

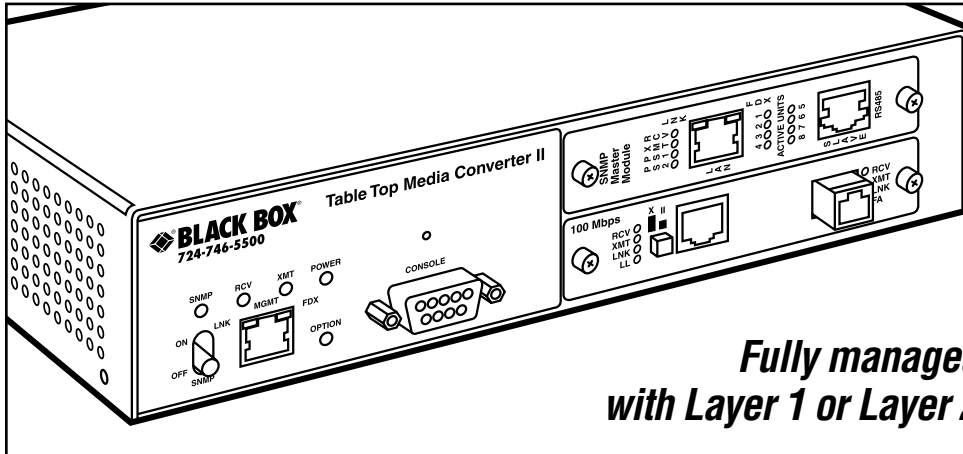


BLACK BOX[®] NETWORK SERVICES

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Black Box Corporation.

Black Box Corporation • 1000 Park Drive • Lawrence, PA 15055-1018 • Tech Support: 724-746-5500 • www.blackbox.com • e-mail: info@blackbox.com

HIGH-DENSITY MEDIA CONVERTER SYSTEM II



**Fully manageable systems
with Layer 1 or Layer 2 conversion options.**

Key Features

- ▶ **Chassis available with or without SNMP.**
- ▶ **Customize this versatile system to your application.**
- ▶ **LinkLoss and/or FiberAlert diagnostics.**
- ▶ **Bandwidth Manager enables you to control per-port bandwidth.**
- ▶ **Copper-to-fiber, fiber-to-fiber, and single-strand fiber modules are available.**
- ▶ **Layer 2 converters increase network efficiency.**

Effectively manage the media converters in your network without ever leaving your computer room. Extend your managed network over fiber optic cable, over ordinary phone wire via vDSL, even over T1. The High-Density Media Converter System II provides an exceptional range of options, making it an ideal solution for any managed enterprise network.

High-Density Media Converter System II is particularly well suited for network-extension applications, offering a wide range of hot-swappable media converter modules for network extension over fiber. Additionally, the system offers a range of modules such as T1/E1, vDSL, and ATM that are not usually available with chassis-based media converter systems.

Choose from a wide range of chassis options ranging from tiny unmanaged desktop chassis for remote desktop locations to large

rackmount chassis with embedded management for your IT center.

With more than 100 modules to choose from, this system can adapt to even the most demanding network configurations. Many media converter modules perform Layer 2 media conversion, which increases the efficiency of your network compared with using a traditional Layer 1 media converter.

All media converter modules are hot-swappable—you never

need to power down a chassis in order to change a module.

Manageable

The High-Density Media Converter System II is easy to integrate into any managed network. Not only does the system support industry-standard SNMP, but fiber modules include LinkLoss and/or FiberAlert to alert you if a fiber link is interrupted. LEDs on each module show link status at a glance.

