C31- OPTOISOLATED 24V BREAKOUT BOARD Rev. 1

User manual Rev. 1.1

1. Overview

This board provides 5 optoisolated sinking inputs for +24VDC signals and 12 optoisolated sourcing outputs for 24VDC signals.

2. Features

- ***EEE 1284 Standard compatible.*** Includes the circuitry recommended by the IEEE 1284 Level 1 standards for bidirectional parallel communications between personal computers and peripherals.
- ***5 Optoisolated 24V Sinking inputs.***
- ***12 Optoisolated Sourcing 24V Outputs.***
- ***Output pins 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 16, 17.***
- ***Input pins 10, 11, 12, 13, 15.***

- ***Common Ground Terminal.***
- ***24V Common Terminal.***
- ***Support for up to 2 KHz optoisolation for inputs and 10 Khz for outputs.***
- ***Status LEDs on all inputs and outputs connections.*** No more guessing. You can SEE all your signals.
- ***Darlington Outputs.***
- ***Screw-On connections for all terminals.*** You only have to screw-on the wires to make all your connections.
- ***External Enable Pin (EN).*** The board has a pin that allows you to enable/disable all the outputs at once.
- ***Status outputs LED.***
- ***Works directly with popular CNC hardware and software.*** Such as Geckodrive, DeskCNC or Rutex, and parallel port control software, such as mach2, Linux EMC, TurboCNC, CNCPlayer, CNCZeus and others. (Not all tested).

3. Specifications.

DIGITAL INPUT SPECIFICATIONS	
On-state voltage range	10 to 27VDC
Minimum on-state input current	10 mA
Maximum off-state voltaje	1V
Maximum operation frequency	2 KHz

DIGITAL OUTPUT SPECIFICATIONS	
Maximum output voltage	28V
Typical output current	100mA
Maximum operation frequency	10KHz
Time of output disabling	12 nS*

*Time passed since a low in the ENABLE input is detected and the outputs are disabled.

4. Schematics

4.1 Discrete 24V Sinking inputs.

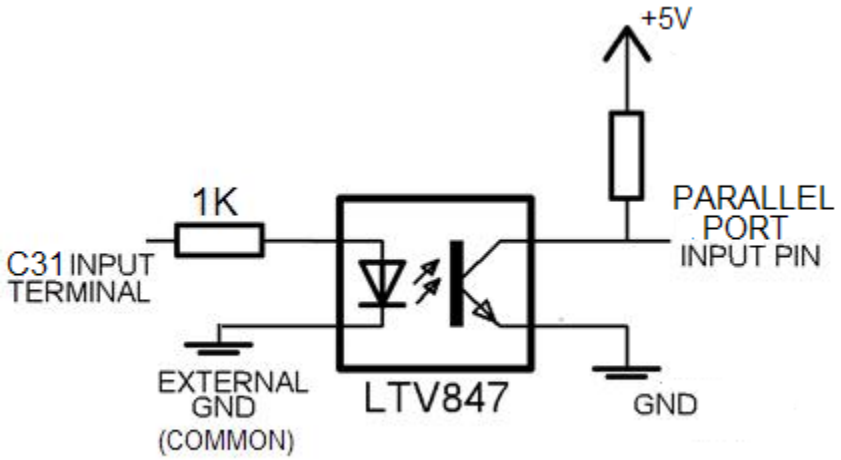


Fig. 1 Inputs schematic

Note: This configuration inverts the original signal, this means that when is applied 24V to the input terminal, in the Parallel port is received a LOW.

4.2 Discrete 24V sourcing Outputs (Pins 1, 14, 16 and 17).

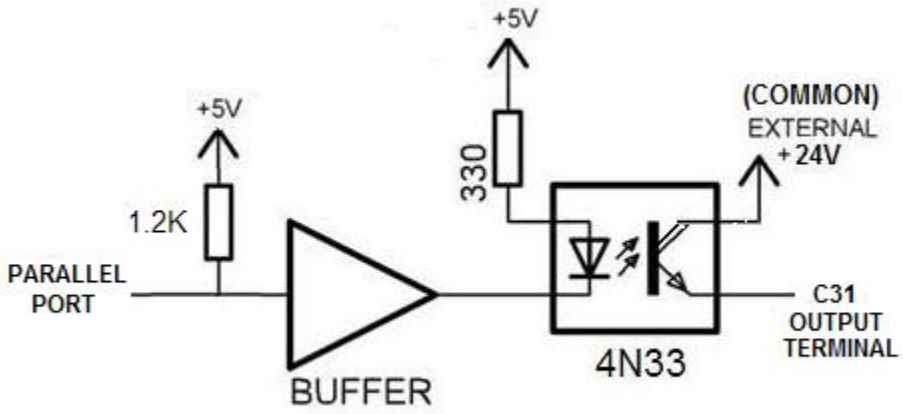


Fig. 2 Outputs schematic (Pin 1, 14, 16 and 17)

4.3 Discrete 24V sourcing Outputs (Pins 2 - 9).

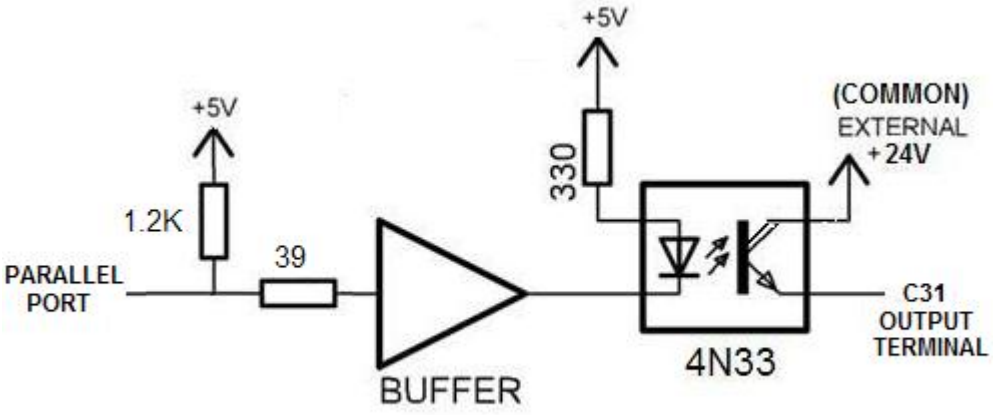


Fig. 3 Outputs schematic (Pins 2- 9)

5. Board description

5.1 Power Requirements

It requires a 5VDC @ 400mA power supply and a 24VDC or 12VDC @ 1 Amps external power supplies to operate.

Note: If the outputs are going to be used to drive high currents loads (Relays), an 24VDC or 12VDC power supply with more amps may be required.

WARNING

Check the polarity and voltage of the external power source and connect the 24V .Overvoltage or reverse-polarity power applied to these terminals can cause damage to the board, and/or the power source.

5.2 Enable pin.

The card must be provided with a 5VDC signal to enable operation. This feature has been added to enable you to control externally the status of the outputs of the card. You can add en external switch to provide the enabling signal. Internally this pin has a 4.7kOhm pull-down resistor.

