LGH1004A

Hardened Ethernet Switch, (4) 10/100/1000 Mbps, (1) GE SFP

User Manual

- LGH1000 Series Switches operate in harsh environments.
- Two power inputs connect simultaneously to live DC power sources.
- Alarm alerts you when power fails or a port disconnects.



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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.

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1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
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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.

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1. Specifications

Alarm Contact	One relay output with current carrying capacity of 1A @ 24 VDC
Approvals	FCC Part 15, Subpart B, Class A; UL60950-1 2nd Ed./CSA C22.2 No. 60950-1-07 2nd Ed.; CE (EMI): EN55022 Class A, FCC Part 15, Class A; CE (EMS): EN61000-4-2 (ESD), EN61000-4-3 (RS), EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS), Shock: IEC60068-2-27; Vibration: IEC60068-2-6; RoHS: IEEE 2002/95/EC; IP Protection: IP31
Buffer Memory	1 MB
Cable	RJ-45 ports: 10BASE-T Category 3, 4, 5 UTP/STP, up to 328 ft. (100 m); 100BASE-TX Category 5, UTP/STP, up to 328 ft. (100 m); 1000BASE-T Category 5e UTP/STP, up to 328 ft. (100 m); SFP open slot: 62.5/125-µm multimode fiber optic cable, up to 220 m/850 nm or 2 km/1300 nm; 50/125-µm multimode fiber optic cable, up to 550 m/850 nm or 2 km/1300 nm; 9/125-µm single-mode fiber optic cable, up to 30 km
Data Rate	10/100/1000 Mbps
Enclosure	IP31 rated aluminum alloy case
Filtering/Forwarding Rates	1000-Mbps port: 1,488,000 pps; 100-Mbps port: 148,800 pps; 10-Mbps port: 14,880 pps; Quality of Service (QoS) for packet forwarding precedence
Flow Control	IEEE802.3x flow control, backpressure flow control
Jumbo Frames	9 Kbytes
MAC Address	2 K
Mounting	DIN-rail, wallmounting
Network Standards	IEEE 802.3/802.3u/802.3x/802.3ab/802.3z
Processing Type	Store-and-forward
Environment	Temperature Tolerance: Operating temperature: -4 to +158° F (-20 to +70° C); Storage temperature: -22 to +176° F (-30 to +80° C)
User Controls	(1) DIP switch for port break alarm: Normal: Open, Default setting: Disabled
Connectors	(4) 10/100/1000BASE-T autonegotiating RJ-45, full-/half-duplex, auto-MDI/MDI-X; (1) 1000-Mbps Gigabit SFP slot (compatible SFPs include LFP411, LFP412, LFP413, LFP414, LFP416)
Indicators	(5) LEDs: (1) PW1, (1) PW2, (1) Alarm, (1) 1000M, (1) Link/Activity
Power	Removable 6-pin terminal block, redundant inputs; Input: 12–48 VDC, 3.36 Watts maximum *NOTE: Includes reverse polarity protection.*

Specifications (continued)

Dimensions	2.2"H x 4.3"W x 4.7"D (5.5 x 10.8 x 12 cm)
Weight	1.54 lb. (0.7 kg)

2. Overview

2.1 Description

The Hardened Ethernet Switch has four 10-/100-/1000-Mbps RJ-45 ports and one Gigabit SFP open slot. To operate in harsh environments, the switch provides two power inputs that can be connected simultaneously to live DC power sources. If one of the power inputs fails, the other live source acts as a backup to automatically support the switch's power needs. It also has a built-in smart alarm that alerts you when power fails or a port disconnects. The switch is hardened for use in temperatures ranging from -4 to +158° F (-20 to +70° C), has an IP31 aluminum case, and also has a DIN-rail and wallmounting installation kit.

2.2 Features

- Hardened metal enclosure for use in extreme temperatures ranging from -4 to +158° F (-20 to +70° C). Resists dust, dirt, moisture, smoke, and insects.
- Provides four 10/100/1000 Mbps RJ-45 ports and one 1000BASE-X Gigabit SFP open slot.
- Has redundant live DC power inputs. If one of the DC power inputs fails, the other source acts as a backup.
- A built-in smart alarm alerts you when power fails or a port connection breaks.
- LEDs indicate power, alarm, speed, and link/activity.
- Supports store-and-forward switching architecture.
- IP-31 aluminum alloy case.
- Compact unit mounts on a DIN rail or wall.

