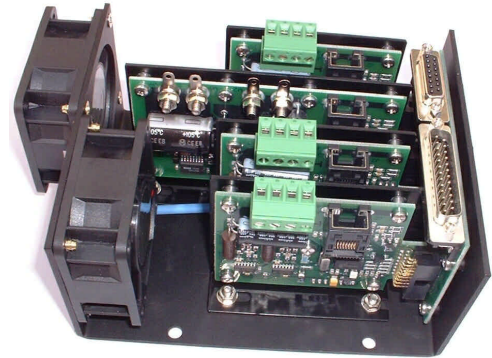


Motherboard for R20x0 Servo Drives:

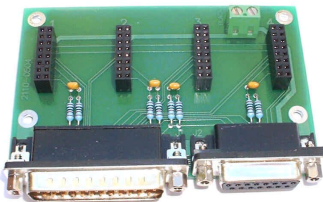
- R2110 – 4 axes non-isolated 5V only
- R2110P – 4 axes non-isolated 5V only
- R2120 – 4 axes opto-isolated 3.3/5V

Features:

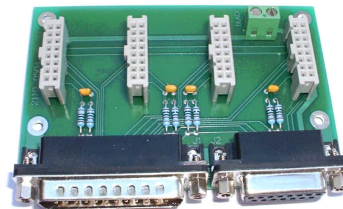
- Mother Board for up to four R20x0 servo drivers.
- One DB25 for LPT (parallel) port.
- One DB15 for limit switches.
- Connection for 24V fan(s).
- Size 140 x 89 x 26 mm (5.5 x 3.5 x 1.0 inch)
- low cost.



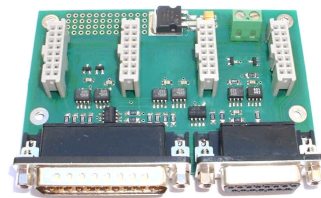
R2000 system



R2110 Non-polarized (5V)



R2110P Polarized (5V)



R2120 Opto-isolated (3.3/5V)

Description:

The R21x0 is an interface, which simplifies interconnection between PC running Step&Direction CNC software via LPT (printer) port and the physical CNC hardware such as motor drivers, cooling pump etc. It can be used with up to four R2010/R2020/R2030/R2040 servo drivers.

The R21x0 has a direct interface to PC printer port (DB25 - LPT port) and DB15 for connecting the limit switches.

R2110(P) suitable for 5V printer ports only – it might work on 3.3V (most laptop and modern motherboards), but not reliably. R2120 needs two supplies 1.) +5 to +30V for I/O and 2.) +18 to 36V for V_c for drives. These two supplies must be isolated – no common ground!

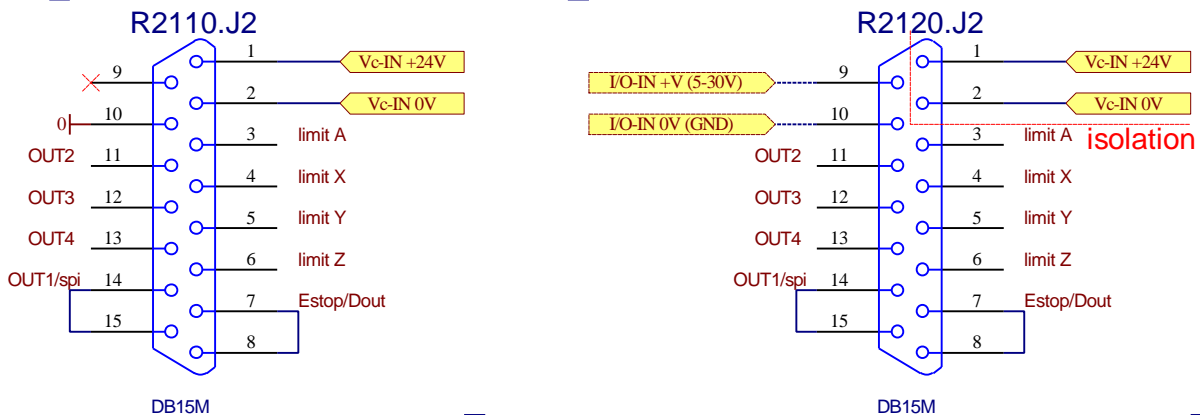
Two DB15 plugs recommended: one for tuning only – pre-wired for SPI and second for Step&Dir mode.

