

Send power and data on one cable.

PoE Mid-Span Injectors



A Black Box
Exclusive

See page 642

Power over Ethernet (PoE) carries both data and power over the same Ethernet cable, enabling you to easily move equipment from room to room without costly, time-consuming rewiring. PoE Mid-Span injectors incorporate PoE power into your network without the need to upgrade embedded network switches.

What's inside Networking:

Small Office/Home Office

Pure Networking™ 802.11n Wireless
Higher speed and greater coverage than 802.11g.
Page 560



Pure Networking Switches

Sized and priced for the small network.
Page 561



Gigabit 5-Port Switch

Bring Gigabit speed to your small network.
Page 565



USB 2.0↔Gigabit Ethernet Adapter
Quickly connect any PC with a USB 2.0 port to Gigabit Ethernet.
Page 562



Switches

Express Ethernet Switches
Solid enterprise switches in a wide range of options.
Pages 568–569



USB-Powered 10/100 Switch

Add ports quickly without needing to find a spare power outlet.
Page 566



Value Console-Managed Switch

Console-based management.
Page 566



Gigabit PSE Web Smart Switch

The solid way to add PoE to your Gigabit network.
Page 576



Media Converters

Pure Networking Media Converters
Change cable types quickly and inexpensively.
Page 586



Compact Media Converters

Workhorse media converters in a wide range of interfaces.
Pages 589



FlexPoint™ Modular Media Converters

Use alone or in a chassis.
Pages 602–605



Dynamic Fiber Conversion System

The range and versatility to work with any enterprise network.
Pages 606–611



Related Products:

AlertWerks ServSensor V4E Hub



See page 320

GigaTrue® CAT6 Patch Cable



See page 42

Customs:

Don't see it? Just ask.
Many products can be customized with different connectors, international or DC power supplies, DIN rail mounting, conformal coating, custom wiring harnesses, and more.
For details, call our FREE Tech Support.



Industrial

Managed Fiber Switches
Tough switches for harsh environments.
Pages 632–633



Heavy-Duty Edge Switches
Small industrial switches in a wide range of configurations.
Pages 624–627.



Industrial MultiPower Media Converters
Hardened media converters powered three ways.
Page 637.



Pure Networking™ Fiber Device Servers
Run Ethernet to an RS-232/422/485 device.
Page 639



Best Sellers:

Multipower Miniature Media Converters

These tiny media converters have many power options including a convenient rackmount PowerTray. See Multipower Miniature Media Converters on pages 596–597. The industrial version with extended temperature range is on page 637.



Managed Field Switch

This tough industrial switch weathers harsh environments. Its advanced thermal chassis works as a heat sink and features a ribbed surface for heat dissipation. Choose from many power options, including 48 VDC.
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White Papers

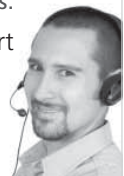
Insights into the latest technology are available at blackbox.com.

Server Configurators

Black Box will build your server, storage device, or laptop or desktop computer to your specifications. See blackbox.com/go/servers.

FREE, Live, 24/7 Tech Support

Talk with an expert in 20 seconds or less or go to blackbox.com.



Pure Networking 802.11n Wireless Access Point, Router, and USB Adapter

802.11n brings you a greater coverage area, fewer dead spots, and higher throughput.

- IEEE 802.11n compliant.
- High-speed wireless network runs six times faster than 802.11g wireless.
- Transfer files at speeds up to 300 Mbps.
- Feature a far greater range than 802.11g—up to 229 feet (70 m)!
- Reduce “dead spots” within the wireless coverage area.
- Backwards compatible with 802.11b/g wireless.
- Auto MDI/MDI-X function for all wired Ethernet ports.
- The router enables multiple users to share a single Internet connection.
- ♦♦ **WARRANTY** — 1 Year



PURE networking™
BLACK BOX WIRELESS NETWORKING

The newly ratified 802.11n wireless standard is light years ahead of older 802.11g wireless. Two antennas and two receivers combine with the latest MIMO technology to maximize wireless throughput and range. It has a 300-Mbps data transmission rate at a distance of up to 229 feet (70 m).

These 802.11n devices are completely compatible with older 802.11b and 802.11g wireless devices. All include a robust set of security features including 64-/128-bit WEP, WPA, WPA2, MAC access control, TKIP, AES, hidden ESSID, and IEEE 802.1x authentication.

Pure Networking™ 802.11n 2T2R Wireless Access Point

With this access point, even inexperienced users can set up a network environment within minutes. An easy-to-use, Web-based graphical user interface (GUI) simplifies configuration and management over your network.

The Universal Repeater function enables you to use multiple access points to build a large wireless network in a facility such as an airport, hotel, or school.

Pure Networking 802.11n 2T2R Wireless Router

With this 802.11n Wireless Broadband Router, up to 253 computers and network devices can

share a single Internet connection at high speed. Because the router is easy to install, you can set up a network environment within minutes. A remote management function enables you to configure, monitor, and upgrade the router across your network with an easy-to-use GUI interface.

The router also features four wired 10-/100-Mbps LAN ports and one 10-/100-Mbps WAN port for network expansion.

Pure Networking 802.11n 2T2R Wireless USB Adapter

Bring your older laptop or desktop computer into the high-speed wireless age with this simple 802.11n adapter. Just plug this tiny adapter right in to a USB 2.0 port and you're ready to start connecting at 802.11n speeds. The adapter is backwards compatible with older USB 1.1 ports, too.

TECH SPECS

Memory — WAP-300BGN: Flash: 4 MB, SDRAM: 16 MB;
WRT-300BGN-R2: SDRAM: 16 MB
Environmental — WAP-300BGN, WRT-300BGN-R2:
Temperature: 32–104° F (0–40° C);
Humidity: 10–90%, noncondensing
Standards — IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX; IEEE 802.11b, 802.11g, 802.11n wireless
CE Approval — Yes
RoHS — Yes
Connectors — WAP-300BGN, WRT-300BGN-R2:
(1) RJ-45;
WUA-300BGN: (1) USB 2.0 Type A
Power — WAP-300BGN, WRT-300BGN-R2: External power supply: 100–240 VAC, 50–60 Hz, 12 watts;
WUA-300BGN: from the USB interface

Size — WAP-300BGN: 1.2"H x 5"W x 3.8"D (3 x 12.7 x 9.6 cm);
WRT-300BGN-R2: 1.2"H x 6.2"W x 5"D (3 x 15.7 x 12.7 cm);
WUA-300BGN: 0.4"H x 1.1"W x 3.4"L (1 x 2.7 x 8.7 cm)
Weight — WAP-300BGN: 0.4 lb. (0.2 kg);
WRT-300BGN-R2: 0.5 lb. (0.2 kg);
WUA-300BGN: <0.1 lb. (<0.1 kg)

Item	Code	List Price
Pure Networking 802.11n 2T2R Access Point	WAP-300BGN	
2T2R Router	WRT-300BGN-R2	
2T2R USB Adapter	WUA-300BGN	

Wireless Accessories

What you need to complete your wireless network.



- Use **802.11g Wireless Adapters** to add wireless capabilities to desktop or laptop computers without wireless capabilities.
- The **Omnidirectional 2.4-GHz Antenna (LW6200A-R2)** extends the transmitting and receiving power of an 802.11b or 802.11g compliant wireless access point or wireless adapter.
- ♦♦ **WARRANTY** — 1 Year

CE Approval — Yes
RoHS — LW6001A, LW6007A, LW6200A-R2

Item	Code	List Price
Pure Networking 802.11g Wireless Adapters		
CardBus (PCMCIA)	LW6000A	
PCI	LW6001A	
High-Gain USB	LW6002A-R2	
Mini USB	LW6007A	
Pure Networking 802.11g 2.4-GHz Antenna		
8-dBi Omnidirectional	LW6200A-R2	
♦ Includes (1) adapter and (1) 1-ft. USB Type A male to Mini USB Type A male cable.		

Buyer's Guide | Small Office/Home Office Switches

For product details, see the page listed.

Speed	Ports	Power Supply	Power Draw	List Price	Code	Product Name
10-/100-Mbps	(5) RJ-45	120-VAC, 60 Hz, external	6 watts		LB8505A-R2	Pure Networking 10/100, below
		115-VAC, 60 Hz, external	7 watts		LB8405A-R3-US	Palm-Sized Ethernet Switch, p. 565
		100–120-VAC/200–240-VAC, 50–60 Hz, external with plugs for U.S., U.K., E.U., and South Africa	7 watts		LB8405A-R3	Palm-Sized Ethernet Switch, p. 565
	(8) RJ-45	120-VAC, 60 Hz, external	6 watts		LB8508A	Pure Networking 10/100, below
		115-VAC, 60 Hz, external	7 watts		LB8408A-R3-US	Palm-Sized Ethernet Switch, p. 565
		100–120-VAC/200–240-VAC, 50–60 Hz, external with plugs for U.S., U.K., E.U., and South Africa	7 watts		LB8408A-R3	Palm-Sized Ethernet Switch, p. 565
	(16) RJ-45	120-VAC, 60 Hz, external	12 watts		LB8516A	Pure Networking 10/100, below
10-/100-/1000-Mbps	(8) RJ-45	100–24-VAC, 50–60 Hz, internal	15 watts		LGB2001A	Pure Networking 10-/100-/1000-Mbps Switch, p. 565

Pure Networking 10/100 Ethernet Switches

The fast way to build a small network.

- A size for most every network: choose from 5, 8, or 16 10-/100-Mbps ports.
- Autosensing ports adapt automatically to 10- or 100-Mbps Ethernet and send data to the correct port.
- Full wire speed with nonblocking, store-and-forward switching architecture.
- Auto MDI/MDI-X function on all ports eliminates the need for cross-pinned cables.
- Autonegotiating half-/full-duplex.
- Easy to set up.
- **◆◆ WARRANTY** — 1 Year

Environmental — 32 to 131° F (0 to 55° C); Humidity: 10–95% noncondensing
Frame Buffer — LB8505A-R2: 128 KB; LB8508A: 256 KB; LB8516A: 512 KB
MAC Addresses — LB8505A-R2: 1K; LB8508A, LB8516A: 8K
Standards — IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX
CE Approval — Yes
RoHS — Yes
Connectors — (5), (8), or (16) RJ-45

TECH SPECS

Power — External power supply: 120 VAC, 60 Hz; Draw: LB8505A-R2, LB8508A: 7 watts; LB8516A: 12 watts
Size — LB8505A-R2: 1.2"H x 5"W x 3.3"D (3 x 12.7 x 8.4 cm); LB8508A: 1.2"H x 7.4"W x 3.9"D (3 x 18.8 x 9.9 cm); LB8516A: 1.2"H x 11.4"W x 3.9"D (3 x 29 x 9.9 cm)
Weight — LB8505A-R2: 0.4 lb. (0.2 kg); LB8508A: 0.8 lb. (0.4 kg); LB8516A: 1.1 lb. (0.5 kg)



Top: 5-Port Switch (LB8505A-R2); middle: 8-Port Switch (LB8508A); bottom: 16-Port Switch (LB8516A)

Item	Code	List Price
Pure Networking™ 10/100 Ethernet Switches		
5-Port	LB8505A-R2	
8-Port	LB8508A	
16-Port	LB8516A	

Don't get down—get help!

FREE, live support in less than 20 seconds.



Pure Networking Print Servers

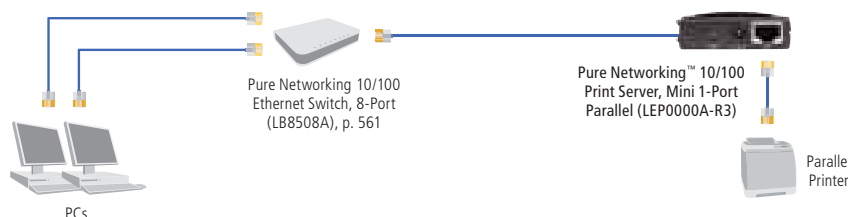
Give your network users easy access to USB and parallel printers.

- Share USB or parallel printers on your wired or wireless LAN.
- Wireless models comply with the IEEE 802.11g standard.
- Select peer-to-peer or server-based printing.
- Wireless models work in networks with or without an access point.
- Accessible via a Web browser connection, so you can share printers with your Internet users!
- **◆◆ WARRANTY** — 1 Year

Pure Networking Print Servers enable everyone on a small network to share one or more printers. Print by sending jobs directly to the print server (peer-to-peer) or by sending jobs via the print server to a network server that queues them for output (server-based printing).

The print servers work with all major operating systems, including Windows® 95/98/Me/XP, Windows NT/2000, Windows 7, Windows Vista®, Mac®, Novell® NetWare®, UNIX®, and Linux®.

Because the print servers support bidirectional communications, you can both send information to and retrieve information from the attached printers. This way, you can troubleshoot your printer operation over the network or over the Internet.



The print servers come with a CD-based utility that includes an installation wizard for complete configuration and management on the print server side. The included Web manager utility enables you to access the print server by entering its IP address into your browser's address field.

Flash memory enables convenient upgrades to the print servers.

For compact installations involving only one printer, choose **Mini Print Servers (LEP0000A-R3, LEP0001A-R2)**.

For busy environments where users need access to more than one printer, choose the **3-Port Desktop Print Server (LEP0005A-R2)**.

To put your USB printers within range of your wired and wireless network users, choose **802.11g Wireless Print Servers, USB (LEP0003A, LEP0006A)**.

Memory — LEP0000A-R3, LEP0001A-R2:

Flash: 512 MB NOR;

RAM: 2 MB SDRAM;

LEP0005A-R2, LEP0003A, LEP0006A:

Flash: 2 MB NOR;

RAM: 16 MB SDRAM

CE Approval — Yes

RoHS — Yes, except LEP0006A

Connectors — Printer port(s):

LEP0000A-R3: (1) Centronics® M;

LEP0001A-R2: (1) USB 1.1 Type A F;

LEP0005A-R2: (2) USB 1.1 Type A F, (1) DB25 F;

LEP0003A: (1) USB 2.0 Type A;

LEP0006A: Printer ports: (2) USB 1.1 Type A, (1) DB25 F;

LAN port: (1) RJ-45 (10/100 Mbps, auto sensing)

Indicators — (1) Power, (1) WLAN, (1) LAN, (3) Print

TECH SPECS

Power — Input: 120 VAC, 60 Hz;

Output: LEP0000A-R3, LEP0001A-R2: 7 VDC,

3.75 watts maximum;

LEP0005A-R2, LEP0003A, LEP0006A: 12 VDC, 12 watts maximum

Standards — LEP0000A-R3, LEP0001A-R2,

LEP0005A-R2: IEEE 802.3, IEEE 802.3u

LEP0003A, LEP0006A: IEEE 802.11g, IEEE 802.3, IEEE 802.3u

Size — LEP0000A-R3: 0.8"H x 2.2"W x 2.4"D

(2 x 5.6 x 6.1 cm);

LEP0001A-R2: 0.8"H x 2.2"W x 2.1"D

(2 x 5.6 x 5.3 cm);

LEP0005A-R2: 1.2"H x 7.4"W x 1.6"D

(3 x 18.8 x 4.1 cm)

LEP0003A: 0.8"H x 2.2"W x 2.9"D

(2 x 5.6 x 7.4 cm);

LEP0006A: 1.2"H x 7.4"W x 4.2"D

(3 x 18.8 x 10.7 cm)

USB 2.0↔Gigabit Ethernet Adapter

Convert a USB port into a 10-/100-/1000-Mbps Ethernet port.

- Data transfer rates of 10, 100, or 1000 Mbps.
- Easy to upgrade to 1000 Mbps. Just plug into a USB 2.0 port!
- Attaches to your PC's USB port or a USB hub via the included 1-foot (0.3-m) USB cable.
- Compact size makes it easy to pack with your laptop.
- Windows compatible.
- **◆◆ WARRANTY** — 1 Year



TECH SPECS

Access Method — Differential and bidirectional per USB specification 2.0

Operating Systems Supported — Windows 95/98/XP, Windows 2000, Windows Vista, Windows 7

Protocols — TCP/IP, IPX/SPX™, NetBEUI

Connectors — (1) USB Type A, (1) RJ-45

CE Approval — Yes

RoHS — Yes

Power — From the USB bus

Item	Code	List Price
USB 2.0↔Gigabit Ethernet Adapter	LG600A	

Buyer's Guide | PC Fiber Adapters and Media Converters

For product details, see below.

Bus	Type	Fiber Distance	Fiber	Connectors	List Price	Code	Product Name
PCI-E	1000BASE-SX	Full-duplex: 300 m (984 ft.)	850-nm Multimode	(1) pair LC		LH1690C-LC	PCI-E Fiber Adapter, below
				(1) pair SC		LH1690C-SC	
	100BASE-FX	Full-duplex: 2 km (1.2 m)	1310-nm Multimode	(1) pair SC		LH1390C-SC	PCI-E Fiber Adapter, below
PCI	1000BASE-SX	Full-duplex: 300 m (984 ft.)	850-nm Multimode	(1) pair LC		LH1660C-LC	PCI Fiber Adapter, below
				(1) pair SC		LH1660C-SC	
	100BASE-FX	Full-duplex: 2 km (1.2 m)	1310-nm Multimode	(1) pair ST		LH1360C-ST	PCI Fiber Adapter, below
				(1) pair SC		LH1360C-SC	
	10/100BASE-X to 100BASE-FX	Full-duplex: 2 km (1.2 m)	1300-nm Multimode	(1) RJ-45, (1) pair ST		LH6618C	PC Media Converter, below
				(1) RJ-45, (1) pair SC		LH6619C	

PCI and PCI-E Fiber Adapters

The easy way to bring fiber to your desktop.

- Include low-profile and standard profile PC brackets.
- Choose high-performance PCI Express (PCI-E) cards for high-speed PC connections to a fiber optic network.
- Gigabit adapters provide up to 1000 Mbps of bandwidth capacity for high-end system demands.
- Deliver maximum bandwidth and bus efficiency with low power consumption.
- High-level VLAN filtering and packet processing gives you improved performance, flexible configuration, and secure networking.
- Wake-on-LAN (WoL) capability and PXE boot support.
- Operate full- or half-duplex.



LH1660C-LC

- Troubleshoot and verify network/board link, activities, collision, and full-duplex status using LED indicators on the bracket.
- Fiber is ideal for electronically noisy areas and secure government networks.
- For specifications, see blackbox.com.
- ♦♦ **WARRANTY** — 2 Years



LH1690C-LC

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
PCI-E Fiber Adapters		
1000BASE-SX, 850-nm		
LC	LH1690C-LC	
SC	LH1690C-SC	
100BASE-FX, 1350-nm		
SC	LH1390C-SC	
PCI Fiber Adapters		
1000BASE-SX, 850-nm		
LC	LH1660C-LC	
SC	LH1660C-SC	
100BASE-FX, 1350-nm		
ST	LH1360C-ST	
SC	LH1360C-SC	

PC Media Converters

Use any PC with a spare PCI slot for media conversion.

- Translate between twisted-pair copper and multimode fiber.
- The 4-pin power connector plugs right into your PC's power supply.
- No IRQ addresses are required.
- ♦♦ **WARRANTY** — 6 Years

Use Black Box® PC Media Converters to take advantage of open PCI or ISA slots to bring fiber to the desktop. Just jumper a PC Media Converter to an installed twisted-pair card. The converter draws its power from the PC, so there are no power supplies to worry about. Best of all, these easy-to-use cards don't take any space on your desktop!

Link Loss™ and Fiber Alert™ LEDs on each twisted-pair and fiber port notify you of any "silent failures." The LH6601C has MDI/MDI-X on the copper port. The LH6618C–LH6619C are configured with simple switches.

TECH SPECS

Environmental — Operating Temperature: 32 to 122° F (0 to 50° C);
Operating Humidity: 5 to 95% noncondensing
Distance (Maximum) — 1.2 mi. (2 km)
Operation — Half- or full-duplex
CE Approval — Yes
RoHS — LH6618C–LH6619C
Connectors — LH6618C, LH6601C: (1) RJ-45, (1) pair ST®, (1) 4-pin power;
LH6619C: (1) RJ-45, (1) pair SC, (1) 4-pin power
Power — From the computer, includes Y power cable
Size — 5.4"H x 0.8"W x 4.5"D (13.7 x 2 x 11.4 cm)
Weight — 0.6 lb. (0.3 kg)



LH6618C

Item	Code	List Price
PC Media Converters		
Switching 10/100BASE-T to 100BASE-FX, Duplex Multimode Fiber, 1300-nm, 2 km		
ST	LH6618C	
SC	LH6619C	
1000BASE-T to 1000BASE-FX Duplex Multimode Fiber, 1300-nm, 2 km		
ST	LH6601C	
♦ All models include (1) media converter, (1) Y power cable, (1) PCI bracket, (1) ISA bracket, and (1) 1-ft. RJ-45 CAT5e cable.		

Buyer's Guide | Ethernet Switches

For product details, see the page listed or go to blackbox.com.

Speed	Management	Ports	Housing		Power		List Price	Code	Ethernet Switch
			Rackmount	Desktop	External	Internal			
Ethernet/Fast Ethernet		(5) 10/100 RJ-45	—	•	USB Bus Power			LBS005A	USB-Powered, p. 566
		(8) 10/100 RJ-45	—	•	USB Bus Power			LBS008A	
		(5) 10/100 RJ-45	—	•	•	—		LB8405A-R3-US	Palm-Sized, facing page
		(4) 10/100 RJ-45+(1) MM ST	—	•	•	—		LB8406A-US	
		(4) 10/100 RJ-45+(1) MM SC	—	•	•	—		LB9005A-FO-R2-US	
		(8) 10/100 RJ-45	—	•	•	—		LB8408A-R3-US	
		(7) 10/100 RJ-45+(1) MM SC	—	•	•	—		LB8418A-US	
		(8) 10/100 copper or fiber+fiber uplink	•	—	—	•		LB9217A-R2	Modular Express, p. 572
		(8) 10/100 copper or fiber	—	•	—	•		LE1401A	Modular Fiber, p. 572
		(8) 10/100 copper or fiber	•	—	—	•		LE1408A	
		(16) 10/100 copper or fiber	•	—	—	•		LE1416A	
		For unmanaged, 10-/100-Mbps Express Ethernet Switches, see pp. 568–569							
	Web Smart	(24) 10/100 RJ-45+2G Slot	—	•	—	•		LBG1000A-R2	Modular Managed Express, pp. 568–569
	L2 Managed	(24) 10/100 copper or fiber+(2) SFP	•	—	—	•		LB610A	Modular Managed L2, p. 571
		(24) 10/100 copper or fiber+(2) SFP	•	—	Dual power-supply slots			LB611A	
		(16) 10/100 RJ-45	•	—	—	•		LB9316A	Value Console-Managed, p. 566
		(24) 10/100 RJ-45	•	—	—	•		LB9324A	
Ethernet/Fast Ethernet/Gigabit Ethernet	Unmanaged	(5) 10/100/1000BASE-TX	—	•	—	•		LGB4005A	Gigabit 5-Port, p. 565
		(8) 10/100/1000BASE-TX	—	•	•	—		LGB2001A	Pure Networking 10-/100-/1000-Mbps, p. 565
		For unmanaged, 10-/100-/1000-Mbps Express Ethernet Switches, see pp. 568–569							
	Web Smart	(8) 10/100/1000+(2) SFP	•	—	—	•		LGB2008A-R2	Web Smart Gigabit, p. 567
		(16) 10/100/1000+(2) SFP	•	—	—	•		LGB2002A-R2	Back Office, p. 570
		(24) 10/100/1000+(2) SFP	•	—	—	•		LGB2003A-R2	
		(48) 10/100/1000+(4) SFP	•	—	—	•		LGB2048A	Web Smart Gigabit, p. 567
	L2 Managed	(8) 10/100/1000+(2) SFP	—	•	—	•		LGB1001A-R2	L2 M Gigabit, p. 571
		(16) 10/100/1000+(4) SFP	—	•	—	•		LGB1002A-R2	
		(24) 10/100/1000+(4) SFP	—	•	—	•		LGB1003A-R2	
		(8) 10/100/1000+(16) SFP	—	•	—	•		LGB1005A-R2	
		(48) 10/100/1000+(4) SFP	—	•	—	•		LGB1048A	
	L3 Managed	(24) 10/100/1000+(4) SFP	•	—	—	•		LBG5803A	Layer 3 Managed Gigabit, p. 573
		(4) 10/100/1000+(24) SFP	•	—	—	•		LBG5802A	

Palm-Sized Ethernet Switches

Unmanaged dual-speed switching—even fiber uplinks—in the palm of your hand!

- Plug-and-play installation.
- Feature 10-/100-Mbps autonegotiation with autosensing ports. They're perfect for networks running 10 Mbps, 100 Mbps, or a mixture of the two.
- Auto MDI/MDI-X on all copper ports.
- Choose a switch with one or two fiber uplink ports to connect a workgroup to a fiber backbone.
- Support multimode fiber links up to 2 kilometers (1.2 mi.) or single-mode fiber links up to 20 kilometers (12.4 mi.).
- ♦♦ **WARRANTY** — 1 Year



U.S. or international power

LB8408A-R3-US

TECH SPECS

Buffer — 1 MB

Environmental — Operating temperature: 32 to 104° F (0 to 40° C);

Operating humidity: 10 to 90% noncondensing

MAC Addresses — 2K

CE Approval — Yes except LB8418A-US

RoHS — Yes

Power — LB8405A-R3-US, LB8406A-US, LB9005A-FO-R2-US, LB8408A-R3-US, LB8415A-US, LB8418A-US, LB8421A-US, LB8422A-US, LB8424A-US: 115 VAC, 60 Hz; LB8405A-R3, LB8406A, LB9005A-FO-R2, LB8408A-R3, LB8415A, LB8418A: 100–120 VAC/200–240 VAC, 50–60 Hz, external supply with plugs for U.S., U.K., and E.U., 12 VDC @ 0.27 A; 3.2 watts maximum

Size — 1.1"H x 6.3"W x 3.2"D (2.8 x 16 x 8.1 cm)

Weight — 0.9 lb. (0.4 kg)

Item	Code	List Price
Palm-Sized Ethernet Switches		
115-VAC, 5-Port		
(5) RJ-45	LB8405A-R3-US	
(4) RJ-45, (1) Multimode, 2 km		
ST	LB8406A-US	
SC	LB9005A-FO-R2-US	
115-VAC, 8-Port		
(8) RJ-45	LB8408A-R3-US	
(7) RJ-45, (1) Multimode, 2 km		
ST	LB8415A-US	
SC	LB8418A-US	
(6) RJ-45, (2) Multimode, 2 km		
ST	LB8422A-US	
SC	LB8421A-US	
(6) RJ-45, (2) Single-Mode, 20 km		
SC	LB8424A-US	

Item	Code	List Price
Palm-Sized Ethernet Switches, Continued		
Autosensing Power, 5-Port		
(5) RJ-45	LB8405A-R3	
(4) RJ-45, (1) Multimode, 2 km		
ST	LB8406A	
SC	LB9005A-FO-R2	
Autosensing Power, 8-Port		
(8) RJ-45	LB8408A-R3	
(7) RJ-45, (1) Multimode, 2 km		
ST	LB8415A	
SC	LB8418A	

Industrial Switches, pp. 619–636. »

Pure Networking 10-/100-/1000-Mbps Switch Affordable Gigabit Ethernet.

- Features eight autosensing 10-/100-/1000-Mbps ports.
- Easy plug-and-play operation.
- Autonegotiating for duplex.
- Auto MDI/MDI-X on each port.
- Universal power supply.
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

Buffer — 144 KB

Environmental — Operating temperature: 32 to 104° F (0 to 40° C);

Operating humidity: 10 to 90% noncondensing

MAC Addresses — 8K

Standards — IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, IEEE 802.3ab 1000BASE-T, IEEE 802.3x full-duplex and flow control

CE Approval — Yes

RoHS — Yes

Connectors — (8) RJ-45

Power — External power supply: 100–240 VAC, 50–60 Hz, autosensing; 4 watts maximum

Size — 1.1"H x 6.7"W x 3.9"D (2.8 x 17 x 9.9 cm)



Item	Code	List Price
Pure Networking™ 10-/100-/1000-Mbps Switch 8-Port	LGB2001A	

Gigabit 5-Port Switch

Bring Gigabit speed to your small network.



- Features five autosensing 10-/100-/1000-Mbps ports.
- Easy plug-and-play operation.
- Autonegotiating for duplex.
- Auto MDI/MDI-X on each port.
- Fanless for silent operation.
- ♦♦ **WARRANTY** — 1 Year

This nimble little switch sets up a small Gigabit network in no time. Just plug and go—the switch does the work for you and figures out the speed, duplex, and wiring of attached devices.

The Gigabit 5-Port Switch has an internal power supply, so there's no bulky transformer to plug in. Plus its fanless design means it's quiet enough for office use.

TECH SPECS

Buffer — 832 KB

Environmental — Operating temperature: 32 to 131° F (0 to 55° C);

Operating humidity: 10 to 90% noncondensing;

MAC Addresses — 1K

Standards — IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, IEEE 802.3ab 1000BASE-T, IEEE 802.3x full-duplex and flow control

CE Approval — Yes

RoHS — Yes

Connectors — (5) RJ-45

Indicators — LEDs: Per Unit: (1) Power; Per Port: (1) LINK/ACT

Power — Internal power supply: 100–240 VAC, 50–60 Hz, autosensing; 4 watts maximum

Size — 1.75"H x 9"W x 4.9"D (4.4 x 22.8 x 12.4 cm)

Item	Code	List Price
Gigabit 5-Port Switch	LGB4005A	

USB-Powered 10/100 Switches

Powered through a PC's USB port, so there's no need to find a spare power outlet.



LBS005A: front

LBS005A: rear

- 10-/100-Mbps ports are autosensing for speed and duplex.
- A quick way to build a small network or add ports to an existing network.
- Can be powered through a PC's USB port so there's no need to find a spare power outlet. Or use the included AC power supply.
- Auto MDI/MDI-X.
- ♦♦ **WARRANTY** — 1 Year

The compact USB-Powered 10/100 Switch is an easy way to quickly add five or eight 10-/100-Mbps Ethernet ports to your network. Because it's USB powered, you can plug it into the nearest PC—an advantage anywhere power outlets are tight.

The switch offers autosensing 10-/100-Mbps ports that autonegotiate half-/full-duplex. All ports feature Auto MDI/MDI-X, so there's no need for cross-pinned cables—just plug it in and you're ready to go. There's no easier way to set up a quick workgroup. Plus, the switch is tiny enough to tuck neatly behind a PC.

TECH SPECS

Environmental — Operating temperature: 32 to 131° F (0 to 55° C);

Operating humidity: 10–90%, noncondensing

Filtering and Forwarding Rate —

10 Mbps: 14,880 pps;

100 Mbps: 148,800 pps

MAC Addresses — 1K

Standards — IEEE 802.3 10BASE-T, IEEE 802.3u

100BASE-T, IEEE 802.3x flow control

Switching Method—Store-and-forward

CE Approval — Yes

RoHS — Yes

Connectors — (5) or (8) RJ-45, (1) Power

Indicators — LEDs: Per Unit: (1) Power; Per Port:

(1) LINK/ACT

Power — Both: From computer's USB port via power cable (included) or 115-VAC, 60-Hz external power supply (included);

LBS005A: 2 watts maximum;

LBS008A: 3 watts maximum

Size — 0.8"H x 2.4"W x 3.1"D (2 x 6.2 x 7.9 cm)

Item	Code	List Price
USB-Powered 10/100 Switches		
5-Port	LBS005A	
8-Port	LBS008A	

Value Console-Managed Switches

Console management in a value-priced yet capable switch.



LB9316A

- Add ports to your network quickly and economically.
- The 10-/100-Mbps ports are autosensing for speed and duplex.
- Fully manageable through the DB9 serial port on the front of the switch.
- Auto MDI/MDI-X on all ports.
- Internal, universal power supply.
- Compact 1U rackmount chassis—the rackmount kit is included.
- ♦♦ **WARRANTY** — 1 Year

The Value Console-Managed Switch has all the features you're looking for in a basic utility switch—including management—at a per-port price that will keep your budget happy.

Autosensing 10-/100-Mbps Ethernet ports automatically adapt to the speed and duplex of a connected device. Auto MDI/MDI-X ensures that you'll never need a crossover cable. Plus you don't need to deal with bulky power transformers—the switch has an internal universal power supply.

Optional uplink modules add fiber uplinks of up to 2 kilometers (1.2 mi.) over multimode fiber or 20 kilometers (12.4 mi.) over single-mode fiber.

TECH SPECS

Buffer — LB9316A: 1.625 MB;

LB9324A: 1.25 MB

Environmental — Operating temperature: 32 to 131° F (0 to 55° C);

Operating humidity: 10–90%, noncondensing

Filtering and Forwarding Rate —

10 Mbps: 14,880 pps;

100 Mbps: 148,800 pps

MAC Addresses — LB9316A: 4 K; LB9324A: 8 K

Standards — IEEE 802.3 10BASE-T, IEEE 802.3u

100BASE-T, IEEE 802.3x flow control

Switching Method—Store-and-forward

CE Approval — Yes

RoHS — Yes

Connectors — (16) or (24) RJ-45, (1) Power

Indicators — LEDs: Per Unit: (1) Power; Per Port:

(1) LINK/ACT

Power — Both: 100–240-VAC, 50–60 Hz internal power supply;

LB9316A: 7.5 watts maximum;

LB9324A: 10 watts maximum;

Size — 1.75"(1U) H x 17.3"W x 8.7" D (4.4 x 44 x 22 cm)

Item	Code	List Price
Value Console-Managed Switches		
16-Port	LB9316A	
24-Port	LB9324A	
Fiber Uplink Modules		
Multimode, 2 km, SC	LB9316C-SC-2K	
Single-Mode, 20 km, SC	LB9316C-SC-20K	

Web Smart Gigabit Switches

Manage these high-speed switches through your Web browser.

- Features autosensing 10-/100-/1000-Mbps ports plus two dual-media ports that support 100- or 1000-Mbps SFPs or function as copper ports.
- Use any standard Web browser to monitor and control the switch.
- **WARRANTY** — 1 Year

Web Smart Gigabit Switches make migrating to Gigabit Ethernet easy and affordable.

Setup is easy. Just use a Web browser to log onto the built-in graphical user interface to configure or monitor the switch.

All 10-/100-/1000-Mbps copper ports are autosensing for speed and autonegotiating for duplex. The switches also feature Auto MDI/MDI-X, which means you never need a crossover cable. Plus, two dual-media ports support 100- or 1000-Mbps SFPs or function as copper ports.

Tagged and port-based VLAN provides precise control over network traffic segmentation and broadcast domains with up to four trunk groups. You also get support for Quality of Service (QoS) with a two-level priority queue.

SNMP trap management alerts you instantly when something goes wrong. Port mirroring helps to track network errors or abnormal packet transmission.



LGB2048A

TECH SPECS

Buffer — LGB2008A-R2: 144 KB;

LGB2048A: 768 KB

Environmental —

LGB2008A-R2: Operating temperature: 41 to 104° F (5 to 40° C);

Operating humidity: 10 to 90% noncondensing;

LGB2048A: Operating temperature: 32 to 104° F (0 to 40° C);

Operating humidity: 10 to 90% noncondensing

MAC Addresses — 8K

Standards — IEEE 802.3, 802.3u, 802.1ab, 802.3z, 802.3x, ANSI/IEEE 802.3 autonegotiation, IEEE 802.1Q VLAN

CE Approval — Yes

RoHS — Yes

Connectors — LGB2008A-R2: (8) RJ-45; (2) SFPs (Shared);

LGB2048A: (48) RJ-45; (4) SFPs (Shared)

Power — Both: 100–240 VAC, 50–60 Hz, autosensing;

LGB2008A-R2: 10 watts maximum;

LGB2048A: 48 watts maximum

Size — LGB2008A-R2: 1.75"H (1U) x 5.2"W x 8.5"D (4.4 x 13.2 x 21.7 cm);

LGB2048A: 1.75"H (1U) x 17.4"W x 9.8"D (4.4 x 44.2 x 24.9 cm)



LGB2008A-R2

Item	Code	List Price
Web Smart Gigabit Switches		
8-Port	LGB2008A-R2	
48-Port	LGB2048A	

To connect to fiber-based Gigabit Ethernet, order...

Small Form-Factor Pluggable (SFP)

Optical Transceivers

Multimode, 850-nm, 550 m

LGB200C-MLC

Single-Mode, 1310-nm, 10 km

LGB200C-SLC10

Single-Mode, 1550-nm, 30 km

LGB200C-SLC30

Don't see it? Just ask.

Many Black Box network products are available in more configurations than we show here. Among requests we may be able to fulfill are:

- Different connectors or connector combinations.
- International or DC power supplies.
- DIN rail mounting.
- Conformal coating for harsh environments.

If you don't see what you need, call our **FREE Tech Support** to discuss your requirements.



Express Ethernet Switches

Workhorse Ethernet switches in a wide range of options and configurations.

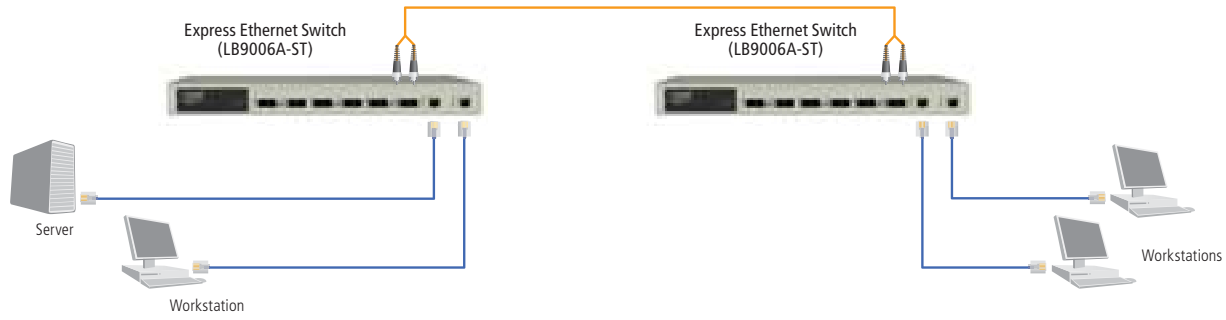
- Choose copper only, copper and fiber, copper with fiber uplinks, or fiber only.
- Multimode fiber ports provide extra distance—up to 2 kilometers!
- Half- and full-duplex operation on all RJ-45/copper ports.
- Internal universal power supplies.
- ♦♦ **WARRANTY** — 1 Year



LGB324A-R2

Buyer's Guide | Express Ethernet Switches

Switch Type	Connectors	Standards	Environmental		Management
			Operating Temperature	Operating Humidity	
10/100-Mbps copper	(8) RJ-45	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(16) RJ-45	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(24) RJ-45	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
10/100-Mbps copper, 100-Mbps fiber	(1) RJ-45, (1) pair SC	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(1) RJ-45, (1) pair ST	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(2) RJ-45, (6) pair SC	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(2) RJ-45, (6) pair ST	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(6) RJ-45, (2) pair SC	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(6) RJ-45, (2) pair ST	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(7) RJ-45, (1) pair SC	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(7) RJ-45, (1) pair ST	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
100-Mbps fiber	(8) pair SC	IEEE 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
10/100-Mbps copper, 100-Mbps fiber, modular	(16) RJ-45, (1) slot for optional fiber uplink	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(24) RJ-45, (1) slot for optional fiber uplink	IEEE 802.3, 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
10-/100-Mbps copper, 1000-Mbps fiber, modular managed	(24) RJ-45; (2) slots for 1000BASE-SX fiber uplink; (1) DB9 F console	IEEE 802.3, 802.3u, 802.3z, 802.3ab	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	HTTP Web interface, SNMP, Telnet, 802.1q, 802.1p
10-/100-/1000-Mbps copper with (4) SFP ports	(16) RJ-45, (4) SFP	IEEE 802.3, 802.3u, 802.3ab, 802.3x	32 to 113° F (0 to 45° C)	5 to 90% noncondensing	—
	(24) RJ-45, (4) SFP	IEEE 802.3, 802.3u, 802.3ab, 802.3x	32 to 113° F (0 to 45° C)	5 to 90% noncondensing	—
Modules					
100-Mbps fiber modules for LB9017A-R4 or LB9024A-R2 switches	(1) pair SC	IEEE 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
	(1) pair ST	IEEE 802.3u	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—
1000BASE-SX fiber module for LBG1000A-R2	(1) pair SC	802.3z	32 to 104° F (0 to 40° C)	5 to 90% noncondensing	—



	Power	Frame Buffer	MAC Addresses	CE	RoHS	Size	Weight	List Price	Code
	100–240 VAC, 50–60 Hz, 8.25 watts	1 MB	16K	•	•	1.4"H x 10"W x 5.3"D (3.6 x 25.4 x 13.5 cm)	6.5 lb. (2.9 kg)		LB9108A-R2
	100–240 VAC, 50–60 Hz, 30 watts	1.25 MB	8K	•	•	1.8"H x 10"W x 5.25"D (4.6 x 25.4 x 13.3 cm)	3.5 lb. (1.6 kg)		LB9019A-R4
	100–240 VAC, 50–60 Hz, 24 watts	1.25 MB	2K	•	•	1.8"H x 10"W x 5.25"D (4.6 x 25.4 x 13.3 cm)	3.5 lb. (1.6 kg)		LB9020A-R3
	100–240 VAC, 50–60 Hz, 7 watts	768 KB	8K	•	•	1.4"H x 10"W x 5.3"D (3.6 x 25.4 x 13.5 cm)	2.1 lb. (1 kg)		LB9002A-SC-R3
	100–240 VAC, 50–60 Hz, 7 watts	768 KB	8K	•	•	1.4"H x 10"W x 5.3"D (3.6 x 25.4 x 13.5 cm)	2.1 lb. (1 kg)		LB9002A-ST-R3
	100–240 VAC, 50–60 Hz, 12 watts	1 MB	1K	•	•	1.75"H x 17.3"W x 8"D (4.4 x 43.9 x 20.3 cm)	5.5 lb. (2.5 kg)		LB9006A-SC
	100–240 VAC, 50–60 Hz, 12 watts	1 MB	1K	•	•	1.75"H x 17.3"W x 8"D (4.4 x 43.9 x 20.3 cm)	5.5 lb. (2.5 kg)		LB9006A-ST
	100–240 VAC, 50–60 Hz, 30 watts	1 MB	1K	•	•	1.8"H x 17.3"W x 8.1"D (4.6 x 43.9 x 20.6 cm)	5.5 lb. (2.5 kg)		LB9021A
	100–240 VAC, 50–60 Hz, 30 watts	1 MB	1K	•	•	1.8"H x 17.3"W x 8.1"D (4.6 x 43.9 x 20.6 cm)	5.5 lb. (2.5 kg)		LB9022A
	100–240 VAC, 50–60 Hz, 8.25 watts	1 MB	1K	•	•	1.4"H x 10"W x 5.3"D (3.6 x 25.4 x 13.5 cm)	3.5 lb. (1.6 kg)		LB9007A-SC-R3
	100–240 VAC, 50–60 Hz, 8.25 watts	1 MB	1K	•	•	1.4"H x 10"W x 5.3"D (3.6 x 25.4 x 13.5 cm)	3.5 lb. (1.6 kg)		LB9007A-ST-R3
	100–240 VAC, 50–60 Hz, 9 watts	1 MB	1K	•	•	1.8"H x 17.3"W x 8.1"D (4.6 x 43.9 x 20.6 cm)	6.5 lb. (2.9 kg)		LB9008A-FO-R2
	100–240 VAC, 50–60 Hz, 24 watts	1.5 MB	2K	•	•	1.75"H x 17.3"W x 8"D (4.4 x 43.9 x 20.3 cm)	6.2 lb. (2.8 kg)		LB9017A-R4
	100–240 VAC, 50–60 Hz, 24 watts	1.5 MB	2K	•	•	1.75"H x 17.3"W x 8"D (4.4 x 43.9 x 20.3 cm)	6.2 lb. (2.8 kg)		LB9024A-R2
	100–240 VAC, 50–60 Hz, 24 watts	16 MB	2K	—	•	1.4"H x 10"W x 5.3"D (3.6 x 25.4 x 13.5 cm)	7.5 lb. (3.5 kg)		LBG1000A-R2
	100–240 VAC, 50–60 Hz, 23 watts	4 MB	8K	•	•	1.7"H x 17.4"W x 5.1"D (4.3 x 44.2 x 13 cm)	3.2 lb. (1.4 kg)		LGB316A-R2
	100–240 VAC, 50–60 Hz, 35 watts	4 MB	8K	•	•	1.7"H x 17.4"W x 5.1"D (4.3 x 44.2 x 13 cm)	3.3 lb. (1.5 kg)		LGB324A-R2
	From the switch interface	—	—	•	•	0.8"H x 2.5"W x 2.5"D (2 x 6.4 x 6.4 cm)	<0.1 lb. (<0.1 kg)		LB9017C-SC-R2
	From the switch interface	—	—	•	•	0.8"H x 2.5"W x 2.5"D (2 x 6.4 x 6.4 cm)	<0.1 lb. (<0.1 kg)		LB9007C-ST-R2
	From the switch interface	—	—	—	—	1.1"H x 2.4"W x 4.5"D (0.4 x 6.1 x 11.4 cm)	0.3 lb. (0.1 kg)		LBG1001C

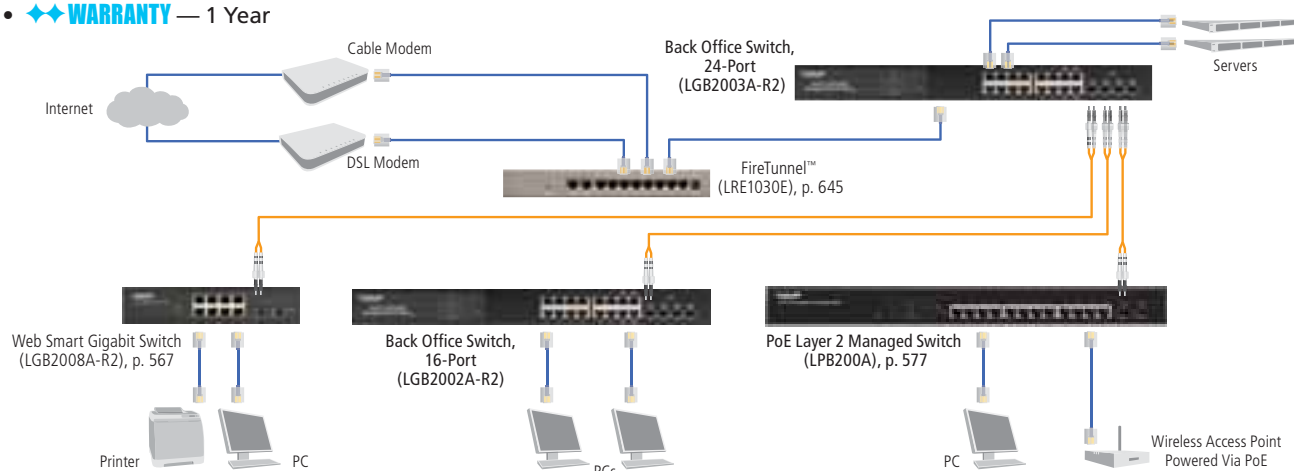
Back Office Switches with SFP

The smart way to expand small and mid-sized networks.

- 10/100/1000BASE-T Ethernet ports plus four dual-media ports that can be used either as 10/100/1000 ports or as SFP ports.
- Enable you to extend your network over fiber-based Gigabit Ethernet.
- Provide enhanced QoS support for real-time applications.
- Bandwidth aggregation is ideal for high-volume communications.
- **WARRANTY** — 1 Year



LGB2002A-R2



Expand your network the smart way! Use a Back Office Switch with SFP to connect up to 16 or 24 Gigabit Ethernet, Fast Ethernet, or Ethernet devices. You can even populate four switch ports with the optional Small Form Factor Pluggable (SFP) Optical Transceivers and connect to fiber-based Gigabit Ethernet!

These switches offer the versatility you need in your growing network, offering browser-based management capabilities plus Quality of Service (QoS), port mirroring, tag- and port-based VLAN, and bandwidth-aggregation capability.

Web Smart

The switches are easy for network administrators to set up and administer. Simply access a switch via your Web browser and log on to monitor, configure, and control each port's activity.

Put some fiber in your data diet.

The last four ports on the switches are dual-media ports that give you the option to connect to fiber-based Gigabit Ethernet by using an SFP. SFP Optical Transceivers are hot-swappable and available in multimode and single-mode versions.

Keeping it real time.

These switches support Layer 2 802.1p Priority Queue control, provide enhanced QoS support for real-time applications like Voice over IP (VoIP), and support Layer 4 TCP/UDP port and ToS classification.

Mirror, mirror on the port.

Port mirroring copies traffic from one specific port to a second target port so you can track network errors or abnormal packet transmissions without interrupting data flow. All ports are capable of port mirroring.

The traffic report.

You can use VLAN to isolate traffic between different users and thus provide better security. Plus VLAN enables you to confine the broadcast traffic to the same VLAN broadcast domain to boost network performance.

Life in the fast lane.

You can combine ports to create a multilink, load-sharing trunk. Port trunks are useful for switch-to-switch cascading, which provides very fast, full-duplex speeds for high-volume communications.

With the LGB2002A-R2, you can set up to eight ports per trunk and up to eight trunking groups. With the LGB2003A-R2, you can set up to 12 ports per trunk. This switch supports up to 12 trunking groups.

Plus, all the basics, of course.

All ports are autosensing for speed and autonegotiating for duplex. The switch's Auto MDI/MDI-X feature means you never need a crossover cable. Furthermore, both switches support IEEE 802.x flow control for full-duplex mode and collision-based backpressure for half-duplex mode.

TECH SPECS

Environmental — Operating temperature: 32 to 122° F (0 to 50° C);

Humidity: 5 to 90% noncondensing

Frame Buffer — LGB2002A-R2: 340 KB;
LGB2003A-R2: 500 KB

MAC Addresses — 8 K

Management — SNMP v2c, HTTP via embedded Web server

Standards — IEEE 802.3, 802.3u, 802.3ab, 802.3z, IEEE 802.3x, 802.1q

CE Approval — Yes

RoHS — Yes

Connectors — LGB2002A-R2: Ethernet: (12) RJ-45, Dual Media: (4) ports, each consisting of (1) RJ-45 + (1) SFP;

LGB2003A-R2: (20) RJ-45, Dual Media: (4) ports, each consisting of (1) RJ-45 + (1) SFP

Power — Internal power supply: autosensing
100–240 VAC, 50–60 Hz, 20 Watts

Size — 1.75"H (1U) x 17.4"W x 8.2"D
(4.4 x 44.2 x 20.8 cm);

Weight — 5.3 lb. (2.4 kg)

Item	Code	List Price
Back Office Switches with SFP		
16-Port	LGB2002A-R2	
24-Port	LGB2003A-R2	

To connect to fiber-based Gigabit Ethernet, order...

Small Form-Factor Pluggable (SFP) Optical Transceivers	
Multimode, 850-nm, 550 m	LGB200C-MLC
Single-Mode, 1310-nm, 10 km	LGB200C-SLC10
Single-Mode, 1550-nm, 30 km	LGB200C-SLC30

L2 Managed Gigabit Ethernet Switches with Dual-Media SFP Ports

Give important traffic priority and bandwidth when switching Gigabit copper—and fiber!

- Dual-media ports support SFPs or function as copper ports.
- SFP ports support SFPs only.
- Copper ports are autosensing for 10BASE-T/100BASE-TX/1000BASE-T.
- **WARRANTY** — 1 Year

These fully manageable and stackable Layer 2 switches provide bandwidth control and QoS for switching and sending packets reliably in VoIP and other real-time applications.

LACP enables you to combine ports to create a multilink trunk for load sharing.

Quality of Service (QoS) support ensures that important data gets through first. The switches support four internal queues for four classifications of traffic.

Allocate bandwidth where you need it with VLAN capability. For enhanced security and performance, isolate traffic between different users using the switch's Q-in-Q VLAN feature.

Monitor, configure, and control each port's activity with ease through the RS-232 console port, the integral Web-based management interface, or SNMP.



LGB1005A-R2

TECH SPECS

Environmental — Operating temperature: 32 to 104° F (0 to 40° C); Humidity: 5 to 90% noncondensing
Frame Buffer — 400 KB
MAC Addresses — 8K
Management — SNMP, Console, Telnet, HTTP via embedded Web server
Standards — IEEE 802.3, 802.3u, 802.3ab, 802.3z, 802.3x, 802.1p, 802.1q
Connectors — LGB1005A-R2: SFP: (16) SFP, Dual media: (8) ports, each consisting of (1) RJ-45 + (1) SFP;
 LGB1001A-R2: Ethernet: (6) RJ-45, Dual media: (2) ports, each consisting of (1) RJ-45 + (1) SFP;
 LGB1002A-R2: Ethernet: (12) RJ-45, Dual media: (4) ports, each consisting of (1) RJ-45 + (1) SFP;
 LGB1003A-R2: Ethernet: (20) RJ-45, Dual media: (4) ports, each consisting of (1) RJ-45 + (1) SFP;
 LGB1048A: Ethernet: (44) RJ-45, Dual media: (4) ports, each consisting of (1) RJ-45 + (1) SFP;
 All: Console port: (1) DB9 F
CE Approval — Yes
RoHS — Yes
Power — Internal power supply: autosensing 100–240 VAC, 50–60 Hz, 30 Watts
Size — LGB1001A-R2: 1.7"H x 8.5"W x 5.2"D (4.3 x 21.6 x 13.2 cm);
 LGB1002A-R2–LGB1003A-R2, LGB1005A-R2, LGB1048A: 1.7"H x 17.4"W x 8.2"D (4.3 x 44.2 x 20.8 cm)

Weight — LGB1001A-R2: 6.6 lb. (3 kg); LGB1001A-R2: 2.2 lb. (1 kg); LGB1002A-R2–LGB1003A-R2: 6.3 lb. (2.9 kg); LGB1048A: 10 lb. (4.5 kg)

Item	Code	List Price
L2 Managed Gigabit Ethernet Switches		
with (16) SFP Ports + (8) Dual-Media Ports	LGB1005A-R2	
with (2) Dual-Media Ports + (6) 10BASE-T/100BASE-TX/1000BASE-T Ports	LGB1001A-R2	
with (4) Dual-Media Ports + (12) 10BASE-T/100BASE-TX/1000BASE-T Ports	LGB1002A-R2	
(20) 10BASE-T/100BASE-TX/1000BASE-T Ports	LGB1003A-R2	
(44) 10BASE-T/100BASE-TX/1000BASE-T Ports	LGB1048A	

Item	Code	List Price
To connect the switches on this page to fiber-based Gigabit Ethernet, order...		
Small Form-Factor Pluggable (SFP) Optical Transceivers		
Multimode, 850-nm, 550 m	LGB200C-MLC	
Single-Mode, 1310-nm, 10 km	LGB200C-SLC10	
Single-Mode, 1550-nm, 30 km	LGB200C-SLC30	

Modular Managed L2 Switch

Provides two Gigabit dual-media ports plus three slots for hot-swappable, 8-port Fast Ethernet modules.



LB610A



LB620C

- Three slots support 8-port 10-/100-Mbps copper modules or 100-Mbps fiber modules.
- Two dual-media ports support 100- or 1000-Mbps SFPs or function as autosensing 10-/100-/1000-Mbps copper ports.
- Fully manageable via SNMP or any standard Web browser.
- Support for QoS and Q-in-Q VLAN.
- The LB611A features dual power-supply slots for redundant backup power—order AC Power Supplies (LB611C-AC) separately.
- **WARRANTY** — 1 Year

TECH SPECS

Environmental — Operating temperature: 32 to 104° F (0 to 40° C); Humidity: 5 to 90% noncondensing
Frame Buffer — 256 KB
MAC Addresses — 8 K
Management — SNMP, Console, Telnet, HTTP via embedded Web server
Standards — IEEE 802.3, 802.3u, 802.3ab, 802.3x, 802.3z, 802.1p, 802.1d, 802.1w, 802.3ad
CE Approval — Yes
RoHS — Yes
Power — LB610A: Internal power supply: autosensing 100–240 VAC, 50–60 Hz, 45 Watts; LB611A requires (1) or (2) power modules (order separately): LB611C-AC: Input: 120–240-VAC, 50–60-Hz; Output: 5 VDC, 17 Amps
Size — LB610A–LB611A: 1.75"H x 17.4"W x 11"D (4.4 x 44.2 x 28 cm)
Weight — LB610A: 7.5 lb. (3.4 kg); LB611A: 10.2 lb. (4.6 kg); LB611C-AC: 3.3 lb. (1.5 kg)

Item	Code	List Price
Select a switch...		
Modular Managed L2 Switch with AC Power Supply	LB610A	
with (2) Power-Supply Slots	LB611A	

...add one or two power supplies...
 AC Power Supply for Modular Managed L2 Switches LB611C-AC

...then populate the slots with up to three switch modules.

Switch Modules for Modular Managed L2 Switches		
(8) 10BASE-T/100BASE-TX	LB620C	
(8) 100-Mbps Fiber, Multimode SC	LB621C	
ST	LB622C	
(8) 100-Mbps Fiber, Single-Mode, SC	LB623C	
(8) 100-Mbps Fiber Single-Strand, Single-Mode, SC (Order one of each)		
(8) 1310-nm TX/1550-nm RX	LB624C	
(8) 1550-nm TX/1310-nm RX	LB625C	

Modular Express Ethernet Switch

The basic modular switch with copper and fiber options.

- All copper ports are 10-/100-Mbps, autosensing for speed and duplex and support Auto MDI/MDI-X.
- All fiber ports are 100-Mbps multimode.
- Features two and a half expansion slots: two slots for 8-port modules and a third "half" slot for single-port fiber uplink modules.
- Mix and match copper and fiber ports to fit your application.
- True nonblocking architecture with full wire-speed forwarding.
- Backpressure and IEEE 802.3-x-compliant flow control help to prevent network congestion.
- Rackmountable in only 1U of rack space.
- **◆◆ WARRANTY** — 1 Year



LB9217A-R2

TECH SPECS

Duplex Support — Half and full, autonegotiating
Environmental — Operating temperature: 32 to 104° F (0 to 40° C); Humidity: 5 to 90% noncondensing
Forwarding Rate — 10 Mbps: 14,880 pps; 100 Mbps: 148,800 pps
Frame Buffer — 2 MB
MAC Addresses — 8K
Standards — IEEE 802.3, IEEE 802.3u
Switching Method — Store-and-forward
CE Approval — Yes
RoHS — Yes
Power — Internal power supply: autosensing 100–240 VAC, 50–60 Hz, 52 Watts
Size — 1.75"H x 17.3"W x 11.2"D (4.4 x 43.9 x 28.4 cm)
Weight — 7.5 lb. (3.4 kg)

Item	Code	List Price
First, order the switch...		
Modular Express Ethernet Switch	LB9217A-R2	
...then select the modules.		
Modular Express Ethernet Switch Modules		
8-Port Fiber	ST® LB9214A	
	SC LB9215A	
2-Port Fiber, 6-Port RJ-45	ST LB9216A	
	SC LB9218A	
8-Port RJ-45	LB9213A	
4-Port Fiber, 4-Port RJ-45	ST LB9210A	
	SC LB9219A	
1-Port Fiber Uplink for Half-Slot	ST LB9220C-ST-R2	
	SC LB9220C-SC-R2	

Modular Fiber Switches

The easy, flexible way to increase network efficiency!



LE1408A

- Mix and match fiber ports with twisted-pair ports. Mix and match speeds, too: 10 Mbps, 10/100 Mbps, and 100 Mbps.
- Configure any chassis with as few as four ports. Then add modules according to the demands of your network.
- All RJ-45 module ports are 10/100 switching and 10/100 autonegotiating.
- All ports support half- and full-duplex modes.
- The 100-Mbps single-mode SC fiber module (LE1421C-40K) supports full-duplex transmissions up to 40 kilometers (24.8 mi.).
- Rackmountable in only 1U of rack space.
- **◆◆ WARRANTY** — 3 Years

TECH SPECS

Environmental — Operating temperature: 32 to 122° F (0 to 50° C); Humidity: 5 to 90% noncondensing
Cooling Method — Internal 9-cfm fan
Filtering and Forwarding Rate — 16-port aggregate: 2380K packets per second
Latency — 100 Mbps: 5 µs + packet time; 10 Mbps: 15 µs + packet time
MAC Addresses — 24K
Packet Buffers — 1 MB
Processing Type — Store and forward with IEEE 802.3x full-duplex flow control
Standards — IEEE 802.3: 10BASE-T, 10BASE-FL; IEEE 802.3u: 100BASE-TX, 100BASE-FX
CE Approval — LE1408A, LE1416A
RoHS — LE1401A, LE1408A, LE1416A

Connectors — LE1401A, LE1408A: (1) power, (2) slots for modules; LE1416A: (1) power, (4) slots for modules; LE1424C, LE1428C: (4) pairs of ST; LE1419C, LE1421C, LE1421C-40K: (4) pairs of SC; LE1422C: (4) pairs of MT-RJ; LE1425C: (4) RJ-45; LE1427C: (3) RJ-45, (1) pair of ST; LE1426C, LE1426C-SM: (3) RJ-45, (1) pair of SC
Power — All: Internal power supplies: autosensing 110–240 VAC, 47–63 Hz; LE1401A, LE1408A: 20 watts; LE1416A: 35 watts
Size — LE1401A: 1.75"H (1U) x 9"W x 9"D (4.4 x 22.9 x 22.9 cm); LE1408A, LE1416A: 1.75"H (1U) x 17"W x 9"D (4.4 x 43.2 x 22.9 cm)
Weight — LE1401A: 2.5 lb. (1.1 kg); LE1408A, LE1416A: 4 lb. (1.8 kg)

Extend distances to 40 kilometers!

Item	Code	List Price
First, choose a chassis for your application...		
Modular Fiber Switches		
8-Port	LE1401A	
8-Port Rackmount	LE1408A	
16-Port Rackmount	LE1416A	
◆ The LE1408A and LE1416A include a 19" rackmount kit.		
...next, choose up to four 4-port modules.		
Fiber Modules, 4-Port		
10-Mbps Multimode ST	LE1424C	
100-Mbps Multimode ST	LE1428C	
Multimode SC	LE1419C	
Multimode MT-RJ	LE1422C	
Single-Mode SC	LE1421C	
100-Mbps (Transmissions up to 40 km) Single-Mode SC	LE1421C-40K	
Twisted-Pair Module, 4-Port (One with Uplink)		
10-/100-Mbps RJ-45	LE1425C	
Mixed-Media Modules, 4-Port		
(3) 10-/100-Mbps RJ-45, (1) 100-Mbps Fiber Multimode ST	LE1427C	
Multimode SC	LE1426C	
Single-Mode SC	LE1426C-SM	
To cover any unused port, order...		
Blank Panel	LE1416A-BLANK	

Layer 3 Gigabit Ethernet Switches

Intelligent high-speed switching with routing features.

- Feature auto sensing 10/100/1000BASE-TX ports plus SFP slots for fiber links.
- Layer 3 full wire-speed routing on all ports.
- Fully manageable.
- **WARRANTY** — Switches: 2 Years; Modules: 1 Year

Layer 3 Gigabit Ethernet Switches are smart, capable switches for your network's core.

The switches are fully manageable to integrate easily into your SNMP managed network. Or you can use Web-based management through any standard Web browser or configure the switches using Telnet through the console port. All management application modules use the same Messaging Application Programming Interface (MAPI), so configuration parameters set using one method instantly show up on management methods. For instance, configurations set via console port will turn up on the Web browser interface.

Security is never a problem. IEEE 802.1x port access control and Layer 4 ACL enable you to exercise pinpoint control over which users get access to which resources.

Use link aggregation to combine two to four ports into a single high-volume pipeline. Each switch supports up to eight trunking groups.

Plus, the switches support QoS, multicast filtering, single IP management, and more.



LBG5803A

TECH SPECS

Environmental —
 Temperature:
 Operating: 32 to 104° F (0 to 40° C),
 Storage: -40 to 158° F (-40 to 70° C);
 Humidity:
 Operating: 20 to 85% noncondensing,
 Storage: 20 to 90% noncondensing

Frame Buffer — 1 MB

MAC Addresses — 16 K

Management — SNMP: RMON group 1, 2, 3, and 9, MIB II, Ethernet MIB, Bridge MIB, and private MIB; command line interface via Telnet; HTTP via embedded Web server

Standards — IEEE 802.3, 802.3u, 802.1q, 802.1p, 802.3x, 802.1d, 802.3ab, 802.3z, 802ac, 802.1w, 802.1s, RIP, RIP2, TCP/IP

CE Approval — Yes

RoHS — Yes

Connectors —
 LBG5803A: (24) RJ-45, (4) SFP;
 LBG5802A: (24) SFP, (4) RJ-45;
 Both: (1) DB9 F (RS-232) console port

Power — Internal power supply: autosensing
 100 – 240 VAC, 50–60 Hz, 12 watts

Size — 3.5"H x 16.9"W x 13.8"D
 (9 x 43 x 35 cm)

Weight — 14.3 lb. (7 kg)

Item	Code	List Price
Layer 3 Gigabit Ethernet Switches		
(24) 10/100/1000BASE-TX Ports, (4) SFP Slots	LBG5803A	
(4) 10/100/100BASE-TX Ports, (24) SFP Slots	LBG5802A	
SFP Modules		
1000BASE-T	LFP301	
1000BASE-SX (Multimode) with DDMI		
550 m	LFP204	
1000BASE-LX (Single-Mode)		
15 km	LFP205	
40 km	LFP206	
70 km	LFP207	
WDM Single Strand (Single-Mode)		
15 km (Order one of each.)		
1310-nm TX/1550-nm RX	LFP208	
1550-nm TX/1310-nm RX	LFP209	
40 km (Order one of each.)		
1310-nm TX/1550-nm RX	LFP210	
1550-nm TX/1310-nm RX	LFP211	

(NOTE: Order the single-strand in pairs: LFP208 and LFP209, or LFP210 and LFP211). For more SFPs, see page 574.

Black Box Explains

SFP, SFP+, and XFP transceivers.

SFP, SFP+, and XFP are all terms for a type of transceiver that plugs into a special port on a switch or other network device to convert the port to a copper or fiber interface. These compact transceivers replace the older, bulkier GBIC interface.

Although these devices are available in copper, their most common use is to add fiber ports. Fiber options include multimode and single-mode fiber in a variety of wavelengths covering distances of up to 120 kilometers (about 75 miles), as well as WDM fiber, which uses two separate wavelengths to both send and receive data on a single fiber strand.

SFPs support speeds up to 4.25 Gbps and are generally used for Fast Ethernet or Gigabit Ethernet applications. The expanded SFP standard, SFP+, supports speeds of 10 Gbps or higher over fiber. XFP is a separate standard that also supports 10-Gbps speeds. The primary difference between SFP+ and the slightly older XFP standard is that SFP+ moves the chip for clock and data recovery into a line card on the host device. This makes an SFP+ smaller than an XFP, enabling greater port density.



SFP, 1000BASE-T (LFP301)

Because all these compact transceivers are hot-swappable, there's no need to shut down a switch to swap out a module—it's easy to change interfaces on the fly for upgrades and maintenance.

Another characteristic shared by this group of transceivers is that they're OSI Layer 1 devices—they're transparent to data and do not examine or alter data in any way. Although they're primarily used with Ethernet, they're also compatible with uncommon or legacy standards such as Fibre Channel, ATM, SONET, or Token Ring.

Formats for SFP, SFP+, and XFP transceivers have been standardized by multisource agreements (MSAs) between manufacturers, so physical dimensions, connectors, and signaling are consistent and interchangeable. Be aware though that some major manufacturers, notably Cisco, sell network devices with slots that lock out transceivers from other vendors.

SFP, SFP+, and XFP Transceivers

Bring high-speed fiber and copper interfaces to your Ethernet switch's SFP, SFP+, or XFP slot.



LFP106



LFP200



LFP300

- These optical transceivers enable you to adapt an SFP, SFP+, or XFP slot to virtually any fiber or copper interface.
- Choose from models to support network speeds from Fast Ethernet to 10-Gigabit Ethernet.
- Single-strand models enable you to send and receive over one fiber, saving on cabling costs.
- Compact SFP+ transceivers enable greater port density than XFPs.
- Transparent to data.
- Hot swappable, so you can change interfaces on the fly.
- ♦♦ **WARRANTY** — 1 Year

Many of today's Ethernet switches and media converters feature ports that enable you to use SFP, SFP+, or XFP transceivers to add a network interface. Because these compact transceivers are available in a wide range of copper and fiber media covering speeds from 100-Mbps to 10-Gigabit and above, they enable you to customize devices to your requirements. And because these transceivers are hot-pluggable, you can change network interfaces on the fly.

Although these transceivers are most often used with Ethernet, they're protocol transparent to data, so they can be used with other network types such as Fibre Channel or ATM.

Choose 155-Mbps SFP models for use with 10- or 100-Mbps Ethernet and 1250-Mbps SFP models for use with 1000-Mbps Ethernet. SFP+ and XFP models support speeds of 10 Gbps or higher over fiber.

All models report basic link characteristics such as type, length of fiber link, wavelength, and bit rate.

SFPs with extended diagnostics also report information such as temperature, TX and RX power, voltage, and bias current.

NOTE: These transceivers do not work with Cisco® or ProCurve® switches.

TECH SPECS

Environmental — LFP100–LFP111, LFP200–LFP203, LFP207, LFP259–LFP260: -40 to +185° F (-40 to +85° C);
LFP300, LXP10G-MMLC, LXP10G-SMLC10, LXP10G-CX4, LSP10G-MMLC, LSP10G-SMLC10: 32 to +122° F (0 to 50° C)

CE Approval — LFP100–LFP107, LFP207, LFP203
RoHS — Yes

Power — From the interface

Size — SFP and SFP+: 0.34"H x 0.54"W x 2.2"D (8.6 x 13.7 x 56.5 mm);

XFP: 0.33"H x 0.72"W x 3.1"D (8.5 x 18.3 x 78 mm)

Item	Code	List Price
SFP Transceivers		
155-Mbps Fiber		
850-nm Multimode, LC, 2 km	LFP104	
1300-nm Multimode, LC, 2 km	LFP105	
1310-nm Single-Mode LC, 20 km	LFP106	
1310-nm Single-Mode Plus, LC, 40 km	LFP107	
155-Mbps Fiber with Extended Diagnostics		
850-nm Multimode, LC, 2 km	LFP100	
1300-nm Multimode, LC, 2 km	LFP101	
1310-nm Single-Mode, LC, 20 km	LFP102	
1310-nm Single-Mode Plus, LC, 40 km	LFP103	
155-Mbps Fiber WDM Single-Strand		
1310-nm TX/1550-nm RX, Single-Mode 20 km	LFP108	
1550-nm TX/1310-nm RX, Single-Mode 20 km	LFP109	
1310-nm TX/1550-nm RX, Single-Mode 40 km	LFP110	
1550-nm TX/1310-nm RX, Single-Mode 40 km	LFP111	

(NOTE: Order the single-strand models in pairs: LFP108 and LFP109, or LFP110 and LFP111.)

Item	Code	List Price
SFP Transceivers (Continued)		
1250-Mbps Fiber		
850-nm Multimode, LC, 500 m	LFP204	
1310-nm Single-Mode, LC, 10 km	LFP205	
1310-nm Single-Mode, LC, 30 km	LFP206	
1310-nm Single-Mode, LC, 70 km	LFP207	
1550-nm Single-Mode, LC, 120 km	LFP259	
1250-Mbps Fiber with Extended Diagnostics		
850-nm Multimode, LC, 550 m	LFP200	
1310-nm Single-Mode, LC, 15 km	LFP201	
1310-nm Single-Mode, LC, 40 km	LFP202	
1310-nm Single-Mode Plus, LC, 70 km	LFP203	
1550-nm Single-Mode, LC, 120 km	LFP260	
1250-Mbps Copper		
10BASE-T/100BASE-TX/1000BASE-T	LFP300	
1000BASE-T	LFP301	

Item	Code	List Price
SFP Transceivers (Continued)		
1250-Mbps Fiber WDM Single-Strand		
1310-nm TX/1550-nm RX, Single-Mode 10 km	LFP208	
1550-nm TX/1310-nm RX, Single-Mode 10 km	LFP209	
1310-nm TX/1550-nm RX, Single-Mode 30 km	LFP210	
1550-nm TX/1310-nm RX, Single-Mode 30 km	LFP211	
(NOTE: Order the single-strand models in pairs: LFP208 and LFP209, or LFP210 and LFP211.)		
10-Gbps Transceivers		
XFP Transceivers		
10GBASE-SR, 850-nm Multimode, 300 m LC	LXP-10G-MMLC	
10GBASE-LR, 1310-nm Single-Mode, 10 km LC	LXP-10G-SMLC10	
10GBASE-CX4, 15 m	LXP-10G-CX4	
SFP+ Transceivers		
10GBASE-SR, 850-nm Multimode, 300 m, LC	LSP-10G-MMLC	
10GBASE-LR, 1310-nm Single-Mode, 10 km, LC	LSP-10G-SMLC10	

CX4 cable, p. 610.



Buyer's Guide | PoE Ethernet Switches

For product details, see the page listed or go to blackbox.com.

Speed	Management	Ports	Housing		Power		PoE	List Price	Code	Ethernet Switch
			Desktop	Rackmount	External	Internal				
Fast Ethernet	Unmanaged	(5) 10/100 RJ-45	•	—	•	—	PD		LPD100A	PoE PD, below
		(4) 10/100 RJ-45+(1) SFP	•	—	•	—	PD		LPD101A	PoE PD, below
		(4) 10/100 RJ-45+(4) 10/100 PoE	—	•	—	•	PSE		LPB208A-R2	8-Port Unmanaged PoE, p. 576
	Web Smart	(24) 1000BASE-TX PoE+(2) SFP	—	•	—	•	PSE		LPB201A	PoE L2 Managed Gigabit, p. 577
		(8) 10/100BASE-TX PoE	•	—	•	—	PSE		LPB708A	10/100 PSE Web Smart, p. 576
		(16) 10/100BASE-TX PoE	•	—	•	—	PSE		LPB716A	10/100 PSE Web Smart, p. 576
		(24) 10/100BASE-TX PoE	•	—	•	—	PSE		LPB724A	10/100 PSE Web Smart, p. 576
Gigabit Ethernet	Web Smart	(16) 10/100/1000 PoE+ (4) SFP	—	•	•	—	PSE		LPBG716A	Gigabit PSE Web Smart, p. 576
		(24) 10/100/1000 PoE+ (4) SFP	—	•	•	—	PSE		LPBG724A	Gigabit PSE Web Smart, p. 576
	L2 Managed	(6) 10/100/1000 PoE+ (2) SFP	—	•	—	•	PSE		LPB4008A	PoE L2 Managed Gigabit, p. 577
		(12) 10/100/1000 PoE+ (2) SFP	—	•	—	•	PSE		LPB200A	PoE L2 Managed Gigabit, p. 577
		(20) 1000BASE-TX PoE+(4) SFP	—	•	—	•	PSE		LPB4024A	PoE L2 Managed Gigabit, p. 577

PoE PD Switches

Power over Ethernet plus fiber options make these the perfect switches for your network's edge.

- Powered by PoE, so there's no need to find a nearby power outlet.
- Copper ports are autosensing 10-/100-Mbps with MDI/MDI-X.
- IEEE 802.3af PoE compliant.
- Choose from a wide range of interfaces including multimode, single-mode, and single-strand fiber.
- **◆◆ WARRANTY — 6 Years**

Compact PoE PD Switches receive their power from a PoE switch or mid-span injector, eliminating the need to find a nearby power outlet and simplifying installation.

Each switch features one PoE PD port that receives power and one VoIP port for high-priority VoIP packets.

These full-featured switches have DiffServ/TOS IP packet prioritization on all ports for QoS prioritization. Fiber ports provide notification of link loss at the far end of the fiber. The switches also include broadcast storm protection and support a 1916-byte packet size.



LPD100A: top: front view;
bottom: rear view

Use PoE PD Switches with fiber ports to extend your network up to 100 kilometers (62.1 miles). Single-strand fiber models transmit and receive on a single fiber, enabling you to maximize use of your fiber infrastructure.

TECH SPECS

Buffer — 64 KB
 Environmental — Operating temperature: +32 to +122° F (0 to +50°C);
 Storage temperature: -13 to +158° F (-25 to +70° C);
 Humidity: 5 to 90% noncondensing
 MAC Addresses — 1K
 PoE Type — 802.3af powered device (PD)
 Standards — IEEE 802.3x, 802.3u, 802.3af
 CE Approval — Yes
 RoHS — Yes
 Connectors — See price block (right)
 Power — Inline PoE power injector
 Size — 1.6"H x 4.8"W x 7.3"D
 (4.1 x 12.2 x 18.5 cm)
 Weight — 1.8 lb. (0.8 kg)

Item	Code	List Price
PoE PD Switches		
(5) 10BASE-T/100BASE-TX	LPD100A	
(4) 10BASE-T/100BASE-TX plus (1) 155-Mbps SFP Slot	LPD101A	
(3) 10BASE-T/100BASE-TX plus		
(1) 100BASE-SX, Multimode, 850-nm 300 m, ST*	LPD102A	
300 m, SC	LPD103A	
(3) 10BASE-T/100BASE-TX plus		
(1) 100BASE-FX, Multimode, 1300-nm 2 km, ST	LPD104A	
2 km, SC	LPD105A	
(3) 10BASE-T/100BASE-TX plus		
(1) 100BASE-LX, Single-Mode 1310-nm 40 km, ST	LPD106A	
40 km, SC	LPD107A	
80 km, ST	LPD108A	
80 km, SC	LPD109A	
100 km, SC	LPD110A	

Item	Code	List Price
PoE PD Switches (Continued)		
(3) 10BASE-T/100BASE-TX plus		
(1) Single-Strand 100BASE-FX, Single-Mode 20 km, SC (Order One of Each.)		
1310-nm TX/1550-nm RX	LPD111A	
1550-nm TX/1310-nm RX	LPD112A	
40 km, SC (Order One of Each.)		
1310-nm TX/1550-nm RX	LPD113A	
1550-nm TX/1310-nm RX	LPD114A	
60 km, SC (Order One of Each.)		
1310-nm TX/1550-nm RX	LPD115A	
1550-nm TX/1310-nm RX	LPD116A	

10/100 PSE Web Smart Switches

Use any Web browser to configure and manage these switches.



LPB708A

- Inject power into Ethernet cable for PoE.
- Use a Web browser to configure and manage the switch.
- 24-port model has two dual-media ports that can be used as SFP ports.
- Support for 802.1p QoS with up to four queues.
- 802.1Q VLAN supports two groups.
- Auto-MDI/MDI-X on all copper ports.
- ♦♦ **WARRANTY** — 1 Year

Buffer — LPB708A, LPB716A: 1.625 MB;
LPB724A: 2.75 MB
Environmental — Operating temperature: 32 to 131° F
(0 to 55° C);
Operating humidity: 10 to 90% noncondensing
MAC Addresses — 4K
Management — HTTP via embedded Web server
PoE Type — 802.3af power source equipment (PSE)
Standards — IEEE 802.3, 802.3u, 802.3ab, 802.3z,
802.3x, 802.1p, 802.1d, 802.1w, 802.1x, 802.1q
CE Approval — Yes
RoHS — Yes
Connectors — LPB708A: (8) RJ-45;
LPB716A: (16) RJ-45;
LPB724A: (22) RJ-45 plus (2) dual-media ports,
each consisting of (1) RJ-45 + (1) SFP

TECH SPECS

Power — All: Internal power supply: autosensing
100–240 VAC, 50–60 Hz;
Draw: LPB708A: 130 watts maximum;
LPB716A: 260 watts maximum;
LPB724A 390 watts maximum
Size — LPB708A: 1.7"H x 10.2"W x 6.3"D
(4.4 x 26 x 16 cm);
LPB716A, LPB724A: 1.7"H x 17"W x 8.7"D
(4.4 x 44 x 22 cm)
Weight — LPB708A: 3.5 lb. (1.6 kg);
LPB716A: 6.8 lb. (3.1 kg);
LPB724A: 7.2 lb. (3.25 kg)

Item	Code	List Price
10/100 PSE Web Smart Switches		
8-Port	LPB708A	
16-Port	LPB716A	
24-Port	LPB724A	

Gigabit PSE Web Smart Switches

Bring PoE into your Gigabit network.



LPBG716A

- Feature 16 or 24 autosensing, auto-negotiating 10-/100-/1000-Mbps ports; four are dual-media ports, which may be used for SFPs.
- Inject power into Ethernet cable for PoE devices such as wireless access points and security cameras.

Buffer — LPBG716A: 340 KB;
LPBG724A: 500 KB
Environmental — Operating temperature: 32 to 131° F
(0 to 55° C);
Operating humidity: 10 to 90% noncondensing
MAC Addresses — 8K
Management — HTTP via embedded Web server
PoE Type — 802.3af power source equipment (PSE)
Standards — IEEE 802.3, 802.3u, 802.3ab, 802.3z,
802.3x, 802.3af, 802.1p, 802.1d, 802.1w, 802.1x,
802.1Q
CE Approval — Yes
RoHS — Yes

TECH SPECS

Connectors — Ethernet: (12) or (20) RJ-45;
Dual Media: (4) ports, each consisting of (1) RJ-45 +
(1) SFP
Power — External power supply: LPBG716A:
Autosensing 100–240 VAC, 50–60 Hz,
260 watts maximum; PoE: 15.4 watts
per port;
LPBG724A: Autosensing 90–260 VAC, 50–60 Hz,
390 watts maximum; PoE: 15.4 watts
per port
Size — 1.7"H x 17"W x 8.7"D (4.4 x 44 x 22 cm)
Weight — LPBG716A: 10.3 lb. (4.7 kg);
LPBG724A: 11.7 lb. (5.3 kg)

Item	Code	List Price
Gigabit PSE Web Smart Switches		
16-Port	LPBG716A	
24-Port	LPBG724A	
♦ Includes (1) switch and rackmount brackets.		



SFPs, p. 574.

8-Port Unmanaged Fast Ethernet Switch with 4 PoE Ports

Save on infrastructure and power up to four devices with PoE.

- Conforms to IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX and IEEE 802.3x flow control standards.
- Powers end-devices directly through LAN cables.
- Works with wireless access points, VoIP phones, security cameras, and more.
- Centralizes power distribution and backup without increasing infrastructure.
- Auto detects powered devices and consumption levels.
- Supports 10-/100-Mbps autodetect half- and full-duplex.



- Supports Auto MDI/MDI-X on all ports.
- Smart feature for PD on/off, PD detection, power level, PD status, and power feeding priority.
- Supports 802.3x flow control pause packet for full duplex.
- ♦♦ **WARRANTY** — 2 Years

TECH SPECS

Buffer — 96 KB
Environmental — Temperature: 32 to 104° F
(0 to 40° C);
Humidity: 5 to 90%
MAC Addresses — 1K
PoE Type — 802.3af power source equipment (PSE)
Standards — IEEE 802.3, 802.3u, 802.3x, 802.3af
CE Approval — Yes
RoHS — Yes
Connectors — (8) RJ-45
Power — 90–240 VAC, 50–60 Hz, autosensing, internal
power supply, 65 watts maximum; PoE: 15.4 watts
per port
Size — 1.7"H x 8.7"W x 5.1"D (4.4 x 22 x 13.1 cm)
Weight — 2.2 lb. (1 kg)

Item	Code	List Price
8-Port Unmanaged Fast Ethernet Switch with 4 PoE Ports	LPB208A-R2	

More PoE, pp. 641–643.



PoE L2 Managed Gigabit Switches

These manageable switches ensure your PoE VoIP phones get network priority.

- PoE ports supply power to PoE PD devices such as wireless access points and VoIP phones.
- Dual-media ports can be used as either an extra copper 10/100/1000 PoE port or as an SFP port.
- Copper ports autonegotiate for speed and feature Auto MDI/MDI-X.
- Manageable over any IP network via a Web browser or through SNMP.
- VLAN and QoS prioritization features.
- Support for IEEE 802.1x access control.
- **WARRANTY** — 2 Years

This managed Ethernet switch provides IEEE 802.3af power plus high-speed Gigabit Ethernet.

The PoE L2 Managed Gigabit Switch is an ideal choice for larger PoE applications. Use it to provide and allocate bandwidth for VoIP and security cameras located in areas without easy access to AC power.

With extensive management features and SNMP support, the switch can be managed over an IP network or through an RS-232 serial console link. Virtual Stacking Management (VSM) enables you to stack up to 16 switches and manage them all via a single IP link.



LPB4024A with (4) dual-media ports, each with (4) RJ-45 shared SFP ports. Dual-media ports can be used as either an extra copper 10/100/1000 PoE port or for adding a 1000-Mbps fiber uplink (optional SFP required).



TECH SPECS

Environmental — Temperature: 32 to 104° F (0° to 40° C); Humidity: 5 to 90%, noncondensing
Ethernet Standards — IEEE 802.3, 802.3ab, 802.3 u, 802.3 x, 802.3 z, 802.3af,
Frame Buffer — 1392 KB
MAC Addresses — 8K
Management — SNMP v1, v2c; HTTP via embedded Web server
PoE Type — 802.3af power source equipment (PSE)
CE Approval — Yes
RoHS — Yes
Connectors — LPB4008A: (6) RJ-45 (10BASE-T/100BASE-TX/1000BASE-T), (2) dual-media ports;
 LPB4024A: (20) RJ-45 (10BASE-T/100BASE-TX/1000BASE-T), (4) dual-media ports, each with (4) RJ-45 shared SFP ports
Power — Input: 100–240 VAC, 50–60 Hz, autosensing; PoE output: 48 VDC through RJ-45 Pin 1;
 Total available power: LPB4008A: 15.4 watts per port, 65 watts total;
 LPB4024A: 15.4 watts per port, 185 watts total

Size — LPB4008A: 1.7"H (1U) x 11"W x 6.5"D (4.3 x 28 x 16.5 cm);
 LPB4024A: 1.7"H (1U) x 17.4"W x 9.8"D (4.3 x 44.2 x 24.9 cm)
Weight — LPB4008A: 4.2 lb. (1.9 kg);
 LPB4024A: 8.4 lb. (3.8 kg)

Item	Code	List Price
PoE L2 Managed Gigabit Switches		
8-Port ([6] 10-/100-/1000-Mbps PoE + [2] Dual-Media)	LPB4008A	
24-Port ([20] 10-/100-/1000-Mbps PoE + [4] Dual-Media)	LPB4024A	

You may also need...

SFPs, 1250-Mbps Fiber
 850-nm Multimode, LC
 500 m LFP204
 1310-nm Single-Mode, LC
 10 km LFP205
 1310-nm Single-Mode, LC
 30 km LFP206

PoE L2 Managed Ethernet Switches with (2) Dual-Media SFP Ports

Power VoIP phones and other network devices—plus uplink to fiber!



LPB201A



LBP200A

TECH SPECS

Environmental — Operating temperature: 32 to 104° F (0° to 40° C); Humidity: 5 to 90%, noncondensing
Ethernet Standard — 802.3/u/x/z/ab/af
Frame Buffer — 208 KB on-chip; Packet: 256K;
 Control: 128K
MAC Addresses — 8K
Management — SNMP v1, v2c; HTTP via embedded Web server
PoE Type — 802.3af power source equipment (PSE)
CE Approval — Yes
RoHS — Yes
Connectors — Twisted-pair ports: (12) or (24) RJ-45; SFP dual-media ports: (2) SFP/RJ-45
Power — Input: 100–240 VAC, 50–60 Hz, autosensing; Total available power: LPB201A: 15.4 watts per port, 185 watts total;
 LPB200A: 15.4 watts per port, 135 watts total
Size — LPB201A: 1.8"H x 17.3"W x 14.6"D (4.5 x 44 x 37 cm);
 LPB200A: 1.7"H (1U) x 17.3"W x 8.3"D (4.4 x 44 x 21 cm)

- Provide power to PoE PD devices with this manageable switch.
- 10/100 model provides 185 watts of power.
- Gigabit model supplies 135 watts of power.
- Two dual-media ports can be used as either an extra copper 10/100/1000 PoE port or as an SFP port.
- Q-in-Q VLAN.
- QoS with four priority queues
- Autodetects consumption levels.
- Circuit protection prevents interference.
- 802.1x access control.
- Manageable through any Web browser or via SNMP.
- Broadcast/multicast storm suppression and port mirroring.
- **WARRANTY** — 1 Year

Item	Code	List Price
PoE L2 Managed Ethernet Switches with (2) Dual-Media SFP Ports + (24) 10BASE-T/100BASE-TX Ports	LPB201A	
(12) 10BASE-T/100BASE-TX/1000BASE-T Ports	LPB200A	

To connect to fiber-based Gigabit Ethernet, order...

Small Form-Factor Pluggable (SFP)
 Optical Transceivers
 850-nm Multimode
 550 m LGB200C-MLC
 1310-nm Single-Mode
 10 km LGB200C-SLC10
 1550-nm Single-Mode
 30 km LGB200C-SLC30

Buyer's Guide | Network Extender Kits

Media Type	Ethernet Type	Extension Protocol	Maximum Distance	Maximum Speed	List Price	Code	Product Name
(1) copper pair	10BASE-T	G.SHDL	6157 m @ 272 kbps	2.3 Mbps @ 3444 m	pair	LR0020A-KIT-R2	SDSL Network Extender 2000 Kit, p. 582
	10BASE-T/ 100BASE-TX	G.SHDSL	1828 m @ 1 Mbps upstream/ 4 Mbps downstream	50 Mbps upstream/50 Mbps downstream @ 243 m	pair	LB401A	High-Speed Ethernet Extender Kit, p. 583
			6800 m @ 192 kbps	5.7 Mbps @ 2100 m	pair	LR0201A-KIT	G.SHDSL Two-Wire Ethernet Network Extender Kit, p. 580
		VDSL	1900 m @ 1 Mbps upstream/ 1 Mbps downstream	50 Mbps upstream/ 50 Mbps downstream @ 300 m	ea.	LB300A-R3	10BASE-T/100BASE-TX Ethernet Extenders, p. 579
			Asymmetric: 1676 m @ 1.56 Mbps upstream/9.38 Mbps downstream; Symmetric: 1219 m @ 12.50 Mbps	Asymmetric: 2.34 Mbps upstream/ 16.67 Mbps downstream @ 1524 m; Symmetric: 16.67 Mbps @ 1005.8 m	pair	LB200A-R2	Ethernet Extender, Data Only, p. 582
		VDSL2	1219 m @ 28 Mbps downstream/0.3 Mbps upstream	100 Mbps downstream/60 Mbps upstream @ 152.4 m	pair	LBP01A-KIT	VDSL PoE Ethernet Extender Kit PD, p. 581
			1219 m @ 28 Mbps downstream/0.3 Mbps upstream	100 Mbps downstream/60 Mbps upstream @ 152.4 m	pair	LBPS01A-KIT	VDSL PoE Ethernet Extender Kit PSE, p. 581
			304.8 m @ 98 Mbps downstream/53 Mbps upstream	100 Mbps downstream/60 Mbps upstream @ 152.4 m	pair	LBPL01A-KIT	VDSL2 Line-Powered Ethernet Extender Kit, p. 580
(2) copper pairs	10BASE-T/ 100BASE-TX	G.SHDL	6800 m @ 384 kbps	10.8 Mbps @ 2100 m	pair	LR0202A-KIT	G.SHDSL Four-Wire Ethernet Network Extender Kit, p. 580
75-ohm BNC video cable	10BASE-T/ 100BASE-TX	VDSL2 (over coax)	1219 m @ 28 Mbps downstream/0.3 Mbps upstream	100 Mbps downstream/60 Mbps upstream @ 152.4 m	pair	LBNC01A-KIT	1-Port Coax Ethernet Extender Kit, p. 580
			2600 m @ 5 Mbps	75–85 Mbps @ 200 m	each	LBNC300A	10BASE-T/100BASE-TX Hardened Ethernet Extender over Coax, p. 579
(1) T1/E1 leased line	10BASE-T/ 100BASE-TX	T1/E1 (1)	—	1.544 Mbps T1/2.048 Mbps E1	pair	LR0301A-KIT	T1/E1 Ethernet Network Extender Kit 1-Port, p. 583
(4) T1/E1 leased lines	10BASE-T/ 100BASE-TX	T1/E1 (4)	—	6.144 Mbps T1/7.936 Mbps E1	pair	LR0304A-KIT	T1/E1 Ethernet Network Extender Kit 4-Port, p. 583
(8) T1/E1 leased lines	10BASE-T/ 100BASE-TX	T1/E1 (8)	—	12.352 Mbps T1/16.384 Mbps E1	pair	LR0308A-KIT	T1/E1 Ethernet Network Extender Kit 8-Port, p. 583

e Black Box Explains

G.SHDSL, VDSL, and VDSL2.

To provide more bandwidth to customers, telco providers kept pace by offering ever-faster xDSL variations (ADSL, HDSL, SDSL etc.). Suppliers have kept pace likewise, with technologies to give network managers higher-speed ways to link networks over POTS lines.

But as bandwidth-intensive requirements have increased, so has the need for technologies that support broadband wireline links for point-to-point Ethernet connectivity and at longer distances.

G.SHDSL — Ratified as a standard in 2001, G.SHDSL (also known as SHDSL) combines ADSL and SDSL features for communications over two or four (multiplexed) copper wires. As a departure from

older DSL services designed to provide higher downstream speeds, G.SHDSL specified higher upstream rates, too. For higher-bandwidth symmetric links, newer G.SHDSL devices for 4-wire applications support 10-Mbps rates at distances up to 1.3 miles (2 km). Equipment for 2-wire deployments can transmit up to 5.7 Mbps the same distance.

Also approved in 2001, **VDSL (Very High Bitrate DSL)** as a DSL service allows for downstream/upstream rates up to 52 Mbps/16 Mbps. Extenders for local networks boast 100-Mbps/60-Mbps speeds when communicating at distances up to 500 feet (152.4 m) over a single voice-grade twisted pair.

As a broadband solution, VDSL enables the simultaneous transmission of voice, data, and video, including HDTV, video on demand, and high-quality videoconferencing. Depending on the application, you can set VDSL to run symmetrically or asymmetrically.

VDSL2 (Very High Bitrate DSL 2), standardized in 2006, provides a higher bandwidth (up to 30 MHz) and higher symmetrical speeds than VDSL, enabling its use for Triple Play services (data, video, voice) at longer distances. While VDSL2 supports upstream/downstream rates similar to VDSL, at longer distances, the speeds don't fall off as much as those transmitted with ordinary VDSL equipment.

10BASE-T/100BASE-TX Ethernet Extenders and 16-Slot Chassis

The simple way to extend your LAN over voice-grade copper or coax.



LB300A-R3



LBNC300A



LBMC300-MMST



The 16-Slot Chassis (LB300A-RACK) provides an easy way to rackmount extenders.

- Extend 10- or 100-Mbps Ethernet up to 1.2 miles (2 km) over voice-grade UTP or up to 1.6 miles (2.6 km) over coax.
- Use standalone or in a convenient rackmount chassis.
- Symmetrical vDSL for speeds of up to 100 Mbps.
- Ten speeds with easy-to-read speed indicator LEDs on top of the extender.
- Ethernet ports are Auto MDI/MDI-X and autosensing for speed and duplex.
- ♦♦ **WARRANTY** — 1 Year

10BASE-T/100BASE-TX Ethernet Extenders use vDSL to provide an easy, inexpensive way to extend the reach of your Ethernet network over ordinary voice-grade copper wire or coax cable.

Just plug an extender into each end of your copper wire and use simple DIP switches to set one unit as local (CO) and the other as remote (CP)—there's never any software to install. Plus, the RJ-45 port autosenses speed and duplex and features MDI/MDI-X for easy cabling.

For larger installations, you can mount the extenders in a convenient 16-slot rackmount chassis. The chassis has ventilation holes plus a fan to keep the extenders cool. Media converters for Ethernet extension over multimode fiber are also available for this chassis, see blackbox.com.

TECH SPECS

Environmental — Operating Temperature:

LB300A-R3: -4 to +140° F (-20 to +60° C);
LBNC300A: +14 to +140° F (-10 to +60° C);

Humidity: 5–90%, noncondensing

Ethernet Standards — IEEE 802.3, 802.3u

Media Type — LB300A-R3: Voice Grade twisted-pair copper wire;

LBNC300A: RG-6 coax

CE Approval — Yes

RoHS — Yes

Connectors — LB300A-R3: (1) RJ-11, (1) RJ-45;

LBNC300A: (1) BNC coax (RG-6/AU), (1) RJ-45

Power — LB300A-R3: 100–240 VAC, 50–60 Hz, 2.4 watts maximum;

LBNC300A: 100–240 VAC, 50–60 Hz, 6 watts maximum

Size — 0.9"H x 4.3"W x 3.2"D (2.3 x 10.9 x 8.1 cm)

Weight — 0.3 lb. (0.2 kg)

Buyer's Guide | LB300A-R3 & LB303A

24 AWG Wire	Maximum Speed	
	Upstream	Downstream
1900 m (1.2 mi.)	1 Mbps	1 Mbps
1700 m (1.1 mi.)	3 Mbps	3 Mbps
1600 m (1.0 mi.)	5 Mbps	5 Mbps
1500 m (4921.2 ft.)	10 Mbps	10 Mbps
1400 m (4593.1 ft.)	15 Mbps	15 Mbps
1000 m (3280.8 ft.)	20 Mbps	20 Mbps
800 m (2624.6 ft.)	25 Mbps	25 Mbps
600 m (1968.5 ft.)	30 Mbps	30 Mbps

Buyer's Guide | LBNC300A

RG-6 Coax	Maximum Speed	
	Upstream	Downstream
2600 m (1.6 mi.)	5 Mbps	5 Mbps
2400 m (1.5 mi.)	10 Mbps	10 Mbps
2000 m (1.2 mi.)	16 Mbps	16 Mbps
1800 m (1.1 mi.)	20 Mbps	20 Mbps
1400 m (4,593.2 ft.)	43 Mbps	43 Mbps
1000 m (3280.8 ft.)	63 Mbps	63 Mbps
600 m (1968.5 ft.)	74 Mbps	74 Mbps
200 m (656.2 ft.)	85 Mbps	85 Mbps

Item Code List Price

10BASE-T/100BASE-TX Ethernet Extenders

Voice-Grade UTP LB300A-R3

Coax LBNC300A

To rackmount these extenders, order...

16-Slot Chassis, 19" LB300A-RACK

See blackbox.com for these media converters that also fit the LB300A-RACK...

10/100BASE-TX to 100BASE-FX Media Converters

Multimode

SC

LBMC300-MMSC

ST

LBMC300-MMST

NOTE: These extenders must be used in pairs. You can use the LB300A-R3 with the LB303A (below).

10BASE-T/100BASE-TX Hardened Ethernet Extender

Extend Ethernet over voice-grade wiring, even in harsh environments.

- Extends 10- or 100-Mbps Ethernet up to 1.2 miles (2 km) over voice-grade copper.
- Hardened for use at an extended temperature range of -40 to +167° F.
- Uses symmetrical vDSL for speeds of up to 100 Mbps.
- Ethernet ports are Auto MDI/MDI-X and autosensing for speed and duplex.
- Hot swap extenders without powering down.
- A switch configures the extender for local (CO) or remote (CP) use.
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

Environmental — Operating Temperature:

-40 to +167° F (-40 to +75° C);

Humidity: 5–90%, noncondensing

Ethernet Standards — IEEE 802.3, 802.3u

Media Type — Voice-grade copper wire

Speed (Maximum) — See Buyer's Guide (above)

CE Approval — All except PSD012

RoHS — Yes

Connectors — (1) RJ-11, (1) RJ-45

Power — 100–240 VAC (PS002A) to terminal block or 24 VDC (PSD012) to DC jack, 2.7 watts maximum; power supply sold separately

Size — 2"H x 5.3"W x 4.3"D (5.1 x 13.5 x 10.2 cm)

Weight — 1.8 lb. (0.8 kg)



Item Code List Price

10BASE-T/100BASE-TX Hardened Ethernet Extender (Power Supply Not Included)

LB303A

Hardened Power Supplies for LB303A

100–240 VAC

PS002A

24 VDC

PSD012

NOTE: This extender must be used in pairs. You can use this extender with the LB300A-R3 (above).

Network Extender Kits

Extend your LAN over phone wire or

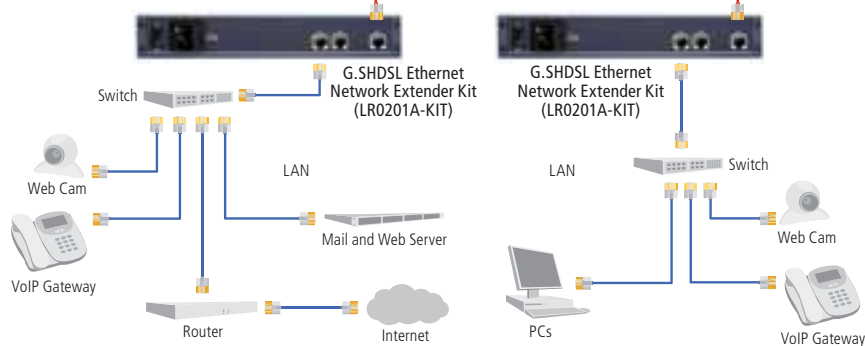
G.SHDSL Two-Wire and Four-Wire Ethernet Network Extender Kits



LR0201A-KIT

- Extend 10-/100-Mbps Ethernet over ordinary copper wire at broadband speeds.
- Dual autosensing 10-/100-Mbps ports with Auto MDI/MDI-X.
- ♦♦ **WARRANTY** — 1 Year

Up to 5.7 Mbps over Single Copper Pair



TECH SPECS

Ethernet Standards — IEEE 802.3, 802.3u
Media Type — LR0201A-KIT: 1-pair voice grade copper wire; LR0202A-KIT: 2-pair voice grade copper wire
RoHS — Yes
Connectors — DSL: (1) RJ-48; LAN: (2) RJ-45; RS-232 console port: DB9 F
Power — Internal power supply: 110/220 VAC, 50/60 Hz, 5 watts
Size — 1.2"H x 6.1"W x 5.5"D (3.1 x 15.4 x 13.9 cm)
Weight — 2.2 lb. (1 kg)

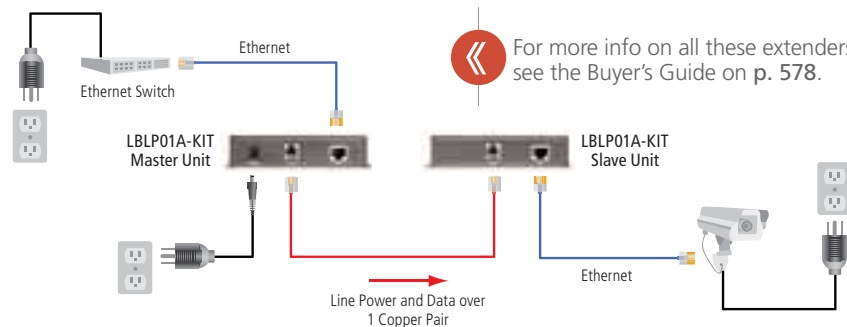
Item	Code	List Price
G.SHDSL Ethernet Network Extender Kits Two-Wire	LR0201A-KIT	
Four-Wire	LR0202A-KIT	
♦ Both kits include (2) extender units and (2) CAT5e Ethernet cables.		



For more info on all these extenders, see the Buyer's Guide on p. 578.

VDSL2 Line Powered Ethernet Extender Kit

- Combine 10-/100-Mbps Ethernet plus power over one pair of voice-grade UTP cable.
- The master unit provides power to the slave unit across the VDSL2 link.
- ♦♦ **WARRANTY** — 1 Year



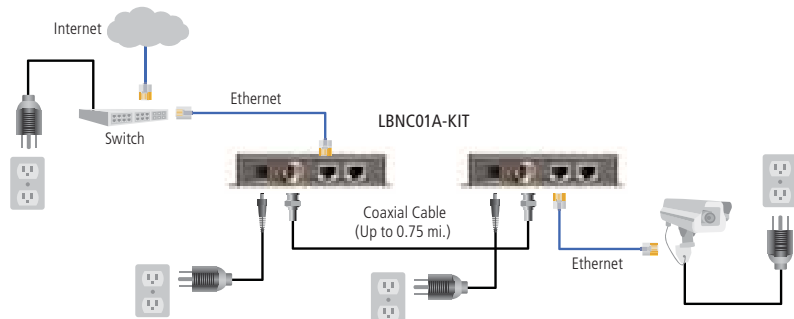
TECH SPECS

Ethernet Standards — IEEE 802.3, 802.3u
Media Type — 1-pair voice grade copper wire
RoHS — Yes
Connectors — DSL: (1) RJ-11; Ethernet: (1) RJ-45
Power — Master: 12 VDC, 2A from a 110/220-VAC, 50/60 Hz external power supply, 21 watts;
 Slave: From central side over RJ-11 connection
Size — 0.8"H x 4.7"W x 3.5"D (2 x 12 x 9 cm)
Weight — 0.3 lb. (0.1 kg)

Item	Code	List Price
VDSL2 Line Powered Ethernet Extender Kit Two-Wire	LBLP01A-KIT	
♦ Kit includes (1) master unit with 12-VDC power adapter and (1) slave unit.		

1-Port Coax Ethernet Extender Kit

- Save money. Use your existing 75-ohm coax cable to extend 10BASE-T/100BASE-TX data.
- VDSL2 technology for extension over coax.
- ♦♦ **WARRANTY** — 1 Year



TECH SPECS

Ethernet Standards — IEEE 802.3, 802.3u
Media Type — 75 Ohm CATV cable
RoHS — Yes
Connectors — DSL: (1) BNC; Ethernet: (1) RJ-45
Power — 5 VDC, 2A from an autosensing 110–220-VAC, 50–60 Hz external power supply, 5 watts maximum
Size — 1.1"H x 4.7"W x 3.5"D (2.8 x 12 x 9 cm)
Weight — 0.3 lb. (0.1 kg)

Item	Code	List Price
1-Port Coax Ethernet Extender Kit	LBNC01A-KIT	
♦ Kit includes (2) extender units and (2) 5-VDC power adapters.		



For more info on all these extenders, see the Buyer's Guide on p. 578.

TV cable you may already have installed.



VDSL PoE Ethernet Extender Kit, PD

- Extends 10BASE-T/100BASE-TX Ethernet across ordinary voice-grade copper wire.
- Includes two extender units: one with standard power and one that's a PoE powered device (PD).
- The PD extender draws its power from a PoE switch or midspan injector.
- Supports 100-Mbps downstream and 60-Mbps upstream for distances up to 500 feet (152.4 m).
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

Environmental — Operating temperature: 32 to 122° F (0 to 50° C);

Humidity: Both: 5–95%, noncondensing

Ethernet Standards — IEEE 802.3, 802.3u

Media Type — 1-pair voice grade copper wire

RoHS — Yes

Connectors — PD Unit: DSL: (1) RJ-11;

Ethernet: (1) RJ-45;

Standard Unit: DSL: (1) RJ-11; Ethernet: (2) RJ-45

Power — PD unit: 100 mA@-48 VDC from IEEE 802.3af

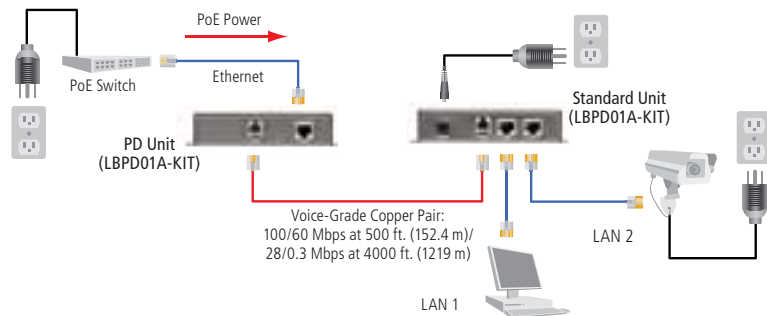
PSE or PoE injector, 5 watts maximum;

Standard unit: 5 VDC, 1 amp from 110-220-VAC,

50-60-Hz external power supply, 5 watts

Size — 0.8"H x 4.7"W x 3.5"D (2 x 12 x 9 cm)

Weight — 0.3 lb. (0.1 kg)



« For more info on all these extenders, see the Buyer's Guide on p. 578.