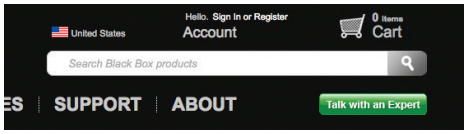
2.3 What's Included

Your package includes one Hardened Ethernet Switch. It has (4) 10-/100-/1000-Mbps twisted-pair ports and (1) 1000-Mbps Gigabit SFP slot.

This user manual/installation guide can be downloaded from the Black Box Web site, or the FTP site.

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3. Open the "L" folder, then search for LGH1004A.

2.4 Hardware Description

The front panel of the Gigabit Ethernet Switch is shown in Figure 2-1. The bottom panel is shown in Figure 2-2.

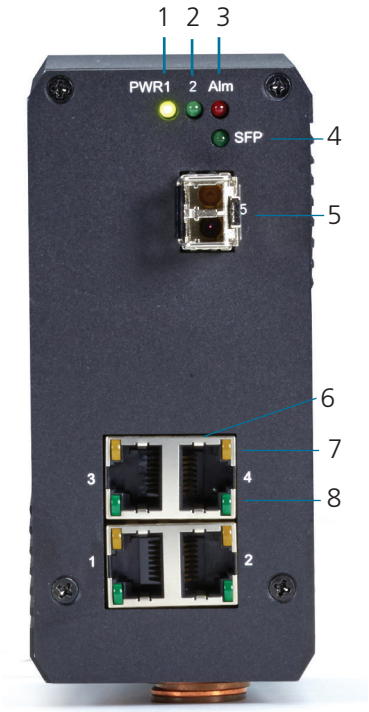


Figure 2-1. Front panel of the switch.

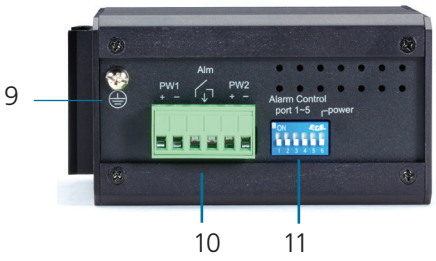


Figure 2-2. Bottom panel of the switch.

Go to the next page for a description of the switch components shown in the diagrams above.

Table 2-1. Hardened Ethernet Switch components.

Number in Figure 2-1 or 2-2	Component	Description
1	(1) Power 1 LED	Lights green when power input 1 is ON; Off when no power is being supplied
2	(1) Power 2 LED	Lights when power input 2 is ON; Off when no power is being supplied
3	(1) Alm LED	Lights red when the port link is disconnected or power fails
4	(1) SFP LED	Lights green when an SFP fiber transceiver is connected
5	(1) SFP open slot	SFP module installs here
6	(4) RJ-45 connectors	Link to 10/100/1000BASE-T network devices
7	NOT USED	NOT USED
8	(4) Network LEDs	Lights green when a network device is detected and linked
9	(1) grounding screw	Links to ground
10	(1) 6-pin terminal block	Links to (2) power inputs and event alarm output
11	(1) 6-position DIP switch	Sets alarm to port or power event

3. Installation

3.1 DIN Rail Mounting

The DIN-Rail clip already attached on the rear side of the switch supports an EN 50022 standard DIN Rail as shown in Figure 3-1.

