

## High-Density Media Converter System II



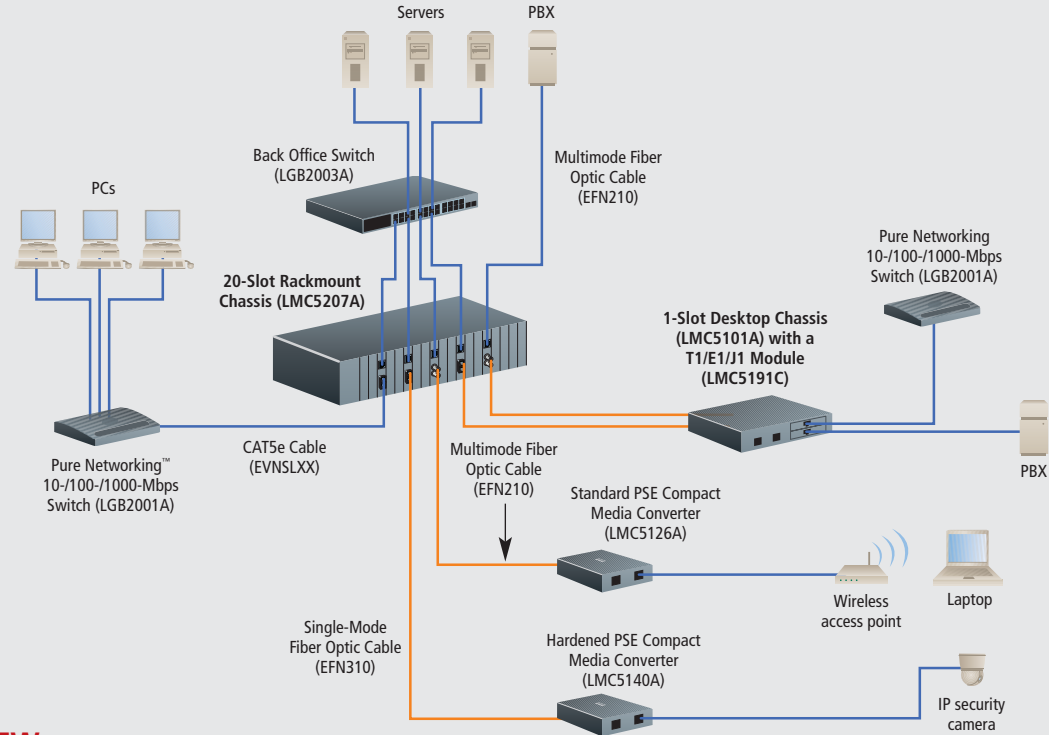
**Fully manageable systems with Layer 1  
or Layer 2 conversion options.**

## FEATURES

- Customize this versatile system to your application.
- Chassis available can be ordered with or without SNMP management capabilities.
- For remote locations, order compact desktop chassis.
- LinkLoss and/or FiberAlert diagnostics for troubleshooting.
- Bandwidth Manager enables you to control per-port bandwidth.
- Copper-to-fiber, fiber-to-fiber, copper-to-copper, and single-strand fiber modules available.
- Layer 2 converters increase network efficiency.

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## OVERVIEW

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, or even over T1. The High-Density Media Converter System II provides a full 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 and vDSL, that are not usually available with chassis-based media converter systems.

Choose from a wide range of chassis options ranging from a large rackmount chassis with modular SNMP management for your IT center down to a tiny unmanaged desktop chassis for remote desktop locations. Modules in unmanaged chassis can also be managed, although the chassis themselves cannot.

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.

The High-Density Media Converter System II is easy to integrate into any managed network. Not only does it 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 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.

Plus, we've expanded the High-Density Media Converter System II family to include manageable media converter cards for connecting copper segments to a fiber backbone. Just plug one of these into one of our compact desktop chassis and get a higher level of control across the link.

For assistance specifying your complete system, give our FREE Tech Support experts a call.

## HIGH-DENSITY MEDIA CONVERTER SYSTEM II CHASSIS WITH MODULAR SNMP

Get full control of your media converter connections in your enterprise by ordering a High-Density Media Converter System II Chassis as well as a plug-in SNMP Management Module.

Choose from a desktop 3-slot chassis, a 1U rackmount or desktop 6-slot chassis, or a 3U rackmount 20-slot chassis (the chassis ship with blank plates already installed, and the 6- and 20-slot models include rackmounting hardware).

Each chassis has one additional slot for the SNMP Management Module, which you order separately and install in the chassis in order to enable both module and chassis management. You can even install chassis as an unmanaged chassis and then add SNMP later—a perfect solution for an unmanaged network that might migrate to a managed one at a later date.

### Module's GUI gives you detailed conversion ports info.

The SNMP Management Module not only also includes MIBs for SNMP, but it comes with a CD-ROM that contains iView management software. This software enables you to configure the chassis and the media converter modules plugged into it in minutes and provides you with a cross-platform application for managing intelligent networking devices from virtually any 32-bit Windows® system. The module is compatible with Windows 95/98, Windows 2000, and Windows NT® 4, as well as HTML.

The user-friendly, comprehensive iView program uses a clear graphical user interface (GUI). This 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 module's 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.

### Lock in SNMP configuration and specify backup power.

In situations where you need to disable chassis management, simply move the 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.

For peace of mind, an SNMP write-lock switch protects the configurations of your installed modules from being accidentally overwritten. Even better, the SNMP slot saves your SNMP settings even when the SNMP Management Module is removed from the chassis.

And, for the chassis themselves, we offer redundant power supplies, which help you isolate mission-critical applications from points of failure. A "last gasp" feature alerts you when one of the power supplies or AC power fails. What's more, the 3-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 20-slot chassis has dual fans that are easily field replaceable, and the 3-slot and 6-slot chassis boast a fan test feature and have fans that activate only when the chassis reaches a preset temperature. Fan speed and chassis temperature can be monitored remotely via SNMP.

### Connect to your network and configure with ease.

The chassis connects to your LAN via an external 10BASE-T/100BASE-TX twisted-pair connection on the installed SNMP Management Module. Simply plug one end of a CAT5 or higher UTP cable into the module's MGMT port and plug the other end into a switch, hub, or other networking device on your LAN.

Because the twisted-pair port has an auto-cross design, it automatically enables either a crossover or a straight-through connection to match the pinning of your connected device. No crossover cables are required!

Once you connect a chassis to your network, you can assign the device its own IP address.

This initial IP address configuration can be done in-band through the management module's twisted-pair port while using the HubControl utility (included on the iView CD) or out-of-band through the management module's RS-232 port using Dynamic Host Configuration Protocol (DHCP). (Because the chassis has an embedded DHCP agent, its IP address is dynamically assigned when connected to a LAN with a DHCP server.) The SNMP Management Module also includes a TFTP client and supports Telnet™.

Of the two IP address assignment routes, the second is the simplest. Simply plug the included straight-through-pinned cable into the module's 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 can 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!



LMC5207A  
(with modules installed)



## HIGH-DENSITY MEDIA CONVERTER SYSTEM II CHASSIS WITH MODULAR SNMP (CONTINUED)

### TECH SPECS

#### Chassis:

**Approvals** — FCC Class B, Part 15; CE

**Indicators** — LNK, FDX, RCV, XMT, MGMT, SNMP

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

Storage: -13 to +158°F (-25 to +70°C)

**Humidity Tolerance** — 5 to 95% (noncondensing)

**Power** — LMC5233A, LMC5203A, LMC5227A, LMC5207A: 100–240 VAC, 50/60 Hz, autosensing, 1/0.5 A;

LMC5234A, LMC5204A: 100–240 VAC, 50/60 Hz, autosensing, 0.5/0.25 A;

LMC5235A, LMC5206A: -48 VDC, 1 A;

LMC5236A, LMC5205A: 48 VDC, 2 A;

LMC5237A: 115–240 VAC, 50–60 Hz, autosensing, plus -48 VDC, 2.5 A;

LMC5208A: -48 VDC, 2.5 A;

**Size** — LMC5233A–LMC5237A: 1.75"H (1U) x 7.5"W x 8.6"D

(4.4 x 19.1 x 21.8 cm);

LMC5203A–LMC5206A: 1.75"H (1U) x 17.4"W x 13.8"D

(4.4 x 44.2 x 35.1 cm)

LMC5227A, LMC5207A–LMC5208A: 5.2"H (3U) x 19"W x 13.8"D

(13.2 x 48.3 x 35.1 cm);

**Weight** — LMC5233A, LMC5235A: 3.2 lb. (1.5 kg);

LMC5234A, LMC5236A–LMC5237A: 3.6 lb. (1.6 kg);

LMC5203A–LMC5206A: 5 lb. (2.3 kg);

LMC5227A, LMC5207A–LMC5208A: 30 lb. (13.6 kg)

#### SNMP Management Module:

**Approvals** — FCC Class B, Part 15; CE

**SNMP Supported** — V1 and V2c compatible

**Connectors** — MGMT (network management):

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

Serial management: (1) DB9 F (RS-232), with included serial cable;