SNMP helps you diagnose network problems by monitoring

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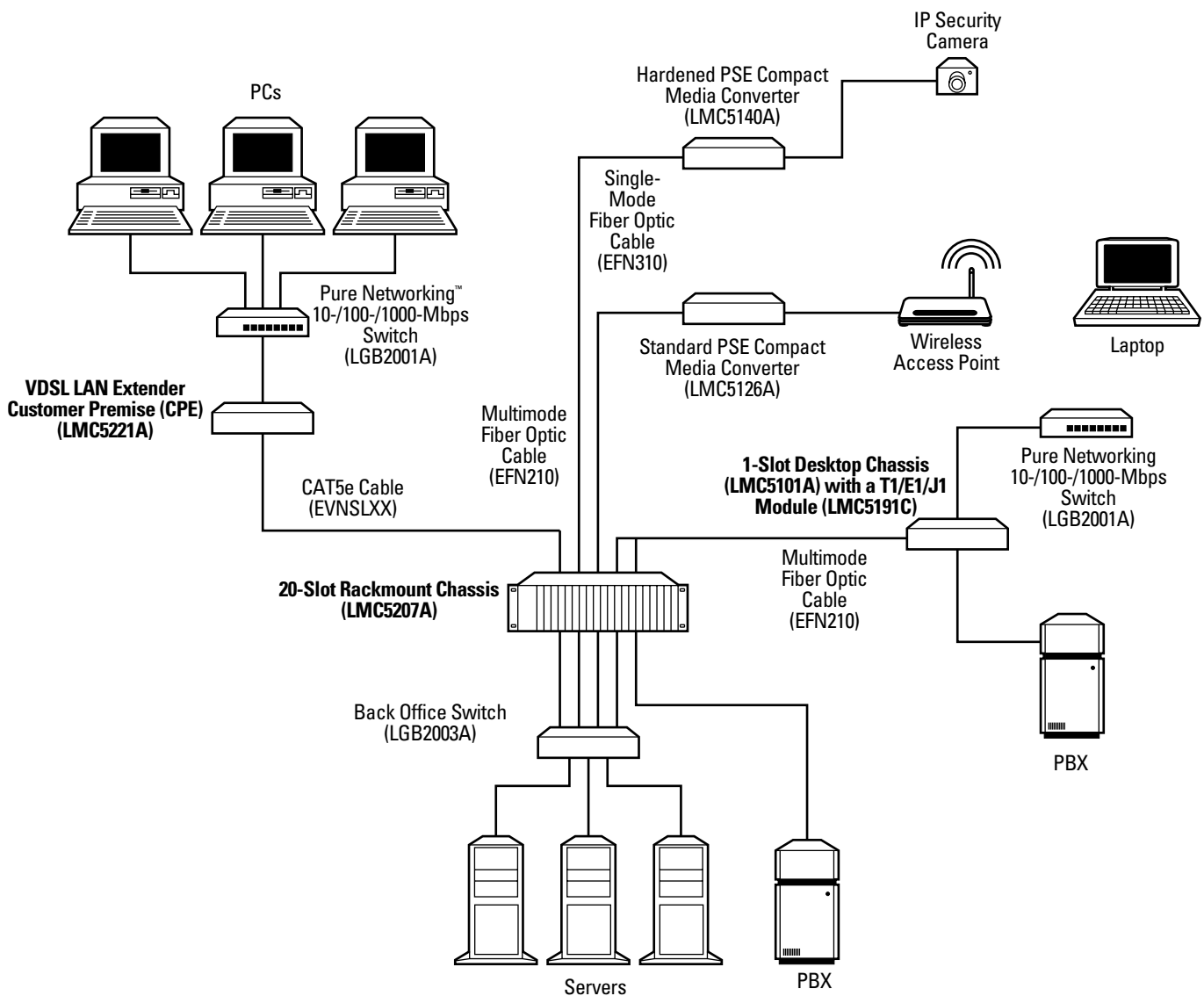
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both copper and fiber link status as well as the chassis' temperature and voltage levels. SNMP traps can alert you to potential network failures so you incur less downtime and spend less time troubleshooting. You can assign a name to each of the various ports and if a link failure occurs, you'll be notified with the port's name.

Each manageable chassis includes a CD-ROM that contains iView management software. This software enables you to configure the chassis and its modules in minutes and provides you with a cross-platform application for managing intelligent networking devices from virtually any 32-bit Windows® system. It also includes MIBs for SNMP.

Compatible with Windows 95/98, Windows 2000, Windows NT® 4, and HTML, the user-friendly, comprehensive iView program uses a clear graphical user interface (GUI). It even shows an on-screen representation of the actual device control panels and gives you detailed information about the conversion ports.

You can also use the included MIBs with any standard SNMP program, such as HP® OpenView®. This enables you to view SNMP's in-depth technical data in iView's easy-to-use interface. You can even display statistics as charts. Modules in unmanaged chassis can also be managed, although the chassis themselves cannot.



High-Density Media Converter System II Chassis

Chassis with Modular SNMP Management

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

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

You can install chassis with modular SNMP Management as unmanaged chassis and then add SNMP later—a perfect solution for an unmanaged network that might migrate to a managed network at a later date.

In situations where you need to disable chassis management, simply move the built-in SNMP switch to the off position. Even though this makes the modules unmanageable, the SNMP agent continues to communicate with installed modules. Turning management back on returns the modules to management control and any settings you've set in iView. A chassis that has its management enabled can be connected to a switch or other network device via a CAT5 straight-through twisted-pair cable that you plug into the unit's external 10BASE-T (RJ-45) connection.

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.

Optional redundant power supplies eliminate a point of failure. Plus, a "last gasp" feature alerts you when one of the power supplies or AC power fails. The 20-slot chassis can even be configured with both an AC and a DC power supply, enabling you to fall back on DC power should your AC power fail.

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.

Chassis with Embedded SNMP Management

Chassis with Embedded Management have SNMP already built in. The SNMP agent is embedded in the chassis backplane, eliminating the need to install a separate management module or software in your system. Just add media converter modules and you're ready to go.

The 2-port models feature a small footprint, house two media converter modules, and come with an AC or a DC power supply. They're perfect for desktop use.

For midrange applications, order the 8-port model, also available with an AC or a DC power supply.

For central office (CO) use, order the 18-port chassis, which we offer with either an AC or a DC power supply. Although the 18-slot chassis comes with its AC or DC power supply already installed, you can order a second power supply in the form of a module that slides into the chassis. The 18-slot chassis comes with blank plates installed and includes rackmount 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.

Tiny 1-Slot Chassis are perfect for when you only need to add one fiber link to bring fiber to the desktop. They hold one media converter module and are powered by either an autosensing 115-/240-VAC power supply or a dual AC/DC power supply.

The model with the dual AC/DC power supply is ideal for

industrial environments. It features AC power supplies and DC 4-screw terminals, and operates in -40 to +158° F (-40 to +70° C) environments. A mounting clip enables you to mount it on a DIN-35 rail.

