

Gigabit Ethernet / Gigabit Automotive Ethernet Converter

P/N: AX141550

Features:

- 12 Vdc, 24 Vdc input power (nominal) for connection to a battery
- 1 gigabit/standard Ethernet port (100 Mbps or 1000 Mbps)
- 1 gigabit/standard Automotive Ethernet port (100 Mbps or 1000 Mbps)
- Surge, reverse polarity, input overvoltage, and input undervoltage protection
- Master or Slave functionality configuration via RS-232 interface
- Power, Link, and ACT LED indicators
- 2 8-pin M12 connectors
- Compact
- IP67
- Suitable for high vibration and shock environments

Applications:

- Off-highway equipment
- Mining equipment
- Industrial trucks



Ordering Part Number:

Gigabit Ethernet / Gigabit Automotive Ethernet Converter: **AX141550**

Accessories:

AX070535: Ethernet Cable 2 m (6.5 ft.), 8-pin M12 A-coded, Ethernet Jack

AX070537: Cable 1.5 m (5 ft.), 8-pin M12 A-coded, Unterminated Leads (**Details preliminary**)

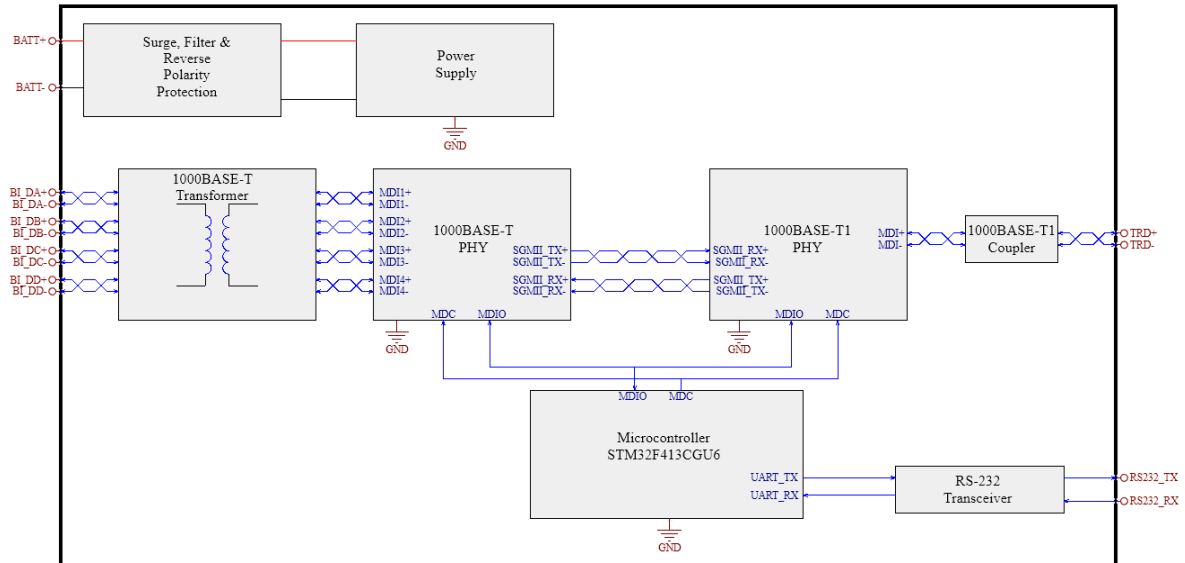
Description:

The Institute of Electrical and Electronic Engineers (IEEE) 802.3bp standard (also known as 1000BASE-T1) is a 1000 Mbps Automotive Ethernet standard aimed at increasing data throughput, meeting strong automotive emissions standards, and reducing cabling weight and cost in automotive networking. Automotive Ethernet networks use a 2 wire, unshielded, twisted pair (UTP) cable.

