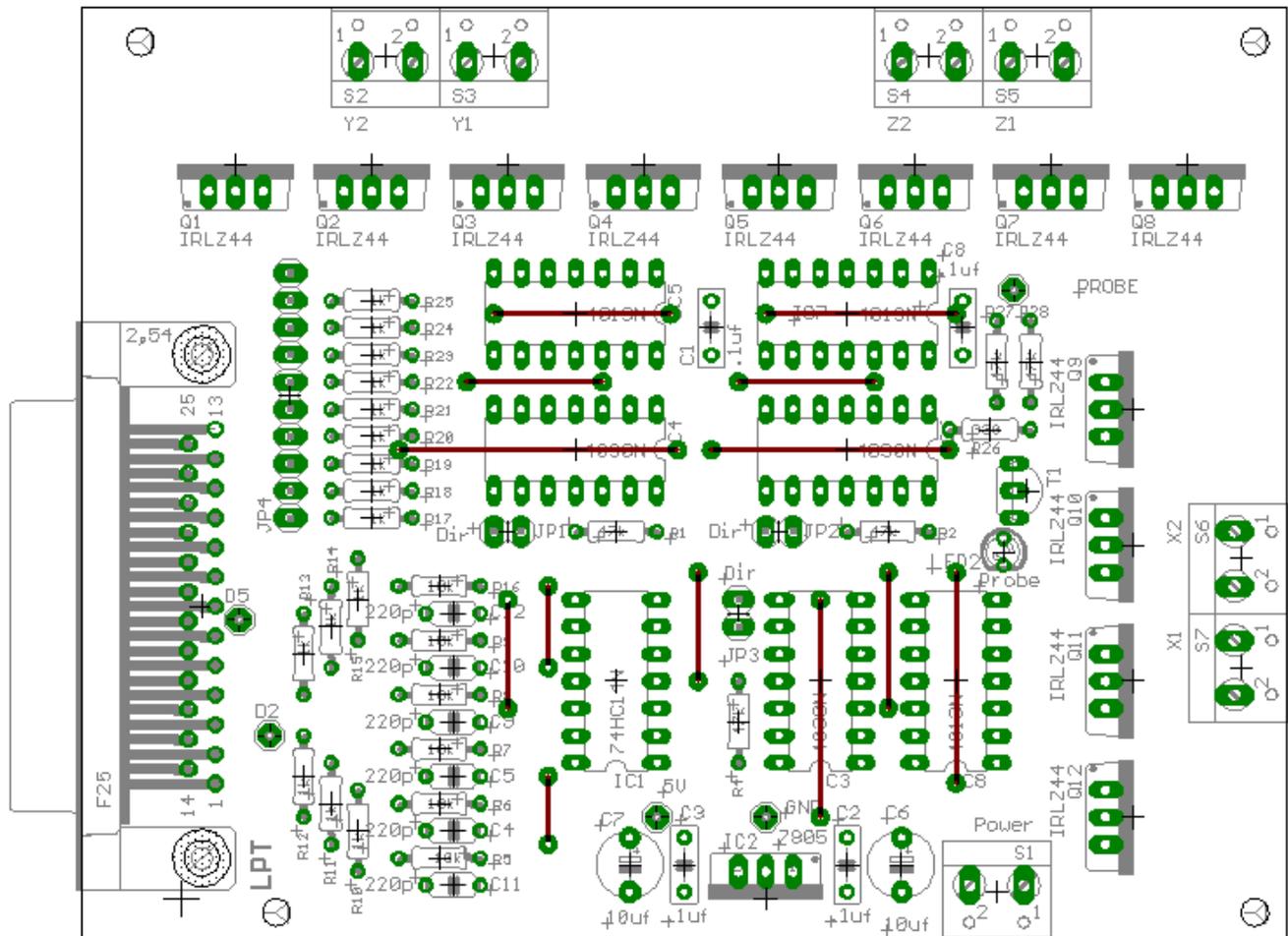


## 3 Axis Unipolar Controller Board Data

### Introduction

This is a simple 3 axis unipolar stepper board that can control stepper motors with power supplies rated to 30VDC. The FET drivers are rated at 50A, but in practicality this board should not be used with motors anywhere near that current for several reasons. The power supply voltage, heat sinks and cooling used for the FET's of your own application play an extremely important part in making that determination. The FET package is designed for 50 Watts of dissipative power. If you're not wise in electronics, the board should be built in stages and tested during each stage to eliminate problems.



