USER MANUAL

LGC5600A, LGC5700A

GIGABIT ENET POE++ MEDIA CONVERTER

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CHAPTER 1: SPECIFICATIONS

1. SPECIFICATIONS

1.1 IEEE

IEEE SPECIFICATION			
Description	**802.3af PoE**	**802.3at PoE+**	**802.3.bt PoE++ Type 3**
Power available at PD	12.95 watts	25.5 watts	51 watts
Max power delivered by PSE	15.4 watts	30.0 watts	60 watts
Voltage range at PSE	44.0 to 57.0 VDC	50.0 to 57.0 VDC	50.0 to 57.0 VDC
Voltage range at PD	37.0 to 57.0 VDC	42.5 to 57.0 VDC	42.5 to 57.0 VDC

1.2 LGC5600A MEDIA CONVERTER

Description	**LGC5600A** **Gigabit Media Converter with 802.3bt 60W, AC power, Commercial temperature range**
Standard Compliances	IEEE 802.3, IEEE 802.3af (15.40 watts max), IEEE 802.3at (30 watts max), IEEE 802.3bt (60 watts max)
PoE++ Supported Modes	IEEE Alternate A (Alt A) and 4-Pair
Regulatory Compliances	UL, CE, FCC Class A, RoHS, WEEE, REACH
Frame Size	Up to 10,240 bytes
AC Power Requirements	100 to 240 VAC/50 to 60 Hz 0.62 A at 120 VAC (typical)
Dimensions	1.0" H x 4.5" W x 6.0" D (2.5 x 11.4 x 15.2 cm)
Weight	Module Only: 1.1 lb. (0.5 kg) Module w/Adapter: 2.8 lb. (1.3 kg)
Operating Temperature	Commercial: 32 to 122° F (0 to 50° C) Storage: -40 to +176° F (-40 to +80° C)
Humidity	5 to 95% (non-condensing)
Altitude	-328 to +13,123 ft. (-100 to +4,000 m)
MTBF (hours)	Module Only: 474,000 AC Adapter: 100,000

1.3 LGC5700A INDUSTRIAL MEDIA CONVERTER

Description	**LGC5700A** **Gigabit Media Converter with 802.3bt 60W, DC power, Industrial temperature range**
Standard Compliances	IEEE 802.3, IEEE 802.3af (15.40 watts max), IEEE 802.3at (30 watts max), IEEE 802.3bt (60 watts max)
PoE++ Supported Modes	IEEE Alternate A (Alt A) and 4 Pair
Regulatory Compliances	UL, CE, FCC Class A, RoHS, WEEE, REACH
Frame Size	Up to 10,240 bytes
DC Power Requirements	±44 to ±57 VDC; 1.16 A at 56 VDC 3-pin terminal (isolated)
Dimensions	1.0" H x 4.5" W x 6.0" D (2.5 x 11.4 x 15.2 cm)
Weight	1.1 lb. (0.5 kg)
Operating Temperature	Industrial: -40 to +167° F (-40 to +75° C) Storage: -40 to +176° F (-40 to +80° C)
Humidity	5 to 95% (non-condensing)
Altitude	-328 to +13,123 ft. (-100 to +4,000 m)
MTBF (hours)	474,000

2. OVERVIEW

2.1 INTRODUCTION

This User Manual describes the functions of the Gigabit 802.3bt PoE++ and the Gigabit Industrial 802.3bt PoE++ media converters.

The LGC5600A and LGC5700A are media converters that convert 10/100/1000BASE-T RJ-45 to 1000BASE-X or 100BASE-X fiber and support Power-over-Ethernet (60 W PoE++).

GIGABIT 802.3BT POE++ MEDIA CONVERTER

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

The LGC5600A and LGC5700A are PSE equipment supporting IEEE 802.3af PoE, IEEE 802.3at PoE+, and IEEE 802.3bt PoE++ 60 W on the RJ-45 port.

MEDIA CONVERTER DESCRIPTIONS

Model Number	Description
LGC5600A	Gigabit Media Converter with (1) SFP and (1) 10/100/1000 RJ-45, External AC Adapter, 100-240 VAC, with U.S. Power Cord, Commercial Temperature: 32 to 122° F (0 to 50°C)
LGC5700A	Gigabit Media Converter with (1) SFP and (1) 10/100/1000 RJ-45, Direct DC input, with 3-pin DC Terminal Connector, Industrial Temperature -40 to 167° F (-40 to 75°C)

