2.5A Bipolar Stepper Driver with Micro-Stepping, Current and Decay Control - Arduino Compatible

This is an Arduino compatible board that contains an Atmega328 microcontroller and Bipolar Stepper Motor Driver chip STK682-010. This Hybrid IC from ON Semiconductor can deliver up to 2.5A current and it can have an input supply up to 32V DC. It has multiple micro-stepping options such as Full step, 1/2th Step, 1/4th Step, 1/8th Step, 1/16th Step, 1/32th Step, 1/64th Step, 1/128th Step. PR1 trimmer potentiometer is provided to set the decay, 3.5V Slow Decay, 1.1V to 3.1V Mixed Decay, 0.8V-1V Fast Decay, and PR2 Trimmer Potentiometer provided to set the output current. Chopping frequency set to 83.3 Khz using capacitor C5 100PF. Micro-Stepping can be set with the help of jumper J1, J2, J3. This board is by default enabled since the enable pin has a pull-up resistor, but you can provide a low signal to disable the motor driver chip. Atmega328D provides Direction pulse, Step pulse, Enable control etc. The IC has built-in automatic half current functions to reduce the vibrations & current while the motor is in static mode. It is important to use a heatsink on the motor driver chip. Refer to the micro-stepping table to set the micro-stepping. Board requires a Motor power supply as well logic supply 5Vdc.

Arduino code is provided to test the board. The user will be able to control stepper motor speed using a 10K potentiometer connected to Analog pin A0 using connector U3. Users may write their own code to drive the motor as per requirements, micro-stepping is separate and independent from micro-controller. Only Pulse/Clock input, Direction, enable pins are connected to Arduino hardware.

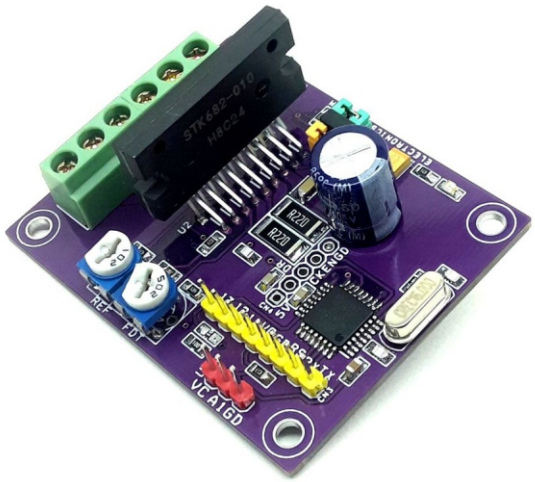
A new Atmega328 requires bootloader programming and Arduino code, refer to the link below for more information:
https://www.arduino.cc/en/Tutorial/BuiltInExamples/ArduinoToBreadboard

