SpinCore DRX-4 TTL Line Driver Owner’s Manual

SpinCore TTL Line Driver
Model DRX-4
Owner’s Manual

SpinCore Technologies, Inc.
www.spincore.com

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Introduction

Product Overview

The SpinCore TTL Line Driver is a USB-powered device equipped with four input channels and 8 output lines. Each of the output lines is capable of producing TTL levels over a 50 Ω load. To allow for a greater range of applications, four of the 8 output lines have been inverted. All input channels and output lines are accessible via BNC connectors. The SpinCore TTL Line Driver is available with a full 2U rack-mount enclosure (model DRX-4E).

Another option for the SpinCore TTL Line Driver is a 2U rack-mount front panel only (model DRX-4F). The third and final model is without an enclosure (model DRX-4B).

Driver Architecture

Design Overview

The SpinCore TTL Line Driver utilizes a NAND gate (Philips **74F3037N)** to drive the input signal to TTL level outputs over a 50 Ω load. The drive capability of the Philips 74F3037N allows a 67 mA source and a 160 mA sink. Typical rise and fall times of the Philips 74F3037N are 2.5 ns, with typical propagation delays of 2.0 ns. *If you require better performance please contact SpinCore for inquiries on pricing.

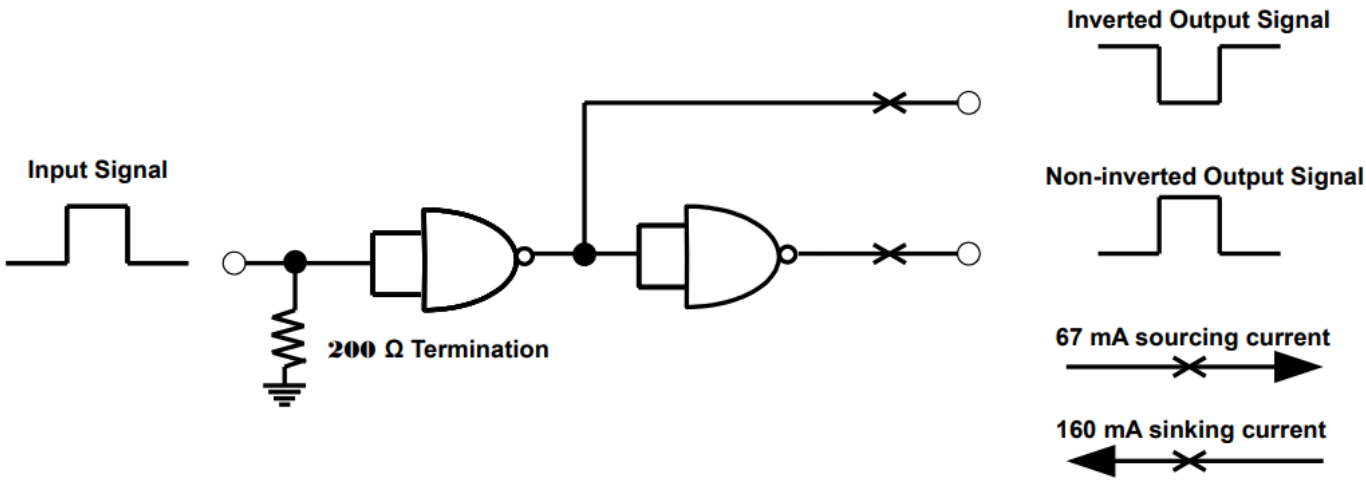

Figure 1: Above is a schematic of a single channel on the SpinCore TTL Line Driver. An input TTL signal is internally terminated over 200 Ω and driven through two NAND gates to create a non-inverted signal. Additionally, an inverted signal is also created by driving the input signal through one NAND gate.

Specifications

- Four BNC input channels with 200 Ω internal termination. TTL levels are required.
- Four BNC non-inverted digital outputs. TTL levels assured over 50 Ω.
- Four BNC inverted digital outputs. TTL levels assured over 50 Ω.
- 67 mA output drive capability for the high state.
- 160 mA output drive capability for the low state.

The physical dimensions of the Line Driver are given below. The full enclosure weighs 1.66 kg.

Product	**Length**	**Width**	**Height**
Board/PCB(cm)	31.2	4.6	N/A
Enclosure(cm)	48.3	5.2	8.8
Enclosure Without Front Panel(cm)	42.7	5.1	8.2

Table 1: TTL Dimensions

A PBESR-PRO-500-PCI board was used for the images below showing the voltage levels without (Figure 2) and with (Figure 3) the TTL Line Driver. The transmission line was terminated with a 50 ohm resistor.

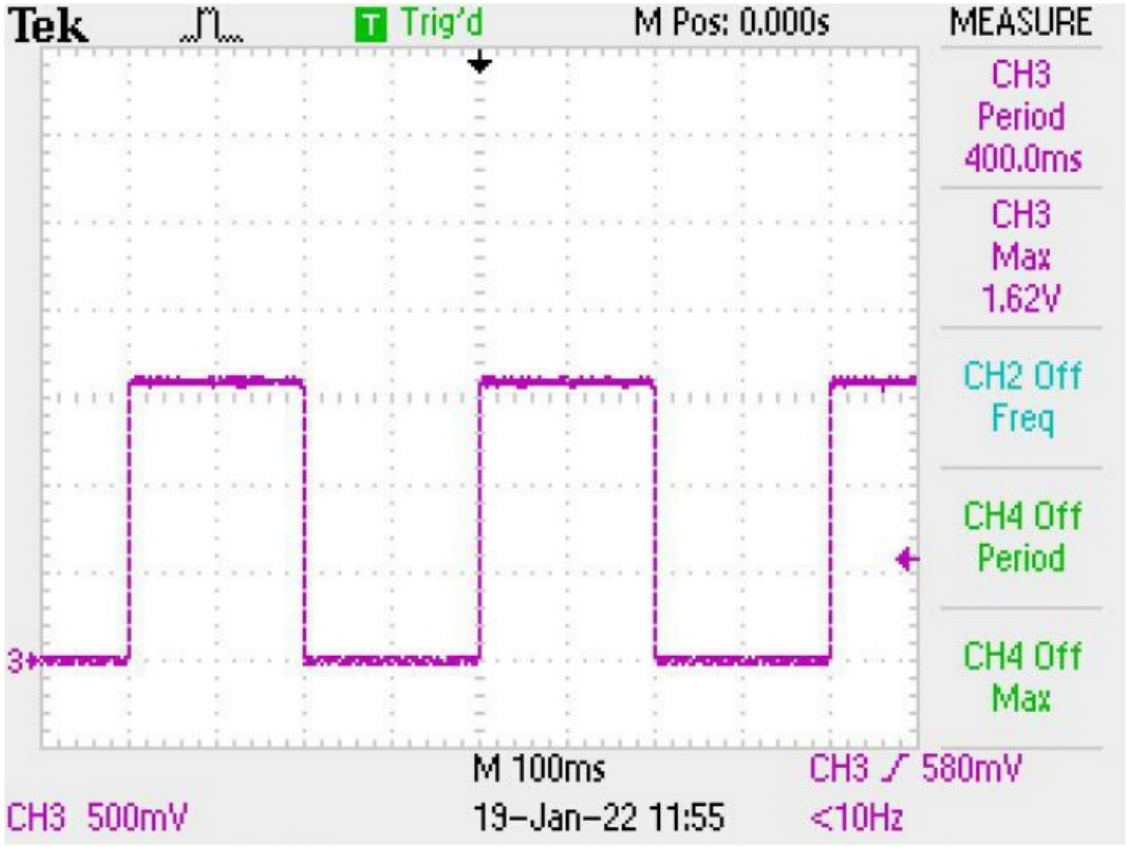

Figure 2: *A 400 ms period, 50% duty cycle pulses from a PBESR-PRO-500-PCI that was terminated with a 50 ohm resistor.*

