 3 DZSANTU drives (sub-nodes) to a single DZEANTU (node) on an EtherCAT® network. DZSANTU drives receive commands from a DZEANTU over a high-speed communication interface, allowing for up to 4 axes of servo drive control from a single EtherCAT connection.

The MC4XDZP01 offers convenient quick-disconnect signal, feedback, and communication connectors. A dedicated connector for Safe Torque Off (STO) is also included. This mounting card is ideal for prototyping and integrating DZE digital servo drives into your machine.

Drive Compatibility

DZE and DZS Drive Models

80V Drive Models

40A
20A

175V Drive Models

20A



EtherCAT®

Features

- ▲ Mounts one DZEANTU and up to three DZSANTU DigiFlex® Performance™ Digital Servo Drives in an *ADVANCED* Motion Controls 'DxM' Configuration

DRIVES SUPPORTED

- 'DxM' Configuration (EtherCAT)
 - DZEANTU-020B080
 - DZSANTU-020B080
 - DZEANTU-040B080
 - DZSANTU-040B080
 - DZEANTU-020B200
 - DZSANTU-020B200

FEEDBACK SUPPORTED (DRIVE FIRMWARE DEPENDENT)

- Incremental Encoder
- Auxiliary Incremental Encoder
- Hall Sensors
- 1Vp-p Sine/Cosine Encoder
- Absolute Encoder (EnDat®, Hiperface®, or BiSS C-Mode)
- ±10 VDC Position
- Tachometer (±10 VDC)

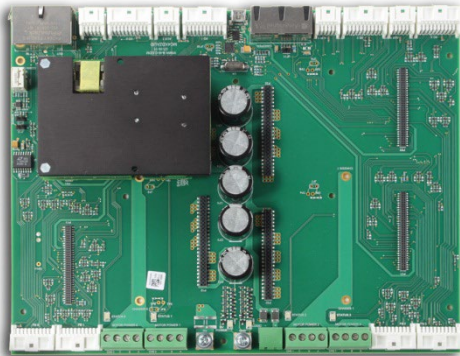
COMPLIANCES & AGENCY APPROVALS

- RoHS II

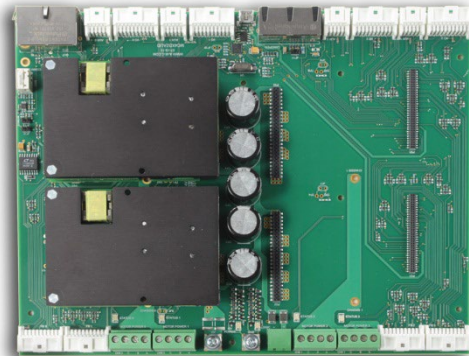
Network Configurations and Axis Population

The table below shows the configuration options and axis population requirements for the MC4XDZP01. Note that populating axes 1, 2, and 3 is not required. The MC4XDZP01 can operate as a node in an EtherCAT network with only a DZEANTU drive installed in the Axis 0 slot if desired. When operating the MC4XDZP01 in a multi-axis configuration, note that only Axis 0 and Axis 1 are used for two-axis control; Axis 0, Axis 1, and Axis 2 are used for three-axis control; and Axis 0, Axis 1, Axis 2, and Axis 3 are used for four-axis control.

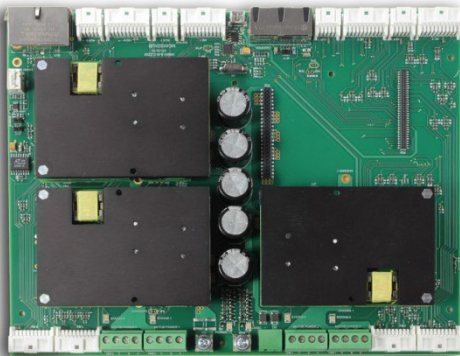
	Single-Axis	Two-Axis	Three-Axis	Four-Axis
Network	Axis 0 (required)	Axis 1 (optional)	Axis 2 (optional)	Axis 3 (optional)
'DxM' Configuration (EtherCAT)	DZEANTU	DZSANTU	DZSANTU	DZSANTU



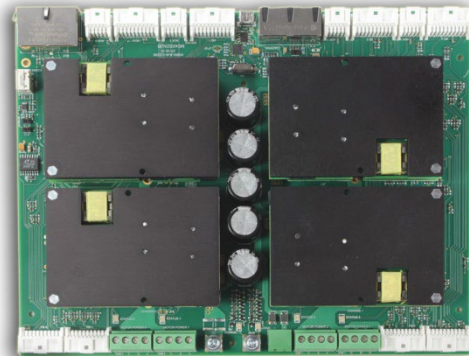
Single-Axis



Two-Axis



Three-Axis



Four-Axis

Status LED Functions

The MC4XDZP01 contains status LEDs that indicate DC Power Supply status, Logic Power Supply status, and the drive Bridge status. The Power LED will light up green when power is applied to P5-Power Connector, and the Logic LED will light up green when the Logic Power is applied to P6-Auxiliary Logic Connector. The Bridge Status LED indicates the servo drive's power bridge state, and will be green when the drive is enabled, and red when the drive is in a fault state.

