



- 4 Axis CNC Breakout Board
- Step, Direction and Limited Switch Connections for Each Axis
- 2 Relays with indicator LED's for Spindle, Coolant or Vacuum Control
- 3 Extra IO for further Expansion
- 12V or 24V DC Power Option
- Charge Pump Safety Option

The Ocean Controls Parallel Port Breakout Board for CNC is a parallel (printer) port hardware interface designed for providing Stepper Motor control signals and incorporates 2 relays for switching devices on and off.

The main circuitry consists of two buffer IC's which boost the weak parallel port signals to a level high enough to drive Stepper Motor Driver Circuits which use Opto-Couplers.

With the safety charge pump option, the board also includes a microcontroller which monitors the CNC software and turns off the relays and output signals when the charge pump signal from the CNC software is lost.

The Breakout Board provides 9 buffered output signals to control up to 4 Stepper Motor Drivers, 5 digital inputs designed for use as limit switch or e-stop inputs, 2 Relay Outputs to control spindles, coolant or vacuums, and a spare output connected directly to the port (available only when the charge pump option is not enable).

The Breakout Board is available with 12V or 24V relays and requires power at the relay voltage.

### Setup:

The Breakout Board is connected to the parallel port of a PC using a standard D25 male to female cable. 12VDC (or 24VDC) is connected between the V+ and COM terminals with positive connected to V+.

The Sx and Dx terminals are connected to each driver circuits STEP and DIRECTION inputs respectively. A connection between the driver circuit COM and the Breakout Board COM terminals may need to be made as well.

The Limit Switch inputs are labelled L1-L4 and I1 and are pulled high internally. To use a limit switch connect a Normally Open switch between the Lx and COM terminals.

The relays Normally Open, Common and Normally Closed terminals are available for both relays.

O1 is connected directly to the port, this is used for the charge pump signal, when the charge pump microcontroller is not installed it can be used as a general purpose output.

O2 can be used as a general purpose Output it is buffered and can be used to drive a motor control signal such as enable lines or the like.

A regulated 5V DC output is available via the terminal labelled 5V.

## Charge Pump:

To use the charge pump option, short jumper JP1.

Models with the charge pump microcontroller installed require the CNC software to output a frequency signal within 3 kHz and 14.5kHz on pin 1 of the parallel port. If the signal is not present relays, motor outputs and switch inputs will not work.

## Software Settings:

Table 1 shows the signal connections, which are needed to set the CNC software up.

Terminal	Description	D25 Pin No.	Signal	Register	Bit No.
V+	12VDC or 24VDC Input				
COM	Ground	18-25	GND		
5V	5V Output				
S1	Stepper Motor 1 STEP output	2	D0	Data	0
D1	Stepper Motor 1 DIRECTION output	3	D1	Data	1
S2	Stepper Motor 2 STEP output	4	D2	Data	2
D2	Stepper Motor 2 DIRECTION output	5	D3	Data	3
S3	Stepper Motor 3 STEP output	6	D4	Data	4
D3	Stepper Motor 3 DIRECTION output	7	D5	Data	5
S4	Stepper Motor 4 STEP output	8	D6	Data	6
D4	Stepper Motor 4 DIRECTION output	9	D7	Data	7
L1	Limit Switch 1 input	13 or 15*	Select	Status	4
L2	Limit Switch 2 input	15 or 13*	nError	Status	3
L3	Limit Switch 3 input	10	nAck	Status	6
L4	Limit Switch 4 input	12	PaperEnd	Status	5
NC1	Relay 1 Normally Closed Contact	17	nSelectIn	Control	3
C1	Relay 1 Common				
NO1	Relay 1 Normally Open Contact				
NC2	Relay 2 Normally Closed Contact	14	nAutoLF	Control	1
C2	Relay 2 Common				
NO2	Relay 2 Normally Open Contact				
I1	Extra Input 1	11	Busy	Status	7
O1	Extra Out 1 (Charge Pump)	1	nStrobe	Control	0
O2	Extra Out 2	16	nInit	Control	3

**Table 1 Connections and Signals**

\*Versions 3 and 4 of the PCB have these incorrectly labelled. In these versions L1 should be P15 and L2 should be P13.

All other versions have the correct labelling on the PCB (L1=P13, L2=P15).

**System Configuration**

