LGC5310A

BLACK BOX

Industrial Gigabit PoE/PoE+ Media Converter

Convert 10/100/1000BASE-T UTP to 1000BASE-X or 100BASE-FX fiber and provide Power-over-Ethernet (PoE+).

Supports IEEE 802.3af PoE and IEEE 802.3at PoE+ standards.

Configurable PoE power reset.

Customer Support Information

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746 • Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018 • Web site: www.blackbox.com • E-mail: info@blackbox.com

FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Normas Oficiales Mexicanas (NOM) Electrical Safety Statement INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

A: El cable de poder o el contacto ha sido dañado; u

B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

C: El aparato ha sido expuesto a la lluvia; o

D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS USED IN THIS MANUAL

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This User Manual describes the functions of the Industrial Gigabit PoE/PoE+ Media Converter.

Product Overview

The Industrial Gigabit PoE/PoE+ media converter provides 10/100/1000BASE-T UTP to 1000BASE-X or 100BASE-FX fiber conversion and function as Power-over-Ethernet (PoE) Power Sourcing Equipment (PSE).

Industrial Gigabit PoE/PoE+ Media Converter.

Equipment that provides DC power over twisted-pair cable is known as Power Sourcing Equipment (PSE). Equipment that is powered over twisted-pair cable is known as a Powered Device (PD).

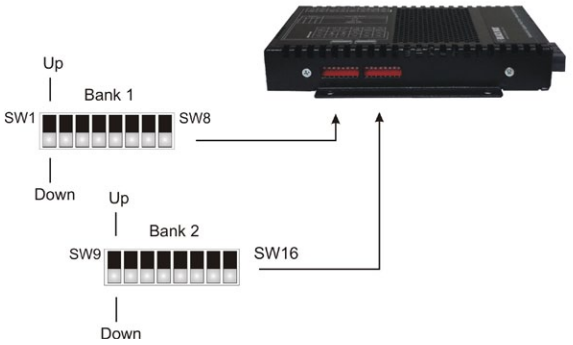
The *Industrial Gigabit PoE/PoE+ Media Converter* supports IEEE 802.3at PoE+ standard providing up to 34.2W of DC power to each PD.

Installation Procedure

1) Configure DIP-switches
2) Apply DC Power
3) Connect Cables
4) Verify Operation

1) Configure DIP-switches

DIP-switches are located on the side of the *Industrial Gigabit PoE/PoE+ Media Converter* module. The DIP-switches are used to configure ports, link modes and PoE/PSE options.



DIP-switch Bank Locations

The table below provides a description of each DIP-switch position and function.

Switch	1 Fiber, 1 UTP
1	Port 1 Fiber Speed
2	N/A
3	Port 2 UTP AUTO/MAN
4	Port 2 UTP Speed (Only in MAN mode)
5	Port 2 UTP Duplex (Only in MAN mode)
6	Pause Capability
7	UTP Port 2 PoE/PSE
8	N/A
9	PSE Configuration Type
10	PSE Configuration Type
11	N/A
12	Link Mode Selection
13	Link Mode Selection
14	PSE Reset
15	N/A
16	N/A

DIP-switch Definitions

SW1: F/O Speed "100/1000" DIP-switch

The *Industrial Gigabit PoE/PoE+ Media Converter* supports 1000BASE-X and 100BASE-FX SFPs. These DIP-switches are used to configure the unit for the speed of the installed

SFPs. Setting these DIP-switches to the Down “1000” position enables the fiber port to accept 1000BASE-X SFPs. Setting these DIP-switches to the Up “100” position enables the fiber port to accept 100BASE-FX SFPs.

SW3, SW4 and SW5 UTP Configuration DIP-Switches

SW3 UTP AN/Man	SW4 UTP 100/10	SW5 UTP FDX/HDX	UTP Mode of Operation
AN	10 or 100	FDX or HDX	The UTP port is set to auto-negotiation with the following modes advertised: 1000FDX, 1000HDX, 100FDX, 100HDX, 10FDX, 10HDX
MAN	100	FDX	The UTP port is set to manual negotiation and is forced to 100FDX.
MAN	100	HDX	The UTP port is set to manual negotiation and is forced to 100HDX.
MAN	10	FDX	The UTP port is set to manual negotiation and is forced to 10FDX.
MAN	10	HDX	The UTP port is set to manual negotiation and is forced to 10HDX.