PIN FUNCTIONS

Mounting Signal Connectors

These connectors mate directly to the drive. Use caution when inserting/removing drive to avoid damaging drive pins! For pin functions refer to the drive datasheet.

Mounting Power Connectors

These connectors mate directly to the drive. Use caution when inserting/removing drive to avoid damaging drive pins! For pin functions refer to the drive datasheet.

MOTOR POWER 0/1/2/3 – Motor Power Connectors

Pin	Name	Description / Notes	I/O
1	MOTOR A	Motor Phase Outputs (16 A continuous maximum per axis)	O
2	MOTOR B		O
3	MOTOR C		O
4	CHS0 or CHS1	Shield Connection. CHS0 connected to Chassis 0 mounting hole, CHS1 connected to Chassis 1 mounting hole.	-

HV – Power Connector

Pin	Name	Description / Notes	I/O
1	HIGH VOLTAGE	DC Power Input (67 A continuous maximum)	I
2	GND	Ground	GND

LOGIC – Auxiliary Logic Connector

Pin	Name	Description / Notes	I/O
1	AUX LOGIC	Logic Supply Input	I
2	GND	Ground	GND

ETHERCAT IN/OUT – EtherCAT Communication Connectors

Pin	Name	Description / Notes	I/O
1	TX+	Transmit Line (100 Base TX)	I/O
2	TX-		I/O
3	RX+	Receive Line (100 Base TX)	I/O
4	RESERVED	Reserved	-
5	RESERVED	Reserved	-
6	RX-	Receive Line (100 Base TX)	I/O
7	RESERVED	Reserved	-
8	COMM CHASSIS	Cable shield. Internally connected to Comm Chassis mounting hole.	-

USB – USB Communication Connector

Pin	Name	Description / Notes	I/O
1	VBUS	Supply Voltage	O
2	DATA -	USB Data -	I/O
3	DATA +	USB Data +	I/O
4	RESERVED	Reserved	-
5	USB GND	USB Ground	UGND

STO 0/1/2/3 – Safe Torque Off (STO) Connectors*

Pin	Name	Description / Notes	I/O
1	STO OUTPUT	Safe Torque Off Output	O
2	STO 5V DISABLE	5V Supply Output for STO Disable. Internal use only.	O
3	STO-1 RETURN	Safe Torque Off 1 Return	STORET1
4	STO-1	Safe Torque Off – Input 1	I
5	STO-2 RETURN	Safe Torque Off 2 Return	STORET2
6	STO-2	Safe Torque Off – Input 2	I
7	STO GND DISABLE	Ground for STO Disable. Internal use only.	GND
8	STO OUT RETURN	Safe Torque Off Output Return	STORETO

*Note: Dedicated STO Disable Key connectors are included and should be installed for applications where STO is not required.

I/O 0/1/2/3 - I/O Connectors

Pin	Name	Description	I/O
1	COMM CHASSIS	Shield Connection. Connected to Comm Chassis mounting hole.	-
2	RESERVED	Reserved	-
3	PDI-1	Programmable Digital Input 1	I
4	PDI-4+	High Speed Differential Programmable Digital Input 4	I
5	PDI-2	Programmable Digital Input 2	I
6	PDI-4-	High Speed Differential Programmable Digital Input 4	I
7	PDI-3	Programmable Digital Input 3	I
8	PDI-5+	High Speed Differential Programmable Digital Input 5	I
9	RESERVED	Reserved	-
10	PDI-5-	High Speed Differential Programmable Digital Input 5	I
11	PDO-1	Programmable Digital Output 1	O
12	RESERVED	Reserved	-
13	PDO-2	Programmable Digital Output 2	O
14	+5V OUT	+5V Output from Logic Supply	O
15	PDO-3	Programmable Digital Output 3	O
16	GND	Ground	GND
17	PDO-4	Programmable Digital Output 4	O
18	PAI-1+	Differential Programmable Analog Input or Reference Signal Input (12-bit resolution)	I
19	PDO-5	Programmable Digital Output 5	O
20	PAI-1-	Differential Programmable Analog Input or Reference Signal Input (12-bit resolution)	I