The 2-Slot Desktop Chassis feature a small footprint, house two media converter modules, and come with an AC or a DC power supply.

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

Configuring a managed chassis

Once you connect a chassis to your network, begin by assigning the device its own IP address. This initial configuration can be done in-band through the chassis' 10BASE-T port while using the HubControl utility that's included on the iView CD or out-of-band through the chassis' front-panel RS-232 serial port using Dynamic Configuration Host Protocol (DCHP).

Of the two IP-address assignment routes, the second is the simplest. Simply plug one end of the included straight-through-pinned cable to the DB9 connector and the other end into the appropriate port on your computer or terminal that's set for VT100™ emulation.

The HubControl utility can also be used to initiate remote SNMP configuration for SNMP-manageable devices. This way, you can get a head start on adding subnet masks, trap assignments, and other management functions. You also use HubControl to upload new versions of the system software and new MIB information.

Once the chassis has an IP address assigned, use the iView software or another SNMP-compatible network management system, such as HP OpenView, to remotely configure, monitor, and manage the modules you install in the chassis. Program

subnet masks and default gateways, create community strings (for both read-only and read/write access), configure traps—all within a password-protection process!

Bandwidth Manager

Making the most of available bandwidth becomes more important as Internet use increases. To allocate bandwidth in the most cost-effective way within a network LAN/WAN environment, add a Bandwidth Manager to any of the chassis.

Ideal for Web hosting, server colocation, and service provider applications, this 2-port networking device enables you to easily and inexpensively control bidirectional bandwidth in 1-kbps increments up to 10 Mbps.

Configure the module in minutes using the iView software or an SNMP application, such as HP OpenView. Within five minutes, you can configure bandwidth simply by dialing in the desired amount.

Use the Bandwidth Manager to quickly adjust uplink or downlink speed. By fine-tuning these settings, you can minimize bandwidth waste and ensure a better use of resources.

Because this module offers bidirectional bandwidth control, you can adjust bandwidth on traffic traveling between upstream and downstream ports. This feature makes the Bandwidth Manager highly suited for environments where you need to provide multiple levels of service to end users, such as in a business park or multitenant building.

The Bandwidth Manager has two shielded RJ-45 10BASE-T ports (Ports A and B) for network connections and a DB9 (RS-232) DTE serial port for IP configuration. You can configure both RJ-45 ports for half- and full duplex operation to match the mode of your connected hardware.

Choose either Port A or Port B to assign bandwidth; do this using iView or by manually flipping DIP switches on the module's component side. Using iView, you can set the bandwidth of the module's data ports up to 10 Mbps and forward it in each direction (A to B or B to A). To edit the data rate for each port in iView, choose between 12 predefined rates or enter your own custom rate in granular, 1-kbps increments.

For each data port, choose a mode for forwarding or discarding frames that come in contact with the Bandwidth Manager. Among your choices are general modes for forwarding all traffic to your LAN or forwarding just IP/ARP traffic. The latter option is best for filtering traffic from the Internet to a LAN.

There are also inclusionary modes in which the Bandwidth Manager forwards only IP/ARP packets that fall into a certain

range while either allowing or preventing all non-IP traffic to pass.

Or use exclusionary modes where the module forwards everything except what you specify in an IP address range, including non-IP traffic, or forwards all IP/ARP packets minus what you specify in an IP range. The second option is best for filtering traffic from a LAN to the Internet or a WAN.

Once you assign an IP address to the module, use iView or another SNMP-based network management application to configure and remotely manage the Bandwidth Manager.

If you don't enable bandwidth-management capabilities on the device, you can essentially use the module as a 10BASE-T to 10BASE-T extender instead.

Chassis Specifications

Approvals: FCC Class A, Part 15; CE

Humidity Tolerance: 5 to 95% (noncondensing)

Temperature Tolerance:

Operating: 32 to 104° F (0 to 40° C);

Storage: 21 to 160° F (-6 to +71° C)

Indicators: LNK, FDX, RCV, XMT, MGMT, SNMP

Power: LMC5203A, LMC5207A, LMC5100A, LMC5102A: 100–240 VAC, 50/60 Hz, 1/0.5 A; LMC5204A: 100–240 VAC, 50/60 Hz, 0.5/0.25 A; LMC5206A: -48 VDC, 1 A; LMC5205A, LMC5100A-DC, LMC5102A-DC, LMC5105A-DC: 48 VDC, 2 A; LMC5208A, LMC5202A: -48 VDC, 2.5 A; LMC5104A: 100–240 VAC, 50/60 Hz, 1.5 A; LMC5101A, LMC5201A: 115/240 VAC, autosensing; LMC5103A: dual power supply: 115/240 VAC, autosensing plus -48 VDC, 2.5 A

Size: LMC5203A–LMC5206A: 1.75" (1U) H x 17.35"W x 13.8"D (4.4 x 44.1 x 35.1 cm); LMC5207A–LMC5208A: 5.2" (3U) H x 19"W x 13.8"D (13.2 x 48.3 x 35.1 cm); LMC5100A, LMC5100A-DC: 2"H x 8.9"W x 5"D (5.1 x 22.6 x 12.7 cm); LMC5102A, LMC5102A-DC: 4.6"H x 8.7"W x 7"D (11.6 x 22.1 x 17.8 cm); LMC5104A, LMC5105A-DC: 4.6"H x 17.4"W x 9.1"D (11.7 x 44.2 x 23.1 cm); LMC5101A, LMC5103A: 1.5"H x 4.8"W x 7.3"D (3.8 x 12.2 x 18.5 cm); LMC5201A–LMC5202A: 2.3"H x 4.75"W x 7.31"D (5.84 x 12.06 x 18.56 cm)

