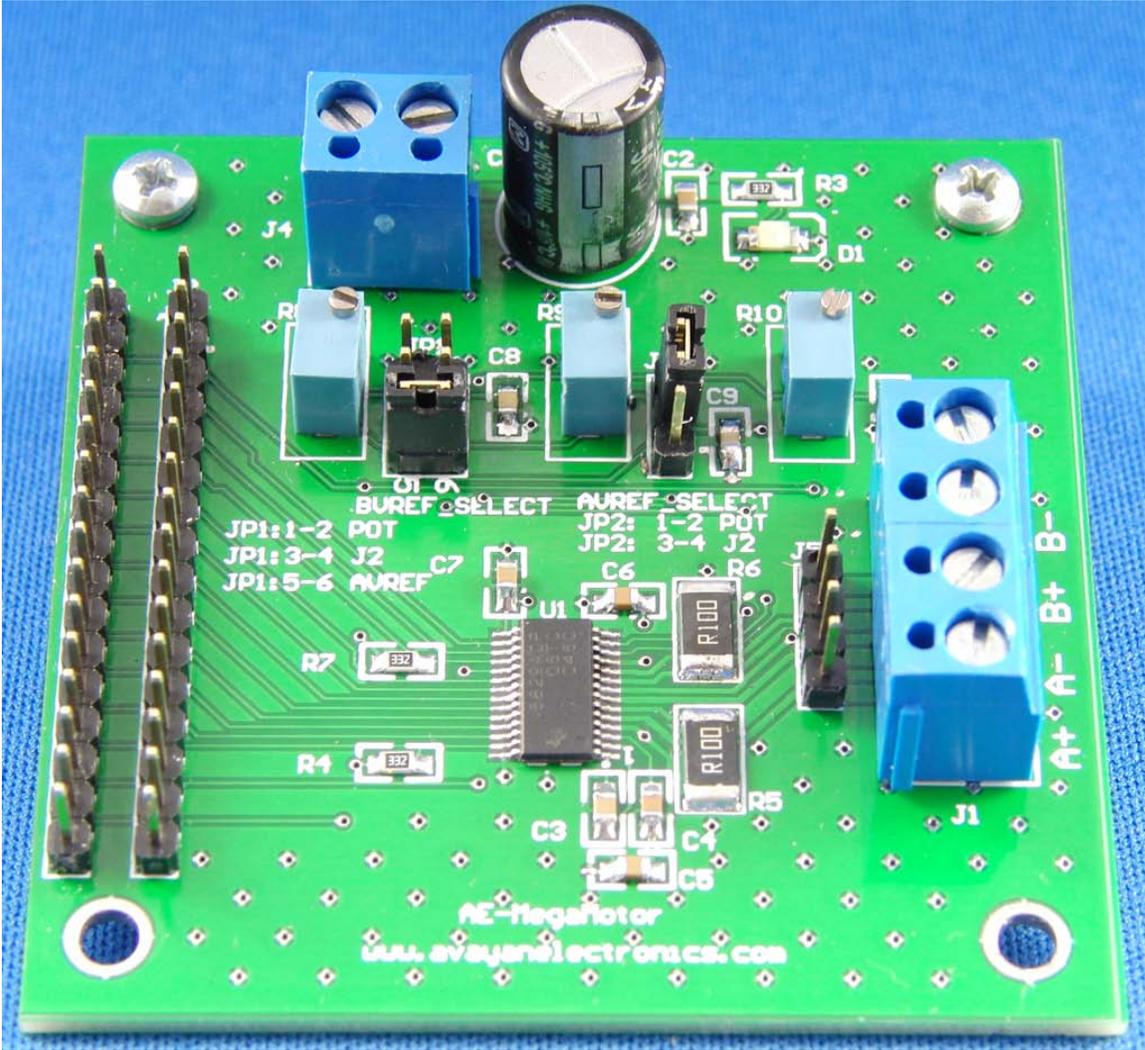
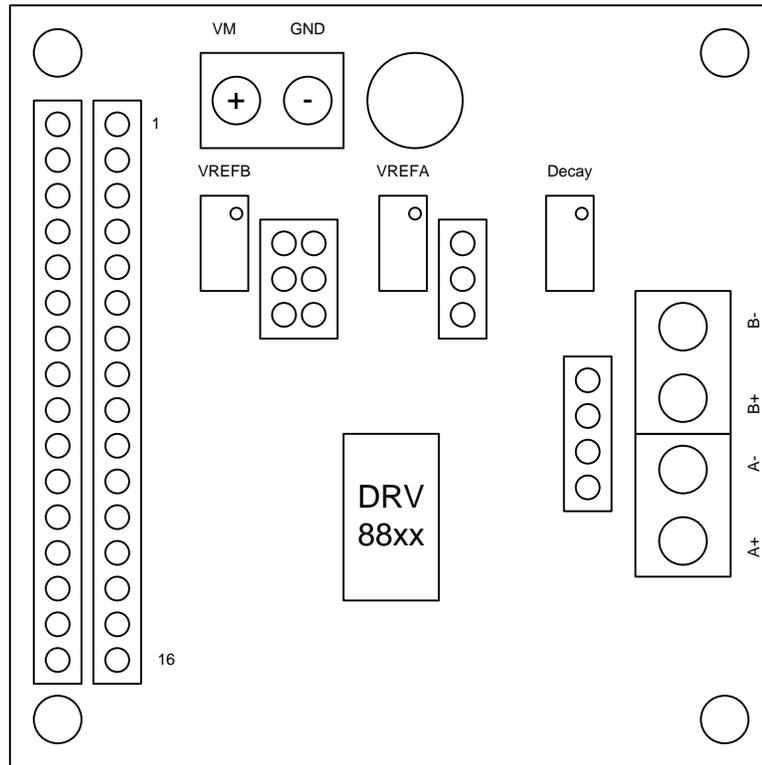