COMPATIBLE FIBER SFPS		
PART NUMBER	DESCRIPTION	DISTANCE
100-MBPS CONNECTIONS		
LFP401	SFP, 155-Mbps, Extreme Temperature, 850 nm Multimode Fiber, 2 km, LC	2 km
LFP402	SFP, 155-Mbps, Extreme Temperature, 1310 nm Multimode Fiber, 2 km, LC	2 km
LFP403	SFP, 155-Mbps, Extreme Temperature, 1310 nm Singlemode Fiber, 30 km, LC	30 km
1000-MBPS CONNECTIONS		
LFP411	SFP, 1.25-Gbps, Extreme Temperature, 850 nm Multimode Fiber, 550 m, LC	550 m
LPF412	SFP, 1.25-Gbps, Extreme Temperature, 1310 nm Multimode Fiber, 2 km, LC	2 km
LFP413	SFP, 1.25-Gbps, Extreme Temperature, 1310 nm Singlemode Fiber, 10 km, LC	10 km
LFP414	SFP, 1.25-Gbps, Extreme Temperature, 1310 nm Singlemode Fiber, 40 km, LC	40 km
LFP420	SFP, 1.25-Gbps, Extreme Temperature, 1550/1310 nm Singlemode Simplex Fiber, 10 km, LC	10 km
LFP421	SFP, 1.25-Gbps, Extreme Temperature, 1310/1550 nm Singlemode Simplex Fiber, 10 km, LC	10 km
LFP441	SFP, 1.25-Gbps, 850nm Multimode Fiber, 550 m, LC	550 m
LFP442	SFP, 1.25-Gbps, 1310nm Singlemode Fiber, 20 km, LC	20 km

NOTES:

1. All Black Box SFPs feature Extended Diagnostics (excluding LFP441 and LFP442).

2. Black Box Media Converters also support generic SFPs.

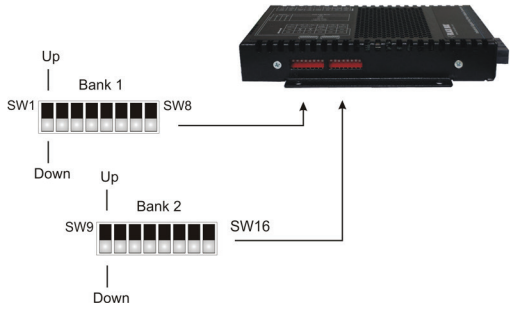
2.2 INSTALLATION PROCEDURE OVERVIEW

1. Configure DIP switches
2. Apply Power
3. Connect Cables
4. Verify Operation

3. INSTALLATION

STEP 1: CONFIGURE DIP SWITCHES

DIP switches are located on the side of the 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.

DIP SWITCH DEFINITIONS

Switch	DOWN	UP	Function
1	Auto	100	SFP Port Fiber Speed
2	N/A	N/A	N/A
3	AN	MAN	RJ-45 Port Auto/Manual
4	100	10	RJ-45 Port Speed (Only in MAN mode)
5	FDX	HDX	RJ-45 Port Duplex (Only in MAN mode)
6	Off	On	Pause Capability
7	On	Off	RJ-45 Port PSE Power
8	N/A	N/A	N/A
9	Norm	Force	RJ-45 Port PSE Power Override
10	N/A	N/A	N/A
11	N/A	N/A	N/A
12	See DIP switch Description		Link Mode Selection
13			Link Mode Selection
14	Off	P1 Lk Loss	PSE Reset
15	N/A	N/A	N/A
16	N/A	N/A	N/A

SW1 - Fiber Speed: Auto/100

This DIP switch configures the speed of the transceiver installed in the SFP receptacle. If this DIP switch is in the DOWN "Auto" (default) position, the port will automatically detect the data rate of the transceiver installed and operate at 100 Mbps or 1000 Mbps accordingly.
If the automatic detection fails to detect the speed of the installed SFP, then the speed will be set to 1000 Mbps.

If this DIP switch is in the UP "100" position, a 100 Mbps capable transceiver must be installed in the SFP receptacle.

When an RJ-45 transceiver is installed in a SFP receptacle, setting this DIP switch to UP "100" position enables the port to operate at 100 Mbps.

SW2 - Reserved

This DIP switch must be left in the DOWN (default) position.

