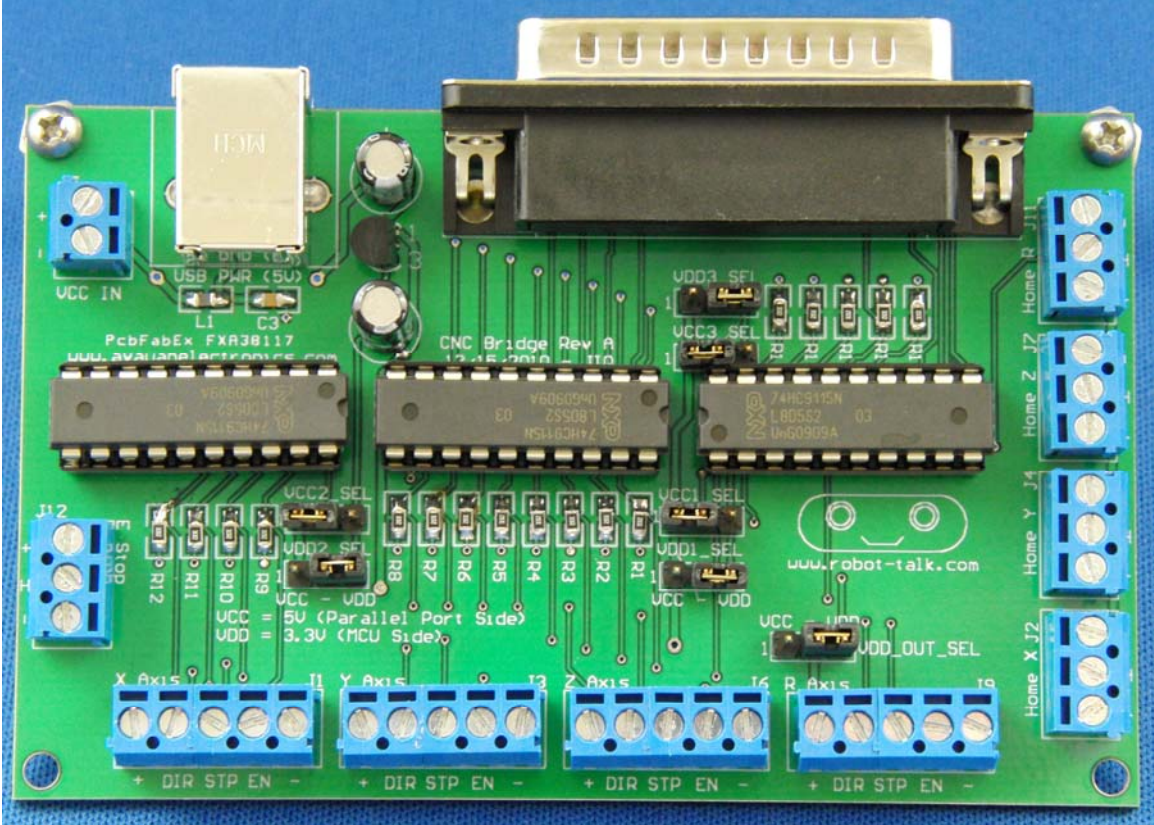
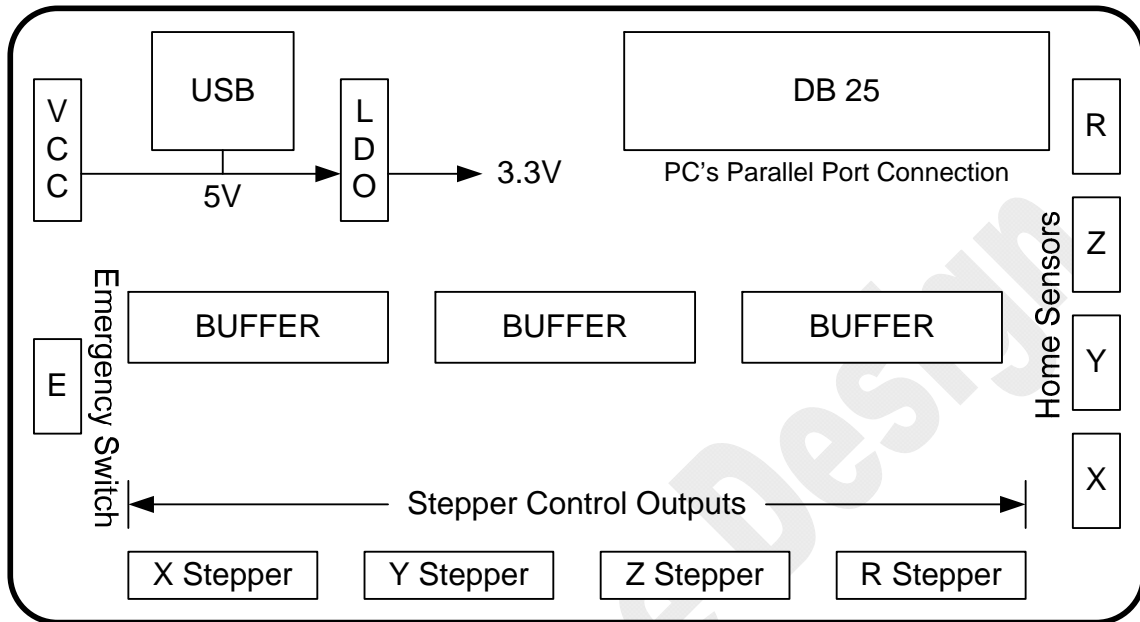


