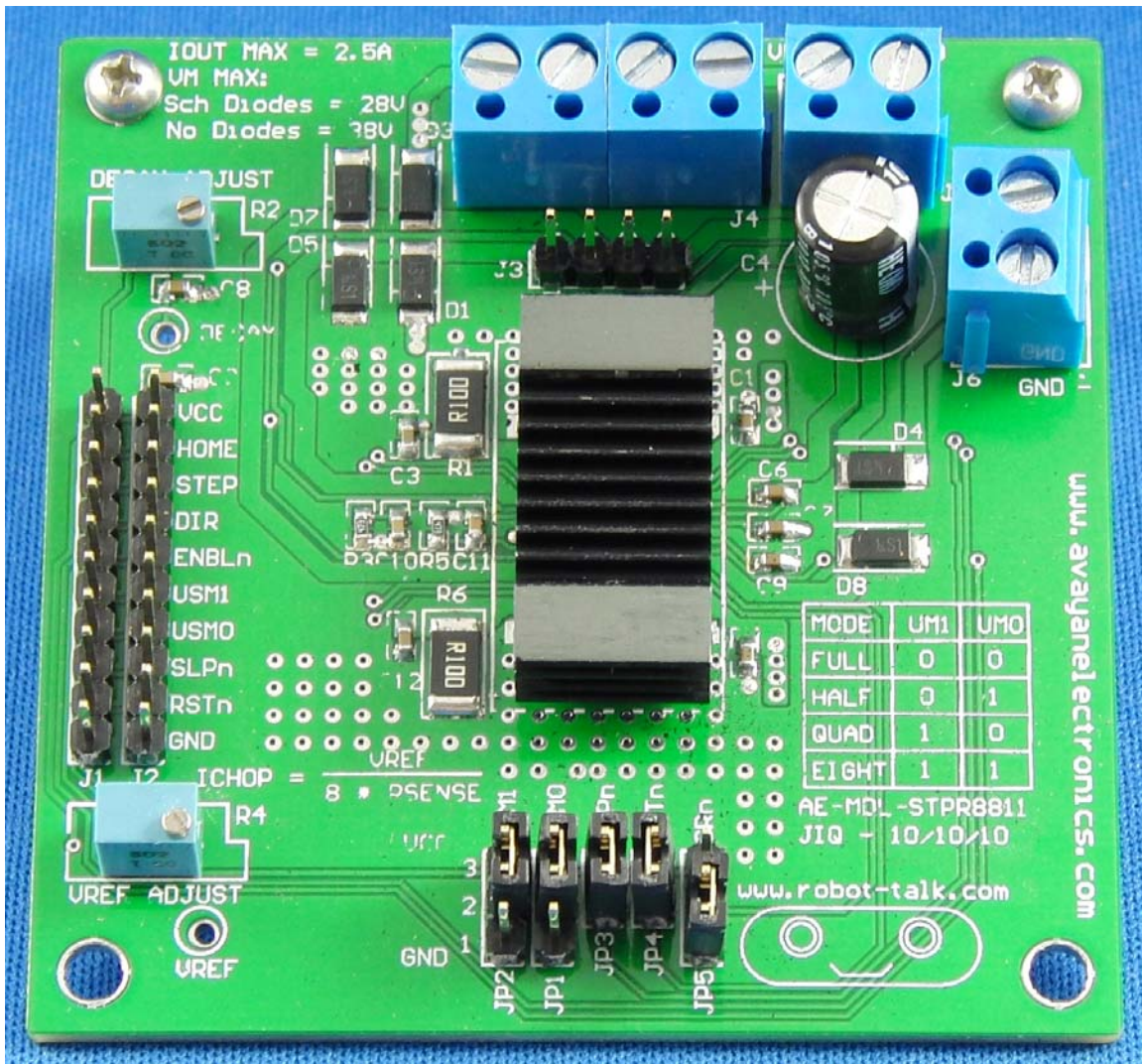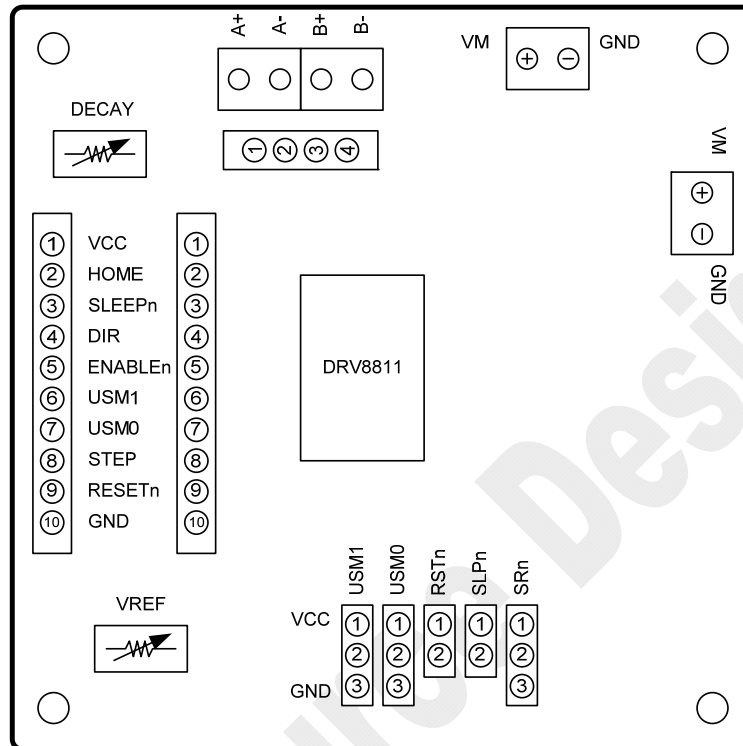# AE-MDL-STPR8811 Manual

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2.5A Microstepping Bipolar Stepper Motor Driver

AE-MDL-STPR8811:

Internal Indexer Microstepper (AE-MDL-STPR8811):

- Controls 1 Bipolar Stepper Motor with up to 2.5A of current
- STEP pin for stepping rate control
- DIR pin for direction of rotation control
- USMx pins to select Microstepping Rate (full/half/quad/eight)
- Sense Resistors for current regulation
- Configurable VREF for programmable current limit selection.
- Configurable Fast Decay (PFD Pot)

Ease of Use Features:

- Input power wires and power outputs screwed into terminal block.
- Measures 2.75" by 2.75"
- Dual 10 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.
- Access for optional surface mount heat sink and 70 mm square fan to improve thermal impedance.