SW3, SW4 and SW5 - RJ-45 Configuration

RJ-45 PORT CONFIGURATION MATRIX

SW3 RJ-45 AN/Man	SW4 RJ-45 100/10	SW5 RJ-45 FDX/HDX	RJ-45 Mode of Operation
AN (DOWN)	10 or 100 (N/A)	FDX or HDX (N/A)	The RJ-45 port is set to auto-negotiation with the following modes advertised: 1000FDX, 1000HDX, 100FDX, 100HDX, 10FDX, 10HDX
MAN (UP)	100 (DOWN)	FDX (DOWN)	The RJ-45 port is set to manual negotiation and is forced to 100FDX
MAN (UP)	100 (DOWN)	HDX (UP)	The RJ-45 port is set to manual negotiation and is forced to 100HDX
MAN (UP)	10 (UP)	FDX (DOWN)	The RJ-45 port is set to manual negotiation and is forced to 10FDX
MAN (UP)	10 (UP)	HDX (UP)	The RJ-45 port is set to manual negotiation and is forced to 10HDX

SW6 - Pause: Off/On

In auto-negotiation mode, setting this DIP switch to the UP "On" position allows the module to advertise Symmetrical and Asymmetrical Pause capability. In auto-negotiation mode, setting the DIP switch to the DOWN "Off" (default) position allows the module to advertise no Pause capability. In the manual mode, this DIP switch determines the Pause behavior.

SW7 - Power Sourcing Function: On/Off

The RJ-45 port automatically detects the attached PD and provides the PD with the necessary power.

This DIP switch controls the power sourcing function for the RJ-45 port. When this DIP switch in the DOWN "On" (default) position, the power sourcing function is enabled. When the DIP switch is in the UP "Off" position, the power sourcing function is disabled.

SW8 - Reserved

This DIP switch must be left in the DOWN (default) position.

SW9 - PSE Power Override: Norm/Force

This DIP switch allows the PoE++ power to be forced ON when connected to a PD with non-standard detection characteristics.

When this DIP switch is in the DOWN "Norm" (default) position, the RJ-45 port will automatically perform the detection, classification, and powering functions for the attached PD. When this DIP switch is in the UP "Force" position, a maximum of 60 watts of power will be available to the PD.

SW10 and SW11 - Reserved

These DIP switches must be left in the DOWN (default) position.

SW12 and SW13 - Link Modes

The LGC5600A and LGC5700A feature Link Segment and Asymmetrical Link Propagate fault detection modes.

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. The other port will continue to generate a link signal. A loss of link on the RJ-45 port will only affect the RJ-45 port, and the fiber port will remain unaffected.

Asymmetrical Link Propagate

In Asymmetrical Link Propagate mode, faults are propagated based on the port notation. Port 1 (fiber) to Port 2 (RJ-45) notation indicates the direction the loss of link signal will propagate. A loss of receive link on the Fiber Port 1 causes the RJ-45 Port 2 to drop its link due to the propagated state (Port 1 to Port 2). The loss of link on the RJ-45 Port 2 does not cause the loss of link to propagate. The loss only propagates in the Port 1 to Port 2 direction.

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.

LINK MODES

SW12	SW13	Function
DOWN	DOWN	Link Segment (LS)
UP	DOWN	Asymmetrical Link Propagate Port 1 (fiber) to Port 2 (RJ-45)
DOWN	UP	Asymmetrical Link Propagate Port 2 (RJ-45) to Port 1 (fiber)
UP	UP	Invalid Configuration

SW14 - PSE Reset: Off/P1 Lk Loss

The module can be configured to reset the PoE++ output power for 2 seconds after a loss of receive link on the 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 "P1 Lk Loss" position, the module will disable PoE++ output power for 2 seconds following a loss of receive link on the fiber port. When this DIP switch is in the DOWN "Off" (default) position, PoE++ output power does not reset on a fiber loss.

SW15 and SW16 - Reserved

This DIP switch must be left in the DOWN (default) position.

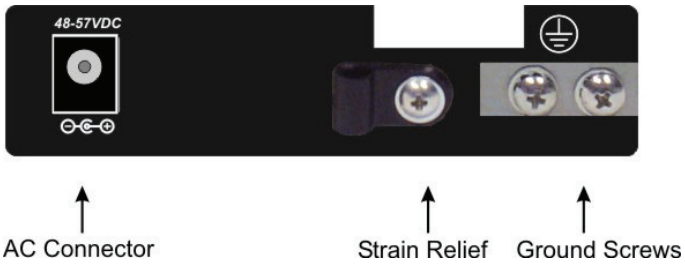
STEP 2: APPLY POWER

AC Power for LGC5600A

To power the module using the AC/DC adapter, connect the DC plug at the end of the wire on the AC/DC adapter to the DC connector on the module. Then connect the AC/DC adapter to the AC outlet. Confirm that the module has powered up properly by checking the Power LED located on the front of the module.

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.

Secure the grounding wire to the ground screw. See the figure below for the location of the grounding screw.



REAR VIEW OF THE LGC5600A WITH AC 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.

DC Power for LGC5700A

A power source should be available within 5 ft. (1.5-m) of the module. 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.

The LGC5700A requires 50 to 57 VDC @ 1.16 Amp max rated power (see specification table). Appropriate overloading protection should be provided on the DC power source outlets used.

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.

