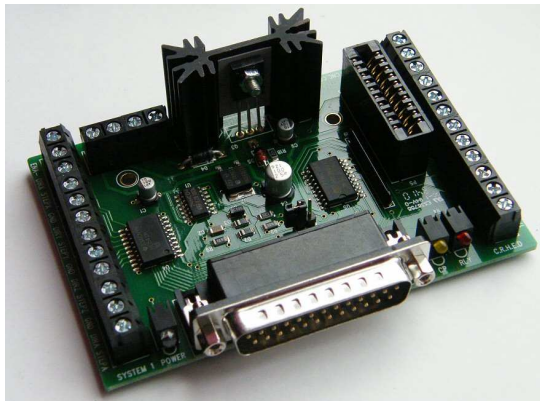


SYSTEM 1 V2

C R H Electronics Design



SYSTEM1 V2

Parallel Buffer Board Interface With Charge Pump interlock and single expansion slot

C R H Electronics Design

Specifications

- Fully buffered PC Parallel port interface
- Smd components for greater reliability
- 5Volt logic 20mA drive capability.
- All signals terminated to connector pins
- Charge Pump protection circuit.
- Built in pull-up resistors on inputs
- High voltage pr-regulator 70V Max.
- LED's for power, charge pump enable and relay.
- High quality two layer, silkscreened PCB
- Single expansion slot
- Board size 100 X 66 mm, FR4, RoHS compliant.
- Compact low cost design.

Manual V1.0 Sep 10

Hardware V1.0 Sept 10

System1 V2 is a buffered parallel interface board with 20mA of drive capability with a combined charge pump interface. This latest version has the same functionality as its predecessor but uses surface mount components and the charge pump circuit has been upgraded to cope with weaker drive levels found on some computers. The board is an ideal link between a PC parallel port and various CNC stepper motor drive boards. The system1 has a single

expansion slot which will accept the spindle module board used on the System4. The board has a high voltage pre-regulator circuit enable it to connect to drive board power rails up to 70 volts. All the parallel port signals are taken to their own terminal blocks and marked with axis step and direction outputs, signal inputs from one to five and spare outputs 14, 16 and 17. Pins 16&17 are also fed to the expansion socket and are used for spindle speed and relay control when fitted with the spindle control board. The charge pump uses the 12 kHz signal from the parallel port generated by the CNC software to operate a logic circuit that gives an active low output. Any piece of machinery that uses powerful motors can be dangerous if controlled by a computer that can be in an unknown state while being powered up or in a software crash condition. Using the charge pump circuit to disable power to motors is a safety device in that it only operates when the software is running correctly and under user control. The charge pump circuit is also used to disable the output signals so even if your stepper boards do not have an enable pin they will be disabled automatically when the charge pump signal is not present.

The output buffers can easily supply 20mA drive current, ideal for stepper motor drive boards with built-in opto-isolators than need more current than most PC Parallel ports can supply. Inputs are also buffered with 10k pull-up resistors so that a simple connection to ground creates a logic switching level.

The board has 5V & 12V regulators which have spare capacity to drive other circuits. The board has three LED's one indicating power on, a second that illuminates when the charge pump circuit is active and a third indicating if the relay on the spindle module has operated. The charge pump circuit has an optional force jumper L3 available if the software does not support this feature. As default the jumper is not linked. Fit the jumper over both pins to override the charge pump circuit and permanently enable the board.