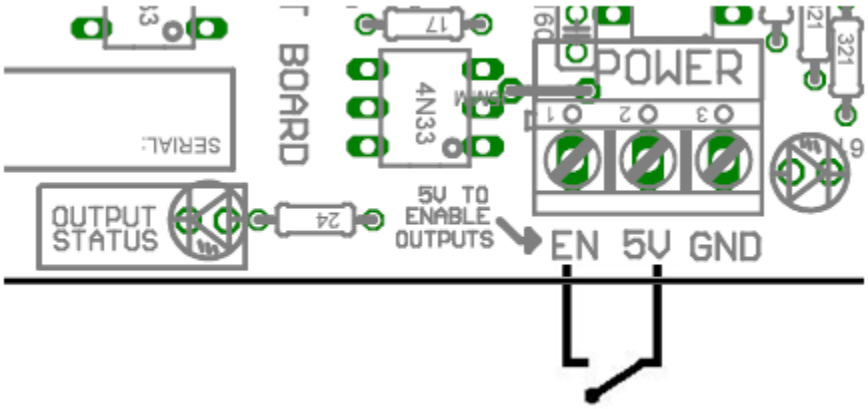


Fig. 4 Enable wiring

6. Wiring Diagrams

6.1 Connecting Switches or push button.

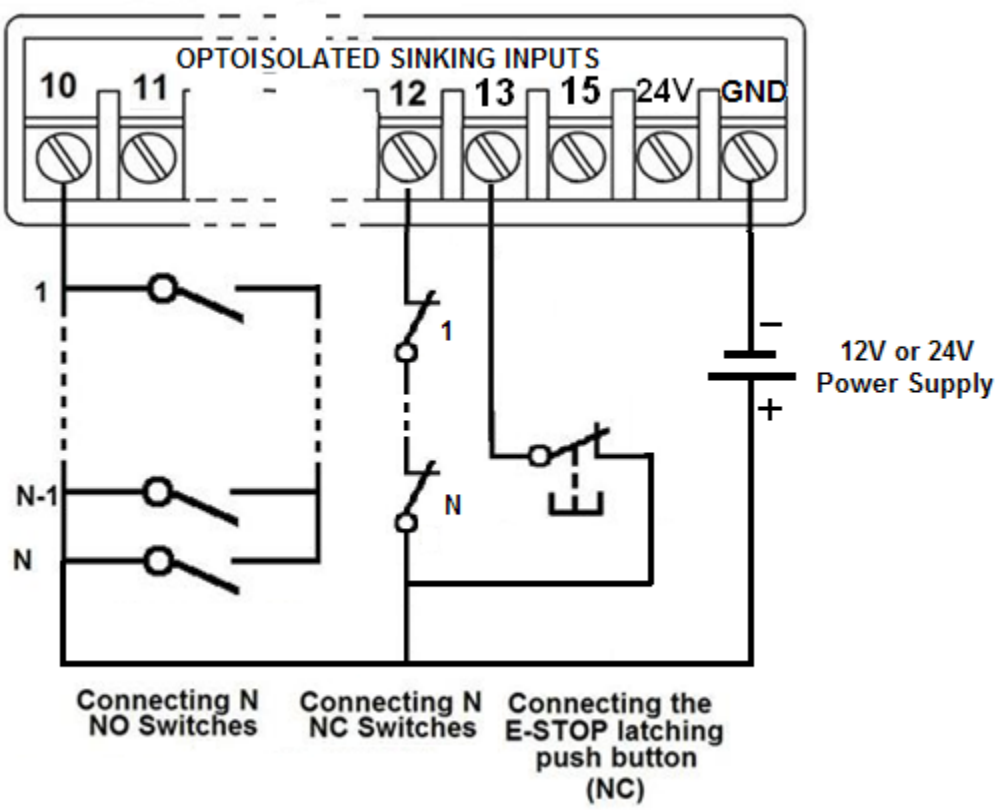


Fig. 5 Wiring diagram to connect switches.