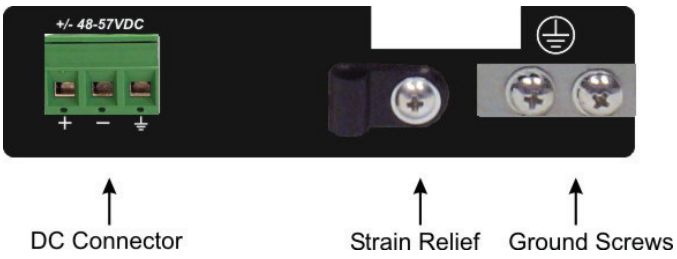
Prepare a power cable using a three conductor insulated wire (not supplied) with 12 AWG to 14 AWG thickness. Cut the power cable to the length required.

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

Connect the power cables to the terminal 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.

Secure the grounding wire to the ground screw. See the figure below for the location of the grounding screw.



REAR VIEW OF THE LGC5700A WITH DC TERMINAL CONNECTOR

Connect the power wires to the circuit breaker and switch the circuit breaker ON. If any modules are installed, the 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.

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.

STEP 3: CONNECT CABLES

a. Insert the SFP 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 singlemode fiber cable to the SFP on the front of the module. It is important to ensure that the transmit (TX) is attached to the receive side of the module at the other end and the receive (RX) is attached to the transmit side. When using a single-fiber (SF) SFP, 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 RJ-45 port via a Category 5 or better cable to an external 10BASE-T, 100BASE-TX, or 1000BASE-T Ethernet PD device.

STEP 4: VERIFY OPERATION

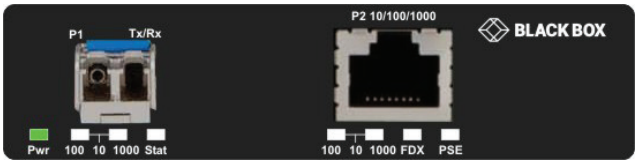
Once the module has been installed and configured per steps 1 through 4, verify the module is operational by viewing the LED indicators.

The Power LED indicates the module is receiving power.

The Fiber Optic LEDs indicates the fiber optic connection has been established.

The RJ-45 10/100/1000 LEDs indicate the speed of the RJ-45 port connection.

The PSE LED indicates the module has established a successful detection of a PD and is supplying Power over Ethernet.



LED INDICATOR LOCATIONS

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

FIBER PORT LED INDICATORS		
Legend	**Indicator**	**Description**
100	OFF	No link
	Green - ON	Port linked at 100 Mbps
	Green - Blinking at 10 Hz	Port data activity at 100 Mbps
	Green - Blinking at 1 Hz	Port linked at 100 Mbps and in redundant standby mode
	Amber - Blinking at 1 Hz	Port linked at 100 Mbps and receiving Far End Fault Indicator (FEFI)
1000	OFF	No link
	Green - ON	Port linked at 1000 Mbps
	Green - Blinking at 10 Hz	Port data activity at 1000 Mbps
	Green - Blinking at 1 Hz	Port linked at 1000 Mbps and in redundant standby mode
	Amber - Blinking at 1 Hz	Port linked at 1000 Mbps and receiving AN Remote Fault
10 (100+1000)	OFF	No link
	Green - ON	Port linked at 10 Mbps
	Green - Blinking at 10 Hz	Port data activity at 10 Mbps
	Green - Blinking at 1 Hz	Port linked at 10 Mbps 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

RJ-45 PORT INDICATORS		
Legend	**Indicator**	**Description**
100	OFF	No link
	Green - ON	Port linked at 100 Mbps
	Green - Blinking at 10 Hz	Port data activity at 100 Mbps
1000	OFF	No link
	Green - ON	Port linked at 1000 Mbps
	Green - Blinking at 10 Hz	Port data activity at 1000 Mbps
10 (100+1000)	OFF	No link
	Green - ON	Port linked at 10 Mbps
	Green - Blinking at 10 Hz	Port data activity at 10 Mbps
	Amber - Blinking at 1 Hz	Port linked at 10 Mbps 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
	OFF	Port PSE disabled

APPENDIX A: REGULATORY INFORMATION

A.1 FCC STATEMENT

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.

APPENDIX A: REGULATORY INFORMATION

A.2 NOM STATEMENT

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 a 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.

APPENDIX B: DISCLAIMER/TRADEMARKS

B.1 DISCLAIMER

Black Box Corporation shall not be liable for damages of any kind, including, but not limited to, punitive, consequential or cost of cover damages, resulting from any errors in the product information or specifications set forth in this document and Black Box Corporation may revise this document at any time without notice.

B.2 TRADEMARKS USED IN THIS MANUAL

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