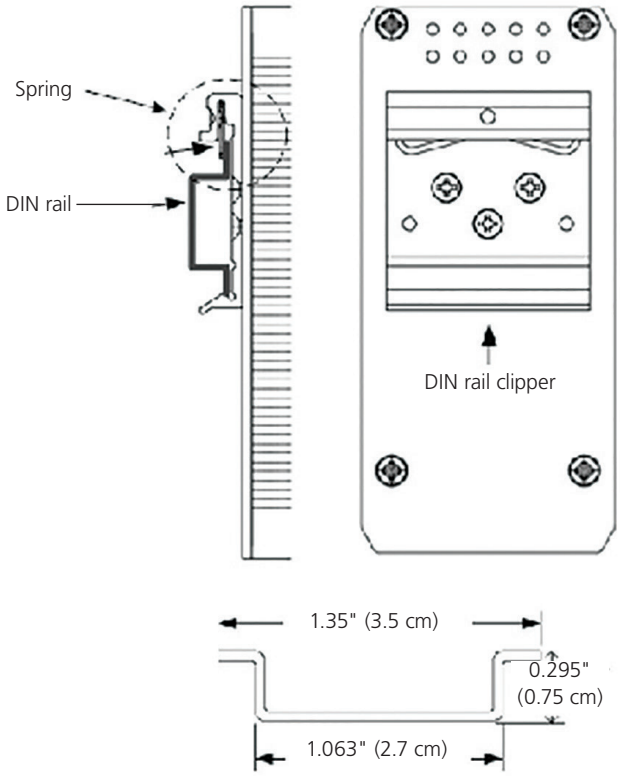


Figure 3-1. DIN rail mounting.

Follow the steps below to mount the switch on the DIN-Rail track.

1. Insert the upper end of the DIN-Rail clip into the back of the DIN-Rail track from its upper side.
2. Lightly push the bottom of the DIN-Rail clip into the track.
3. Check if the DIN-Rail clip is tightly attached to the track.
4. To remove the switch from the track, reverse the steps 1–3 above.

3.2 Hardware Installation

3.2.1 Wiring the DC Power Inputs

Before installing the power input, make sure the DC power supply complies with standard power supply certifications.

NOTE: Suitable wire gauge is from 12 to 24 AWG.

Follow these steps to wire the DC power cable to the connector:

1. Insert the positive and negative wires into the V+ and V- contacts on the terminal block connector.
2. Tighten the wire clamp screws to prevent the DC wires from loosening.

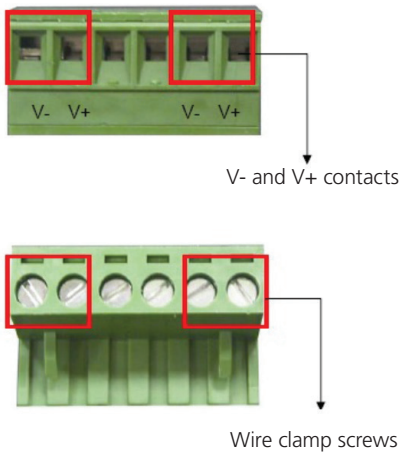


Figure 3-2. Terminal block connector.

3.2.2 Wiring the Alarm Relay

The switch provides one dry relay output for a power or port link event. The alarm relay default is "open" and forms a closed circuit when the event occurs. The relay conductor has a maximum of 24 Watts. When it connects with a 24-VDC power source, the maximum current is 1 Amp. The following diagram shows how to create an alarm circuit.

WARNING: Do not connect to AC line.

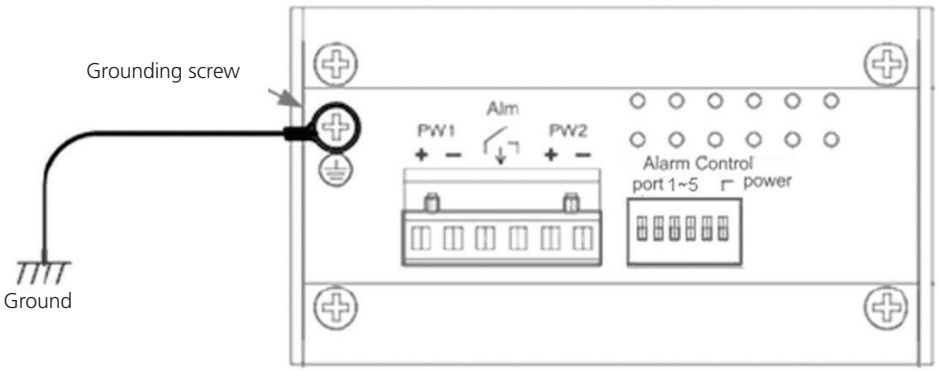


Figure 3-3. Alarm relay wiring.

3.2.3 Wiring Grounding

AC motors, electric welding machines, and power devices generate electromagnetic and disturb communications. To prevent noise, be sure to ground the switch. The following diagram shows how to create a connection.

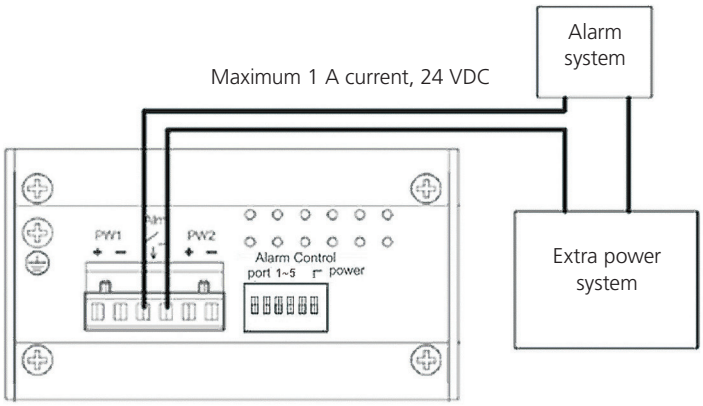


Figure 3-4. Grounding the switch.

3.2.4 Enable the Event Alarm Function

The switch has one dry relay output for port link fails or power fails. Just change the DIP switch to the desired setting and the new configuration will be activated. You don't need to reset the system.

On the bottom side of the switch, there is one 6-pin DIP switch for alarm control. Insert the power and port wiring and the DIP switch for the intended alarm is switched to "ON." The relay output will form a short circuit if the alarm occurred.

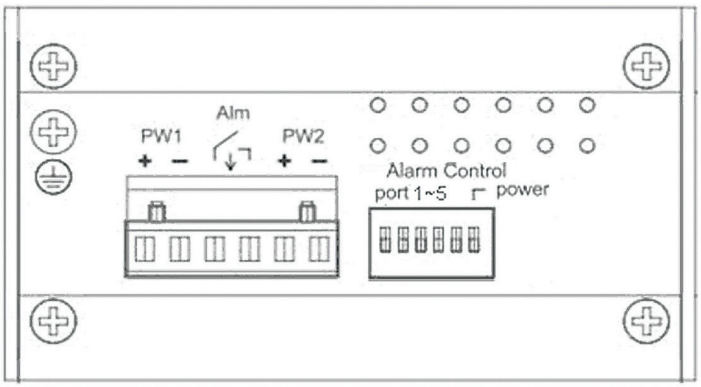


Figure 3-5. Setting the DIP switch.

Table 3-1. DIP switch settings for port link or power failure alarm.

Pin Number	Status	Description
P1 to P (Pin 1–5)	ON	Enables port link down alarm at this port.
	OFF	Disables port link down alarm at this port.
P6	ON	Enables power failure alarm.
	OFF	Disables power failure alarm.

3.2.5 Cabling

Ethernet Cabling:

Ports 1–4 use copper UTP/STP cable.

Table 3-2. Cable types for data transmision.

Description
10BASE-T: 2-pair UTP/STP CAT3, 4, 5 cable, EIA/TIA-568, 100-ohm, Max. 328 feet (100 m)
100BASE-TX: 2-pair UTP/STP CAT5 cable, EIA/TIA-568, 100-ohm, Max. 328 feet (100 m)
1000BASE-T: 4-pair UTP/STP CAT5 cable, EIA/TIA-568, 100-ohm, Max. 328 feet (100 m)

NOTE: For optimum data transmission and power delivery in any speed, use CAT5 cable or above.

Fiber port

Port 5 houses a fiber transceiver (SFP). See the table below for compatible SFPs.

Table 3-3. Compatible SFPs.

Part Number	Description
LFP411	SFP, 1.25-Gbps Fiber with Extended Diagnostics, 850-nm Multimode, LC, 300 m
LFP412	SFP, 1.25-Gbps Fiber with Extended Diagnostics, 1310-nm Multimode, LC, 2 km
LFP413	SFP, 1.25-Gbps Fiber with Extended Diagnostics, 1310-nm Single-Mode, LC, 10 km
LFP414	SFP, 1.25-Gbps Fiber with Extended Diagnostics, 1310-nm Single-Mode, LC, 30 km
LFP416	SFP with SGMII Interface, 1.25 Gbps, Copper, 10/100/1000BASE-T, Extended Diagnostics

SFP Installation

Before installing the SFP transceiver, make sure the SFP type at both ends of the link is the same and the transmission distance, wavelength, fiber cable are correct for your application.

At both ends of the connection, simply plug the SFP transceiver into the switch, then connect the fiber cable.