Weight: LMC5203A–LMC5206A: 5 lb. (2.3 kg); LMC5207A–LMC5208A: 30 lb. (13.6 kg); LMC5100A: 2.7 lb. (1.2 kg); LMC5100A-DC: 2.8 lb. (1.3 kg); LMC5101A: 1.3 lb. (0.6 kg); LMC5102A, LMC5102A-DC: 6.2 lb. (2.8 kg); LMC5104A, LMC5105A-DC: 12.9 lb. (5.9 kg); LMC5101A, LMC5103A: 1.4 lb. (0.7 kg); LMC5201A–LMC5202A: 3.22 lb. (1.46 kg)

Ordering Information

ITEM	CODE
High-Density Media Converter System II Chassis with Modular SNMP Management	
6-Slot Rackmount or Desktop Chassis	
AC Power	LMC5203A
Dual AC Power	LMC5204A
DC Power	LMC5206A
Dual DC Power	LMC5205A
20-Slot Rackmount Chassis	
AC Power	LMC5207A
DC Power	LMC5208A
<i>To add a redundant power supply to LMC5203A, order...</i>	
AC Module	LMC5214A
<i>To add a redundant power supply to LMC5206A, order...</i>	
DC Module	LMC5213A
<i>To upgrade the LMC5207A to dual AC power, order...</i>	
AC Module	LMC5210A
<i>To upgrade the LMC5208A to AC and DC power, order...</i>	
AC Module	LMC5211A
<i>To upgrade the LMC5208A to dual DC power, order...</i>	
DC Module	LMC5212A
<i>For SNMP Management, you need...</i>	
SNMP Management Module	LMC5200A
<i>You may also need...</i>	
Backup/Spare Fan Assembly for 20-Slot Rackmount Chassis	LMC5209A
High-Density Media Converter System II Chassis with Embedded SNMP Management	
2-Slot Desktop Chassis	
AC Power	LMC5100A
DC Power	LMC5100A-DC
8-Slot Desktop Chassis	
AC Power	LMC5102A
DC Power	LMC5102A-DC
18-Slot Rackmount	
AC Power, 110-Watt.....	LMC5104A
DC Power	LMC5105A-DC
<i>To add redundant power supplies to the 18-Slot Chassis, order...</i>	
AC Module, 110-Watt	LMC5106AC
DC Module.....	LMC5107DC
<i>To rackmount the LMC5100A, order...</i>	
2-Slot Rackmount Ears	LMC5100A-RM
<i>To rackmount the LMC5102A, order...</i>	
8-Slot Rackmount Ears	LMC5102A-RM

Ordering Information

ITEM

CODE

High-Density Media Converter System II Unmanaged Chassis

1-Slot Desktop Chassis

AC PowerLMC5101A

AC/DC Power.....LMC5103A

2-Slot Desktop Chassis

AC PowerLMC5201A

DC PowerLMC5202A

To mount the Unmanaged Chassis, order...

Rackmount BracketsLMC5167A-RM

Rackmount ShelfLMC5165A-RM

Wallmount Brackets.....LMC5166A-WM

Accessories for chassis

To manage the bandwidth on connected segments, order...

Bandwidth ManagerLE1028C

You may also need...

North American Power Adapter ClipLMC5216A

European Power Adapter ClipLMC5215A

Layer 1 Media Converter Modules for the High-Density Media Converter System II

Layer 1 Media Converter 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. These media converters bridge the gap between two different Ethernet types and are totally transparent to network operation, having no effect on the data being sent across the link.

Layer 1 Media Converter Modules include the LinkLoss™ feature, which notifies you of “silent failures” on copper-to-fiber links. LinkLoss enables you to troubleshoot network problems just by looking at the media converter’s Link LED—the link status of the fiber segment will always be reflected by the twisted-pair segment so you’re informed quickly of fiber problems.

Many of the twisted-pair modules feature autocrossover ports to eliminate the worry of whether to use straight- or cross-pinned cabling. This built-in MDI/MDI-X function

automatically determines whether the converter has to cross over between the four pairs on the twisted-pair port’s RJ-45 connector.

The twisted-pair modules without automatic termination have a push button for you to choose the crossover.

10BASE-T to 10BASE-FL

These 10-Mbps media converter modules offer traditional conversion between 10BASE-T Ethernet devices and 10BASE-FL multimode or single-mode fiber optic devices. Use a pair of these converters at opposite ends of the same fiber optic link to increase your fiber reach.

100BASE-TX to 100BASE-FX

Order these 100-Mbps modules to convert between 100BASE-TX and 100BASE-FX devices. For converters that support autosensing 10/100-Mbps Ethernet, see our Layer 2 Media Converter Modules for the High-Density Media Converter System II (pages 9–10).

100BASE-TX to 100BASE-FX Single Strand

Get more mileage from your fiber cable. These modules extend Fast Ethernet connections over a single strand of fiber cable by compressing the transmit and receive wavelengths into *one* single-mode fiber strand.