6.2 Connecting 2 wire and PNP sensors.

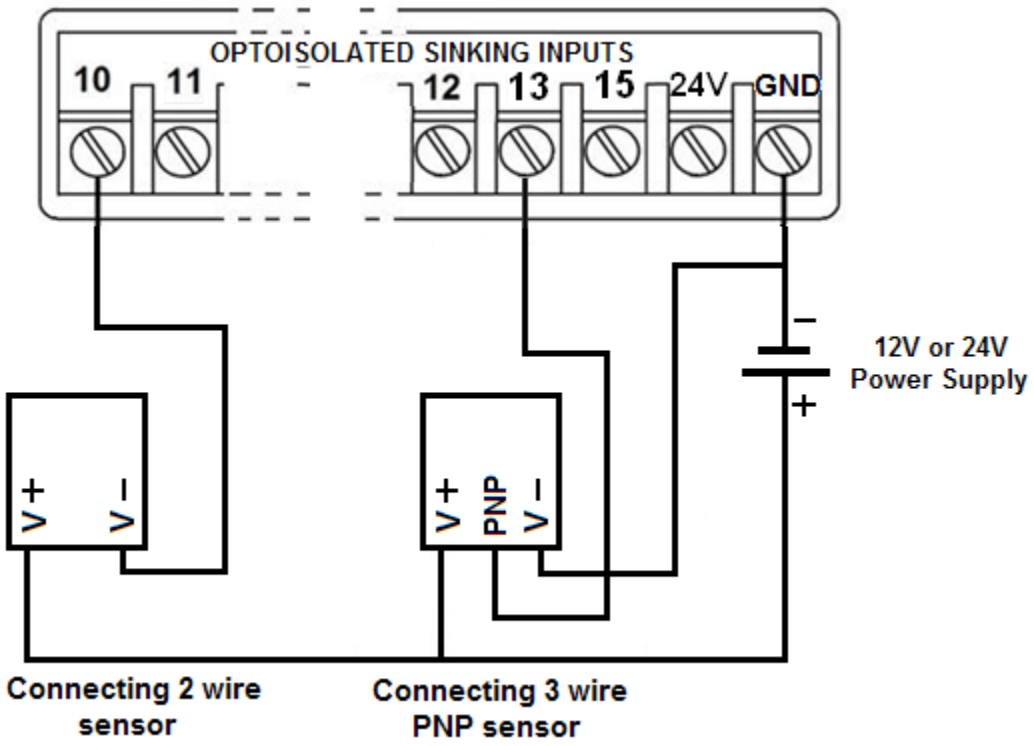


Fig. 6 Wiring diagram to connect PNP sensors.

A two wire sensor can be used as either a sourcing or sinking input. In the 3 wire sensor case, it is recommended using PNP sensors.

6.3 Connecting electromechanical relays.

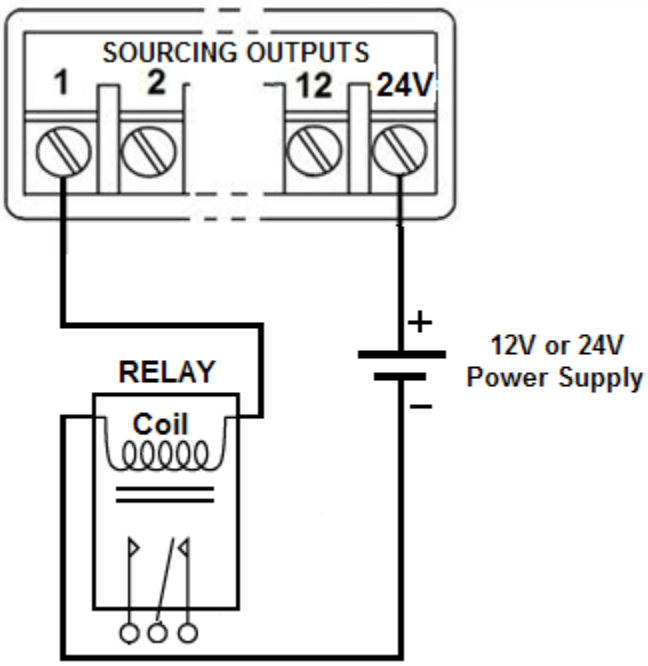


Fig. 7 Wiring diagram to connect electromechanical relays.

7. **Troubleshooting.**

SYMPTOM 1: THE BOARD DOES NOT REACT TO THE SIGNAL.

POSSIBLE CAUSE	POSSIBLE SOLUTIONS
- **Pin conflict or mach3 configuration**. It is possible that the port address used for the pin is not right, or that there is a pin conflict. That is that you are using that same pin twice. (it could be assigned to a different function).	- Check that the pin you are using is not been used anywhere else in your setup.

SYMPTOM 2: AN INPUT PIN MIGHT NOT BE WORKING.

POSSIBLE CAUSE	POSSIBLE SOLUTIONS
- **There could be a problem with the cable**	- Test this with a different ribbon cable

SYMPTOM 3 THE OUTPUTS DO NOT GET ENABLED / NO SIGNALS ARE COMING OUT.

POSSIBLE CAUSE	POSSIBLE SOLUTIONS
- **The EN terminal (Enable Outputs) is not enabled.** The board requires to be externally enabled.	- Make sure you are providing +5vdc to the EN terminal. This +5vdc can be taken from the terminal next to it.

SYMPTOM 4: THERE IS NOISE IN THE SYSTEM.

