BLACK BOX®
NETWORK SERVICES

Dec, 2006

Express
Ethernet Switch
LGB316A-R2
LGB324A-R2

FEDERAL COMMUNICATIONS COMMISSION AND
CANADIAN DEPARTMENT OF COMMUNICATIONS
RADIO FREQUENCY INTERFERENCE STATEMENT

Class B Digital Device. This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. If this equipment does cause harmful interference to radio or telephone reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult an experienced radio/TV technician for help.

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

To meet FCC requirements, shielded cables and power cords are required to connect this device to a personal computer or other Class B certified device.

This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

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

Normas Oficiales Mexicanas (NOM)
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 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.

FCC Certifications

This Equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received; including interference that may cause undesired operation.

CE Mark Warning

This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022 class A for ITE, the essential protection requirement of Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Company has an on-going policy of upgrading its products and it may be possible that information in this document is not up-to-date. Please check with your local distributors for the latest information. No part of this document can be copied or reproduced in any form without written consent from the company.

Trademarks:
All trade names and trademarks are the properties of their respective companies.

Unpacking Information

Thank you for purchasing this product. Before installation, please verify that your package contains the following items.

1. One 16/24-Port Gigabit Ethernet Switch with 4-Port Mini-GBIC
2. One AC power cord
3. Rack-mount brackets (optional)
4. User's Manual

Introduction

General Description

Easily boost your networking throughput; the product equips 16/24 Gigabit ports that lead you to a real Gigabit connection. Users are now able to transfer large and high bandwidth-needed files faster and hence get a real efficiency improvement. In addition to the cooper ports, 4 of the ports supports fiber connection with the equipped Mini-GBIC ports for obtaining long-distance communication.

This product offers users with fast and reliable network. The store-and-forward architecture filters errors and forwards packets in a non-blocking environment. Flow control prevent data loss while transmitting. The 802.3x and backpressure flow control mechanisms work respectively for full and half duplex modes.

The switch features with easy installation and maintenance. It supports Nway auto-negotiation protocol that detects the networking speed (10/100/1000 Mbps) and the duplex modes (Full/Half) automatically. Auto-MDI/MDI-X function alleviates the effort to use crossover cables. Also, rich diagnostic LEDs are provided for users to get real-time information of the connection status.

Key Features

- Complies with IEEE802.3, IEEE 802.3u, IEEE 802.3ab and IEEE 802.3z standards.
- 16/24 * 10/100/1000 Mbps RJ-45 Nway ports
- 4* Mini-GBIC port for optional fiber optical communication
- Supports NWay protocol for speed (10/100/1000Mbps) and duplex mode (Half/Full) auto-detection
- Supports MDI/MDI-X auto crossover
- Supports full and half duplex operation on all copper ports
- Supports back-pressure (half duplex) and flow control (IEEE 802.3x)
- Wire-speed packet filtering and forwarding rate
- Store-and-forward architecture
- Supports 9K bytes Jumbo frame.
- Supports 8K bytes MAC address entries in whole system
- 340K(16-Port) \500K(24-Port) bytes buffer memory
- Internal power adapter
- FCC,VCCI,CE Class A. Meet RoHS

The Front Panel

The front panel consists of LED indicators. For detailed LED definition, please refer to the next paragraph.
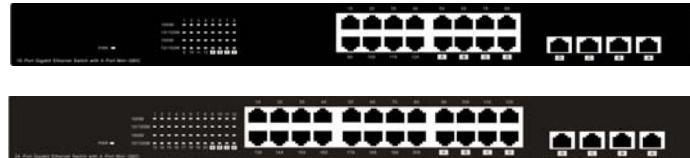
<u>LEDs Definition</u>

System LED

LED	Status	Operation
Power	Steady Green	The switch is powered on
	Off	The switch is powered off

Port LEDs

LED	Status	Operation
1000M	Steady Green	Valid port connection at 1000 Mbps
	Blinking Green	Valid port connection and there is data transmitting/ receiving
	Off	Port disconnected or the port is connected at 10 Mbps or 100 Mbps
10/ 100M	Steady Green	Valid port connection at 10/ 100 Mbps
	Blinking Green	Valid port connection and there is data transmitting/ receiving
	Off	Port disconnected or the port is connected at 1000 Mbps

Attention : The Mini GBIC slot shares the same LED indicators with Gigabit RJ-45 (copper) ports.

The Rear Panel

Power Receptacle

To be compatible with the electric service standards around the world, the switch is designed to afford the power supply in the range from 100 to 240VAC, 50/60Hz. Please make sure that your outlet standard to be within this range.

To power on the switch, plug the female end of the power cord firmly into the receptacle of the switch and the other end into an electric service outlet. After the power cord installation, please check if the power LED is illuminated for a normal power status.

Installation

This switch can be placed on your desktop directly, or mounted in a rack. The installation is a snap. Users can use all the features of the switch with simply attaching the cables and turning the power on.

Before installing the switch, we strongly recommend:
1. The switch is placed with appropriate ventilation environment. A minimum 25mm space around the unit is recommended.
2. The switch and the relevant components are away from sources of electrical noise such as radios, transmitters and broadband amplifiers
3. The switch is away from environments beyond recommend moisture

Desktop Installation

1. Attach the provided robber feet to the bottom of the switch to keep the switch from slipping. The recommend position has been square-marked.
2. Install the switch on a level surface that can support the weight of the unit and the relevant components.
3. Plug the switch with the female end of the provided power cord and plug the male end to the power outlet.

Rack-mount Installation

Rack mounting facilitate to an orderly installation when series of networking devices being installed. The switch is supplied with rack mounting brackets and screws for rack mounting the unit.

Procedures to Rack-Mount the Switch in the rack:

1. Disconnect all the cables from the switch before continuing.
2. Place the unit the right way up on a hard, flat surface with the front facing you.
3. Locate a mounting bracket over the mounting holes on one side of the unit.
4. Insert the screws and fully tighten with a suitable screwdriver.
5. Repeat the two previous steps for the other side of the unit.
6. Insert the unit into the rack and secure with suitable screws (optional).
7. Reconnect all the cables.

Network Cables Installation

1. **Crossover or straight-through cable**: All the ports on the switch support Auto-MDI/MDI-X functionality. Both straight-through or crossover cables can be used to connect the switch with PCs as well as other devices like switches, hubs or router.

2. **Category 3,4,5 or 5e UTP/STP cable**: To make a valid connection and obtain the optimal performance. Appropriate cables corresponding to different transmitting/receiving speed is required. To choose a suitable cable, please refer to the following table.

| Media	Speed	Wiring
10/100/1000Mbps copper	10Mbps	Category 3,4,5 Utp/STP
	100Mbps	Category 5 UTP/STP
	1000Mbps	Category 5,5e UTP/STP
1000Mbps Fiber (Mini GBIC required)	1000Mbps	The cable type differs from the mini-GBIC you choose. Please refer to the instruction came with your mini-GBIC.

Port Operation

The auto-negotiation feature allows ports running at one of the following operation modes:

Media	Speed	Duplex Mode
10/100/1000Mbps (copper)	10Mbps	Full Duplex
		Half Duplex
	100Mbps	Full Duplex
		Half Duplex
	1000Mbps	Full Duplex
1000Mbps(Fiber) (mini GBIC required)	1000Mbps	Full Duplex

Note: For the last port, when both the fiber and cooper interfaces are connected, the system adapts the fiber interface and disables the relevant cooper port automatically.

Backbone Network Application

This switch is ideal for boosting the throughput of backbone. For an application sample of network topology, please refer to the following chart.
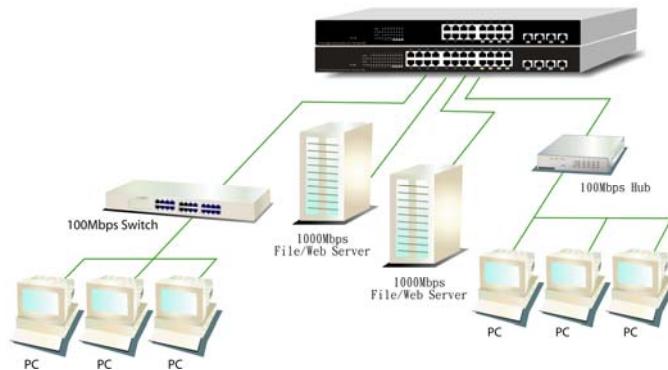
Product Specifications

Standard	IEEE802.3 10BASE-T IEEE802.3u 100BASE-TX IEEE802.3x full-duplex flow control IEEE802.3z/ab 1000BASE-T
Interface	16/24 *10/100/1000 Mbps auto MDI/MDI-X RJ-45 switching ports 4* Mini-GBIC module sockets
Cable Connections	RJ-45 (10BASE-T): Category 3,4,5 UTP/STP RJ-45 (100BASE-TX): Category 5 UTP/STP RJ-45 (1000BASE-T): Category 5,5e or enhanced UTP/STP Fiber: depend on Mini-GBIC types
Transmission Mode	10/100Mbps Full-duplex, Half-duplex 1000Mbps Full-duplex
LED indications	System: Power 16/24 * 10/ 100M: Link/ACT 16/24 * 1000M: Link/ACT
Memory	8K MAC entries 340K bytes Buffer Memory (16 Port) 500K bytes Buffer Memory (24 Port)
Emission	FCC, CE, VCCI class A
Operating Temperature	$0^0 \sim 40^0$C ($32^0 \sim 104^0$F)
Operating Humidity	10% - 90%(non-condensing)
Power Supply	Internal power supply 100-240V/50-60 Hz universal input