The Axiomatic Gigabit Ethernet to Gigabit Automotive Ethernet Converter provides a purely physical, bi-directional conversion between Gigabit Automotive Ethernet (1000BASE-T1) and Gigabit Ethernet (1000BASE-T) via PHY transceivers. No packets are stored or modified in this device. The converter supports a baud rate of 100 Mbit/s and 1000 Mbit/s. Status LEDs provide information on connection link and communication. The converter is designed for the harsh environments of off-highway or industrial equipment.

The unit is configured via the RS-232 port to act as a Master or Slave for Automotive Ethernet. The Master mode works if the connected device has its transceiver set to slave mode. The Slave mode works when the connected device has its transceiver set to master mode. Hard setting the master/slave relationship saves on setup-time costs and ensures that the Automotive Ethernet link is established quickly. As a comparison, regular Ethernet converters rely on auto-negotiation to determine master and slave.

Functional Block Diagram



Technical Specifications:

Specifications are indicative and subject to change. Actual performance will vary depending on the application and operating conditions. Users should satisfy themselves that the product is suitable for use in the intended application. All our products carry a limited warranty against defects in material and workmanship. Please refer to our Warranty, Application Approvals/Limitations and Return Materials Process as described on <https://www.axiomatic.com/service/>.

Input

Power Supply Input - Nominal	12 Vdc, 24 Vdc nominal (9 Vdc to 36 Vdc power supply range)
Protections	Surge protection is provided. Reverse polarity protection up to -36 V is provided. Input overvoltage (42 V) and input undervoltage (4 V) protection are provided.

Ethernet Port

Port Type	1 port 1000BASE-T (IEEE 802.3 bp compliant) Auto-Negotiation Automatic Polarity Correction
MDIX	Auto-MDI/MDIX (crossover)
PHY	Marvell 88EA1512 (100BASE-TX, 1000BASE-T)
Protocol	Ethernet IEEE 802.3
Protection	ESD protection for signal lines

Automotive Ethernet

Port Type	1 port 1000BASE-T1 (IEEE 802.3 ab compliant) Automatic Polarity Correction (for 1000 Mbps mode) Note: For 100 Mbps mode, polarity correction is not functional. Default configuration: Slave (Master mode is configurable via RS-232 interface)
PHY	Marvell 88Q2112 (100BASE-T1 / 1000BASE-T1)
Protection	ESD protection for signal lines
Protocol	Automotive Ethernet Ethernet IEEE 802.3bw for 100BASE-T1 (previously known as BroadR-Reach) Ethernet IEEE 802.3bp for 1000BASE-T1

Interfaces

User Interface for Reflashing	RS-232
RS-232	1 3-wire RS-232 port Configuration Baud Rate: 115200 kbit/s ESD and EFT protection for signal lines
RS-232 User Interface	Any terminal emulator that supports serial communication.