UTP Port Configuration Matrix

SW6 - Pause “On/Off” DIP-Switch

In auto-negotiation mode, setting this DIP-switch to the Up “On” position allows the unit to advertise Symmetrical and Asymmetrical Pause capability. In auto-negotiation mode, setting the DIP-switch to the Down “Off” position allows the unit to advertise no Pause capability. In the manual mode, this DIP-switch determines the Pause behavior.

SW7 - Power Sourcing Function, UTP Port

The *Industrial Gigabit PoE/PoE+ Media Converter* automatically detects the attached PD and provides the equipment with the necessary power.

This DIP-switch controls the power sourcing function for Port 2 on the single-fiber models and Port 3 on all other models (see DIP-switch Definition table on page 4). When this DIP-switch in the Down “On” position, the power sourcing function is enabled. When the DIP-switch is in the Up “Off” position, the power sourcing function is disabled.

Switch Position	Description	DOWN	UP
7	UTP Port 2 PoE/PSE	Enabled (ON)	Disabled (OFF)

Power Sourcing Function

SW9, SW10 and SW11 - Power Sourcing Options

The UTP ports can be configured to support different powering options. The powering options include Alternative A (supporting power on pins 1,2 and 3,6), Alternative B (supporting power on pins 4,5 and 7,8), legacy Power Devices (PDs) that use large capacitance for detection (supporting pins 4,5 and 7,8) and legacy VoIP phones (supporting reverse polarity on pins 4,5 and 7,8).

SW9	SW10	SW11	PoE Option
DOWN	DOWN	N/A	IEEE Alternative A (Alt A)
UP	DOWN	N/A	IEEE Alternative B (Alt B)
DOWN	UP	N/A	Large Capacitor Detection
UP	UP	N/A	Legacy VoIP Phones

Power Sourcing Options

Select the appropriate powering source option based on the PD type. Use the following table to determine the compatibility of the PD.

PD Type	PSE Type			
	Alternative A	Alternative B	Large Capacitor	Legacy VoIP (Cisco)
IEEE 802.3 af	Yes	Yes	Yes	No
IEEE 802.3 at*	Yes	Yes	Yes	No
Legacy VoIP Phones	No	No	No	Yes
Large Capacitor	No	No	Yes	No

Power Sourcing Compatibility

RJ-45 Pinout	PoE Option		
	Alternative A	Alternative B	Legacy VoIP
1	Vport Positive		
2	Vport Positive		
3	Vport Negative		
4		Vport Positive	Vport Negative
5		Vport Positive	Vport Negative
6	Vport Negative		
7		Vport Negative	Vport Positive
8		Vport Negative	Vport Positive

Voltage Polarity for PoE Options

NOTE: Alternative A and Alternative B pinouts are compliant with IEEE802.3af and IEEE802.3at specifications. Power is applied to center tap of transformers for both Alternative A and Alternative B pinouts per IEEE802.3at. Power is applied to center tap of transformers for Legacy VoIP pinout, but polarity is reversed.

SW12 and SW13 - Link Modes

The *Industrial Gigabit PoE/PoE+ Media Converter* supports Link Segment and Asymmetrical Link Propagate. See Appendix A for Link Mode block diagrams.

Link Segment

In Link Segment mode, all ports operate independently. A loss of a receive link signal will only affect the port detecting the loss of signal. All the other ports will continue to generate a link signal. A loss of link on the UTP port will only affect the UTP port, and the other ports will remain unaffected.

Asymmetrical Link Propagate

In Asymmetrical Link Propagate mode, faults are propagated based on the port notation. Port 1 to Port 2 notation indicates the direction the loss of link signal will propagate. A loss of receive link on the fiber optic Port 1 causes the UTP Port 2 to drop its link due to the propagated state (Port 1 to Port 2). The loss of link on the UTP Port 2 does not cause the loss of link to propagate. The loss only propagates in the Port 1 to Port 2 direction. See Port Configurations on Page 3.

