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Professional Solutions to Professional Problems

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Information and Instruction Manual for the **OptoIso4Chan Series** Of Optical Isolator Boards

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Table of Contents

Table of Contents 2

Disclaimer and Revision History..... 3

Product Warnings 3

 LIFE SUPPORT POLICY 3

Introduction and Product Summary 4

Mounting the OptioIso4Chan..... 4

Connecting the OptioIso4Chan 4

 Left connector: Differential Signal Inputs..... 5

 Right Connector: Power and TTL outputs..... 6

Disclaimer and Revision History

All of our products are constantly undergoing upgrades and enhancements. Therefore, while this manual is accurate to the best of our knowledge as of its date of publication, it cannot be construed as a commitment that future releases will operate identically to this description. Errors may appear in the documentation; we will correct any mistakes as soon as they are discovered, and we will post the corrections on the web site in a timely manner. Please refer to the specific manual for the version of the hardware and firmware that you have for the most accurate information for your product.

This manual describes the OptoIso4Chan interface board, artwork version 2.

Product Warnings

Note that the product is not fully protected against static electricity. Its components can be damaged simply by touching the board when you have a "static charge" built up on your body. Such damage is not covered under either the satisfaction guarantee or the product warranty. Please be certain to safely "discharge" yourself before handling any of the boards or components.

LIFE SUPPORT POLICY

Due to the components used in the products (such as those from National Semiconductor Corporation and others), Peter Norberg Consulting, Inc.'s products are not authorized for use in life support devices or systems or in devices that can cause any form of personal injury if a failure occurs.

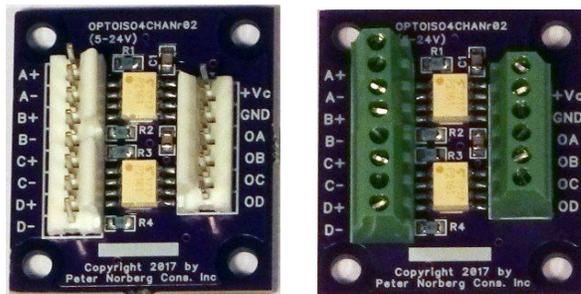
Note that National Semiconductor states "Life support devices or systems are devices which (a) are intended for surgical implant within the body, or (b) support or sustain life, and in whose failure to perform when properly used in accordance with instructions or use provided in the labeling, can be reasonably expected to result in a significant injury to the user". For a more detailed set of such policies, please contact National Semiconductor Corporation.

Introduction and Product Summary

The Peter Norberg Consulting, Inc. OptoIso4Chan series of optical isolators board are tiny (1.15" x 1.3") boards that allow isolation of up to 4 sets of 5 to 24 volt input signals (such as limit switches) to be buffered for connection to a 3.3 to 5 volt digital input of any product that accepts such signals (such as all of our motor controller boards).

The output stage of the OptoIso4Chan adapter is designed to be powered off of the target board: that is to say, it should ideally operate directly off of the power and ground associated with the board to which it is connected. If this is not possible, then it must be powered off of a 3.3 to 5 volt regulated DC supply that is correctly ground referenced to the target board. The TTL output voltage level of the OptoIso4Chan board will match the voltage level of the supply.

The OptoIso4Chan board appears as follows:



The picture on the left shows the AR-OPTOISO4CHAN-L with Amp MTA-100 connectors, while the one on the right shows the AR-OPTOISO4CHAN-T with Screw Terminal connectors.

Mounting the OptioIso4Chan

The OptoIso4Chan board has 4 mounting holes, each 0.125 inches in diameter. They are positioned exactly 0.125 inches in from each corner, and allow up to a number 5 screw. This allows use of standard #4 mounting spacers. Horizontally, their centers are 0.9 inches apart, and vertically they are 1.05 inches apart. Thus, when the board is positioned as shown above, their positions are:

$$(0.125, 0.125), (1.025, 0.125), \\ (0.125, 1.175), (1.025, 1.175)$$

Connecting the OptioIso4Chan

There are exactly 2 connectors on the board. As shown on this page, the one on the left is an 8 pin connector that is to receive the up to 4 differential input signals that are to be buffered, while the one on the right is a 6 pin connector that provides the power and ground to the output stage and provides connections to the TTL output signals from the board (these would normally be connected to your microcontroller board, such as one of our motor controllers).