The conversion is done with Wave Division Multiplexing (WDM) technology. WDM technology transmits two signals simultaneously at different wavelengths on the same fiber. One unit transmits at 1550 nm and receives at 1310 nm. The other unit transmits at 1310 nm and receives at 1550 nm. The two wavelengths operate independently and don’t interfere with each other. This bidirectional traffic flow effectively converts a single fiber into a pair of “virtual fibers,” each driven independently at different wavelengths.

1000BASE-TX to 1000BASE-SX

Choose these modules for Gigabit Ethernet connections of up to 200 meters (656.2 ft.)— enough distance to support Gigabit fiber backbone runs either within a building or between neighboring buildings in a campus environment.

1000BASE-TX to 1000BASE-LX

For longer Gigabit fiber runs, choose 1000BASE-LX Gigabit Ethernet modules, which achieve blazing Gigabit throughput at distances of up to 40 kilometers (24.9 mi.) over single-mode fiber cable.

1000BASE-TX to 1000BASE-SSLX

Send Gigabit Ethernet at distances of up to 40 kilometers (24.9 mi.) over a single fiber strand—truly the best performance you can get from your fiber infrastructure.

Ordering Information

ITEM	CODE
High-Density Media Converter System II Layer 1 Media Converter Modules	
10BASE-T to 10BASE-FL	
Multimode, 850-nm, 4 km	
ST	LMC5014C-R2
SC	LMC5015C-R2
Multimode, 1300-nm, 10 km	
ST	LMC5016C-R2
SC	LMC5017C-R2
Single-Mode, 1310-nm, 20 km	
ST	LMC5018C
SC	LMC5019C
Single-Mode Plus, 1310-nm, 40 km	
ST	LMC5020C-R2
SC	LMC5021C-R2

Ordering Information

ITEM	CODE
High-Density Media Converter System II Layer 1 Media Converter Modules (Continued)	
100BASE-TX to 100BASE-FX	
Multimode, 850-nm, 300 m	
ST	LMC5182C
SC	LMC5181C
Multimode, 1300-nm, 2 km	
ST	LMC5022C
SC	LMC5023C
MT-RJ	LMC5183C
Single-Mode Plus, 1310-nm, 40 km	
ST	LMC5026C
SC	LMC5027C
Single-Mode Long, 1310-nm, 80 km	
ST	LMC5111C
SC	LMC5110C
Single-Mode Long, 1550-nm, 100 km	
SC	LMC5180C
100BASE-TX to 100BASE-FX, Single Strand	
Transmit/Receive Individual Modules	
Single-Mode, 20 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	LMC5113C
1550-nm Transmit/1310-nm Receive, SC	LMC5114C
Single-Mode Plus SC, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	LMC5116C
1550-nm Transmit/1310-nm Receive, SC	LMC5117C
1000BASE-TX to 1000BASE-SX	
Multimode, 850-nm, 200 meters	
SC	LGC5108C-R2
1000BASE-TX to 1000BASE-LX	
Single-Mode Plus, 1310-nm, 10 km	
SC	LGC5184C
Single-Mode Plus, 1310-nm, 40 km	
SC	LGC5109C-R2
1000BASE-TX to 1000BASE-SSLX, Single Strand	
Transmit/Receive Individual Modules	
Single-Mode, 10 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	LGC5844C
1550-nm Transmit/1310-nm Receive, SC	LGC5845C
Single-Mode Plus, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	LGC5846C
1550-nm Transmit/1310-nm Receive, SC	LGC5847C

Layer 2 Media Converter Modules for the High-Density Media Converter System II

Unlike Layer 1 media converters, which only convert one Ethernet media type to another, Layer 2 Media Converter Modules for the High-Density Media Converter System II are true switches—they actively store, filter, and forward Ethernet packets like any other MAC layer switch.

Layer 2 converters increase network efficiency and reduce network overhead, significantly increasing data throughput.

Because Layer 2 converters are also switches, they incorporate 10/100 or 10/100/1000 ports in contrast to the single-speed ports of Layer 1 converters. You can set the RJ-45 ports for autonegotiation or set them for 10-, 100-, or 1000-Mbps speed as well as for half- or full-duplex. The fiber port can be set for half- or full-duplex, too.

Layer 2 Media Converter modules include the LinkLoss™ feature, which notifies you of “silent failures” on copper-to-fiber links. With LinkLoss, a fault on the fiber port is mirrored to the Ethernet twisted-pair port. If the fiber link is lost at the converter, the converter disables the twisted-pair Link LED so you can see at a glance that the link is down.

Twisted-pair ports feature autocrossover ports to eliminate the worry of whether to use straight- or cross-pinned cabling. This built-in MDI/MDI-X function determines automatically whether the converter has to cross over between the four pairs on the twisted-pair port’s RJ-45 connector.

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

Use a pair of 10BASE-T/100BASE-TX to 10BASE-FL/100BASE-FX converters at opposite ends of a fiber optic link to increase your fiber reach. Because they support both Ethernet and Fast Ethernet, these media converters are perfect for a network that includes both standards.

The copper ports auto-negotiate speed and duplex; the fiber ports operate at the speed of the copper port.

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

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-FX, Single Strand

Get more mileage from your fiber cable. These modules extend Fast Ethernet connections over a single strand of fiber cable by compressing the transmit and receive wavelengths into *one* single-mode fiber strand.