Note: A loss of link or loss of signal is when the optical receiver on the media converter can no longer detect the presence of an optic signal.

SW12	SW13	Function
DOWN	DOWN	Link Segment (LS)
UP	DOWN	Asymmetrical Link Propagate Port 1 to Port 2
DOWN	UP	Asymmetrical Link Propagate Port 2 to Port 1
UP	UP	Invalid Configuration

Link Modes

SW14 - Power Sourcing Reset

The *Industrial Gigabit PoE/PoE+ Media Converter* can be configured to disable (reset) the PoE output power for 2 seconds after a loss of receive link on any fiber port. This feature is typically used to allow a PD to re-initialize after a failure on the incoming fiber. When this DIP-switch is in the Up “Lk Loss” position, the module will disable PoE output power for 2 seconds following a loss of receive link on any fiber port. When this DIP-switch is in the Down position, PoE output power does not reset on fiber link loss.

2) Apply DC Power

Power source should be available within 5 ft. of the chassis. The over current protection for connection with centralized DC shall be provided in the building installation, and shall be a UL listed circuit breaker rated 20 Amps, and installed per the National Electrical Code, ANSI/NFPA-70.

If PoE, this equipment requires 46 to 57VDC @ 1.5Amp max rated power. If PoE+, this equipment requires 52 to 57VDC @ 1.5Amp max rated power (see Specification table for specific model requirements). Appropriate overloading protection should be provided on the DC power source outlets utilized.

WARNING: Only a DC power source that complies with safety extra low voltage (SELV) requirements can be connected to the DC-input power supply.

WARNING REGARDING EARTHING GROUND:

- This equipment shall be connected to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode is connected.
- This equipment shall be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.
- The DC supply source is to be located within the same premises as this equipment.
- There shall be no switching or disconnecting devices in the earthed circuit conductor between the DC source and the earthing electrode conductor.

Locate the DC circuit breaker of the external power source, and switch the circuit breaker to the OFF position.

Prepare a power cable (not supplied) using a three conductor insulated 14 AWG wire or better. Cut the power cable to the length required.

Strip approximately 3/8 of an inch of insulation from the power cable wires.

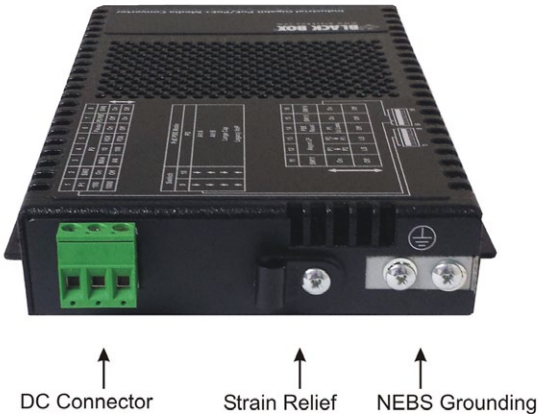
Route the power cables through the provided strain relief for additional support. Connect the power cables to the *Industrial Gigabit PoE/PoE+ Media Converter* by fastening the stripped ends to the DC power connector.

WARNING: Note the wire colors used in making the positive, negative and ground connections. Use the same color assignment for the connection at the circuit breaker.

Connect the power wires to the circuit breaker and switch the circuit breaker ON. If any modules are installed, their Power LED should indicate the presence of power.

Installation of the equipment should be such that the air flow in the front, back, side and top vents of the chassis are not compromised or restricted.

If the installation requires NEBS grounding, secure the grounding wire to the ground lug. See the figure below for the location of the grounding lug.



Rear View with DC Power Connector

WARNING!!!

NEVER ATTEMPT TO OPEN THE CHASSIS OR SERVICE THE POWER SUPPLY. OPENING THE CHASSIS MAY CAUSE SERIOUS INJURY OR DEATH. THERE ARE NO USER REPLACEABLE OR SERVICEABLE PARTS IN THIS UNIT.