### Current Limiting Resistors (IMPORTANT)

Anytime a power supply for the stepper motor is used that is greater than the rated voltage of the motor, current limiting resistors are required. This board does not contain room for current limiting resistors as they can be quite large sometimes. The coil resistance of the motor can be computed by dividing the rated voltage by the rated current. For example a motor rated at 5.2 volts @ 1.6 A ( $5.2/1.6$ ) has a coil resistance of 3.25 ohms. To compute the size of the current limiting resistor subtract the motor voltage rating from the power supply voltage and divide it by the current rating. For example using a 12v power supply with the above motor ( $12-5.2/1.6$ ), you would need a 4.25 ohm resistor. The wattage rating of that resistor is the current squared times the resistor value ( $1.6 * 1.6 * 4.25$ ) or in this case 10.88 watts minimum. Power resistors come in standard wattage ratings or 1, 5, 10, 25, 50 watts.

## Setting the Step Direction

JP1 thru JP3 are motor direction jumpers. JP1 Y axis, JP3 X axis, JP2 Z axis.

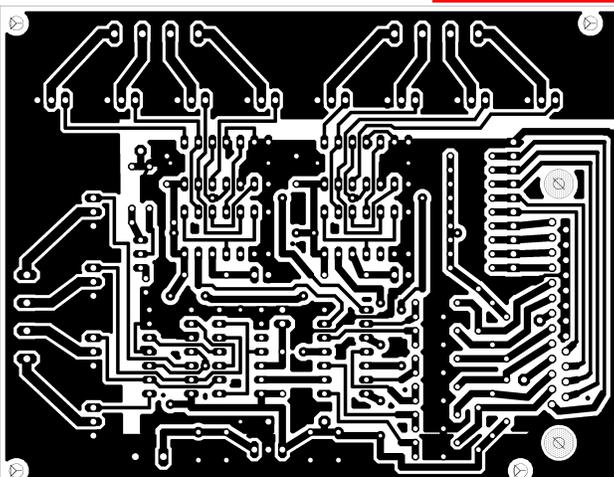
## Optional Logic Probe

Many times in troubleshooting a simple logic probe that visually gives an indication of a high or low logic state is helpful. Components R26, R27, R28, R30, T1, and LED2 make up the logic probe. By installing a wire in the probe pad to use as a test lead with those components installed the LED, will slightly illuminate when the test lead is left open, become brighter when connected to a logic hi, it will not illuminate when touched to a logic low.

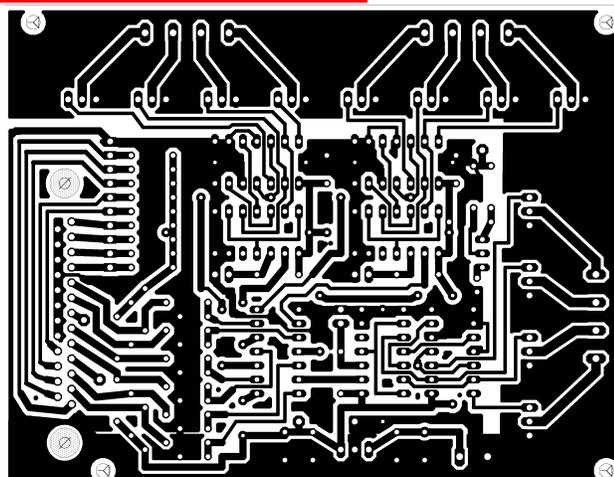
## Parts List

Part	Value/Device	Package	DigiKey P#	Quantity
C1-3,8	.1uf(100n)	Radial 0.2	BC1133CT-ND	4
C4-7,9-12	220p	Radial 0.2	1375PH-ND	6
C6,7	10uF	Radial 0.2	P11250-ND	2
IC1	74HC14N	DIL14	MM74HC14N-ND	1
IC2	7805	TO220	296-1974-5-ND	1
IC3,4,6	4030N	DIL14	296-2047-5-ND	3
IC5,7,8	4013N	DIL14	296-2033-5-ND	3
JP1-3	PINHD-1X2	pinhead	WM6402-ND	1
LED2	Red LED	3MM	67-1066-ND	1
Q1-12	IRLZ44	TO220BV	IRLZ44-ND	12
R1,2,4,27,28	47K	Axial 1/4W	47KQBK-ND	5
R5-9,16	10K	Axial 1/4W	10KQBK-ND	6
R10-15,17-25	1K	Axial 1/4W	1.0KQBK-ND	15
R26	330	Axial 1/4W	330QBK-ND	1
S1-7	2 Way Screw		281-1435-ND	7
T1	BC547B-NPN	TO92	BC547BOS-ND	1

