

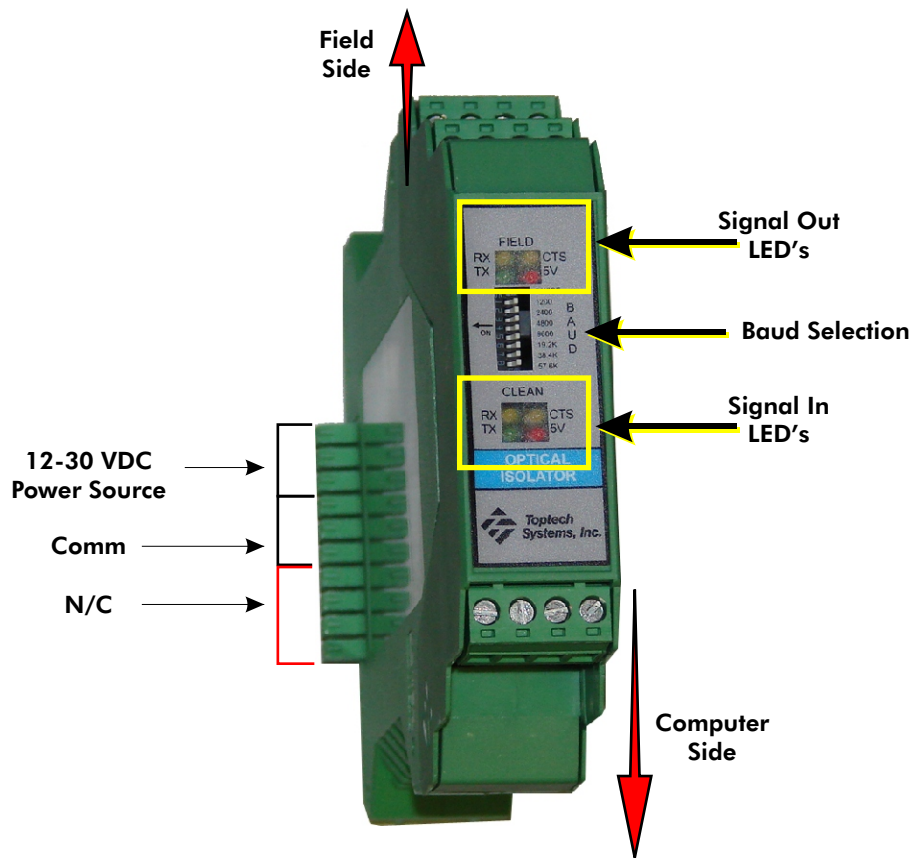
Toptech Optical Isolator - Technical Bulletin #1017

Board Version #3

Product Overview

Purpose of the Toptech Optical Isolator Board

The Toptech Optical Isolator board protects the TMS computer from damage by electrically isolating field devices from the computer. To that end, the field-side interface is isolated from the computer side interface with 2500V separation between the communication signals and 4000V isolation between the dc power. Multiple field protocols are converted to RS-232 signals. One board can be wired and configured for all field protocol conversion options: RS-232, RS-485 2-wire, and RS-485 4-wire.



Benefits of Board Revision #3

- More robust protection against lightning
- Onboard isolation eliminates need for dual, isolated power supplies
- Reduced emissions
- RS-232 or RS-485 is selectable by choice of terminal block
- 2-wire RS-485 baud select
- 2-wire/4-wire RS-485 mode is selectable via DIP switches
- DIN rail mount option
- Universal replacement for all other Optical Isolator Boards
 - For use with all protocols: RS-232, RS-485 4-wire, RS-485 2-wire



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Product Overview

Technical Overview

The optical isolator is designed to be resistant to electromagnetic threats typically present in a heavy industrial environment. Lightning is perhaps the most severe of these threats. Another type of line disturbance is known as Electrical Fast Transients (EFTs). While lacking the energy and much of the destructive power of surges, these EFT signals can potentially cause disruption in the form of data transmission corruption and possible memory loss. The presence of radios and other handheld transmitters also places unwanted radio frequency signals into the environment. Like transients, the concern with this type of noise is not usually the destruction of electronics but rather corruption of data that is transmitted or stored.

The optical isolator has been designed to offer outstanding protection against these common threats. Every board comes equipped with isolated power source for the field transceivers. If a field surge affects one isolator, a common path to the others is not available. In addition, the field signals are provided with common and differential mode filtering against line disturbance. The result is improved immunity to industrial noise and protection of data throughput.