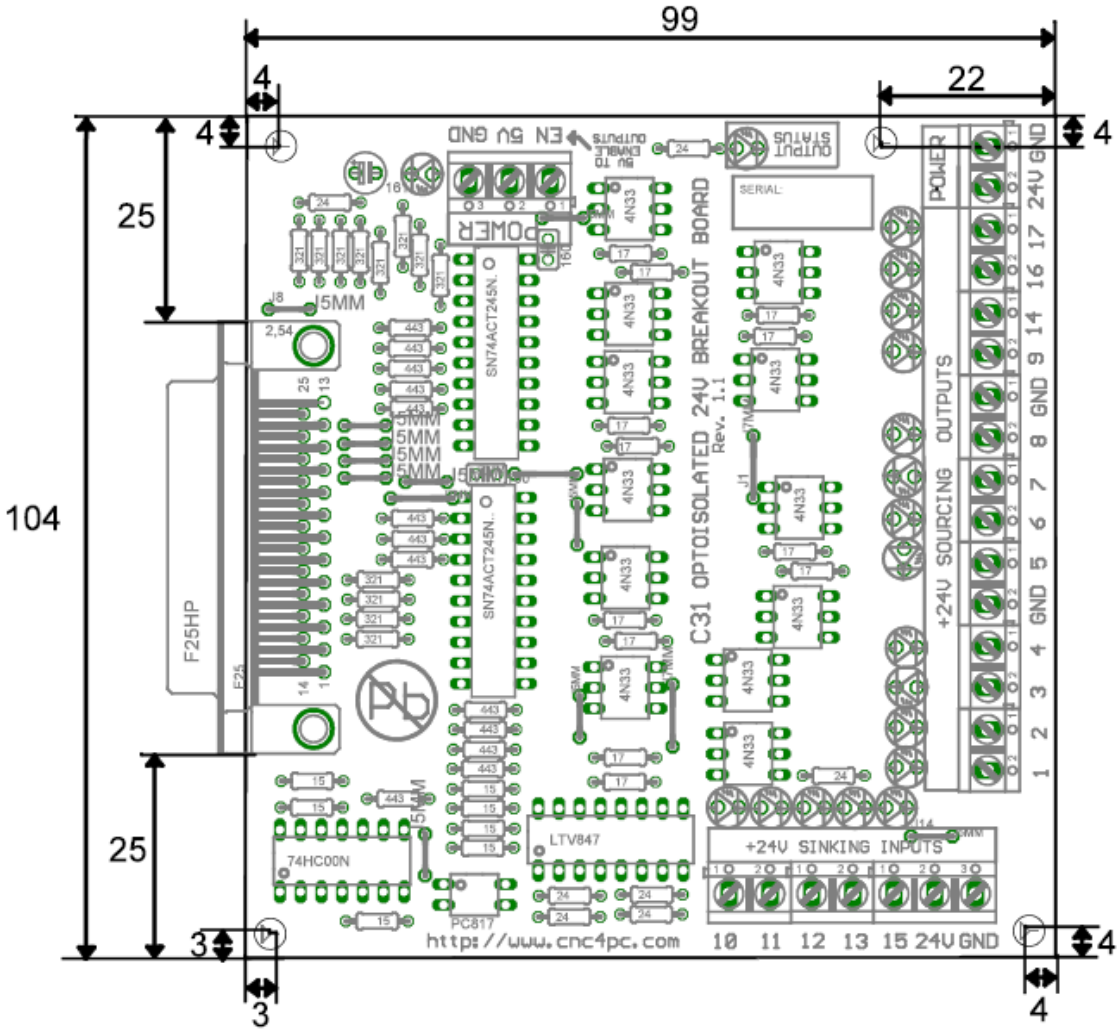
POSSIBLE CAUSE	POSSIBLE SOLUTIONS
- **The board could be underpowered.**	- Make sure that main board can supply +5vdc@300mA to this board.

- **There could be a short that could be draining the power to the board.**	- Check that there are no hot spots in the board or it's connections. - Measure the board's power consumption, it should be less than 300mA (depending on the features used).

SYMPTOM 5: AN OUTPUT PIN MIGHT NOT BE WORKING.

POSSIBLE CAUSE	POSSIBLE SOLUTIONS
- **A chip may have gone bad.** These buffers could act as fuses for the signals, and they can go bad because of noise spikes or even strong static.	- These chips are inexpensive and readily available. You can order them here: http://www.cnc4pc.com/Store/osc/index.php?cPath=38_43. - Carefully moving chips around and checking if the problem moves around could be a way of figuring out if this is the case.
- **There could be a problem with the cable.**	- Test this with a different ribbon cable

8. Dimensions



All dimensions are in Millimeters.

Disclaimer:
Use caution. CNC machines could be dangerous machines. DUNCAN USA, LLC or Arturo Duncan are not liable for any accidents resulting from the improper use of these devices. The C31 is not fail-safe device, and it should not be used in life support systems or in other devices where its failure or possible erratic operation could cause property damage, bodily injury or loss of life.