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Eval Board
D50/5/4QE-M2

General Description

The D50/5/4QE-M2 evaluation board is designed to work with the D50/5/4QE-E2 series drivers (referenced below as -E2 drivers). It is designed for interfacing the driver with the customer electronics, power supplies and measuring equipment and is very handy for limited volume production or to allow the testing of systems before the customer's electronics is ready.
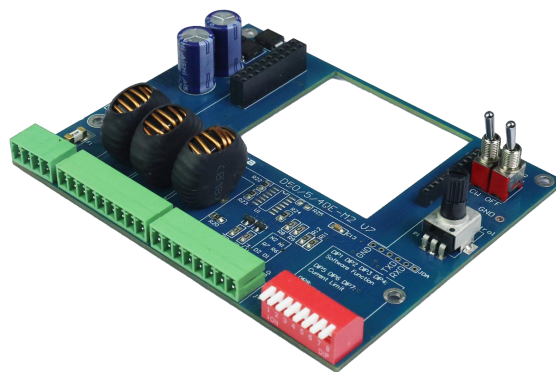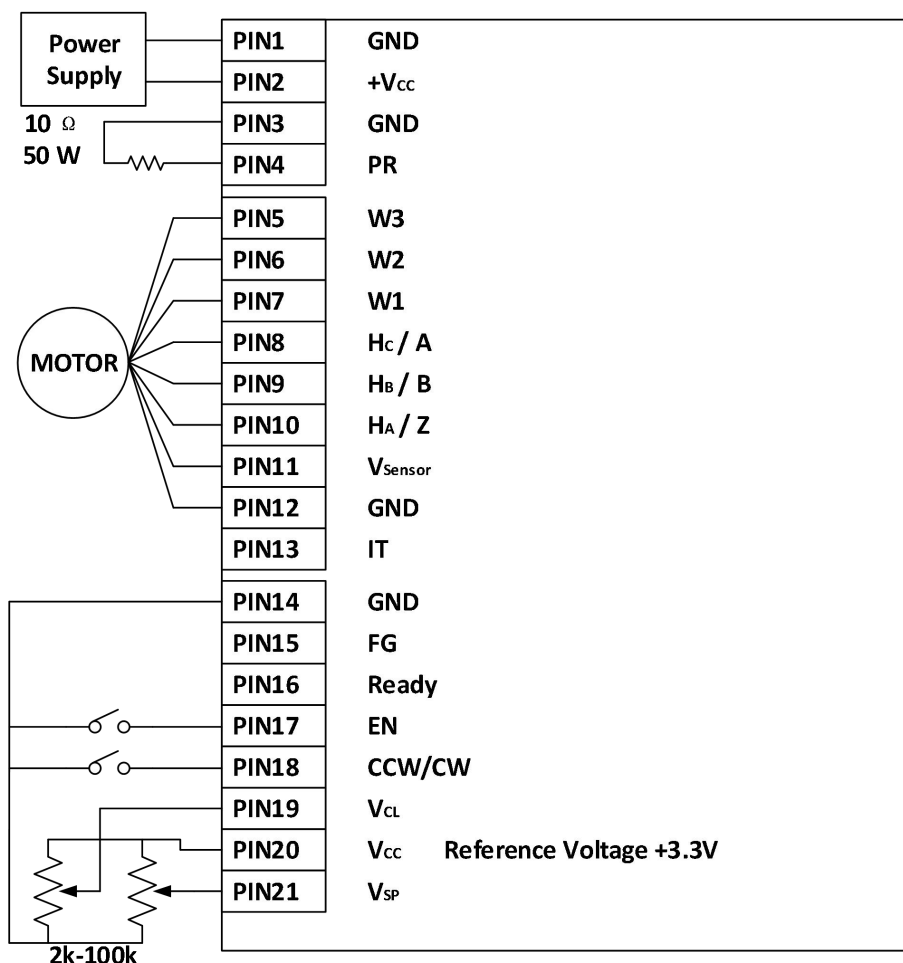
Together with the -E2 drivers, they were designed to control brushless motors.

For more details about the -E2 drivers, refer to the D50/5/4QE-E2 literature.