Electrical specifications:

Model:		R2110	R2120	
Supply Voltage for isolated I/O ports:	I/O +V	n/a	5-30	V
Supply Current for isolated I/O ports:	I _c	n/a	20	mA
Supply Voltage for control circuit:	V _c	18-36	18-36	V
Supply Current (no drive or encoder connected):	I _c	0	0	mA
Operating temperature	T	0-70	0-70	°C

J2 – interface (DB15) – R2110, R2120

Pin#	R2110/R2110P	R2120	Description
1	Vc-IN +24V	Vc-IN +24V	Control supply for drives DC 18 to 36 Volts – positive terminal.
2	Vc-IN 0V	Vc-IN 0V	Control supply DC 0 Volts – negative terminal.
3	Limit A [DB25.15]	Limit A [DB25.15]	Limit switch input for A drive – pin is connected to DB25 [LPT] connector, pin 15 as well.
4	Limit X [DB25.11]	Limit X [DB25.11]	Limit switch input for X drive – pin is connected to DB25 [LPT] connector, pin 11 as well.
5	Limit Y [DB25.12]	Limit Y [DB25.12]	Limit switch input for Y drive – pin is connected to DB25 [LPT] connector, pin 12 as well.
6	Limit Z [DB25.13]	Limit Z [DB25.13]	Limit switch input for Z drive – pin is connected to DB25 [LPT] connector, pin 13 as well.
7	E-stop/Dout [DB25.10]	E-stop/Dout [DB25.10]	S&D mode: E-stop or general purpose input. SPI mode: Pin must be connected to DB15.8 <i>Note: this pin is directly connected to DB25.10 [LPT]</i>
8	ERR/Dout signal from drives	ERR/Dout signal from drives	S&D mode: pin can be left open or it can be connected back to E-stop circuitry [DB15.7]. This pin goes low if there is an error in one or more servo drives connected to motherboard such as excessive following error. SPI mode: pin must be connected to DB15.7 <i>ErrorOut (in Step&Dir mode) or Data-out (in SPI mode) output</i>
9	[PC GND]	I/O-in +V	R2110: common ground pin R2120: isolated supply for I/O (DC +5V to +30V)
10	[PC GND]	I/O-in 0V [PC GND]	R2110: common ground pin R2120: isolated supply for I/O (0V) plus PC ground
11	OUT2 [DB25.14]	OUT2 [DB25.14]	General-purpose output pin. This pin is directly connected to DB25 [LPT] connector, pin 14.
12	OUT3 [DB25.16]	OUT3 [DB25.16]	General-purpose output pin. This pin is directly connected to DB25 [LPT] connector, pin 16.
13	OUT4 [DB25.17]	OUT4 [DB25.17]	General-purpose output pin. This pin is directly connected to DB25 [LPT] connector, pin 17.
14	OUT1 [DB25.1]	OUT1 [DB25.1]	S&D mode: General purpose output pin. This pin is directly connected to DB25 [LPT] connector, pin 1. SPI mode: pin must be connected to DB15.15
15	STEPPER/SPI	STEPPER/SPI	S&D mode: not used. SPI mode: pin must be connected to DB15.14 <i>Note: this pin is used as synch i/o signal as well in the Master/Slave SPI mode.</i>



Example of SPI tuning cable for R2110 (left) and R2120 (right). A single 24V supply can be used for testing purposes only – connecting Vc-IN and I/O-IN supplies together.