AE MegaMotor Manual



3A Dual DC Motor, 1.6A/3A Microstepper, 5A Single DC Motor Controller



AE-MegaMotor:

- Controls either two DC motors (up to 3A), 1 bipolar stepper motor (Up to 3A) or 1 large DC motor (up to 5A).
- Easy access to all signals. Three different combinations documented on the back side.
- Selectable reference voltage to either external access, or internally derivable through a potentiometer.

Ease of Use Features:

- Input power wires and power outputs screwed into terminal block.
- Measures 2.5" by 2.5"
- Dual 16 pin header connector offers easy access to signals. Second header can work of as an access point to a second board or test stakes for in application monitoring.
- All possible combinations tackled by the use of potentiometers and jumpers.



Description:

The AE-MegaMotor is the most flexible motor control module you will ever find. Measuring only 2.5" by 2.5" this module can either drive two DC motors, one bipolar steppers with or without microstepping, or a single DC motor.

The "secret" is a new family of drivers with different functionality but identical pinout, from Texas Instruments, which consists on drivers such as the DRV8812/13/14/24/25/28/29/40/41/42. The different flavors are:

DRV8812 Flavor: Dual H Bridge to control either two DC motors or a bipolar stepper.

DRV8824 Flavor: Dual H Bridge with internal indexer to microstep a bipolar stepper motor.

DRV8828 Flavor: Single H Bridge with increased current capability for driving DC motors. Two of these can be used to drive larger steppers.

Other than the differences mentioned above, all of these devices offer the exact same features:

1. Current control engine to regulate current. Vital for stepper driving and torque control on DC motors.
2. Selectable slow, fast or mixed current decay modes.
3. Over Current Protection and fault signaling.
4. Identical pinout, allowing for completely different devices to be soldered into the very same board!