Item	Code	List Price
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VDSL PoE Ethernet Extender Kit, PD	LBP01A-KIT	
------------------------------------	------------	--

♦ Kit includes (1) extender PoE PD unit, (1) standard-power unit, and (1) 5-VDC power adapter.

VDSL PoE Ethernet Extender Kit, PSE

- Includes two extenders—one acts as PoE power source equipment (PSE); the other is a standard extender.
- Extends 10BASE-T/100BASE-TX Ethernet across ordinary voice-grade copper wire.
- Supports 100-Mbps downstream and 60-Mbps upstream for distances up to 500 feet (152.4 m).
- Supports distances of up to 4000 feet (1219 m) at 28/0.3 Mbps.
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

Environmental — Operating temperature: 32 to 122° F (0 to 50° C);

Humidity: 5–95%, noncondensing

Ethernet Standards — IEEE 802.3, 802.3u

Media Type — 1-pair voice grade copper wire

RoHS — Yes

Connectors — PSE unit: DSL: (1) RJ-11;

Ethernet: (1) RJ-45;

Standard unit: DSL: (1) RJ-11; Ethernet: (2) RJ-45

Power — PSE unit: Input: 12 VDC, 2A from 110-/220-VAC,

50-/60-Hz external power supply; Output:

100 mA @-48 VDC IEEE 802.3af compliant power,

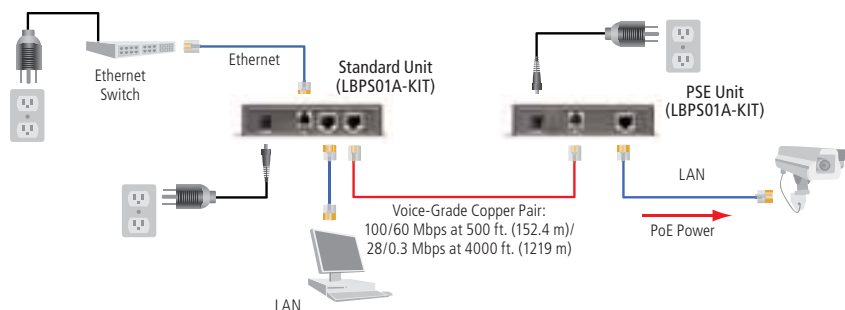
21 watts maximum;

Standard unit: Input: 5 VDC, 1A from 110-220-VAC,

50-60 Hz external power supply, 5 watts maximum

Size — 0.8"H x 4.7"W x 3.5"D (2 x 12 x 9 cm)

Weight — 0.3 lb. (0.1 kg)



« For more info on all these extenders, see the Buyer's Guide on p. 578.

Item	Code	List Price
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VDSL PoE Ethernet Extender Kit, PSE	LBPS01A-KIT	
-------------------------------------	-------------	--

♦ Kit includes (1) extender PoE PSE unit, (1) standard-power unit, (1) 5-VDC power adapter, and (1) 12-VDC power adapter.

SDSL Network Extender 2000 Kit

Extend your LAN over one pair of ordinary voice-grade copper.

- Supports 2.3 Mbps throughput at distances of up to 2.1 miles (3.4 km).
- Plug-and-play installation.
- Switch-selectable data rates for high-speed, short-range or lower-speed, longer-range operation.
- ♦♦ **WARRANTY** — 1 Year

The SDSL Network Extender 2000 Kit provides affordable, high-speed LAN connections and Internet access over any grade of UTP cable—CAT5, CAT3, even phone cable.

It enables you to establish both DSL and Ethernet links on each side of your single copper pair to provide a very long Ethernet connection. Because the extender performs symmetrical data transfer, it's suited for applications in which both sides must send and receive data at equal rates.



LR0020A-KIT-R2

TECH SPECS

Distance (Maximum) — 2.1 miles (3.4 km) @ 2.3 Mbps; 3.63 mi. (6.1 km) @ 272 kbps

Environmental — Operating temperature: 32 to 122° F (0 to 50° C);

Humidity: 5–95% noncondensing

Ethernet Standard — IEEE 802.3: 10BASE-T

Media Type — UTP cable, 1-pair, voice grade or better

Protocols — SDSL: TC-PAM encoding

Speed — Selectable 272 kbps, 528 kbps, 784 kbps, 2.3 Mbps (symmetrical)

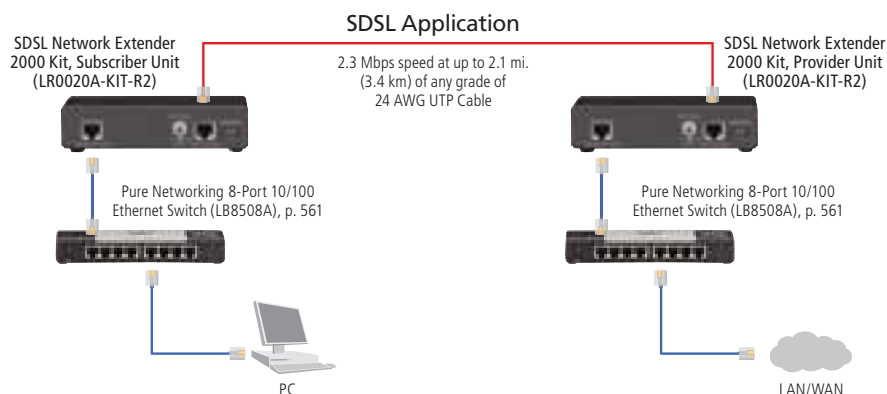
RoHS — Yes

Connectors — Each unit: Network: (1) RJ-45; SDSL: (1) RJ-45

Power — External power supply: 100–120 VAC, 60 Hz, 7.5 watts maximum

Size — Each unit: 1.4"H x 15.5"W x 4.5"D (3.6 x 39.4 x 11.4 cm)

Weight — Each unit: 0.5 lb. (0.2 kg)



Item	Code	List Price
SDSL Network Extender 2000 Kit	LR0020A-KIT-R2	

♦ Kit includes (1) Single-Port Provider Unit with power supply and (1) Single-Port Subscriber Unit with power supply.

Ethernet Extender

Connect Ethernet LAN segments at 16.67 Mbps across ordinary CAT3 cables.



TECH SPECS

Clocking — Internal, external, or receive recover

Distance and Speed (Maximum) — See Buyer's Guide, below

Environmental — Temperature: 32 to 122° F (0 to 50° C);

Humidity: 5–90% noncondensing

Ethernet Standard — IEEE 802.3: 10BASE-T; IEEE 802.3u: 100BASE-TX

Format — Sync or async, switch selectable

Media Type — UTP cable, 1-pair, voice grade or better

Operation — Point-to-point, synchronous or asynchronous; half- or full-duplex

Protocols — vDSL

Surge Suppression — 20 kA (8/20ms) gas tube

CE Approval — Yes

RoHS — Yes

Connectors — (2) RJ-45

Indicators — (5) LEDs: Power, DSL Link, Error, Ethernet Link, Activity

Power — External power supply: autosensing 120/250 VAC, 50/60 Hz, 5 watts maximum

Size — 1.6"H x 4.1"W x 6"D (4.1 x 10.4 x 15.2 cm)

Weight — 2.2 lb. (1 kg)

- Break Ethernet distance limitations and extend your Ethernet network one mile (1.6 km) at speeds up to 16.67 Mbps.
- Operates across any 2-wire unconditioned 24 AWG cable— even phone cables!
- Transparent, plug-and-play operation.
- Switch-selectable symmetric or asymmetric operation.
- Supports half- or full-duplex Ethernet.
- Autosensing 10-/100-Mbps Ethernet ports adapt to your network speeds.
- ♦♦ **WARRANTY** — 1 Year

Buyer's Guide | Line Rates

Asymmetric		
Maximum Speed		
Upstream	Downstream	Distance
1.56 Mbps	9.38 Mbps	5500 ft. (1676.4 m)
2.34 Mbps	16.67 Mbps	5000 ft. (1524 m)
Symmetric		
Maximum Speed		
Upstream	Downstream	Distance
12.50 Mbps	12.50 Mbps	4000 ft. (1219.2 m)
16.67 Mbps	16.67 Mbps	3300 ft. (1005.8 m)

Item	Code	List Price
------	------	------------

Ethernet Extenders

Data Only LB200A-R2

♦ Includes (1) CO unit and (1) CP unit.

High-Speed Ethernet Extender Kit

Stretch your Ethernet network up to 6000 feet over ordinary voice-grade wiring!

- Use a single voice-grade twisted-pair cable to extend your network up to 6000 feet (1828.8 m).
- Ideal for extending 10-/100-Mbps links to remote buildings, those beyond the 328-foot (100-m) limit of Ethernet.
- Data rates up to 50 Mbps in each direction for full-duplex speed of 100 Mbps.
- Switch-selectable line rates.
- Asymmetric or symmetric operation.
- Autodetects 10-/100-Mbps connections, autonegotiating half- or full-duplex.
- Auto MDI/MDI-X.
- Bridges LANs transparently, passing higher layer protocols. Also supports 802.1Q VLAN tagged and untagged traffic.
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

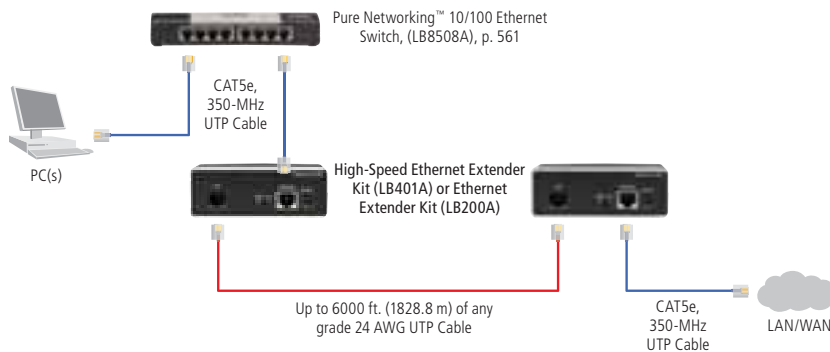
Distance (Maximum) — See Buyer's Guide, below right
Environmental — Operating temperature: 32 to 122° F (0 to 50° C); Humidity: 90% noncondensing
Ethernet Standards — IEEE 802.3: 10BASE-T; IEEE 802.3u: 100BASE-TX
Media Type — UTP cable, 1-pair, voice grade or better
Protocols — G.SHDSL
Speed (Maximum) — See Buyer's Guide, below, right
CE Approval — Yes
RoHS — Yes
Connectors — (1) RJ-45 (link); (1) shielded RJ-45 (LAN)
Power — External power supply: autosensing 100–240 VAC, 50/60 Hz, 2.25 watts maximum
Size — Each extender unit: 1.5"H x 4.1"W x 3.75"D (3.8 x 10.4 x 9.5 cm)
Weight — Each extender unit: 1.4 lb. (0.6 kg)



Buyer's Guide | Line Rates

Asymmetric		
Upstream	Downstream	Distance
1 Mbps	4 Mbps	6000 ft. (1828.8 m)
1 Mbps	16 Mbps	4000 ft. (1219.2 m)
2 Mbps	50 Mbps	2000 ft. (609.6 m)
Symmetric		
Upstream	Downstream	Distance
10 Mbps	10 Mbps	4000 ft. (1219.2 m)
25 Mbps	25 Mbps	2000 ft. (609.6 m)
50 Mbps	50 Mbps	800 ft. (243.8 m)

NOTE: Line rates are for 24 AWG, 0.5-mm cable.



Item Code List Price

High-Speed Ethernet Extender Kit
LB401A

- ♦ Includes (2) extender units, switch-selectable for use as either a remote or local unit.

T1/ E1 Ethernet Network Extender Kits

Bridge 10BASE-T/100BASE-TX Ethernet across T1/E1 lines.

- Kits include two extenders equipped with one, four, or eight T1/E1 ports.
- Dual Ethernet ports.
- Support Fractional T1/E1 in framed and unframed mode.
- Support speeds up to 6.144 Mbps on T1 and 7.936 Mbps on E1.
- Autosensing, autonegotiating 10-/100-Mbps LAN connections.
- Auto MDI/MDI-X means you never need a crossover cable on the Ethernet side.
- RS-232 console port for configuration.
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

Environmental — Temperature: 32 to 122° F (0 to 50° C); Humidity: 5–90% noncondensing

Ethernet Standards — IEEE 802.3: 10BASE-T; IEEE 802.3u: 100BASE-TX

Protocols — T1/E1

CE Approval — Yes, except LR0308A-KIT

RoHS — Yes

Connectors — LR0301A-KIT: E1: (2) BNC, T1/E1: (1) RJ-48;

LR0304A-KIT: T1/E1: (4) RJ-48;

LR0308A-KIT: T1/E1: (8) RJ-48;

All: Ethernet: (2) RJ-45; RS-232 console port: DB9 F

Power — Internal power supply: autosensing 100–240 VAC, 50/60 Hz, 5 watts maximum

Size — Each extender unit: LR0301A-KIT:

1.7"H x 9.8"W x 5.9"D (4.3 x 25 x 15 cm);

LR0304A-KIT, LR0308A-KIT:

1.7"H x 10.2"W x 5.9"D (4.4 x 26 x 15 cm)

Weight — Each extender unit: LR0301A-KIT: 0.3 lb. (0.1 kg);

LR0304A-KIT, LR0308A-KIT: 1 lb. (0.5 kg)



LR0301A-KIT

Item Code List Price

T1/E1 Ethernet Network Extender Kits
 1-Port LR0301A-KIT
 4-Port LR0304A-KIT
 8-Port LR0308A-KIT

- ♦ Include (2) T1/E1 Ethernet network extenders and (2) CAT5e Ethernet cables.

Buyer's Guide | Standalone Media Converters

Copper Side Ethernet Standard(s)	Fiber Side Ethernet Standard	Fiber Transmission Type	Maximum Distance	Fiber Connector	List Price	Code	Product Name
10BASE-T	10BASE-FL	850-nm Multimode	2 km (1.2 mi.)	ST®		LMC001A-R5	Compact, p. 589
				SC		LMC002A-R5	Compact, p. 589
		1300-nm Multimode	2 km (1.2 mi.)	ST		LE1505A	Crossover, p. 588*
				ST		LE1506A	Crossover, p. 588
				ST		LE2122A-R4	AutoCross, p. 587
				ST		LMC003A-R5	Compact, p. 589
				SC		LMC004A-R5	Compact, p. 589
		1310-nm Single-Mode	10 km (6.2 mi.)	ST		LE1501A-R2	Compact, p. 589
			20 km (12.4 mi.)	SC		LE2122A-SM-R4	AutoCross, p. 587
			40 km (24.8 mi.)	ST		LMC007A-R5	Compact, p. 589
				SC		LMC008A-R5	Compact, p. 589
			80 km (49.6 mi.)	ST		LMC010A	Compact, p. 589
				SC		LMC011A	Compact, p. 589
		1550-nm Single-Mode	80 km (49.6 mi.)	SC		LMC012A	Compact, p. 589
Autosensing 10BASE-T/ 100BASE-TX	100BASE-FX	850-nm Multimode	300 m (984.3 ft.)	ST		LMC7001A-R4	Compact, p. 589
				SC		LMC7002A-R4	Compact, p. 589
			300 m (984.3 ft.)	ST		LHC040A	Multipower Miniature, pp. 596–597
				SC		LHC041A	Multipower Miniature, pp. 596–597
		1300-nm Multimode	2 km (1.2 mi.)	ST		LMC7004A	Compact, p. 589
				SC		LMC7005A	Compact, p. 589
			2 km (1.2 mi.)	ST		LHC013A	Multipower Miniature, pp. 596–597
				SC		LHC014A	Multipower Miniature, pp. 596–597
			2 km (1.2 mi.)	ST		LH1706A-ST-US	Pure Networking, p. 586
				SC		LH1706A-SC-US	Pure Networking, p. 586
		1310-nm Single-Mode	15 km (9.3 mi.)	SC		LH1707A-SC-US	Pure Networking, p. 586
			30 km (18.6 mi.)	SC		LH1708A-SC-US	Pure Networking, p. 586
			40 km (24.8 mi.)	ST		LMC7003A-R4	Compact, p. 589
				SC		LMC7004A-R4	Compact, p. 589
			40 km (24.8 mi.)	ST		LHC036A	Multipower Miniature, pp. 596–597
				SC		LHC015A	Multipower Miniature, pp. 596–597
		1550-nm Single-Mode	80 km (49.7 mi.)	ST		LMC7007A	Compact, p. 589
				SC		LMC7008A	Compact, p. 589
						LMC7009A	Compact, p. 589

* Does not include Link Pass Through.

For product details, see the page listed or go to blackbox.com.

Copper Side Ethernet Standard(s)	Fiber Side Ethernet Standard	Fiber Transmission Type	Maximum Distance	Fiber Connector	List Price	Code	Product Name
100BASE-TX	100BASE-FX	1310-nm Multimode	2 km (1.2 mi.)	ST®		LH1504A	Crossover, p. 588
				SC		LH1503A	Crossover, p. 588
				MT-RJ		LH1506A	Crossover, p. 588
		1310-nm Multimode	2 km (1.2 mi.)	ST		LH1700A-ST-US	Pure Networking, p. 586
				SC		LH1700A-SC-US	Pure Networking, p. 586
			20 km (12.4 mi.)	SC		LH1507A	Crossover, p. 588
		1310-nm Single-Mode	15 km (9.3 mi.)	SC		LH1701A-SC-US	Pure Networking, p. 586
			30 km (18.6 mi.)	SC		LH1702A-SC-US	Pure Networking, p. 586
			40 km (24.8 mi.)	SC		LH1508A	Crossover, p. 588
		1310/1550-nm Single-Strand Single-Mode*	20 km (12.4 mi.)	SC		LH1709A-SCTS-US	Pure Networking, p. 586
			40 km (24.8 mi.)	SC		LH1711A-SCTS-US	Pure Networking, p. 586
		1550/1310-nm Single-Strand Single-Mode*	20 km (12.4 mi.)	SC		LH1710A-SCRS-US	Pure Networking, p. 586
			40 km (24.8 mi.)	SC		LH1712A-SCRS-US	Pure Networking, p. 586
	100BASE-FX Duplex	850-nm Multimode	300 m (984.3 ft.)	ST		LHC008A-R3	Compact, p. 589
				SC		LHC009A-R3	Compact, p. 589
		1300-nm Multimode	2 km (1.2 mi.)	ST		LHC001A-R4	Compact, p. 589
				SC		LHC002A-R4	Compact, p. 589
		1310-nm Single-Mode	40 km (24.8 mi.)	ST		LHC005A-R4	Compact, p. 589
				SC		LHC006A-R4	Compact, p. 589
			80 km (49.6 mi.)	ST		LHC037A	Compact, p. 589
				SC		LHC038A	Compact, p. 589
		1550-nm Single-Mode	80 km (49.6 mi.)	SC		LHC039A	Compact, p. 589
	100BASE-BX Single-Strand	1310/1550-nm Single-Strand Single-Mode*	20 km (12.4 mi.)	SC		LHC5129A-R3	Compact, p. 589
			40 km (24.8 mi.)	SC		LHC5132A-R3	Compact, p. 589
			60 km (37.3 mi.)	SC		LHC5134A	Compact, p. 589
		1550/1310-nm Single-Strand Single-Mode*	20 km (12.4 mi.)	SC		LHC5130A-R3	Compact, p. 589
			40 km (24.8 mi.)	SC		LHC5133A-R3	Compact, p. 589
			60 km (37.3 mi.)	SC		LHC5135A	Compact, p. 589
1000BASE-TX	1000BASE-SX	850-nm Multimode	220 m (721.8 ft.)	SC		LGC1713A-SX-US	Pure Networking, p. 586
			300 m (984.3 ft.)	SC		LGC5134A-R4	Compact, p. 589
	1000BASE-LX10 Duplex	1310-nm Single-Mode	10 km (6.2 mi.)	SC		LGC1713A-LX-US	Pure Networking, p. 586
			15 km (9.3 mi.)	SC		LGC5137A-R2	Compact, p. 589
			40 km (24.8 mi.)	SC		LGC5135A-R3	Compact, p. 589
		1550-nm Single-Mode	70 km (43.5 mi.)	SC		LGC5138A-R2	Compact, p. 589
	1000BASE-LX10 Single-Strand	1310/1550-nm Single-Strand Single-Mode*	15 km (9.3 mi.)	SC		LGC5139A-R2	Compact, p. 589
			40 km (24.8 mi.)	SC		LGC5141A-R2	Compact, p. 589
		1550/1310-nm Single-Strand Single-Mode*	15 km (9.3 mi.)	SC		LGC5140A-R2	Compact, p. 589
			40 km (24.8 mi.)	SC		LGC5142A-R2	Compact, p. 589

* Must be used in complementary pairs. That is, a single-strand 1550-/1310-nm media converter must be used with a 1310-/1550-nm media converter of the same fiber type and distance rating.

Pure Networking Media Converters

Match cable types simply and affordably!

- Available in 10/100 Mbps or 1000 Mbps.
- Link copper and fiber networks.
- Feature MDI/MDI-X crossover for configuring the RJ-45 port.
- Transparent to network operation.
- Use on the desktop or wallmount.
- Status LEDs for easy monitoring of network connections.

- ♦♦ **WARRANTY** — 1 Year



10BASE-T/100BASE-TX Media Converters

- Autosensing for MDI/MDI-X ports and duplex on UTP ports.
- The UTP port senses network speed automatically.
- The fiber port offers switch-selectable half- or full-duplex operation.

1000BASE-T Media Converters

- Link your 1000BASE-T UTP Ethernet lines quickly and easily to 1000BASE-SX multimode or 1000BASE-LX single-mode fiber.
- Comply with the IEEE 802.3z 1000BASE-SX/LX standard.
- RJ-45 port supports Auto MDI/MDI-X and auto polarity connection.
- Feature autonegotiation and NWay support on the fiber port.
- Use the DIP switch to enable local and remote loopback testing for installation and troubleshooting.
- Compatible with other Gigabit 1000BASE-T/SX/LX devices.

TECH SPECS

Environmental — Operating temperature: 32 to 122 ° F (0 to 50 ° C);
Storage temperature: -20 to 158 ° F (-20 to 70 ° C);
Operating humidity: 10–80% noncondensing;
Storage humidity: 5–90% noncondensing

Operation — LGC1713A-SX-US, LGC1713A-LX-US:
Full-duplex;
All others: Half- or full-duplex

Standards — IEEE 802.3u

CE Approval — Yes

RoHS — Yes

Connectors — LH1706A-ST-US:
(1) RJ-45, (1) pair of ST®;
LH1706A-SC-US–LH1708A-SC-US,
LGC1713A-SX-US, LGC1713A-LX-US: (1) RJ-45,
(1) pair of SC

Indicators — LEDs: LH1706A-ST-US, LH1706A-SC-US,
LH1707A-SC-US, LH1708A-SC-US: (2) Link/Activity,
(2) Full-Duplex/Collision, (1) 100, (1) Power;
LGC1713A-SX-US, LGC1713A-LX-US: (2) Link,
(2) Receive, (1) Full-Duplex, (1) Power

Power — 120 VAC, 60-Hz, 10-watt external power supply included

Size — 0.9"H x 2.9"W x 5"D (2.3 x 7.4 x 12.7 cm)

Weight — 0.3 lb. (0.1 kg)

Item				Code	List Price
Pure Networking™ 10BASE-T/100BASE-TX Media Converters					
to 100BASE-FX Multimode, 1310-nm	2 km	ST		LH1706A-ST-US	
		SC		LH1706A-SC-US	
to 100BASE-LX Single-Mode, 1310-nm	15 km	SC		LH1707A-SC-US	
to 100BASE-LX Single-Mode, 1310-nm	30 km	SC		LH1708A-SC-US	
♦ All include (1) media converter, mounting screws, rubber feet, and (1) power supply.					
Pure Networking 1000BASE-T Media Converters					
to 1000BASE-SX Multimode, 850-nm	220 m	SC		LGC1713A-SX-US	
to 1000BASE-LX Single-Mode, 1310-nm	10 km	SC		LGC1713A-LX-US	

Black Box Explains

Gigabit Ethernet.

Gigabit Ethernet was developed to handle the network traffic generated on the server and backbone level by Fast Ethernet. It delivers an incredible 1000 Mbps (or 1 Gbps), 100 times faster than 10BASE-T. At that speed, Gigabit Ethernet can handle even the traffic generated by campus network backbones. Plus it provides a smooth upgrade path from 10-Mbps Ethernet and 100-Mbps Fast Ethernet at a reasonable cost.

Gigabit Ethernet is a true Ethernet standard. Because it uses the same frame formats and flow control as earlier Ethernet versions, networks readily recognize it, and it's compatible with older Ethernet standards. Other high-speed technologies (ATM, for instance) present compatibility problems such as different frame formats or different hardware requirements.

The primary difference between Gigabit Ethernet and earlier implementations of Ethernet is that Gigabit Ethernet almost always runs in full-duplex mode, rather than the half-duplex mode commonly found in 10- and 100-Mbps Ethernet.

One significant feature of Gigabit Ethernet is the improvement to the Carrier Sense Multiple Access with Collision Detection (CSMA/CD) function. In half-duplex mode, all Ethernet speeds use the CSMA/CD access method to resolve contention for shared media. For Gigabit Ethernet, CSMA/CD has been enhanced to maintain the 200-meter (656.1-ft.) collision diameter.

When Gigabit Ethernet first appeared, fiber was crucial to running Gigabit Ethernet effectively. Since then, the IEEE 802.3ab standard for Gigabit over Category 5 cable has been approved, enabling short stretches of Gigabit speed over existing copper cable.



AutoCross Media Converters

Why worry about the UTP port? Let "the Box" figure it out!

- 10BASE-T or 100BASE-TX.
- Seamless copper-to-fiber conversion for Ethernet or Fast Ethernet.
- Easy plug-and-play operation.
- Reconfigure themselves for proper UTP cabling — no more crossover cables!
- Support for half- and full-duplex operation.
- Uplink/downlink fault detection is provided by LinkAlert™!
- ♦♦ **WARRANTY** — Lifetime

Connect Ethernet or Fast Ethernet segments to fiber segments without using crossover cables. With Black Box® AutoCross Media Converters, you no longer have to deal with mismatched transmit and receive cable pairs.

These converters contain a switch that senses the type of circuit connected to the UTP port and automatically configures the port to match. Because the UTP side is autosensing to MDI/MDI-X, you can use either a straight or crossed cable to connect a switch or NIC.

The converters feature LinkAlert to monitor for uplink and downlink failures, and alert the network if transmission fails.

Use AutoCross Media Converters up to 100 meters (328 ft.) on the UTP link, up to 2 kilometers (1.2 mi.) on a multimode fiber link, and up to 20 kilometers (12.4 mi.) on a single-mode fiber link.



LE2122A-R4

Autosensing
port
configuration!



LH2001A-ST-R3

10BASE-T only work with standard 10-Mbps devices. They're perfect for legacy and industrial networks.

TECH SPECS

Environmental — Operating temperature: 32 to 122 ° F (0 to 50 ° C);
Storage temperature: -4 to 150 ° F (-20 to 85 ° C);
Humidity: 5–95% noncondensing

CE Approval — Yes

RoHS — Yes

Connectors — LE2122A-R4, LH2001A-ST-R3:

(1) RJ-45, (1) pair of ST;

LE2122A-SM-R4, LH2001A-SC-R3,

LH2001A-SCSM-R3: (1) RJ-45, (1) pair of SC

Indicators — LEDs: (1) Power; (1) Link Status
and (1) Activity (per each twisted-pair
and fiber port)

Power — 110–240 VAC, 50–60 Hz, 0.5-amp external
autosensing power supply;

Size — 1"H x 3"W x 4"D (2.5 x 7.6 x 10.2 cm)

Weight — 0.4 lb. (0.2 kg)

Item	Code	List Price
AutoCross Media Converters		
10BASE-T to Duplex 10BASE-FL Multimode		
ST	LE2122A-R4	
Single-Mode SC	LE2122A-SM-R4	
100BASE-TX to Duplex 100BASE-FX Multimode		
ST	LH2001A-ST-R3	
SC	LH2001A-SC-R3	
100BASE-TX to Duplex 100BASE-LX Single-Mode		
SC	LH2001A-SCSM-R3	

Black Box Explains

Media converters.

Media converters transparently convert the incoming electrical signal from one cable type and then transmit it over another type — thick coax to Thin, UTP to fiber, and so on. Traditionally, media converters were purely Layer 1 devices that only converted electrical signals and physical media and didn't do anything to the data coming through the link.

Today's media converters, however, are often more advanced Layer 2 Ethernet devices that, like traditional media converters, provide Layer 1 electrical and physical conversion. But, unlike traditional media converters, they also provide Layer 2 services and route Ethernet packets based on MAC address. These media converters are often called media converter switches, switching media converters, or Layer 2 media converters. They enable you to have multiple connections rather than just one

simple in-and-out connection. And because they're switches, they increase network efficiency.

Media converters are often used to connect newer 100-Mbps, Gigabit Ethernet, or ATM equipment to existing networks, which are generally 10BASE-T, 100BASE-T, or a mixture of both. They can also be used in pairs to insert a fiber segment into copper networks to increase cabling distances and enhance immunity to electromagnetic interference.

Rent an apartment...

Media converters are available in standalone models that convert between two different media types and in chassis-based models that house many media converters in a single chassis.

Standalone models convert between two media. But, like a small apartment, they can be outgrown. Consider your current and future applications before selecting a media converter. A good way to anticipate future network

requirements is to choose media converters that work as standalone devices but can be rackmounted if needed later.

...or buy a house.

Chassis-based or modular media converter systems are normally rackmountable and have slots to house media converter modules. Like a well-planned house, the chassis gives you room to grow. These are used when many Ethernet segments of different media types need to be connected in a central location. Modules are available for the same conversions performed by the standalone converters, and they enable you to mix different media types such as 10BASE-T, 100BASE-TX, 100BASE-FX, ATM, and Gigabit modules. Although enterprise-level, chassis-based systems generally have modules that can only be used in a chassis, many midrange systems feature modules that can be used individually or in a chassis as well.

Crossover Media Converters, 10-Mbps

Inexpensive media conversion with configurable UTP ports.

- Make 10BASE-T to legacy ThinNet or 10BASE-T to fiber conversions.
- Use the built-in uplink switch to easily configure the UTP port: straight through or crossover.
- The 10BASE-T to ThinNet models have an internal BNC termination.
- LE1506A features link pass-through: A failure on either end of the link disables the link indicator on both ends.
- Optional Rackmount Tray (LE1505-RACK) holds up to 16 converters; the Powered Rackmount Tray (LH1505P-RACK) holds 16 converters and powers ten converters.
- Wallmountable with the included VELCRO or metal brackets. A DIN Rail Mounting Bracket (DIN-RAIL MC2) is also available.
- ♦♦ **WARRANTY** — 1 Year



TECH SPECS

Distance (Maximum) —

LE1502A-R3, LE1502AE-R4:
185 m (606.9 ft.);
LE1501A-R2: 10 km (6.2 mi.);
LE1505A-LE1506A:
62.5/125-μm: 2 km (1.2 mi.)

Operating Environment —

Temperature: 32 to 104°F (0 to 40°C);
Humidity: 10 to 95%, noncondensing

Operation — Half-duplex

Standards — LE1502A-R3, LE1502AE-R4:

IEEE 802.3, IEEE 802.3a;
LE1501A-R2, LE1505A-LE1506A:
IEEE 802.3, IEEE 802.3j

CE Approval — Yes

RoHS — Yes

Indicators — LEDs: LE1502A-R3,

LE1502AE-R4, LE1501A-R2:
(1) PWR, (1) LINK, (2) RX, (2) COL,
(1) POL, (1) JAB;
LE1505A-LE1506A: (1) PWR, (2) LINK,
(2) RX;

Power — LE1502A-R3, LE1501A-R2,

LE1505A: Input: 95–125 VAC,
60 Hz, external;
Draw: 5 watts maximum
LE1502AE-R4: Input: 100–240 VAC,
50–60 Hz, autosensing, external;
Draw: 5 watts maximum

LE1506A: 95–125 VAC, 60 Hz, external

Draw: 5 watts maximum;
LH1505P-RACK: Input: 90–260 VAC

50–60 Hz; Draw: 40 watts max.;
includes DC power cables for
10 media converters

Size — LE1502A-R3, LE1502AE-R4,

LE1501A-R2: 3.5"H x 3"W x 1"D
(8.9 x 7.6 x 2.5 cm);
LE1505A-LE1506A:
2.1"H x 3"W x 0.8"D
(5.3 x 7.6 x 2 cm)

Weight — LE1502A-R3, LE1502AE-R4

LE1501A-R2: 0.3 lb. (0.1 kg);
LE1505A-LE1506A: 0.4 lb. (0.2 kg)

Item

Code

List Price

Crossover Media Converters, 10-Mbps

10BASE-T to ThinNet

with 120-VAC Power Supply
with Universal Power Supply

LE1502A-R3
LE1502AE-R4

10BASE-T to Duplex Fiber

Single-Mode ST®
Multimode ST
Multimode ST with Link Pass-Through

LE1501A-R2
LE1505A
LE1506A

♦ Include (1) converter, VELCRO® mounts, and (2) metal wallmounting brackets.

To rackmount your media converters, order...

Rackmount Tray
Powered Rackmount Tray

LE1505-RACK
LH1505P-RACK

For DIN rail mounting order...

DIN Rail Mounting Bracket

DIN-RAIL MC2

Crossover Media Converters, 100-Mbps

Configurable UTP ports make Fast Ethernet media conversion even easier!

- Convert 100BASE-TX to duplex fiber.
- A built-in uplink switch means you change the switch, not the cable, and make the right connection instantly.
- Mount multiple units in optional Rackmount Trays.
- ♦♦ **WARRANTY** — 3 Years

Crossover Media Converters, 100-Mbps enable you to translate between twisted-pair copper and fiber. A crossover feature is built in, so you don't need to worry about using external crossover cables.

For rackmounting, order the Rackmount Tray (LE1505-RACK) or the Powered Rackmount Tray (LH1505P-RACK). Each tray holds up to 16 media converters. The powered tray supplies power for up to ten media converters. You can also wallmount the converters with the included VELCRO® or metal brackets. A DIN Rail Mounting Bracket (DIN-RAIL MC2) is available, too.



Don't repin
cable—just
flip a switch!

TECH SPECS

Distance (Maximum) —

LH1503A-LH1504A, LH1506A:
62.5/125-μm: 2 km (1.2 mi.);
LH1507A: 20 km (12.4 mi.);
LH1508A: 40 km (24.8 mi.)

Operating Environment —

Temperature: 32 to 120°F (0 to 50°C);
Humidity: 10 to 95%, noncondensing

Operation — Autonegotiating

half- or full-duplex

Standards — IEEE 802.3u

CE Approval — Yes

RoHS — Yes

Indicators — (10) LEDs: (1) Power,
(1) Link (copper port), (1) Link (fiber

port), (2) RX/ACT (copper and fiber
ports) plus redundant set on side
of unit

Power — Media Converters: Input:

95–125 VAC, 60 Hz, external;
Draw: 9 watts maximum;
LH1505P-RACK: Input: 90–260 VAC

50–60 Hz; Draw: 40 watts
maximum; includes DC power
cables for 10 media converters

Size — 3.5"H x 3"W x 1"D

(8.9 x 7.6 x 2.5 cm)

Weight — 0.3 lb. (0.1 kg)

Item

Code

List Price

Crossover Media Converters, 100-Mbps

100BASE-TX/Duplex Fiber

Multimode SC

Multimode ST

Multimode MT-RJ

Single-Mode SC

Single-Mode Long-Haul SC

LH1503A
LH1504A
LH1506A
LH1507A
LH1508A

♦ Include (1) converter, VELCRO® mounts, and (2) metal wallmounting brackets.

To rackmount your media converters, order...

Rackmount Tray
Powered Rackmount Tray

LE1505-RACK
LH1505P-RACK

For DIN rail mounting order...

DIN Rail Mounting Bracket

DIN-RAIL MC2

Compact Media Converters

What you need for simplified high-end copper-to-fiber or Ethernet-to-ThinNet conversion.



- Compact size means you can install them virtually anywhere.
- Depending on version(s) ordered, multimode models send data as far as 300 meters (984.2 ft.) or 2 kilometers (1.2 mi.) and single-mode models transmit data from 15 to 80 kilometers (9.3 to 49.7 mi.).
- Single-strand models convert to 100- or 1000-Mbps single-mode fiber with a single strand carrying 1310- and 1550-nm wavelengths—so you can maximize your use of available fibers!
- Built-in universal power supply autosenses power for worldwide use.
- No crossover cable needed on the UTP side. Auto MDI/MDI-X detection figures out wiring type and adjusts to it automatically.
- LinkLoss™ and FiberAlert™ notify you of “silent failures” on the fiber side.
- 10BASE-T/ThinNet version enables you to integrate your legacy coax infrastructure into your twisted-pair network.
- **WARRANTY** — 6 Years

Approvals — UL®, cUL®
Distance (Maximum) —
 10BASE-T, 100BASE-TX,
 1000BASE-TX links: 100 m (328 ft.);
 10BASE2 links: 185 m (606.9 ft.);
 Fiber links: See price block below
Operating Environment —
 Temperature: 32 to 120° F (0 to 50° C);
 Humidity: 5 to 95%, noncondensing
Operation — Half- or full-duplex
Standards — Depending on model:
 10BASE-T (IEEE 802.3); 100BASE-TX,
 100BASE-SX, 100BASE-FX (IEEE
 802.3u); 1000BASE-TX (IEEE 802.3ab);
 10BASE-FL (IEEE 802.3j); 1000BASE-SX,
 1000BASE-LX, 1000BASE-LX10, (IEEE
 802.3z); 1000BASE-BX10 (IEEE
 802.3ah), 10BASE2 (IEEE 802.3a)

TECH SPECS

CE Approval — Yes
RoHS — All except LMC010A–LMC012A,
 LMC7009A
Connectors — Copper-to-fiber models:
 Copper side: All: (1) RJ-45;
 Fiber side: Duplex models:
 (1) pair of ST, SC, or MT-RJ;
 Single-strand models: (1) SC;
 LMC009A-R4: (1) RJ-45, (1) BNC
Power — Input: 110–240 VAC, 50–60 Hz,
 autosensing, internal;
 Draw: 15 W maximum
Size — 1.65"H x 4.8"W x 5"D
 (4.2 x 12.2 x 12.7 cm)
Weight — 2 lb. (0.9 kg)

Item			Code	List Price
Compact Media Converters				
10BASE-T to 10BASE-FL Duplex				
Multimode				
850-nm	2 km	ST®	LMC001A-R5	
		SC	LMC002A-R5	
1300-nm	2 km	ST	LMC003A-R5	
		SC	LMC004A-R5	
Single-Mode Plus				
1310-nm	40 km	ST	LMC007A-R5	
		SC	LMC008A-R5	
	80 km	ST	LMC010A	
		SC	LMC011A	
1550-nm	80 km	SC	LMC012A	
10BASE-T/100BASE-TX Autosensing to 100BASE-SX Duplex				
Multimode				
850-nm	300 m	ST	LMC7001A-R4	
		SC	LMC7002A-R4	
10BASE-T/100BASE-TX Autosensing to 100BASE-FX Duplex				
Multimode				
1300-nm	2 km	ST	LMC7005A	
		SC	LMC7006A	
10BASE-T/100BASE-TX Autosensing to 100BASE-LX Duplex				
Single-Mode Plus				
1310-nm	40 km	ST	LMC7003A-R4	
		SC	LMC7004A-R4	
	80 km	ST	LMC7007A	
		SC	LMC7008A	
1550-nm	80 km	SC	LMC7009A	
100BASE-TX to 100BASE-SX Duplex				
Multimode				
850-nm	300 m	ST	LHC008A-R3	
		SC	LHC009A-R3	
100BASE-TX to 100BASE-FX Duplex				
1300-nm	2 km	ST	LHC001A-R4	
		SC	LHC002A-R4	

Item			Code	List Price
Compact Media Converters (Continued)				
100BASE-TX to 100BASE-LX Duplex (Continued)				
Single-Mode Plus				
1310-nm	40 km	ST	LHC005A-R4	
		SC	LHC006A-R4	
	80 km	ST	LHC037A	
		SC	LHC038A	
1550-nm	80 km	SC	LHC039A	
100BASE-TX to 100BASE-BX Single-Strand				
Single-Mode (Use in matched pairs.)				
1310-nm TX/1550-nm RX	20 km	SC	LHC5129A-R3	
1550-nm TX/1310-nm RX	20 km	SC	LHC5130A-R3	
1310-nm TX/1550-nm RX	40 km	SC	LHC5132A-R3	
1550-nm TX/1310-nm RX	40 km	SC	LHC5133A-R3	
1310-nm TX/1550-nm RX	60 km	SC	LHC5134A	
1550-nm TX/1310-nm RX	60 km	SC	LHC5135A	
1000BASE-TX to 1000BASE-SX Duplex				
Multimode				
850-nm	220 m	SC	LGC5134A-R4	
1000BASE-TX to 1000BASE-X Duplex				
Single-Mode				
1310-nm	15 km	SC	LGC5137A-R2	
1310-nm	40 km	SC	LGC5135A-R3	
1550-nm	70 km	SC	LGC5138A-R2	
1000BASE-TX to 1000BASE-X Single-Strand				
Single-Mode (Use in matched pairs.)				
1310-nm TX/1550-nm RX	15 km	SC	LGC5139A-R2	
1550-nm TX/1310-nm RX	15 km	SC	LGC5140A-R2	
1310-nm TX/1550-nm RX	40 km	SC	LGC5141A-R2	
1550-nm TX/1310-nm RX	40 km	SC	LGC5142A-R2	
10BASE-T to ThinNet	300 m		LMC009A-R4	

Buyer's Guide | PoE Media Converters

For product details, go to blackbox.com.

PoE Type	Copper Side Ethernet	Fiber Side Ethernet	Fiber Transmission Type	Distance	Fiber Connector	List Price	Code	Product Name
Powered Device (PD) 802.3af	10BASE-T/ 100BASE-TX	100BASE-FX	1300-nm multimode	2 km (1.2 mi.)	ST		LPD501A	PoE PD Media Converters, p. 592
					SC		LPD500A	
		100BASE-LX	1310-nm single-mode	20 km (12.4 mi.)	SC		LPD502A	
Power Source Equipment (PSE) 802.3af	10BASE-T/ 100BASE-TX	100BASE-FX/LX	1300-nm multimode	2 km (1.2 mi.)	ST		LPM601A	PoE PSE Media Converters, p. 591
					SC		LPM600A	
			1310-nm single-mode	20 km (12.4 mi.)	SC		LPM602A	
			1310-/1550-nm single-strand single-mode*	20 km (12.4 mi.)	SC		LPM606A	
			1550-/1310-nm single-strand single-mode*	20 km (12.4 mi.)	SC		LPM607A	
	100BASE-TX	100BASE-FX	850-nm multimode	2 km (1.2 mi.)	ST		LMC5128A	PSE Compact Media Converters, p. 593†
					SC		LMC5129A	
			1300-nm multimode	5 km (3.1 mi.)	ST		LMC5125A	
					SC		LMC5126A	
		100BASE-LX		80 km (49.7 mi.)	SC		LMC5131A	
					ST		LMC5154A	
					SC		LMC5155A	
			1550-nm single-mode	80 km (49.7 mi.)	SC		LMC5156A	
			1310-/1550-nm single-strand single-mode*	20 km† (12.4 mi.)	SC		LMC5142A	
			1550-/1310-nm single-strand single-mode*	20 km† (12.4 mi.)	SC		LMC5143A	
	10BASE-T/ 100BASE-TX/ 1000BASE-T	1000BASE-SX	850-nm multimode	550 m (1880 ft.)	SC		LPS1000A-MM	PSE Compact Media Converter, p. 593†
				220 m (722 ft.)	SC		LPS500A-MM-SC	PoE PSE Media Converters, p. 591
					LC		LPS500A-MM-LC	
		1000BASE-LX	1310-nm single-mode	10 km (6.2 mi.)	SC		LPS1000A-SM	PSE Compact Media Converter, p. 593†
					SC		LPS500A-SM-10K-SC	PoE PSE Media Converters, p. 591
					LC		LPS500A-SM-10K-LC	
					SFP		LPS1000A-1SFP	PSE Compact Media Converters, p. 593†
					(2) SFP		LPS1000A-2SFP	

* Must be used in complementary pairs. That is, a single-strand 1550-/1310-nm media converter must be used with a 1310-/1550-nm media converter of the same fiber type and distance rating.

† 40- and 80-km versions are also available. For more information, call our FREE Tech Support or go to blackbox.com.

‡ Also available in hardened versions for use in extreme environments. For more information, see [page 593](#) or contact our FREE Tech Support.

PoE PD Media Converters

Compact copper-to-fiber converters that get their power over Ethernet.

- Translate 10-/100-Mbps copper media to 100-Mbps fiber optic connections.
- Work as powered devices (PD) that receive their power from PoE power source equipment (PSE).
- **WARRANTY** — 1 Year

Bridge long-distance Fast Ethernet fiber optic segments with Ethernet or Fast Ethernet copper cabling—without a local power supply.

Because the converters are compatible with the 802.3af PoE standard, they draw their power via UTP cable connected to a PoE PSE. This makes the converter ideal for remote areas of a network without AC power outlets.

PoE PD Media Converters are easy to install—just plug and go. They autosense speed and duplex, although you can override speed and duplex settings using DIP switches. Plus, Auto MDI/MDI-X ensures you never need to worry about whether you need a cross-pinned or straight-pinned UTP cable.

Link-fault passthrough enhances the integrity of the copper and fiber links—if either the twisted pair or the fiber port fails, the other

port is automatically disabled, preventing the media converter from attempting to send data over a dead connection.

TECH SPECS

Environmental — Operating temperature: 32 to 122° F (0 to 50° C);

Humidity: 5 to 90% noncondensing

Flow Control — 802.3x for full-duplex; backpressure for half-duplex

Forwarding Rate — 100 Mbps: 148,800 pps;
10 Mbps: 14,880 pps

PoE Type — IEEE 802.3af Powered Device (PD)

CE Approval — Yes

RoHS — Yes

Connectors — Copper: (1) RJ-45;
Fiber: (1) pair of SC or ST

Power — 60 mA at -48 VDC from 802.3af PSE or
1 A at +5 VDC AC/DC adapter (not included);

Draw: 5 watts

Size — 1"H x 2.7"W x 3.7"D (2.5 x 6.9 x 9.4 cm)

Weight — 0.8 lb. (0.4 kg)



LPD500A

Item	Code	List Price
PoE PD Media Converters		
10BASE-T/100BASE-TX to 100BASE-FX		
Multimode	SC	LPD500A
	ST	LPD501A
Single-Mode	SC	LPD502A

e Black Box Explains

Power over Ethernet (PoE).

The seemingly universal network connection, twisted-pair Ethernet cable, has another role to play, providing electrical power to low-wattage electrical devices. Power over Ethernet (PoE) was ratified by the Institute of Electrical and Electronic Engineers (IEEE) in June 2000 as the 802.3af-2003 standard. It defines the specifications for low-level power delivery—roughly 13 watts at 48 VDC—over twisted-pair Ethernet cable to PoE-enabled devices such as IP telephones, wireless access points, Web cameras, and audio speakers.

Recently, the basic 802.3af standard was joined by the IEEE 802.3at PoE standard, ratified on September 11, 2009, which supplies at least 25 watts to larger, more power-hungry devices. 802.3at is backwards compatible with 802.3af.

The way it works is simple: Ethernet cable that meets CAT5 (or better) standards consists of four twisted pairs of cable, and PoE sends power over these pairs to PoE-enabled devices. In one method, two wire pairs are used to transmit data, and the remaining two pairs are used for power. In the other method, power and data are sent over the same pair.

When the same pair is used for both power and data, the power and data transmissions don't interfere with each other. Because electricity and data function at opposite ends of the frequency spectrum, they can travel over the same cable. Electricity has a low frequency of 60 Hz or less, and data transmissions have frequencies that can range from 10 million to 100 million Hz.

There are two types of devices involved in PoE configurations: Powered Devices (PD) and Power Sourcing Equipment (PSE).

PDs are pieces of equipment like surveillance cameras, sensors, wireless access points, and other devices that receive power via PoE.

PSEs, which include end-span and mid-span devices, provide power to PDs over the Ethernet cable. When a PD is plugged in, it identifies itself as a PoE device with a 25-kilo-ohm resistor between the powered pairs. If the PSE detects 25-kilo-ohm resistance, it sends power; if it detects higher or lower resistance, it doesn't send power. This keeps power from accidentally going to devices that don't support PoE.

An end-span device is often a PoE-enabled network switch that's designed to supply power directly to the cable from each port. A mid-span device is inserted between a non-PoE device and the network, and it supplies power from that juncture. Power injectors, a third type of PSE, supply power to a specific point on the network while the other network segments remain without power.

PoE is a technology that works well for wireless access points, video surveillance, building management, retail video kiosks, smart signs, and retail point-of-information systems, making it possible to easily move a device with minimal disruption. Additionally, if your LAN is protected from power failure by a UPS, the PoE devices connected to your LAN are also protected from power failure.

PSE Compact Media Converters

Power PoE access points and PoE cameras!

- Convert 100-Mbps copper to 100-Mbps duplex or single-strand fiber.
- Act as power sourcing equipment (PSE) on the copper side to power PoE devices.
- Available for multimode and single-mode for duplex fiber and single-mode for single-strand fiber.
- Include fixed, internal 100–240 VAC, 50/60 Hz power supply.
- For harsh environments, see our hardened models, which can operate intemperatures up to 149° F (65° C) on [page 638](#).
- **WARRANTY** — 6 Years

PSE Compact Media Converters are ideal for use with PoE access points or other PoE devices, such as IP cameras or entry control systems.

Use them as Power Sourcing Equipment (PSE) for your wireless equipment. Because these media converters only require one electrical outlet to power both the converter and a PoE device, you can position access points up to 30 meters (98.4 ft.) from the nearest power outlet.

Plus the media converters include LinkLoss™ and/or FiberAlert™ diagnostic features.

Single-strand fiber models transmit data over a single strand of single-mode fiber. And for harsh environments, see our hardened models on [page 638](#) (available in duplex and single-strand versions), which can take the heat, operating in temperatures up to 149° F (65° C)!

Power source equipment—
PoE compliant!



LMC5126A

TECH SPECS

Environmental — Operating temperature: 32 to 122° F (0 to 50° C);
Humidity: 5 to 95% noncondensing
PoE Type — IEEE 802.3af Power Source Equipment (PSE)
Connectors — Twisted pair: (1) RJ-45;
Fiber: (1) duplex ST® or SC
CE Approval — Yes
RoHS — Yes
Power — Internal power supply: autosensing
100–240 VAC, 50/60 Hz, 20 watts
Size — 1.6"H x 4.8"W x 5"D (4.1 x 12.2 x 12.7 cm)

NOTE: Must be used in pairs.

NOTE: For both duplex fiber and single-strand fiber models, you can mix standard with hardened models on [page 638](#) as long as distance, fiber types, and connectors match.

Item	Code	List Price
PSE Compact Media Converters		
100BASE-TX to 100BASE-SX/FX		
Duplex Fiber		
Multimode 850-nm, 2 km		
ST®	LMC5128A	
SC	LMC5129A	
Multimode 1300-nm, 5 km		
ST	LMC5125A	
SC	LMC5126A	
Single-Mode 1310-nm, 40 km		
SC	LMC5131A	
Single-Mode 1310-nm, 80 km		
ST	LMC5154A	
SC	LMC5155A	
Single-Mode 1550-nm, 80 km		
SC	LMC5156A	

Item	Code	List Price
PSE Compact Media Converters		
100BASE-TX to 100BASE-SX/FX (Continued)		
Single-Strand Fiber		
(Must be used in complementary pairs.)		
Single-Mode 1310-nm TX/1550-nm RX, 20 km		
SC	LMC5142A	
Single-Mode 1550-nm TX/1310-nm RX, 20 km		
SC	LMC5143A	
Single-Mode 1310-nm TX/1550-nm RX, 40 km		
SC	LMC5146A	
Single-Mode 1550-nm TX/1310-nm RX, 40 km		
SC	LMC5147A	
Single-Mode 1310-nm TX/1550-nm RX, 60 km		
SC	LMC5150A	
Single-Mode 1550-nm TX/1310-nm RX, 60 km		
SC	LMC5151A	

Gigabit PoE PSE Compact Media Converters

Power PoE devices and convert high-speed Gigabit cable segments!

- Provide an autosensing 10-/100-/1000-Mbps copper port at the end of a 1000-Mbps fiber link.
- Act as power sourcing equipment (PSE) on the copper side to power PoE devices.
- Choose from multimode or single-mode fiber or choose a model with an SFP port.
- IEEE 802.3af compliant.
- **WARRANTY** — Lifetime

When the 100-meter copper Ethernet limit puts a crimp into your plans to place PoE devices, extend that link up to 220 meters (722 ft.) over 62.5-µm multimode fiber, or up to 550 meters (1804 ft.) over 50-µm multimode fiber. A Gigabit PoE Media Converter enables you to incorporate fiber into your network while still providing power to remote PoE devices.

SFP models enable you to customize the converter to the fiber distance, speed, and type



Power source equipment—
PoE compliant!



LPS1000A-MM

TECH SPECS

Operating Temperature — 32 to 104° F (0 to 40° C);
Humidity: 5 to 95% noncondensing
Distance (Maximum) — 62.5-µm multimode:
220 m (722 ft.);
50-µm multimode: 550 m (1804 ft.)
PoE Type — IEEE 802.3af Power Source Equipment (PSE)
Standards — 802.3, 802.3u, 802.3ab, 802.3x, 802.3af
CE Approval — Yes
RoHS — Yes
Power — External power supply: autosensing 90–250-VAC, 20 watts maximum
Size — 1"H x 4.4"W x 5.1"D (2.5 x 11.2 x 12.9 cm)
Weight — 2 lb. (0.9 kg) shipping

you need by using an SFP (for SFPs, see [page 574](#) or call our FREE Tech Support).

These media converters offer overcurrent and undercurrent detection, as well as fault protection input. They support signal-pair or spare-pair power insertion. The converters can be set to restart PoE devices when the fiber signal is interrupted. On the fiber side, the converters offer link-fault passthrough to alert you to invalid links.

Item	Code	List Price
Gigabit PoE PSE Compact Media Converters		
10/100/1000BASE-T to 1000BASE-SX Fiber		
Multimode 850-nm, 220 m		
SC	LPS1000A-MM	
10/100/1000BASE-T to 1000BASE-LX Fiber		
Single-Mode 1310-nm, 10 km		
SC	LPS1000A-SM	
Gigabit PoE Compact Media Converters		
10/100/1000BASE-T with		
(1) SFP Slot	LPS1000A-1SFP	
(2) SFP Slots	LPS1000A-2SFP	

Populate the SFP slot(s) with module(s):

SFPs **See [page 574](#).**

You may also need...

DIN Rail Bracket	LPS1000-DINRAIL
Wallmount Bracket	LPS1000-WALL

Buyer's Guide | Chassis-Based Media Converter Systems

For product details, see the pages listed.

	Unmanaged Media Converter Systems			Managed Media Converter Systems	
	Modular Media Converters, facing page	Multipower Miniature Media Converters, pp. 596–597	FlexPoint Modular Media Converters, pp. 602–605	High-Density Media Conversion System II, pp. 598–601	Dynamic Fiber Conversion System, pp. 606–611
Chassis					
AC Power	1-, 4-, 8-, and 12-slot chassis	18-slot PowerTray	14-slot power chassis	3-, 6- and 20-slot chassis	1-, 2-, 5-, and 19-slot chassis
DC Power	12-slot chassis	—	14-slot power chassis	3- and 6-slot chassis	5- and 19-slot chassis
Dual AC Power	—	—	14-slot power chassis	6- and 20-slot chassis	5- and 19-slot chassis
Dual DC Power	—	—	14-slot power chassis	6- and 20-slot chassis	5- and 19-slot chassis
Unpowered	—	—	5-position rackmount kit	—	—
Modules					
ThinNet Coax to:					
10-Mbps UTP	•	—	•	—	•
10-Mbps Duplex Fiber	—	—	•	—	—
10-Mbps UTP to:					
ThinNet Coax	•	—	•	—	•
10-Mbps Duplex Fiber	•	—	•	•	•
100-Mbps UTP to:					
100-Mbps Duplex Fiber	•	—	•	•	•
100-Mbps Simplex Fiber	—	—	—	•	•
Dual 10-/100-Mbps UTP	—	—	—	—	•
Dual 100-Mbps Duplex Fiber	—	—	—	—	•
10-/100-Mbps UTP to:					
100-Mbps Duplex Fiber	•	•	•	•	•
100-Mbps Simplex Fiber	—	•	—	•	•
1000-Mbps UTP to:					
1000-Mbps Duplex Fiber	•	•	•	•	•
1000-Mbps Simplex Fiber	•	•	—	•	•
10-/100-/1000-Mbps UTP to:					
1000-Mbps Duplex Fiber	—	•	—	•	•
1000-Mbps Simplex Fiber	—	•	—	•	•
T1/E1 to:					
Duplex Fiber	—	—	•	•	•
Simplex Fiber	—	—	—	•	—
Multimode/Single-Mode Fiber Converters					
100-Mbps Duplex Fiber	—	—	•	•	•
1000-Mbps Duplex Fiber	—	—	•	•	•
1000-Mbps Simplex Fiber	—	—	—	•	•
DS3/E3/STS-1 BNC Coax to:					
Duplex Fiber	—	—	—	•	—
Simplex Fiber	—	—	—	•	—
ATM OC-3 Mode Converter	—	—	•	•	•
ATM OC-12 Mode Converter	—	—	•	•	—
Token Ring UTP to Duplex Fiber	—	—	•	—	—
Switch Module	—	—	—	—	•

Modular Media Converters

Absolute flexibility. Here's everything you need to convert UTP and fiber segments.



LE7412A with modules: top: front view;
bottom: rear view. Rackmount ears
can be mounted front or back.

CHASSIS SPECS

Environmental —

Operating temperature: +32 to +122° F (0 to +50° C);
Humidity: 5–95%, noncondensing

CE Approval — Yes

RoHS — Yes, except LH741-TPSCS13/154
and LH741-TPSCS15/134

Power — LE7401A-R2, LE7404A, LE7408A, LE7412A:
120/240 VAC, 50/60 Hz;
LE7412A-DC: -48 VDC

Size — LE7401A-R2: 1.5"H x 4.7"W x 4.4"D
(3.8 x 11.9 x 11.2 cm);

LE7404A: 1.8"H x 8.6"W x 5"D (4.6 x 21.8 x 12.7 cm);

LE7408A: 1.8"H x 17.5"W x 5"D

(4.6 x 44.5 x 12.7 cm);

LE7412A, LE7412A-DC: 1.75"H x 17.5"W x 8.8"D

(4.4 x 44.5 x 22.4 cm)

- Support a mix of 10- or 100-Mbps segments for UTP and single-mode or multimode fiber.
- LinkLoss™ provides instant notification of fiber segment link problems.
- ♦♦ **WARRANTY** — 6 Years

Convert 100-Mbps segments between twisted-pair and single-mode or multimode fiber in half- or full-duplex mode. Choose from 6 different chassis and 12 converter modules for exactly the right configuration.

Chassis

Choose a 1-, 4-, 8-, or 12-slot chassis.

The 1- and 4-slot chassis are standalone models. The 8- and 12-slot chassis are rackmountable and 1U high. The 12-slot chassis has a slot for a Redundant Power Supply Module.

Conversion Modules

The 10- and 100-Mbps modules have a LinkLoss feature, so you can identify problems on the fiber segment from the twisted-pair side, and vice-versa.

The FiberAlert™ feature minimizes problems associated with the loss of one strand of fiber cable by sending fault alerts.

All 10-Mbps twisted-pair modules feature an internal two-position switch on the twisted-pair port, which eliminates the need for a cross-over cable.

Use the 100-Mbps modules to convert from twisted-pair Fast Ethernet to single-mode or multimode fiber with ST® or SC connectors.

The 1300-nm Single-Mode to 1300-nm Multimode Modules come in two-packs, work in pairs, and require two chassis slots. One module features a single-mode receive port and a multimode transmit port; the other has a multimode receive port and a single-mode transmit port.

Item				Code	List Price
First order the chassis...					
Chassis	120-/240-VAC Power Supply	1-Slot Standalone		LE7401A-R2	
		4-Slot Standalone		LE7404A	
		8-Slot (1U)		LE7408A	
		12-Slot (1U)		LE7412A	
	48-VDC Power Supply	12-Slot (1U)		LE7412A-DC	
For redundant power, order...					
Redundant Power Supply Modules for 1U 12-Slot Chassis					
40 Watts, 120/240-VAC				PS7412A	
...then add the modules for your application.					
10-Mbps Copper to Duplex Fiber Media Conversion Modules					
Multimode, 850-nm	4 km	ST		LE740-TPSTM-R2	
		SC		LE740-TPSTM-SC-R2	
		ST		LE740-TPSTS20-R2	
Single-Mode Plus, 1310-nm					
	40 km	ST			
100-Mbps Copper to 100-Mbps Duplex Fiber Media Conversion Modules					
Multimode, 850-nm	300 m	ST		LH742-TPSTM-SX	
		SC		LH742-TPSCM-SX	
		ST		LH740-TPSTM-R3	
Multimode, 1300-nm	2 km	ST		LH740-TPSTM-R3	
		SC		LH740-TPSCM-R3	
		ST		LH740-TPSTS20-R3	
Single-Mode Plus, 1310-nm	40 km	ST		LH740-TPSTS20-R3	
		SC		LH740-TPSCS20-R3	
10-/100-Mbps Copper to 100-Mbps Duplex Fiber Media Conversion Modules					
Multimode, 850-nm	300 m	ST		LH741-TPSTSXM	
		SC		LH741-TPSCSXM	
		ST		LH741-TPSTM	
Multimode, 1300-nm	2 km	ST		LH741-TPSTM	
		SC		LH741-TPSCM	
		SC		LH741-TPSCM	
Single-Mode, 1310-nm	40 km	SC		LH741-TPSCM	
		SC		LH741-TPSCM	
10-/100-Mbps Copper to 100-Mbps Single-Strand Fiber Media Conversion Modules					
Single-Mode (Order one of each.)					
1310-nm TX/1550-nm RX	20 km	SC		LH741-TPSCS13/15	
		SC		LH741-TPSCS15/13	
Single-Mode Plus (Order one of each.)					
1310-nm TX/1550-nm RX	40 km	SC		LH741-TPSCS13/154	
		SC		LH741-TPSCS15/134	
1000-Mbps Copper to Duplex Fiber Media Conversion Modules					
1000BASE-SX Multimode, 850-nm	300 m	SC		LG741-TXSXSC	
		SC		LG741-TXLXSC	
		SC		LG741-TXLXSC40	
		SC		LG741-TXLXSC70	
1000BASE-LX Single-Mode, 1310-nm					
	10 km	SC			
	40 km	SC			
	70 km	SC			
1000-Mbps Copper to 1000BASE-LX Single-Strand Fiber Media Conversion Modules					
Single-Mode (Order one of each.)					
1310-nm TX/1550-nm RX	10 km	SC		LG741-TXLXSC-13	
		SC		LG741-TXLXSC-15	
Single-Mode Plus (Order one of each.)					
1310-nm TX/1550-nm RX	40 km	SC		LG741-TXLXSC-1340	
		SC		LG741-TXLXSC-1540	
1550-nm TX/1310-nm RX	40 km	SC			
		SC			

Multipower Miniature Media Converters

Industrial versions on p. 637.

These tiny converters are perfect for bringing



LHC018A-AC-R2 with (9) LHC015A-R2 and (9) LHC036A-R2 converters

- Connect Ethernet, Fast Ethernet, or Gigabit Ethernet copper ports to fiber optic cable.
- Measure just 1.8"H x 0.8"W x 3.4"D.
- Available in fiber optic duplex and single-strand fiber versions.
- 10/100 versions autonegotiate for speed and duplex.
- Use as standalone media converters or rackmount in the optional PowerTray.
- Powered by its universal AC power supply, a PC's USB port, or the optional rackmountable PowerTray.
- Auto MDI/MDI-X means you never need to worry about what kind of cable to use.
- **WARRANTY** — 6 Years

Simple connections.

Bring fiber to the desktop more conveniently and at a lower cost than installing fiber NICs with the economically priced Multipower Miniature Media Converters.

Just connect a converter to your PC's copper port with a CAT5 cable (you can use unshielded or shielded CAT5 or higher), then connect a fiber cable to the converter's other side.

Best of all, you can tuck these tiny converters unobtrusively behind your PC.

Flexible power options.

Power the converter one of three ways:

- Through its included AC power supply.
- Through the optional USB Power Adapter Cable (LH021A), which plugs into a PC's USB port.
- Or through the optional rackmount PowerTray, which powers up to 18 converters in only 2U of rack space (rackmount ears are included).

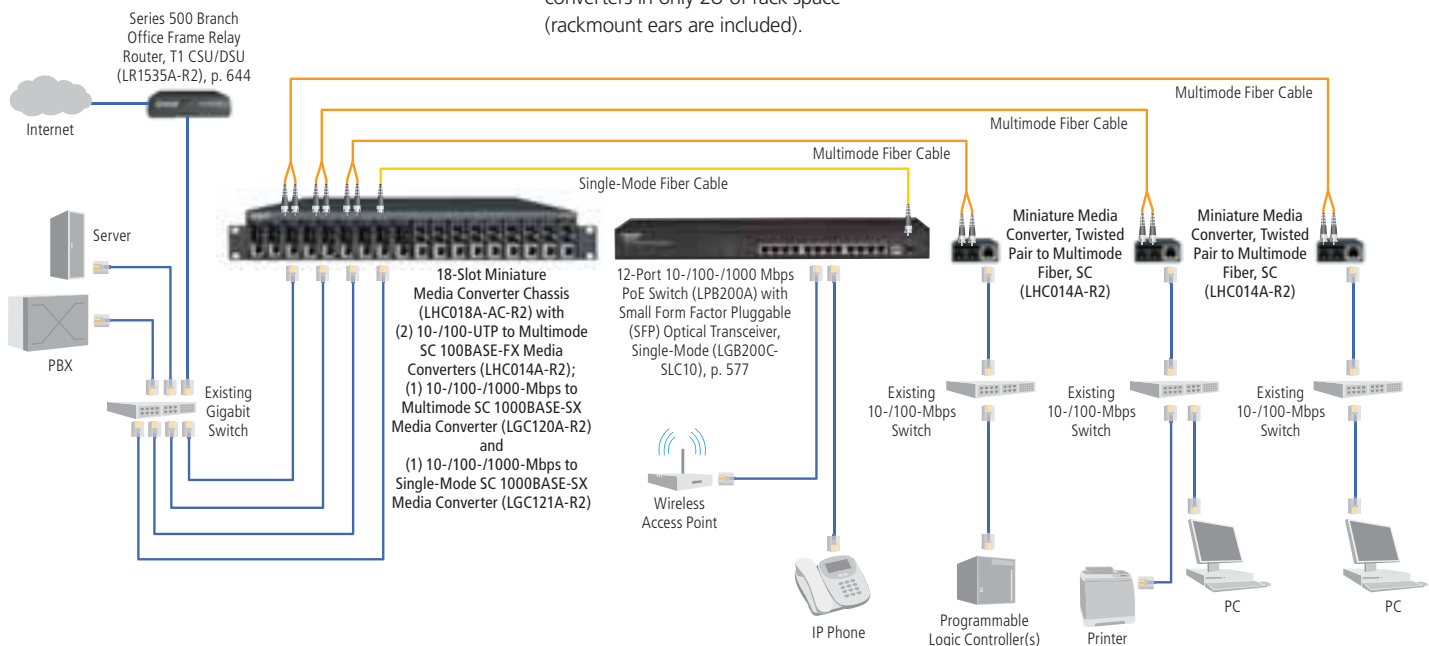
Choose your model.

Choose from multimode and single-mode duplex fiber versions, and single-mode single-strand fiber versions.

For long-distance transmissions, order single-mode models. They support distances of 20 kilometers (12.4 mi.), 40 kilometers (24.8 mi.), or even 70 kilometers (43.4 mi.), depending on the model.

The 10-/100-/1000-Mbps versions also work as data rate converters, performing speed autonegotiation on the twisted-pair port.

We also offer an SFP-to-SFP mode converter model (LGC300A-R2). It enables you to adapt the converter to the interfaces of your choice simply by adding SFPs. Use a pair of SFPs to convert any fiber type to any other fiber type, for instance. The mode converter version works with both Fast Ethernet and Gigabit Ethernet SFPs.



fiber to the desktop or other tight spaces!



LHC013A-R2



LHC014A-R2

TECH SPECS

Operating Environment —

Temperature: 32 to 122° F (0° to 50° C);

Humidity: 5 to 95%, noncondensing

Standards — IEEE 802.3, IEEE 802.3u

CE Approval — Yes

RoHS — Yes

Connectors — All except for LGC300A (SFP model):

Copper side: (1) RJ-45;

Fiber side: LHC040A-R2, LHC013A-R2,

LHC036A-R2: (1) pair of ST®;

LHC041A-R2, LHC014A-R2–LHC015A-R2,

LGC010A-R2–LGC013A-R2,

LGC120A-R2–LGC128A-R2: (1) pair of SC;

LHC042A-R2–LHC043A-R2, LHC028A-R2–

LHC031A-R2, LGC014A-R2–LGC017A-R2:

(1) SC;

LGC300A-R2 (SFP-to-SFP model): (2) SFP,

(1) AC power, (1) 4-terminal DC power

Power — All except for LGC300A-R2 (SFP model):

From the included external 100–240-VAC,

50–60-Hz, autosensing adapter;

Via the optional USB Power Adapter Cable

(LHC021A) connected to computer's USB port;

From the optional PowerTray with a 100–240 VAC,

50–60-Hz (LHC018A-AC-R2) or -48 VDC

(LHC018A-DC-R3) power supply;

Draw: 96 watts, fully loaded

LGC300A-R2 (SFP model): Dual power:

AC: External 100–240-VAC, 50–60-Hz,

autosensing power supply; 5 VDC, 2 amp,

10 watts

Size — 1.8"H x 0.8"W x 3.4"D (2 x 4.6 x 8.6 cm)

Weight — 0.3 lb. (0.1 kg)

Item				Code	List Price
Multipower Miniature Media Converters					
10-/100-Mbps Copper to 100-Mbps Duplex Fiber					
Multimode, 850-nm	300 m	ST	LHC040A-R2		
		SC	LHC041A-R2		
Multimode, 1300-nm	2 km	ST	LHC013A-R2		
		SC	LHC014A-R2		
Single-Mode, 1310-nm	40 km	ST	LHC036A-R2		
		SC	LHC015A-R2		
10-/100-Mbps Copper to 100-Mbps Single-Strand Fiber, 300 m (Order one of each.)					
Multimode, 1310-nm TX/1550-nm RX		SC	LHC042A-R2		
Multimode, 1550-nm TX/1310-nm RX		SC	LHC043A-R2		
10-/100-Mbps Copper to 100-Mbps Single-Strand Fiber, 20 km (Order one of each.)					
Single-Mode, 1310-nm TX/1550-nm RX		SC	LHC028A-R2		
Single-Mode, 1550-nm TX/1310-nm RX		SC	LHC029A-R2		
10-/100-Mbps Copper to 100-Mbps Single-Strand Fiber, 40 km (Order one of each.)					
Single-Mode, 1310-nm TX/1550-nm RX		SC	LHC030A-R2		
Single-Mode, 1550-nm TX/1310-nm RX		SC	LHC031A-R2		
1000-Mbps Copper to 1000-Mbps Duplex Fiber					
Multimode, 850-nm	220 m	SC	LGC010A-R2		
Single-Mode, 1310-nm	10 km	SC	LGC011A-R2		
	40 km	SC	LGC012A-R2		
Single-Mode, 1550-nm	70 km	SC	LGC013A-R2		
1000-Mbps Copper to 1000-Mbps Single-Strand Fiber, 10 km (Order one of each.)					
Single-Mode, 1310-nm TX/1550-nm RX		SC	LGC014A-R2		
Single-Mode, 1550-nm TX/1310-nm RX		SC	LGC015A-R2		
1000-Mbps Copper to 1000-Mbps Single-Strand Fiber, 40 km (Order one of each.)					
Single-Mode, 1310-nm TX/1550-nm RX		SC	LGC016A-R2		
Single-Mode, 1550-nm TX/1310-nm RX		SC	LGC017A-R2		
10-/100-/1000-Mbps Copper to 1000-Mbps Duplex Fiber					
Multimode, 850-nm	220 m	SC	LGC120A-R2		
Single-Mode, 1310-nm	10 km	SC	LGC121A-R2		
	40 km	SC	LGC122A-R2		
	70 km	SC	LGC124A-R2		
10-/100-/1000-Mbps Copper to 1000-Mbps Single-Strand Fiber, 10 km (Order one of each.)					
Single-Mode, 1310-nm TX/1550-nm RX		SC	LGC125A-R2		
Single-Mode, 1550-nm TX/1310-nm RX		SC	LGC126A-R2		
10-/100-/1000-Mbps Copper to 1000-Mbps Single-Strand Fiber, 40 km (Order one of each.)					
Single-Mode, 1310-nm TX/1550-nm RX		SC	LGC127A-R2		
Single-Mode, 1550-nm TX/1310-nm RX		SC	LGC128A-R2		
Multipower Miniature 100-/1000-Mbps SFP-to-SFP Mode Converter				LGC300A-R2	
To power a single converter via your computer's USB port, order...					
USB Power Adapter Cable				LHC021A	
To rackmount multiple Miniature Media Converters, order...					
PowerTray, 18-Slot with AC Power				LHC018A-AC-R2	



High-Density Media Converter System II

Monitor and manage your network's copper-to-fiber

- The included MIBs enable you to manage the system from any standard SNMP system or the included iView software.
- Many modules offer Layer 2 media conversion.
- Choose a rackmountable chassis for installation in a central location, such as a computer room.
- Select the 2-slot desktop model for remote locations.
- Hot-swappable modules.
- Single-mode modules support distances up to 80 kilometers (49.7 mi.).
- Redundant power supplies are available.
- ♦♦ **WARRANTY** — 6 Years

The Black Box® High-Density Media Converter System II offers fully manageable rackmount and desktop chassis, and it has the option of high-speed Layer 2 media conversion.

Monitor and manage.

The system enables you to monitor and manage the media converters in your large network from one location. It's perfect for twisted-pair networks with fiber segments.

Fix network failures from your desk with the included iView™ software, which is compatible with multiple platforms including Windows NT®, Windows® 2000, and Windows XP, and runs as a standalone Java™ application for other operating systems. The software provides an easy-to-use graphic interface to help you manage your High-Density Media Converter System II. You can also use it as a front-end snap-in to integrate with HP® OpenView® or as a Web server running IIS, or as a Java servlet.

What's more, the system works with the interface modules from the original High-Density Media Converter System for complete network management!

Chassis with Modular SNMP Management

These heavy-duty chassis are manageable through a separate SNMP Management Module (LMC5200A).

Choose from 1U, 6-slot chassis or 3U, 20-slot chassis. Each chassis has one additional slot for the SNMP module.

A built-in SNMP switch enables you to disable chassis management. Even with management turned off, the SNMP agent continues to communicate with installed modules.

An SNMP write-lock switch protects the configurations of your installed modules from being accidentally overwritten.

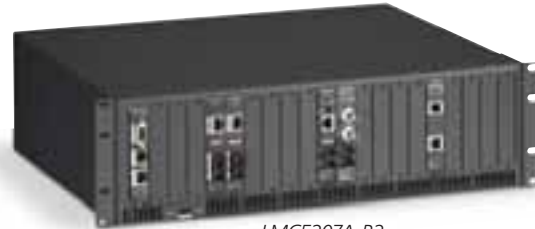
Because the chassis has an embedded DHCP agent, its IP address is dynamically assigned when connected to a LAN with a DHCP server.

Models with dual power supplies eliminate a point of failure. Plus, a "last gasp" feature alerts you when one of the power supplies or AC power fails. And there are even more features to ensure reliability: The dual fans are easily field replaceable in the 20-slot chassis. In the 6-slot chassis, fans activate only when the chassis reaches a preset temperature. Fan speed and chassis temperature can be monitored remotely via SNMP. The chassis come with blank plates installed and include rackmounting hardware.

Unmanaged Chassis

You can also choose from a 1- or 2-slot Unmanaged Chassis for desktop use. Although these chassis are unmanaged, modules within them can be accessed through a managed chassis in the same system.

In addition to internal power supplies, all chassis feature redundant, 6.8-cfm-rated cooling fans to keep them from becoming overheated and causing downtime.



LMC5207A-R2



LMC5203A

CE Approval — All except for mounting hardware

RoHS — All except for LMC5213A, mounting hardware, and power adapter clips

Item	Code	List Price
High-Density Media Converter System II		
Chassis		
3-Slot Desktop		
AC Power	LMC5233A	
Dual AC Power	LMC5234A	
DC Power	LMC5235A	
Dual DC Power	LMC5236A	
Dual AC/DC Power	LMC5237A	
6-Slot Rackmount or Desktop		
AC Power	LMC5203A	
Dual AC Power	LMC5204A	
DC Power	LMC5206A	
Dual DC Power	LMC5205A	
20-Slot Rackmount		
AC Power	LMC5227A	
Dual AC Power	LMC5207A-R2	
Dual DC Power	LMC5208A-R2	
Dual AC/DC Power	LMC5228A	
Spare Power Supplies		
for 6-Slot Rackmount or Desktop Chassis		
AC Module	LMC5214A	
DC Module	LMC5213A	
Spare Power Supplies		
for 20-Slot Rackmount Chassis		
AC Module	LMC5210A-R2	
DC Module	LMC5212A	
For SNMP management, you need...		
SNMP Management Module	LMC5200A	
You may also need...		
Backup/Spare Fan Assembly		
for 20-Slot Rackmount Chassis	LMC5209A	
Unmanaged Chassis		
1-Slot Desktop		
AC Power	LMC5101A	
1-Slot Multipower Desktop		
AC/DC Power	LMC5103A	
2-Slot Desktop		
AC Power	LMC5201A	
Accessories for Unmanaged Chassis...		
Rackmount Brackets	LMC5167A-RM	
Rackmount Shelf	LMC5165A-RM	
Wallmount Brackets	LMC5166A-WM	
Accessories for all chassis...		
North American Power Adapter Clip	LMC5216A	
European Power Adapter Clip	LMC5215A	

converters from a central location.

Layer 1 Modules

These Layer 1 modules for the High-Density Media Converter System II convert the incoming electrical signal from one cable type and then transmit it over another type.

They bridge the gap between two different Ethernet media types and are totally transparent to network operation, having no effect on data.

The modules include the LinkLoss™ feature, which notifies you of “silent failures” on copper-to-fiber links. LinkLoss enables you to troubleshoot just by looking at the Link LED — the fiber segment’s link status is always reflected by the twisted-pair segment so you’re informed quickly of fiber problems.

Many twisted-pair modules feature autocrossover ports to eliminate the worry of whether to use straight- or cross-pinned cabling. The twisted-pair modules without automatic termination have a push button for you to choose the crossover.

10BASE-T to 10BASE-FL

- Convert between 10BASE-T Ethernet devices and 10BASE-FL multimode or single-mode fiber optic devices.
- Use single-mode models to reach up to 40 kilometers (24.8 mi.).

10BASE-T/100BASE-TX to 100BASE-SX/FX/LX

- Feature an autosensing 10/100 copper port and a 100-Mbps fiber port.
- Distances of up to 40 kilometers (24.8 mi.) over single-mode cable.

Item	Code	List Price
High-Density Media Converter System II Layer 1 Modules		
10BASE-T to 10BASE-FL		
Multimode, 850-nm		
2 km ST	LMC5014C-R2	
SC	LMC5015C-R2	
Multimode, 1300-nm		
2 km ST	LMC5016C-R2	
SC	LMC5017C-R2	
Single-Mode Plus, 1310-nm		
40 km ST	LMC5020C-R2	
SC	LMC5021C-R2	
10BASE-T/100BASE-TX to 100BASE-SX		
Multimode, 850-nm		
300 m ST*	LMC5040C	
10BASE-T/100BASE-TX to 100BASE-FX		
Multimode, 1300-nm		
2 km ST	LMC5196C	
SC	LMC5195C	
10BASE-T/100BASE-TX to 100BASE-LX		
Single-Mode Plus, 1310-nm		
40 km ST	LMC5194C	
SC	LMC5193C	
100BASE-TX to 100BASE-SX		
Multimode, 850-nm		
300 m ST	LMC5182C-R2	
SC	LMC5181C-R2	
100BASE-TX to 100BASE-FX		
Multimode, 1300-nm		
2 km ST	LMC5022C	
SC	LMC5023C-R2	
100BASE-TX to 100BASE-LX		
Single-Mode Plus, 1310-nm		
40 km ST	LMC5026C	
SC	LMC5027C	
Single-Mode Long, 1310-nm		
80 km ST	LMC5111C-R2	
SC	LMC5110C-R2	
Single-Mode Long, 1550-nm		
80 km SC	LMC5180C-R2	

100BASE-TX to 100BASE-SX/FX/LX

- Convert between 100BASE-TX and 100BASE-SX/FX/LX devices.
- Extend a network up to 80 kilometers (49.7 mi.).

100BASE-TX to 100BASE-LX Single-Strand

- Extend Fast Ethernet connections over a single strand of fiber cable by compressing the transmit/receive wavelengths.
 - Must be used in complementary pairs.
- For details, call our FREE Tech Support.

1000BASE-TX to 1000BASE-SX

- Extend Gigabit Ethernet connections up to 550 meters (1640.2 ft.).
- Establish backbone runs either within a building or between neighboring buildings in a campus environment.

1000BASE-TX to 1000BASE-LX

- Achieve blazing Gigabit throughput at distances of up to 40 kilometers (24.8 mi.) over single-mode fiber cable.

1000BASE-TX to 1000BASE-SSLX Single-Strand

- Send Gigabit Ethernet up to 40 kilometers (24.8 mi.) over a single fiber strand.

CE Approval — Yes except for LMC5014C-R2–LMC5017C-R2, LMC5020C-R2–LMC5021C-R2

RoHS — Yes



LGC5108C-R2

Item	Code	List Price
High-Density Media Converter System II Layer 1 Modules (Continued)		
100BASE-TX to 100BASE-LX Single-Strand		
Single-Mode (Must be used in complementary pairs.)		
1310-nm TX/1550-nm RX		
20 km SC	LMC5113C-R2	
1550-nm TX/1310-nm RX		
20 km SC	LMC5114C-R2	
Single-Mode Plus (Must be used in complementary pairs.)		
1310-nm TX/1550-nm RX		
40 km SC	LMC5116C-R2	
1550-nm TX/1310-nm RX		
40 km SC	LMC5117C-R2	
1000BASE-TX to 1000BASE-SX		
Multimode, 850-nm		
220 m SC	LGC5108C-R3	
1000BASE-TX to 1000BASE-LX		
Single-Mode, 1310-nm		
15 km SC	LGC5184C-R2	
Single-Mode Plus, 1310-nm		
40 km SC	LGC5109C-R2	
1000BASE-TX to 1000BASE-SSLX Single-Strand		
Single-Mode (Must be used in complementary pairs.)		
1310-nm TX/1550-nm RX		
15 km SC	LGC5844C-R2	
1550-nm TX/1310-nm RX		
15 km SC	LGC5845C	
Single-Mode Plus (Must be used in complementary pairs.)		
1310-nm TX/1550-nm RX		
40 km SC	LGC5846C-R2	
1550-nm TX/1310-nm RX		
40 km SC	LGC5847C-R2	

More system options, turn the page.



High-Density Media Converter System II, Continued

Layer 2 Switching Modules

Use a pair of these modules at opposite ends of a link to increase your network reach. All but the LMC5605C (a multiport copper switching module) support copper-to-fiber conversions and switching.

Unlike Layer 1 converters, which only convert one Ethernet media type to another, Layer 2 modules are true switches. They actively store, filter, and forward Ethernet packets like any other MAC-layer switch. Layer 2 media converters increase network efficiency and reduce network overhead, significantly increasing data throughput. Because they're also switches, they incorporate 10/100 or 10/100/1000 ports in contrast to the single-speed ports of Layer 1 converters.

Set the RJ-45 ports for autonegotiation or for specific speed, as well as for half- or full-duplex. You can set the fiber port for half- or full-duplex, too.

Layer 2 media converter modules include LinkLoss™, which notifies you of "silent failures" on copper-to-fiber links.



LMC5118C

10BASE-T/100BASE-TX to 100BASE-FX/LX

These converters feature an autosensing 10/100 copper port and a 100-Mbps fiber port. They're a good choice for remote Fast Ethernet connections to Ethernet devices that may later be upgraded to Fast Ethernet.

10BASE-T/100BASE-TX to 100BASE-LX Single-Strand

These modules extend Fast Ethernet connections over a single strand of fiber cable by compressing the transmit and receive wavelengths into the one single-mode strand. The copper port is autosensing for speed; the fiber port is Fast Ethernet.

10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SX

Choose these short-range modules for Gigabit Ethernet connections of up to 220 meters (721.8 ft.). Autosensing 10-/100-/1000-Mbps ports on the copper side provide maximum versatility.

10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-X

These modules achieve Gigabit throughput at distances of up to 70 kilometers (43.4 mi.) over single-mode cable. The copper port supports Ethernet, Fast Ethernet, and Gigabit Ethernet and autonegotiates speed and duplex.

10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SSLX Single-Strand

Send Gigabit Ethernet at distances of up to 15 or 40 kilometers (9.3 or 24.8 mi.) over a single fiber strand. Maximum fiber utilization plus autosensing 10/100/1000 ports make it extremely versatile.

Multiport 10BASE-T/100BASE-TX Ports

Switch between five 10-/100-Mbps copper ports and increase port density in your system. This copper switching module enables you to extend Ethernet up to 328 feet away from a source.

Multiport 10BASE-T/100BASE-TX to 100BASE-FX SFP

Available in 3- and 4-port models, this switch module supports plugging in one or two optional SFPs (p. 574) for switching to 100-Mbps fiber backbone(s).

Multiport 10BASE-T/100BASE-TX to 100BASE-FX/LX

Instead of a switching module with SFP slots, you can order 10/100 copper-to-fiber modules with fixed ports for duplex or single-strand fiber connectivity for links up to 40 kilometers (24.8 mi.) over single-mode fiber. These support up to 1000 MAC address learning, as well as flow control, autonegotiating, duplex, and MDI-II/MDI-X UTP cable connection features.

CE Approval — All except for LMC5120C
RoHS — Yes

Item	Code	List Price
High-Density Media Converter System II Layer 2 Switching Modules		
10BASE-T/100BASE-TX to 100BASE-FX/LX		
Multimode, 1300-nm (100BASE-FX)		
2 km ST®	LMC5118C-R2	
SC	LMC5119C-R2	
Single-Mode Plus, 1310-nm (100BASE-LX)		
40 km ST	LMC5120C	
SC	LMC5121C	
10BASE-T/100BASE-TX to 100BASE-LX Single-Strand		
Single-Mode (Order one of each.)		
1310-nm TX/1550-nm RX		
20 km SC	LMC5123C-R2	
1550-nm TX/1310-nm RX		
20 km SC	LMC5124C-R2	
Single Mode Plus (Order one of each.)		
1310-nm TX/1550-nm RX		
40 km SC	LMC5126C-R2	
1550-nm TX/1310-nm RX		
40 km SC	LMC5127C-R2	
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SX		
Multimode, 850-nm		
220 m SC	LGC5950C-R2	
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-X		
Single-Mode, 1310-nm		
15 km SC	LGC5951C-R2	
Single-Mode Plus, 1310-nm		
40 km SC	LGC5952C-R2	
Single-Mode Long, 1550-nm		
70 km SC	LGC5953C-R2	
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SSLX Single-Strand		
Single-Mode (Order one of each.)		
1310-nm TX/1550-nm RX		
15 km SC	LGC5940C	
1550-nm TX/1310-nm RX		
15 km SC	LGC5941C	
Single-Mode Plus (Order one of each.)		
1310-nm TX/1550-nm RX		
40 km SC	LGC5942C	
1550-nm TX/1310-nm RX		
40 km SC	LGC5943C	

Item	Code	List Price
High-Density Media Converter System II Layer 2 Multiport Switching Modules		
(5) 10BASE-T/100BASE-TX Ports	LMC5605C	
(4) 10BASE-T/100BASE-TX to (1) 100BASE-FX SFP Slot (1550-nm)	LMC5604C-1SFP	
(3) 10BASE-T/100BASE-TX to (2) 100BASE-FX SFP Slots (1550-nm)	LMC5603C-2SFP	
(3) 10BASE-T/100BASE-TX to (1) 100BASE-FX/LX		
Multimode, 850-nm (100BASE-FX)		
2 km ST	LMC5603C-ST-2KM	
2 km SC	LMC5603C-SC-2KM	
Multimode, 1300-nm (100BASE-FX)		
5 km ST	LMC5603C-ST-5KM	
5 km SC	LMC5603C-SC-5KM	
Single-Mode Plus, 1310-nm (100BASE-LX)		
40 km ST	LMC5603C-ST-40KM	
40 km SC	LMC5603C-SC-40KM	
(3) 10BASE-T/100BASE-TX to (1) 100BASE-LX Single-Strand		
Single-Mode (Order one of each.)		
1310-nm TX/1550-nm RX		
20 km SC	LMC5603C-10SC-20KM	
1550-nm TX/1310-nm RX		
20 km SC	LMC5603C-50SC-20KM	
Single-Mode Plus (Order one of each.)		
1310-nm TX/1550-nm RX		
40 km SC	LMC5603C-10SC-40KM	
1550-nm TX/1310-nm RX		
40 km SC	LMC5603C-50SC-40KM	

« More system options, turn the page.

T1/E1/J1 Modules

- Extend T1/J1 or E1 communications up to 80 kilometers (49.7 mi.) over fiber cable.
- Selectable for 1.544-Mbps T1, 2.048-Mbps E1, or 1.544-Mbps J1.
- Full diagnostics with fiber analog, fiber digital, and twisted-pair digital loopbacks line integrity test, and Transmit Data Source diagnostics.
- Built-in jitter removal ensures maximum throughput.
- Auto MDI/MDI-X on the RJ-48 port.

CE Approval — Yes
RoHS — Yes



Item	Code	List Price
High-Density Media Converter System II T1/E1/J1 Modules		
Twisted Pair (RJ-48) to Multimode, 1300-nm, 2 km		
ST®	LME001A	
SC	LME002A	
MT-RJ	LME003A	
Twisted Pair (RJ-48) to Single-Mode, 1310-nm, 40 km		
ST	LME004A	
SC	LME005A	
Twisted Pair (RJ-48) to Single-Mode, 1310-nm, 80 km		
ST	LME006A	
SC	LME007A	
Twisted Pair (RJ-48) to Single-Mode, 1550-nm, 80 km		
SC	LME008A	
Twisted Pair (RJ-48) to Single-Strand Single-Mode (Must be used in complementary pairs.)		
1310-nm TX/1550-nm RX		
20 km SC	LMC5192C	
1550-nm TX/1310-nm RX		
20 km SC	LMC5191C	
1310-nm TX/1550-nm RX		
40 km SC	LMC5190C	
1550-nm TX/1310-nm RX		
40 km SC	LMC5189C	

DS3/E3/STS-1 Modules

- Convert coax circuits to fiber for distribution, extend DS3 (45 Mbps), E3 (34 Mbps), or STS-1 (52 Mbps) up to 80 kilometers (49.7 mi.) over fiber.
- Advanced line conditioning and jitter removal for maximum throughput.
- Advanced diagnostics including FiberAlert for fiber link troubleshooting.
- Auto MDI-II/MDI-X on the copper side.

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
High-Density Media Converter System II DS3/E3/STS-1 Modules		
BNC Coax to Multimode, 1300-nm, 2 km		
ST	LME020A	
SC	LME021A	
BNC Coax to Single-Mode, 1300-nm, 40 km		
ST	LME022A	
SC	LME023A	
BNC Coax to Single-Mode, 1310-nm, 80 km		
ST	LME024A	
SC	LME025A	
BNC Coax to Single-Mode, 1550-nm, 80 km		
SC	LME026A	
BNC Coax to Single-Strand Single-Mode (Must be used in complementary pairs.)		
1310-nm TX/1550-nm RX		
20 km SC	LMC5188C	
1550-nm TX/1310-nm RX		
20 km SC	LMC5187C	
1310-nm TX/1550-nm RX		
40 km SC	LMC5186C	
1550-nm TX/1310-nm RX		
40 km SC	LMC5185C	

Fiber Mode Conversion Modules

- Protocol-independent conversion from multimode to single-mode.
- Add up to 80 kilometers (49.7 mi.) to your fiber infrastructure.
- 155-Mbps models support 10/100 Ethernet and OC-3 ATM; 622-Mbps models support OC-12 ATM; and 1250-Mbps models support Gigabit Ethernet or OC-12 ATM.
- FiberAlert™ notifies you of “silent failures.”

CE Approval — LMC5168C–LMC5169C, LMC5036C
RoHS — Yes

Item	Code	List Price
High-Density Media Converter System II Fiber Mode Conversion Modules		
Multimode, 850-nm to Single-Mode, 1310-nm (155 Mbps)		
40 km ST/ST	LMC5032C	
80 km ST/ST	LMC5034C	
SC/SC	LMC5035C	
Multimode, 1300-nm to Single-Mode, 1310-nm (155 Mbps)		
40 km ST/ST	LMC5028C	
SC/SC	LMC5029C	
80 km ST/ST	LMC5030C	
SC/SC	LMC5031C	
OC12 ATM, Multimode, 1300-nm to Single-Mode, 1310-nm (622 Mbps)		
40 km SC/SC	LMC5010C	
Multimode, 850-nm to Single-Mode, 1310-nm (1250 Mbps)		
15 km SC/SC	LMC5036C	
Single-Mode Plus, 1310-nm (1250 Mbps)		
40 km SC/SC	LMC5011C	
Single-Mode Long, 1550-nm (1250 Mbps)		
70 km SC/SC	LMC5012C	
Multimode to Single-Strand Single-Mode (1250-Mbps) (Order one of each.)		
1310-nm TX/1550-nm RX		
40 km SC	LMC5169C	
1550-nm TX/1310-nm RX		
40 km SC	LMC5168C	

SFP/SFP Mode Converter Module

- Dual SFP-port, SNMP-manageable module enables you to incorporate multiple fiber types and wavelengths within a network.
- Add SFPs to convert between different wavelengths or single-mode and multimode fiber, single-mode to single-mode fiber, or multimode to single-strand single-mode fiber.
- For a selection of our hot-swappable SFPs, see [page 574](#).
- Supports variable-speed SFPs and user-configurable LinkLoss for isolating cable faults and failures.
- Industrial Equipment (IE) device. Works in extended-temperature areas.

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
High-Density Media Converter System II SFP/SFP Mode Converter Module		
(1) SFP Slot to (1) SFP Slot	LMC5601C-2SFP	

10-/100-Mbps Ethernet VDSL2 Extender Module

- Gives you an easy, affordable way to extend a 10/100 Ethernet network over existing CAT3 voice-grade wiring within buildings or sites.
- Uses second-generation VDSL2 technology (Band Plan 997/998).
- Offers user-selectable symmetrical and asymmetrical data transmission.
- Enables you to exceed 328-foot limits of twisted-pair data cabling.
- Displays maximum VDSL bandwidth and adjusts automatically to obtain best bandwidth performance.

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
High-Density Media Converter System II Ethernet VDSL2 Extender Module		
(1) Twisted-Pair RJ-45 to (1) RJ-11 VDSL2	LMC5601C-VDSL2	

FlexPoint Modular Media Converters

The flexible media converter solution.



The 14-Slot Power Chassis (LMC200) makes the FlexPoint system easy to expand. To order, see p. 605.

- Work as standalone conversion devices or hot-swappable, chassis-based media converters.
- Easy installation — no software required.
- The FlexPoint Power Chassis (page 605) holds up to 14 media converters and features single or dual hot-swappable AC or DC power supplies.
- Plus, the FlexPoint Power Chassis fits into a standard 19" rack to save space.
- **WARRANTY** — 1 Year

FlexPoint™ Modular Media Converters from Black Box are versatile and cost-effective standalone media converters that you can upgrade to a chassis-based system. They provide the ultimate in flexibility and reliability for your expanding multimedia LAN.

FlexPoint offers a very wide range of converter options, including media converters for legacy media such as ThinNet and 10BASE-FL. Your choices include:

- Ethernet
- Fast Ethernet
- Gigabit Ethernet
- UTP
- Single-mode fiber
- Multimode fiber
- ThinNet
- Single-mode to multimode fiber converters
- Long-distance fiber converters
- ATM OC-3
- ATM OC-12
- 10/100 rate converters
- T1/E1 line drivers
- RS-232

The incredible variety and versatility of this system make it ideal for networks that are subject to constant upgrades and changes.

Tailor the system to your requirements. Get the media converters you need now and use them individually. Then, when your LAN grows, mount your media converters on the wall using the 5-Position Rackmounting Kit, or use the media converters as modules in the Power Chassis. The Power Chassis holds 14 media converters and a Single or Dual AC or DC Power Supply.

10BASE-T to BNC Media Converter

- Connect 10BASE-T devices to ThinNet (coax) devices.
- Supports ThinNet cable to 185 meters (606.9 ft.) and up to 30 stations.
- UTP crossover switch plus automatic polarity detection.
- Switch-selectable ThinNet line termination.



LMC210A

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
FlexPoint Modular Media Converter		
10-Mbps UTP to ThinNet		
10BASE-T to BNC	LMC210A	

10BASE-FL to BNC Media Converters

- Connect ThinNet network segments via fiber cable while retaining their collision domain.
- Support single-mode or multimode links to 2 kilometers (1.2 mi.).
- Support ThinNet cable to 185 meters (606.9 ft.) and 30 stations.
- Switch-selectable ThinNet line termination.



LMC211A-MM

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
FlexPoint Modular Media Converters		
10-Mbps Fiber to ThinNet		
10BASE-FL to BNC		
Multimode, 850-nm, 2 km, ST	LMC211A-MM	
Multimode, 1300-nm, 2 km, ST	LMC211A-13MM	
Single-Mode, 1300-nm, 2 km, ST	LMC211A-SM	

10BASE-T to 10BASE-FL Media Converters

- Convert 10BASE-T (twisted pair) to 10BASE-FL (fiber).
- Adapt automatically to 10-Mbps half-duplex or 20-Mbps full-duplex Ethernet.
- Increase bandwidth and distance in full-duplex operation.
- A UTP crossover switch eliminates the need for a crossed cable.



LMC212A-MM-R3

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
FlexPoint™ Modular Media Converters		
10-Mbps UTP to 10-Mbps Fiber		
10BASE-T to 10BASE-FL		
Multimode		
850-nm, 2 km, ST®	LMC212A-MM-R3	
850-nm, 2 km, SC	LMC212A-MM-SC-R2	
1300-nm, 5 km, ST	LMC212A-13MM-R3	
Single-Mode		
1300-nm, 15 km, ST	LMC212A-SM-R3	
1550-nm, 85 km, SC	LMC212A-SM-XLH	
1550-nm, 110 km, SC	LMC212A-SM-SLH	

100BASE-TX to 100BASE-FX and -LX Media Converters

- Convert 100BASE-TX (twisted pair) to 100BASE-FX or -LX (fiber).
- Connect Fast Ethernet switches, hubs, and workstations up to 110 kilometers (68.3 mi.)!
- Autosense half- and full-duplex.
- Manual override switch provides manual control of half- and full-duplex operation.
- The UTP crossover switch eliminates the need for crossed Ethernet cables.
- Multimode and single-mode versions are available.



LMC213A-MMST-R2

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
FlexPoint™ Modular Media Converters		
100-Mbps UTP to 100-Mbps Fiber		
100BASE-TX to 100BASE-FX		
Multimode		
1300-nm, 2 km Full-Duplex, 412 m Half-Duplex, ST®	LMC213A-MMST-R2	
1300-nm, 2 km Full-Duplex, 412 m Half-Duplex, SC	LMC213A-MMSC-R2	
1300-nm, 2 km Full-Duplex, 412 m Half-Duplex, MT-RJ	LMC213A-MMRJ	
100BASE-TX to 100BASE-LX		
Single-Mode		
1300-nm, 25 km, ST	LMC213A-SMST-R2	
1300-nm, 25 km, SC	LMC213A-SMSC-R2	
1300-nm, 25 km, MT-RJ	LMC213A-SMRJ	
1300-nm Plus, 58 km, ST	LMC214A-STP-R2	
1300-nm Plus, 58 km, SC	LMC214A-SCP-R2	
1550-nm, 85 km, SC	LMC213A-SM-XLH-R2	
1550-nm, 110 km, SC	LMC213A-SM-SLH-R2	

10BASE-T/100BASE-TX to 100BASE-FX Media Converters

- Link copper-based 10BASE-T or 100BASE-TX to 100BASE-FX fiber media.
- Function as a Layer 2 switch—each port is capable of learning and aging up to 1K MAC addresses.
- Both UTP and fiber ports support half- and full-duplex operation.
- Order a single-mode version to go longer distances—up to 58 kilometers (36 mi.)!
- UTP port autosenses 10- or 100-Mbps speeds.
- Manual override switch for extra control over fiber and UTP ports.
- Crossover switch provides easy connections to hubs or switches.



LMC100A-R2

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
FlexPoint™ Modular Media Converters		
10/100-Mbps Copper to 100-Mbps Fiber		
10BASE-T/100BASE-TX to 100BASE-FX		
Multimode		
1300-nm, 2 km, ST	LMC100A-R2	
1300-nm, 2 km, SC	LMC100A-SC-R2	
1300-nm, 2 km, MT-RJ	LMC100A-RJ-R2	
Single-Mode		
1300-nm, 28 km, ST	LMC100A-SM-R2	
1300-nm, 28 km, SC	LMC100A-SMSC-R2	
1300-nm, 28 km, MT-RJ	LMC100A-SMRJ-R2	
1300-nm, 58 km, SC	LMC100A-SMSC-LH-R2	

1000BASE-T to 1000BASE-SX and -X Media Converters

- Gigabit speeds! Convert your copper Gigabit Ethernet network to fiber.
- Support IEEE 802.3ab 1000BASE-T and 1000BASE-SX/-X standards.
- Send data from 220 meters (721.7 ft.) up to an incredible 65 kilometers (40.3 mi.), depending on the model.
- Both UTP and fiber ports support full- and half-duplex operation.
- Manual switches give you the option to control port operation.
- Diagnostic LEDs report power availability and status of attached devices.



LMC1003A-R3

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
FlexPoint™ Modular Media Converters		
1000-Mbps UTP to 1000-Mbps Fiber		
1000BASE-T to 1000BASE-SX		
Multimode		
850-nm, 220 m, SC	LMC1003A-R3	
850-nm, 220 m, MT-RJ	LMC1007A-R3	
1000BASE-T to 1000BASE-X		
Single-Mode		
1300-nm, 10 km, SC	LMC1004A-R3	
1300-nm, 10 km, MT-RJ	LMC1008A-R3	
1300-nm, 10 km, LC	LMC1009A-R3	
1300-nm, 25 km, LC	LMC1010A-R3	
1550-nm, 65 km, SC	LMC1006A-R3	
1550-nm, 65 km, LC	LMC1011A-R3	

For more FlexPoint Media Converters, turn the page.



FlexPoint Modular Media Converters, Continued

10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-X SFP Media Converter

- All the features and speed of the LMC1017A series **below** but equipped with a slot for your choice of SFP fiber transceiver.
- Modular! When your network needs change, simply plug in a new SFP for a different fiber type and distance.
- For our selection of SFPs, see **page 574**.

CE Approval — Yes
RoHS — Yes



LMC1017A-SFP

Item	Code	List Price
FlexPoint™ Modular Media Converter 10/100/100-Mbps UTP to 1000-Mbps Fiber SFP 10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-X SFP LMC1017A-SFP		

10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SX and 1000BASE-X Media Converters

- Gigabit speeds! Convert a copper 10/100/1000 network to 1000-Mbps fiber.
- Single-mode models support distances up to 12 kilometers (7.4 mi.).
- Autonegotiate for speed.
- Full- and half-duplex operation.
- To prevent congestion, support automatic and manual pause function for flow control.
- Jumbo frames up to 10,240 bytes.

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
FlexPoint™ Modular Media Converters 10/100/100-Mbps UTP to 1000-Mbps Fiber 10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SX Multimode 850-nm, 550 m, SC LMC1017A-MMSC 850-nm, 550 m, ST® LMC1017A-MMST 10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-X Single-Mode 1310-nm, 12 km, SC LMC1017A-SMSC 1310-nm, 12 km, ST LMC1017A-SMST		

Token Ring UTP to Fiber Media Converter

- Autosenses 4-/16-Mbps Token Ring.
- Supports both active and passive Token Ring MAUs and concentrators.
- The UTP crossover switch eliminates crossed cables.
- Network distance up to 2.5 kilometers (1.5 mi.) on multimode cable.
- Self-configures automatically to operate on Token Ring main ring as well as lobe connections.

CE Approval — Yes
RoHS — Yes



LTM215A-MM

Item	Code	List Price
FlexPoint™ Modular Media Converter Token Ring UTP to Fiber Multimode, 850-nm, 2.5 km, ST LTM215A-MM		

For more FlexPoint Media Converters, turn the page.

100- and 1000-Mbps Fiber-to-Fiber Mode Converters

- Convert, extend mismatched fiber segments.
- Get extra distance with the single-mode—up to 58 kilometers (36 mi.) with the LH models!
- LMC25xA models support 10- and 100-Mbps Ethernet and full-duplex operation.
- LMC100xA models support Gigabit Ethernet communications and half- or full-duplex operation.



LMC1001A

CE Approval — All except for LMC250A, LMC1000A
RoHS — Yes

Item	Code	List Price
FlexPoint™ Modular Media Converters 100-Mbps Fiber-to-Fiber Mode Converters 850-nm Multimode to 1300-nm Single-Mode 500 m to 28 km ST to ST LMC251A-ST SC to SC LMC251A-SC 5 km to 58 km SC to SC LMC251A-SC-LH 1300-nm Multimode to 1300-nm Multimode 5 km to 5 km Full-Duplex/412 m to 412 m Half-Duplex ST to ST LMC253A-ST SC to SC LMC253A-SC 1300-nm Multimode to 1300-nm Single-Mode 5 km to 28 km ST to ST LMC250A-ST SC to SC LMC250A 5 km to 58 km ST to ST LMC250A-ST-LH SC to SC LMC250A-LH 1000-Mbps Fiber-to-Fiber Mode Converters 850-nm Multimode to 1300-nm Single-Mode 220 m to 5 km SC to SC LMC1001A 850-nm Multimode to 1550-nm Single-Mode 220 m to 50 km SC to SC LMC1000A		

Fiber-to-Fiber Mode Converters for ATM OC-3 and OC-12

- Support OC-3 or OC-12 standards over ATM and SONET networks.
- Perfect for extending line drops in corporations, telco switching offices, and other intercampus telecommunication systems.

CE Approval — LMC156A-ST-LH, LMC156A-SC-LH, LMC155A-LH, LMC622A-LLH
RoHS — Yes

Item	Code	List Price
FlexPoint™ Modular Media Converters Fiber-to-Fiber Mode Converters for ATM OC-3 850-nm Multimode to 1300-nm Single-Mode, 5 km to 28 km ST to ST LMC156A-ST SC to SC LMC156A-SC 850-nm Multimode to 1300-nm Single-Mode, 5 km to 50 km ST to ST LMC156A-ST-LH SC to SC LMC156A-SC-LH 1300-nm Multimode to 1300-nm Single-Mode, 5 km to 28 km ST to ST LMC155A-ST SC to SC LMC155A 1300-nm Multimode to 1300-nm Single-Mode, 5 km to 58 km SC to SC LMC155A-LH Fiber-to-Fiber Mode Converters for ATM OC-12 LX 1300-nm Multimode to 1300-nm Single-Mode, 550 m to 20 km SC to SC LMC622A-LH 1300-nm Multimode to 1550-nm Single-Mode, 550 m to 50 km SC to SC LMC622A-LLH		



To conveniently rackmount up to five FlexPoint Media Converters, choose the 5-Position Rackmounting Kit (LMC205).

RS-232 to Fiber Media Converters

- Work as serial RS-232 fiber converters and extenders that autosense speeds up to 115.2 kbps.
- Feature DTE/DCE configuration for easy connections to DTE or DCE devices using straight-through cabling.
- Support half- and full-duplex.
- Include remote loop capability for remote fiber testing and LEDs for status monitoring.
- Asynchronous, point-to-point communications.



ME660A-MST

CE Approval — Yes
RoHS — All except for ME662A-SRJ

Item	Code	List Price
FlexPoint Modular Media Converters		
RS-232 to Fiber, DB9 to		
Multimode		
850-nm, 2.5 km, ST®	ME660A-MST	
850-nm, 2.5 km, SC	ME660A-MSC	
1310-nm, 5 km, ST®	ME661A-MST	
1310-nm, 5 km, SC	ME661A-MSC	
1310-nm, 5 km, MT-RJ	ME661A-MRJ	
Single-Mode		
1310-nm, 30 km, ST	ME662A-SST	
1310-nm, 30 km, SC	ME662A-SSC	
1310-nm, 30 km, MT-RJ	ME662A-SRJ	
1310-nm, 60 km, SC	ME663A-SSC	

T1/E1 Copper to Fiber Line Drivers

- Extend T1/E1 over fiber, converting to multimode or single-mode fiber.
- Feature a crossover switch on the RJ-45/RJ-48 port for easy connections to equipment.
- Equipped with dry relay contacts for connection to alarm equipment on Pins 3 and 6 of the RJ-45 connector.
- Get extra distance with the single-mode versions—up to 58 kilometers (36 mi.) with the MT664A-SSC!
- LEDs display the T1/E1 link status, diagnostic modes of operation, and line segment errors.
- Support AMI, B8ZS, and HDB3 line codes.



MT660A-MM

CE Approval — Yes
RoHS — Yes

Item	Code	List Price
FlexPoint Modular Media Converters		
T1/E1 Copper to Fiber Line Drivers		
Multimode		
1310-nm, 5 km, ST	MT660A-MM	
1310-nm, 5 km, SC	MT662A-MSC	
Single-Mode		
1310-nm, 28 km, ST	MT661A-SM	
1310-nm, 28 km, SC	MT663A-SSC	
1310-nm, 58 km, SC	MT664A-SSC	



Use Wallmounting Hardware (LMC206-WALL) to mount individual FlexPoint Media Converters on virtually any surface.

CE Approval — All powered accessories
RoHS — PSFP200

Item	Code	List Price
You may also need accessories or replacement parts...		
FlexPoint 14-Slot Power Chassis		
Single Power Supply		
115–230 VAC	LMC200	
48-VDC	LMC200A-DC	
Dual Power Supply		
115–230 VAC	LMC200-2PS	
48-VDC	LMC200A-2PS-DC	
5-Position Rackmounting Kit	LMC205	
Wallmounting Hardware	LMC206-WALL	
DIN Rail Mounting Kit	LMC207-DRM	
Extra Power Supply for Power Chassis		
115–230 VAC	PSFP200	
48 VDC	PSFP20-DC	
DC Power Converter, 18–72 VDC, Standalone		
	LMC204A	
Wallmounting Kit for LMC204A	LMC206A-WALL-DC	
International Power Supply for All FlexPoint Models (9 V, 1.0 A)		
	LMC203A	

Click and find at blackbox.com.
Specifications for FlexPoint items

Dynamic Fiber Conversion System

- Many module choices—including 10/100/1000 Ethernet.
- Modules with VLAN tagging enable you to shut down remote connections to thwart hackers.
- New chassis and modules that enable XFP/SFP+ 10-Gbps uplinks (see [page 610](#)).
- Most modules have Network Equipment Building System (NEBS) Level 3 certification.
- Many modules are hot-swappable. For details, contact our FREE Tech Support.
- SNMP manageable or use without management.
- 19- and 5-slot chassis available with single or redundant, hot-swappable AC or DC power supplies.
- ♦♦ **WARRANTY** — 1 Year

The Dynamic Fiber Conversion System is the battleship of media conversion systems. It's tough, extremely versatile, and manageable, making it perfect for a wide range of network demands. Our Tech Support team raves about it and consistently recommends it as its top choice for enterprise-level media conversion systems. And now the system is even more versatile with the addition of SFP+ and XFP compatible modules and standalone chassis (see [page 610](#)) for 10-Gigabit uplinks.

The Dynamic Fiber Conversion System is built to last. It's NEBS Level 3 certified, meeting the stringent durability requirements for carrier-class applications. NEBS Level 3 certification guarantees that the equipment performs well in harsh environmental conditions and does not interfere with nearby electronic devices. To verify certification of individual modules, call our FREE Tech Support.

The system is built to withstand harder use than most media conversion systems and offers a wide choice of modules, including autosensing 10/100/1000 Ethernet media converters. All modules are hot swappable (although there are special procedures for hot swapping DC power supplies). Plus, the Dynamic Fiber Conversion System is fully SNMP manageable. You aren't going to find a harder working, more versatile system anywhere!

This tough system brings you



The 19-Slot Power Chassis (LMC3004A) shown with modules.

Chassis

Choose from four different powered chassis with a choice of power supplies. All Power Chassis are constructed of rugged metal and are NEBS Level 3 tested and certified. All but the 1-Slot Power Chassis are SNMP manageable with the addition of the SNMP Management Module.

The **19-Slot Power Chassis** is available with single or dual AC or DC power supplies and holds up to three universal 110/230 AC or -48 VDC power supplies. When more than one power supply is installed, they provide both redundancy and load sharing. The 2U (3.5") chassis mounts in any standard 19" rack. A 23" rackmount kit is available by special request—for details, call our FREE Tech Support. Backplane speed is 100-Mbps half-duplex or 200-Mbps full-duplex, enabling two modules to share a broadcast domain.

Choose the **5-Slot Power Chassis** for smaller applications. It's only 1U (1.75") high and mounts in any standard 19" rack. Shared backplane speed is 100-Mbps half-duplex or 200-Mbps full-duplex, providing 1.0-Gbps total switching performance for five slots at 200 Mbps duplex each. Choose a **1-Slot or 2-Slot Power Chassis** for desktop use.

TECH SPECS

Chassis:

Environmental — 19-, 5- and 1-Slot Chassis: Operating Temperature:

32 to 122° F (0 to 50° C);

Storage Temperature: -40 to 176° F (-40 to 80° C);

Humidity: 0 to 90% noncondensing;

2-Slot Chassis: Operating Temperature: 32 to 113° F (0 to 45° C);

Storage Temperature: -40 to 176° F (-40 to 80° C);

Humidity: 0 to 90% noncondensing

CE Approval — Yes

RoHS — Except LMC002A, LMC3017C, LMC3003A-R2, LMC3020C-R2—LMC3021C-R2

Power — LMC3004A: Internal power supply: autosensing 110/230 VAC, 50/60 Hz, 60 watts maximum;

LMC3005A: Dual internal power supplies: autosensing 110/230 VAC, 50/60 Hz, 60 watts maximum per power supply;

LMC3007A: Internal power supply: ± 48 VDC, 66 watts maximum;

LMC3008A: Dual internal power supplies: ± 48 VDC, 66 watts maximum per power supply;

LMC3010A: Internal power supply: autosensing 110/230 VAC, 50/60 Hz, 83 watts maximum;

LMC3080A: Dual internal power supplies: autosensing 110/230 VAC, 50/60 Hz, 83 watts maximum per power supply;

LMC3012A: Internal power supply: ± 48 VDC, 47 watts maximum;

LMC3081A: Dual internal power supplies: ± 48 VDC, 47 watts maximum per power supply;

LMC3014A: Internal power supply: autosensing 110/230 VAC, 50/60 Hz,

83 watts maximum;

LMC3082A: Internal power supply: ± 48 VDC, 6.6 watts maximum;

LMC3015A: External power supply: 110 VAC, 60 Hz, 22 watts maximum;

LMC3016A: External power supply: 230 VAC, 50 Hz, 22 watts maximum

Size — 19-Slot Chassis: 3.5"H x 17.2"W x 14"D (8.9 x 43.7 x 35.6 cm);

5-Slot Chassis: 1.75"H x 17.2"W x 9"D (4.4 x 43.7 x 22.9 cm);

2-Slot Chassis: 1.9"H x 6.7"W x 5.5"D (4.8 x 17 x 14 cm);

1-Slot Chassis: 1"H x 3.8"W x 5.5"D (2.5 x 9.7 x 14 cm)

Weight — 19-Slot Chassis: Single power supply: 16 lb. (7.3 kg);

Dual power supplies: 18.5 lb. (8.4 kg);

5-Slot Chassis: Single power supply: 7.5 lb. (3.4 kg);

Dual power supplies: 9 lb. (4.1 kg);

2-Slot Chassis: 2.5 lb. (1.1 kg);

1-Slot Chassis: 1.5 lb. (0.7 kg)

Modules, facing page:

Environmental — Operating Temperature: 32 to 122° F (0 to 50° C);

Storage Temperature: -40 to 176° F (-40 to 80° C);

Humidity: 0 to 95% noncondensing

CE Approval — Yes

RoHS — All except LMC3021C-R2, LMC3020C-R2

Power — From the interface, 3.3 watts

Size — 2.8"H x 0.9"W x 4.5"D (7.1 x 2.3 x 11.4 cm)

Weight — 0.5 lb. (0.2 kg)

serious conversion for serious networks.



The 5-Slot Power Chassis uses less rack space — only 1U — but still offers optional management and hot-swappable, redundant AC or DC power supplies.

NEBS
Level 3

The 1-Slot Power Chassis is unmanaged; you can use the SNMP Management Module with the 2-Slot Power Chassis. These chassis come with one fixed AC or DC power supply.

Management Module

The Dynamic Fiber Conversion System is completely SNMP manageable. Just install one **SNMP Management Module** in each chassis you wish to manage. You can manage the system with SNMP and Telnet™, in-band or out-of-band. Connect up to 16 SNMP Management Modules in different

chassis by using **SNMP Management Module Cascade Cables** and manage them as a single IP address.

For software customized to the Dynamic Fiber Conversion System, order **Management Software** works as a standalone application in Windows® or you can integrate it with a management program such as HP® OpenView®. The software features an intuitive GUI that gives you real-time network status and control of your system. It monitors power, voltage, current, and temperature, and enables you to manage and configure the system.

Item	Code	List Price
Dynamic Fiber Conversion System		
19-Slot Power Chassis, Managed, Rackmount		
with (1) 110-VAC Power Supply	LMC3004A	
with (2) 110-VAC Power Supplies	LMC3005A	
with (1) -48-VDC Power Supply	LMC3007A	
with (2) -48-VDC Power Supplies	LMC3008A	
5-Slot Power Chassis, Managed, Rackmount		
with (1) 110-VAC Power Supply	LMC3010A	
with (2) 110-VAC Power Supplies	LMC3080A	
with (1) -48-VDC Power Supply	LMC3012A	
with (2) -48-VDC Power Supplies	LMC3081A	
2-Slot Power Chassis, Managed, for Desktop Use		
with (1) 110-VAC Power Supply	LMC3014A	
with (1) -48-VDC Power Supply	LMC3082A	
1-Slot Power Chassis, Unmanaged, for Desktop Use		
with (1) 110-VAC Power Supply	LMC3015A	
with (1) 230-VAC Power Supply	LMC3016A	
Blank Panels for Unused Slots	LMC3002A	
Wallmounting Kit for 1-or 2- Slot Chassis	LMC3017C	
Spare Power Supplies		
for 19-Slot Chassis (Holds up to Three Power Supplies)		
AC	LMC3006P	
DC	LMC3009P	
for 5-Slot Chassis (Holds up to Two Power Supplies)		
AC	LMC3011P	
DC	LMC3013P	
SNMP Management Module	LMC3000A-R2	
Management Software	LMC3003A-R2	
SNMP Management Module Cascade Cable, 3-ft. (0.9-m)	LMC3001A	
UTP to Multimode Duplex Fiber Modules		
10BASE-T to 10BASE-FL		
850-nm, 2 km		
ST®	LMC3018C-R2	
SC	LMC3021C-R2	
1310-nm, 5 km		
ST	LMC3019C-R2	

Item	Code	List Price
Dynamic Fiber Conversion System (Continued)		
100BASE-TX to 100BASE-FX		
1310-nm, 5 km		
ST	LMC3023C	
SC	LMC3026C	
10BASE-T/100BASE-TX to 100BASE-FX		
1310-nm, 5 km		
ST	LMC3033C	
SC	LMC3036C	
1000BASE-T to 1000BASE-SX		
850-nm, 220 m/550 m		
SC	LMC3051C-R2	
MT-RJ	LMC3054C-R2	
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SX		
850-nm, 220 m/ 550 m		
SC	LMC3058C	
UTP to Single-Mode Duplex Fiber Modules		
10BASE-T/10BASE-FL, 1310-nm		
30 km, ST®	LMC3020C-R2	
30 km, SC	LMC3022C-R2	
100BASE-TX to 100BASE-FX, 1310-nm		
30 km, ST	LMC3024C	
30 km, SC	LMC3027C	
60 km, ST	LMC3025C	
60 km, SC	LMC3028C	
10BASE-T/100BASE-TX to 100BASE-FX, 1310-nm		
30 km, ST	LMC3034C	
30 km, SC	LMC3037C	
60 km, ST	LMC3035C	
1000BASE-TX to 1000BASE-LX, 1310-nm		
12 km, SC	LMC3052C-R2	
12 km, MT-RJ	LMC3055C-R2	
34 km, SC	LMC3053C-R2	
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-LX, 1310-nm		
12 km, SC	LMC3059C	
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-LX, 1550-nm		
80 km, SC	LMC3061C	

More system options, turn the page. »

Dynamic Fiber Conversion System, Continued

UTP-to-Fiber Modules

Extend your copper network over fiber optic cable. The Dynamic Fiber Conversion System offers both multimode and single-mode dual-fiber modules as well as single-mode, single-fiber modules with support for distances from 2 to 80 kilometers (1.2 to 49.7 mi.).

The 10-, 100-, and 1000-Mbps modules are Layer 1 media converters. They don't monitor packet size, they're transparent to oversized packets such as 802.1Q, and they don't connect to the backplane.

Autosensing 10-/100-Mbps or 10-/100-/1000-Mbps modules (LMC3033C-LMC3042C, LMC3058C-LMC3063C) are Layer 2 media converters that can act on oversized packets. They pass packets up to 1536 bytes and accommodate VLANs.

UTP to Multimode Duplex Fiber Modules enable you to extend your network over a multimode fiber pair. Modules are available to support distances of up to 60 kilometers (37.2 mi.) or speeds of up to 1000 Mbps. There is even a module that supports autosensing 10-/100-/1000-Mbps Ethernet.

UTP to Single-Mode Duplex Fiber Modules enable you to extend your network over a single-mode fiber pair.

UTP to Single-Mode Single-Strand Fiber Modules extend your network over just one single-mode fiber strand, enabling you to get double the use from duplex fiber cable. These modules work by using different wavelengths to send and receive data.

Mode Converters

Mode converters interconnect multimode and single-mode fiber optic cable, enabling you to extend your multimode fiber network over long distances with single-mode fiber optic cable.

The **100BASE-FX Multimode Duplex to 100BASE-FX Single-Mode Duplex** modules enable you to extend your multimode fiber runs up to 120 kilometers (74.5 mi.) over single-mode cable. The **Gigabit 1000BASE-SX Multimode Duplex to 1000BASE-LX Single-Mode Duplex** modules support distances of up to 80 kilometers (49.7 mi.). The **1000BASE-X Multimode Duplex to 1000BASE-X Single-Mode Single-Strand** media converter modules enable you to seamlessly connect multimode duplex fiber to a single strand of single-mode fiber.

Mode converter modules have Link Fault Detection (Link Propagation) for remote troubleshooting. All are Layer 1 media converters and do not connect to the backplane.

Redundant Modules

Redundant Modules provide redundant link operation for networks that require copper or fiber link redundancy. These modules provide the hot backup you need for your critical connections, switching to the redundant link within 100 microseconds if the primary link goes down.

All ports support full- or half-duplex operation; UTP ports autonegotiate duplex, and fiber ports can be set manually. All UTP ports support MDI/MDI-X, eliminating the need for crossover cables. All ports support LinkLoss™ Carry Forward (Link Propagation).

Redundant modules do not connect to the backplane and must be deployed in pairs.

Switch Module

The switch module (LMC3050C) is not a media converter, but it works with the Dynamic Fiber Conversion System. Use it to add four switched autosensing 10/100BASE-T ports wherever you need them.

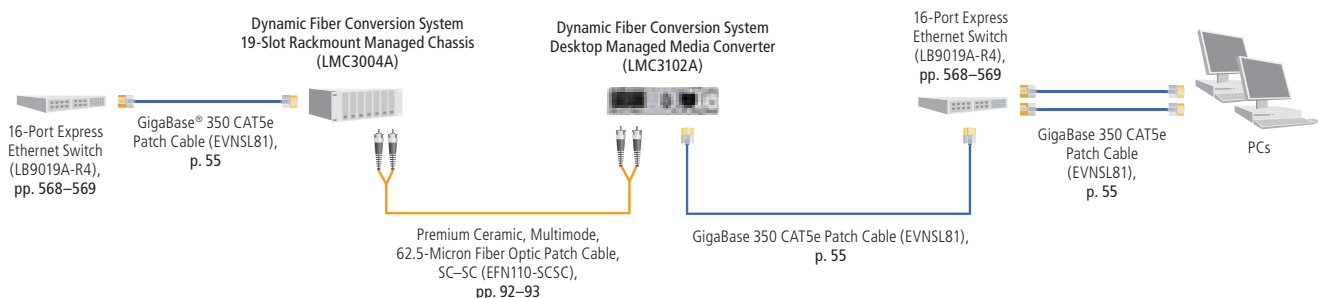
The switch module is autosensing for both speed and duplex with hardware control available for two ports and software control available for all four ports.

Because the switch module supports MDI/MDI-X crossover, you never need to worry about having a crossover cable. Port 1 has a manual crossover switch; Ports 2, 3, and 4 feature automatic crossover detection.

The switch module can pass through oversized packets up to a maximum of 1536 bytes, easily accommodating normal VLAN packets (1522 bytes) as well as extended VLAN packets. It also supports MIB-Stats and per-port VLANs. Nine status LEDs enable you to view switch status at a glance.

ATM OC3 Modules

ATM OC3 modules are mode converters that support OC3 over ATM or SONET. They enable you to convert legacy ATM fiber runs from duplex multimode to duplex single-mode fiber optic cable, adding up to 30 kilometers (18.6 mi.) of distance to your OC3 network.



For more system options, turn the page.



Learn more at blackbox.com/go/networking

White paper, Media Converters

Product data sheet, Dynamic Fiber Conversion System

NEBS
Level 3

UTP to Single-Mode Duplex Fiber Module, 10BASE-T/100BASE-TX to 100BASE-FX, 1310-nm, SC (LMC3037C)



2-Slot Power Chassis (LMC3014A) shown with LMC3029C (top) and LMC3058C (bottom)

T1/E1 Modules

T1/E1 modules convert copper T1 lines with RJ-48 connectors to single-mode or multimode fiber for long-range transmission. These extenders provide electrical protection and isolation, increasing network reliability.

Test modes include Local Loopback, Force 1s to Copper, Force 1s to Fiber, and Fiber Test. The modules support B8ZS and AMI modes. The B8ZS mode is the default mode; when both Local Loopback and Fiber Test functions are enabled, the module is forced into AMI mode. A DCE/DTE switch eliminates the need for crossover cable when connecting to devices such as PBXs and CSUs.

UTP to Coax Module

This module provides quick and simple 10BASE-T UTP to 10BASE2 coax conversion.

TECH SPECS

Environmental — Operating Temperature: 32 to 122° F (0 to 50°C);
Storage Temperature: -40 to 176° F (-40 to 80° C);
Humidity: 0 to 95% noncondensing

CE Approval — Yes

RoHS — Yes

Power — From the interface, 3.3 watts

Size — 2.8"H x 0.9"W x 4.5"D (7.1 x 2.3 x 11.4 cm)

Weight — 0.5 lb. (0.2 kg)

Item	Code	List Price
Dynamic Fiber Conversion System		
UTP to Single-Mode Single-Strand Fiber Modules		
100BASE-TX to 100BASE-FX		
40 km, SC (Order one of each.)		
1310-nm TX/1550-nm RX	LMC3030C	
1550-nm TX/1310-nm RX	LMC3032C	
10BASE-T/100BASE-TX to 100BASE-FX		
20 km, SC (Order one of each.)		
1310-nm TX/1550-nm RX	LMC3039C	
1550-nm TX/1310-nm RX	LMC3041C	
1000BASE-TX to 1000BASE-LX		
20 km, SC (Order one of each.)		
1310-nm TX/1550-nm RX	LMC3056C-R2	
1550-nm TX/1310-nm RX	LMC3057C-R2	
Mode Converters		
100BASE-FX Multimode Duplex to 100BASE-FX Single-Mode Duplex		
1310-nm/1310-nm, Multimode, 5 km/Single-Mode		
30 km, ST	LMC3064C	
30 km, SC	LMC3066C	
60 km, ST	LMC3065C	
1310-nm/1550-nm, Multimode, 5 km/Single-Mode		
120 km, SC	LMC3068C	
1000BASE-SX Multimode Duplex to 1000BASE-LX Single-Mode Duplex		
850-nm/1310-nm, Multimode, 220/550 m/Single-Mode		
12 km, SC	LMC3069C	
80 km, SC	LMC3071C	
1000BASE-X Multimode Duplex to 1000BASE-X Single-Mode		
Single-Strand, Multimode, 220/550 m/Single-Mode		
20 km, SC (Order one of each.)		
1310-nm TX/1550-nm RX	LMC3072C	
1550-nm TX/1310-nm RX	LMC3073C	

Item	Code	List Price
Dynamic Fiber Conversion System (Continued)		
Redundant Modules		
UTP to Dual UTP		
(1) 100BASE-TX to (2) 10BASE-T/100BASE-TX		
100 m, RJ-45	LMC3043C	
UTP to Dual Multimode Duplex		
(1) 100BASE-TX to (2) 100BASE-FX, 1310-nm		
5 km, SC	LMC3047C	
UTP to Dual Single-Mode Duplex		
(1) 100BASE-TX to (2) 100BASE-FX, 1310-nm		
30 km, ST	LMC3045C	
30 km, SC	LMC3048C	
60 km, ST	LMC3046C	
60 km, SC	LMC3049C	
Switch Module		
4-Port 10/100 Ethernet		
RJ-45	LMC3050C	
ATM OC3 Module, Multimode Duplex to Single-Mode Duplex Fiber		
1310-nm/1310-nm		
5 km/30 km, SC	LMC3075C	
T1/E1 Copper to 1310-nm Multimode Duplex Fiber		
5 km, ST	LMC3076C	
5 km, SC	LMC3078C	
T1/E1 Copper to 1310-nm Single-Mode Duplex Fiber		
30 km, ST	LMC3077C	
30 km, SC	LMC3079C	
UTP to Coax Module		
10BASE-T to 10BASE2	LMC3083C	

More system options, turn the page. »

Dynamic Fiber Conversion System, Continued



CX4 Cable

- Supports 10-Gbps CX4 Ethernet at distances of up to 15 meters.
- High speed, low latency. Shielded to prevent alien crosstalk.
- Terminated with InfiniBand™ connectors.
- For use with our CX4 XFP (LXP-10G-CX4) below.
- **WARRANTY** — Lifetime

RoHS — Yes

Item	Code	List Price
CX4 Cable		
1-m (3.3-ft.)	EHC420-001M	
3-m (9.8-ft.)	EHC420-003M	
5-m (16.4-ft.)	EHC420-005M	
15-m (49.2-ft.)	EHC420-015M	

Black Box Explains
CX4 cable.

The copper cable used for 10GBASE-CX4 Ethernet doesn't resemble your average four-pair copper Ethernet cable. To reliably accommodate extremely high-speed data connections, CX4 cable has four shielded twinax copper pairs in each direction—eight pairs total. It's terminated, not with familiar RJ-45 connectors, but with the same InfiniBand connectors used by the InfiniBand switched fabric interface. CX4 supports a shorter distance than most Ethernet standards, too—the specification for 10GBASE-CX4 permits a distance of only 15 meters on 24 AWG cable.

Although the newer 10GBASE-T standard offers 10-Gigabit Ethernet with greater range and more familiar-looking cables and connectors, 10GBASE-CX4 is still a data center staple because it offers both a much lower latency and lower power consumption than 10GBASE-T.

A question that's often asked is whether there's a difference between CX4 Ethernet cable and CX4 InfiniBand cable. The answer is, maybe. Although the cables seem identical, they're tested to different standards. In practice, however, most high-quality CX4 cable may be used for either InfiniBand or 10GBASE-CX4, but the only way to be 100% sure is to try the cable.

**Chassis and modules for 10-Gbps Transceivers**

The Dynamic Fiber Conversion System now also offers chassis and modules that accept XFP and SFP+ 10-Gbps transceivers—a combination that's ideal for 10-Gbps mode conversion and fiber extension.

The compact 2-Slot Chassis and the 2-Slot Modules each accommodate two XFP or SFP+ transceivers. Use the chassis as a standalone unit; use the modules in any Dynamic Fiber Conversion System chassis (see [page 607](#)).

Compact XFP and SFP+ transceivers support fiber 10-Gbps Ethernet. Additionally XFP transceivers support CX4 copper links—see our CX4 Cable at [left](#). The transceivers are protocol transparent in the 9.95- to 11.32-Gbps range. For more information about transceivers, see *Black Box Explains SFP, SFP+, and XFP Transceivers*, [page 573](#).

TECH SPECS**2-Slot Standalone Chassis for 10-Gbps Transceivers:**

Environmental — Operating temperature: 32 to 122° F (0 to 50° C); Storage temperature: -40 to 176° F (-40 to 80° C); Humidity: 5 to 95% noncondensing
Standards — IEEE 802.3, IEEE 802.3ah, IEEE 802.1Q, IEEE 802.1p
CE Approval — Yes
RoHS — Yes
Power — 110–120 VAC, 60 Hz external power supply, 10.8 watts maximum (100–240 VAC or DC power supply available on request)
Size — 1"H x 3.5"W x 4.7"D (2.5 x 8.9 x 11.9 cm)
Weight — 1.5 lb. (0.7 kg)

2-Slot Modules for 10-Gbps Transceivers:

Environmental — Operating temperature: 32 to 122° F (0 to 50° C); Storage temperature: -40 to 176° F (-40 to 80° C); Humidity: 5 to 95% noncondensing
Standards — IEEE 802.3, IEEE 802.3ah, IEEE 802.1Q, IEEE 802.1p
CE Approval — Yes
RoHS — Yes
Power — From the interface, 3.63 watts typical, 8.25 watts maximum
Size — 2.8"H x 0.9"W x 4.5"D (7.1 x 2.3 x 11.4 cm)
Weight — 0.5 lb. (0.2 kg)
10-Gbps Transceivers:
Standards — IEEE 802.3, IEEE 802.3ah, IEEE 802.1Q, IEEE 802.1p
RoHS — Yes
Power — From the interface

Item	Code	List Price
Dynamic Fiber Conversion System (Continued)		
2-Slot Standalone Chassis for 10-Gbps Transceivers		
XFP to XFP	LMC11002A	
SFP+ to SFP+	LMC11012A	
SFP+ to XFP	LMC11022A	
2-Slot Modules for 10-Gbps Transceivers		
XFP to XFP	LMC11002C	
SFP+ to SFP+	LMC11012C	
SFP+ to XFP	LMC11022C	
10-Gbps Transceivers		
XFP Transceivers		
10GBASE-SR, 850-nm Multimode, 300 m, LC	LXP-10G-MMLC	
10GBASE-LR, 1310-nm Single-Mode, 10 km, LC	LXP-10G-SMLC10	
10GBASE-CX4, 15 m	LXP-10G-CX4	
SFP+ Transceivers		
10GBASE-SR, 850-nm Multimode, 300 m, LC	LSP-10G-MMLC	
10GBASE-LR, 1310-nm Single-Mode, 10 km, LC	LSP-10G-SMLC10	

« For more system options, turn the page.



Desktop Managed Media Converter, 10BASE-T/100BASE-TX to 100BASE-FX, ST (LMC3100A)

Desktop Managed Media Converters

For a remote media converter that's also fully managed, choose a Desktop Managed Media Converter. These compact standalone media converters are completely compatible with modules from our Dynamic Fiber Conversion System (as noted in the prices below).

The Dynamic Fiber Conversion System is also compatible with many more managed and unmanaged standalone media converters. To find the best match, call our FREE Tech Support.

TECH SPECS

Desktop Managed Media Converters:

Environmental — Operating temperature:

32 to 122° F (0 to 50° C);
Storage temperature: -40 to 176° F
(-40 to 80° C);

Humidity: 5 to 95% noncondensing

Standards — IEEE 802.3, IEEE 802.3ah,
IEEE 802.1Q, IEEE 802.1p

CE Approval — Yes

RoHS — Yes

Power — 110–120 VAC, 60 Hz external
power supply, 8.4 watts maximum
(100–240 VAC or DC power supply
available on request)

Size — 1"H x 3.5"W x 4.7"D
(2.5 x 8.9 x 11.9 cm)

Weight — 1.5 lb. (0.7 kg)

Item	Code	List Price
Dynamic Fiber Conversion System (Continued)		
For remote units order...		
Desktop Managed Media Converters		
10BASE-T/100BASE-TX to 100BASE-FX, 1310 nm, Multimode, 5 km		
ST (Compatible with LMC3033C on p. 607.)	LMC3100A	
SC (Compatible with LMC3036C on p. 607.)	LMC3102A	
10BASE-T/100BASE-TX to 100BASE-FX, 1310 nm, Single-Mode, 30 km		
ST (Compatible with LMC3034C on p. 607.)	LMC3101A	
SC (Compatible with LMC3037C on p. 607.)	LMC3103A	
10BASE-T/100BASE-TX to 100BASE-FX, Single-Mode, Single-Strand		
20 km		
1310-nm TX/1550-nm RX, SC (Compatible with LMC3031C on p. 609.)	LMC3104A	
1550-nm TX/1310-nm RX, SC (Compatible with LMC3029C on p. 609.)	LMC3106A	
40 km		
1310-nm TX/1550-nm RX, SC (Compatible with LMC3032C on p. 609.)	LMC3105A	
1550-nm TX/1310-nm RX, SC (Compatible with LMC3030C on p. 609.)	LMC3107A	

NOTE: Desktop Managed Media Converters are also available with DC power supplies. For more information, call our FREE Tech Support.

e Black Box Explains

10-Gigabit Ethernet.

10-Gigabit Ethernet, sometimes called 10-GbE or 10 GgE, is the latest improvement on the Ethernet standard, ratified in 2003 for fiber as the 802.3ae standard, in 2004 for CX4 cable as the 802.3ak standard, and in 2006 for UTP as the 802.3an standard.

10-Gigabit Ethernet offers ten times the speed of Gigabit Ethernet. This extraordinary throughput plus compatibility with existing Ethernet standards has resulted in 10-Gigabit Ethernet quickly becoming the new standard for high-speed network backbones, largely supplanting older technologies such as ATM over SONET. 10-Gigabit Ethernet has even made inroads in the area of storage area networks (SAN) where Fibre Channel has long been the dominant standard. This new Ethernet standard offers a fast, simple, relatively inexpensive way to incorporate super-high-speed links into your network.

Because 10-Gigabit Ethernet is simply an extension of the existing Ethernet standards family, it's a true Ethernet standard—it's totally backwards compatible and retains full compatibility with 10-/100-/1000-Mbps Ethernet. It has no impact on existing Ethernet nodes, enabling you to seamlessly upgrade your network with straightforward upgrade paths and scalability.

10-Gigabit Ethernet is also more efficient than other high-speed standards. Because it uses the same Ethernet frames as earlier Ethernet standards, it can be integrated into your network using switches rather than routers.

Unlike earlier Ethernet standards, which operate in half- or full-duplex, 10-Gigabit Ethernet operates in full-duplex only, eliminating collisions and abandoning the CSMA/CD protocol used to negotiate half-duplex links. It maintains MAC frame compatibility with earlier Ethernet standards with 64- to 1518-byte frame lengths. The 10-Gigabit standard does not support jumbo frames, although there are proprietary methods for accommodating them.

Common 10-Gigabit Ethernet standards

10GBASE-SR (Short-Range) is a serial short-range fiber standard that operates over two multimode fibers. It has a range of 26 to 82 meters (85 to 269 ft.) over legacy 62.5-µm 850-nm fiber and up to 300 meters (984 ft.) over 50-µm 850-nm fiber.

10GBASE-LR (Long-Range) is a serial long-range 10-Gbps Ethernet standard that operates at ranges of up to 25 kilometers (15.5 mi.) on two 1310-nm single-mode fibers.

10GBASE-ER (Extended-Range) is similar to 10GBASE-LR but supports distances up to 40 kilometers (24.9 mi.) over two 1550-nm single-mode fibers.

10GBASE-LX4 uses Coarse-Wavelength Division Multiplexing (CWDM) to achieve ranges of 300 meters (984 ft.) over two legacy 850-nm multimode fibers or up to 10 kilometers (6.2 mi.) over two 1310-nm single-mode fibers. This standard multiplexes four data streams over four different wavelengths in the range of 1300 nm. Each wavelength carries 3.125 Gbps to achieve 10-Gigabit speed.

10GBASE-CX4 is a standard that enables Ethernet to run over CX4 cable, which consists of eight copper twinax pairs bundled into a single cable. Because this standard uses a specialized cable at short distances, 10GBASE-CX4 is generally used for data center interconnects.

10GBASE-T is the 10-Gigabit standard that uses the familiar shielded or unshielded copper UTP cable. It operates at distances of up to 55 meters (180 ft.) over existing Category 6 cabling or up to 100 meters (328 ft.) over augmented Category 6, or "6a," cable.

Buyer's Guide | Console/Terminal/Device Servers

For product details, see the page listed or go to blackbox.com.

Number of Serial Ports	Type of Serial Port	Ethernet Ports	Serial Standard (s)	USB Ports	Power	Memory	Out-of-band	List Price	Code	Product Name
1-Port	DB9 M	(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, switch selectable	—	Single external AC	4 MB embedded flash 16 MB RAM	—		LES4011A	10/100 Terminal Server, p. 613
		(1) 10-/100-Mbps RJ-45	RS-232	—	PoE	2 MB flash 8 MB SDRAM	—		LPD401A	Power over Ethernet to RS-232 Converter, p. 614
		(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, software selectable	—	Single external AC	8 MB embedded flash 32 MB RAM	—		LES5011A	10/100 Secure Device Server, p. 613
	DB25 M	(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, switch selectable	—	Single external AC	4 MB embedded flash 16 MB RAM	—		LES4012A	10/100 Terminal Server, p. 613
	DB9 M	(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, software selectable	—	Single external AC	8 MB embedded flash 16 MB SDRAM	—		LES1101A	Value Line Secure Device Server, p. 613
	DB25 F	(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, switch selectable	—	Single external AC	4 MB embedded flash 16 MB RAM	—		LES4013A	10/100 Terminal Server, p. 613
		(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, software selectable	—	Single external AC	2 MB flash 2 MB EPROM	—		LES290A	RS-232/422/485 Device Server, p. 614
		(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, software selectable	—	Single external AC	8 MB embedded flash 32 MB RAM	—		LES5013A	10/100 Secure Device Server, p. 613
	RJ-45	(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, switch selectable	—	Single external AC	4 MB embedded flash 16 MB RAM	—		LES4014A	10/100 Terminal Server, p. 613
		(1) 10BASE-T RJ-45	RS-232	—	Single external AC	64 KB RAM 2 KB NVRAM 256 KB EPROM	—		LE995A-R5	Compact Single-Port Terminal Server
		(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, software selectable	—	PoE	8 MB embedded flash 32 MB RAM	—		LES5015A	10/100 Secure Device Server, p. 613
2 Ports	DB9 M	(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, switch selectable	—	Single external AC	Serial UART buffer: 4 KB in/4 KB out	—		LES300A	Dual Serial Bridge, p. 614
		(1) 10-/100-Mbps RJ-45	RS-232, -422, -485, software selectable	—	Single external AC	8 MB embedded flash 16 MB SDRAM	—		LES1102A	Value Line Secure Device Server, p. 613
	RJ-45	(1) 10-/100-Mbps RJ-45	RS-232	(1) 2.0	Single external AC	16 MB embedded flash	—		LES1202A	Remote Console Manager, p. 616
3 Ports	RJ-45	(1) 10-/100-Mbps RJ-45, 802.11g wireless	RS-232	(3) 2.0	Single external AC	16 MB embedded flash	—		LES1203A-11G	Remote Console Manager, p. 616
		(1) 10-/100-Mbps RJ-45	RS-232	(3) 2.0	Single external AC	16 MB embedded flash	V.92 Modem		LES1203A-M	Remote Console Manager, p. 616
4 Ports	RJ-45	(1) 10-/100-Mbps RJ-45	RS-232	(3) 2.0	Single external AC	16 MB embedded flash	—		LES1204A	Remote Console Manager, p. 616
		(1) 10-/100-Mbps RJ-45	RS-232	(3) 2.0	Single external AC	16 MB embedded flash	G3 Cellular		LES1204A-3G	Remote Console Manager, p. 616
8 Ports	RJ-45	(1) 10-/100-Mbps RJ-45	RS-232	—	Single external AC	8 MB embedded flash 16 MB SDRAM	—		LES1108A	Value Line Console Server, p. 615
		(2) 10-/100-Mbps RJ-45	RS-232	(1) 2.0	Dual internal AC	16 MB embedded flash 64 MB SDRAM	V.92 Modem		LES1208A	Advanced Console Server, p. 616
16 Ports	RJ-45	(1) 10-/100-Mbps RJ-45	RS-232	—	Single external AC	16 MB embedded flash 64 MB SDRAM	—		LES1116A	Value Line Console Server, p. 615
		(2) 10-/100-Mbps RJ-45	RS-232	(1) 2.0	Dual internal AC	16 MB embedded flash 64 MB SDRAM	V.92 Modem		LES1216A	Advanced Console Server, p. 616
48 Ports	RJ-45	(1) 10-/100-Mbps RJ-45	RS-232	—	Single external AC	16 MB embedded flash 64 MB SDRAM	—		LES1148A	Value Line Console Server, p. 615
		(2) 10-/100-Mbps RJ-45	RS-232	(1) 2.0	Dual internal AC	16 MB embedded flash 64 MB SDRAM	V.92 Modem		LES1248A	Advanced Console Server, p. 616

Value Line Secure Device Servers

Conveniently manage devices right over your network.

- 10-/100-Mbps ports are autosensing and autonegotiating for speed and duplex.
- Access serial RS-232, 422, 485 ports using any standard Web browser.
- Embedded with open-source Linux® based operating system.
- Support auto failover through alternate dial-in.
- Protect data traveling over a public network with Secure Shell (SSH) encryption, SSH tunneled serial bridging, SSH tunneling for TCP/DUP, IP packet filtering, and more.
- Off-line data logging, on-line data buffering and logging, as well as port sniffing for multiple users per port.
- Store multiple boot images locally.
- Support up to 50 concurrent sessions (SDT tunnels).
- LES1101A has one RS-232 port that can be adapted for RS-422/-485.
- LES1102A has one RS-232 port plus one port that can be either a DB9 RS-232/-422/-485 port or a terminal-block RS-422/-485 port.
- **WARRANTY** — 2 Years



LES1101A



LES1102A



TECH SPECS

CPU Processor — 166 MHz ARM (Micrel KS8695P)
Environmental — Operating temperature: 41 to 122° F (5 to 50° C);
 Humidity: 5 to 90%, noncondensing
Memory — 16 MB SDRAM, 8 MB embedded flash
Serial Standards — RS-232, -422, -485, software selectable
CE Approval — Yes
RoHS — Yes
Connectors — Both: (1) RJ-45 (10/100BASE-TX);
 LES1101A: (1) DB9 (RS-232/-422/-485), must remove jumper for RS-422/-485
 LES1102A: (1) DB9 (RS-232), (1) DB9 (RS-232/-422/-485), (1) 8-position terminal block (RS-422/-485)

Power — Input: 100–240 VAC, 50–60 Hz external;
 Consumption: Less than 20 W
Size — LES1101A: 0.9"H x 1.8"W x 3.75"D (2.4 x 4.6 x 9.5 cm);
 LES1102A: 1.2"H x 3"W x 4.25"D (3 x 7.6 x 10.8 cm)
Weight — LES1101A: 0.25 lb. (0.1 kg);
 LES1102A: 1 lb. (0.5 kg)

Item	Code	List Price
Value Line Secure Device Servers		
1-Port	LES1101A	
2-Port	LES1102A	

10/100 Terminal Servers

10/100 Secure Device Servers

Fast, easy access to a serial device across your Ethernet network.

Both the terminal servers and the device servers feature:

- The 10-/100-Mbps Ethernet port is autosensing for speed and duplex.
- Software-selectable RS-232, RS-422, and RS-485 interface prevents tampering in the field.
- Full bidirectional modem support.
- Completely manageable through any Web browser or Telnet.
- Support SNMP management.
- COMredirect software provides true remote serial ports over an Ethernet LAN.
- Device Manager software provides central control of multiple terminal servers.

10/100 Secure Device Servers also feature:

- The device servers have all the features of the terminal servers plus superior security in a wide range of interface options.
- Secured with 128-, 192-, and 256-bit AES, 3DES, Blowfish, and CAST128, plus ARCFOUR or ARCTWO data encryption across the LAN via SSH and SSL.
- Support Next Generation IP (IPv6), making them compatible with networks that have upgraded to this new IP standard.
- **WARRANTY** — All: 1 Year



LES4011A

TECH SPECS

Environmental — Operating temperature: 32 to 131° F (0 to 55° C);
 Storage temperature: -40 to 150° F (-40 to 66° C)
Serial Standards — RS-232, RS-422, RS-485, software selectable
Memory — 16 MB RAM, 4 MB flash
CE — Yes
RoHS — Yes
Connectors — All: (1) RJ-45
 10-/100-Mbps Ethernet;
 LES4011A: (1) DB9 M;
 LES4012A: (1) DB25 M;
 LES4013A: (1) DB25 F;
 LES4014A: (1) RJ-45
 LES5011A: (1) DB9 M;
 LES5012A: (1) DB25 M;
 LES5013A: (1) DB25 F;
 LES5014A–LES5015A: (1) RJ-45;
 LES5016A: (1) RJ-45, (1) RJ-11 modem;
Power — All except LES5015A: 120-VAC, 50-Hz external power supply
Size — LES4011A–LES4014A, LES5011A–LES5016A: 0.9"H x 2.5"W x 3.5"D (2.3 x 6.4 x 9 cm)
Weight — LES4011A–LES4014A, LES5011A–LES5016A: 0.5 lb. (0.2 kg)

Item	Code	List Price
10/100 Terminal Servers, 1-Port, RS-232/422/485		
DB9 Male	LES4011A	
DB25 Male	LES4012A	
DB25 Female	LES4013A	
RJ-45	LES4014A	
10/100 Secure Device Servers, RS-232/422/485		
DB9 Male	LES5011A	
DB25 Male	LES5012A	
DB25 Female	LES5013A	
RJ-45	LES5014A	
RJ-45 PoE	LES5015A	
RJ-45 with Modem	LES5016A	

You may also need...

DIN Rail Mounting Kit		
	LCA100	
Serial Adapters, RJ-45/		
DB25 Female (PC)	LCA102	
DB9 Female (PC)	LCA103	
DB25 Male (Modem)		
	LCA104	
DB25 Male (Printer)	LCA105	
Sun®/Cisco® RJ-45	LCA106	

RS-232/422/485 Device Server

Access serial devices across your Ethernet network.

- Supports RS-232/422/485 serial standards.
- Accesses printers, scanners, industrial devices, and other serial devices.
- No need to run separate serial cable. Anywhere your network goes, you can make a connection.
- Transparent operation.
- Encapsulates serial data into packets for transport over Ethernet.
- Manage through your Web browser, the serial port, or by using Telnet™
- Accepts AT commands, so you can use it as a modem substitute.
- ♦♦ **WARRANTY** — 2 Years

TECH SPECS

Data Rate — Ethernet: 10/100 Mbps, autosensing or software selectable;
Serial: 300 bps to 230 kbps, software selectable
Environmental — Temperature: 41 to 122° F (5 to 50° C);
Storage Temperature: -40 to 151° F (-40 to 66° C);
Operating Humidity: 10 to 90% noncondensing
Memory — 256 MB zero wait state SRAM; 2 Mb Flash
Standards — IEEE 802.3, IEEE 802.3u, ARP, UDP, TCP, ICMP, Telnet, TFTP, AutoIP, DHCP, HTTP, SNMP
CE Approval — Yes
RoHS — Yes
Interface — RS-232, RS-422, RS-485
Connectors — (1) RJ-45, (1) DB25 F
Power — 100–240-VAC, 50–60-Hz external, 1.5 watts maximum
Size — 0.9" H x 2.5" W x 3.5" D in. (2.3 x 6.4 x 9 cm)
Weight — 0.45 lb. (0.2 kg)



Item	Code	List Price
RS-232/422/485 Device Server	LES290A	

Power over Ethernet (PoE) to RS-232 Converter

The serial server that virtually eliminates power-cord clutter.

- Connects your serial bar code readers, time clocks, slip printers, and other legacy equipment to your 10/100BASE-T LAN.
- Transparent 10-/100-Mbps operation.
- Offers simple plug-and-play operation.
- Ports are current-limited for short-circuit protection.
- Compatible with the IEEE 802.3af Power over Ethernet (PoE) standard.
- ♦♦ **WARRANTY** — 5 Years

TECH SPECS

Environmental — Operating Temperature: 32 to 158° F (0 to 70° C);
Operating Humidity: 10 to 90% noncondensing
Speed — 10/100 Mbps, autosensing
Standards — IEEE 802.3af
CE Approval — Yes
RoHS — Yes
Connectors — LAN: (1) RJ-45;
Serial: (1) DB9 M;
Power: (1) terminal block
Power — From an 802.3af PoE PSE
Size — 0.9" H x 1.6" W x 3.8" D (2.3 x 4.1 x 9.7 cm)
Weight — 0.25 lb. (0.11 kg)



Item	Code	List Price
Power over Ethernet to RS-232 Converter	LPD401A	

Dual Serial Bridges

Access two serial devices over your network—even your wireless network!

- Easily connect two serial devices across 10BASE-T/100BASE-TX Ethernet/Fast Ethernet, 100BASE-FX Fast Ethernet, or 802.11b wireless Ethernet.
- Dual serial ports are switch selectable to RS-232, RS-422, or RS-485.
- Extended temperature range for industrial environments.
- DIN-rail mountable.
- Serial ports are individually configurable and manageable through any Web browser.
- The baud rate is programmable from 110 bps to 230.4 kbps.
- Include configuration and management utility.
- Auto Discovery function enables you to find any Dual Serial Bridge connected to your network.
- Support watchdog timer.
- Password security.
- Wireless model features an extra layer of WEP 64- and 128-bit encryption.
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

Baud Rate — Programmable: 230.4, 115.2, 57.6, 38.4, and 19.2 kbps; 9600, 4800, 2400, 1200, 600, 300, 150, and 110 bps
Data Format — Programmable: 5, 6, 7, 8 bits
Flow Control — Hardware (RTS/CTS) or software (X-ON/X-OFF, None)
Protocols — TCP, UDP, IP, ICMP, HTTP, TFTP, ARP, DHCP Client, SNMP (get)
Serial Parity — Programmable: Even, Odd, None, Mask, Space
Serial Stop Bit — Programmable: 1 (default), 2 bits
UART — 4096-byte buffer per direction
CE Approval — LES300A
RoHS — Yes
Connectors — LES300A: (2) DB9 M, (1) RJ-45;
LFS402A: (2) DB9 M, (1) pair of SC;
LWS100A: (2) DB9 M, (1) RSMA antenna
Power — 110-VAC, 60-Hz external power supply;
Draw: LES300A: 2.88 watts;
LFS402A, LWS100A: 7.2 watts;
220-VAC power supply on request
Size — LES300A: 0.9" H x 4.5" W x 3.5" D (2.3 x 11.4 x 8.9 cm);
LFS402A: 0.9" H x 4.5" W x 4.1" D (2.3 x 11.4 x 10.4 cm);
LWS100A: Without antenna:
0.9" H x 4.6" W x 3.5" D (2.3 x 11.7 x 8.9 cm)
Weight — LES300A, LFS402A: 0.6 lb. (0.3 kg);
LWS100A: 0.7 lb. (0.3 kg)



Item	Code	List Price
Dual Serial Bridges		
10/100BASE-TX	LES300A	
100BASE-FX Fiber		
Single-Mode, SC, 2 km	LFS402A	
Wireless LAN	LWS100A	

You may also need...

Serial Adapters for Dual Serial Bridges	
DB9 to RJ-45 RS-232	LA126
DB9 to RJ-45 RS-422/485	LA127
DB9 to RS-232/422/485 Terminal Strip	LA128
DIN Rail Mounting Kit for Dual Serial Bridges	DR125

Value Line Console Servers

Affordable, secure console access.

- Manage a range of serial console ports and devices from a single user interface.
- Manageable over your network—or even the Internet—using any standard Web browser.
- Embedded with open-source Linux® based operating system.
- Support auto failover.
- Protect data traveling over a public network with Secure Shell (SSH) encryption, SSH tunneled serial bridging, SSH tunneling for TCP/UDP, IP packet filtering, and more.
- Off-line data logging, on-line data buffering and logging, as well as port sniffing for multiple users per port.
- For easy rollback, stores multiple local boot images locally. It's also easy to restore configurations.
- Support up to 50 concurrent sessions (SDT tunnels).
- Supports IPMI, ILO, LOM, DRAC, and RSA.
- **WARRANTY** — 5 Years

Black Box® Value Line 8-, 16, and 48-Port Console Servers provide solid out-of-band serial console port control in a secure platform that fits your budget. Use them as gateways to remotely access servers and other network IT equipment for reliable 24/7 uptime.

The console servers feature secure serial bridging, encapsulating incoming raw serial data into IP packets and transporting it over a network to a remote location, where it's then represented as serial data.

Use the stable Linux® OS platform and preloaded Nagios® network monitoring software to centrally manage Linux, Windows®, Sun®, HP®, and IBM® servers. Value Line Console Servers come with SDT Connector, a free open-source SSH Java client. Use it to autoloading your configurations to set up SSH tunnels.

In addition to remote in-band access through its 10BASE-T/100BASE-TX TCP/IP ports, Value Line Console Servers support out-of-band access via external dialup modem.

Advanced encryption keeps all connection communications secure—to protect against unauthorized access, the system enables you to restrict access by IP address, password, or account.

To help ensure maximum uptime, Value Line Console Servers proactively scan serial streams on console ports, searching for specific errors and phrases. The console server supports SNMP and SMTP alerts/traps for serial ports and hosts.



LES1116A

TECH SPECS

Compliance — FCC Part 15 A, UL® 1950, TUV, C-Tick, RoHS

CPU Processor — 166 MHz ARM (Micrel KS8695P)

LAN Console Port Management — Secure SSH tunneling (TCP/UDP); Secure Remote Desktop access to Windows XP/2003; Secure VNC access to Sun®, Windows, Linux computers; secure HTTP(S) access to browser-controlled appliances; Native IPMI 1.5/2.0 (RMCP/RMCP+) support for BMC and service processor access and control; Secure SOL to BIOS, EMS, ACS data; service processor access (IPMI, ILO, LOM); access to KVM built into service processors (DRAC, RSA); secure Telnet access; limit user access by LAN device and SDT service for device; embedded DHCP server

Network Protocols — NTP, TCP/IP, UDP/IP; Ethernet, Fast Ethernet, PPP, RS-232

Environmental — Operating temperature: 41 to 122° F (5 to 50° C);

Humidity: 5 to 90%, noncondensing

Operating System — Linux with source code access (custom development kit included)

Security and Authentication — Secure Shell (SSH-2, SSH-3); TACACS+, RADIUS, LDAP, PAP/CHAP (dialup); dial-back support; local authentication; system event syslog; SSH port and IP forwarding support; IP packet filtering

Serial Console Port Management — SSH tunneled serial bridging; Windows® 2003 Server ACS and EMS support; Sun/Solaris® ready (no inadvertent breaks); Break over SSH support; port triggers with SNMP and e-mail alerts; off-line data logging (Syslog, NFS, CIFS); on-line data buffering and

logging; access by TCP port; Telnet/ unauthenticated Telnet SSH/Raw TCP connect; RFC 2217 port redirection; Windows Remote Desktop or VNC over serial support; per serial port user access lists

Serial Standards — RS-232

Memory — LES1108A: 16 MB SDRAM, 8 MB embedded flash;

LES1116A, LES1148A: 64 MB SDRAM, 16 MB embedded flash

CE Approval — Yes

RoHS — Yes

Connectors — LES1108A: Serial: (8) RJ-45 (RS-232); Local console and modem serial port: (1) DB9 F (RS-232);

Network: (1) RJ-45 (10BASE-T/100BASE-TX)

LES1116A: Serial: (16) RJ-45 (RS-232);

Local console and modem serial port: (1) DB9 F (RS-232);

Network: (1) RJ-45 (10BASE-T/100BASE-TX);

LES1148A: Serial: (48) RJ-45 (RS-232);

Local console and modem serial port: (1) DB9 F (RS-232);

Network: (1) RJ-45 (10BASE-T/100BASE-TX)

Power — Input: 100–240 VAC, 50–60 Hz external; Consumption: 20 watts maximum

Size — LES1108A: 1.2"H x 8.2"W x 4.9"D (3 x 20.8 x 12.4 cm);

LES1116A, LES1148A: 1.75"H (1U) x 17"W x 8.5"D (4.4 x 43.1 x 22 cm)

Weight — LES1108A: 3.7 lb. (1.7 kg);

LES1116A, LES1148A: 8.5 lb. (3.85 kg)

Item	Code	List Price
Value Line Console Servers		
8-Port	LES1108A	
16-Port	LES1116A	
48-Port	LES1148A	

You may also need...

Console Port Adapters for Value Line Console Servers

DB25 Female DTE	LES1116A-25FC
DB25 Female DCE	LES1116A-25FT
DB25 Male DTE	LES1116A-25MC
DB25 Male DCE	LES1116A-25MT
DB9 Female DTE	LES1116A-9FT
DB9 Male DTE	LES1116A-9MT
Cisco Compatible	LES1116A-CISCO

Advanced Console Servers

Advanced console port access with redundant Ethernet and power.

FIPS 140-2
validated
module



Top: LES1216A, front view;
bottom: LES1216A, rear view

- Federal Information Processing Standard (FIPS) 140-2 validated module for enhanced security.
- Dual Ethernet ports with bonding ensure high availability.
- Dual universal AC input for redundant backup power.
- Includes a built-in modem RJ-11 port as well as a DB9 serial port.
- Accessible in band with a Web browser, out of band via modem, or directly through the local console port.
- Supports IPMI, ILO, LOM, DRAC, and RSA.
- Protects data with Secure Shell (SSH) encryption, SSH tunneled serial bridging, SSH tunneling for TCP/UDP, IP packet filtering, and more.
- ♦♦ **WARRANTY** — 5 Years

The Black Box® Advanced Console Server provides secure server access with the features you need to provide continuous, reliable access to console ports on your remote devices.

Dual 10/100 Ethernet ports with bonding ensure high availability. Set up automatic failover and an additional out-of-band broadband connection. It also features 4 GB of USB flash memory with an included 4 GB flash drive for local FTP/TFTP storage.

It includes IPSec High Availability VPN gateway software to set up a gateway to remotely access servers and other devices, as well as network UPS tools for UPS monitoring.

Because the console server uses the open-source Linux® platform, you get full access to the Linux core,

including bash. Use the preloaded Nagios® network monitoring application to centrally manage servers. SDT Connector, a free open-source SSH Java client, is also included.

Out-of-band access for managing the console server is through an internal modem and a DB9 local console port. Robust advanced encryption keeps all connection communications secure.

The Advanced Console Server also provides out-of-band access to a frozen device through specified PDUs. Using a hotkey from the command line interface via SSH or Telnet, launch the console server's power menu and turn power on (or off), power cycle, or just check power status.

TECH SPECS

Environmental — Temperature: 41 to 122° F (5 to 50° C);

Humidity: 5 to 90%, noncondensing

Memory — 64 MB SDRAM, 16 MB embedded Flash, external 4 GB USB flash drive (included)

Network Protocols — NTP, TCP/IP, UDP/IP; Ethernet, Fast Ethernet, PPP, RS-232

Operating System — Linux with source code access (custom development kit included)

Security and Authentication — Secure Shell (SSH-2, SSH-3); TACACS+, RADIUS, LDAP, PAP/CHAP (dialup); dialback support; local authentication; system event syslog; SSH port and IP forwarding support; IP packet filtering

Serial Standards — RS-232

CE Approval — Yes

RoHS — Yes

Connectors — Serial: (8), (16), or (48) RJ-45 (RS-232);

Console port: (1) DB9 F (RS-232);

Built-in modem port: (1) RJ-11;

Network/broadband out-of-band access:

(2) RJ-45 (10BASE-T/100BASE-TX);

USB: (1) USB 2.0

Power — Dual-socket internal power supplies:

100–240 VAC, 50–60 Hz;

Consumption: 30 watts maximum

Size — 1.75"H (1U) x 17"W x 12"D (4.4 x 43.1 x 30.4 cm)

Item	Code	List Price
Advanced Console Servers		
8-Port, (2) RJ-45	LES1208A	
16-Port, (2) RJ-45	LES1216A	
48-Port, (2) RJ-45	LES1248A	

To adapt an RJ-45 port to another serial interface, order...

Console Port Adapters

for Advanced Console Servers

DB25 Female DTE LS1016A-25FT

DB25 Female DCE LS1016A-25FC

DB25 Male DTE LS1016A-25MT

DB25 Male DCE LS1016A-25MC

DB9 Female DTE LS1016A-9FT

DB9 Male DTE LS1016A-9MT

Remote Console Managers

Versatile remote serial access with redundant links for automatic failover.

- Federal Information Processing Standard (FIPS) 140-2 validated module for enhanced security.
- Provides optional redundant backup paths via 802.11g wireless, dialup modem, or 3G cellular.
- Seamless automatic failover.
- Integral temperature sensors enable you to monitor conditions at the remote site.
- USB ports enable you to store logs and configurations on a flash drive.
- GUI Web-based management.
- Advanced security uses LDAP, Radius, or TACACS+ authentication, yet maintains a local user list for out-of-band communications through modem or cellular links.
- ♦♦ **WARRANTY** — 3 Years

TECH SPECS

Environmental — Operating temperature:

41 to 122° F (5 to 50° C);

Humidity: 5 to 90% noncondensing;

Memory — 16 MB embedded

Serial Standards — RS-232

CE Approval — Yes

RoHS — Yes

Connectors — LES1202A: (1) RJ-45 10/100 Ethernet,

(2) RJ-45 RS-232, (1) USB;

LES1203A-11G: (1) RJ-45 10/100 Ethernet,

(3) RJ-45 RS-232, (3) USB;

LES1203A-M: (1) RJ-45 10/100 Ethernet,

(1) RJ-11 modem, (3) RJ-45 RS-232, (3) USB;

LES1204A, LES1204A-3G: (1) RJ-45 10/100 Ethernet,

(4) RJ-45 RS-232, (3) USB

Power — Internal power supply: 110–240-VAC, 50–60-Hz, 12 watts maximum

Size — 1.1" H x 3.5"W x 4"D (2.8 x 8.9 x 10.2 cm)

FIPS 140-2
validated
module



Item	Code	List Price
Remote Console Managers		
2-Port	LES1202A	
3-Port w/Wireless	LES1203A-11G	
3-Port w/Modem	LES1203A-M	
4-Port	LES1204A	
4-Port w/3G Cellular	LES1204A-3G	

10/100 Secure Terminal Servers

Secure access to your RS-232 devices with a PoE option!

- Secure access to up to four RS-232 devices such as PBXs, servers, routers, or network storage equipment.
- Autosensing 10-/100-Mbps Ethernet port.
- Feature four RJ-45 serial ports.
- Easy Web browser management.
- The Power over Ethernet (PoE) model can be installed even where there is no nearby power outlet.
- Support SNMP V3 management plus Syslog and e-mail event notification.
- Includes COMredirect software to provide true remote serial ports over an Ethernet LAN.
- Feature a 66-MHz, 87-MIPS processor.
- Built-in surge protection on all interfaces.
- **◆◆ WARRANTY** — 1 Year

TECH SPECS

Environmental — Operating temperature: 32 to 131° F (0 to 55° C); Humidity: 5 to 95% noncondensing;
Memory—256 KB per port
Security — 128-, 192-, and 256-bit AES, 3DES, Blowfish, CAST128, ARCFour or ARCTWO data encryption across the LAN via SSH and SSL
Serial Standards — RS-232
CE Approval—Yes
RoHS—Yes
Connectors — (1) RJ-45 Ethernet; (4) RJ-45 RS-232
Power — LES6044A: External power supply, 120-VAC, 60-Hz, 10 watts maximum; LES6045A: via 802.3af PoE or optional external AC power adapter (included), 10 watts maximum
Size — 1.1"H x 3.2"W x 4.4"D (2.8 x 11.3 x 8.1 cm)
Weight — 1.6 lb. (0.7 kg)



LES6044A: top: front view; bottom: rear view

Item	Code	List Price
10/100 Secure Terminal Servers		
4-Port	LES6044A	
4-Port PoE	LES6045A	
You may also need...		
DIN Rail Mounting Kit	LCA101	

10/100/1000 Secure Console Servers

Superior security plus support for Gigabit Ethernet.

- Secure access to your RS-232 devices or serial console ports across your 10-/100-/1000-Mbps Ethernet network.
- Manageable through Windows® Device Manager, HTTP, HTTPS/SSL/TLS, SSH, or Telnet.
- Supports SNMP V3 management.
- Syslog support.
- Includes COMredirect software to provide true remote serial ports over an Ethernet LAN.
- Feature a 400-MHz, 750-MIPS, 32-bit processor.
- Housed in a sturdy 1U rackmount chassis.
- Built-in surge protection on all interfaces.
- **◆◆ WARRANTY** — 1 Year

TECH SPECS

Environmental — Operating temperature: 32 to 131° F (0 to 55° C); Humidity: 5 to 95% noncondensing;
Memory—256 KB per port
Security — 128-, 192-, and 256-bit AES, 3DES, Blowfish, CAST128, ARCFour or ARCTWO data encryption across the LAN via SSH and SSL
Serial Standards — RS-232
CE Approval—Yes
RoHS—Yes
Connectors — (1) RJ-45 Ethernet; (4), (8), (16), or (24) RJ-45 RS-232
Power — Internal power supply, 100–240-VAC, 50–60-Hz, 10 watts maximum
Size — 1.75" (1U) H x 17.1"W x 10.4"D (4.4 x 43.4 x 26.4 cm)



LES7164A: top: front view; bottom: rear view

Item	Code	List Price
10/100/1000 Secure Console Servers		
4-Port	LES7044A	
8-Port	LES7084A	
16-Port	LES7164A	
24-Port	LES7244A	

Dual 10/100/1000 Secure Console Servers

Dual Gigabit Ethernet ports for redundancy.

- Secure access to RS-232 serial console ports across your Ethernet network.
- Dual Gigabit Ethernet ports provide the security of redundant links.
- Choose optional dual power inputs for redundant power.
- Feature a powerful 400-MHz, 750-MIPS, 32-bit processor.
- Manageable through Windows Device Manager, HTTP, HTTPS/SSL/TLS, SSH, or Telnet.
- Includes COMredirect software to provide true remote serial ports over an Ethernet LAN.
- The rackmountable steel chassis is only 1U high and can be front or rear mounted.
- Built-in surge protection on all interfaces.
- **◆◆ WARRANTY** — 1 Year

TECH SPECS

Environmental — Operating temperature: 32 to 131° F (0 to 55° C); Humidity: 5 to 95% noncondensing;
Memory—256 KB per port
Security — 128-, 192-, and 256-bit AES, 3DES, Blowfish, CAST128, ARCFour or ARCTWO data encryption across the LAN via SSH and SSL; authentication through RADIUS, TACACS+, LDAP, Kerberos, NIS, and RSA
Serial Standards — RS-232
CE Approval—Yes
RoHS—Yes
Connectors — (1) RJ-45 Ethernet; (4), (16), or (32) RJ-45 RS-232
Power — Single or dual internal power supplies, 100–240-VAC, 50–60-Hz, 17 watts maximum
Size — 1.75" (1U) H x 17.1"W x 10.4"D (4.4 x 43.4 x 26.4 cm)



LES8164A: top: front view; bottom: rear view

Item	Code	List Price
Dual 10/100/1000 Secure Console Servers		
8-Port	LES8084A	
8-Port, Dual Power Inputs	LES8084A-2AC	
16-Port	LES8164A	
16-Port, Dual Power Inputs	LES8164A-2AC	
32-Port	LES8324A	
32-Port, Dual Power Inputs	LES8324A-2AC	

Enhanced TCP/IP Terminal Servers

More than just terminal servers—connect terminals, printers, modems, bar-code readers, and RS-232 serial devices.

- Use TCP/IP for your software connection—eliminate long serial cable runs.
- Full modem control on all ports.
- 2-, 4-, 8-, and 16-port models suit a wide range of applications.
- Asynchronous data speeds up to 115.2 kbps per port.
- Multipoint remote access using PPP, SLIP, or CSLIP protocols.
- Support Reverse Telnet, configurable on a per-port basis.
- Dial-in support for UNIX® and Microsoft® networks.
- Surge-protected serial ports.
- Full bidirectional modem support.
- ♦♦ **WARRANTY** — 1 Year



TECH SPECS

Environmental — Operating Temperature: 41 to 122° F (5 to 55° C)

Operating Humidity: 10 to 90% noncondensing

Memory — 1 MB DRAM, 512 KB Flash

CE Approval — Yes

RoHS — Yes

Connectors — 37688-R2:

(1) 10/100 RJ-45, (8) serial DB25 F;

37687-R2: (1) 10/100 RJ-45, (16) serial DB25 F;

41872-R3: (1) 10/100 RJ-45, (2) serial RJ-45;

41874-R3: (1) 10/100 RJ-45, (4) serial RJ-45;

40871-R3: 40871-DC-R3

(1) 10/100 RJ-45, (8) serial RJ-45;

40870-R3, 40870-DC-R3:

(1) 10/100 RJ-45, (16) serial RJ-45

Power — 37688-R2, 37687-R2, 41872-R3, 41874-R3: 110–230 VAC,

44 watts, maximum,

50–60 Hz, autosensing, external;

40871-R3, 40870-R3: 90–250 VAC,

44 watts, maximum, 50/60 Hz,

internal, autosensing

40871-DC-R3, 40870-DC-R3:

48–60 VDC screw terminal, 44 watts, maximum

Size — 37688-R2, 37687-R2: 1.8"H x 9"W x 12"D

(4.6 x 22.9 x 30.5 cm);

41872-R3, 41874-R3: 1.3"H x 9.1"W x 6.4"D

(3.3 x 23.1 x 16.3 cm);

40871-R3, 40870-R3, 40871-DC-R3, 40870-DC-R3:

1.75"H (1U) x 19.3"W x 11.8"D

(4.4 x 49 x 30 cm)

NOTE: Serial ports are pinned as DTE. To connect modems and other DCEs, use RS-232 cables pinned straight through. For cables to connect DTEs, such as terminals and printers, call our FREE Tech Support.

Item	Code	List Price
Enhanced TCP/IP Terminal Servers		
DB25 Async	8-Port	37688-R2
	16-Port	37687-R2
RJ-45 Async	2-Port	41872-R3
	4-Port	41874-R3
RJ-45 Async, Rackmount		
	8-Port	40871-R3
	16-Port	40870-R3
RJ-45 Async, DC-Powered, Rackmount		
	8-Port	40871-DC-R3
	16-Port	40870-DC-R3

To adapt the RJ-45 ports for your serial devices, order...

Serial Adapters

PC/Terminal DTE, RJ-45 F/DB9 F

FA705

PC/Terminal DTE, RJ-45 F/DB25 F

FA706

Modem DCE, RJ-45 M/DB25 F

FA707

Industrial Ethernet Serial Servers

Access hard-to-reach remote serial equipment as if it were local.

- Control remote serial equipment across your Ethernet network.
- Slim-line DIN rail box is IP30 rated for use in dirty environments.
- Support RS-232, RS-422, and RS-485 serial interfaces.
- 4-screw power connector enables daisy-chaining of AC or DC power to multiple servers.
- Ideal for industrial equipment such as PLCs, drives, motor controls, process analyzers, and more.
- ♦♦ **WARRANTY** — 5 Years

TECH SPECS

Environmental — Operating Temperature: 14 to 176° F (-10 to +80° C)

Serial Standards — RS-232, RS-422, RS-485

CE Approval — Yes

RoHS — Yes

Connectors —

Serial: (1), (2), or (4) DB9 M, DTE configuration;

LES401A also has (1) terminal block;

Ethernet: (1) RJ-45;

Power: (1) 4-screw terminal block

Power — Works with an 8–24-VAC or a 9–48-VDC power supply (not included);

Draw: LES401A: 3.84 watts;

LES402A: 4.08 watts;

LES404A: 3.912 watts

Size — LES401A–LES402A: 1.75"H x 6.1"W x 4.1"D

(4.5 x 15.5 x 10.5 cm);

LES404A: 1.75"H x 7.1"W x 4.1"D

(4.5 x 18 x 10.5 cm)

Weight — LES401A–LES402A: 3 lb. (1.4 kg);

LES404A: 3.2 lb. (1.5 kg)



Item	Code	List Price
Industrial Ethernet Serial Servers		
RS-232/422/485		
1-Port	LES401A	
2-Port	LES402A	
4-Port	LES404A	

You may also need...

12-VDC DIN-Mount Power Supply
PSD100-R2

Buyer's Guide | Industrial Ethernet Switches

For product details, see the page listed or go to blackbox.com.

	Unmanaged					Managed			
	Media Converter Switches, pp. 620–623	Heavy-Duty Edge Switches, pp. 624–627	Hardened Mini Industrial Switches, p. 629	PoE Ethernet Switches, pp. 575–577	Hardened Ethernet Switches, p. 636	Hardened Managed Ethernet Switches, p. 628	Managed Field Switches pp. 630–631	Managed Fiber Switches pp. 632–633	Vertical Mount Fiber Managed Switches, pp. 634–635
Temperature Range									
Standard: 32 to 104° F	•	•	—	—	—	—	—	—	—
Hardened: -13 to 140° F	•	•	•	—	—	—	—	•	•
Extreme: -40 to 167° F	•	•	—	•	•	•	•	—	—
Power									
AC	•	•	•	•	•	—	—	•	•
DC	•	•	•	•	•	•	•	•	•
Redundant power	—	•	—	—	—	•	•	—	—
Port Types									
Copper	•	•	•	•	•	•	•	•	•
Fiber	•	•	•	—	•	•	•	•	•
Port Speeds									
10-/100-Mbps copper	•	•	•	•	•	•	•	•	•
1000-Mbps copper	•	•	—	—	—	•	•	•	•
10-Mbps fiber	—	—	—	—	—	—	•	•	•
100-Mbps fiber	•	•	•	—	•	—	•	•	•
1000-Mbps fiber	—	•	—	—	—	•	•	•	•
Mounting Options									
DIN rail	•	•	•	•	—	•	•	•	•
Rackmount	—	—	—	—	—	—	—	•	—
Wallmount	—	—	—	—	•	•	•	—	—
Chassis	•	•	—	—	—	—	—	—	—
Powered chassis	•	•	—	•	—	—	—	—	—
Management									
SNMP	—	—	—	—	—	•	•	•	•
CLI	—	—	—	—	—	•	•	•	•
Graphical user interface via embedded Web Server	—	—	—	—	—	•	•	•	•

Media Converter Switches

These Media Converter Switches can



LBH100A-H-ST



Media Converter Switches feature LEDs on two sides so you can view network status at a glance no matter which way the unit is mounted.

- Function as both a media converter and a switch.
- Provide one 100-Mbps or 1000-Mbps Gigabit fiber port and two 10-/100-Mbps or 10-/100-/1000-Mbps UTP switch ports.
- Copper ports are autosensing for speed and duplex and feature MDI/MDI-X.
- Support VLAN tagging and Spanning Tree passthrough.
- Tough enough to withstand any environment—whether it's the wiring closet, the factory floor, or even the desert!
- Mount on DIN rails with optional brackets or you can rackmount up to 16 units in the optional trays.
- **WARRANTY** — 3 Years

Buyer's Guide | 10-/100-Mbps Media Converter Switches, Standard: +32 to +104° F (0 to +40° C)

	Multimode			Single-Mode		
	SC	ST*	MT-RJ	SC	LC	Long-Distance/SC
115 VAC, 60 Hz	LBH100A-SC	LBH100A-ST	LBH100A-MT	LBH100A-SSC	LBH100A-SLC	LBH100A-SSCL
230 VAC, 50 Hz w/IEC power connector	LBH100AE-SC	LBH100AE-ST	LBH100AE-MT	LBH100AE-SSC	—	—

Buyer's Guide | 10-/100-Mbps Media Converter Switches, Hardened: -13 to +140° F (-25 to +60° C)

	Multimode			Single-Mode		
	SC	ST	MT-RJ	SC	LC	Long-Distance/SC
115 VAC, 60 Hz	LBH100A-H-SC	LBH100A-H-ST	LBH100A-H-MT	LBH100A-H-SSC	—	LBH100A-H-SSCL
230 VAC, 50 Hz w/IEC power connector	LBH100AE-H-SC	LBH100AE-H-ST	LBH100AE-H-MT	LBH100AE-H-SSC	LBH100AE-H-SLC	LBH100AE-H-SSCL
12 VDC*	LBH100A-H-SC-12	LBH100A-H-ST-12	—	LBH100A-H-SSC-12	—	—
24 VDC*	LBH100A-H-SC-24	LBH100A-H-ST-24	LBH100A-H-MT-24	LBH100A-H-SSC-24	—	LBH100A-H-SSCL-24
24 VDC* w/DIN rail bracket	LBH100A-HD-SC-24	LBH100A-HD-ST-24	LBH100A-HD-MT-24	LBH100A-HD-SSC-24	—	LBH100A-HD-SSCL-24
48 VDC*	LBH100A-H-SC-48	LBH100A-H-ST-48	LBH100A-H-MT-48	LBH100A-H-SSC-48	—	LBH100A-H-SSCL-48

Buyer's Guide | 10-/100-Mbps Media Converter Switches, Extreme: -40 to +167° F (-40 to +75° C)

	Multimode			Single-Mode			
	SC	ST	MT-RJ	SC	ST	LC	Long-Distance/SC
115 VAC, 60 Hz	LBH100A-P-SC	LBH100A-P-ST	LBH100A-P-MT	LBH100A-P-SSC	—	LBH100A-P-SLC	LBH100A-P-SSCL
115 VAC, 60 Hz w/DIN rail bracket	LBH100A-PD-SC	—	—	—	—	—	—
230 VAC, 50 Hz w/IEC power connector	LBH100AE-P-SC	LBH100AE-P-ST	LBH100AE-P-MT	LBH100AE-P-SSC	—	—	LBH100AE-P-SSCL
12 VDC*	LBH100A-P-SC-12	LBH100A-P-ST-12	—	LBH100A-P-SSC-12	LBH100A-P-SST-12	—	—
24 VDC*	LBH100A-P-SC-24	LBH100A-P-ST-24	—	LBH100A-P-SSC-24	—	LBH100A-P-SLC-24	—
24 VDC* w/DIN rail bracket	LBH100A-PD-SC-24	LBH100A-P-ST-24	—	LBH100A-PD-SSC-24	—	—	—
48 VDC*	LBH100A-P-SC-48	LBH100A-P-ST-48	—	LBH100A-P-SSC-48	—	—	—

* Models with terminal blocks for DC power also feature a jack for an AC power adapter (not included).

withstand even the toughest environments.

Use **Standard Media Converter Switches** in clean, temperature-controlled areas of +32 to +104° F (0 to +40° C), such as offices and closets.

Hardened Media Converter Switches suit -13 to +140° F (-25 to +60° C) operation in dusty or dirty environments. Their sealed cases are a heat sink, so no internal airflow is needed for cooling, and they resist contaminants such as dust, dirt, and moisture.

For harsher environments of -40 to +167° F (-40 to +75° C), choose **Extreme Media Converter Switches**. These rugged units are for outdoor use (they only require protection from water) and feature a sealed case, which uses its own metal shell as a heat sink.

Power supplies with recessed IEC connectors work with any IEC standard power cord, making them adaptable to most international locations.

DC-powered Hardened and Extreme units have internal screw terminals for connecting DC power in addition to the AC power jack. You can use them simultaneously with both your DC power supply and an AC power adapter (sold separately) to provide redundant power input.

You can also order a Powered Rackmount Tray, available with one or two common AC adapters that output 9 VDC to 16 Media Converter Switches.

Redundant power option available!



The DIN Rail Mounting Bracket (DIN-RAIL MC2) features a spring latch that enables you to quickly add or remove a module without using a screwdriver. Like the Media Converter Switches, the bracket is all metal, tough, and durable.

Buyer's Guide | 10-/100-/1000-Mbps Media Converter Switches, Hardened or Extreme

	Hardened: -13 to +140° F (-25 to +60° C)		Extreme: -40 to +167° F (-40 to +75° C)	
	Multimode	Single-Mode	Multimode	Single-Mode
	SC	LC	SC	LC
100–240 VAC, 47–63 Hz	LBH2001A-H-SC	LBH2001A-H-LX	LBH2001A-P-SC	LBH2001A-P-LX
100–240 VAC, 47–63 Hz with IEC power connector	LBH2001AE-H-SC	LBH2001AE-H-LX	LBH2001AE-P-SC	LBH2001AE-P-LX
12 VDC*	LBH2001A-H-SC-12	LBH2001A-H-LX-12	LBH2001A-P-SC-12	LBH2001A-P-LX-12
24 VDC*	LBH2001A-H-SC-24	LBH2001A-H-LX-24	LBH2001A-P-SC-24	LBH2001A-P-LX-24
48 VDC*	LBH2001A-H-SC-48	LBH2001A-H-LX-48	LBH2001A-P-SC-48	LBH2001A-P-LX-48

* Models with terminal blocks for DC power also feature a jack for an AC power adapter (not included).

TECH SPECS

Altitude — -200 to 13,000 ft. (-60.9 to 3962.4 m)

Approvals — UL® Listed 60950

Distance (Maximum) — Multimode models: 2 km (1.2 mi.);

Single-mode SC models: 20 km (12.4 mi.);

Single-mode LC models: 15 km (9.3 mi.);

Single-mode, long-distance SC models: 40 km (24.8 mi.)

Enclosure — Steel

Environmental —

Operating Temperature:

Standard: +32 to +104° F (0 to +40° C);

Hardened: -13 to +140° F (-25 to +60° C);

Extreme: -40 to +167° F (-40 to +75° C)

Storage Temperature: -40 to +185° F (-40 to +85° C);

Humidity: -95%, noncondensing

Standards — IEEE 802.3, IEEE 802.3u, IEEE 802.1p/q, IEEE 802.3z,

CE Approval — All except for DIN-RAIL MC2, LH1505P-RACK

RoHS — All except LBH100A-H-MT-48, LBH100A-P-SSC-48, LBH100A-H-SSCL, LBH100AE-H-SSCL, LBH100A-H-PS, LBH100AE-H-PS, LBH100A-P-PS, LE1505-RACK, LH1505P-RACK-2-9-V

Power — Input: Standard 115-VAC models:

115 VAC, 60 Hz, external;

Standard 240-VAC models: 240 VAC, 50 Hz, external, with IEC connector;

Hardened and Extreme AC models: 100–240 VAC, 47–63 Hz, external;

12-, 24-, and 48-VDC models: Internal terminal block plus jack for AC power supply (not included);

Draw: 10-/100-Mbps models:

4.8 watts typical, 6 watts maximum;

10-/100-/1000-Mbps models: 4 watts typical, 5 watts maximum

Size — 3.5"H x 3"W x 1"D (8.9 x 7.6 x 2.5 cm)

Weight — Media Converter Switches:

0.3 lb. (0.1 kg);

Standard and Hardened Power Supplies:

0.4 lb. (0.2 kg);

Extreme Power Supplies: 0.5 lb. (0.2 kg)

Item	Code	List Price
For spare power supplies, order...		
AC Power Supplies for Media Converter Switches		
Standard		
115 VAC	LBH100A-115-VAC	
240 VAC	LBH100AE-240-VAC	
Hardened		
100–240 VAC	LBH100A-H-PS	
100–240 VAC with IEC Connector	LBH100AE-H-PS	
Extreme		
100–240 VAC	LBH100A-P-PS	
100–240 VAC with IEC Connector	LBH100AE-P-PS	
For DIN rail mounting, order...		
DIN Rail Mounting Bracket	DIN-RAIL MC2	
For rackmounting, order...		
Rackmount Tray	LE1505-RACK	
Powered Rackmount Tray with (1) 9-V Power Supply	LH1505P-RACK	
with (2) 9-V Power Supplies	LH1505P-RACK-2-9-V	

NOTE: Available in 10-Mbps versions and other interface types, such as other fiber connectors and BNC connectors. We also offer additional power options and DIN-rail-ready models. For details, call our FREE Tech Support.

Need more remote 10/100 ports?
Add a Convenient Switch, p. 623.



Black Box Explains

The relationship between switches, media converters, and OSI layers.

Today's media converters are often switches, and switches often act as media converters. Plus, both switches and media converters are frequently described in terms of layers—Layer 2, Layer 3. How can you tell what you're looking at?

Most of the confusion happens around OSI Layer 2 where Layer 1 media converters have evolved to meet basic switches. And today's switches are rapidly advancing into Layers 3 and 4, territory formerly held by routers, muddying the waters still more.

A clear understanding of what OSI layers do and what the differences between devices operating at different layers are will help you select the right device.

OSI is a layered network design framework. The layers are referenced in the Open Systems Interconnection (OSI) Reference Model (which provides a layered network design framework that establishes a standard so that devices from different vendors work together). The OSI model is hierarchical. The layer at which a switch or a media converter operates determines which addressing detail it reads as data passes through.

Layer 1: media converters

Layer 1 is the Physical Layer. Media converters operating at Layer 1 only convert electrical signals and physical media without doing anything to data coming through the link.

These media converters only have two ports—one in, one out—and convert the incoming electrical signal from one cable type

and then transmit it over another type—UTP to fiber, thick coax to Thin, and so on.

Layer 2: switches and media converters

Layer 2 is the Data-Link Layer. Devices operating at Layer 2 sort packets using physical network addresses, also known as MAC addresses. All network hardware is permanently assigned this number during its manufacture.

Both switches and media converters can be Layer 2 devices. Usually the only difference between a Layer 2 switch and a Layer 2 media converter is the number of ports—a device with two or three ports is called a media converter; four or more ports is called a switch. A media converter operating at Layer 2 may have more than two ports and may have ports operating at different speeds.

Devices operating at Layer 2 are very fast, but aren't very smart because they don't look at data packets closely. A Layer 2 media converter is considered to be fairly advanced for a media converter, but a Layer 2 switch is a basic switch.

Layer 3: switches

Layer 3 is the Network Layer. Layer 3 switches use network or IP addresses that identify locations on the network. Because they read packets more closely than Layer 2 switches do, they identify network locations as well as physical devices. A location can be a LAN workstation, an address in a computer's memory, or even a different packet of data traveling through a network.

Switches operating at Layer 3 are smarter than Layer 2 devices and incorporate routing functions to actively calculate the best way to send a packet to its destination.

Layer 4: switches

Layer 4—the Transport Layer of the OSI model—coordinates communications between systems. Layer 4 switches are capable of identifying which application protocols (HTTP, SMTP, FTP, and so forth) are included with each packet, and use this information to hand off the packet to the appropriate higher-layer software.

Because Layer 4 devices enable you to establish priorities for network traffic based on application, you can assign a high priority to packets belonging to your vital in-house applications, with different forwarding rules for low-priority packets.

Layer 4 switches also provide an effective wire-speed security shield for a network because any company- or industry-specific protocols can be confined to only authorized switched ports or users. This security feature is often reinforced with traffic filtering and forwarding features.

High-end vs. low-end switches

Switches can also be considered low end or high end. A low-end switch operates in Layer 2 of the OSI model and can also operate in a combination of Layers 2 and 3. High-end switches operate in Layer 3, Layer 4, or a combination of the two.

	OSI Layer 1	OSI Layer 2	OSI Layer 3	OSI Layer 4
Media Converters	- Convert one media type to another - Don't look at data - Two ports only - Single speed	- Convert one media type to another - Sort packets by MAC address - Two or more ports - May support multiple network speeds and have autosensing ports	—	—
Switches	—	- Sort packets by MAC address - More than two ports—usually four or more - May support multiple network speeds and have autosensing ports - Ports may be the same media type or may be mixed media (copper and fiber)	- Sort packets by MAC address - Route packets by IP address - More than two ports—usually four or more - May support multiple network speeds and have autosensing ports - Ports may be the same media type or may be mixed media (copper and fiber)	- Sort packets by MAC address - Route packets by IP address - Prioritize packets by application - More than two ports—usually four or more - May support multiple network speeds and have autosensing ports - Ports may be the same media type or may be mixed (copper and fiber)

Convenient Switches

Quickly add Ethernet ports anywhere in your network—even in harsh outdoor areas.

- Versatile, handy switches with four 10-/100-Mbps UTP ports.
- Part of the Black Box® Media Converter Switch family, providing network extension for any environment.
- Models available to stand up to environments ranging from the wiring closet to harsh outdoor applications.
- Mount on DIN rails with optional brackets or you can rackmount up to 16 units in the optional trays.
- **WARRANTY** — 3 Years

Autosensing Convenient Switches enable you to quickly add ports anywhere on your Ethernet network. They're designed as part of our Media Converter Switch family (pages 620–621). Although they were designed to match our Media Converter Switches, they can be used just like any other 10-/100-Mbps switch.

The switches come in three versions for use in various environments. Because all three types work together seamlessly and also work with our Media Converter Switches, you can use inexpensive switches in the protection of the wiring closet and choose the more robust Hardened or Extreme Convenient Switches for harsh locations at your network's edge.

Standard—Use these in clean, temperature-controlled areas of +32 to +104° F (0 to +40° C), such as offices and closets. They feature the same heavyweight case as our more robust models.

Hardened—These versions are for dusty or dirty environments with temperatures ranging from -13 to +140° F (-25 to +60° C). They use the metal case as a heat sink so no internal airflow is needed for cooling. The case is sealed to resist environmental contaminants such as dust, moisture, smoke, and insects. They're ideal for industrial applications such as factory floors.

Extreme—Choose these for outdoor areas with temperature ranges of -40 to +167° F (-40 to +75° C). All they need in the way of protection is shelter from direct rainfall. Like our hardened models, the Extreme models feature a sealed case, which uses its own metal shell as a heat sink. They're ideal for use in traffic-signal control or for surveillance applications. Plus, they're rated for above-the-ceiling plenum installation.



LBH101AE: top: front view;
bottom: rear view

Easy to set up and use.

Convenient Switches are literally plug-and-play. All four UTP ports are autosensing for speed and duplex, adjusting to the connected device automatically. Plus, all ports feature Auto MDI/MDIX, eliminating the need for crossover cables.

TECH SPECS

Altitude — -200 to 13,000 ft. (-60.9 to 3962.4 m)

Approvals — UL® Listed 60950

Enclosure — Steel

Standards — IEEE 802.3, IEEE 802.3u, IEEE 802.1p/q

Environmental —

Operating Temperature:

Standard: +32 to +104° F

(0 to +40° C);

Hardened: -13 to +140° F

(-25 to +60° C);

Extreme: -40 to +167° F

(-40 to +75° C);

Storage Temperature: -40 to +185° F

(-40 to +85° C);

Humidity: 5–95%, noncondensing

CE Approval — All except for

DIN-RAIL MC2, LH1505P-RACK

RoHS — All except for LBH100A-H-PS,

LBH100AE-H-PS, LBH100A-P-PS,

LE1505-RACK, LH1505P-RACK-2-9-V

Connectors — (4) RJ-45

Indicators — (2) Power, (8) 10/100, (8) LK/ACT

Power — Input: Standard 115-VAC

models: 115 VAC, 60 Hz, external;

Standard 240-VAC models: 240 VAC,

50 Hz, external, with IEC connector;

Hardened and Extreme AC models:

100–240 VAC, 47–63 Hz, external;

12-VDC, 24-VDC, and 48-VDC models:

Internal terminal block plus jack

for AC power supply (not included);

Draw: 4.8 watts typical,

6.0 watts maximum

Size — 3.5" H x 3" W x 1" D

(8.9 x 7.6 x 2.5 cm)

Weight — Switches: 0.3 lb. (0.1 kg);

Standard and Hardened Power

Supplies: 0.4 lb. (0.2 kg);

Extreme Power Supplies: 0.5 lb. (0.2 kg)

Buyer's Guide | 10-/100-Mbps Media Convenient Switches, (4 UTP Ports)

	115 VAC, 60 Hz	240 VAC, 50 Hz	100-240 VAC, 47–63 Hz	12 VDC*	24 VDC*	48 VDC*
Standard (+32 to +104° F)	LBH101A	LBH101AE	—	—	—	—
Hardened (-13 to +140° F)	—	—	LBH101A-H	LBH101A-H-12	LBH101A-H-24	LBH101A-H-48
Extreme (-40 to +167° F)	—	—	LBH101A-P	LBH101A-P-12	LBH101A-P-24	—

* Models with terminal blocks for DC power also feature a jack for an AC power adapter (not included).

Item	Code	List Price	Item	Code	List Price
For spare power supplies, order...			For rackmounting, order...		
AC Power Supplies for Convenient Switches			Rackmount Tray	LE1505-RACK	
Standard			Powered Rackmount Tray		
115 VAC	LBH100A-115-VAC		with (1) 9-V Power Supply	LH1505P-RACK	
240 VAC	LBH100AE-240-VAC		with (2) 9-V Power Supplies	LH1505P-RACK-2-9-V	
Hardened			For DIN rail mounting, order...		
100–240 VAC	LBH100A-H-PS		DIN Rail Mounting Bracket	DIN-RAIL MC2	
100–240 VAC with IEC Connector	LBH100AE-H-PS		Save by ordering a 24-VDC Convenient Switch together with a DIN Rail Mounting Bracket...		
Extreme			LBH101A-H-24 plus DIN-RAIL MC2	LBH101A-HD-24	
100–240 VAC	LBH100A-P-PS		LBH101A-P-24 plus DIN-RAIL MC2	LBH101A-PD-24	
100–240 VAC with IEC Connector	LBH100AE-P-PS				

NOTE: We also offer additional power options and DIN-rail-ready models. For details, call our FREE Tech Support.

Heavy-Duty Edge Switches

Rough, tough switches for the wild



LBH600A



LBH240A-H-SC



LBH150A-P-SC

- Choose from versions for office, industrial, or outdoor environments.
- Feature six ports to expand your network.
- Variety of port types and power options available.
- RJ-45 ports support autonegotiation, so you can easily attach any 10- or 100-Mbps device.
- Two sets of LEDs enable you to see status information from the front, top, or side.
- Panel or DIN-rail mount.
- Support VLAN tagging and Spanning Tree passthrough.
- Convection cooled, sealed against dust and dirt.
- ♦♦ **WARRANTY** — 3 Years

Mix and match standard, hardened, and extreme Heavy-Duty Edge Switches in one installation.

Unlike the Ethernet switches in your wiring closet or computer center, the Ethernet switches at the edges of your network have to put up with the bumps, the dirt, the dampness, and the temperature fluctuations that happen out in the real world. This is where Heavy-Duty Edge Switches from Black Box come in.

These tough, 6-port Ethernet switches enable you to expand your network even into such harsh areas as factory floors or the outdoors. They're robust, they're easy to set up, and they're available with a vast array of interface, power, and durability options. They're everything you're looking for in an industrial edge switch!

Built tough.

All Heavy-Duty Edge Switches come in a sturdy steel case that withstands heavy use. Plus, they're available in three versions to adapt to nearly any environment. Because all three types work together seamlessly, you can use inexpensive Standard Heavy-Duty Edge Switches in protected office environments and choose the more robust Hardened or Extreme Heavy-Duty Edge Switches for harsh locations at your network's edge.

Standard Edge Switches

- For use in clean, temperature-controlled environments such as offices and wiring closets.
- Feature the same heavyweight metal case as our more robust models.

Hardened Edge Switches

- For use in dusty or dirty environments—ideal for demanding industrial applications.
- Rated for a temperature range of -13 to +140° F (-25 to +60° C).
- The metal case functions as a heat sink.
- Resist dust, dirt, moisture, smoke, and insects.

Extreme Edge Switches

- Robust units for outdoor use only require protection from direct rainfall or standing water.
- Ideal for traffic-signal control or for outdoor sensors or cameras.
- Rated for above-the-ceiling plenum installation.
- Rated for an extreme temperature range of -40 to +167° F (-40 to +75° C).
- Sealed case uses its own metal shell as a heat sink.

Multiple power options.

- Standard models come with AC power adapters only, in a choice of 115 or 240 VAC.
- AC-powered Hardened and Extreme Switches feature robust 100- to 240-VAC power supplies.
- DC-powered Hardened and Extreme units have internal screw terminals for DC power in addition to an AC power jack. Because these models have dual power connections, you can easily bench test or provide redundant power input.

Run the distance in harsh environments!

Multimode models support up to 2 kilometers (1.2 mi.) between switches. For longer distances, choose single-mode models for up to 20 kilometers (12.4 mi.) or single-mode, long-distance models for an incredible 40 kilometers (24.8 mi.) between links!

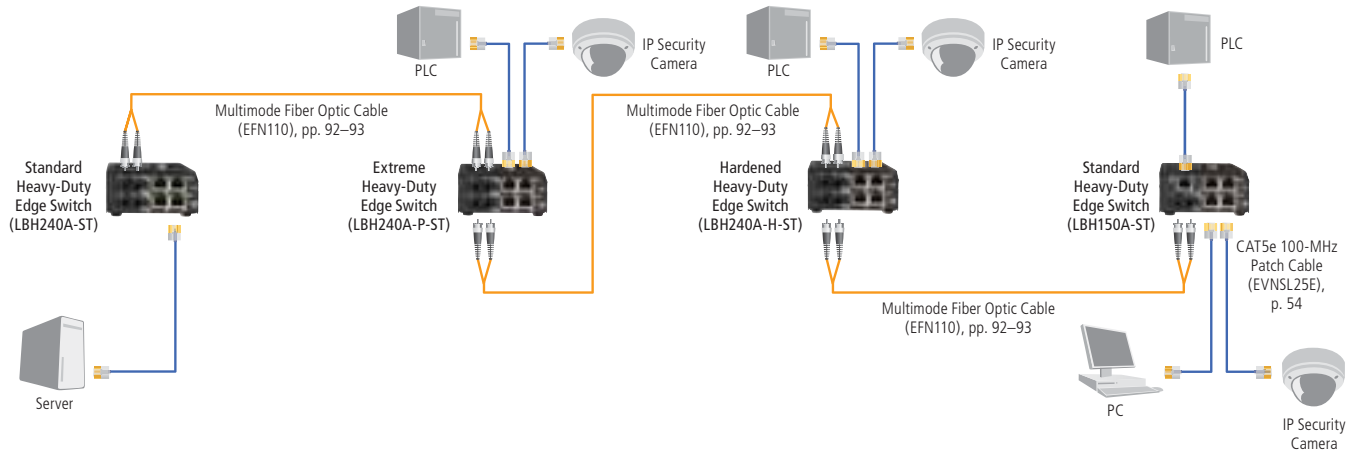
You can daisychain Heavy-Duty Edge Switches together indefinitely, making them ideal for applications such as wind farms and traffic signals where many switches are needed over a long distance.

Easy to set up.

Heavy-Duty Edge Switches are literally plug-and-play. All copper ports are autosensing for speed and duplex, adjusting to the connected device automatically. Plus, the UTP ports feature Auto MDI/MDI-X, eliminating the need for crossover cables.

Each switch has two full sets of LED indicators: one set on the front for viewing convenience when the switch is DIN rail or wallmounted, and one set mounted in the end next to the media ports for easy viewing when units are in a rackmount tray.

frontiers of your network!



Heavy-Duty Edge Switches feature nonblocking switching architecture with a 2K MAC address table. The 128K buffer memory makes it easy to interconnect 10- and 100-Mbps devices.

Fast, redundant backup.

These switches feature Link-Loss-Learn (LLL) for fast network recovery in redundant applications. In configurations with primary and backup links, the network can take a few minutes to recover after the primary link goes down, using its old MAC address table to try to send data to the disabled port. With LLL, the switch senses the disconnect and instantly clears its MAC address table, forcing a new one that includes the new link. LLL works on both copper and fiber ports.

Don't see it? Just ask.

If you require a port combination, power source, PoE, or mounting option not listed, call our FREE Tech Support.

TECH SPECS

Environmental —

All models:

Storage temperature:

-40 to +185° F

(-40 to +85° C)

Humidity: 5–95%, noncondensing

Standard models: Operating

temperature: 32 to 104° F

(0 to 40° C);

Hardened models:

Long-term operating temperature:

-13 to +140° F (-25 to +60° C);

Short-term operating temperature:

-40 to +185° F (-40 to 85° C);

Cold start to -4° F (-20° C);

Extreme models:

Long-term operating temperature:

-40 to +167° F (-40 to +75° C);

Short-term operating temperature:

-58 to +212° F (-50 to +100° C);

Cold start to -40° F (-40° C)

Distance (Maximum) — Multimode

models: 2 km (1.2 mi.);

Single-mode SC models: 20 km

(12.4 mi.);

Single-mode LC models: 15 km

(9.3 mi.);

Single-mode, long-distance SC

models: 40 km (24.8 mi.)

Standards — IEEE 802.3, IEEE 802.3u,

IEEE 802.1p/q

CE Approval — Yes

RoHS — Yes except LBH150A-SSCL

Power — Consumption: 7 watts typical,

9 watts maximum

Size — 3.6" H x 3" W x 1.7" D

(9.2 x 7.6 x 4.3 cm)

Weight — Switches: 0.8 lb. (0.4 kg);

Standard and Hardened Power

Supplies: 0.4 lb. (0.2 kg);

Extreme Power Supplies: 0.5 lb.

(0.2 kg)

Buyer's Guide | 10-/100-Mbps Heavy-Duty Edge Switches, Standard: +32 to +104° F (0 to +40° C)

	(5) 10-/100 Mbps Copper and (1) 100-Mbps Multimode Fiber Ports		(5) 10-/100 Mbps Copper and (1) 100-Mbps Single-Mode Fiber Ports			(6) 10-/100-Mbps Copper Ports
	SC	ST	SC	LC	Long-Distance/SC	LBH600A
115 VAC, 60 Hz	LBH150A-SC	LBH150A-ST	LBH150A-SSC	—	LBH150A-SSCL	
230 VAC, 50 Hz w/IEC power connec- tor	LBH150AE-SC	LBH150AE-ST	LBH150AE-SSC	LBH150AE-SLC	—	LBH600AE
	(4) 10-/100 Mbps Copper and (2) 100-Mbps Multimode Fiber Ports		(4) 10-/100 Mbps Copper and (2) 100-Mbps Single-Mode Fiber Ports			
	SC	ST	SC	LC	Long-Distance/SC	
115 VAC, 60 Hz	LBH240A-SC	LBH240A-ST	LBH240A-SSC	—	LBH240A-SSCL	
230 VAC, 50 Hz w/IEC power connector	LBH240AE-SC	LBH240AE-ST	LBH240AE-SSC	—	—	

For more Heavy-Duty Edge Switches, turn the page.



Heavy-Duty Edge Switches, Continued



DIN-RAIL MC2: rear view



DIN-RAIL MC2: front view



The DIN Rail Mounting Bracket (DIN-RAIL MC2) is a sturdy metal mounting clip for DIN-rail use.

10-/100-Mbps Heavy-Duty Edge Switches, Hardened: -13 to +140° F (-25 to +60° C)

(5) 10-/100 Mbps Copper and (1) 100-Mbps Multimode Fiber Ports				(5) 10-/100 Mbps Copper and (1) 100-Mbps Single-Mode Fiber Ports			(6) 10-/100-Mbps Copper Ports
	SC	ST	MT-RJ	SC	Long-Distance/SC	LC	
115 VAC, 60 Hz	LBH150A-H-SC	LBH150A-H-ST	LBH150A-H-MT	LBH150A-H-SSC	LBH150A-H-SSCL	—	LBH600A-H
230 VAC, 50 Hz w/IEC power connector	LBH150AE-H-SC	LBH150AE-H-ST	—	LBH150AE-H-SSC	—	LBH150AE-H-SLC	LBH600AE-H
12 VDC	LBH150A-H-SC-12	LBH150A-H-ST-12	—	LBH150A-H-SSC-12	—	—	LBH600A-H-12
24 VDC	LBH150A-H-SC-24	LBH150A-H-ST-24	—	LBH150A-H-SSC-24	—	—	LBH600A-H-24
24 VDC, DIN rail	LBH150A-HD-SC-24	LBH150A-HD-ST-24	LBH150A-HD-MT-24	LBH150A-HD-SSC-24	—	—	LBH600A-HD-24
48 VDC	LBH150A-H-SC-48	LBH150A-H-ST-48	—	—	—	—	LBH600A-H-48
(4) 10-/100 Mbps Copper and (2) 100-Mbps Multimode Fiber Ports				(4) 10-/100 Mbps Copper and (2) 100-Mbps Single-Mode Fiber Ports			
	SC	ST	MT-RJ	SC	Long-Distance/SC		
115 VAC, 60 Hz	LBH240A-H-SC	LBH240A-H-ST	LBH240A-H-MT	LBH240A-H-SSC	LBH240A-H-SSCL		
230 VAC, 50 Hz w/IEC power connector	LBH240AE-H-SC	LBH240AE-H-ST	—	LBH240AE-H-SSC	—		
12 VDC	LBH240A-H-SC-12	LBH240A-H-ST-12	—	LBH240A-H-SSC-12	—		
24 VDC	LBH240A-H-SC-24	LBH240A-H-ST-24	—	LBH240A-H-SSC-24	—		
24 VDC, DIN rail	LBH240A-HD-SC-24 \$509.95	LBH240A-HD-ST-24	LBH240A-HD-MT-24	LBH240A-HD-SSC-24	—		
48 VDC	LBH240A-H-SC-48	LBH240A-H-ST-48	—		—		



For details on Heavy-Duty Edge Switches, turn the page.

10-/100-Mbps Heavy-Duty Edge Switches, Extreme: -40 to +167° F (-40 to +75° C)

	(5) 10-/100 Mbps Copper and (1) 100-Mbps Multimode Fiber Ports			(5) 10-/100 Mbps Copper and (1) 100-Mbps Single-Mode Fiber Ports			(6) 10-/100-Mbps Copper Ports
	SC	ST	MT-RJ	SC	Long Distance/SC	LC	
115 VAC, 60 Hz	LBH150A-P-SC	LBH150A-P-ST	LBH150A-P-MT	LBH150A-P-SSC	—	LBH150A-P-SLC	LBH600A-P
230 VAC, 50 Hz w/IEC power connector	LBH150AE-P-SC	LBH150AE-P-ST	—	LBH150AE-P-SSC	—	—	LBH600AE-P
12 VDC	LBH150A-P-SC-12	LBH150A-P-ST-12	—	LBH150A-P-SSC-12	—	—	LBH600A-P-12
24 VDC	LBH150A-P-SC-24	—	—	LBH150A-P-SSC-24	LBH150A-P-SSCL-24	—	LBH600A-P-24
24 VDC, DIN rail	LBH150A-PD-SC-24	LBH150A-PD-ST-24	—	—	—	—	LBH600A-PD-24
	(4) 10-/100 Mbps Copper and (2) 100-Mbps Multimode Fiber Ports			(4) 10-/100 Mbps Copper and (2) 100-Mbps Single-Mode Fiber Ports			
	SC	ST	MT-RJ	SC		LC	
115 VAC, 60 Hz	LBH240A-P-SC	LBH240A-P-ST	—	LBH240A-P-SSC		LBH240A-P-SLC	
230 VAC, 50 Hz w/IEC power connector	LBH240AE-P-SC	LBH240AE-P-ST	—	LBH240AE-P-SSC		—	
12 VDC	LBH240A-P-SC-12	LBH240A-P-ST-12	—	LBH240A-P-SSC-12		LBH240A-P-SLC-12	
24 VDC	LBH240A-P-SC-24	LBH240A-P-ST-24	—	LBH240A-P-SSC-24		—	
24 VDC, DIN rail	—	LBH240A-PD-ST-24	—	LBH240A-PD-SSC-24		—	

Item	Code	List Price
For spare power supplies, order...		
AC Power Supplies for Heavy-Duty Edge Switches		
Standard		
115 VAC	LBH100A-115-VAC	
240 VAC	LBH100AE-240-VAC	
Hardened		
100–240 VAC	LBH100A-H-PS	
100–240 VAC with IEC Connector	LBH100AE-H-PS	
Extreme		
100–240 VAC	LBH100A-P-PS	
100–240 VAC with IEC Connector	LBH100AE-P-PS	

Item	Code	List Price
For rackmounting, order...		
Rackmount Tray with No Power Supply (Holds up to 8 Switches)	LE1505-RACK	
Rackmount Tray with (1) 9-V Power Supply (Powers up to 3 Switches)	LH1505P-RACK	
Rackmount Tray with (2) 9-V Power Supplies (Powers up to 6 Switches)	LH1505P-RACK-2-9-V	
To supply redundant power to both the AC power jack and the DC screw terminal on 24-VDC models only, order...		
Dual-Source Cable Kit	LH1505-CK	
For DIN rail mounting, order...		
DIN Rail Mounting Bracket	DIN-RAIL MC2	
DIN Rail, 1-m (3.2-ft.)	DR100	

NOTE: Panel-mounting brackets are included.

NOTE: AC-powered models come complete with an AC power supply. Order a separate AC power supply to provide backup power to DC-powered Heavy Duty Edge Switches.

Hardened Managed Ethernet Switches

Tough, multiport switches that give you economical ways to move data quickly—and reliably—in harsh environments.



LEH808-1G: top: front view; bottom: rear view

- Hardened managed switches that operate in very hot and very cold conditions—even outdoors in sheltered locations.
- Available in copper-only and copper and fiber optic port configurations, including Gigabit-speed switches.
- Offer bandwidth rate control and support IEEE 802.1p Quality of Service (QoS) for four priority queues.
- Support network redundancy, offering a recovery time of <15 ms and automatic link failover, as well as redundant power inputs.
- Manageable through an RS-232 console, Telnet, SNMP, RMON, a Web browser, or TFTP.
- Per-port programmable MAC address locking, up to 24 static secure MAC addresses per port, and MAC-based trunking.
- **WARRANTY** — 5 Years

Designed for rugged environments, Hardened Managed Ethernet Switches provide reliable switching in industrial areas.

Encased in IP30 rated metal cases, they withstand temperatures ranging from -40 to +167° F (-40 to +75° C). They're great for factory floors and traffic-signal applications (the switches comply with the IEC 61000-6-2 EMC Generic standard for immunity in industrial environments, IEC 60068-2 testing for vibration resistance and shock, as well as NEMA TS1 and TS2 environmental requirements for traffic-control equipment).

Fully manageable through SNMP, a Web browser, Telnet, or a console port, the switches are designed to integrate mixed-speed copper-only segments or 10-/100-Mbps copper networks with fiber backbones. You can control the maximum bandwidth on each port individually, as well as set up Quality of Service (QoS) priority queuing for critical applications.

A majority of the switches support a Gigabit Ethernet uplink port or two. All models offer full wire-speed forwarding rates, autonegotiate for network speed, and feature Auto-MDI/MDI-X, eliminating the need for crossover cables on the copper ports.

What's more, the Hardened Managed Ethernet Switches support port-based VLAN and IEEE 802.1Q VLAN tagging, MAC-based trunking, IP-multicast IGMP snooping (V1, V2, and V3), rapid spanning tree for redundancy, and port mirroring. Plus, they also boast 802.1x port-based authentication for network security.

Mount the compact switches on a DIN rail, on a panel, or in a rack. The switches come with redundant power inputs (terminal block and DC jack). Choose power supplies from the Hardened Mini Industrial Switches presentation on the [facing page](#).

TECH SPECS

Environmental — Operating temperature: -40 to +167° F (-40 to +75° C); Storage temperature: -40 to +185° F (-40 to +85° C); Humidity: 5 to 95%, noncondensing	RoHS — Yes
Forward and Filtering Rate — 14,880 pps for 10 Mbps; 148,810 pps for 100 Mbps; 1,488,100 pps for 1000 Mbps	Connectors — 10-/100-Mbps copper: (8), (12), (13), or (14) RJ-45 (10BASE-T/100BASE-TX); 10-/100-/1000-Mbps copper: (1) or (2) RJ-45 (10BASE-T/100BASE-TX/1000BASE-T); 100-Mbps fiber: (1) pair of SC or ST® (100BASE-FX); 1000-Mbps fiber: (1) pair of SC or ST (1000BASE-SX); Serial console: (1) DB9 F (RS-232)
MAC Addresses — 8192	Indicators — LEDs: Power (Power 1, Power 2, Power 3); Link/Activity, Speed per each port
Management — RS-232 console (CLI), Telnet, SSL/SSH, SNMP V1/V2/V3, RMON, Web browser, TFTP	Power — Input: 12–32 VDC terminal block; 12 VDC (DC jack); Consumption: 15 W (max.); 1.25 A at 12 VDC, 0.625 A at 24 VDC
Packet Buffer — 2 MB	Size — 2"H x 9.25"W x 5"D (5.1 x 23.5 x 12.7 cm)
Standards — IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX/100BASE-FX, IEEE 802.3ab 1000BASE-T, IEEE 802.3x, IEEE 802.1p, IEEE 802.1Q, IEEE 802.1S, IEEE 802.1w, IEEE 802.1D, IEEE 802.1x	Weight — 3.3 lb. (1.5 kg)
Switching Processing Type — Store-and-forward, half-duplex backpressure and IEEE 802.3x full-duplex flow control	
CE Approval — Yes	

Item	Code	List Price
Hardened Managed Ethernet Switches		
Copper Only		
(14) 10-/100-Mbps Copper	LEH8814	
(8) 10-/100-Mbps Copper + (1) 10-/100-/1000-Mbps Copper	LEH808-1G	
(8) 10-/100-Mbps Copper + (2) 10-/100-/1000-Mbps Copper	LEH808-2G	
(12) 10-/100-Mbps Copper + (1) 10-/100-/1000-Mbps Copper	LEH812-1G	
(12) 10-/100-Mbps Copper + (2) 10-/100-/1000-Mbps Copper	LEH812-2G	
Copper/Fiber		
(8) 10-/100-Mbps Copper + (2) 100-Mbps Fiber		
Multimode SC 2 km	LEH808-2MMSC	
ST 2 km	LEH808-2MMST	
Single-Mode SC 20 km	LEH808-2SMSC20	
ST 20 km	LEH808-2SMST20	
(8) 10-/100-Mbps Copper + (1) 1000-Mbps Fiber		
Multimode SC 2 km	LEH808-1GSXSC	
Single-Mode SC 10 km	LEH808-1GLXSC10	
20 km	LEH808-1GLXSC20	
(8) 10-/100-Mbps Copper + (2) 1000-Mbps Fiber		
Multimode SC 2 km	LEH808-2GSXSC	
Single-Mode SC 10 km	LEH808-2GLXSC10	
20 km	LEH808-2GLXSC20	
(12) 10-/100-Mbps Copper + (2) 100-Mbps Fiber		
Multimode SC 2 km	LEH812-2MMSC	
ST 2 km	LEH812-2MMST	
Single-Mode SC 20 km	LEH812-2SMSC20	
ST 20 km	LEH812-2SMST20	
(12) 10-/100-Mbps Copper + (1) 1000-Mbps Fiber		
Multimode SC 2 km	LEH812-1GSXSC	
Single-Mode SC 10 km	LEH812-1GLXSC10	
20 km	LEH812-1GLXSC20	
(12) 10-/100-Mbps Copper + (2) 1000-Mbps Fiber		
Multimode SC 2 km	LEH812-2GSXSC	
Single-Mode SC 10 km	LEH812-2GLXSC10	
20 km	LEH812-2GLXSC20	
(13) 10-/100-Mbps Copper + (1) 100-Mbps Fiber		
Multimode SC 2 km	LEH813-1MMSC	
ST 2 km	LEH813-1MMST	
Single-Mode SC 20 km	LEH813-1SMSC20	
ST 20 km	LEH813-1SMST20	

For your switch, choose a DIN rail-mountable DC power supply or an AC power adapter from the Hardened Mini Industrial Switches presentation on the [facing page](#).

Hardened Mini Industrial Switches

Rugged, DIN rail-mountable devices for switching 10/100 copper or copper-to-fiber traffic.

- Inexpensive, unmanaged switches for taking your Ethernet network into harsh environments—without taking up much-needed space.
- Industrial-strength case. Complies with IEC standards for electromagnetic compatibility (EMC) in industrial environments.
- Full wire-speed forwarding rates.
- Fiber optic models offer interference-free connections plus extended distances—as far as 75 kilometers (46.6 mi.).
- **◆◆ WARRANTY** — 1 Year



LBH120A-H-SC

TECH SPECS

Enclosure — Plastic case, IP30 rated
Environmental — Operating temperature: +14 to +140° F (-10 to +60° C); Storage temperature: -13 to +185° F (-25 to +85° C); Humidity: 5 to 95%, noncondensing
Filtering/Forwarding Rate — Ethernet: 14,880 pps; Fast Ethernet: 148,800 pps
MAC Addresses — 2K
Packet Buffer — 384 KB
Switching Processing Type — Store and forward with half-duplex backpressure and IEEE 802.3x full-duplex flow control
Standards — IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX/100BASE-FX, IEEE 802.3x
CE Approval — Yes except PSD012, PS002–PS003

RoHS — Yes
Connectors — Copper: (4) or (5) RJ-45 (10BASE-T/100BASE-TX); Fiber optic: (1) pair of SC or ST® (100BASE-FX)
Indicators — LEDs: Power; Link/Activity, Speed per each port
Power — Input: 12–48 VDC (terminal block); Output: Per optional DC or AC power supply ordered; Draw: 2.4 W max. (0.2 A at 12 VDC, 0.1A at 24 VDC, 0.05 A at 48 VDC)
Size — 4.3"H x 1"W x 2.8"D (10.9 x 2.5 x 7.1 cm)
Weight — 0.5 lb. (0.2 kg)

Use these Inexpensive, unmanaged switches to switch 10BASE-T/100BASE-TX traffic or 10BASE-T/100BASE-TX and 100BASE-FX traffic in factory or other industrial areas.

With a slim design, the Hardened Mini Industrial Switches suit harsh environments where you're constrained by space. They can be installed easily on a DIN rail (a mounting kit is included). Simplifying matters further, they feature Auto MDI/MDI-X on their copper ports, autonegotiate for speed, and autodetect full- or half-duplex mode.

In addition to their compliance with the IEC 61000-Part 6-2 Generic standard for electromagnetic compatibility (EMC), the Hardened Mini Industrial Switches comply with IEC 60068-2-6 Fc vibration resistance and IEC 60068-2-27 Ea shock standards.

They support 2048 MAC addresses, feature a 384 KB buffer memory and broadcast storm filtering, and provide full wire-speed forwarding rates.

Item	Code	List Price
Hardened Mini Industrial Switches		
Copper Only		
(5) 10-/100-Mbps Copper	LBH120A-H	
Copper/Fiber		
(4) 10-/100-Mbps Copper + (1) 100-Mbps Fiber		
Multimode SC	2 km	LBH120A-H-SC
ST	2 km	LBH120A-H-ST
Single-Mode SC	20 km	LBH120A-H-20K-SC
	40 km	LBH120A-H-40K-SC
	75 km	LBH120A-H-75K-SC
ST	20 km	LBH120A-H-20K-ST
Choose a DIN rail-mountable DC power supply or an AC power adapter...		
DIN Mount Power Supply	24-VDC	PSD012
	48-VDC	PSD014
External 100–240-VAC Power Adapter		
12-VDC Output Jack	U.S. Cord	PS002A
	No Cord	PS002
12-VDC Stripped Ends Output		
	U.S. Cord	PS003A
	No Cord	PS003

4-Port Power over Ethernet Switch

Connect PoE devices at the edge of your network—even outdoors!

- Tough, unmanaged switch works as power source equipment (PSE), providing power across UTP cable to up to four attached PoE devices.
- Heavy-duty, premium-grade extended temperature components. IP40-rated steel case is designed to keep out dust, dirt, moisture, smoke, and insects.
- For use in industrial and sheltered outdoor environments.
- Connect wireless access points, readers, cameras, sensors, and other PoE equipment at the edge of your 10BASE-T or 100BASE-TX network.
- Autonegotiating, full-/half-duplex ports with Auto MDI/MDI-X.
- **◆◆ WARRANTY** — 3 Years

TECH SPECS

Environmental — Operating temperature: -40 to +167° F (-40 to +75° C); Storage temperature: -40 to +185° F (-40 to +85° C); Humidity: 5 to 95%, noncondensing
MAC Addresses — 2K
Packet Buffer — 128 KB
Standards — IEEE 802.3 10BASE-T, IEEE 802.3u 100BASE-TX, IEEE 802.3af PoE; IEEE 802.3, IEEE 802.1p
CE Approval — Yes
RoHS — Yes, wAll except LE1505-RACK
Connectors — (4) shielded RJ-45

(10BASE-T/100BASE-TX)
Power — Input: 46–60 VDC terminal block; 8–15 VDC jack for use when no PoE devices are attached; PoE output: 44–57 VDC on Pins 4, 5 (+), 7, 8 (–) of RJ-45 ports; Draw: 66 watts max. (1.4 A at 48 VDC); PoE: 61.6 watts max. (15.4 watts per port)
Size — 3.5"H x 3"W x 1"D (8.9 x 7.6 x 2.5 cm)
Weight — 0.6 lb. (0.3 kg)



802.3af
PoE PSE
device

NOTE: Requires 48-VDC, 1.5-amp power on terminal block to power PoE devices or -12-VDC, 0.35-amp power via barrel connector for non-PoE applications.

Item	Code	List Price
4-Port Power over Ethernet Switch		
	LP004A	
For rackmounting up to eight switches, order...		
Rackmount Tray	LE1505-RACK	
Powered Rackmount Tray	LH1505P-RACK	
For DIN rail mounting, order...		
DIN Rail Mounting Bracket	DIN-RAIL MC2	

Managed Field Switches

A heavy-duty switch ready to customize with 10-/100- and Gigabit-speed copper and fiber ports.



LE2325A-48VDC



LE2325A-48VDC: rear view

- Ideal for industrial networking in harsh environments.
- IP53-rated protection. Advanced thermal chassis works as a heat sink and features a ribbed surface for heat dissipation.
- Great for building a switched, hardened Ethernet infrastructure to connect edge devices.
- Feature four 10/100 copper ports plus three slots for adding copper and fiber modules (for a maximum of 16 total ports).
- Power over Ethernet (PoE) options available.
- Handle bursty traffic and priority streaming traffic.
- Include mounting brackets and management software.
- Support SNMP management plus secure browser-based access.
- **WARRANTY** — 3 Years

Use these modular Managed Field Switches from Black Box to build a switched, hardened Ethernet infrastructure to connect edge devices, such as PLCs and IEDs, with upstream switches or routers.

Ideal for industrial networking in factory, engineering/process control, utility, or video surveillance applications, the switches feature a high-strength, extruded aluminum chassis that works as a heat sink and features a ribbed surface for heat dissipation—no need for fans! Even better, the switches' sealed case provides high EMI/RFI noise immunity.

They also boast IP53-rated environmental protection and meet IEC 61850 and IEEE 1613 Environmental Standards for Electric Power Substations, are NEBS Level 3 and ETSI compliant, and are NEMA TS-2 rated for outdoor use.

Build the perfect beast.

Start with a Managed Field Switch with (4) 10-/100-Mbps Copper Ports (fixed RJ-45 ports in chassis Slot A), specifying the type of power input you need. Or, for networks where you need Power over Ethernet (PoE) for 802.3af devices on switched ports, choose a Managed Field Switch with (4) 10-/100-Mbps Copper PoE Ports and -48-VDC Power Input (LE2325A-POE48DC)

For the three other slots in the chassis, choose from a number of copper and fiber modules to establish up to 16 total ports. You can even specify Gigabit-speed connections, as well as modules with optical SFP transceiver slots.

This mixed-media modular capability makes the Managed Field Switches ideal for industrial applications where you need to accommodate existing Ethernet cabling and integrate interference-free fiber cabling into your LAN structure.

Handle heavy workloads and support secure connections.

In addition to non-blocking, wire-speed filtering and forwarding across all ports, the Managed Field Switches handle stressful workloads, including a mix of bursty data and priority streaming traffic, and feature 802.3x flow control. Plus, they have a self-learning 4K-node address table and large packet buffers.

On their copper ports, the switches autonegotiate for speed in full- or half-duplex and feature auto-crossover (MDI-X) for simple cabling.

Alarm relay contacts on the switches enable monitoring through traps. Then you can use the software to record any losses of power signals and other user-defined events.

For security, the Managed Field Switches support secure browser-based access, and RADIUS and TACACS+ access protocols, as well as SNMPv3 for encrypted authentication and access security.

Easy to manage with included GUI software.

The full-featured management software included with each switch offers advanced control through an easy-to-use GUI Web-based interface. In addition to SNMP management—including IP support for SNMP (both TCP/IP and UDP/IP)—it supports RMON statistics, history, alarms, and events; port mirroring for selective traffic analysis; copper and fiber port control; and much, much more.

What's more, the software supports VLAN tagging and trunking, IGMP-L2 multicast management, Link Aggregation Control Protocol (LACP), and multilevel 802.1p/802.1q ToS and DiffServ Quality of Service (QoS) for ensuring bandwidth for critical video or voice traffic.

TECH SPECS

Environmental — Operating temperature:

UL® 60950/component parts rating:

-40 to +140° F (-40 to +60° C);

IEC 60068 short term rating:

-60 to +210° F (-50 to +85° C);

Storage temperature: -13° to +185° F

(-25° to +100° C);

Humidity: 5 to 95%, noncondensing

MAC Addresses — 4K

Management — Embedded Web server; supporting SNMPv2, v3, secure Web management, RMON, CLI, VLANs, MODBUS® over TCP/IP, Telnet (client and server support, multiple sessions)

Packet Buffer — 240 KB for 10-/100-Mbps (120 KB for optional 1000 Mbps)

Standards — IEEE 802.3, IEEE 802.3ab, IEEE 802.1p, 10BASE-FL, 100BASE-TX, 100BASE-FX, 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX

Switching Processing Type — Store and

forward with IEEE 802.3x full-duplex flow control, non-blocking

CE Approval — Yes

RoHS — Yes

Connectors — Ethernet/Fast Ethernet:

LE2325A-POE48VC: (4) RJ-45 PoE;

Other switch chassis: (4) RJ-45;

Management console: (1) DB15 (serial),

(1) RJ-45;

Alarm contacts: (1) NC (internal power), (1) NC (software control)

Power — Input: 12 VDC, 24 VDC, -48 VDC,

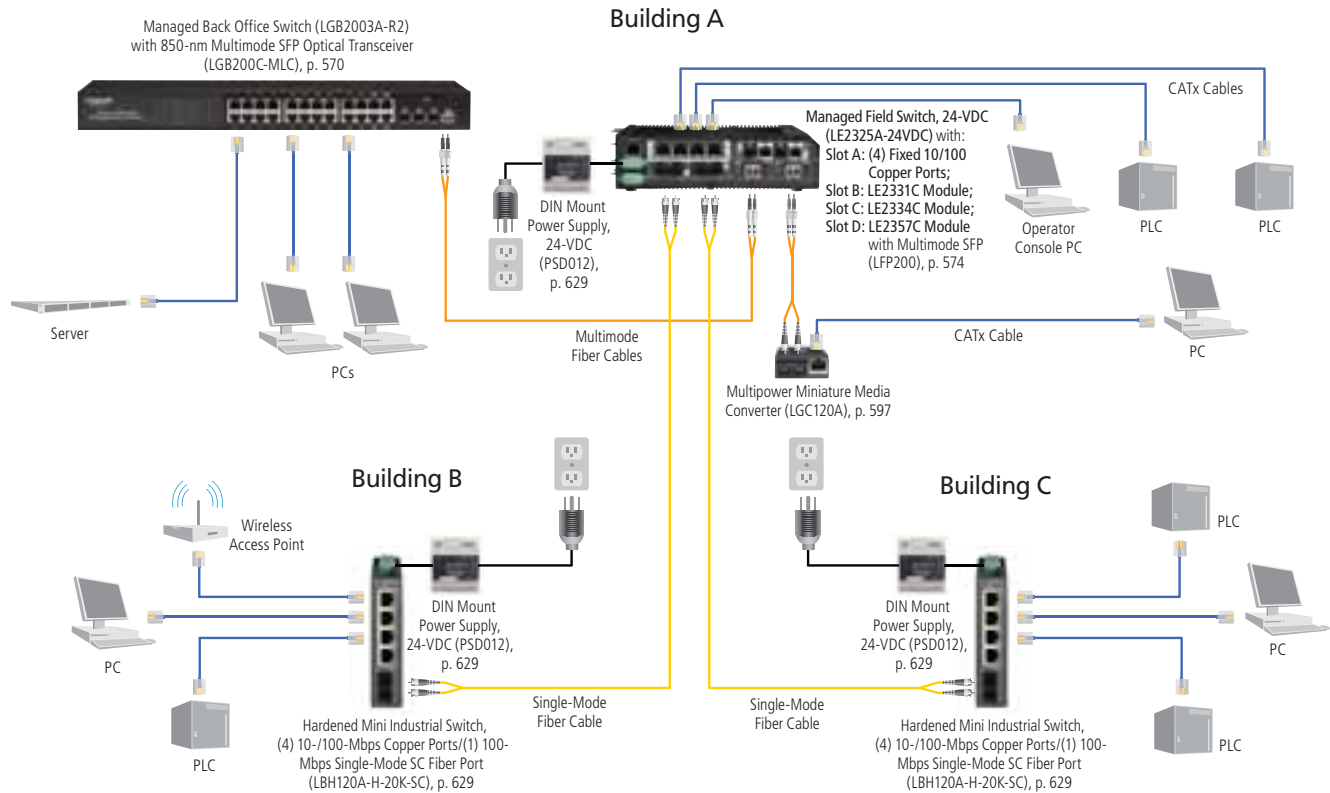
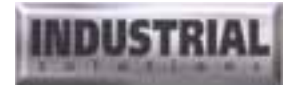
125 VDC, or 250 VDC, internal, on standard terminal block (-, GND, +);

Draw: Typical: 20 watts for 4-port copper only model;

35 watts for fully loaded fiber-only model

Size — Switch chassis: 6.9"H x 7.5"W x 2"D (17.5 x 19.1 x 5.1 cm)

Weight — Switch chassis: 3 lb. (1.4 kg)



Item	Code	List Price
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First, choose a chassis, which has (4) fixed RJ-45 ports in its Slot A...

Managed Field Switches with (4) 10-/100-Mbps Copper Ports	LE2325A-24VDC
24-VDC Power Input	LE2325A-48VDC
-48-VDC Power Input	LE2325A-125VDC
125-VDC Power Input	LE2325A-250VDC
250-VDC Power Input	LE2325A-POE48DC
Managed Field Switch with (4) 10-/100-Mbps Copper PoE Ports	LE2380-PS
-48-VDC Power Input	
-48-VDC Power Supply for LE2325A-POE48DC	

NOTE: The PoE version of this switch (LE2325A-POE48DC) requires a separate power supply (LE2380-PS).

...then, for Slot B, choose a switch port module...

Managed Field Switch Port Modules			
(4) 10-/100-Mbps Copper			LE2326C
(2) 10-/100-Mbps Copper, (2) 100-Mbps Fiber			
Multimode	MT-RJ	2 km	LE2327C
LC		2 km	LE2328C
Single-Mode	LC	15 km	LE2329C
(2) 10-/100-Mbps Copper, (1) 100-Mbps Fiber			
Multimode	SC	2 km	LE2330C
(2) 10-Mbps Fiber			
Multimode	ST*	2 km	LE2331C
(2) 100-Mbps Fiber			
Multimode	ST	2 km	LE2332C
SC		2 km	LE2333C
Single-Mode	SC	20 km	LE2334C
SC		40 km	LE2335C
(4) 100-Mbps Fiber			
Multimode	MT-RJ	2 km	LE2336C
LC		2 km	LE2337C
Single-Mode	LC	15 km	LE2338C
(4) 10-/100-Mbps Copper PoE (for LE2325A-POE48VDC Only)			LE2339C

Item	Code	List Price
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...next, order a module for Slot C...

Managed Field Switch Fiber Port Modules			
100-Mbps			
Multimode	(1) ST	2 km	LE2341C
	(1) SC	2 km	LE2343C
	(2) ST	2 km	LE2340C
	(2) SC	2 km	LE2342C
	(2) MT-RJ	2 km	LE2349C
	(2) LC	2 km	LE2351C
	(4) LC	2 km	LE2350C
	(4) MT-RJ	2 km	LE2348C
Single-Mode	(1) SC	20 km	LE2345C
	(1) SC	40 km	LE2347C
	(2) SC	20 km	LE2344C
	(2) SC	40 km	LE2346C
	(2) LC	15 km	LE2353C
	(4) LC	15 km	LE2352C

...finally, for Slot D, choose either another module from the Step 2 list above (all work in Slot D except for the PoE module) or one of these:

Managed Field Switch Gigabit Port Modules	
(1) 10-/100-/1000-Mbps Copper	LE2358C
(2) 10-/100-/1000-Mbps Copper	LE2355C
(1) 1000-Mbps Copper, (1) 1000-Mbps Fiber SFP Open Transceiver	LE2356C
(1) 1000-Mbps Fiber SFP Open Transceiver	LE2357C
(2) 1000-Mbps Fiber SFP Open Transceiver	LE2354C

NOTE: For a selection of SFP transceivers, see pp. 570 and 574 or blackbox.com. For help specifying your Managed Field Switch, call our FREE Tech Support.

Managed Fiber Switches

The flexible, modular switch that

- Manageable 1U rackmount switches designed for demanding industrial networks.
- Four modular slots enable you to add 10-, 100-, or 1000-Mbps Ethernet ports.
- Nonblocking wire-speed performance. System supports aggregate forwarding and filtering rates up to 5.1 Mbps (24 ports at 100 Mbps; one port at Gigabit speed).
- Included software supports SNMP, RMON, Telnet™, TFTP, SNMPc, SNMP, and more.
- Also supports IGMP, spanning tree protocols, VLAN tagging and trunking, as well as 802.1p QoS prioritization for ensuring critical traffic delivery.
- Include rackmount ears. Choose from AC and DC power supplies.
- ♦♦ **WARRANTY** — 3 Years

The Black Box® Managed Fiber Switches don't need the shelter and protection of an air-conditioned data center. They're hardy enough to withstand conditions that make ordinary switches wilt.

The switches are built to withstand extremes of temperature and humidity, are encased in a rugged metal chassis, and include three internal cooling fans. NEBS Level 3 certified, they're a proven switching solution for the most demanding locations. That's because to obtain this level of certification, they had to undergo stringent tests (see Black Box Explains **below**).

With 100–240-VAC and 24-, 48-, and 125-VDC power supplies to choose from, the switches are adaptable to nearly any power situation. They're ideal for applications such as telecomm central offices (CO), traffic control systems, water treatment plants, or manufacturing plants.

Modular design for flexibility.

They're more than hardy switches. They're also extremely versatile modular fiber switches with a wide range of interface options and support for Gigabit links.

Each chassis has four slots for modules. The first three slots (A, B, and C) are full-sized slots, which can be used for copper or fiber ports at 10 or 100 Mbps, or as a Gigabit uplink port with the LE2433C module. The fourth slot (D) is a ¼-size slot, which can only be configured as a Gigabit uplink port with the LE2432C module.

This versatile architecture enables you to adapt the switch to nearly any application up to and including Gigabit backbone interconnections between network centers. Use one or more Managed Fiber Switches to build a switched fiber network infrastructure that connects to routers, hubs, or other switches.

Only 1U high, the switch comes with rackmount ears for a standard 19" rack but can be adapted for ETSI rackmounting or a 23" telco rack with our optional hardware.

Manage locally or remotely.

All Managed Fiber Switches include extensive management software, which enables you to manage the switch locally or remotely.

The GUI software supports SNMP, RMON, VLANs, and port security, as well as Telnet™, TFTP, DHCP, SNMP, event logging, Spanning Tree Protocol, and SNMPc™. SNMPc is a secure, scalable, distributed software suite that enables a single user to manage a small- to medium-size network. It features e-mail event notifications, real-time MIB displays, Web reports, alarms, and more!

What's more, the software supports VLAN tagging and trunking; IGMP-L2 multicast management, Link Aggregation Control Protocol (LACP), and multi-level 802.1p/802.1q ToS and DiffServ Quality of Service (QoS) for ensuring bandwidth for critical video or voice traffic.

For simple setup, the switches learn the addresses of attached nodes automatically, so changing services to support network changes is a plug-and-play process.

Plus, they offer high-performance, non-blocking switching on all ports.

NEBS Level 3
certified

TECH SPECS

Approvals — UL® Listed (UL60950), cUL; FCC Part 15, Class A (emissions); NEBS Level 3; ETSI; NEMA TS-1 (traffic control)

Environmental — Operating temperature:
UL® 60950/component parts rating: 130° F (55° C);
IEC 60068 short term rating: -40 to +185° F
(-40 to +85° C);

Storage: -40 to +185° F (-40 to +85° C);

Humidity: 5 to 95% noncondensing

MAC Addresses — 4000 nodes, self learning with address aging

Management — Locally or remote via included software's GUIs; CLI, SNMP, RMON, VLANs, QoS, Port Security, Telnet™, Event Log, IGMP, Spanning Tree Protocol

Standards — Dependent on modules populating chassis:
IEEE 802.3 10BASE-T; IEEE 802.3u 100BASE-TX/FX;
IEEE 802.3z; IEEE 802.3ab 1000BASE-X; IEEE 802.1p;
IEEE 802.3x

Packet Buffer — 10 Mbps/100 Mbps: 240 KB;
100 Mbps: 120 KB

Switching Method — Store and forward with IEEE 802.3x full-duplex flow control, nonblocking

CE Approval — Yes

RoHS — All except for LE2425A-125VDC,
LE2446C-LE2447C, LE2441C, LE2438C-LE2439C,
LE2452C-LE2453C, LE2458C, LE2456RM

Connectors — Dependent on modules populating slots;
Copper modules: RJ-45;

Fiber modules: ST, SC, LC, or MT-RJ

Indicators — LEDs: Per RJ-45 port: (1) Link, (1) Activity,
(1) Duplex, (1) 10/100;

Per fiber port: (1) Link, (1) Activity, (1) Duplex

Power — Input: 100–240 VAC, 47–63 Hz, autosensing;
-48-VDC; 24-VDC; or 125-VDC power supplies;
Draw: Typical: 60 watts for a fully loaded chassis with
fiber modules; 35 watts for fully loaded chassis
with copper-only modules

Size — Switch chassis: 1.75"H x 17"W x 9"D
(4.4 x 43.2 x 22.9 cm)

Weight — Switch chassis: 5 lb. (2.3 kg)

Black Box Explains

NEBS Level 3 compliance.

Network Equipment Building System (NEBS) standards set requirements for telco equipment. The standards are maintained by Telcordia Technologies, Inc., formerly Bellcore. Bellcore Special Report, SR-3580 defines three distinct functional levels of NEBS compliance. The third of these levels, NEBS Level 3, is the most stringent, certifying carrier-class equipment intended for long-term use in variable environments.

NEBS Level 3 certifies that a piece of equipment can be safely used in an extreme environment. To become certified at NEBS Level 3, a device must meet strict physical, electrical, and environmental requirements to prove it will operate safely and reliably in extreme conditions. It must pass a series of tests that include extreme heat, humidity, fire, earthquakes (Zone 4), light, and noise.



stands up to tough environments.



LE2425A-CHASSIS: top: front view; bottom: rear view

Item	Code	List Price
First, order the switch chassis...		
Managed Fiber Switch Chassis		
AC Power Supply 100–240 VAC	LE2425A-CHASSIS	
DC Power Supply 24 VDC	LE2425A-24VDC	
48 VDC	LE2425A-48VDC	
125 VDC	LE2425A-125VDC	
...then select the modules for your application.		
4-Port Managed Fiber Switch Modules		
(4) 10BASE-FL Multimode		
ST 2 km	LE2427C	
(4) 100BASE-FX Multimode		
ST 2 km	LE2445C	
SC 2 km	LE2426C	
(2) 10BASE-FL Multimode ST + (2) 100BASE-FX Single-Mode		
ST 2 km	LE2446C	
6-Port Managed Fiber Switch Modules		
(2) 10BASE-FL Multimode ST + (4) 100BASE-FX Multimode		
MT-RJ 2 km	LE2447C	
(4) 10-/100-Mbps RJ-45 + (2) 10BASE-FL Multimode		
ST 2 km	LE2440C	
(4) 10-/100-Mbps RJ-45 + (2) 100BASE-FX Multimode		
ST 2 km	LE2429C	
SC 2 km	LE2430C	
Single-Mode		
SC 20 km	LE2431C	
40 km	LE2441C	
8-Port Managed Fiber Switch Modules		
(4) 10-/100-Mbps RJ-45 + (4) 100BASE-FX Multimode		
MT-RJ 2 km	LE2442C	
LC 2 km	LE2443C	
Single-Mode		
LC 15 km	LE2444C	
(6) 10-/100-Mbps RJ-45 + (2) 100BASE-FX Multimode		
MT-RJ 2 km	LE2438C	
Single-Mode		
LC 15 km	LE2439C	
(8) 10-/100-Mbps RJ-45	LE2428C	
(8) 100BASE-FX Multimode		
MT-RJ 2 km	LE2436C	
LC 2 km	LE2448C	
Single-Mode		
LC 15 km	LE2437C	

Item	Code	List Price
You may also want to populate your chassis' A slot and/or B slot with a Gigabit Module. First, order a Slot Module...		
Gigabit Slot Module for 1 A, B, or C Slots	LE2433C	
Gigabit Slot Module for 1 D-Slot	LE2432C	
...then add a GBIC Transceiver for each Gigabit Slot Module.		
GBIC Transceivers for LE2433C or LE2432C		
(1) 1000BASE-TX RJ-45 100 m	LE2451C	
(1) 1000BASE-SX, Multimode		
SC 220 m	LE2434C	
(1) 1000BASE-LX/LH, Single-Mode 1310-nm		
SC 10 km	LE2449C	
25 km	LE2450C	
(1) 1000BASE-ZX, Single-Mode 1550-nm		
SC 40 km	LE2452C	
70 km	LE2453C	
You may also need...		
Blank Covers for Unused A-, B-, or C-Slots	LE2435C	
Alarm Contacts, (1) Power, (1) Software	LE2459C	
Two Separate Power Inputs (24, 48, or 125 V)	LE2458C	
Console Attachment Cable, Serial Null-Modem		
DB9	LE2454C	
USB	LE2455C	
Rackmount Kits		
23" Telco, 1U	LE2456RM	
ETSI, 1U	LE2457RM	

FOR OPTIMUM PERFORMANCE, and a 20% savings, order...

GigaBase® 350 CAT5e 350-MHz Patch Cable, 4-Pair, Straight-Pinned, PVC, Beige, 10-ft. (3.0-m) (For other lengths or colors, see p. 55.)
EVNSL85-0010
Single-Mode, 9.0-Micron Duplex Fiber Optic Cable, SC-SC, PVC, 3-m (9.8-ft.) (For other connectors or lengths, see pps. 98–99.)
EFN310-003M-SCSC
Multimode, 10-Gigabit, 50-Micron Fiber Optic Patch Cable, Zipcord, PVC, SC-SC, 3-m (9.8-ft.) (For other connectors or lengths, see p. 96.)
EFNT010-003M-SCSC



More CATx copper and fiber optic cables, pp. 16–99.

NOTE: Because this switch is built to order and modules are installed at our factory, this product is returnable only for functional failures. Please allow an extra day for delivery.

Vertical-Mount Managed Fiber Switch

When your network isn't typical,

- Ideal for industrial applications such as transportation and traffic control systems, utilities, factories, and surveillance systems.
- Supports up to 16 ports.
- Space-saving vertical wallmount configuration.
- Operates in an extreme temperature range of -40 to +140° F.
- Heavy-duty metal enclosure.

The chassis

- Each chassis features an A slot and a B slot that can be outfitted with Multiport Media Modules, Gigabit Modules, or User-Selectable GBIC Transceiver Modules.
- Mount with the included brackets or a pair of DIN Rail Brackets (LEV2556DR).
- Use the DC Power Supply (LE2458C) with the 24, -48, and 125 VDC Chassis.

The modules

- All RJ-45 ports feature Auto MDI/MDI-X autonegotiation and autocrossover. Use straight-through or crossover CAT5 or CAT5e cables.
- To uplink to Gigabit Ethernet, choose the **Gigabit Slot Modules**. Each houses one or two User-Selectable GBIC Transceiver Modules.
- Use **User-Selectable GBIC Transceivers** to uplink to Gigabit Ethernet.

Robust management features

- Manage via SNMP, tag-based VLANs, and IGMP Snooping and Port Security. Rapid Spanning Tree protocol, SNMP, QoS, GUI, and Event Log are included.
- Includes nonblocking speed on all ports and 802.1p Quality of Service (QoS) traffic prioritization.
- Use where a mix of bursty data traffic and priority streaming traffic for Voice over IP (VoIP) and audio/video signals are present.
- ♦♦ **WARRANTY** — 1 Year

You're not the type for cookiecutter solutions. When given choices of only A, B, or C, you want D through Z just to explore all your networking options.

At Black Box, we know how you feel—and we've done something about it. Our Vertical-Mount Managed Fiber Switch is the switch you've always wanted, with more than 20 modular port options that enable almost unlimited configuration flexibility.

Plus, the switch withstands an extraordinary temperature range and is engineered to mount vertically against the wall, making it ideal for industrial environments.

The Vertical-Mount Managed Fiber Switch is great for transportation and traffic control systems, utilities, and factory environments, as well as video surveillance systems with segments requiring Gigabit backbone connections.

Unleash your inner engineer.

The Vertical-Mount Managed Fiber Switch is available in an autosensing AC version and three DC-powered versions. Each chassis features an A slot and a B slot that can be outfitted with Multiport Media Modules, Gigabit Modules, or User-Selectable GBIC Transceiver Modules—all this enables you to customize the switch to your network's specifications.

Multiport Media Modules come in three varieties: Copper Only, Fiber Only, and Mixed Media.

You can connect Copper Only and Mixed Media modules with RJ-45 ports to Ethernet or Fast Ethernet. All RJ-45 ports feature Auto MDI/MDI-X autonegotiation and autocrossover. Auto MDI/MDI-X enables the use of straight-through or crossover CAT5 or CAT5e cables, even when straight-through would normally be required.

Fiber Only modules feature two, four, six, or eight 100BASE-FX or 10BASE-FL fiber ports—and some even handle both fiber standards! Fiber Only modules are available for multimode or single-mode and feature a variety of connectors. Most modules support communications up to 2 kilometers (1.2 mi.), but the LEV2548C has a maximum distance of 15 kilometers (9.3 mi.)!

Mixed Media modules combine four or six RJ-45 ports with two or four fiber ports. The fiber ports on most modules have a 2-kilometer (1.2-mi.) range, and some modules even support fiber optic communications up to 15, 20, or 40 kilometers (9.3, 12.4, or 24.8 mi.)!

You can also populate the switch's A or B slot with Gigabit Modules. Start with a Slot Module that provides a slot for your GBIC Transceiver Module to uplink to Gigabit Ethernet. If you're only uplinking to Gigabit Ethernet, choose the



LEV2528C



LEV2533C or LEV2562C Slot Modules, which each house one or two User-Selectable GBIC Transceiver Modules.

The LEV2560C Slot Module also includes four RJ-45 ports for Ethernet or Fast Ethernet connections and the LEV2561C Slot Module also comes with a pair of 100BASE-FX ports for multimode fiber communications.

User-Selectable GBIC Transceiver Modules come in one-port models only and are available for a twisted-pair, 1000BASE-LX/LH, or 1000BASE-ZX connection. All fiber communications are single-mode with ranges of 10, 25, 40, and even 70 kilometers (6.2, 15.5, 24.8, or 43.4 mi.)!

Although the Vertical-Mount Managed Fiber Switch has a near-infinite amount of configuration options, the total number of ports added to the A and B slots cannot exceed 16.

Give this switch a hard hat!

The Vertical-Mount Managed Fiber Switch operates at environmental extremes, has an optional redundant DC power supply, and provides security—plus it features a sleek, heavy-duty metal enclosure.

You can order three DC-powered versions with the optional dual-input DC power supply (LE2458C). It provides continuity of operation when either one of the DC input sources is interrupted. The LE2458C is available for 24, 48, or 125 VDC.

you need more than a typical switch.

What's more, you can mount the switch vertically using the vertical mounting brackets that come with the unit or by using a pair of DIN Rail Mounting Brackets (LEV2556DR).

It performs and helps you take charge.

The Vertical-Mount Managed Fiber Switch is loaded with software that enables management via SNMP, tag- and port-based VLANs, and IGMP.

Snooping and Port Security.

For LANs using ring topologies, Spanning Tree protocol, Link-Loss-Learn™, and S-Ring™ are also available.

Alarm relay contacts on the switch monitor power and user-defined software events through traps. High-performance features include non-blocking speed on all ports and 802.1p Quality of Service (QoS) traffic prioritization. The Managed Fiber Switch is ready for use as a backbone switch where a mix of bursty data traffic and priority streaming traffic for Voice over IP (VoIP) and audio/video applications is present.

Distance (Maximum) —10-Mbps Ethernet:
Unshielded twisted pair (UTP): 100 m (328 ft.);
Shielded twisted pair (STP): 150 m (492.1 ft.);
10BASE-FL multimode: 2 km (1.2 mi.);
10BASE-FL single-mode: 10 km (6.2 mi.);
10-/100-Mbps Fast Ethernet: 10BASE-T (CAT3, 4, 5 UTP), 100BASE-TX (CAT5 UTP): 100 m (328 ft.);
STP: 150 m (492.1 ft.);
100BASE-FX, half-duplex, multimode or single-mode: 412 m (1351.7 ft.);
100BASE-FX, full-duplex, multimode: 2 km (1.2 mi.);
100BASE-FX, full-duplex, single-mode: 20 km (12.4 mi.);
100BASE-FX, full-duplex, long reach: 40 km (24.8 mi.);
1000-Mbps Gigabit Ethernet:
1000BASE-T (CAT5e or higher): 100 m (328 ft.);
1000BASE-SX, full-duplex, multimode (62.5-micron cable): 220 m (721.7 ft.);
1000BASE-SX, full-duplex, multimode (50-micron cable): 550 m (1804.4 ft.);
1000BASE-LX, full-duplex, single-mode (62.5-micron cable): 5 km (3.1 mi.)
Environmental — Temperature:
-60 to +205° F (+51 to +96° C);
Humidity: 5 to 95% noncondensing;
Altitude: -200 to +13,000 ft. (-60.9 to 3962.4 m)
Frame Buffer — 10 or 100 Mbps: 240 KB;
1000 Mbps: 120 KB

MAC Addresses — 4000 nodes, self learning, with address aging time of 155 seconds typical

Management — Via software: SNMP, tag- and port-based VLAN support, IGMP Snooping and Port Security, Spanning Tree protocol, Link-Loss-Learn™, S-Ring™

Standards — IEEE 802.3: 10BASE-T;
IEEE 802.3u: 100BASE-TX, 100BASE-FX;
IEEE 802.3z: 1000BASE-TX (autonegotiation);
IEEE 802.3ab: 1000BASE-TX;
IEEE 802.1p: Priority protocol;
IEEE 802.1d: Spanning Tree protocol;
IEEE 802.1q: VLAN tagging;
IEEE 802.3x: Flow control

CE Approval — Yes

Connectors — Chassis: (1) DB9 F management console;

Power — LEV2525A: 100 to 240 VAC, 47 to 63 Hz, autosensing, internal;

LEV2525A-24VDC: 18 to 36 VDC, internal;
LEV2525A-48VDC: -36 to -70 VDC, internal;
LEV2525A-125VDC: 88 to 300 VDC, internal;
LE2458C: Redundant power supply available for 24-VDC, -48-VDC, or 125-VDC operation;

Draw: 50 watts typical with all fiber ports,
30 watts typical with all copper ports

Size — 9.5" H x 8.75" W x 1.75" D (24.1 x 22.2 x 4.4 cm)

Weight — 4.2 lb. (1.9 kg)

NOTE: Because this switch is built to order and modules are installed at our factory, this product is returnable only for functional failures. Please allow an extra day for delivery.

Item	Code	List Price
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First, order the switch chassis...

Vertical-Mount Managed Fiber Switch Chassis

AC	LEV2525A-CHASSIS
DC 24 VDC	LEV2525A-24VDC
48 VDC	LEV2525A-48VDC
125 VDC	LEV2525A-125VDC

...then select the modules for your application.

4-Port Modules

(4) 10BASE-FL Multimode ST	2 km	LEV2545C
(4) 100BASE-FX Multimode ST®	2 km	LEV2527C
(4) 100BASE-FX Multimode SC	2 km	LEV2526C
(2) 10BASE-FL Multimode ST plus		
(2) 100BASE-FX Multimode ST	2 km	LEV2546C

6-Port Modules

(2) 10BASE-FL Multimode ST plus		
(4) 100BASE-FX Multimode MT-RJ	2 km	LEV2547C
(4) 10-/100-Mbps RJ-45 plus		
(2) 10BASE-FL Multimode ST	2 km	LEV2540C
(4) 10-/100-Mbps RJ-45 plus (2) 100BASE-FX Multimode ST	2 km	LEV2529C
Multimode SC	2 km	LEV2530C
Single-Mode SC	20 km	LEV2531C
	40 km	LEV2541C

Item	Code	List Price
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8-Port Modules

(4) 10-/100-Mbps RJ-45 plus (4) 100BASE-FX Multimode MT-RJ	2 km	LEV2542C
Multimode LC	2 km	LEV2543C
Single-Mode LC	15 km	LEV2544C
(6) 10-/100-Mbps RJ-45 plus (2) 100BASE-FX Multimode MT-RJ	2 km	LEV2538C
Single-Mode LC	15 km	LEV2539C
(8) 10-/100-Mbps RJ-45		LEV2528C
(8) 100BASE-FX Multimode MT-RJ	2 km	LEV2536C
Multimode LC	2 km	LEV2537C
Single-Mode LC	15 km	LEV2548C

You may also want to populate your chassis' A slot and/or B slot with a Gigabit Module.

First, order a Slot Module...

Gigabit Slot Modules

for (1) User-Selectable GBIC Transceiver		
Gigabit Only	LEV2533C	
for (2) User-Selectable GBIC Transceivers		
Gigabit Only	LEV2562C	

Item	Code	List Price
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Gigabit Slot Modules (Continued)

for (1) User-Selectable GBIC Transceiver		
Gigabit + (4) 10-/100-Mbps RJ-45		LEV2560C
Gigabit + (2) 100BASE-FX Multimode, SC,	2 km	LEV2561C

...then add a User-Selectable GBIC Transceiver for each Gigabit Slot Module.

User-Selectable GBIC Transceivers

(1) 1000BASE-TX, RJ-45		LE2451C
(1) 1000BASE-SX Multimode SC, 1310-nm	2 km	LE2434C
(1) 1000BASE-LX/LH Single-Mode SC, 1310-nm	10 km	LE2449C
	25 km	LE2450C
(1) 1000BASE-ZX Single-Mode SC, 1550-nm	40 km	LE2452C
	70 km	LE2453C

You may also need...

Blank Cover for Unused Slots		LE2435C
DC Power Supply with (2) Inputs		LE2458C
Console Attachment Cable, Serial Null-Modem		
DB9		LE2454C
USB		LE2455C
(2) DIN Rail Mounting Brackets		LEV2556DR

Hardened Ethernet Switches

When the going gets tough, these tough switches get your data going over copper or fiber in all climates!

- Operate in conditions of uncontrolled heat or cold—even outdoors.
- Rugged cases for outdoor installation in NEMA 4 enclosures.
- Daisychain the switches for a fiber optic Ethernet network hundreds of kilometers long!
- AC models offer surge protection.
- NEBS Level 3 and ETSI compliant.
- NEMA TS-2 and TEES complaint for traffic control equipment.
- ♦♦ **WARRANTY** — 3 Years

Hardened Ethernet Switches are designed to operate in applications where the temperature cannot be controlled, from the withering heat of the desert sun to the numbing cold of arctic conditions. Their rugged, 18-gauge steel cases seal out insects, dirt, smoke, and other contaminants. Cases also operate as heat sinks, drawing heat away from internal components. Install them in NEMA 4 metal enclosures for all-weather outdoor use.

All the switches have two fiber ports. The single-mode SC ports transmit up to 20 kilometers (12.4 mi.) away, making them perfect for roadside traffic data collection and control stations, industrial plant locations, plenums and ceilings in commercial buildings, and military tents and field sites.

AC models feature autoranging AC power supplies with surge protection. DC models do not include a power supply, but have a three-position terminal strip (+, -, GND) for 20–70 VDC input.



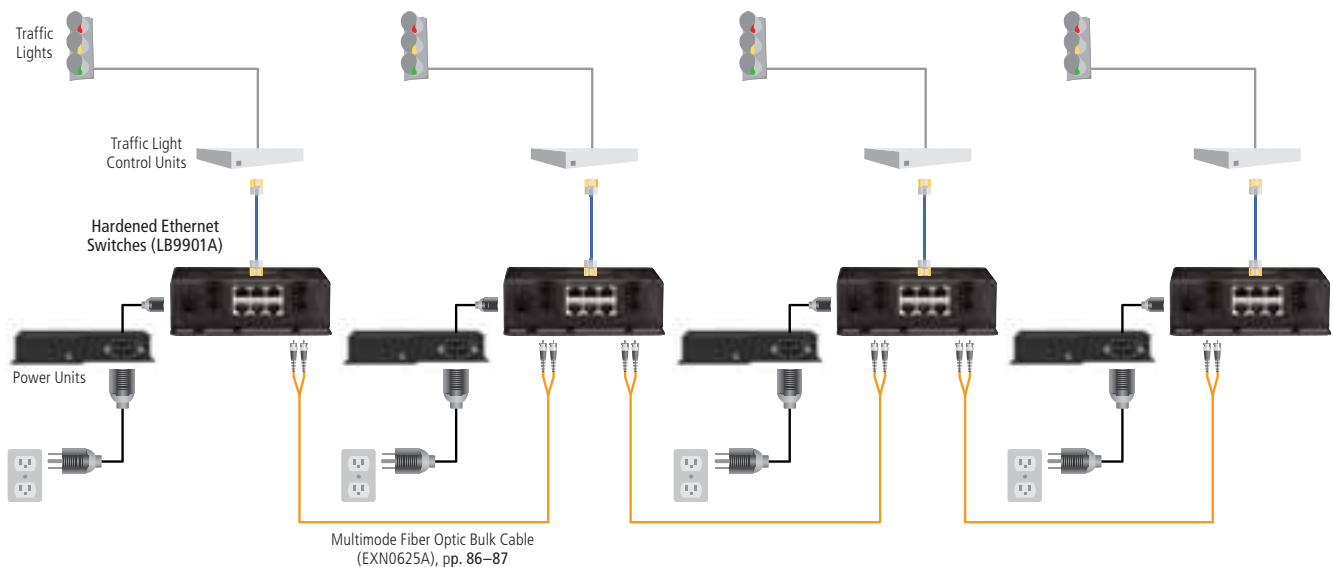
LB9901A

AC-powered models include an external AC power supply that has surge protection to withstand nearby lightning strikes over 150 joules, with clamping at 800 V, 50 A minimum.

TECH SPECS

Environmental — Operating temperature: -40 to 160° F (-40 to 70° C); cold starts as low as -4° F (-20° C); Humidity: 10 to 95% noncondensing
Construction — 18-gauge steel case
Cooling Method — Convection, with case operating as a heat sink
Standards — 802.3 10BASE-T; IEEE 802.3u 100BASE-TX, 100BASE-FX
CE Approval — LB9901A only
RoHS — All except LB9905A–LB9906A

Indicators — (1) LED for power; (3) LEDs per port: speed, link activity, full- or half-duplex
Power — LB9901A–LB9903A: External power supply: 85–260 VAC, 47–63 Hz, autosensing, 15 watts maximum; LB9904A–LB9906A: Power supply not included, accepts 20–70 VDC, 15 watts maximum
Size — 9"H x 5.8"W x 1.7"D (22.9 x 14.7 x 4.3 cm)
Weight — 3.5 lb. (1.6 kg)



Item	Code	List Price	Item	Code	List Price
Hardened Ethernet Switches			Hardened Ethernet Switches (Continued)		
AC Power			DC Power		
(6) 10-/100-Mbps RJ-45 Ports plus (2) 100-Mbps Multimode SC Ports	LB9901A		(6) 10-/100-Mbps RJ-45 Ports plus (2) 100-Mbps Multimode SC Ports	LB9904A	
(1) 100-Mbps Multimode SC Port and (1) 100-Mbps Single-Mode SC (20-km) Port	LB9902A		(1) 100-Mbps Multimode SC Port and (1) 100-Mbps Single-Mode SC (20-km) Port	LB9905A	
(2) 100-Mbps Single-Mode SC (20-km) Ports	LB9903A		(2) 100-Mbps Single-Mode SC (20-km) Ports	LB9906A	
			You may also need...		
			Spare AC Power Supply	LB9907PS	

Industrial MultiPower Media Converters

Choose from three different ways to power these hardened media converters.

- Convert 10-/100-Mbps copper to 100-Mbps duplex or single-strand fiber or from 10-/100-/1000-Mbps copper to 1000-Mbps fiber.
- Power up one of three ways: with AC or DC power, or via a PC's USB port.
- 10-/100-Mbps media converters also feature 802.3af Power over Ethernet (PoE).
- Operate in temperatures from -31 to +158° F (-25 to +70° C).
- Copper ports autonegotiate for speed and duplex.
- Auto MDI/MDI-X on copper ports.
- **WARRANTY** — 6 Years



LIC023A units mounted on a DIN rail (not included)

These ultra-compact, plug-and-play converters offer many power options. Plus, Industrial MultiPower Media Converters are designed for use in harsh industrial environments.

There are three different ways to power the converters: with an AC adapter, using 5–50-VDC terminal block power, or via an optional USB Power Adapter Cable (which you plug into your PC's USB port and is sold separately). The 10-/100-Mbps models can also be powered by Power over Ethernet.

You can even use multiple power options at the same time to provide maximum redundancy and ensure that your mission-critical applications remain up and running. For instance, you can connect a converter to power sourcing equipment (PSE) for PoE while also using AC adapter power, DC terminal block power, and USB bus power.

Then, if any one of these power sources fails, the other sources will continue to supply power to the converter seamlessly.

You can also connect a PSE switch to an uninterruptible power supply to ensure that the switch and each connected media converter always have power.

The converters come with DIN clips, so you can attach them to a DIN rail. When installing multiple Industrial MultiPower Media Converters on a DIN rail, use one DC input source, then cascade from one DC block to the next until you reach the maximum current available.

For versions of these media converters that are not hardened, see our Multipower Miniature Media Converters on [pages 596–597](#).

TECH SPECS

Cable Requirements — Twisted pair: CAT5 or above, shielded or unshielded;
Multimode fiber: 50-/125-μm or 62.5-/125-μm duplex;
Single-mode fiber: 9-/125-μm duplex or single-strand

Environmental — Temperature: Using AC adapter: +32 to +122° F (0 to +50° C);
Using other available power sources: -13 to +158° F (-25 to +70° C);
Humidity: 5 to 95% noncondensing

Mounting — With included DIN clip on DIN-35 rails

Standards — IEEE 802.3 10BASE-T; IEEE 802.3u 100BASE-TX, 100BASE-FX; 802.3af PoE, IEEE 802.3z 1000BASE-X

Switching Engine — Store-and-forward; autonegotiating; broadcast storm protection; supports oversized packets up to 1916 bytes

CE Approval — Yes

RoHS — All except LIC054A–LIC055A

Connectors — All: (1) RJ-45, with autocross for MDI-II/MDI-X;
LIC022A, LIC024A, LIC026A: (1) pair of ST;
LIC023A, LIC025A, LIC027A, LGC320A–LGC323A: (1) pair of SC;
LIC052A–LIC057A, LGC324A–LGC331A: (1) SC;

Power — All: From the included external 100–240-VAC, 50–60-Hz adapter;
Via the terminal block: 5 to 50 VDC;
Via the USB Power Adapter Cable (LHC021A) connected to a computer's USB port;
LIC022A–LIC027A, LIC052A–LIC057A: From a PSE over a Power over Ethernet link; 10 watts maximum

Size — 0.8"H x 1.8"W x 3.4"D (2 x 4.6 x 8.6 cm)

NOTE: Single-Strand Fiber Media Converters must be used in matched pairs.

NOTE: These media converters may also be ordered without a power supply.



Item	Code	List Price
Industrial MultiPower Media Converters		
10-/100-Mbps Copper to 100-Mbps Fiber		
Duplex Fiber		
Multimode 1300-nm, 2 km		
ST®	LIC022A	
SC	LIC023A	
Single-Mode 1310-nm, 40 km		
ST®	LIC024A	
SC	LIC025A	
Single-Mode Long 1310-nm, 80 km		
ST®	LIC026A	
SC	LIC027A	
Single-Strand Fiber		
Single-Mode, 20 km (Order one of each.)		
1310-nm TX/1550-nm RX, SC	LIC052A	
1550-nm TX/1310-nm RX, SC	LIC053A	
Single-Mode, 40 km (Order one of each.)		
1310-nm TX/1550-nm RX, SC	LIC054A	
1550-nm TX/1310-nm RX, SC	LIC055A	
Single-Mode, 60 km (Order one of each.)		
1310-nm TX/1550-nm RX, SC	LIC056A	
550-nm TX/1310-nm RX, SC	LIC057A	
10-/100-/1000-Mbps Copper to 1000-Mbps Fiber		
Duplex Fiber		
Multimode 850-nm, 300 m		
SC	LGC320A	
Single-Mode 1310-nm, 10 km		
SC	LGC321A	
Single-Mode 1310-nm, 40 km		
SC	LGC322A	
Single-Mode 1550-nm, 70 km		
SC	LGC323A	
Single-Strand Fiber		
Single-Mode, 10 km (Order one of each.)		
1310-nm TX/1550-nm RX, SC	LGC324A	
1550-nm TX/1310-nm RX, SC	LGC325A	
Single-Mode, 40 km (Order one of each.)		
1310-nm TX/1550-nm RX, SC	LGC326A	
1550-nm TX/1310-nm RX, SC	LGC327A	
Single-Mode, 60 km (Order one of each.)		
1310-nm TX/1550-nm RX, SC	LGC328A	
1550-nm TX/1310-nm RX, SC	LGC329A	
Single-Mode, 80 km (Order one of each.)		
1490-nm TX/1550-nm RX, SC	LGC330A	
1550-nm TX/1490-nm RX, SC	LGC331A	

To power a single converter via your computer's USB port, order ...

USB Power Adapter Cable

LHC021A

For rackmounting and powering Industrial MultiPower Media Converters, order ...

Miniature Media Converter Power Tray, 18-Slot AC Power LHC018A-AC-R2

« Multipower Miniature Media Converters, pp. 596–597.

Hardened Mini Industrial Media Converters

Tough DIN rail-mountable devices for 1-to-1 copper-to-fiber media conversion.

- Inexpensive, unmanaged devices easily integrate your legacy 10-Mbps networks with 100-Mbps networks in harsh environments—without taking up much-needed space.
- Feature an industrial-strength plastic case and comply with IEC 61000-Part 6-2 Generic standards for electromagnetic compatibility (EMC) in industrial environments.
- Full wire-speed forwarding rates across the network.
- Offer interference-free connections plus extended distances.
- Auto MDI/MDI-X copper ports autonegotiate for 10-/100-Mbps speed and autodetect full- or half-duplex mode.
- Support 2048 MAC addresses and feature a 384 KB buffer memory.
- Can be installed easily on a DIN rail. Mounting kit is included.
- **◆◆ WARRANTY** — 1 Year

TECH SPECS

Enclosure — Plastic case, IP30 rated
Environmental — Temperature: +14 to +140° F (-10 to +60° C);
 Humidity: 5 to 95% (noncondensing)

Filtering/Forwarding Rate —

Ethernet: 14,880 pps;
 Fast Ethernet: 148,800 pps

MAC Addresses — 2K

Packet Buffer — 384 KB

Standards — IEEE 802.3 10BASE-T,
 IEEE 802.3u 100BASE-TX/100BASE-FX,
 IEEE 802.3x

Switching Processing Type — Store and forward with half-duplex back-pressure and IEEE 802.3x full-duplex flow control

CE Approval — Yes except PSD012, PS002–PS003

RoHS — Yes

Connectors — Ethernet/Fast Ethernet:
 (1), (4), or (5) RJ-45;

Fiber optic: (1) pair of SC or ST®

Power — Input: 12–48 VDC (terminal block);
 Output: Per optional DC or AC power supply ordered;

Draw: 2.4 watts maximum
Size — 4.3"H x 1"W x 2.8"D
 (10.9 x 2.5 x 7.1 cm)

Weight — 0.5 lb. (0.2 kg)



LMC270A-MM-SC



Item	Code	List Price
Hardened Mini Industrial Media Converters		
2-Port, (1) 10-/100-Mbps Copper to (1) 100-Mbps Fiber		
Multimode	SC 2 km	LMC270A-MM-SC
	ST 2 km	LMC270A-MM-ST
Single-Mode	SC 20 km	LMC270A-SM-20K-SC
	40 km	LMC270A-SM-40K-SC
	75 km	LMC270A-SM-75K-SC
	ST 20 km	LMC270A-SM-20K-ST

Next, choose a DIN rail-mountable DC power supply or an AC power adapter...

DIN Mount Power Supply	24-VDC	PSD012
	48-VDC	PSD014
External 100–240-VAC Power Adapter		
12-VDC Output Jack	U.S. Cord	PS002A
	No Cord	PS002
12-VDC Stripped Ends Output	U.S. Cord	PS003A
	No Cord	PS003

Don't see it? Just ask.

Many Black Box network products are available in more configurations than we show here. Among requests we may be able to fulfill are:

- Different connectors or connector combinations.
- International or DC power supplies.
- DIN rail mounting.
- Conformal coating for harsh environments.

If you don't see what you need, call our **FREE Tech Support** to discuss your requirements.



Power over Ethernet to RS-232 Converter

The serial server that virtually eliminates power-cord clutter.

- Connects your serial bar code readers, time clocks, slip printers, and other legacy equipment to your 10/100BASE-T LAN.
- Transparent plug-and-play operation.
- Ports are current-limited for short-circuit protection.
- Compatible with the IEEE 802.3af Power over Ethernet (PoE) standard.
- ♦♦ **WARRANTY** — 5 Years

Eliminate the cost and clutter of power supplies when you want to connect RS-232 serial devices to your LAN. With the Power over Ethernet to RS-232 Converter, you can use versatile Power over Ethernet (PoE) technology to draw power through the Ethernet cable instead of separate wall transformers and power cords.

The Power over Ethernet to RS-232 Converter is ideal for retail POS (point of sale), banking, telecom, VoIP, factory automation, and security applications, or anywhere you need to connect a serial device to your network without having to provide a separate power outlet for the converter.



LPD401A

TECH SPECS

Environmental — Operating temperature: 32 to 158° F (0 to 70° C);
Operating humidity: 10 to 90% noncondensing
PoE Type — PD
Speed — Ethernet: 10/100 Mbps, autosensing;
Serial: 50 bps to 2 Mbps
Standards — IEEE 802.3af

CE Approval — Yes
RoHS — Yes
Connectors — LAN: (1) RJ-45;
Serial: (1) DB9 M;
Power: (1) terminal block
Power — -48 VDC from 802.11af PSE
Size — 0.9"H x 1.6"W x 3.8"D
(2.3 x 4.1 x 9.7 cm)
Weight — 0.25 lb. (0.11 kg)

Item	Code	List Price
Power over Ethernet to RS-232 Converter RS-232	LPD401A	

Pure Networking Device Servers

Run an Ethernet fiber or copper link to an RS-232/422/485 device.

- Run 100BASE-TX/FX to your serial device.
- Connect industrial serial equipment, such as programmable logic controllers, to your Fast Ethernet network.
- Ideal for harsh manufacturing environments.
- Offer easy plug-and-play installation.
- Can be used as a standalone device, wallmounted, or mounted on a DIN rail—a DIN-rail bracket is included.
- ♦♦ **WARRANTY** — 1 Year



LS4100A-US-R2

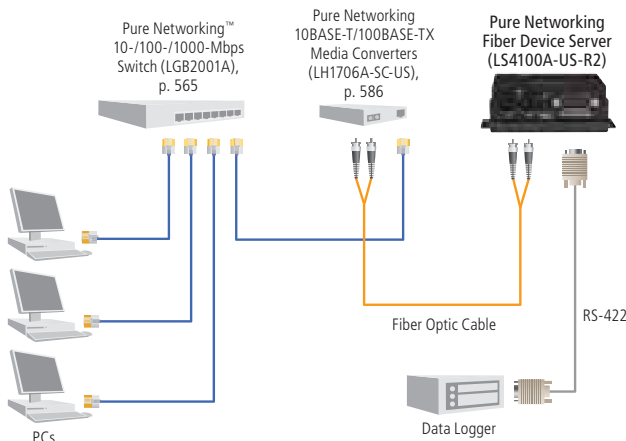


TECH SPECS

Control Signals — RS-232: TX, RX, CTS, RTS, DTR, DSR, RI, DCD, GND;
RS-422: TX, RX, GND;
RS-485: Data, GND
Distance (Maximum) —
Fiber: Multimode: 1.2 mi. (2 km);
Single-Mode: 12.4 mi. (20 km);
Serial: RS-232: 50 ft. (15.2 m);
RS-422/485: 0.7 mi. (1.1 km)
Environmental — Operating temperature: 32 to 158° F (0 to 70° C);
Operating humidity: 10 to 90% noncondensing
Operation — 4-wire full duplex, 2-wire half-duplex
Speed — Ethernet: 100 Mbps;
Serial: 50–115.2 kbps async

Standards — IEEE 802.3u; EIA/TIA-232, EIA/TIA-574
CE Approval — Yes
RoHS — Yes
Connectors —
LS4100A-US-R2–LS4102A-US-R2:
(1) DB9 F, (1) pair of SC or ST®;
LS4103A-US-R2: (1) DB9 M, (1) RJ-45
Indicators — (3) LEDs: Power, Link, Receive
Power — 120 VAC, 60 Hz
external adapter, 12 VDC @ 800 mA, 9.6 watts maximum
Size — 0.9"H x 2.9"W x 4.3"D
(2.3 x 7.4 x 10.9 cm)
Weight — 0.3 lb. (1.3 kg)

Item	Code	List Price
Pure Networking™ Device Servers		
RS-232/422/485 to Fiber		
Multimode SC	LS4100A-US-R2	
Multimode ST	LS4101A-US-R2	
Single-Mode SC	LS4102A-US-R2	
RS-232/422/485 to Copper		
RJ-45	LS4103A-US-R2	



Legacy Equipment

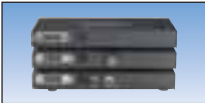
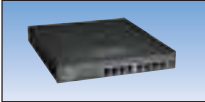
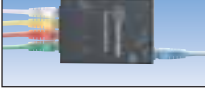
Here today, maybe gone tomorrow—
spare parts for your legacy network.

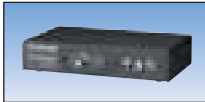
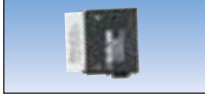
Here at Black Box, we know that many of our customers maintain legacy networks and depend on us for spare parts. We have a commitment to keep components for legacy networks in stock and available for those customers who need them.

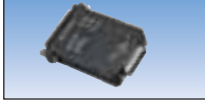
Many components based on legacy technology are becoming unavailable because the chip sets they're based on are going out of production.

We will do our best to keep these components in stock but cannot make any guarantees about how long they will remain available.

For more information about these legacy networking products, go to blackbox.com or call our FREE Tech Support.

Item	Code	List Price
Hubs		
	Stackable MiniHubs	
	(1) Standard Ethernet (AUI), (8) RJ-45	LE2801A
	(1) BNC, (1) Standard Ethernet (AUI), (8) RJ-45	LE2801A-BNC
	(1) Fiber Optic ST, (1) Standard Ethernet (AUI), (8) RJ-45	LE2801A-FO
	Dual-Speed Personal MiniHub	LH408A-R2
	Spare Power Supplies for LH408A-R2	LH408A-PS
	In-Line LH408A-ILPS	
	Dual-Speed Personal MiniHubs with Fiber Ports	
	ST Multimode	LH408A-MST
	SC Multimode	LH408A-MSC
	SC Single-Mode	LH408A-SSC
	Dual-Speed 10/100 Stackable Hubs	
	8-Port Desktop	
	Master	LH8000A-M
	Client	LH8000A-C
	16-Port Rackmount	
	Master	LH8016A-M
	Client	LH8016A-C
	Mixed-Media Fiber Hubs	
	Order a chassis without uplink capability...	
	16-Port Base Chassis	LH8050A
	16-Port Add-On Chassis	LH8050A-C
	...then select modules to match your media...	
	UTP Port Modules, RJ-45	
	10/100 Mbps	LH8056C
	10/100 Mbps, Switch-Selectable Uplink	LH8056C-UP
	Fiber Port Modules	
	10-Mbps, Multimode	
	ST	LE8055C-ST
	100-Mbps, Multimode	
	ST	LH8051C-ST
	SC	LH8051C-SC
	100-Mbps, Single-Mode	
	SC	LH8051C-SMSC
	Blank Chassis Panel	LH8057A-PNL
	10BASE-T MiniHub	LE2601A
	Personal MiniHub	
	5-Port (4 + 1)	LE2650A
	9-Port (8 + 1)	LE2690A

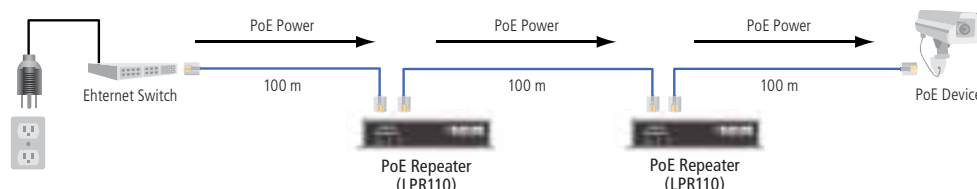
Item	Code	List Price
Repeaters		
	Local Repeaters	
	4-Port BNC	LE8003A-R2
	10BASE-T/10BASE-T	LE624A
	Remote Multimode Fiber Optic Repeaters	
	AUI/ST®	LE603A-R5
	BNC/ST	LE604A-R4
	10BASE-T/ST	LE626A
	ST/ST	LE628A
	Remote Single-Mode Fiber Optic Repeaters	
	BNC/ST	LE630A
	10BASE-T/ST	LE631A
	Single-Mode ST/Single-Mode ST	LE633A
	Workgroup Repeaters	
	BNC/BNC	LE4200A-R3
	AUI/BNC	LE4201A-R3
	AUI/AUI	LE4202A-R3
	Fiber/AUI ST	LE4204A-R3
	Fiber/BNC ST	LE4203A-R3
	SC	LE4203A-SC
	Fiber/UTP ST	LE4208A-R3
	SC	LE4208A-SC
	Fiber/Fiber ST/ST	LE4207A-R3
	SC/SC	LE4207A-SC
	UTP/BNC	LE4205A-R3
	UTP/AUI	LE4206A-R3
	UTP/UTP	LE4209A-R3
Transceivers		
	AUI to Fiber Transceivers	
	Mini FOIRL LD, ST	LE2127A-R3
	Mini Fiber, ST	LE2051A-ST-R4
	AUI to Standard "Thick" Coax Transceivers	
	1-Port with AUI Monitor with Vampire Tap	LE003A-R3
	1-Port with AUI Monitor without Tap	LE008A-R2
	AUI to Thin Coax Transceivers	
	Pure Networking AUI to BNC	LE1601A
	Mini BNC	LE2006A-R3
	AUI to 10BASE-T Transceiver	LE180A

Item	Code	List Price
Bridges		
	Remote MiniBridges	
	10/100BASE-T with WAN Interface	
	RS-530	LB0100A-530
	RS-232	LB0100A-V24
	V.35 F	LB0100A-V35F
	V.35 M	LB0100A-V35M
	4-Wire	LB0100A-4W
	RS-442/449	LB0100A-V36
	X.21 F	LB0100A-X21F
	X.21 M	LB0100A-X21M
	10BASE-T UTP	
	V.35	LB0010A-U35-R2
	RS-422	LB0010A-U36-R2
	X.21	LB0010A-U21-R2
	Workgroup MiniBridges	
	(2) AUI Ports	LB9901A-AUI
	(1) AUI, (1) Fiber Port	LB9901A-AST

PoE Repeater

Break through the Ethernet 100-meter limit—boost Ethernet plus PoE power to 300 meters.

- Plug-and-play ease of use.
- Autosensing, autonegotiating 10-/100-Mbps Ethernet ports.
- Auto MDI/MDI-X means you never need a crossover cable.
- ♦♦ **WARRANTY** — 1 Year



The 802.3af-compliant PoE Repeater enables you to extend PoE connections beyond the 100-meter limit to access faraway PoE devices.

The repeater passes on both data and power, so it needs no separate power supply—add one repeater for an additional 100 meters (328 ft.) or daisychain two repeaters to extend the reach of your PoE an additional 200 meters (656 ft.) on top of the standard PoE distance of 100 meters (328 ft.) for a total reach of 300 meters (984 ft.) Because each repeater uses about 2.5 watts, we do not recommend daisychaining beyond two units. Two repeaters daisychained support a PoE PD end device up to 6.49 watts.

Installation is easy—just plug in the Ethernet cable and go.

TECH SPECS

Environmental — Operating temperature: 32 to 122° F (0 to 50° C);

Humidity: 5–95%, noncondensing

RoHS — Yes

Connectors — Ethernet: (2) RJ-45

Indicators — LEDs: (1) Power, (1) OUT, (1) IN

Power — Input: IEEE 802.3af Class 0 (minimum 12.95 watts);

Output: IEEE 802.3af Class 1 or 2 (maximum

6.49 watts if two PoE repeaters are used);

Maximum power dissipation: 2.5 watts

Size — 1.1"H x 4.7"W x 3.5"D (2.8 x 12 x 9 cm)

Weight — 1 lb. (0.45 kg)

Item	Code	List Price
PoE Repeater	LPR110	

NOTE: Because each repeater uses about 2.5 watts itself, we do not recommend daisychaining beyond two units.

Buyer's Guide | PoE Injector Chart

For product details, see page 642.

PoE Type	Ports	DC Output Voltage (Max.)	Available PoE Power	List Price	Code	Product Name
802.3af	1	48 VDC 0.32 A	15.4 W		LPJ000A-F	802.3af PoE 10-/100-Mbps Injector
	1	56 VDC 0.35 A	19.6 W		LPJ001A-F	802.3af PoE Gigabit Injector, 1-Port
	8	48 VDC 0.32 A	125 W		LPJ008A-F	802.3af PoE Gigabit Injector, 8-Port
	8	48 VDC 0.32 A	125 W		LPJ008A-FM	802.3af PoE Gigabit Managed Injector, 8-Port
	16	48 VDC 0.32 A	250 W		LPJ016A-F	802.3af PoE Gigabit Injector, 16-Port
	16	48 VDC 0.32 A	250 W		LPJ016A-FM	802.3af PoE Gigabit Managed Injector, 16-Port
	24	48 VDC 0.32 A	370 W		LPJ024A-F	802.3af PoE Gigabit Injector, 24-Port
	24	48 VDC 0.32 A	370 W		LPJ024A-FM	802.3af PoE Gigabit Managed Injector, 24-Port
802.3at	1	56 VDC 0.60 A	33.6 W		LPJ001A-T	802.3at PoE Gigabit Injector, 1-Port
	8	56 VDC 0.60 A	269 W		LPJ008A-T	802.3at PoE Gigabit Injector, 8-Port
	8	56 VDC 0.60 A	269 W		LPJ008A-TM	802.3at PoE Gigabit Managed Injector, 8-Port
	16	56 VDC 0.60 A	538 W		LPJ016A-T	802.3at PoE Gigabit Injector, 16-Port
	16	56 VDC 0.60 A	538 W		LPJ016A-TM	802.3at PoE Gigabit Managed Injector, 16-Port

PoE Mid-Span Injectors

The quick, safe, and effective way to add PoE to your network.

- Provide a minimum of 15.4 watts to every 802.3af port and a minimum of 25.5 watts to every 802.3at port simultaneously.
- Use to power various VoIP phones, security system cameras, wireless network access points, Bluetooth® access points, and other 802.3af- or 802.3at-compatible equipment.
- Avoid the cost and hassle of installing AC power at remote cameras or door scanners.
- **WARRANTY** — 1 Year

Power over Ethernet (PoE) is an economical wiring solution because it carries both data and power over the same Ethernet cable. PoE Mid-Span Injectors add power to Ethernet for powering PoE powered devices ranging from wireless access points to IP cameras. PoE enables you to easily move equipment from room to room without costly, time-consuming rewiring.

Our 802.3af injectors provide up to 15.4 watts of safe power to PoE devices; Our 802.3at injectors provide up to 25.5 watts per port to support more high-powered devices such as multiradio wireless access points, PTZ security cameras, IP phones containing streaming video displays, and LCDs. 802.3at injectors are backwards compatible with 802.3af devices.

PoE Mid-Span Injectors are easy to install—literally plug-and-play. They automatically detect whether a connected device is PoE compliant and only send power to PoE devices. 802.3at injectors perform a “two-finger” classification sequence, determining if connected devices require 802.3 at-level power. The injectors also support connections to Cisco® legacy equipment, including Cisco AP1250 Series access points running in full power mode.

All injectors include overvoltage/overcurrent overload and short circuit protection on the power output and provide fully compliant detection and disconnect. Additionally the injectors offer overtemperature protection., which shuts down the device automatically before it's damaged by overheating.

Use compact 1-port models to power a single device. Larger multiport models consolidate up to 24 ports in a single 1U rackmount chassis. All except the LPJ000A-F model support up to Gigabit Ethernet data speeds. ([LPJ000A-F] supports 10-/100-Mbps midspan data connections).

Multiport injectors have a USB port for diagnostics and manual port control via a Windows® GUI. Managed multiport models feature full SNMP management for easy integration into your managed network.



LPJ024A-FM

No need to
buy a PoE
switch!

TECH SPECS

Environmental — Operating temperature: 32 to 104° F (0 to +40° C);

Storage temperature: -13 to 149° F (-25 to +65° C);

Humidity: 5 to 90% noncondensing

PoE Type — LPJ000A-F, LPJ001A-F, LPJ008A-F, LPJ008A-FM, LPJ016A-F, LPJ016A-FM, LPJ024A-F, LPJ016A-FM, LPJ024A-F: 802.11af PSE; LPJ001A-T, LPJ008A-T, LPJ016A-T, LPJ008A-TM, LPJ016A-TM: 802.11at PSE

CE Approval — Yes

RoHS — Yes

Connectors — LPJ000A-F, LPJ001A-F: Data in:

(1) RJ-45; Data/PoE out: (1) RJ-45;

LPJ1008A-F, LPJ008A-T: Data in: (8) RJ-45;

Data/PoE out: (8) RJ-45;

USB diagnostics port: (1) USB Type B;

LPJ016A-F, LPJ016A-T: Data in:

(16) RJ-45;

Data/PoE out: (16) RJ-45;

USB diagnostics port: (1) USB Type B;

LPJ024A-F: Data in: (24) RJ-45;

Data/PoE out: (24) RJ-45;

USB diagnostics port: (1) USB Type B;

LPJ008A-FM, LPJ008A-TM: Data in: (8) RJ-45;

Data/PoE out: (8) RJ-45;

USB diagnostics port: (1) USB Type B;

Console port: (1) RJ-45;

LPJ016A-FM, LPJ016A-TM: Data in: (16) RJ-45;

Data/PoE out: (16) RJ-45;

USB diagnostics port: (1) USB Type B;

Console port: (1) RJ-45;

LPJ024A-FM: Data in: (24) RJ-45;

Data/PoE out: (24) RJ-45;

USB diagnostics port: (1) USB Type B;

Console port: (1) RJ-45

Power — LPJ000A-F, LPJ001A-F:

AC input voltage range: 90–264 VAC;

AC input voltage rating: 100–240 VAC, 47–63 Hz;

Output: 15.4 watts at 48 VDC;

Total available power: 15.4 watts;

LPJ008A-F, LPJ008A-FM:

AC input voltage range: 90–264 VAC;

AC input voltage rating: 100–240 VAC, 47–63 Hz;

Output: 15.4 watts per port at 48 VDC;

Total available power: 125 watts;

LPJ016A-F, LPJ016A-FM:

AC input voltage range: 90–264 VAC;

AC input voltage rating: 100–240 VAC, 47–63 Hz;

Output: 15.4 watts per port at 48 VDC;

Total available power: 250 watts;

LPJ024A-F, LPJ024A-FM:

AC input voltage range: 90–264 VAC;

AC input voltage rating: 100–240 VAC, 47–63 Hz;

Output: 15.4 watts per port at 48 VDC;

Total available power: 250 watts;

LPJ001A-T:

AC input voltage range: 90–264 VAC;

AC input voltage rating: 100–240 VAC, 47–63 Hz;

Output: 33.6 watts per port;

Total available power: 33.6 watts;

LPJ008A-T, LPJ008A-TM:

AC input voltage range: 90–264 VAC;

AC input voltage rating: 100–240 VAC, 47–63 Hz;

Output: 33.6 watts per port;

Total available power: 269 watts;

LPJ016A-T, LPJ016A-TM:

AC input voltage range: 90–264 VAC;

AC input voltage rating: 100–240 VAC, 47–63 Hz;

Output: 33.6 watts per port;

Total available power: 538 watts

Size — LPJ000A-F, LPJ001A-F: 1.4"H x 2.6"W x 5.5"D

(1 x 6.6 x 14 cm);

LPJ008A-F, LPJ008A-FM, LPJ016A-F, LPJ024A-F, LPJ016A-FM, LPJ024A-FM, LPJ008A-T, LPJ016A-T, LPJ008A-TM, LPJ008A-TM: 1.75"H (1U) x 17.25"W x 9"D (4.4 x 44 x 23 cm)

Weight — LPJ000A-F, LPJ001A-F: 0.4 lb. (0.2 kg);

LPJ008A-F, LPJ008A-FM, LPJ016A-F, LPJ016A-FM,

LPJ024A-F, LPJ024A-FM: 9 lb. (4.1 kg);

LPJ008A-TM, LPJ008A-TM, LPJ008A-T,

LPJ016A-T: 8.5 lb. (3.9 kg)

Item	Code	List Price
PoE Mid-Span Injectors		
802.3af		
10-/100-Mbps		
1-Port	LPJ000A-F	
10-/100-/1000-Mbps		
1-Port	LPJ001A-F	
8-Port	LPJ008A-F	
16-Port	LPJ016A-F	
24-Port	LPJ024A-F	
10-/100-/1000-Mbps, Managed		
8-Port	LPJ008A-FM	
16-Port	LPJ016A-FM	
24-Port	LPJ024A-FM	

Item	Code	List Price
PoE Mid-Span Injectors (Continued)		
802.3at		
10-/100-/1000-Mbps		
1-Port	LPJ001A-T	
8-Port	LPJ008A-T	
16-Port	LPJ016A-T	
10-/100-/1000-Mbps, Managed		
8-Port	LPJ008A-TM	
16-Port	LPJ016A-TM	



Black Box Explains PoE, p. 592.

Find more Power over Ethernet
throughout the Big Book.



**PoE Switches are
on pages 575–577.**

Item	Code	List Price
PoE PD Switch, (5) 10-/100BASE-T	LPD100A	



**PoE Media Converters are
on pages 590–593 and 637.**

Item	Code	List Price
PoE PSE Media Converter, 10BASE-T/100BASE-TX to 100BASE-FX, Multimode, SC, 2 km, page 591	LPM600A	



**A PoE Device Server
is on pages 614 and 639.**

Item	Code	List Price
Power over Ethernet to RS-232 Converter	LPD401A	



**PoE Testers are on
pages 170 and 176.**

Item	Code	List Price
Net Tone Plus	TS400A	



**VDSL PoE Ethernet Extender Kits
are on page 581.**

Item	Code	List Price
VDSL PoE Ethernet Extender Kit, PD	LBP001A-KIT	



The PoE Repeater is on page 641.

Item	Code	List Price
PoE Repeater	LPR110	

If you still can't find what you need, just ask the experts
at our FREE Tech Support hotline!

Series 500 Branch Office Frame Relay Routers

Make 20 or 40 Frame Relay links.

- Make legacy Frame Relay connections.
- All 10BASE-T LAN ports feature MDI/MDI-X.
- Route IP/IPX™.
- ♦♦ **WARRANTY** — 1 Year

Frame Relay
at 56K, T1, or
E1 speeds



LR1531A-R2

Base Model

- Supports up to 20 Frame Relay links.
- Data rates of 56 kbps—or 128 kbps with compression.

56K CSU/DSU Model

- Supports up to 20 Frame Relay links.
- Ethernet speeds up to 2.048 Mbps; leased-line speeds up to 56 kbps.
- Internal 56K CSU/DSU.

T1 CSU/DSU Model

- Supports up to 40 Frame Relay links.
- T1 speeds of 1.544 Mbps or E1 speeds of 2.048 Mbps.

TECH SPECS

Management — LR1535A-R2: LSNMPV2, WEB II, Bridged MIB, Enterprise MIB, Telnet, Console port
CE Approval — LR1531A-R2
Interface — All LAN: 10BASE-T MDI and MDI-X ports;
 LR1530A-R3: WAN: DB25 F;
 LR1531A-R2: WAN: V.35;
 LR1535A-R2: WAN: T1/E1
Connectors — LR1530A-R3: LAN: (1) RJ-45;
 WAN: (1) DB25 F;
 LR1531A-R2: LAN: (1) RJ-45; WAN: (1) RJ-45;
 LR1535A-R2: LAN: (1) RJ-45; WAN: (1) RJ-48
Power — External power supply: : 120 VAC, 60 Hz, 5 watts maximum
Size — 1.6"H x 6.1"W x 4.3"D (4.1 x 15.5 x 10.9 cm)
Weight — 0.7 lb. (0.3 kg)

Item	Code	List Price
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Series 500 Branch Office Frame Relay Routers

Base	LR1530A-R3	
56K CSU/DSU	LR1531A-R2	
T1 CSU/DSU	LR1535A-R2	

For RS-232 and RS-530/RS-422, order...

RS-232 Cable, DB25 Male/DB25 Male 6.5-ft. (2-m)	EHC2625-MM	
--	------------	--

For V.35, order...

V.35 Cable, DB25 Male/M/34 Male 6.5-ft. (2-m)	EHC530C-MM	
--	------------	--

**FOR OPTIMUM PERFORMANCE,
and a 20% savings, order...**

GigaBase® 350 CAT5e 350-MHz Patch Cable,
4-Pair, Straight-Pinned, PVC, Beige, 10-ft.
(3.0-m) (For other lengths or colors,
see p. 55.) EVNSL85-0010

Series 500 Branch Office ISDN Routers

We have Net needs covered for branch offices.

- The ideal solution for legacy network connections.
- Connect up to 25 remote users to a central LAN or the Internet.
- All users can send or receive data at up to 64 kbps (128 kbps with BONDING).
- STAC LZS data compression boosts bandwidth up to 600%.
- Browser-based Net Wizard configuration.
- Supports NAT and DHCP.
- Include data compression and SNMP.
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

Environmental — Operating temperature: 35 to 122°F,
(2 to 50° C);
Storage Temperature: -40 to +176° F (-40 to 80° C);
Operating Humidity: 20–80% noncondensing;
Storage Humidity: 0–95% relative humidity
Protocols — LAN: IP, IPX™; WAN: PPP
CE Approval — LR1560A-ST-R2 only
Interface — LAN: 10BASE-T MDI and MDI-X ports;
 WAN: ISDN BRI S/T or U
Connectors — LAN: RJ-45;
 WAN: ISDN BRI S/T or U
Power — External power supply: 100–240-VAC,
50/60Hz; 12 watts maximum
Size — 1.6"H x 6.1"W x 4.3"D (4.1 x 15.5 x 10.9 cm)
Weight — 0.7 lb. (0.3 kg)



LR1560A-U-R2

Item	Code	List Price
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Series 500 Branch Office ISDN Routers		
S/T Interface	LR1560A-ST-R2	
U Interface	LR1560A-U-R2	

T1 WAN Access Router

Connect small to medium enterprises to an IP network.



- Use to connect legacy networks.
- Includes traditional LAN/WAN routing features.
- Provides NAT/NAPT, firewall, and DHCP.
- Installation via Console/VT100™, Telnet, and HTTP/SNMP management.
- Includes an integrated T1/E1 CSU/DSU.
- ♦♦ **WARRANTY** — 1 Year

TECH SPECS

Ethernet Connection — Single-port 10/100BASE-T switch, autosensing, full-/half-duplex, built-in MDI-X
Speed — 1.544 Mbps or 2.048 Mbps
CE Approval — Yes
RoHS — Yes
Connectors — WAN: (1) RJ-48C F;
 LAN: (1) RJ-45
Power — Internal power supply: 90–260-VAC,
50/60 Hz, 20 watts maximum
Size — 1.6"H x 7.3"W x 6.6"D (4.1 x 18.5 x 16.8 cm)

Item	Code	List Price
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T1 WAN Access Router	LR120A	
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EncryptTight WAN Encryption

Transparent WAN encryption with no VPN tunnels.

- Encrypts at OSI Layer 2, 3, or 4.
- Works with all kinds of network traffic, including VoIP.
- Works on the Internet or on private WANs.
- No need for VPN tunnels.
- No delays, no jitter, no latency.
- Transparent to network operation and applications.
- ♦♦ **WARRANTY** — 1 Year

More and more organizations are using the Internet to send data to branch offices. But because the Internet is a public network, security is an issue and sensitive data must be encrypted.

EncryptTight™ is an encryption solution that overcomes the limitations associated with IPsec VPN tunnels. It brings you air-tight encryption across any WAN—even the Internet—without the hassle of setting up a VPN tunnel for each connection. Layer 4 encryption capability leaves packet headers intact, making encrypted data far more compatible with network operations.

The not-so-private MPLS WAN

Many organizations don't encrypt their data because it's traveling on a "safe" MPLS network. Although MPLS networks provide more reliable connections than the Internet and aren't as public, they cannot be counted upon to be private—they're still vulnerable.

MPLS is technically a VPN that mimics privacy by logically separating data with labels. Although the data traffic is kept separate from other traffic, it can still be easily intercepted at any node. The only way to ensure data security over MPLS is through encryption.

Breaking out of the tunnel

Although IPsec VPN tunnels are fairly simple to set up between only two points, when remote sites multiply, the number of tunnels increases exponentially. A tunnel is needed between each pair of sites, leading to administrative hassles every time a site is added.

EncryptTight eliminates the need to establish point-to-point tunnels between each pair of remote sites, freeing network administrators for other tasks. With EncryptTight, every network on your WAN can establish an instant encrypted connection to every other network equipped with an EncryptTight appliance.

Layer 4 encryption

In addition to Layer 2 Ethernet frame encryptions and Layer 3 IP packet encryption, EncryptTight offers a Layer 4 payload-only encryption option. Layer 4 encryption offers many advantages, including:

- Ability to pass encrypted data through NAT devices. VPN tunnels, which encapsulate the Layer 3 address, often don't work with NAT.
- Compatibility with policy-based routing and load balancing that require Layer 3 addresses to be intact.
- Layer 4 encryption leaves Layer 3 headers intact, making it possible to troubleshoot a network without turning off encryption.
- Because headers are intact, data looks unencrypted, making it possible to use within countries that restrict encrypted data.



Central management

Manage all your EncryptTight appliances with EncryptTight Management Software. The simple drag-and-drop interface scales seamlessly and enables you to set encryption policies based on IP addresses, port numbers, protocol IDs, or VLAN tags. You can quickly change policies across the entire WAN without interrupting network traffic. EncryptTight Management Software generates, and securely pushes, encryption keys and policies to appliances throughout the WAN. Logging and auditing functions enable you to collect and monitor important criteria such as enforcement point status, as well as policy, password, and device configuration changes.

To learn more about EncryptTight, visit blackbox.com/go/EncryptTight or call.

Item	Code	List Price
First, select your appliance...		
EncryptTight™ Appliances		
3–50 Mbps	ET0010A	Call
100–250 Mbps	ET0100A	Call
500–1000 Mbps	ET1000A	Call
...then, select a license for the desired bandwidth...		
EncryptTight Bandwidth Licenses		
ET0010A Licenses		
3-Mbps	ET-BWL-3MBPS	Call
6-Mbps	ET-BWL-6MBPS	Call
10-Mbps	ET-BWL-10MBPS	Call
25-Mbps	ET-BWL-25MBPS	Call
50-Mbps	ET-BWL-50MBPS	Call
ET0100A Licenses		
100-Mbps	ET-BWL-100MBPS	Call
155-Mbps	ET-BWL-155MBPS	Call
250-Mbps	ET-BWL-250MBPS	Call
ET1000A Licenses		
500-Mbps	ET-BWL-500MBPS	Call
650-Mbps	ET-BWL-650MBPS	Call
1000-Mbps (1 Gbps)	ET-BWL-1GBPS	Call
...and management software...		
EncryptTight Management Software Package		
for Windows (Included with EncryptTight Appliance)		Included
for Linux	ETKMS	Call
...then add a management software license.		
EncryptTight Management Software Licenses		
for 1 to 20 Appliances	EML-SMALL	Call
for 21 to 50 Appliances	EML-MEDIUM	Call
for More than 50 Appliances	EML-LARGE	Call
For Key Management Software pre-loaded on a server, order...		
EncryptTight Linux Server	ET-KSRV	Call
For increased security for the ET-KSRV, order...		
EncryptTight Hardware Security Module	ET-HSM	Call

Pure Networking 802.11n Wireless Access Point, Router, and USB Adapter

802.11n brings you a greater coverage area, fewer dead spots, and higher throughput.



Pure Networking 802.11n 2T2R
Wireless Access Point (WAP-300BGN)



Pure Networking 802.11n 2T2R
Wireless Router (WRT-300BGN-R2)

PURE networking™
BLACK BOX WIRELESS NETWORKING

Buyer's Guide | Wireless

Product Name	Maximum Indoor Range	Maximum Outdoor Range
802.11n 2T2R Access Point	229 ft. (70 m)	820 ft. (250 m)
802.11n 2T2R Router	229 ft. (70 m)	820 ft. (250 m)
802.11n 2T2R USB Adapter	229 ft. (70 m)	820 ft. (250 m)

CE Approval — Yes
RoHS — Yes

- High-speed wireless network runs six times faster than a conventional 802.11g wireless network.
- Transfer files at speeds up to 300 Mbps.
- Reduce “dead spots” within the wireless coverage area.
- High throughput for Internet access.
- Auto MDI/MDI-X function for all wired Ethernet ports.
- The router enables multiple users to share a single Internet connection.
- ♦♦ **WARRANTY** — 1 Year

The 802.11n wireless standard, ratified in October 2009, is light years ahead of older 802.11g wireless. Two antennas and two receivers combine with the latest MIMO technology to maximize wireless throughput and range. It has a 300-Mbps data transmission rate and three times more coverage than 802.11g.

These 802.11n devices are completely compatible with older 802.11b and 802.11g wireless devices. All include a robust set of security features including 64-/128-bit WEP, WPA, WPA2, MAC access control, TKIP, AES, hidden ESSID, and IEEE 802.1x authentication.

2T2R Wireless Access Point

With this access point, even inexperienced users can set up a network environment within minutes. An easy-to-use, Web-based graphical user interface (GUI) simplifies configuration and management over your network.

The Universal Repeater function enables you to extend your area of coverage

2T2R Wireless Router

With this 802.11n Wireless Broadband Router, up to 253 computers and network devices can share a single Internet connection at high speed. Because the router is easy to install, you can set up a network environment within minutes. A remote management function enables you to configure, monitor, and upgrade the router

across your network with an easy-to-use GUI interface.

The router also features four wired 10-/100-Mbps LAN ports and one 10-/100-Mbps WAN port for network expansion.

2T2R Wireless USB Adapter

Bring your older laptop or desktop computer into the high-speed wireless age with this simple 802.11n adapter. Just plug this tiny adapter right in to a USB 2.0 port and you're ready to start connecting at 802.11n speeds. The adapter is backwards compatible with older USB 1.1 ports, too.

Item	Code	List Price
Pure Networking 802.11n Wireless Equipment		
802.11n 2T2R Access Point	WAP-300BGN	
802.11n 2T2R Router	WRT-300BGN-R2	
802.11n 2T2R USB Adapter	WUA-300BGN	

Wireless Accessories

Outfit your 802.11g wireless network.

PURE networking™
BLACK BOX WIRELESS NETWORKING

- ♦♦ **WARRANTY** — 1 Year



LW6007A



LW6002A-R2

CE Approval — Yes
RoHS — LW6001A, LW6007A, LW6200A-R2–
LW6201A-R2

Item	Code	List Price
Pure Networking 802.11g Wireless Adapters		
CardBus (PCMCIA)	LW6000A	
PCI	LW6001A	
High-Gain USB	LW6002A-R2	
Mini USB	LW6007A	
♦ LW6002A includes (1) adapter and (1) 1-ft. USB Type A male to Mini USB Type A male cable.		
Pure Networking 802.11g 2.4-GHz Antennas		
8-dBi Omnidirectional	LW6200A-R2	

Black Box *is* networking.

Black Box has the resources, the worldwide reach, and the expertise to meet virtually any networking need. Whether you need a simple switch or a worldwide enterprise network, make your first stop Black Box. Check out our Web site at blackbox.com or give us a call. When you're ready to network, Black Box is ready to help.



Equipment from major manufacturers

Looking for a specific brand? Black Box can source a wide range of brand-name networking products. Just give us a call. In addition to high-quality Black Box branded network components, Black Box offers equipment from major manufacturers including Cisco®, HP®, Avaya®, NEC, Fluke Networks®, and more. Black Box offers an unmatched portfolio of networking products from today's leading manufacturers and expertise backed by more than 2000 certifications.

Network installation and maintenance

Black Box builds networks. Count on Black Box for end-to-end, start-to-finish voice and data networks, including design, installation, upgrades, and maintenance. With an unmatched portfolio from today's leading manufacturers and an extensive offering of maintenance solutions, we can deliver comprehensive solutions for clients of every size and industry, whether it's for just one office or a global enterprise. To discuss your network requirements, just give us a call.

Network components customized to your requirements

Many Black Box network products are available in more configurations than we show in the Big Book or even on our Web site.

Among requests we may be able to fulfill are:

- Different connectors or connector combinations.
- International or DC power supplies.
- DIN rail mounting.
- Conformal coating for harsh environments.

If you don't see what you need, call our FREE Tech Support to discuss your requirements.



Cisco Gold-Certified Partner

As a Cisco Gold-Certified Partner, Black Box holds many specializations including advanced unified communications, advanced wireless, advanced security, and routing and switching.



Avaya Connect Platinum Partner

Black Box is an Avaya Connect Platinum Partner. Our highly skilled technicians are authorized to design, install, and maintain Avaya's state-of-the-art business communications systems.



HP® Authorized Reseller

Black Box is Hewlett-Packard authorized reseller, offering sales and support for HP ProCurve®, a complete family of wired and wireless infrastructure products.

SmartPath Enterprise Wireless System

The smart way to create an 802.11n network or upgrade an older WLAN or wired LAN for 802.11n Wi-Fi communications.

- Features fast 802.11n wireless.
- Smart controller-less architecture.
- Intelligent APs automatically adjust for traffic, interference, and power conditions.
- Ultra-reliable with no single point of failure.
- Cloud-based management eliminates CAPEX.
- Provides quality voice or video over Wi-Fi.
- Reliability and throughput rivals that of wired networks.
- Supports video and VoIP communications.
- Smart APs sort and send packets to WLAN or wired points.
- Architecture reduces traffic backhauling—QoS and policy are enforced right at the edge.
- To speak to a SmartPath expert, call.
- ♦♦ **WARRANTY** — 3 Years

Black Box's SmartPath Enterprise Wireless system combines the stability, security, and speed of a wired network with the versatility and adaptability of a wireless network. It's just what you need to set up fast, 802.11n standard Wi-Fi communications in a logical way.

The technology differs greatly from existing wireless technology available today. You get speed and reliable wireless communications from a system that's simpler—and more affordable—to deploy.

With SmartPath, you get enterprise-class access points (APs) and a suite of management and security functions that provide all the benefits of a controller-based wireless LAN (WLAN) solution—without requiring a controller or an overlay network.

SmartPath APs work together to improve throughput and provide redundancy for your latest 802.11n wireless devices. The SmartPath system combines a distributed WLAN architecture and best-in-class management without a lot of upfront costs or operating expenses.

Because there are no expensive controllers required, you can expand from a few APs to thousands of APs easily—with no hidden upgrade costs. Start small, adding APs into an existing wired network as your budget allows, or build a complete enterprise-grade WLAN all at once.

Plus, the system boasts robust security and policy enforcement, including firewall and NAC functionality. Built-in RADIUS server and LDAP/Active Directory™ integration—along with a full-featured guest management system and portal—complete the system, making it perfect for organizations of all sizes.

SmartPath™
BLACK BOX ENTERPRISE WIRELESS SYSTEM



LWN602A

The SmartPath architecture

Unlike ordinary wireless systems, in which APs function as accessories to the wired network, SmartPath is designed as an equal partner to the wired network, making it a practical way to provide wireless across your organization.

First, SmartPath APs work much like the intelligent, smart switching devices found in today's wired networks, devices that actively sort packets and send them only to where they're needed—either to an attached node or to another switch or router for forwarding.

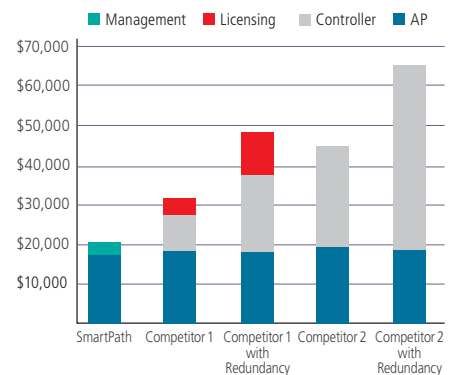
SmartPath APs sort and send the same way, broadcasting packets wirelessly, whether it's to a nearby Wi-Fi laptop user, passing them on to another access point in a wireless mesh arrangement, or sending them through the wired network to another endpoint.

It's really smart—and not something you'll likely find on today's average wireless APs, which function more like legacy network hubs and act only as interfaces to the wired network without making any decisions about where to send packets.

For seamless mobile user connectivity, SmartPath anticipates motion and proactively tracks users moving from AP to AP. This provides continuous coverage for voice or video applications without an interruption in service or having to connect and authenticate to each new AP. This is done automatically and is transparent to the end user.

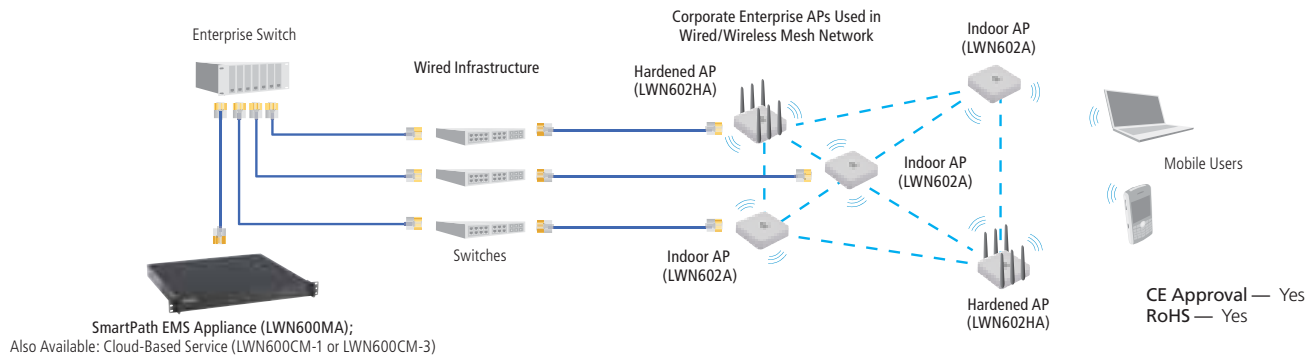
Also, advanced circuitry and algorithms enable older 802.11a/b/g devices to share the network without slowing down 802.11n devices.

Cost comparison: SmartPath vs. top competitors*



The best thing about SmartPath Enterprise Wireless is its performance. But don't ignore its very low cost of entry. Versus its two leading industry competitors, it's very cost effective with no big investment to start and no waste as you grow. The main reason: SmartPath's unique architecture eliminates the need for an expensive controller. Plus, you can manage it from the cloud (or a local appliance). If management is lost, the APs will function normally—no backup controllers are needed for redundancy!

*(30) Indoor SmartPath APs (LWN602A) managed via the cloud using (30) SmartPath Enterprise Management System 1-Year Subscriptions (LWN600CM-1) vs. competitor systems with (30) APs, management software, additional licenses (if required), controller(s), and support costs. NOTE: SmartPath Cloud-Based EMS Subscriptions are represented above as "Management" expenses, and there is no separate license purchase required.



LWN600A-OUT (shown with the LWN602HA installed).



The SmartPath Enterprise Management System (EMS) is available as a cloud-based service or as a standalone network appliance. It features a GUI for centrally configuring and monitoring access points as well as setting security and guest log-in parameters. It even enables you to set up wireless network access by user, so you can keep data secure by giving guests access to the Internet while allowing only employees to connect to your internal network.

How SmartPath works

SmartPath uses a collaborative control design based on the same architectural premise behind dynamic routing protocols used by WANs and the Internet, and the Spanning Tree protocols of LANs: By distributing the control and data plane, redundancy and optimization are built into the system, and by centralizing management functions, the entire system can all be run from one location—even from the cloud.

This collaborative design enables multiple APs in the SmartPath network to be organized into groups, or clusters. These clusters of APs “talk” to one another, sharing control information and enabling fast Layer 2/Layer 3 roaming and seamless mobility for users, cooperative RF management, higher security, resiliency, and more.

SmartPath APs discover each other no matter if they’re connected to each other over a wired network or linked wirelessly. When neighboring APs are found with the same cluster or mobility credentials, the APs build secure connections to each other. They then use special protocols to provide best-path data forwarding.

This way, APs can dynamically route around any problems or failures, and adding another site is as simple as adding another AP. You never need to upgrade to a higher-capacity controller when you have to add one or more APs.

What’s more, the SmartPath network architecture is more reliable and higher performing—and more suitable for voice-over-wireless LAN—than most controller-based architectures.

Item	Code	List Price
First choose your wireless AP(s)...		
SmartPath Wireless Access Point (AP)		
Indoor (with Integrated Antennas)	LWN602A	Call
Hardened (without Antennas)	LWN602HA	Call
...then select either a cloud-based management platform...		
SmartPath Enterprise Management System (EMS), Cloud-Based		
1-Year License per AP	LWN600CM-1	Call
3-Year License per AP	LWN600CM-3	Call
...or a standalone appliance with the required AP licenses...		
SmartPath Enterprise Management System (EMS) Appliance		
(Up to 2000 APs)	LWN600MA	Call
SmartPath Perpetual License for EMS Appliance (Perpetual, per Access Point)	LWN600MLA-1	Call

Item	Code	List Price
Select the power option for your application:		
802.3at PoE Gigabit Injector, 1-Port	LPJ001A-T	Call
SmartPath 30-W Power Kit with Cord, U.S.	LWN600PS-US	Call
For hardened APs, order...		
SmartPath 602HA Antenna Kit (Indoor Use Only)	LWN600A-ANTK	Call
◆ Includes (3) 2.4-GHz and (3) 5-GHz antennas for (1) AP.		
SmartPath 602HA Outdoor Kit		
	LWN600A-OUT	Call
◆ Includes (1) NEMA enclosure, (1) pole bracket, assorted hardware, (1) lightning protection device, (1) power supply, and (4) dual-band antennas for (1) AP.		



Learn more at blackbox.com/go/SmartPath

Brochure, SmartPath Enterprise Wireless.

White paper, Wireless Networking.

White paper, Ten Steps to Ensure Wireless Success.

White paper, Industrial Wireless.

Black Box explains, Wireless Security.

Black Box explains, Power over Ethernet.