**For reference only these are not true to size**



**Image as you look at the bottom  
Copper on the board**



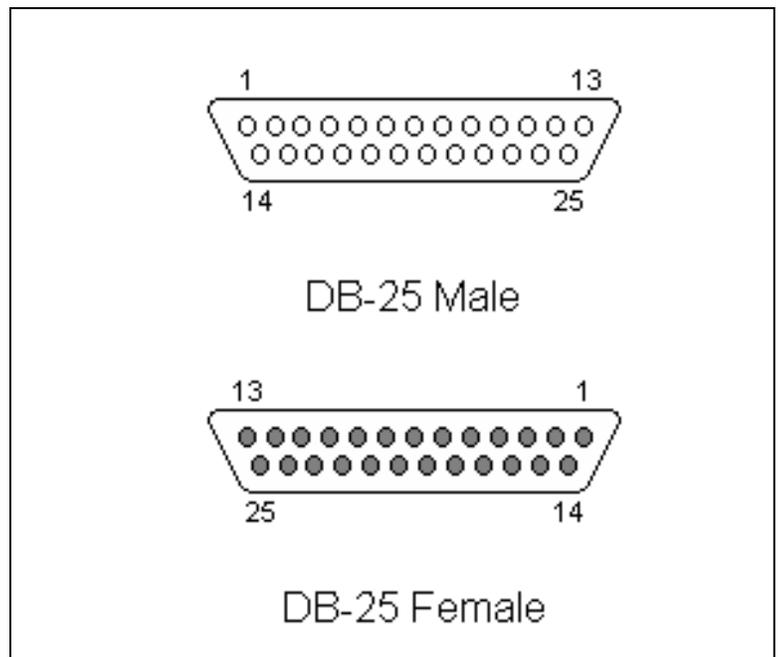
**Image as printed for Toner Transfer**

## Software Setup

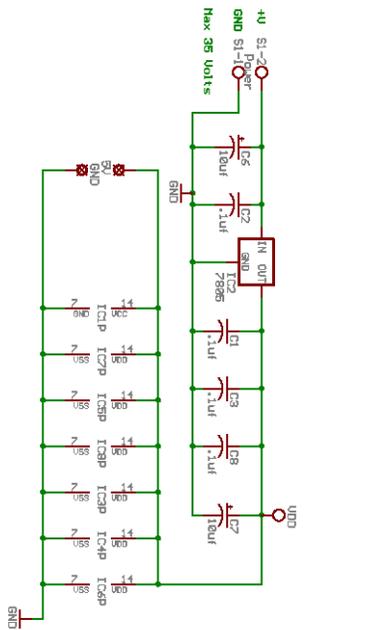
DB25 Pin	Function	DB25 Pin	Function
1	O Switch	13	I Switch
2	O X Dir	14	O
3	O X Step	15	I Switch
4	O NU (Pad D2)	16	O
5	O Y Dir	17	O
6	O Y Step	18	G GND
7	O NU (Pad D5)	19	G GND
8	O Z Dir	20	G GND
9	O Z Step	21	G GND
10	I Switch	22	G GND
11	I Switch	23	G GND
12	I Switch	24	G GND
		25	G GND

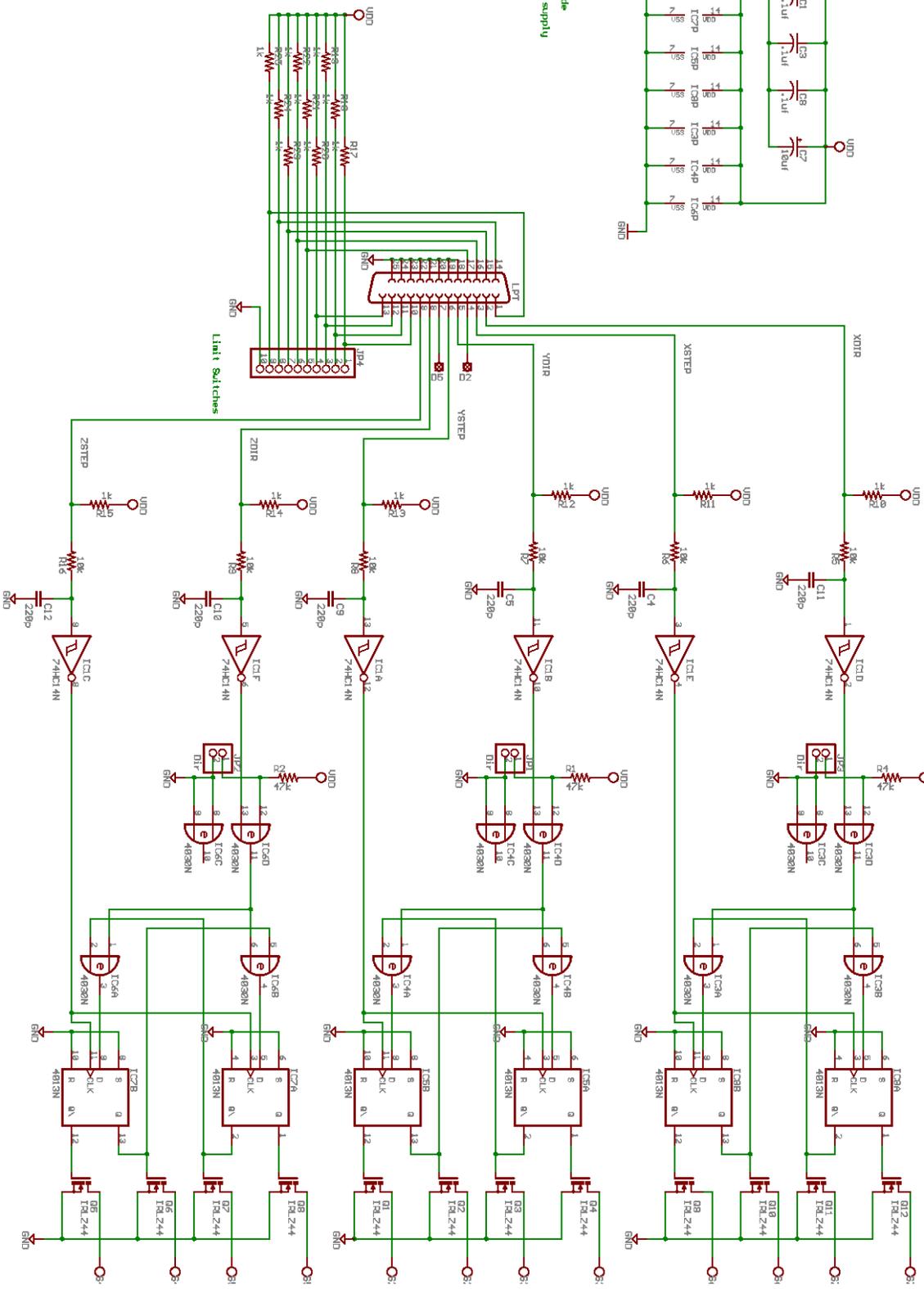
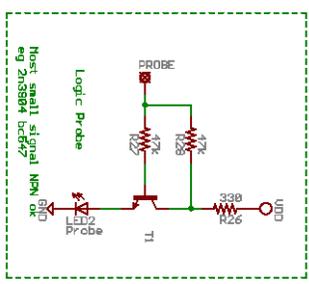
I = Input to PC
O = Output from PC
G = PC Common



Motors will step on a high to low transition at the computer. JP1, JP2, JP3 allow to reverse the direction via hardware of the direction signal.



Hostlets  
 Logic Level N Channel With Internal Diode  
 Voltage rating must be at least 2 times supply  
 TO220 Package  
 Suitable Types  
 1A244-44 65U  
 STP980E6 (396 68U)



Host small signal NPN bcd47 eg 2A9804