3) Connect Cables

a. When using the SFP model, insert the SFP Fiber transceiver into the SFP receptacle on the front of the module.

NOTE: The release latch of the SFP Fiber transceiver must be in the closed (up) position before insertion.

b. Connect an appropriate multimode or single-mode fiber cable to the fiber port on the front of the module. It is important to ensure that the transmit (TX) is attached to the receive side of the device at the other end and the receive (RX) is attached to the transmit side. When using single-fiber (SF) models, the TX wavelength must match the RX wavelength at the other end and the RX wavelength must match the TX wavelength at the other end.

c. Connect the Ethernet 10/100/1000 UTP port via a Category 5 or better cable to an external 10BASE-T, 100BASE-TX or 1000BASE-T Ethernet device.

4) Verify Operation

Verify the *Industrial Gigabit PoE/PoE+ Media Converter* is operational by viewing the LED indicators.

Power LED Indicators		
Legend	**Indicator**	**Description**
Pwr	OFF	Unit not powered
	Green - ON	Unit powered
	Amber - ON	Over temperature condition

Power LED Indicators

Fiber Port LED Indicators		
Legend	**Indicator**	**Description**
100	OFF	No link
	Green - ON	Port linked at 100Mbps
	Green - Blinking at 10Hz	Port data activity at 100Mbps
	Green - Blinking at 1Hz	Port linked at 100Mbps and in redundant standby mode
	Amber - Blinking at 1Hz	Port linked at 100Mbps and receiving Far End Fault Indicator (FEFI)
1000	OFF	No link
	Green - ON	Port linked at 1000Mbps
	Green - Blinking at 10Hz	Port data activity at 1000Mbps
	Green - Blinking at 1Hz	Port linked at 1000Mbps and in redundant standby mode
	Amber - Blinking at 1Hz	Port linked at 1000Mbps and receiving AN Remote Fault
10 (100+1000)	OFF	No link
	Green - ON	Port linked at 10Mbps
	Green - Blinking at 10Hz	Port data activity at 10Mbps
	Green - Blinking at 1Hz	Port linked at 10Mbps and in redundant standby mode
Stat	OFF	Transceiver does not support digital diagnostics or no transceiver (SFP) is installed
	Green - ON	Transceiver (SFP) supports digital diagnostics and no alarm is detected
	Amber - ON	Transceiver (SFP) supports digital diagnostics and alarms are present

Fiber LED Indicators

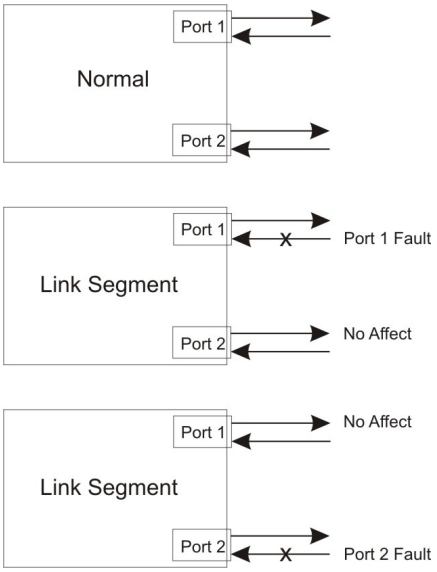
UTP Port Indicators		
Legend	**Indicator**	**Description**
100	OFF	No link
	Green - ON	Port linked at 100Mbps
	Green - Blinking at 10Hz	Port data activity at 100Mbps
1000	OFF	No link
	Green - ON	Port linked at 1000Mbps
	Green - Blinking at 10Hz	Port data activity at 1000Mbps
10 (100+1000)	OFF	No link
	Green - ON	Port linked at 10Mbps
	Green - Blinking at 10Hz	Port data activity at 10Mbps
	Amber - Blinking at 1Hz	Port linked at 10Mbps and receiving AN Remote Fault
FDX	Green - ON	Port is configured for full-duplex via DIP-switch or has negotiated to full-duplex in AN mode
	OFF	Port is configured for half-duplex via DIP-switches or Port 2 has negotiated to half-duplex in AN mode or Port 2 in AN mode has not established the correct connection
PSE	Green - ON	Port PSE is active
	Amber - ON	Port PSE inactive
	Amber - Blinking at 1Hz	Port PSE inactive due to resistance too low (< 15k ohms) or short circuit detected
	Amber - Blinking at 10Hz	Port PSE inactive due to resistance to high (33k to 500k ohms)
	OFF	Port PSE disabled