The conversion is done with Wave-Division Multiplexing (WDM) technology. WDM technology transmits two signals simultaneously at different wavelengths on the same fiber. One unit transmits at 1550 nm and receives at 1310 nm. The other unit transmits at 1310 nm and receives at 1550 nm. The two wavelengths operate independently and don’t interfere with each other. This bidirectional traffic flow effectively converts a single fiber into a pair of “virtual fibers,” each driven independently at different wavelengths.

The copper port is autosensing for speed; the fiber port is Fast Ethernet.

10BASE-T/100BASE-TX to 100BASE-FX, Fault Tolerant

Fault-Tolerant media converter modules feature two autosensing RJ-45 ports, enabling you to build in redundancy on the copper side. If

the primary port goes down, the media converter falls back to the secondary port automatically.

The copper port is autosensing for 10- or 100-Mbps; 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 300 meters (984.3 ft.). Autosensing 10-/100-/1000-Mbps ports on the copper side provide maximum versatility.

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

For longer Gigabit fiber runs, choose 1000BASE-LX Gigabit Ethernet modules, which achieve blazing Gigabit throughput at distances of up to 40 or 70 kilometers over single-mode fiber cable. The copper port supports Ethernet, Fast Ethernet, and Gigabit Ethernet and automatically autonegotiates speed and duplex.

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

Send Gigabit Ethernet at distances of up to 10 or 40 kilometers over a single fiber strand. Maximum fiber utilization plus autosensing 10/100/1000 ports make this an extremely versatile choice for your fiber infrastructure.

Ordering Information

ITEM

CODE

High-Density Media Converter System II Layer 2 Media Converter Modules

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

Multimode, 850-nm, 300 m

ST LMC5040C

SC LMC5041C

Multimode, 1300-nm, 2 km

ST LMC5196C

SC LMC5195C

Single-Mode, 1310-nm, 40 km

ST LMC5194C

SC LMC5193C

Ordering Information

ITEM	CODE
High-Density Media Converter System II Layer 2 Media Converter Modules (Continued)	
10BASE-T/100BASE-TX to 100BASE -FX	
Multimode, 300-nm, 2 km	
ST	LMC5118C
SC	LMC5119C
Single-Mode, 1310-nm, 40 km	
ST	LMC5120C
SC	LMC5121C
10BASE-T/100BASE-TX to 100BASE -FX, Single Strand	
Transmit/Receive Individual Modules	
Single-Mode, 20 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	LMC5123C
1550-nm Transmit/1310-nm Receive, SC	LMC5124C
Single-Mode Plus, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	LMC5126C
1550-nm Transmit/1310-nm Receive, SC	LMC5127C
10BASE-T/100BASE-TX to 100BASE -FX, Fault-Tolerant [(2) twisted pair, (1) pair fiber]	
Multimode, 1300-nm, 2 km	
ST	LMC5176C
SC	LMC5175C
Single-Mode, 1310-nm, 40 km	
ST	LMC5174C
SC	LMC5173C
Single-Mode, 1310-nm, 80 km	
ST	LMC5172C
SC	LMC5171C
Single-Mode, 1310-nm, 100 km	
SC	LMC5170C
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SX, 300 m	
Multimode, 850-nm, SC	LGC5950C
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-LX	
Twisted Pair/LX 1310-nm Single-Mode SC, 10 km	LGC5951C
Twisted Pair/LX 1310-nm Single-Mode Plus SC, 40 km	LGC5952C
Twisted Pair/LX 1550-nm Single-Mode Long SC, 70 km	LGC5953C
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SSLX, Single Strand	
Transmit/Receive Individual Modules	
Single-Mode, 10 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	LGC5940C
1550-nm Transmit/1310-nm Receive, SC	LGC5841C
Single-Mode Plus, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	LGC5842C
1550-nm Transmit/1310-nm Receive, SC	LGC5843C

T1/E1/J1 Modules for the High-Density Media Converter System II

T1/E1/J1 modules for the High-Density Media Converter System II enable you to extend 1.544-Mbps T1/J1 or 2.048-Mbps E1 copper-based circuits over duplex fiber optic cable. They're ideal for use with PBX systems or legacy telco circuits.

These modules are selectable to support 1.544-Mbps T1 (ANSI T1.403), 2.048-Mbps E1 (G.703), or 1.544-Mbps J1.

They include full diagnostics, including three modes of operation for loopback testing (Fiber Analog Loopback, Fiber Digital Loopback, and Twisted-Pair Digital Loopback), a line integrity test feature, and a Transmit Data Source diagnostic feature. Built-in jitter removal ensures maximum throughput. An MDI/MDI-X switch configures the RJ-48 port for crossover or straight-through cable connection automatically.

Specifications

Encoding: AMI, B8ZS, HDB3

Fiber Type: 50/125- μ m or 62.5/125- μ m multimode; or 9/125- μ m single-mode

Speed (Maximum):
T1, J1: 1.544 Mbps;
E1: 2.048 Mbps

CE Approval: Yes

Connectors: T1/E1/J1: (1) RJ-48; Fiber optic: (1) pair of ST[®], SC, or MT-RJ

Power — From an optional 1-Slot Desktop or High-Density Media Conversion System II chassis

Ordering Information

ITEM	CODE
T1/E1/J1 Modules for the High-Density Media Converter System II	
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, 100 km	
SC	LME008A
Twisted Pair (RJ-48) to Single-Strand Single-Mode, 20 km (Order one of each.)	
Transmit, 1310-nm/Receive, 1550-nm SC	LMC5192C
Transmit, 1550-nm/Receive, 1310-nm SC	LMC5191C
Twisted Pair (RJ-48) to Single-Strand Single-Mode, 40 km (Order one of each.)	
Transmit, 1310-nm/Receive, 1550-nm SC	LMC5190C
Transmit, 1550-nm/Receive, 1310-nm SC	LMC5189C

DS3/E3/STS-1 Modules for the High-Density Media Converter System II

DS3/E3/STS-1 Modules for the High-Density Media Converter System II provide conversion from BNC Coax cable to fiber for DS-3, E-3, or STS-1 applications. They're ideal in Municipal Area Network (MAN) access applications, for linking buildings over a campus area network, or anywhere incoming coaxial circuits need to be converted to fiber for distribution. Use fiber to extend high-speed coax circuits at greater distances and never worry about interference.

The modules are selectable for DS3 (45 Mbps), E3 (34 Mbps), or STS-1 (52 Mbps). Advanced line conditioning and jitter removal features ensure maximum throughput. Fiber loopback and coax loopback test capabilities enable you to troubleshoot remote units from a central location. The modules also feature a transmit data source diagnostic feature and FiberAlert™ for troubleshooting the fiber link as well as Auto MDI-II/MDI-X on the copper side.

Specifications

Fiber Type: 50/125- μ m or 62.5/125- μ m multimode; or 9/125- μ m single-mode

Speed (Maximum):
 DS3: 45 Mbps;
 E3: 34 Mbps;
 STS-1: 52 Mbps

CE Approval: Yes

Connectors:
 DS3/E3/STS-1: (1) BNC;
 Fiber optic: (1) pair of ST or SC

Power: From an optional 1-Slot Desktop or High-Density Media Conversion System II chassis

Ordering Information

ITEM	CODE
DS3/E3/STS-1 Modules for the High-Density Media Converter System II	
BNC Coax to Multimode, 1300-nm, 2 km	
ST	LME020A
SC	LME021A
BNC Coax to Multimode, 1300-nm, 40 km	
ST	LME022A
SC	LME023A
BNC Coax to Multimode, 1310-nm, 80 km	
ST	LME024A
SC	LME025A
BNC Coax to Multimode, 1550-nm, 100 km	
SC	LME026A
BNC Coax to Single-Strand Single-Mode, 20 km (Order one of each.)	
Transmit, 1310-nm/Receive, 1550-nm SC	LMC5188C
Transmit, 1550-nm/Receive, 1310-nm SC	LMC5187C
BNC Coax to Single-Strand Single-Mode, 40 km (Order one of each.)	
Transmit, 1310-nm/Receive, 1550-nm SC	LMC5186C
Transmit, 1550-nm/Receive, 1310-nm SC	LMC5185C

ATM Modules for the High-Density Media Converter System II

ATM Modules for the High-Density Media Converter System II support ATM so you can establish low-cost copper-to-fiber conversion for OC-3 155-Mbps ATM rings or fiber-to-fiber conversion for OC-12 622-Mbps or 1250-Mbps data/Internet backbones.

OC-3 Modules are ideal for ATM network managers who require fiber links to connect their network-side switching equipment to the OC-3 ATM backbone. The ATM Physical Layer is compliant with ANSI T1S1/92-002R3, ITU 1.361, and the ATM Forum UNI v.3.1

specification. ATM signaling is UNI 3.0/3.1 compliant.

The RJ-45 ATM port is internally pinned as a standard ATM-DTE. Use a straight-wired ATM cable to connect the port to a DCE port, such as an ATM switch, and use a cross-pinned ATM cable to connect to another DTE, such as an ATM NIC.

For fiber-to-fiber conversion up to 1250 Mbps, see our protocol-independent mode converters on **page 15**.

Ordering Information

ITEM	CODE
ATM OC-3 (1.55-Mbps)Modules for the High-Density Media Converter System II	
Twisted Pair to Multimode, 1300-nm, 20 km	
SC.....	LMC5006C
Twisted Pair to Single-Mode, 1310-nm, 40 km	
SC.....	LMC5007C
Twisted Pair to Single-Mode, 1310-nm, 80 km	
SC.....	LMC5008C
Twisted Pair to Single-Mode, 1550-nm, 80 km	
SC.....	LMC5009C

VDSL LAN Extender Modules for the High-Density Media Converter System II

Save on wiring costs by extending Ethernet over ordinary phone-grade wiring. VDSL LAN Extender Modules for the High-Density Media Converter System II are the perfect way to extend your Ethernet network past the 100-meter (328-ft.) twisted-pair distance limit in a campus environment or in very large buildings.

The extenders support an aggregate speed of up to 25 Mbps and distances of up to

2 kilometers (1.2 mi.). Ethernet ports are autosensing for 10BASE-T and 100BASE-TX.

Because we find that our customers often use VDSL LAN Extender Modules outside of the High-Density Media Converter System II, we also offer modules already installed in a 1-Slot Desktop Chassis. These are, of course, fully compatible with the High-Density Media Converter System II.