The optical isolator complies with the following standards:

IEC 1000-4-3, Radiated RF Immunity, 80 – 1000MHz, AM 80% @ 1KHz, 10V/m

IEC 1000-4-4, Electrical Fast Transients 2.0KV on field signal lines

IEC 1000-4-5, Surge Voltage, 1.0KV on each field signal line with respect to earth

IEC 1000-4-6, Conducted RF Immunity, 150KHz – 80MHz, AM 80% @ 1KHz, 10Vrms on field signal lines

IEC 1000-4-8, Power Frequency Magnetic Fields, 50Hz, 30A/m

Specifications:

Instrument Power

12-30 vdc, 40 mA

Environmental

-40°C to 60°C

Compliance Information

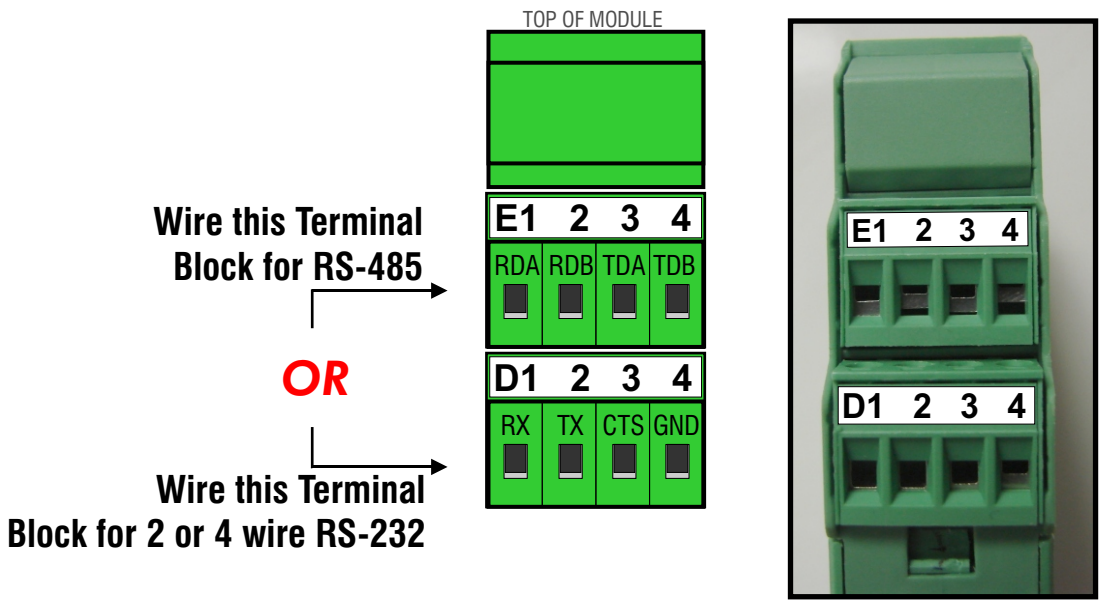
CE marked to comply with EMC Directive (2004/108/EC)