AUX 0/1/2/3 - Auxiliary Feedback Connectors

Pin	Name	Description	I/O
1	COMM CHASSIS	Shield Connection. Connected to Comm Chassis mounting hole.	-
2	RESERVED	Reserved	-
3	AUX ENC I+	Auxiliary Incremental Encoder Channel I or Differential Programmable Digital Input 8	I
4	AUX ENC A+	Auxiliary Incremental Encoder Channel A or Differential Programmable Digital Input 6	I
5	AUX ENC I-	Auxiliary Incremental Encoder Channel I or Differential Programmable Digital Input 8	I
6	AUX ENC A-	Auxiliary Incremental Encoder Channel A or Differential Programmable Digital Input 6	I
7	+5V USER	+5V User Supply Output (current shared with Pin-17 on Feedback Connector)	O
8	AUX ENC B+	Auxiliary Incremental Encoder Channel B or Differential Programmable Digital Input 7	I
9	GND	Ground	GND
10	AUX ENC B-	Auxiliary Incremental Encoder Channel B or Differential Programmable Digital Input 7	I

FB 0/1/2/3 - Feedback Connectors*

Pin	Incremental Encoder	Absolute Encoder	1Vp-p Sin/Cos Encoder	Description / Notes	I/O
1	CHS0 or CHS1	CHS0 or CHS1	CHS0 or CHS1	Shield Connection. FB 0 and FB 1 connected to Chassis 0 mounting hole, FB 2 and FB 3 connected to Chassis 1 mounting hole.	-
2	RESERVED	RESERVED	RESERVED	Reserved	-
3	MOT ENC I+	RESERVED	RESERVED	Differential Encoder Index	I
4	MOT ENC A+	SIN+	SIN+	Differential Encoder A / Differential Sine Input	I
5	MOT ENC I-	RESERVED	RESERVED	Differential Encoder Index	I
6	MOT ENC A-	SIN-	SIN-	Differential Encoder A / Differential Sine Input	I
7	HALL A	RESERVED	HALL A	Commutation sensor input.	I
8	MOT ENC B+	COS+	COS+	Differential Encoder B/ Differential Cosine Input	I
9	HALL B	RESERVED	HALL B	Commutation sensor input.	I
10	MOT ENC B-	COS-	COS-	Differential Encoder B/ Differential Cosine Input	I
11	HALL C	RESERVED	HALL C	Commutation sensor input.	I
12	RESERVED	RESERVED	RESERVED	Reserved	-
13	RESERVED	RESERVED	RESERVED	Reserved	-
14	RESERVED	MOT ENC CLK+	RESERVED	Differential Clock Line	I/O
15	MOTOR THERMISTOR	MOTOR THERMISTOR	MOTOR THERMISTOR	Motor Thermal Protection	I
16	RESERVED	MOT ENC CLK-	RESERVED	Differential Clock Line	I/O
17	+5V USER	+5V USER	+5V USER	+5V User Supply Output (current shared w/ Pin-7 on Aux Feedback Conn.)	O
18	RESERVED	MOT ENC DATA+	RESERVED	Differential Data Line	I/O
19	GND	GND	GND	Ground	GND
20	RESERVED	MOT ENC DATA-	RESERVED	Differential Data Line	I/O

*Note: Feedback supported (Incremental Encoder, Absolute Sin/Cos Encoder, or 1Vp-p Sin/Cos Encoder) will be dependent on drive firmware.

BOARD CONFIGURATION

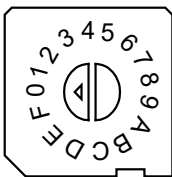
EtherCAT Communication LED Functions (on RJ-45 Communication Connectors)

LINK/ACTIVITY LED		
LED State	Description	
Green – On	Valid Link - No Activity	
Green – Flickering	Valid Link - Network Activity	
Off	Invalid Link	

STATUS LED	
LED State	Description
Green – On	The device is in the state OPERATIONAL
Green – Blinking (2.5Hz – 200ms on and 200ms off)	The device is in the state PRE-OPERATIONAL
Green – Single Flash (200ms flash followed by 1000ms off)	The device is in state SAFE-OPERATIONAL
Green – Flickering (10Hz – 50ms on and 50ms off)	The device is booting and has not yet entered the INIT state
	or The device is in state BOOTSTRAP
	or Firmware download operation in progress
Off	The device is in state INIT