Left connector: Differential Signal Inputs

The left connector contains 4 pairs of differential input signals that may range from a differential voltage value of 5 to 24 volts.

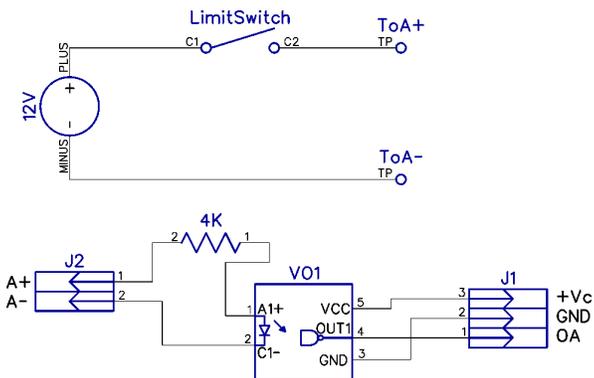
The left connector signals are:

Signal	Description
A+	High side of differential signal input A
A-	Low side of differential signal input A
B+	High side of differential signal input B
B-	Low side of differential signal input B
C+	High side of differential signal input C
C-	Low side of differential signal input C
D+	High side of differential signal input D
D-	Low side of differential signal input D

These signals are used to drive the optical isolator input to the board, and are designed to handle a differential input voltage of from 5 to 24 volts. The current draw is approximately:

6 mA at 24 volts

1 mA at 5 volts



The example shows use of a 12 volt supply (non-regulated "wall-wart" is fine) as the source, connected to your limit switch. The TTL OUT is any of the outputs from the board.

The top half shows your switch, the bottom half is an example circuit from the OptoIso4Chan board

Right Connector: Power and TTL outputs

The right connector contains 4 TTL output signals, and power for the board.

The right connector signals are:

Signal	Description
+Vc	3.3 to +5 volt regulated power input to the board. Normally, this is directly connected to the power that runs your microprocessor. On our motor controller boards, this will be connected to the board +5 or board +3.3 volt power output pin.
GND	Ground reference. This must be connected to the ground on your controller board; otherwise, the TTL signals may not have a correct reference for operation.
OA	TTL output for differential input A+/A-. Will range from 0 to +Vc volts.
OB	TTL output for differential input B+/B-
OC	TTL output for differential input C+/C-
OD	TTL output for differential input D+/D-

All of the output signals (OA through OD) will have a voltage range of 0 to +Vc volts, and will be the logical inverse of their related differential input signal. That is to say, if the +A/-A differential input signal is 5 volts or larger, then OA will be a TTL low (0 to 0.8 volts). If the +A/-A differential input signal is 0 to 2 volts, then OA will be a TTL high (very close to the +Vc level).

Note that if your differential input signal is in the range of about 2 to 4 volts, the related output will be undefined and VERY ill-behaved! Expect it to oscillate in a very spiky fashion.

The power connection (+Vc) on the OptoIso4Chan board should go to one of the following pins on each of the following target StepperBoard products:

Product	Pin Description
BC2D20	+5 on the "IO" connector
BS1010 or SS1010	+5 on the "IO" connector
BC4E20	+5 on the "IO" connector
BC6D20, BC6D25 or SD6DX	If the board is jumpered for 5 volts on the TTL I/O voltage, connect to "+5" on the "IO" connector. If it is jumpered for 3.3 volts on the TTL I/O voltage, connect to "3.3" on the extended IO connector.
SD4DX	+5 on the "PWR" connector

In each case, the GND pin on the OptoIso4Chan board should go to any GND pin on your target board.