General Specifications

Functionality	Can be configured to acts as a master or a slave																			
Microcontroller	STM32F413CGU6																			
Quiescent Current Draw	100 mA @ 12 Vdc; 50 mA @ 24 Vdc																			
LEDs	3 GREEN LEDs																			
	LED	ON	BLINK	OFF																
	Power	Power On		Power Off or Overvoltage/ Undervoltage Condition																
	Link	Ethernet Link Up	Ethernet Activity	Ethernet Link Down																
ACT	Automotive Ethernet Link Up	Automotive Ethernet Activity	Automotive Ethernet Link Down																	
Compliance	CE / UKCA marking ISO 13766-1:2018 RoHS																			
Vibration	MIL-STD-202H, method 214A, test condition I/B Random Component: 7.56 Grms (8 hr/axis) MIL-STD-202H, method 204D, test condition C Sinusoidal Component: 10 g peak (8 hr/axis)																			
Shock	MIL-STD-202H, method 213B, test condition A Shock Component: 50 g peak																			
Operating Conditions	-40°C to 80°C (-40°F to 176°F) Please see temperature ratings of cables under Mating Wire Harnesses.																			
Storage Temperature	-40°C to 85°C (-40°F to 185°F)																			
Protection	IP67																			
Weight	0.15 lb. (0.068 kg)																			
Installation	The typical maximum wire harness length for Automotive Ethernet cabling is 15 m.																			
Enclosure and Dimensions	See dimensional drawing Figure 2.0. Nylon 6/6, 30% glass fill, Encapsulation UL 94V-0 Ultrasonically welded																			
Electrical Connections	Ethernet Connector 1 Phoenix Contact M12 8-pin connector (A-coded), Female, P/N: 1441817																			
	<table border="1"> <thead> <tr> <th>PIN#</th> <th>Description</th> </tr> </thead> <tbody> <tr><td>1</td><td>BI_DC_P</td></tr> <tr><td>2</td><td>BI_DD_P</td></tr> <tr><td>3</td><td>BI_DD_N</td></tr> <tr><td>4</td><td>BI_DA_N</td></tr> <tr><td>5</td><td>BI_DB_P</td></tr> <tr><td>6</td><td>BI_DA_P</td></tr> <tr><td>7</td><td>BI_DC_N</td></tr> <tr><td>8</td><td>BI_DB_N</td></tr> </tbody> </table>	PIN#	Description	1	BI_DC_P	2	BI_DD_P	3	BI_DD_N	4	BI_DA_N	5	BI_DB_P	6	BI_DA_P	7	BI_DC_N	8	BI_DB_N	
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Electrical Connections	Power / Automotive Ethernet / RS-232 Connector 1 Phoenix Contact M12 8-pin connector (A-coded), Male P/N: 1441804																			
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Mating Connectors	Mating connectors should meet the following standard for M12 Connectors, IEC 61076-2-101:2012. They should be A-coded.																			
Mating Wire Harnesses	The following part numbers are available from Axiomatic. AX070535: Ethernet Cable 2 m (6.5 ft.), 8-pin M12 A-coded, Ethernet Jack Note: Cable supplier is Phoenix Contact Network cable NBC-M12MR/2,0-94B/R4AC US – 1406112. The M12 connector on the harness assembly is rated for -20°C to 85°C and the RJ45 ethernet jack is rated as -20°C to 60°C. AX070537: Cable 1.5 m (5 ft.), 8-pin M12 A-coded, Untermated Leads (Details preliminary)																			