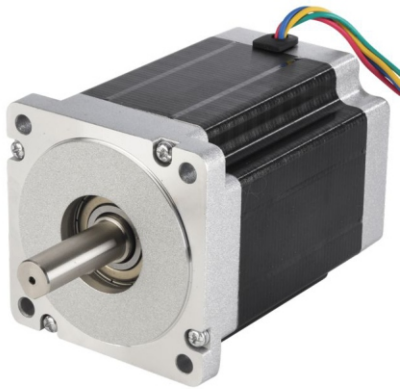
Arduino Pins

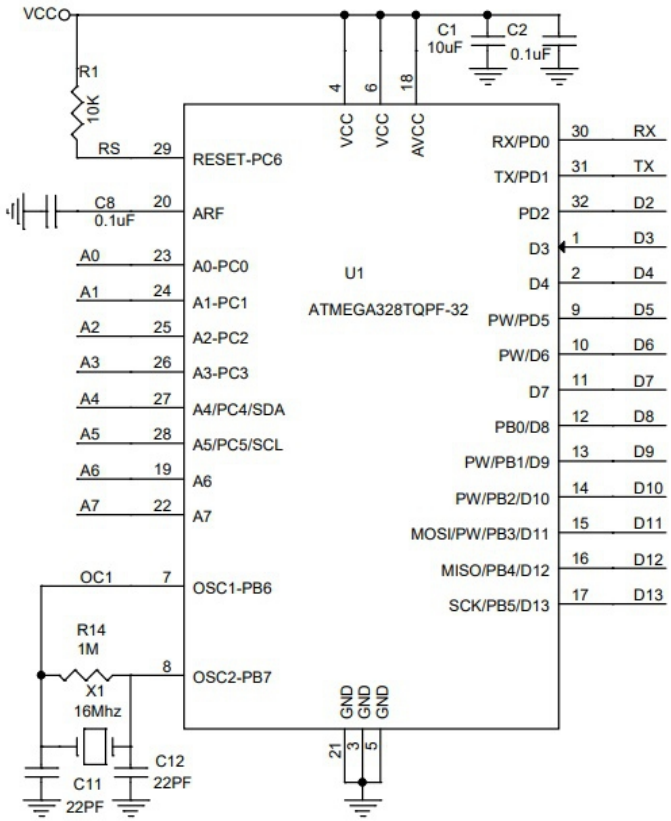
- Digital Pin D6: Enable STK682-010, Default this pin is High Using Pullup Resistor R9, Pull Down this Pin to disable the motor driver
- Digital Pin D5: Clock/Pulse STK682-010
- Digital Pin D10: Dir (Motor CCW/CW Low or High) STK682-010, Default this Pin is High Using pullup Resistors R3
- Analog Pin A1: Analog input, Potentiometer or Sensor Connection

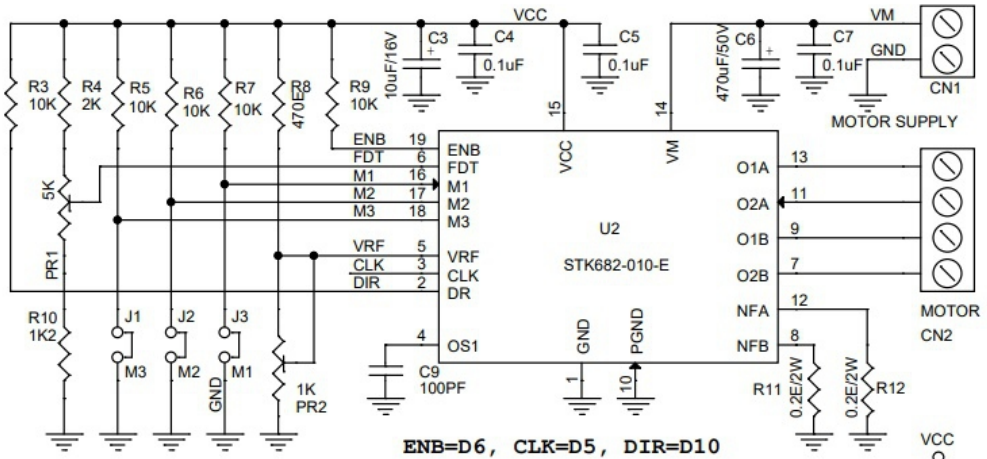
Features

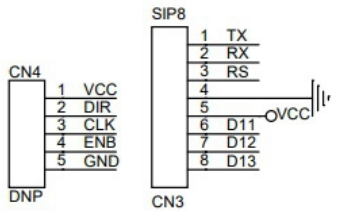
- Supply Voltage Range 9-32V DC (Connector Cn1)
- Logic Supply 5V DC (CN4 Pin 4=GND, Pin 5=5V DC Input)
- Motor Load 2.5A Continues (Connector CN2)
- J1, J2, J3 Jumpers for Micro-Stepping
- PR2 Current Adjust Trimmer Potentiometer
- PR1 FDT Trimmer Pot to adjust Decay
- Built In Automatic Half Current Maintenance energizing function
- Built in Over Current Protection Circuit (Within IC)
- Built Thermal Shutdown Circuit (Within IC)
- On Board Power LED D1
- PCB Dimensions 57.94MM X 46.67MM

