Stepper Driver PCB Design

Skittle Sorter Project

Jaidon Lybbert, Motor Control Design Lead, EWU IEEE Student Chapter

08/23/20

This document describes the current stepper motor driver PCB design.

3D View:

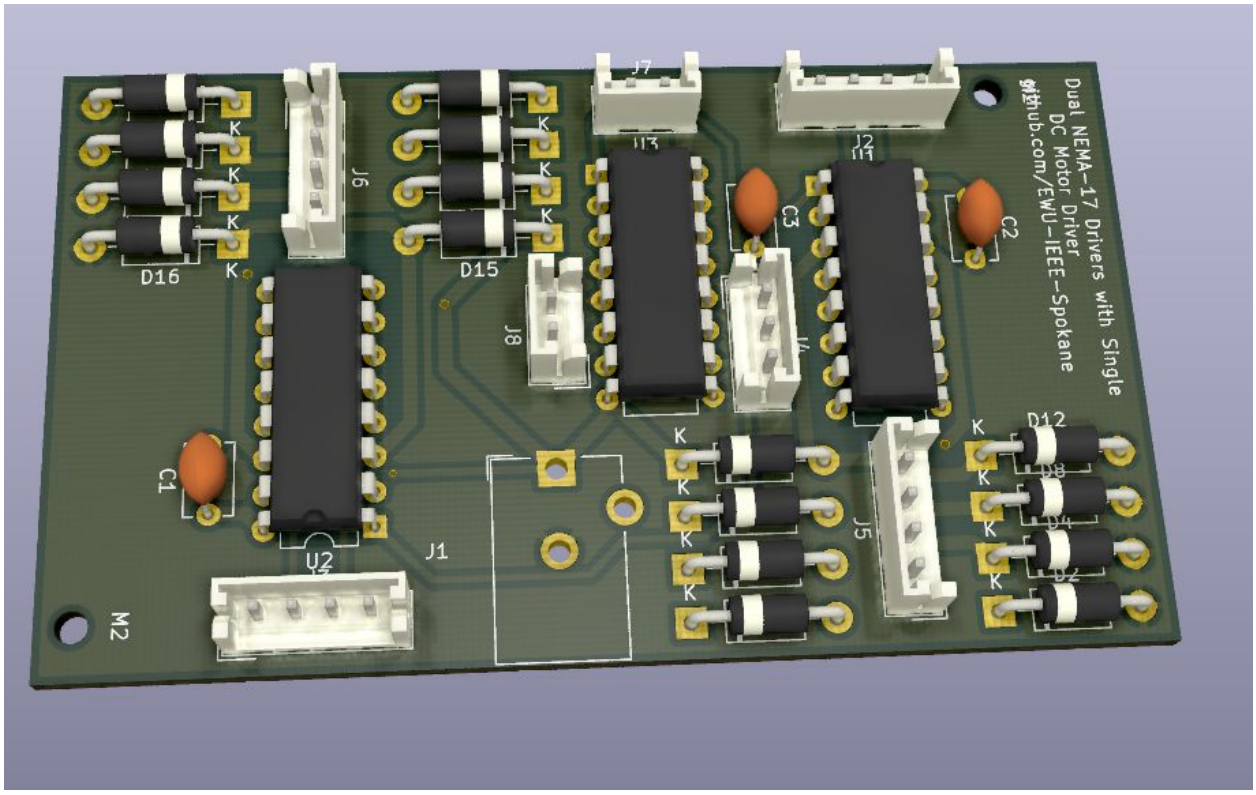


Fig. 1: Current version of the driver PCB. The outer ICs are l293B chips, and the center IC is an l293D chip. The l293Bs have 2 external 1N4001 flyback diodes for each of their 4 output pins (J5, J6). The connectors at the top end of each IC are the logical inputs (J2, J7, J3) and connector J4 has one active high enable pin for each IC. Each IC has one 0.22uF bypass capacitor for its logic power supply input.