Control Signals and AE-MegaMotor Header pinout:

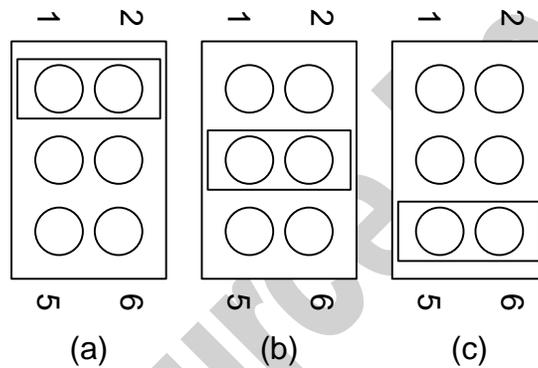
J2 and J3 pins	DRV8812 Flavor	DRV8824 Flavor	DRV8828 Flavor
	DRV8812/13/14/41	DRV8824/25	DRV8828/29/40/42
1	NC		
2	VDD (3.3V)		
3	nRESET (input)		
4	nSLEEP (input)		
5	nFAULT (output)		
6	PHASE A	DIRECTION	PHASE
7	ENABLE A	nENABLE	ENABLE
8	ENABLE B	STEP	NC
9	PHASE B	NC	I0
10	AI 0	MODE0	I1
11	AI1	MODE1	I2
12	BI 0	MODE2	I3
13	BI 1	nHOME (output)	I4
14	A_VREF		
15	B_VREF		
16	GROUND		

Jumper Configurations:

Jumpers will allow the configuration of the reference voltage selection. Depending on the device soldered into the AE-MegaMotor module, jumpers must be configured accordingly. Per example, Dual DC variants will most likely require dual VREF analog inputs, while the microstepper and single H Bridge will require a single VREF analog input.

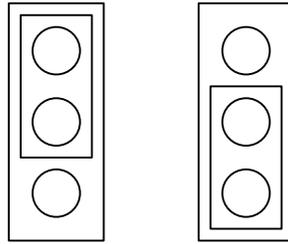
Jumper settings will also control whether the VREF analog input is derived from the provided potentiometer or through the header connections.

Jumper JP1 (B_VREF Select):



JP1 Position	Diagram	VREF B Source
JP1:1-2	(a)	Potentiometer R8
JP1:3-4	(b)	Headers J2 or J3
JP1:5-6	(c)	VREFA

Jumper JP2 (A_VREF Select):



(a)

(b)

JP2 Position	Diagram	VREF A Source
JP2:1-2	(a)	Potentiometer R9
JP2:2-3	(b)	Headers J2 or J3

Open Source Design

Control Signals Description:

Control Signal	Direction	Description
All Devices		
VDD	Power	3.3V power supply must be provided on this power rail
nRESET	Input	Clears the internal logic on the device. If an over current protection has shut down the driver, a low on this pin clears the fault and resumes operation.
nSLEEP	Input	A LO level on this pin places the device on low power mode.
nFAULT	Output	Open Collector output which signals if a fault has occurred (Thermal Shutdown, Over Current, etc.)
VREF	Analog Input	Configures ITrip Max Current according to the equation $ITrip = VREF / (5 * RSENSE)$
DECAY	Input	Specifies Current Recirculation Scheme. A LO configures for Slow Decay mode. An OPEN (or NC) configures for Mixed Decay mode. A HI configures for a Fast Decay mode
H Bridge Control (DC motor or Stepper motor winding)		
PHASEx	Input	Selects direction of current flow on the H Bridge driving an inductive load.
ENABLEx	Input	A LO on this pin disables the H Bridge. A HI on this pin enabled the H Bridge.
Aix / Bix	Input	Current Select Bits. An internal 2 bit DAC used to scale down the maximum current that will be allowed through the H Bridge

Bipolar Microstepper		
MODE _x	Input	Selects the degrees of microstepping from full step to 32 degrees of microstepping.
DIRECTION	Input	Selects the direction of rotation (CW or CCW depending on how the motor is wired)
STEP	Input	A transition from LO to HI tells the device to increment one step or microstep as depending on DIRECTION and MODE _x .
nENABLE	Input	A LO on this pin enables the device. A HI on this pin disables the device.
nHOME	Output	An output which goes asserted (LO) when the step being produced is the first on the internal lookup table.
Single H Bridge (DC Motor or Stepper motor winding)		
I _x	Input	Current Select Bits. On the single H Bridge flavor, these five bits select from one of the 32 possible current levels. Use these bits if you want to microstep a large stepper motor.
PHASE	Input	Selects direction of current flow on the H Bridge driving an inductive load.
ENABLE	Input	A LO on this pin disables the H Bridge. A HI on this pin enabled the H Bridge.