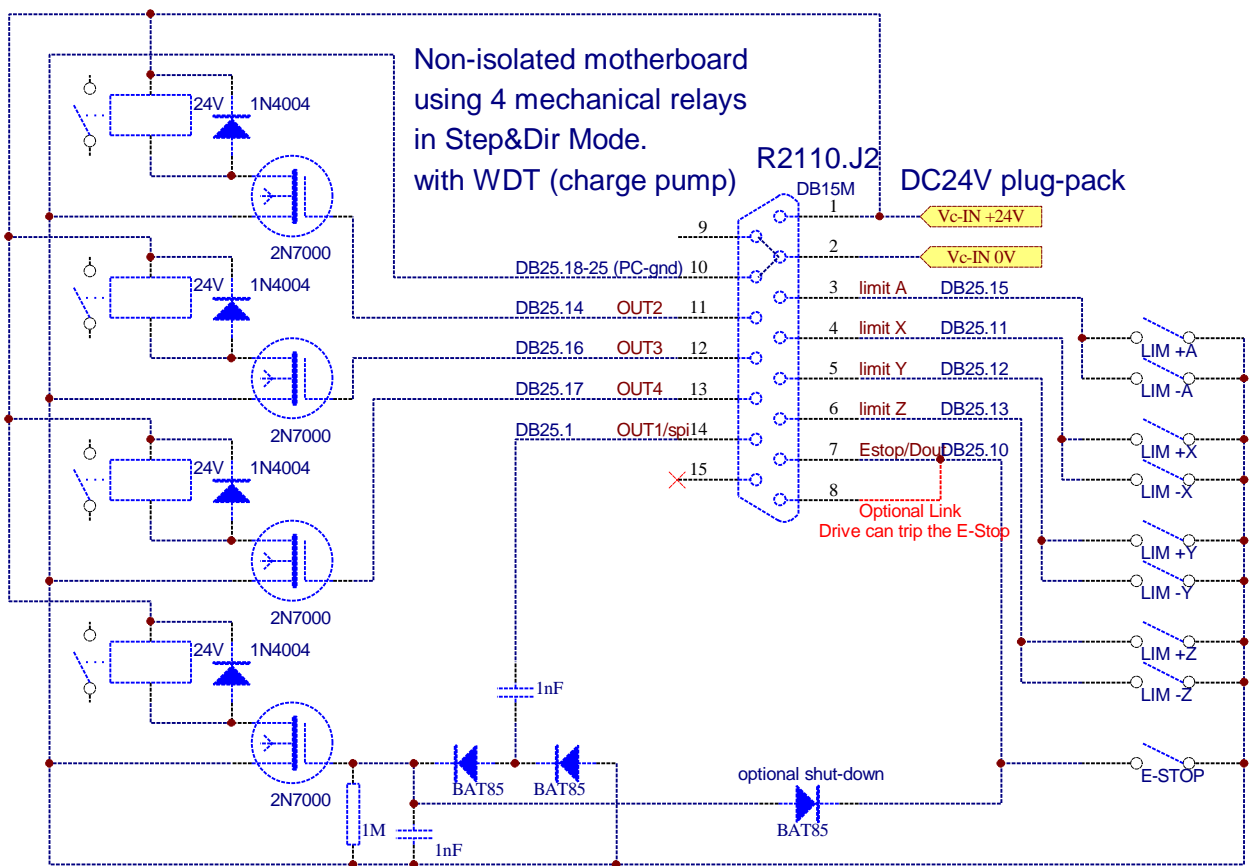


Fig.3. Example of R2110(P) using 24V relays, Watch Dog Timer (charge pump) in Step&Dir mode. Note the link between pins 7. & 8. Drive can trip the Estop if error detected, such as excessive following error or encoder fault etc.