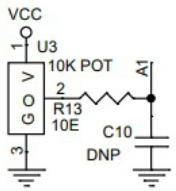


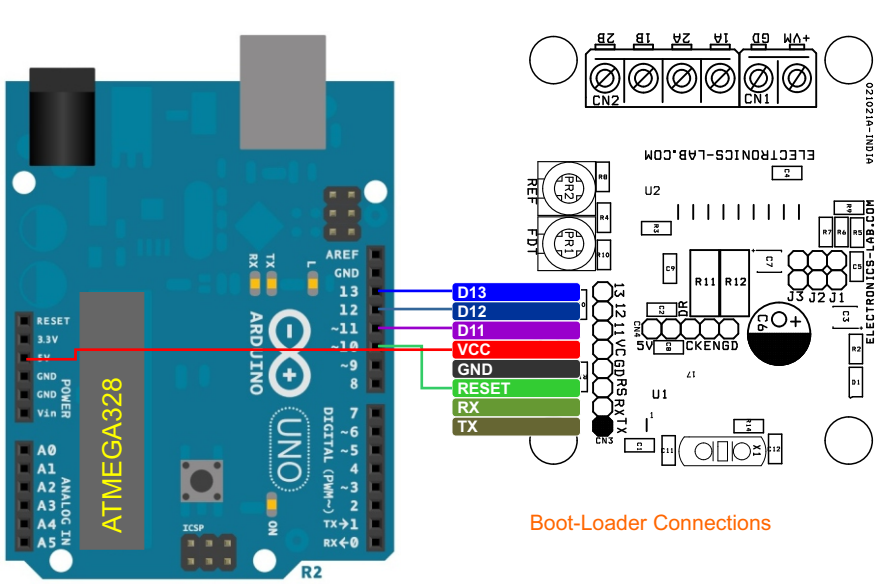



VCC
R1
10K
RS
29
RESET-PC6
C8
0.1uF
20
ARF
A0
23
A0-PC0
A1
24
A1-PC1
A2
25
A2-PC2
A3
26
A3-PC3
A4
27
A4/PC4/SDA
A5
28
A5/PC5/SCL
A6
19
A6
A7
22
A7
OC1
7
OSC1-PB6
R14
1M
8
OSC2-PB7
X1
16Mhz
C11
22PF
C12
22PF
U1
ATMEGA328TQPF-32
C1
10uF
C2
0.1uF
4
6
18
VCC
VCC
AVCC
21
3
5
GND
GND
GND
RX/PD0
30
RX
TX/PD1
31
TX
PD2
32
D2
D3
1
D3
D4
2
D4
PW/PD5
9
D5
PW/D6
10
D6
D7
11
D7
PB0/D8
12
D8
PW/PB1/D9
13
D9
PW/PB2/D10
14
D10
MOSI/PW/PB3/D11
15
D11
MISO/PB4/D12
16
D12
SCK/PB5/D13
17
D13