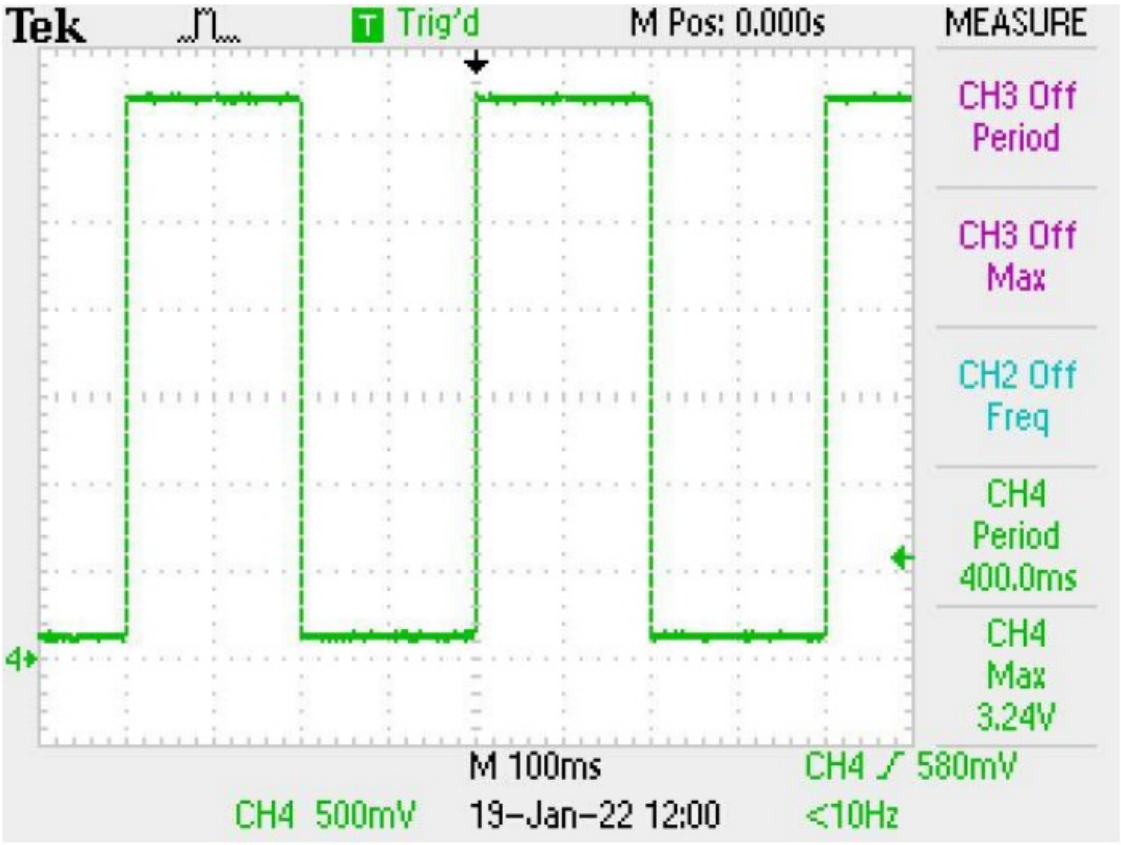

Figure 3: A 400 ms period, 50% duty cycle pulses from the TTL Line Driver which had the incoming signal from the PBESR-PRO-500-PCI board. The transmission line was terminated with a 50 ohm resistor.

Connecting to the SpinCore TLL Line Driver

Connector Information

The device has a total of 12 BNC connectors and one USB Type B Connector. Starting from the left edge of the device is the USB connection. The first four BNC connectors next to the USB connection are used as inputs from other TTL devices. The middle four BNC connectors are the inverted output lines, and the last four BNC connectors are the non-inverted output lines. Each of the four input channels has a corresponding inverted and non-inverted output line which can be identified below by the numbers in the figure. **Figure 4** provides a representation of the connector locations.

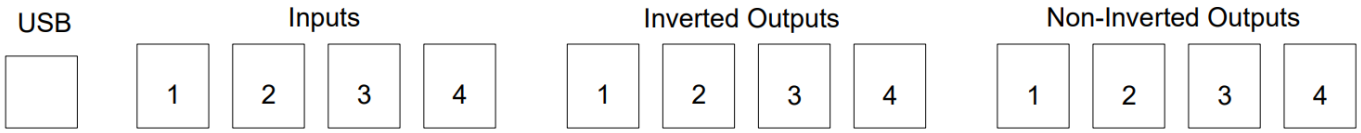

Figure 4: Connector Locations

Connecting to the Device

The SpinCore TTL Line Driver board is a USB-powered device. The device does not require the installation of drivers or for the host computer to be turned off before being plugged in. Simply connect the USB Type B cable to the board and host computer to power on the board.
Connecting the SpinCore TTL Line driver to other devices is very quick and simple. Once the board has been powered on, connect the output of your device to one of the four input BNC connectors of the SpinCore TTL Line Driver using a standard 50 Ω BNC cable.
If using a high-input-impedance oscilloscope to evaluate the performance of the SpinCore TTL Line Driver, place a resistor that matches the characteristic impedance of the transmission line in parallel with the coaxial transmission line at the oscilloscope input. (e.g., a 50 Ω resistor with a 50 Ω transmission line, see Figures 5 and 6). When using an oscilloscope with adjustable bandwidth, set the bandwidth to as large as possible. These settings are crucial to yield accurate readouts on the oscilloscope.

Figure 5: BNC T-Adapter (left) and 50 Ω BNC resistor (right)

Figure 6: BNC T-Adapter on the oscilloscope with coaxial transmission line connected on the left and BNC 50 Ω resistor connected on the right to terminate the line.

Available Models

The SpinCore TTL Line Driver is available in three models which are listed below. Ordering information can be found at this **link**.

- **SpinCore TTL Line Driver DRX-4B** – Equipped with four input channels and 8 output lines, the SpinCore TTL Line Driver delivers enough current driving capabilities to work with 50 Ω loads. This model is the bare board version of the SpinCore TTL Line Driver.
- **SpinCore TTL Line Driver DRX-4E** – The SpinCore TTL Line Driver is placed in a standard 2U rackmount enclosure that protects the board from outside damage. The enclosure is equipped with two metal handles for mobility and stability. This model is equipped with four input channels and 8 output lines.
- **SpinCore TTL Line Driver DRX-4F** – The SpinCore TTL Line Driver is connected to the front panel of a standard 2U rack-mount enclosure. Please note that the entire SpinCore TTL Driver is not fully enclosed in this model. The front panel has two metal handles for mobility and stability.

Contact Information

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Document Information

- Revision history available at SpinCore.

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Documents / Resources

	SpinCore DRX-4 TTL Line Driver [pdf] Owner's Manual DRX-4, TTL Line Driver

References

- spincore.com/contact.shtml
- Welcome to SpinCore Technologies
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