AE-CNCBridge Manual



Open

PC Parallel Port CNC machine Interface



AE-CNCBridge:

Create your own CNC machine!

- Male DB25 Parallel Port Connection
- Four Axis Control
- Emergency Switch Access
- Four Axis Home Sensor Access
- Selectable Voltage (5V or 3.3V) for stepper driver boards
- Internal 5V to 3.3V regulator
- 5V can be supplied externally or through USB connection
- Socketed buffers operate as lever shifters and isolation devices.

Description:

The AE-CNCBridge was designed to provide a portal from the PC's parallel port into any of our stepper driver boards, making it superbly easy to build your own CNC machine. There are many parallel boards out there, but the CNCBridge was tailored to match our stepper boards, in particular, the MonstroStep.

MonstroStep uses a 3.3V tolerant MSP430 microcontroller to generate up to 256 degrees of microstepping and 8 different waveforms. Most parallel interface boards rely on the parallel port's 5V to generate similarly railed control signals. Since the MSP430 microcontroller is not 5V tolerant, it is imperative to step down the 5V control signals into the 3.3V realm.

By utilizing open drain outputs, it is very easy to take 5V GPIO signals and transform them into any voltage you require. In this case, signal outputs can be railed at either 5V or 3.3V.

Board provides all the means to control up to 4 axis and an emergency button. Each axis contain independent control of enablement, direction and stepping rate. Each axis contains its own sensor input.

The board also contains an easy means of obtaining power from the same computer controlling the same machine by using an available USB port. The USB connection is used to obtain 5V which will then be stepped down to 3.3V through an internal LDO regulator. No communications are possible through the USB connection.



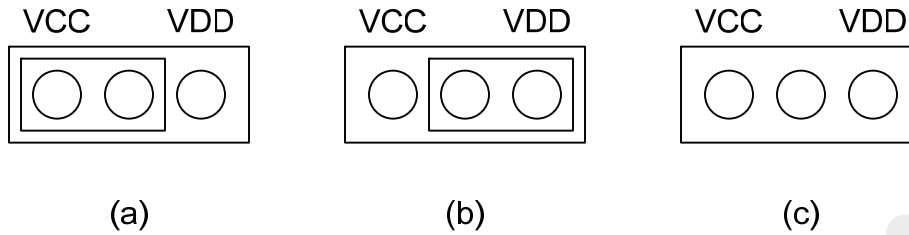
Control Signals: Stepper Connectors (J1, J3, J6 and J9)

Pins	Direction	Stepper Axis Control Signals
1	PWR+	Power + (can be 5V or 3.3V as selected by VDD Out Sel Jumper)
2	OUT	DIRECTION
3	OUT	STEP
4	OUT	ENABLE
5	GND	Power - GND

Control Signals: Sensor Connectors (J2, J4, J7, J11 and J12)

Pins	Direction	Switch or Sensor Connectors
1	PWR+	Power + (5V)
2	INPUT	Sensor Signal (Input)
3	GND	Power - GND

Jumper Configurations:

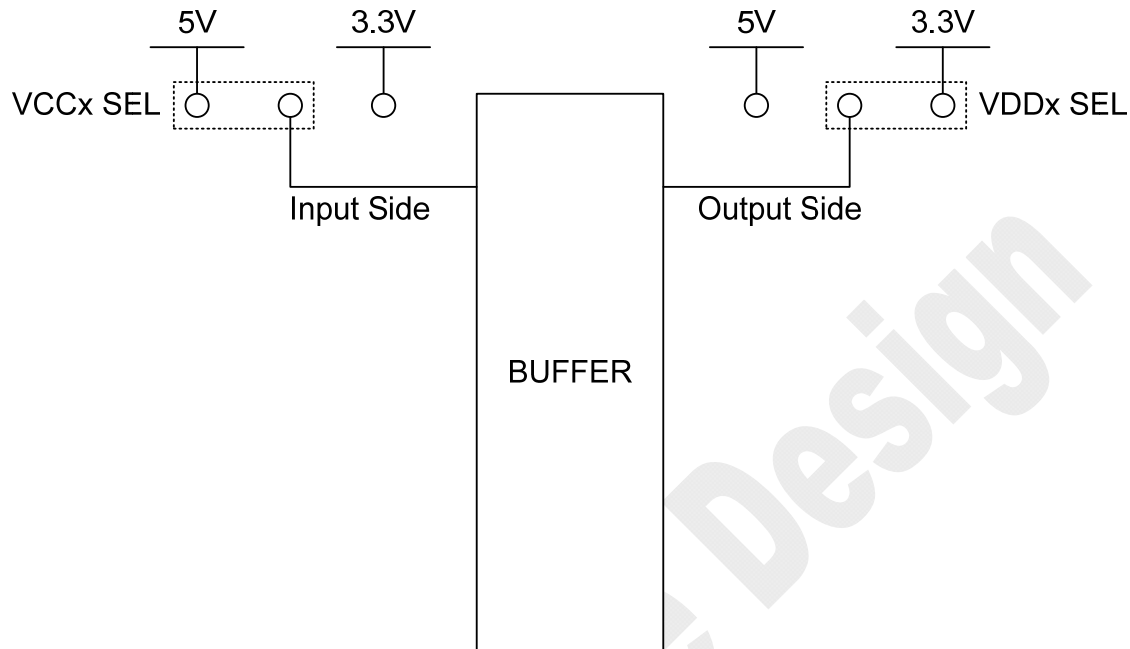


NOTE: On the AE-CNCBridge board, VCC refers to 5V and VDD refers to 3.3V.

(a) Jumpers configured to the VCC side will connect the respective node to 5V. (b) Jumpers configured to the VDD side will connect the respective node to 3.3V. (c) These jumpers should not be left disconnected as they represent a voltage rail to the buffer chip.

JPx Position	Diagram	Description
JPx:1-2	(a)	Rail is 5V
JPx:2-3	(b)	Rail is 3.3V
JPx: NONE	(c)	DO NOT USE

VDD SEL and VCC SEL Jumpers



NOTE: On the AE-CNCBridge board, VCC refers to 5V and VDD refers to 3.3V.

There are seven jumpers (2 per buffer and 1 for stepper axis control) used to select the voltage rail at different portions of the system. The first six are used to determine rail voltage at both sides of the buffer and the last jumper is used to determine voltage rail at the stepper axis control outputs.

Buffer's input side jumpers are called VCCx_SEL because this side of the buffer should be driven with 5V. This rail is actually the voltage used to power up the device. In the case of a future in which 3.3V is an option, the jumper can be moved to the VDD position. We do not foresee this to be the case.

Buffer's Output side jumpers are called VDDx_SEL because this side of the buffer could be driven with a 3.3V rail depending on which Stepper Driver you are interfacing to. For example, in the event your stepper driver is an AE-MonstroStep, 3.3V must be used! Other stepper drivers such as the AE-MDL-STPR8811, AE-MDL-STPR1, or AE-MDL-MegaMotor, are 5V tolerant so it is up to the user which jumper setting to use.

Axis Control Output is called VDD_OUT_SEL because this board was designed to interface to the MonstroStep which is by design a 3.3V driver board.



Buffers 1 and 2 (U1 and U2 respectively) are hard wired to deal with outputs (signals going from the parallel port to the CNC machine). These two buffers should be wired to be powered up with 5V (VCCx_SEL = VCC) and output either 3.3V or 5V depending on your stepper board.

Buffer 3 (U3) is hard wired to deal with input signals (Signals going from the CNC machine and into the parallel port). Both VCC3_SEL and VDD3_SEL should be configured to VCC.

The following table shows the recommended jumper settings for most CNC machines.

Jumper Name	Connection	Description
VCC1_SEL	JP:1-2	Buffer 1 is powered with 5V
VDD1_SEL	JP:2-3	Buffer 1 outputs are pulled up to 3.3V
VCC2_SEL	JP:1-2	Buffer 2 is powered with 5V
VDD2_SEL	JP:2-3	Buffer 2 outputs are pulled up to 3.3V
VCC3_SEL	JP:1-2	Buffer 3 is powered with 5V
VDD3_SEL	JP:1-2	Buffer 3 outputs are pulled up to 5V
VDD_OUT_SEL	JP:1-2	Stepper Board receives 5V rail
VDD_OUT_SEL	JP:2-3	Stepper Board receives 3.3V rail

Recommended Jumper Settings