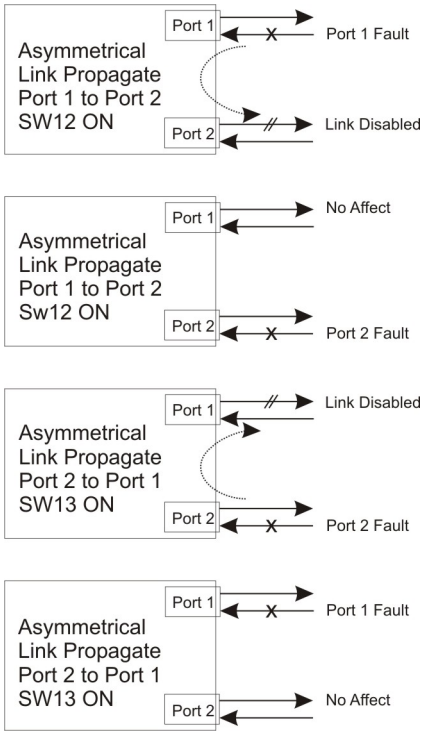
UTP LED Indicators

Model Type	*Industrial Gigabit PoE/PoE+ Media Converter*
Standard (PoE)	IEEE 802.3at
Max PoE Power (per UTP port)	34.2W
Protocols (Ethernet) Fiber: UTP Copper:	 100BASE-FX, 1000BASE-X 10/100/1000BASE-T
Copper Connectors	RJ-45
Fiber Connectors SFP:	 LC
AC Power requirements (typical)	100 to 240VAC / 50 to 60HZ 460mA@120VAC
DC Power requirements (typical)	+/- 52 to 57VDC 1.2A
Dimensions	W: 4.5” x D: 6.0” x H 1.0”
Weight	1.07 lbs.
Compliance*	UL, CE, FCC Class A
Temperature Commercial Operating: Industrial Operating: Storage:	 0 to 50º C -40 to 75º C -40 to 80º C
Humidity	5 to 95% (non-condensing)
Altitude	-100m to 4000m
MTBF (hrs) AC Model: DC Model:	 83,000 hrs. 474,000 hrs.

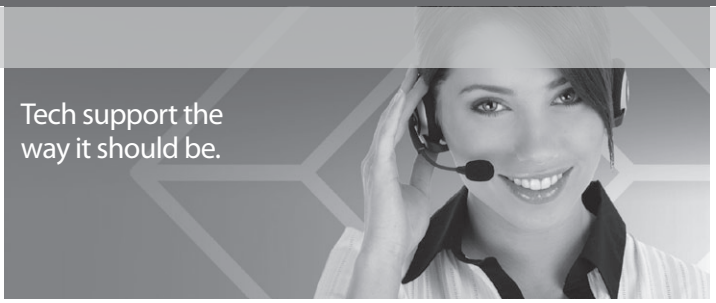
Specifications

Appendix A: Link Modes




Asymmetrical
Link Propagate
Port 1 to Port 2
SW12 ON
Port 1
Port 2
Port 1 Fault
Link Disabled
Asymmetrical
Link Propagate
Port 1 to Port 2
Sw12 ON
Port 1
Port 2
No Affect
Port 2 Fault
Asymmetrical
Link Propagate
Port 2 to Port 1
SW13 ON
Port 1
Port 2
Link Disabled
Port 2 Fault
Asymmetrical
Link Propagate
Port 2 to Port 1
SW13 ON
Port 1
Port 2
Port 1 Fault
No Affect

Black Box Tech Support: FREE! Live. 24/7.



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