Features:

- Drives one brushless motor (up to 50 V and 5 A)
- Speed and current limiting modes
- Designed for Boreasa motors, but suitable for various motor requirements
- Robust 50 VDC power supply interface
- Onboard potentiometer-based speed regulation
- Reverse polarity protection

Typical hookup drawing:

Power Supply	PIN1	GND
	PIN2	+V_{CC}
10 Ω 50 W	PIN3	GND
	PIN4	PR
	PIN5	W3
	PIN6	W2
	PIN7	W1
MOTOR	PIN8	H_C / A
	PIN9	H_B / B
	PIN10	H_A / Z
	PIN11	V_{Sensor}
	PIN12	GND
	PIN13	IT
	PIN14	GND
	PIN15	FG
	PIN16	Ready
	PIN17	EN
	PIN18	CCW/CW
	PIN19	V_{CL}
	PIN20	V_{CC} Reference Voltage +3.3V
	PIN21	V_{SP}

2k-100k

Pin assignment D50/5/4QE-M2:

Pin	Signal	Description
1	GND	Ground
2	+V$_{CC}$	Supply voltage 16 to 50 VDC
3	GND	Ground
4	PR	Connect the brake resistor
5	W	Motor winding 3
6	V	Motor winding 2
7	U	Motor winding 1
8	H$_C$	Hall sensor C
8	A	Incremental encoder channel A
9	H$_B$	Hall sensor B
9	B	Incremental encoder channel B
10	H$_A$	Hall sensor A
10	Z	Incremental encoder channel Z
11	V$_{Sensor}$	+5 VDC output to sensors
12	GND	Sensor GND
13	IT	Motor internal temperature

Pin	Signal	Description
14	GND	Ground
15	FG	Motor speed monitor digital output, 3.3 V
16	Ready	Status indication digital output, 3.3 V
17	EN	Enable input (+2.4 to +15 V) or open collector
18	CCW/CW	Direction input
19	V$_{CL}$	Set peak current limit input
20	V$_{CC}$	Reference voltage output +3.3 V
21	V$_{SP}$	Speed control input, 0 to +3.0 V

For more details on signals, please refer to -E2 driver literature.

DIP switch setting:

Interface diagram	Switch	Description
	DIP1	Different daughter boards have different definitions, please check the corresponding daughter board software manual.
	DIP2	DIP1 is connected to DigIN1 of the E2 driver; DIP2 is connected to DigIN2 of the E2 driver;
	DIP3	DIP3 is connected to DigIN3 of the E2 driver; DIP4 is connected to DigIN4 of the E2 driver;
	DIP4	DIPx is turned on, which is equal to the low level of the DigINx pin. DIPx is turned off, which is equal to the high level of the DigINx pin.
	DIP5	
	DIP6	Current limit
	DIP7	
	DIP8	Control Mode

Current limit:

DIP5	DIP6	DIP7	Current limit
ON	ON	ON	2 A
ON	ON	OFF	5 A
ON	OFF	ON	7 A
ON	OFF	OFF	10 A
OFF	ON	ON	12 A
OFF	ON	OFF	13 A
OFF	OFF	ON	14 A
OFF	OFF	OFF	15 A

Control mode:

DIP8	Set speed value
ON	Internal potentiometer
OFF	External potentiometer (2k - 100k) or voltage

Note: when the DIP8 is ON, the PIN21 must be disconnected.

LED signals:

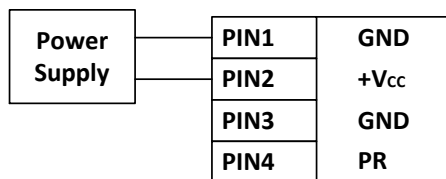| D1	Meaning
ON	Ready
OFF	Error

Recommended Initial Settings for Boreasa Motors:

Basic Connections:

«EN» port: Active-low enable

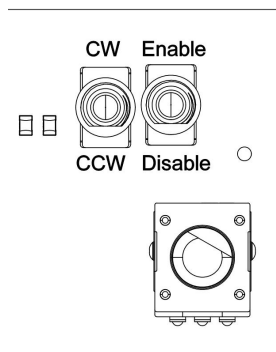«CCW/CW» switch position logic: CCW = high level, CW = low level at the «CCW/CW» port.

1Q Driver:

Power Supply	PIN1	GND
	PIN2	+Vcc
	PIN3	GND
	PIN4	PR

4Q Driver:

Brake resistor must be connected.

Power Supply	PIN1	GND
	PIN2	+Vcc
10 Ω	PIN3	GND
50 W	PIN4	PR
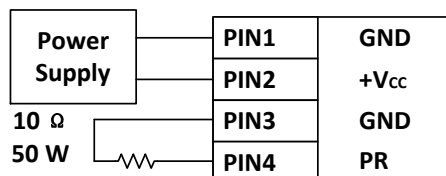
Switches and Potentiometer:

- ENABLE SWITCH: Enable
- CCW / CW: CCW
- POTENTIOMETER: ALL THE WAY UP

ATTENTION：

TVS protection activates at 50 V (bus over-voltage discharge). Input voltage must **not exceed** 50 VDC.

Mother board schematic: