HIGH PERFORMANCE MICROSTEPPING DRIVER

The STPMDRV-404 is a high performance, low cost microstepping driver that incorporates advanced surface mount and ASIC technology. The STPMDRV-404 is small, easy to interface and use, yet powerful enough to handle the most demanding applications.

The STPMDRV-404 has 14 different resolutions both in binary and decimal built into the driver.

The development of proprietary circuits has minimized ripple current while maintaining a 25 KHz chopping rate.

This prevents additional motor heating that is common with drivers requiring higher chopping rates. Now low inductance stepper motors can be used to improve high speed performance and system efficiency.

Features

- Low Cost
- 12 - 40 VDC Input Power
- High Output Current, 3 Amps RMS, 4 Amps Peak
- No Minimum Inductance
- Resistor Programmable Current Adjustment
- Optoisolated Inputs, Step, Direction, Enable, Reset
- Step Frequency up to 5 MHz
- 25 KHz Chopper Drive
- Status Indicator - Axis ON
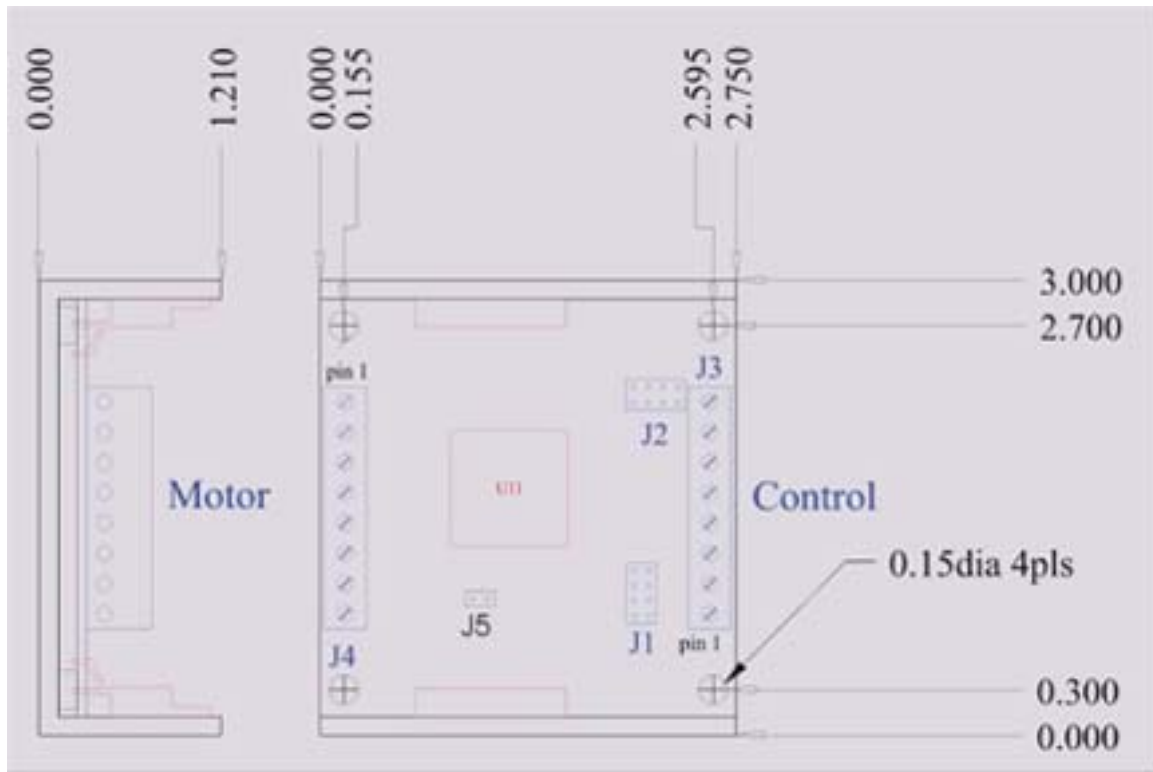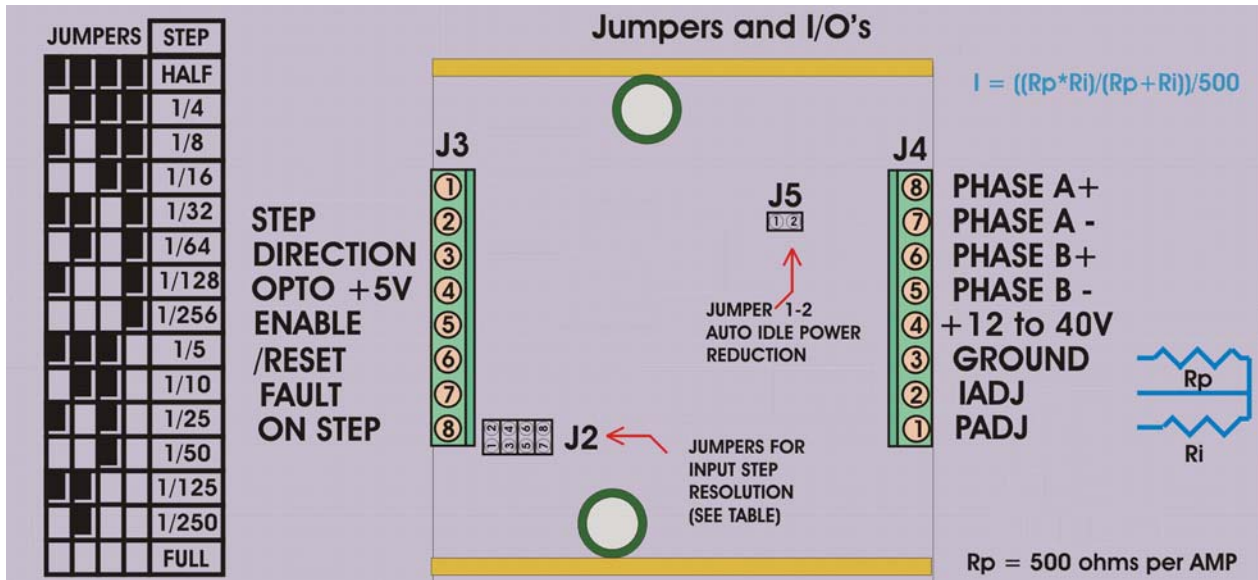- Operating Temperature, 0 - 70 C at Heatsink

Features C'ntd

- Crystal Controlled Clock
- Over Temperature Protection
- Automatic Current Reduction, 0.5 Sec After Last Step Input
- 14 Selectable Resolutions Both in Decimal and Binary
- Microstep Resolutions: 1/2 1/4 1/5 1/8 1/10 1/16 1/25 1/32 1/501/64 1/125 1/128 1/250 1/256
- Extremely Small Size, 2.75"(69.9 mm) X 3.00" (76.2 mm) X 1.20" (30.5 mm)

Jumpers and I/O's

JUMPERS	STEP
	HALF
	1/4
	1/8
	1/16
	1/32
	1/64
	1/128
	1/256
	1/5
	1/10
	1/25
	1/50
	1/125
	1/250
	FULL

$$I = ((Rp*Ri)/(Rp+Ri))/500$$

J3

1. STEP
2. DIRECTION
3. OPTO +5V
4. ENABLE
5. /RESET
6. FAULT
7. ON STEP
8.

J5
1 2
JUMPER 1-2
AUTO IDLE POWER
REDUCTION

J2
1 2
3 4
5 6
7 8
JUMPERS FOR
INPUT STEP
RESOLUTION
(SEE TABLE)

J4

8. PHASE A+
7. PHASE A -
6. PHASE B+
5. PHASE B -
4. +12 to 40V
3. GROUND
2. IADJ
1. PADJ

Rp
Ri

Rp = 500 ohms per AMP

0.000
1.210
0.000
0.155
2.595
2.750

3.000
2.700

pin 1

Motor

J3
J2
U1
Control

0.15dia 4pls

J5
J1   pin 1

J4

0.300
0.000

Recommended to mount with 4-40 Screws.

CONNECTION	SIGNAL	DESCRIPTION
J3 - 1	+5V USER	This is a +5V 100ma output power source for user application. It is the same supply that is used to power the logic in the module and is derived via a switching power supply from the +12 to +40 VDC input supply to the module. It is short circuit protected and current limited. However if shut-down occurs because of user loading the driver will also quit working. If the outputs FAULT and ON STEP are to be used to drive opto-isolators in the user equipment, this supply should be used for the positive input to the opto with the negative input connected to the signal. Twisted pair should be used to give maximum noise immunity.
J3-2	STEP	The STEP input is an opto-isolated signal. The positive input to the opto-isolator is connected to the OPTO +5V (J3-4) with a 390 ohm series re-sistor. The input must be driven to ground by a device that can sink at least 8 ma at 0.4V. The stepping action of the driver is triggered by the positive edge of the step pulse.
J3-3	DIRECTION	The DIRECTION input is an opto-isolated signal. The positive input to the opto-isolator is connected to the OPTO +5V (J3-4) with a 390 ohm series resistor. The input must be driven to ground by a device that can sink at least 8 ma at 0.4 V. A high input or open input cause clockwise rotation of the motor. For CW rotation Phase A goes positive and Phase B goes negative starting at zero.
J3-4	OPTO +5V	The OPTO +5V input is the common connection to all of the OPTO in-puts of the module. For best noise immunity this should be connected to the User's +5V logic power supply that is being used by the driving source thru one conductor of each of the input signals twisted pair for op-timum noise immunity. For connection to PLC and other equipment using 24 V logic you must connect this input in the same fashion to the +24 V logic power supply. In addition 2k ohm resistors need to be put in series with all of the inputs (user driver outputs).
J3-5	ENABLE	This opto-isolated input when OPEN or HIGH enables the driver, turning on the Motor phase currents. When held low the motor drive outputs are disabled and disconnected from the motor. When the driver is disabled it is safe to connect or disconnect a motor without damaging the driver.
J3-6	/RESET	This opto-isolated input when OPEN or HIGH leaves the driver in an op-erating state. If the signal is brought LOW, the driver is reset to initial starting conditions which will reset the motor phases to 0 degrees (Phase A = 0 amps Phase B = Max amps)
J3-7	FAULT	This is a non-isolated output which when HIGH (+5 V) indicates a fault condition within the driver. Normally this signal will remain LOW at all times (<0.4 V). There is also an onboard LED indicator which will be lit when the driver is OK, and extinguishes when a fault occurs. A normal fault condition might be caused by a motor wiring short circuit triggering the electronic circuit breaker. To reset the fault condition, either a RESET must be asserted, or the power to the module turned off then back on again.
J3-8	ON STEP	This is a non-isolated output when LOW indicates the start of each full step of the motor (0, 90, 180, and 270 degrees phase currents).

CONNECTION	SIGNAL	DESCRIPTION
J4-1	PADJ	This pin is used for connection to the idle current reduction programming resistor, the other end of which is connected to IADJ (J4-2). Idle Current (Amp) = ((Ri * Rp) / (Ri + Rp)) / 500 where Ri is the idle current resistor and Rp is the programmed current resistor.
J4-2	IADJ	This pin is used for programming the current of the driver. A positive one milliamp current source is injected into this connection so that a resistor connected to ground from this pin will set a current control voltage. On the standard 4 amp maximum drivers the driver current is 2 amps per volt on this pin, or when a resistor is used 500 ohms per amp. The return pin for the resistor should be connected to the GND (J4-3) pin.
J4-3	GND	This pin is used for the negative connection of the driver power supply. The heatsink of the driver is also connected to GND.
J4-4	PWR	This pin should be connected to the positive output of the driver power supply. The maximum voltage applied should not exceed +40 VDC. This +40 VDC includes any increase in the supply voltage due to re-generation from the motor. If you do not take this into account, the voltage may be exceeded during deceleration of the motor or crashing and driver failure will occur.
J4-5	PHASE B-	Motor Phase B negative connection.
J4-6	PHASE B+	Motor Phase B positive connection.
J4-7	PHASE A-	Motor Phase A negative connection.
J4-8	PHASE A+	Motor Phase A positive connection. Note to reverse motor direction you can just swap Phase A or Phase B plus and minus connections.

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