ERROR LED		
LED State	Description	Example
Red – On	A PDI Watchdog timeout has occurred.	Application controller is not responding anymore.
Red – Blinking (2.5Hz – 200ms on and 200ms off)	General Configuration Error.	State change commanded by master is impossible due to register or object settings.
Red – Flickering (10Hz – 50ms on and 50ms off)	Bootling Error was detected. INIT state reached, but parameter "Change" in the AL status register is set to 0x01:change/error	Checksum Error in Flash Memory.
Red – Single Flash (200ms flash followed by 1000ms off)	The slave device application has changed the EtherCAT state autonomously: Parameter "Change" in the AL status register is set to 0x01:change/error.	Synchronization error; device enters SAFE-OPERATIONAL automatically
Red – Double Flash (Two 200ms flashes separated by 200ms off, followed by 1000ms off)	An application Watchdog timeout has occurred.	Sync Manager Watchdog timeout.

Mounting Card Address Switch

Switch Diagram	Description															
	Hexadecimal switch settings correspond to the drive Station Alias. Note that drives on an EtherCAT network will be given an address automatically based on proximity to the host. Setting the switches manually is optional, and only necessary if a fixed address is required.															
	<table> <tr> <th>Switch Setting</th><th>Node ID</th></tr> <tr> <td>0</td><td>000</td></tr> <tr> <td>1</td><td>016</td></tr> <tr> <td>2</td><td>032</td></tr> <tr> <td>...</td><td>...</td></tr> <tr> <td>D</td><td>208</td></tr> <tr> <td>E</td><td>224</td></tr> <tr> <td>F</td><td>240</td></tr> </table>	Switch Setting	Node ID	0	000	1	016	2	032	D	208	E	224	F
Switch Setting	Node ID															
0	000															
1	016															
2	032															
...	...															
D	208															
E	224															
F	240															

CONNECTOR INFORMATION

Mounting Signal Connectors

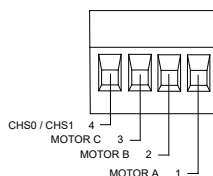
Connector Information	96-pin (Axis 0) / 68-pin (Axis 1/2/3), 1.27 mm spaced, dual-row socket
Mating Connector Example	No Mating Connector Required. Mate directly to drive

Mounting Power Connectors

Connector Information	50-pin, 2.0 mm spaced, dual-row socket
Mating Connector Example	No Mating Connector Required. Mate directly to drive

MOTOR POWER 0/1/2/3 - Motor Power Connectors

Connector Information		4-port screw terminal
Mating Connector	Details	Not Applicable
	Included with Card	Not Applicable

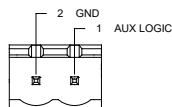


HV - Power Connector

Connector Information		Bushings with M4 Screw
Mating Connector	Details	Not Applicable
	Included with Card	Not Applicable

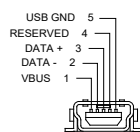
LOGIC - Auxiliary Logic Connector

Connector Information		2-port, 5.08 mm spaced, enclosed, friction lock header
Mating Connector	Details	Phoenix Contact: P/N 1757019
	Included with Card	Yes



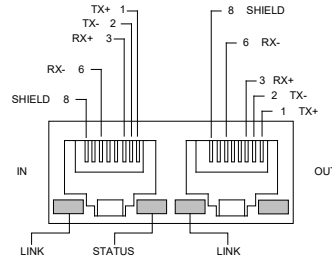
USB - USB Connector

Connector Information		5-pin, Mini USB B Type port
Mating Connector	Details	TYCO: 1496476-3 (2-meter STD-A to MINI-B ASSY)
	Included with Card	No



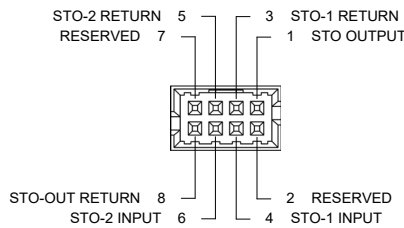
ETHERCAT IN/OUT - EtherCAT Communication Connectors

Connector Information		Shielded, dual RJ-45 socket with LEDs
Mating Connector	Details	CAT 5 Cable
	Included with Card	No



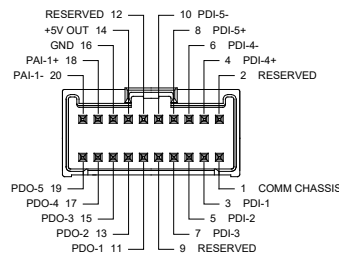
STO 0/1/2/3 - Safe Torque Off Connectors

Connector Information		8-port, 2.00 mm spaced, enclosed, friction lock header
Mating Connector	Details	Molex: P/N 51110-0860 (housing); 50394-8051 (pins)
	Included with Card	No