4. System Diagnostics

Do a ping test to make sure the installation is correct.

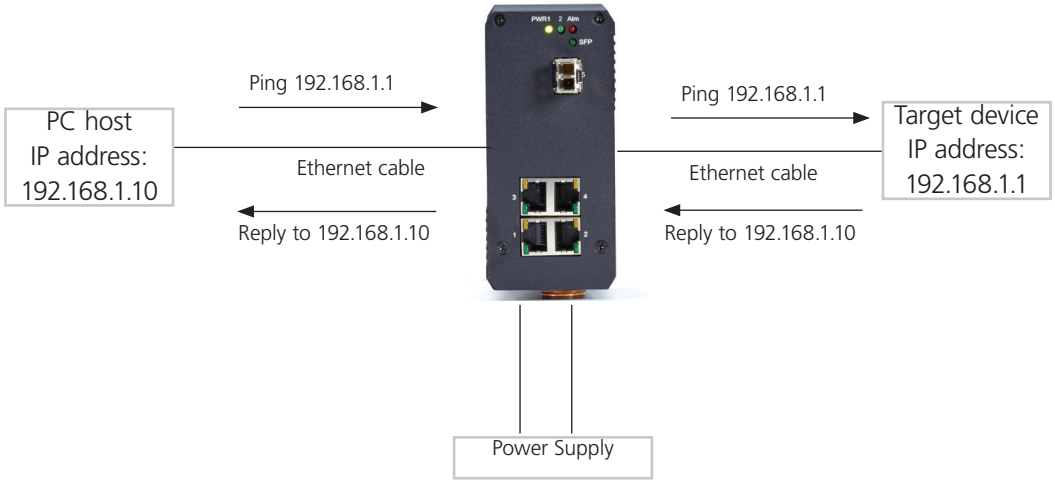


Figure 4-1. Connection for ping test.

1. Click on "Run" in the Windows Start Menu, type "Command," then click "OK."

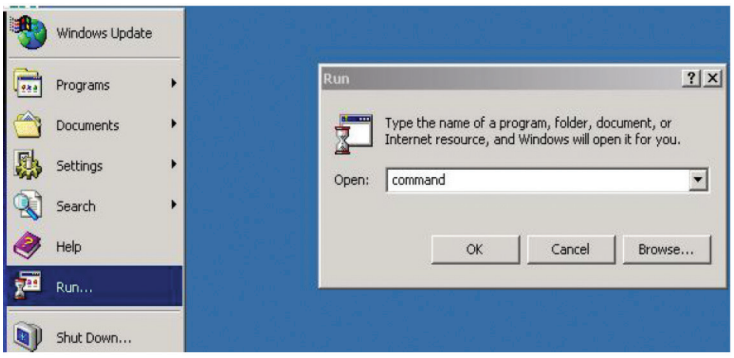


Figure 4-2. Open command.

2. Type "ping 192.168.1.1" command in the command window. The PC host (192.168.1.10) will then ping the target PC. The screen below shows the result you will get if you successfully ping the target IP address, for example 192.168.1.1.

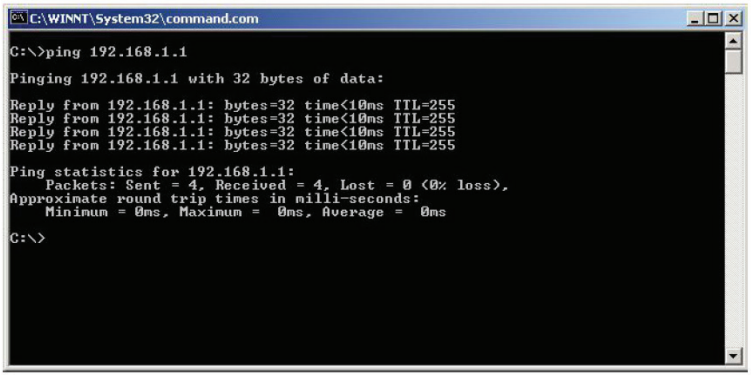


Figure 4-3. Ping results screen.

NOTE: If you failed to ping the target IP, the command mode will show "Ping Request Timeout." Check the IP address settings of the PCs, Ethernet cable connections, and the port LEDs to identify the problem.

NOTES

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