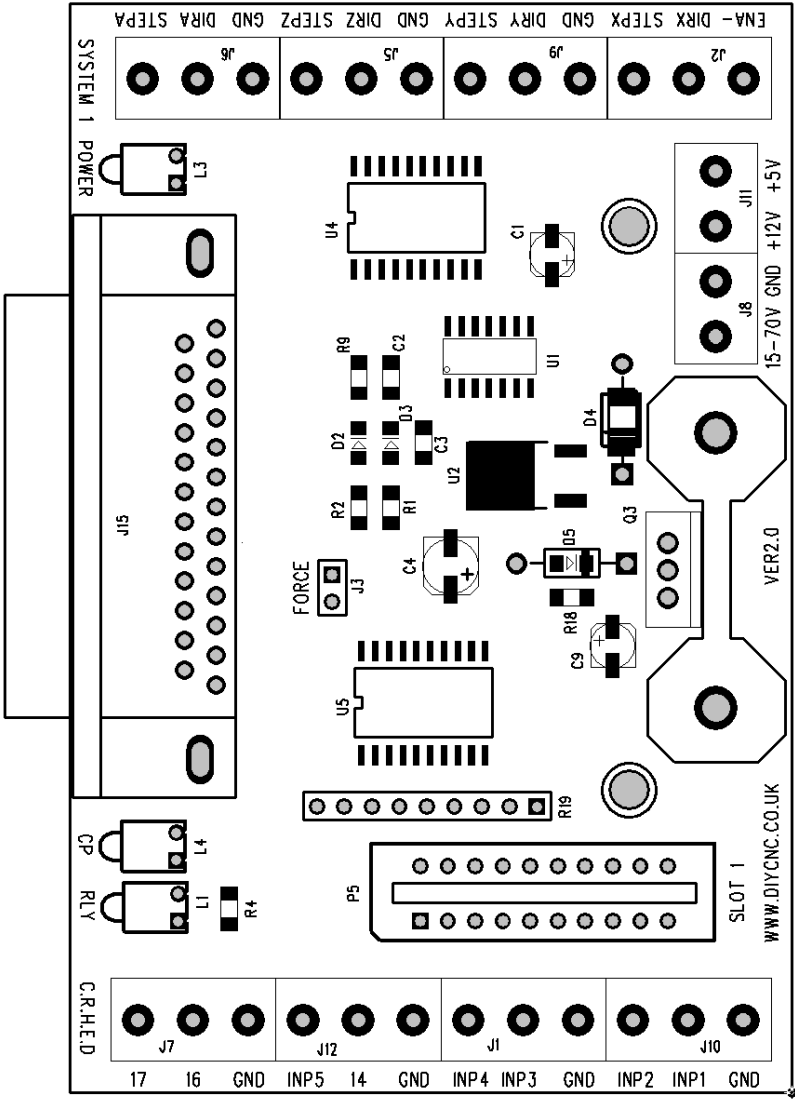
Power Input

With the high voltage regulator, absolute Maximum input voltage is 70V. This should be adequate for most users, simplifying power supply circuits and eliminating extra power supplies.

Expansion Connector

The board has a single expansion slot which can accept the Spindle module as used in the System4 or any future expansion boards when made available.

Board layout, of System1 V2



Connecting the board

The board is marked with the various axis signals, inputs and outputs of the 25 way D connector which can need to be allocated in software. Fig 1 shows the usual setup conditions for inputs and outputs. Pins 16 & 17 are used to drive spindle control module if fitted.

Fig1

Parallel Port Pin	Bufferport Signal	Input / Output
1	Charge pump signal	Out
2	X Direction	Out
3	X Step	Out
4	Y Direction	Out
5	Y Step	Out
6	Z Direction	Out
7	Z Step	Out
8	A Direction (4th Axis)	Out
9	A Step	Out
10	In 1	Input
11	In 2	Input
12	In 3	Input
13	In 4	Input
14	14 Output	Out
15	In 5	Input
16	16 Output (shared with slot)	Out
17	17 Output (shared with slot)	Out
18-25 computer ground	GND	

Spare output power

Spare 5V & 12V power current is dependent on power supply input voltage thus increasing heat dissipation in the pre-regulator circuit. Recommended maximum spare current output 100mA for input voltages > 30V and 200mA spare current for voltages < 30V.

Optional Spindlemod board

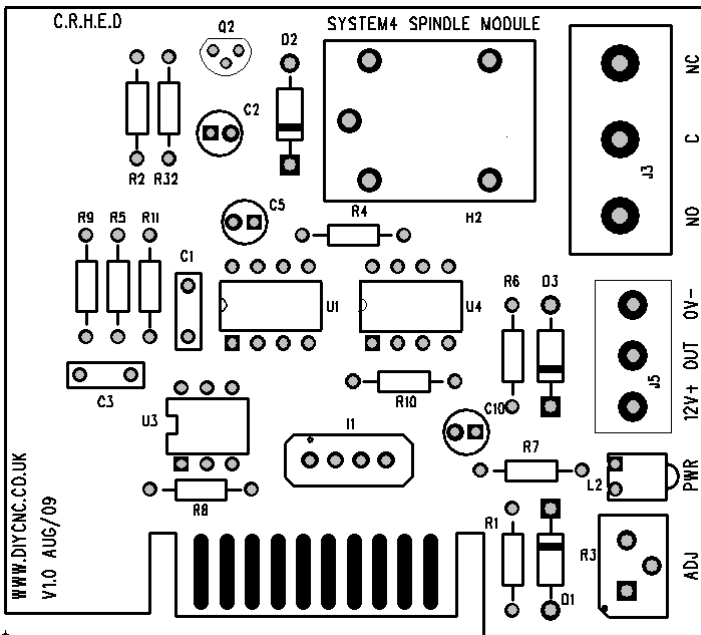
The board is able to take step signals to drive a spindle motor board that normally uses a potentiometer to control spindle speed. This is achieved by converting stepper pulses on pin 16 of the parallel port into a voltage level suitable for the spindle drive board. There is also a relay with contacts rated at 2400 Watts or 240V AC at 10 Amps

suitable for switching power to the motor that is controlled by the forward, backward signal on pin 17. Some motor control boards allow full reverse features, others are single direction only. The board has Opto isolation and an isolated dc/dc converter for power to the analogue side of the board making external power unnecessary.

WARNING

It should be noted that some motor controller boards have no mains isolation and instead rely on being self contained systems. Connecting other circuits to these boards present a possibility of hazardous voltage levels which may result in electrocution or severe damage to circuit boards. We strongly recommend isolating all spindle motor power while handling this board as full mains potentials are possible between various parts of the circuit.

Fig5



When using the spindle board to control an existing manual system only two connections are required between the Spindle module and the spindle drive motor board. A ground or the bottom of the variable potentiometer connection to the 0V- pin and the centre pin or variable or wiper connection of the pot to the OUT connection. You must remove the existing potentiometer connections to prevent it loading the circuit.

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Dimensions and support fixings are 3.2mm for M3 screws.