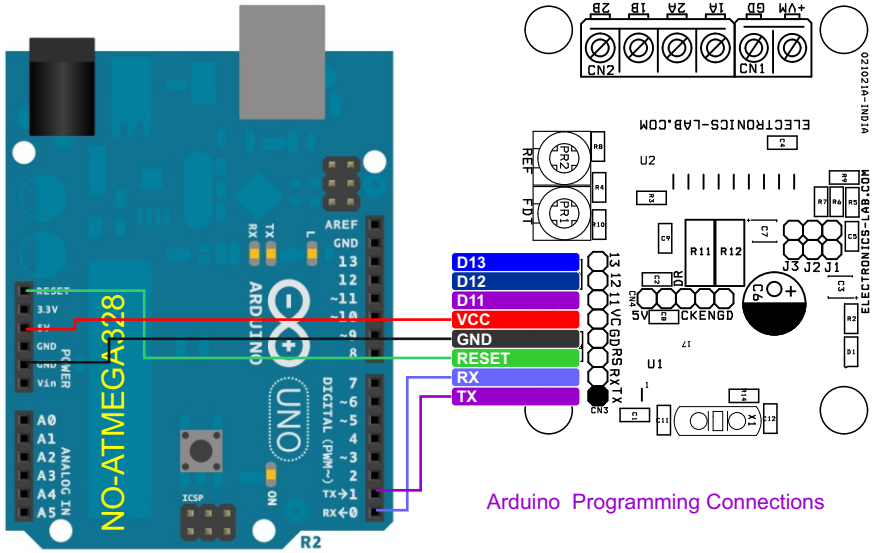

R3
10K
R4
2K
R5
10K
R6
10K
R7
10K
R8
470E
R9
10K
10uF/16V
C3
C4
0.1uF
VCC
C5
0.1uF
470uF/50V
C6
C7
0.1uF
VM
GND
CN1
MOTOR SUPPLY
5K
PR1
ENB
19
FDT
6
M1
16
M2
17
M3
18
VRF
5
CLK
3
DIR
2
OS1
4
U2
STK682-010-E
O1A
13
O2A
11
O1B
9
O2B
7
NFA
12
NFB
8
MOTOR
CN2
R10
1K2
J1
J2
J3
M3
M2
M1
GND
1K
PR2
C9
100PF
PGND
10
R11
0.2E/2W
0.2E/2W
R12
ENB=D6, CLK=D5, DIR=D10
R2
470E
D1
LED