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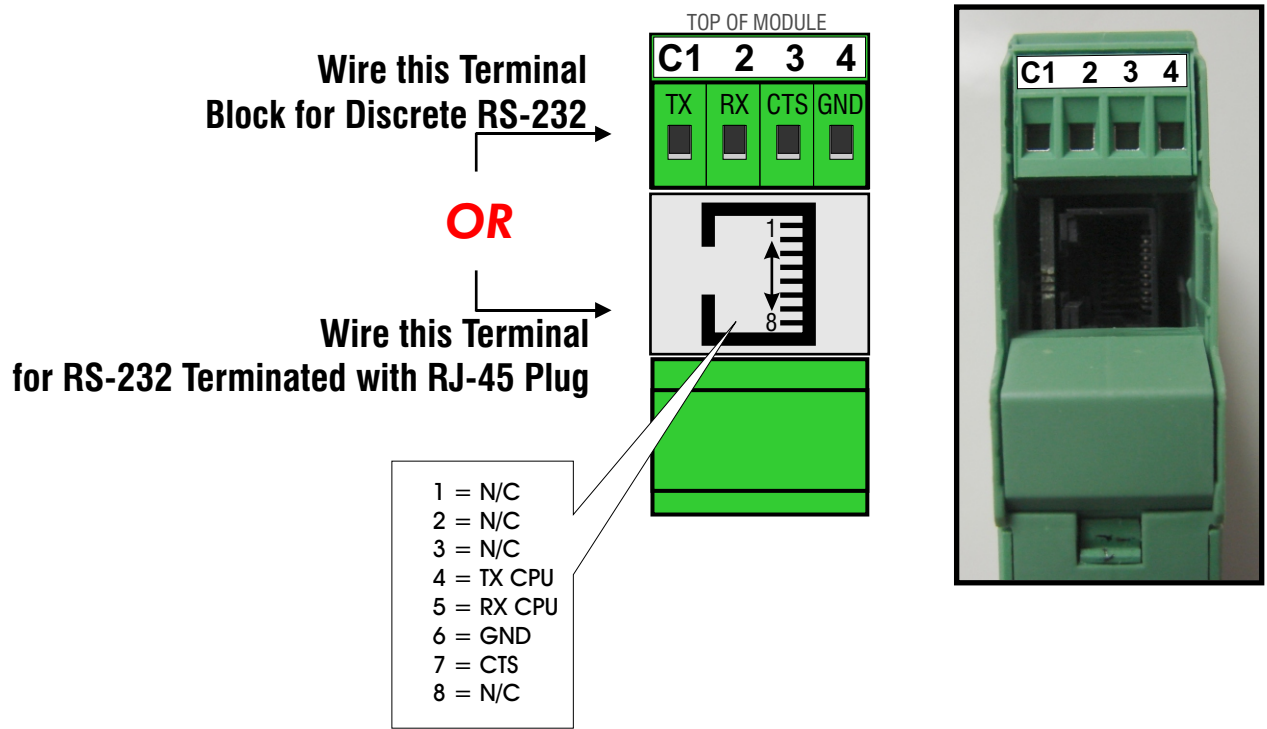
Wiring

Field Side Wiring



Note:
 The wiring labels (RX, TX, etc.) describe the computer function. For example, "TX" is the computer transmit, "RX" is the computer receive. The Optical Isolator is simply a pass-through device.

Computer Side Wiring



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DIP Settings and Troubleshooting

Board Version #2
Released December, 2005

DIP Settings

DIP Switch Quick Reference

Switch #1: 2-wire 485 Select (ON)

Switches #2-8: Baud Select (2-wire 485 Only)

I DIP Settings with RS-485 4-wire Field Wiring

DIP SWI #1	DIP SWI #2	DIP SWI #3	DIP SWI #4	DIP SWI #5	DIP SWI #6	DIP SWI #7	DIP SWI #8
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

ALL DIP switches should be set to the "OFF" position when using RS-485 (4-wire) field wiring

II DIP Settings with RS-485 2-wire Field Wiring

		DIP SWI #1	DIP SWI #2	DIP SWI #3	DIP SWI #4	DIP SWI #5	DIP SWI #6	DIP SWI #7	DIP SWI #8
Baud Rate	1.2k	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
	2.4k	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
	4.8k	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
	9.6k	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
	19.2k	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
	38.4k	ON	OFF	OFF	OFF	OFF	OFF	ON	OFF
	57.6k	ON	OFF	OFF	OFF	OFF	OFF	OFF	ON

III DIP Settings with RS-232 Field Wiring



































DIP SWI #1	DIP SWI #2	DIP SWI #3	DIP SWI #4	DIP SWI #5	DIP SWI #6	DIP SWI #7	DIP SWI #8
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF

ALL DIP switches should be in the "OFF" position when using RS-232 field wiring

Troubleshooting using the LEDs

When corresponding TX and RX LED's are flashing, data is being transmitted properly.

If you experience communication problems, please refer to the table below for troubleshooting.

	RX   CTS			
	TX   5V		   = ON	   = OFF
Field Side	 	Computer Side	 	Power Off
Field Side	 	Computer Side	 	Normal sending and receiving between field side and computer side
Field Side	 	Computer Side	 	Normal sending and receiving between field side and computer side
Field Side	 	Computer Side	 	Possible problem with field device or field wiring
Field Side	 	Computer Side	 	Possible problem with field device or field wiring
Field Side	 	Computer Side	 	Possible problem with wiring between optical isolator and computer

When a "CTS" signal is not present, "CTS" LEDs may be solid ON or solid OFF

!
Optical Isolator **MUST** be terminated to field devices **BEFORE** troubleshooting