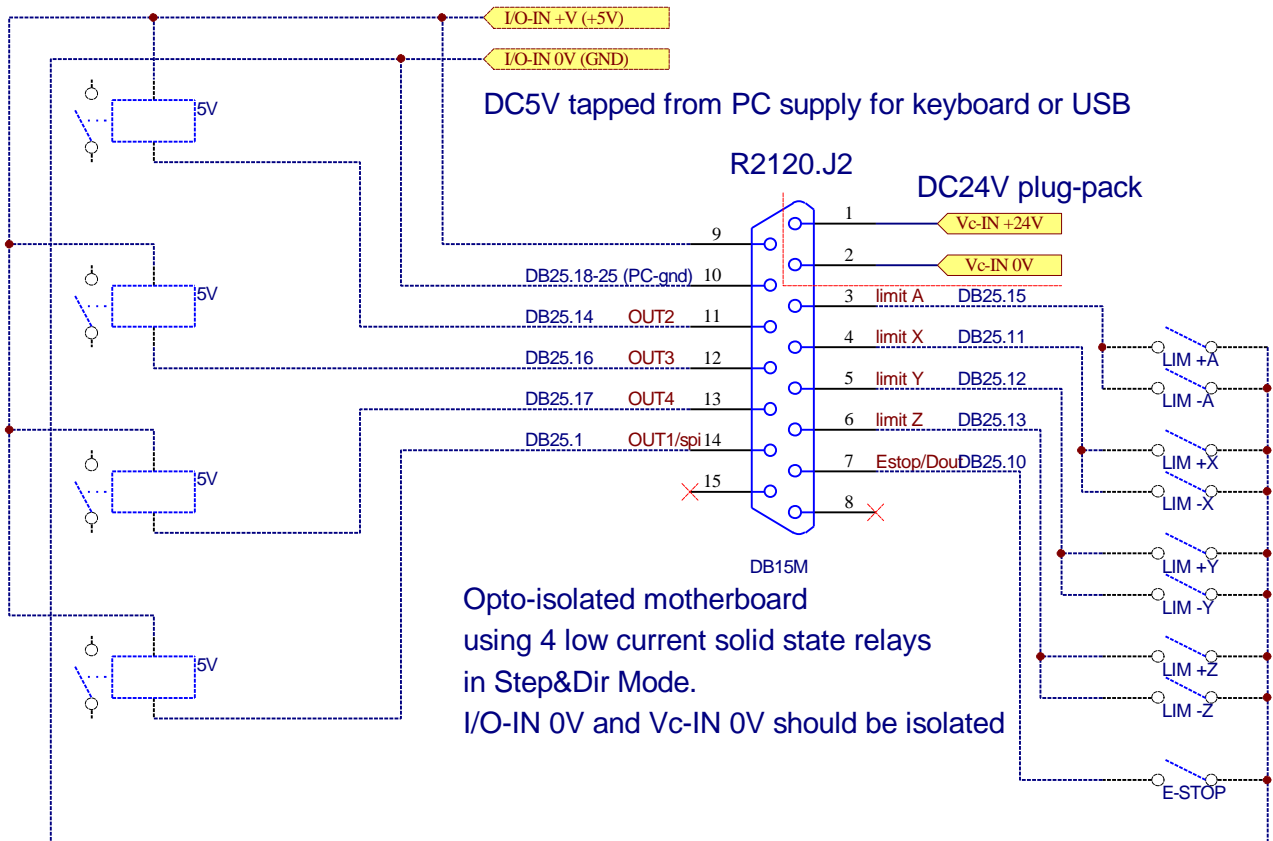


Fig.4. Example of R2120 using low power solid-state relays in Step&Dir mode. The 5V supply for I/O must be regulated 5V (+/-10%) and it can be "tapped" from PC supply from USB or PS2 connector. The printer port [LPT] usually can sink >20mA. The solid-state relays should not draw more then 20mA.