Description:

The AE-MDL-STPR11 bipolar stepper motor microstepping driver module is a design revolving around the DRV8811 integrated driver. It contains all the circuitry and flexibility to control most stepper motors with up to 2.5A per phase. In order to achieve this high current status, a series of design elements were implemented. The usage of these elements is crucial in obtaining the high current capability of the aforementioned device.

Module can be fully controlled by means of a conventional microcontroller. The great majority of control signal are made available through the 10 pin header connectors. Analog inputs such as VREF and Decay are handled through potentiometers. In the event that these two analog entities are to be controlled through the microcontroller, a test stake is made available which can be utilized after the removal of the respective potentiometer component.

Signals which are often hard coded, such as those defining the microstepping rate or the usage of external versus internal diodes, can be predetermined through the usage of jumpers.

A power connector is made available to connect a 24V fan. The mounting holes were equally spaced at 70 mm in order to allow for a square 70 mm fan. Refer to downloadable BOM for specific part number.

In order to fully improve thermal impedance while the utilization of the high current capability on the DRV8811 device, SMT pads have been made available which allow for the soldering of a specific heat sink. Refer to downloadable BOM for specific part number.

Stepper motor can be connected through a simple 4 pin header or through a four position terminal block.

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Control Signals and AE-MegaMotor Header pinout:

| J1 and J2 pins	AE-MDL-STPR8811 Control Signals
1	VDD (3.3V or 5V)
2	nHOME (output)
3	SLEEPn (input)
4	DIR (input)
5	ENABLEn (Input)
6	USM1 (Input)
7	USM0 (Input)
8	STEP (Input)
9	nRESET (input)
	GROUND

Jumper Configurations:

Jumpers will allow the predefinition of different signals which may not be needed to be controlled through the controlling application. A fair example is CNC machines being driven though a PC computer's parallel port in which only ENABLE, DIRECTION and STEP functions are made available on a per axis basis.

Jumpers with three positions are for signals which may require being driven HI or LO. Drivers with two pin position jumpers are for signals which only need to be predefined as HI. Per example, it does not make sense to predefine the board to be on RESET or SLEEP as this deems the module inoperable.

If you require any of these signals to be driven externally, a shunt must not be placed on any jumper position, leaving the jumper disconnected.
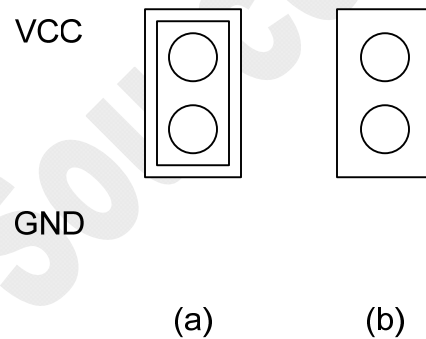
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Three pin position jumpers (JP1, JP2 and JP5)

VCC

GND

(a)   (b)   (c)
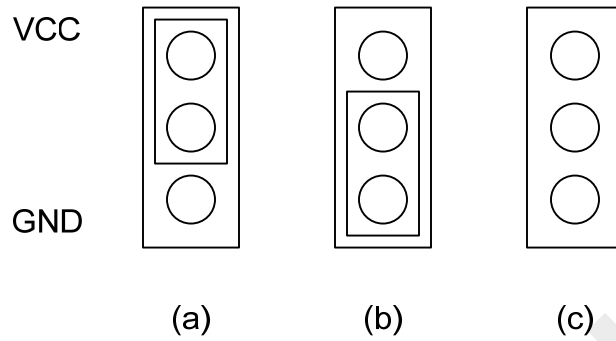
JPx Position	Diagram	Description
JPx:2-3	(a)	Respective signal is HI
JPx:1-2	(b)	Respective signal is LO
JPx: NONE	(c)	Signal driven through J1 or J2

Two pin position jumpers (JP3 and JP4)

VCC

GND

(a)   (b)

JPx Position	Diagram	Description
JPx:2-3	(a)	Respective signal is HI
JPx:NONE	(b)	Signal driven through J1 or J2

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Control Signals Description:

Control Signal	Direction	Description
VDD	Power	3.3V power supply must be provided on this power rail
RESETn	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.
SLEEPn	Input	A LO level on this pin places the device on low power mode.
VREF	Analog Input	Configures ITrip Max Current according to the equation ITrip = VREF / (8 * RSENSE)
DECAY	Analog Input	Specifies Current Recirculation Scheme. A voltage smaller than 0.21VCC, selects Slow Decay mode. A voltage larger than 0.6VCC, selects fast decay mode. Voltages in between these limits configure for Mixed Decay mode with the rate of fast to slow being directly proportional to the applied voltage. Refer to datasheet for specific equation defining mixed decay timing.
USMx	Input	Selects the degrees of microstepping from full step to 8 degrees of microstepping.
DIR	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 MODEx.
ENABLEn	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.