Specifications

Speed (Maximum):

Synchronous at 500 meters (1640.4 ft.):
Upstream: 12.5 Mbps,
Downstream: 12.5 Mbps,
Total: 25 Mbps;

Asynchronous at 1.5 km (0.9 mi.):
Upstream: 2.1 Mbps,
Downstream: 12.5 Mbps,
Total: 15 Mbps;

Asynchronous at 2 km (1.2 mi.):
Upstream: 2.1 Mbps,
Downstream: 4.25 Mbps,
Total: 6.5 Mbps

Connectors: (1) RJ-11, (1) RJ-45

Ordering Information

ITEM	CODE
VDSL LAN Extender Modules for the High-Density Media Converter System II	
VDSL to 10BASE-T/100BASE-TX (Order one of each.)	
VDSL-LAN Extender/Central Office (CO), 200 m–2 km	LMC5178C
VDSL-LAN Extender/Customer Premise Equipment (CPE), 200 m–2 km	LMC5177C
VDSL LAN Extenders (Modules premounted in High-Density Media Converter System II Chassis)	
CPE	
Standard (LMC5177C mounted in LMC5101A chassis)	LMC5221A
Multi-Power (LMC5177C mounted in LMC5103A chassis)	LMC5224A
CO	
Standard (LMC5178C mounted in LMC5101A chassis)	LMC5222A
Multi-Power (LMC5178C mounted in LMC5103A chassis)	LMC5225A
VDSL LAN Extender Kits (Modules premounted in High-Density Media Converter System II Chassis)	
CPE plus CO	
Standard (LMC5177C and LMC5178C, each mounted in LMC5101A chassis)	LMC5220A
Multi-Power (LMC5177C and LMC5178C, each mounted in LMC5103A chassis)	LMC5225A

Fiber Mode Conversion Modules for the High-Density Media Converter System II

These protocol-independent modules convert multimode to single-mode fiber. Use them to add extra distance—up to 70 km—to your fiber infrastructure. Or use them for migrating your multimode fiber infrastructure to single-mode.

Modules that support up to 155 Mbps are typically used for Ethernet or Fast Ethernet, although, because they are transparent to protocol, they can also be used in an OC-3 ATM (155-Mbps) environment. Use the modules that support up to 1250 Mbps for Gigabit Ethernet or OC-12 ATM.

Use a Repeater Module anywhere you need extra distance on a single-mode fiber link. Repeater modules support distances of up to 40 kilometers and can be daisychained for fiber cable runs hundreds of kilometers long.

The repeater modules retime the data signal, remove jitter, and retransmit the amplified signal. User-selectable transmission speeds range from 622-Mbps (OC-12) up to 1250-Mbps Gigabit Ethernet.

Both Fiber Mode Conversion Modules and Fiber Repeater Modules include FiberAlert™ to notify you of “silent failures” and help you troubleshoot problems. No more time wasted searching for them! You can check a link by observing the status of the media converter’s Link LED.

The FiberAlert function informs you when a fault occurs on one fiber strand and the link can’t carry bidirectional communications between two fiber devices. With FiberAlert, the link status of one end

is mirrored at the opposite end. If a strand isn’t available, and you have FiberAlert enabled, the receiver end device notes the loss of the link and stops transmitting data until it receives a signal or link pulse. This means that the link status can be seen at *both ends* through the respective Link LEDs, thus helping you to identify and isolate faults anywhere in the fiber loop. FiberAlert works even if the fiber devices are separated by great distances.

Ordering Information

ITEM	CODE
Fiber Mode Conversion Modules for the High-Density Media Converter System II	
155 Mbps (Fast Ethernet)	
Multimode, 850-nm to Single-Mode, 1310-nm, 2 km Multimode/40 km Single-Mode	
ST/ST	LMC5032C
SC/SC	LMC5033C
Multimode, 850-nm to Single-Mode, 1310-nm, 2 km Multimode/80 km Single-Mode	
ST/ST	LMC5034C
SC/SC	LMC5035C
Multimode, 1300-nm to Single-Mode, 1310-nm, 2 km Multimode/40 km Single-Mode	
ST/ST	LMC5028C
SC/SC	LMC5029C
Multimode, 1300-nm to Single-Mode, 1310-nm, 2 km Multimode/80 km Single-Mode	
ST/ST	LMC5030C
SC/SC	LMC5031C
622 Mbps (OC-12 ATM)	
Multimode, 1300-nm to Single-Mode, 1300-nm, 40 km	
SC/SC	LMC5010C
1250 Mbps (Gigabit Ethernet or OC-12 ATM)	
Multimode, 850-nm to Single-Mode, 1310-nm, 2 km Multimode/10 km Single-Mode	
SC/SC	LMC5036C
Multimode, 850-nm to Single-Mode, 1310-nm, 2 km Multimode/40 km Single-Mode	
SC/SC	LMC5011C
Multimode, 850-nm to Single-Mode, 1550-nm, 2 km Multimode/70 km Single-Mode	
SC/SC	LMC5012C
Single-Strand Multimode to Single-Strand Single-Mode, 40 km (Order one of each.)	
Transmit 1310-nm/Receive, 1550-nm, SC/SC	LMC5169C
Transmit 1550-nm/Receive, 1310-nm, SC/SC	LMC5168C
Fiber Repeater Modules	
Single-Mode Plus, 1310-nm to Single-Mode Plus, 1310-nm, 40 km	
SC	LE1029C