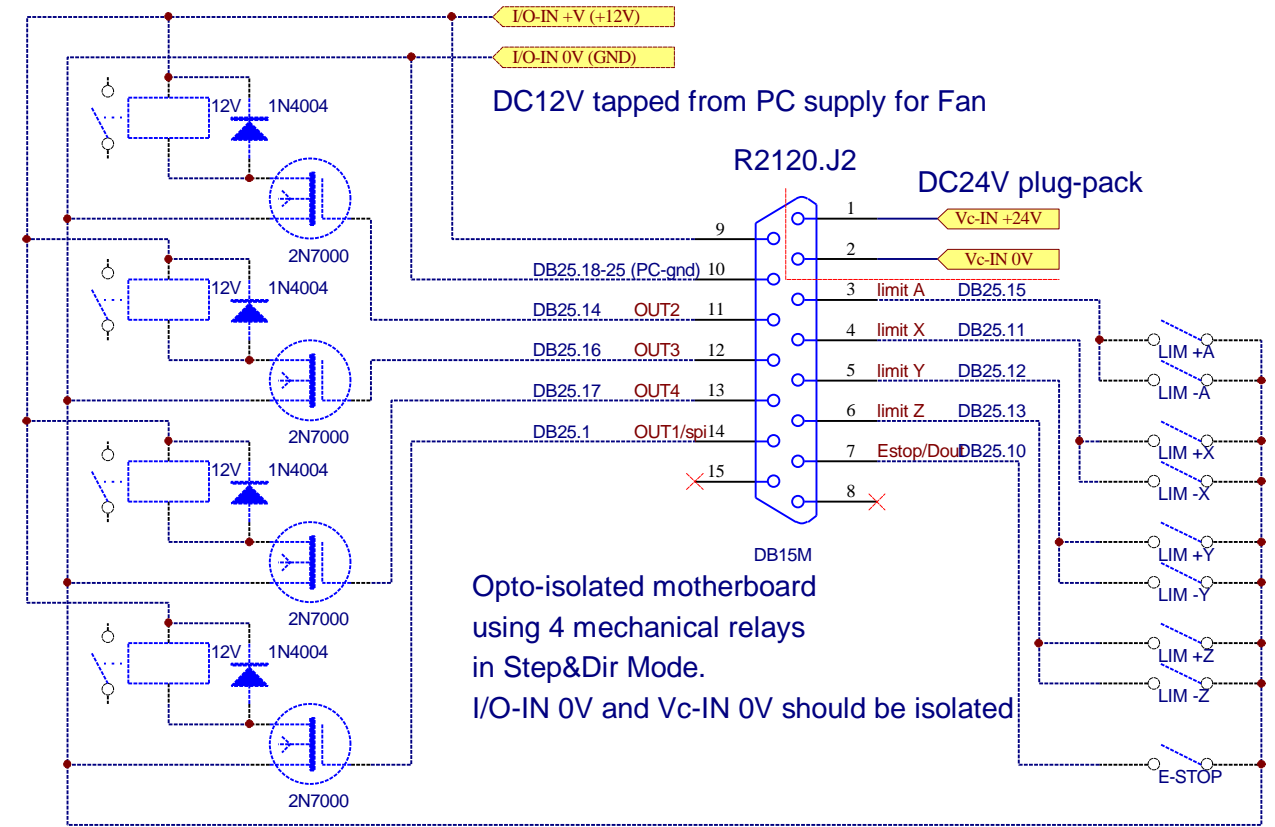


Fig.5. Example of R2120 using standard electro-mechanical 12V relays in Step&Dir mode. The 12V supply for I/O does not have to be regulated and it can be “tapped” from PC supply from Fan connector. Note that the WDT and Estop circuitry can be implemented same way as in R2110 example.

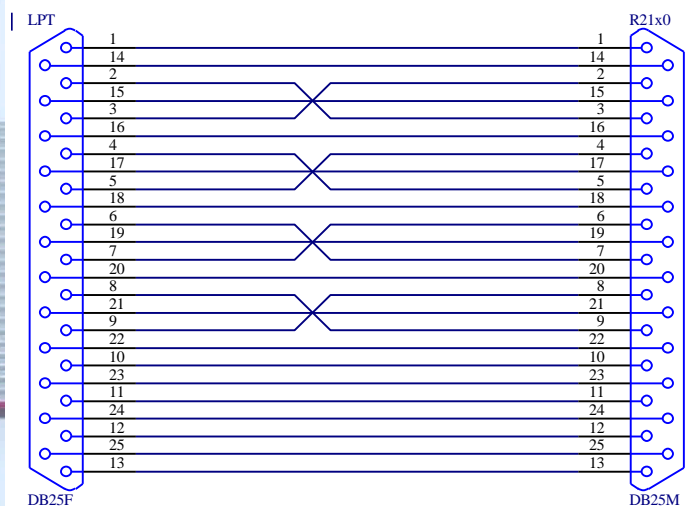
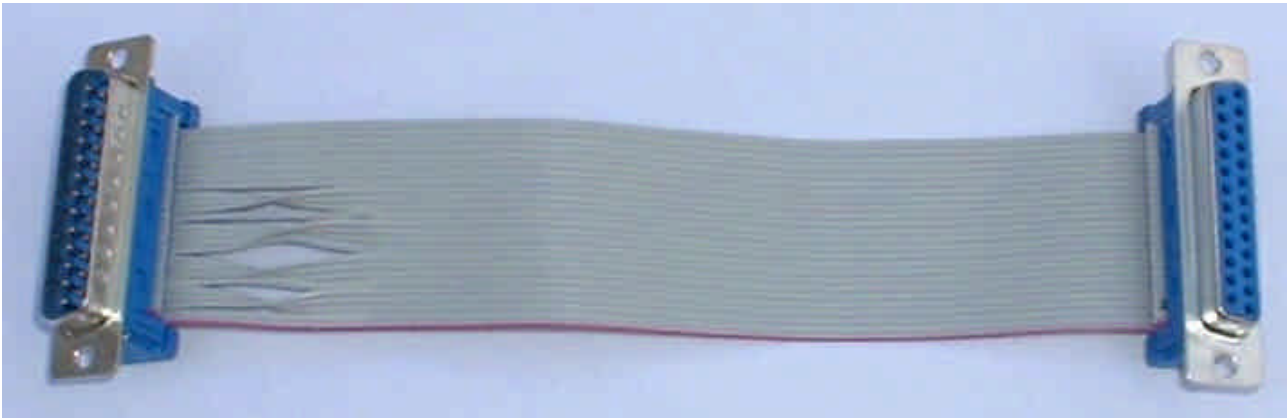
CNC Software configuration:

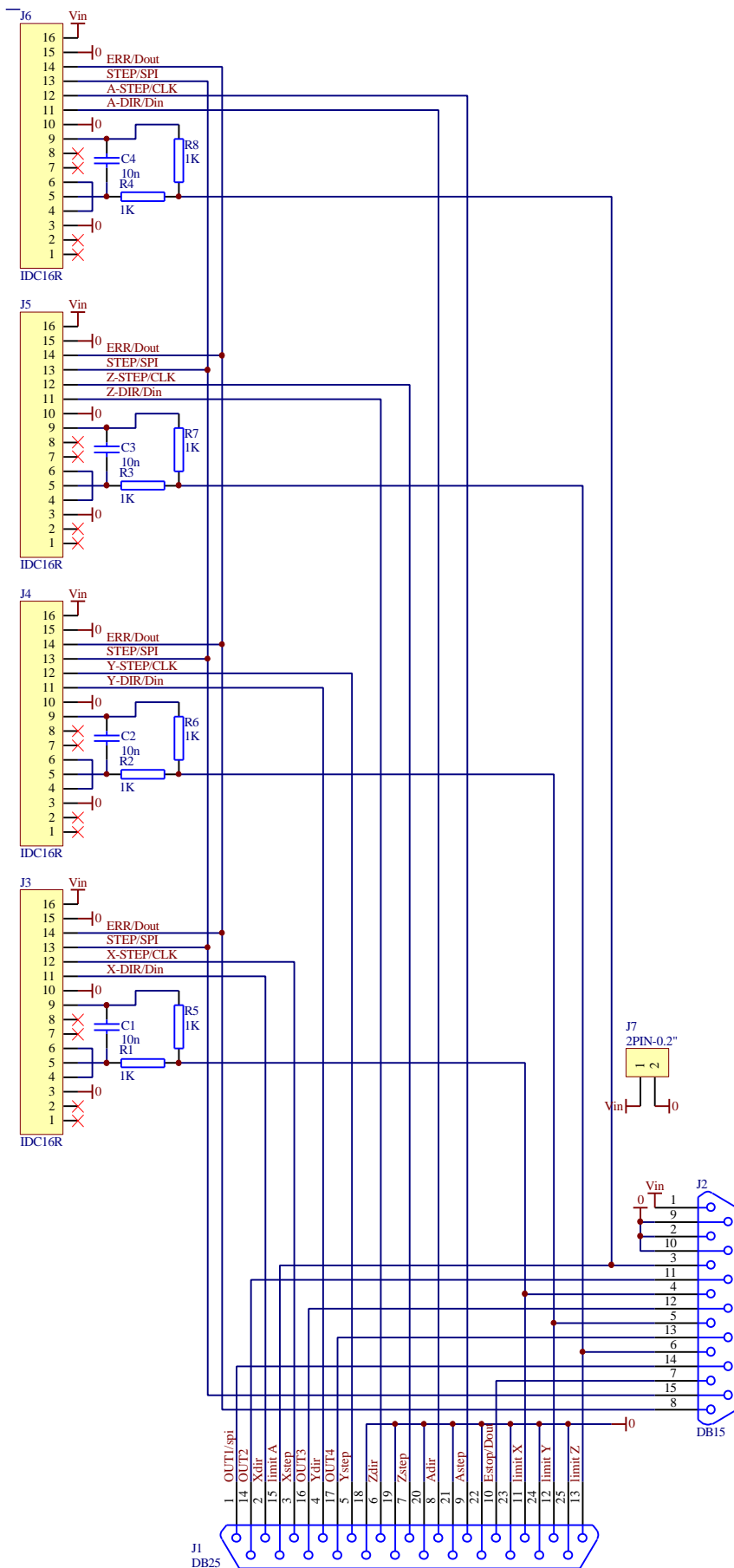
Please config the printer port DB25 [LPT#:] of your Step&Dir CNC PC based software as per table below:

Pin#	Function	Note
1	OUT1	General-purpose output or WDT output as per above example.
2	Xdir	Drive X Direction
3	Xstep	Drive X Step
4	Ydir	Drive Y Direction
5	Ystep	Drive Y Step
6	Zdir	Drive Z Direction
7	Zstep	Drive Z Step
8	Adir	Drive A Direction
9	Astep	Drive A Step
10	E-stop / in1	Estop input or general purpose input

11	Limit_X / in2	Limit switch X input or general purpose input
12	Limit_Y / in3	Limit switch Y input or general purpose input
13	Limit_Z / in4	Limit switch Z input or general purpose input
14	OUT2	General purpose output
15	Limit_A / in5	Limit switch A input or general purpose input
16	OUT3	General purpose output
17	OUT4	General purpose output
18-25	PC GND	PC ground

Example of swapping Step and Dir pins if needed. In case that they cannot be re-configured in your CNC software.





_R2010(P) schematics.