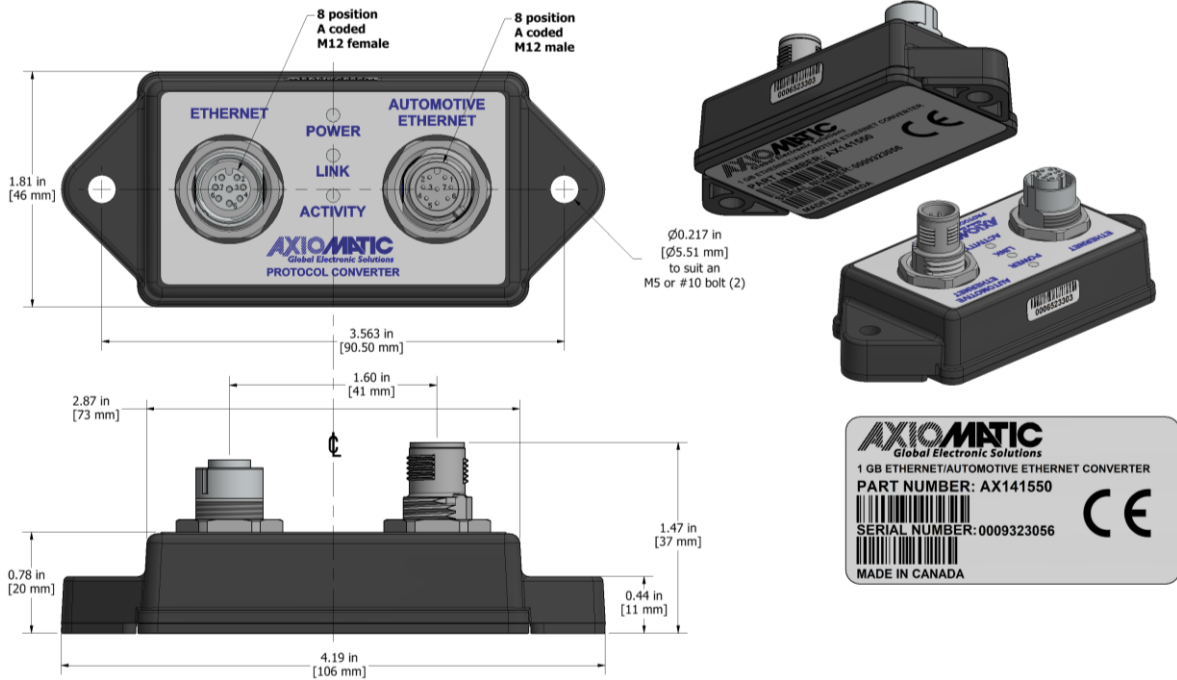


Figure 2.0. Dimensional Drawing

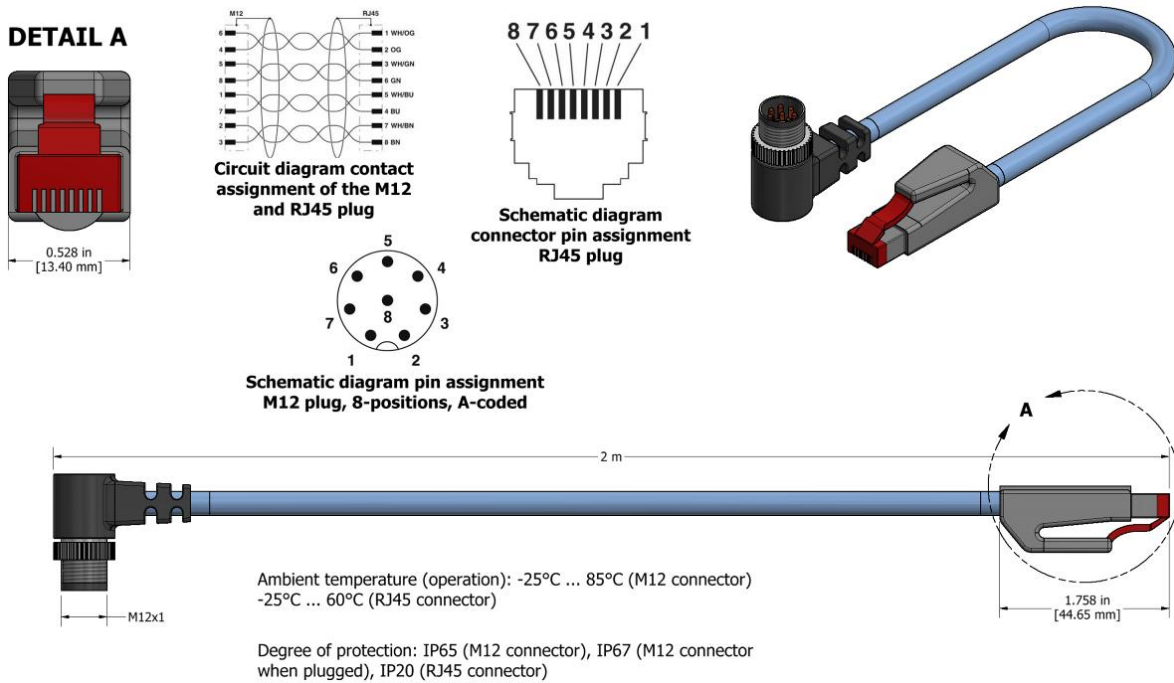


Figure 3.0 AX070535 Mating Cable

Figure 4.0 AX07537 Mating Cable

Form: TDAX141550-03/27/2024