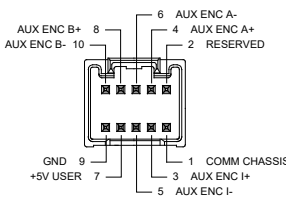
I/O 0/1/2/3 - I/O Connectors

Connector Information		20-pin, dual-row, 2.00 mm spaced plug terminal, horizontal mount
Mating Connector	Details	Molex: P/N 51353-2000 (housing); 56134-9100 (contacts)
	Included with Card	No



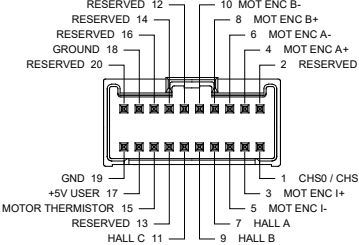
AUX 0/1/2/3 - Auxiliary Feedback Connectors

Connector Information		10-pin, dual-row, 2.00 mm spaced plug terminal, horizontal mount
Mating Connector	Details	Molex: P/N 51353-1000 (housing); 56134-9100 (contacts)
	Included with Card	No

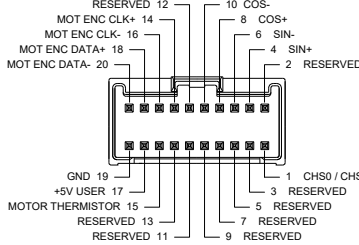


FB 0/1/2/3 - Feedback Connectors

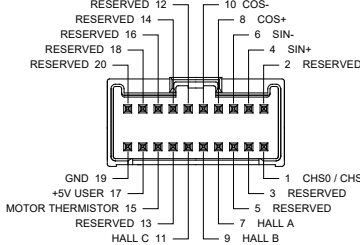
Connector Information		20-pin, dual-row, 2.00 mm spaced plug terminal, horizontal mount
Mating Connector	Details	Molex: P/N 51353-2000 (housing); 56134-9100 (contacts)
	Included with Card	No



Incremental Encoder

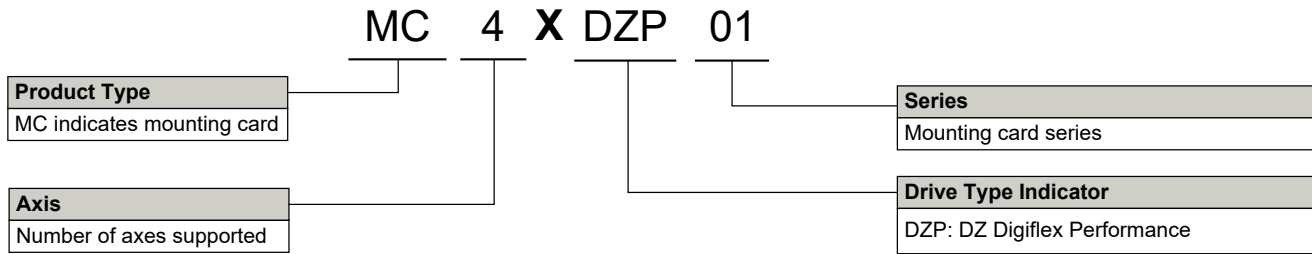


Absolute Encoder



1Vp-p Sin/Cos Encoder

PART NUMBERING INFORMATION



DigiFlex® Performance™ series of products are available in many configurations. All models listed in the selection tables of the website are readily available, standard product offerings.

ADVANCED Motion Controls also has the capability to promptly develop and deliver specified products for OEMs with volume requests. Our Applications and Engineering Departments will work closely with your design team through all stages of development in order to provide the best servo drive solution for your system. Equipped with on-site manufacturing for quick-turn customs capabilities, ADVANCED Motion Controls utilizes our years of engineering and manufacturing expertise to decrease your costs and time-to-market while increasing system quality and reliability.

Examples of Customized Products

- | | |
|--|--|
| <ul style="list-style-type: none"> ▲ Optimized Footprint ▲ Private Label Software ▲ OEM Specified Connectors ▲ No Outer Case ▲ Increased Current Resolution ▲ Increased Temperature Range ▲ Custom Control Interface ▲ Integrated System I/O | <ul style="list-style-type: none"> ▲ Tailored Project File ▲ Silkscreen Branding ▲ Optimized Base Plate ▲ Increased Current Limits ▲ Increased Voltage Range ▲ Conformal Coating ▲ Multi-Axis Configurations ▲ Reduced Profile Size and Weight |
|--|--|

Feel free to contact Applications Engineering for further information and details.

All specifications in this document are subject to change without written notice. Actual product may differ from pictures provided in this document.