PCB Specifications:

- Layers: 2
- Dimensions: 44.45 x 76.20mm
- Thickness: 1.6mm
- Copper weight: 2 Oz.

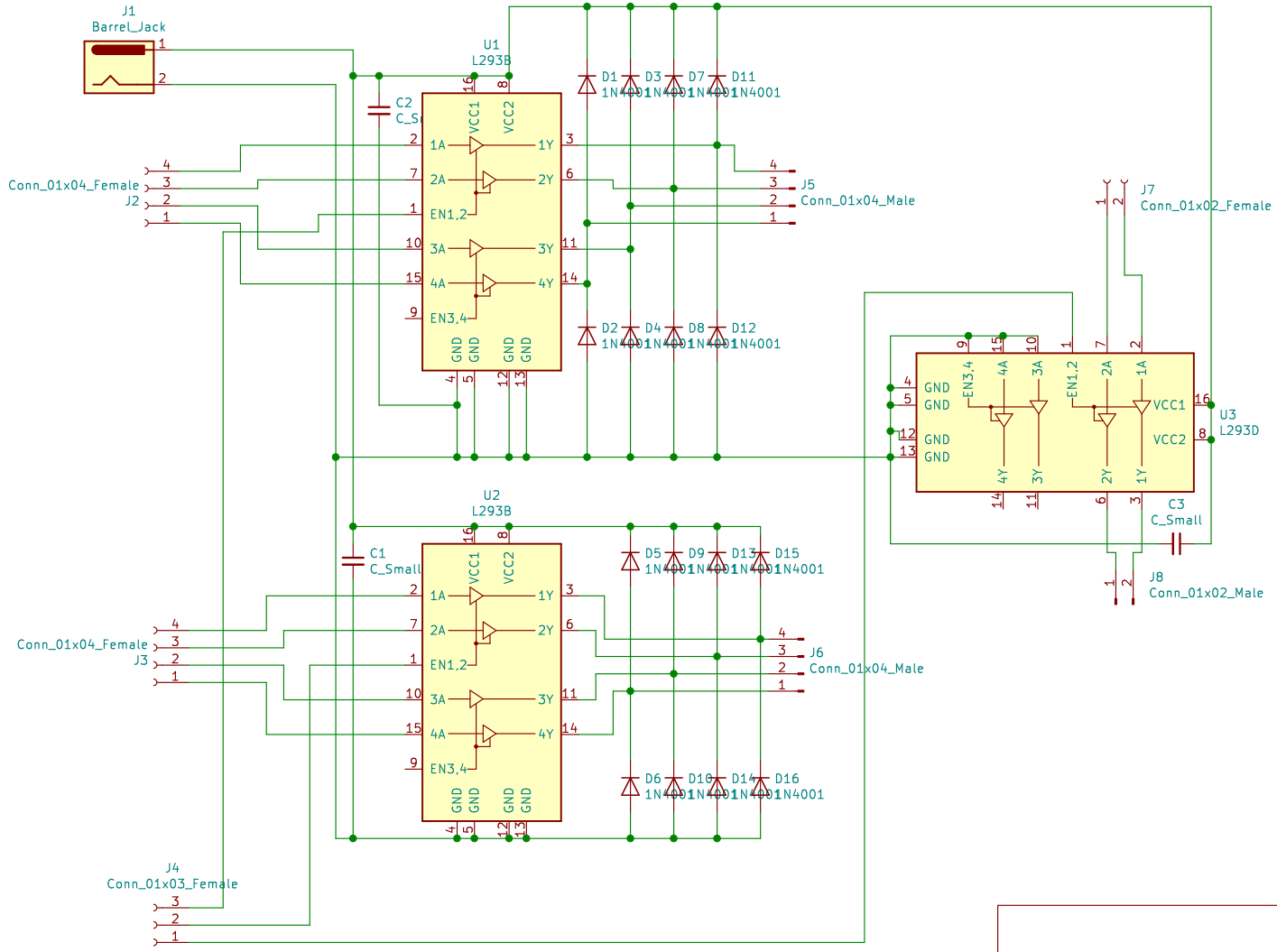
Components List:

"Source:" "C:\Users\Jaidon Lybbert\Documents\Classwork\EENG250\Lab0\MotorDriver\Motor_Driver\Motor_Driver.sch"
"Date:" "8/23/20 2:54:10 PM"
"Tool:" "Eeschema (5.1.5-108-gad11b7ebd)-1"
"Component Count:" "30"

"Ref"	"Value"	"Part"	"Footprint"	"Description"	"Vendor"
"C1"	"0.22uF"	"Device:C_Small"	"Capacitor_THT:C_Disc_D5.1mm_W3.2mm_P5.00mm"	"Unpolarized capacitor, small symbol"	""
"C2"	"0.22uF"	"Device:C_Small"	"Capacitor_THT:C_Disc_D5.1mm_W3.2mm_P5.00mm"	"Unpolarized capacitor, small symbol"	""
"C3"	"0.22uF"	"Device:C_Small"	"Capacitor_THT:C_Disc_D5.1mm_W3.2mm_P5.00mm"	"Unpolarized capacitor, small symbol"	""
"D1"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D2"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D3"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D4"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D5"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D6"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D7"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D8"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D9"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D10"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D11"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D12"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D13"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D14"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D15"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"D16"	"1N4001"	"Diode:1N4001"	"Diode_THT:D_DO-41_SOD81_P10.16mm_Horizontal"	"50V 1A General Purpose Rectifier Diode, DO-41"	
"J1"	"Barrel_Jack"	"Connector:Barrel_Jack"	"Connector_BarrelJack:BarrelJack_Horizontal"	"DC Barrel Jack"	""
"J2"	"Conn_01x04_Female"	"Connector:Conn_01x04_Female"	"Connector_JST:JST_EH_B4B-EH-A_1x04_P2.50mm_Vertical"		
"J3"	"Conn_01x04_Female"	"Connector:Conn_01x04_Female"	"Connector_JST:JST_EH_B4B-EH-A_1x04_P2.50mm_Vertical"		
"J4"	"Conn_01x03_Female"	"Connector:Conn_01x03_Female"	"Connector_JST:JST_EH_B3B-EH-A_1x03_P2.50mm_Vertical"		
"J5"	"Conn_01x04_Male"	"Connector:Conn_01x04_Male"	"Connector_JST:JST_EH_B4B-EH-A_1x04_P2.50mm_Vertical"		
"J6"	"Conn_01x04_Male"	"Connector:Conn_01x04_Male"	"Connector_JST:JST_EH_B4B-EH-A_1x04_P2.50mm_Vertical"		
"J7"	"Conn_01x02_Female"	"Connector:Conn_01x02_Female"	"Connector_JST:JST_EH_B2B-EH-A_1x02_P2.50mm_Vertical"		
"J8"	"Conn_01x02_Male"	"Connector:Conn_01x02_Male"	"Connector_JST:JST_EH_B2B-EH-A_1x02_P2.50mm_Vertical"		
"U1"	"L293B"	"Driver_Motor:L293"	"Package_DIP:DIP-16_W7.62mm"	"Quadruple Half-H Drivers"	""
"U2"	"L293B"	"Driver_Motor:L293"	"Package_DIP:DIP-16_W7.62mm"	"Quadruple Half-H Drivers"	""
"U3"	"L293D"	"Driver_Motor:L293D"	"Package_DIP:DIP-16_W7.62mm"	"Quadruple Half-H Drivers"	""

Additional notes:

- The l293B chips require heatsinks



EWU IEEE Student Chapter		
Sheet: /		
File: Motor_Driver.sch		
Title: Tri-Motor Driver Circuit		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.5-108-gad11b7ebd)-1		Id: 1/1