CN4
1 VCC
2 DIR
3 CLK
4 ENB
5 GND
DNP
SIP8
1 TX
2 RX
3 RS
4
5
6 D11
7 D12
8 D13
VCC
CN3

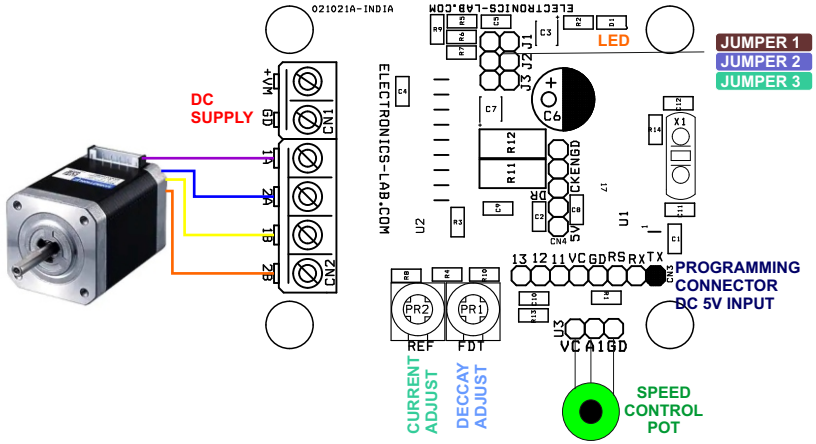

VCC
U3
10K POT
R13
10E
C10
DNP
A1



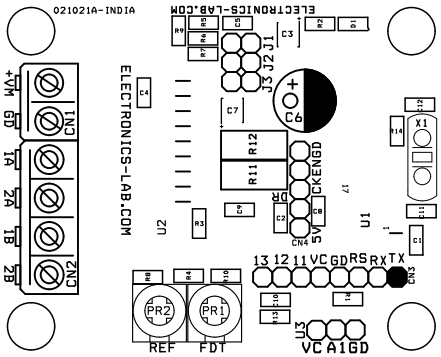
Boot-Loader Connections



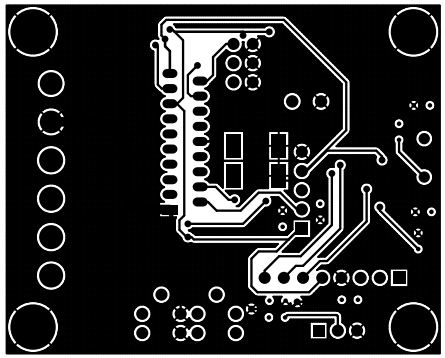
Arduino Programming Connections


021021A-INDIA
ELECTRONICS-LAB.COM
LED
JUMPER 1
JUMPER 2
JUMPER 3
DC
SUPPLY
+VM
GD
CN1
1A
2A
1B
2B
CN2
ELECTRONICS-LAB.COM
U2
U1
5V
CKEN
GND
13 12 11 VC GD RS RX TX
PROGRAMMING
CONNECTOR
DC 5V INPUT
PR2
PR1
REF
FDT
U3
VC A1 GD
CURRENT
ADJUST
DECCAY
ADJUST
SPEED
CONTROL
POT

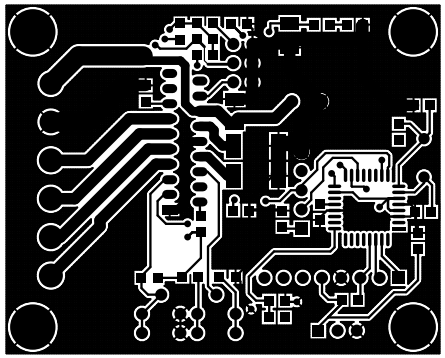
BOM						
NO.	QNTY.	REF.	DESC.	MANUFACTURER	SUPPLIER	SUPPLIER PART NO
1	1	CN1	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
2	2	CN2	2 PIN SCREW TERMINAL PITCH 5.08MM	PHOENIX	DIGIKEY	277-1247-ND
3	1	CN3	8 PIN MALE HEADER PITCH 2.54MM	WURTH	DIGIKEY	732-5321-ND
4	2	CN4,C10	DNP			
5	1	C1	10uF/10V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
6	5	C2,C4,C5,C7,C8	0.1uF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
7	1	C3	10uF/16V SMD TANTLUM	MURATA/YAGEO	DIGIKEY	478-8999-1-ND
8	1	C6	470uF/50V	RUBYCON	DIGIKEY	1189-4017-ND
9	1	C9	100PF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
10	2	C11,C12	22PF/50V SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
11	1	D1	LED RED SMD SIZE 0805	LITE ON INC	DIGIKEY	160-1427-1-ND
12	3	J1,J2,J3	2 PIN MALE HDAER PITCH 2.54MM	WURTH	DIGIKEY	732-5315-ND
13	3	JUMPER SHUNT	SHUNT FOR JUMPERS	SULLINS CONNECTORS	DIGIKEY	S9001-ND
14	1	PR1	5K TRIMMER POT	BOURNS	DIGIKEY	118-3362U-1-502RLFCT-ND
15	1	PR2	1K TRIMMER POT	BOURNS	DIGIKEY	3362H-502LF-ND
16	6	R1,R3,R5,R6,R7,R9	10K 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
17	2	R2,R8	470E 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
18	1	R4	2K 1% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
19	1	R10	1K2 1% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
20	2	R11,R12	0.2E/2W SMD 2512	MURATA/YAGEO	DIGIKEY	
21	1	R13	10E 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
22	1	R14	1M 5% SMD SIZE 0805	MURATA/YAGEO	DIGIKEY	
23	1	U1	ATMEGA328TQPF-32	MICROCHIP	DIGIKEY	ATMEGA328PB-AURCT-ND
24	1	U2	STK682-010-E	ONSEMI	RS COMPONENTS	801-6814P
25	1	U3	10K POTENTIOMETER	TT ELECTRONICS	DIGIKEY	987-1307-ND
26	1	X1	16Mhz	ECS INC	DIGIKEY	X1103-ND



SILK SCREEN TOP



BOTTOM LAYER



TOP LAYER

PCB DIMENSIONS 57.94MM X 46.67MM