Also have an OPTION port for future use

**Indicators** — LNK/ACT, FDX/COL, TEMP, PS, FAN A/FAN B

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

Storage: -13 to +158°F (-25 to +70°C)

**Humidity Tolerance** — 5 to 95% (noncondensing)

**Power** — From the chassis



LMC5203A  
(with modules installed)

Item	Code
High-Density Media Converter System II Chassis with Modular SNMP Management	
3-Slot Desktop Chassis	
AC Power	LMC5233A
Dual AC Power	LMC5234A
DC Power	LMC5235A
Dual DC Power	LMC5236A
AC/DC Power	LMC5237A
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	LMC5227A
Dual AC Power	LMC5207A
Dual DC Power	LMC5208A
<b>For SNMP management, you need...</b>	
SNMP Management Module	LMC5200A
<b>To add a spare power supply to the LMC5203A, order...</b>	
AC Module	LMC5214A
<b>To add a spare power supply to LMC5206A, order...</b>	
DC Module	LMC5213A
<b>If you need a replacement AC power supply for the LMC5207A or a spare AC power supply for the LMC5227A, order...</b>	
AC Module	LMC5210A
<b>To replace the LMC5208A's DC power supply, order...</b>	
DC Module	LMC5212A
<b>For power connections, you may also need...</b>	
North American Power Adapter Clip	LMC5216A
European Power Adapter Clip	LMC5215A
<b>To mount a 3-Slot Desktop Chassis, order...</b>	
Rackmount Shelf	LMC5238A
<b>You may also need...</b>	
Backup/Spare Fan Assembly for 20-Slot Chassis	LMC5209A

## HIGH-DENSITY MEDIA CONVERTER SYSTEM II UNMANAGED CHASSIS

Choose 1- or 2-Slot Desktop Chassis for use as remote unmanaged media converters in your High-Density Media Converter System II application. With these tabletop units, you can customize your network to the protocols and media most appropriate for your application.

Although these models are designed primarily to work as remote chassis when paired with a larger, managed High-Density Media Converter System II Chassis, you can also use them on their own, particularly in applications where you don't require an SNMP card or chassis management.

The chassis are not only ideal for areas with limited space, but they feature a rugged enclosure that makes them suitable for out-of-the-way areas of your network.

The compact 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 combination AC/DC power supply.

The combination AC/DC power supply model strongly suits industrial environments. It features an AC power adapter and a DC 4-screw terminal block. When operating on DC power, it can be used in -40 to +158°F (-40 to +70°C) environments. What's more, a mounting clip included with the chassis

enables you to mount it on a DIN-35 rail. Depending on the installation, you can mount the AC/DC 1-Slot High Density Media Converter System II parallel or perpendicular to the DIN rail.

The 2-Slot Chassis feature a small footprint, house two 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 and causing downtime.

If you're short on desktop space, order Rackmount or Wallmount Brackets with your chassis. Or order a Rackmount Shelf, which enables you to install up to three High-Density Media Converter System II Unmanaged Chassis in a standard rack.

Once you choose your chassis, order the High-Density Media Converter System II modules (pages 6–15) appropriate for your applications. To install a module in the chassis, slide it in until the module is firmly seated in the backplane and secure it by tightening a screw. The modules can then be interconnected to other devices in your network.

### TECH SPECS

**Approvals** — FCC Class B, Part 15; CE

**Indicators** — LNK, FDX, RCV, XMT, MGMT, SNMP

**Operating Temperature** — LMC5101A, LMC5201A–LMC5202A:  
32 to 122° F (0 to 50°C);

LMC5103A: With AC adapter: 32 to 122°F (0 to 50°C);  
Without AC adapter: -40 to +158°F (-40 to +70°C)

**Humidity Tolerance** — 5 to 95% (noncondensing)

**Power** — LMC5101A, LMC5201A: 115–240 VAC, 50–60 Hz, autosensing;  
LMC5103A 115–240 VAC, 50–60 Hz, autosensing, plus -48 VDC, 2.5 A;  
LMC5202A: 48 VDC

**Size** — 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 4.8"W x 7.3"D  
(5.8 x 12.2 x 18.5 cm)

**Weight** — LMC5101A, LMC5103A: 1.4 lb. (0.6 kg);  
LMC5201A–LMC5202A: 3.2 lb. (1.5 kg)

Item	Code
High-Density Media Converter System II Unmanaged Chassis	
1-Slot Desktop Chassis	
AC Power	<b>LMC5101A</b>
AC/DC Power	<b>LMC5103A</b>
2-Slot Desktop Chassis	
AC Power	<b>LMC5201A</b>
DC Power	<b>LMC5202A</b>
<b>To mount the 1- or 2-Slot Unmanaged Desktop Chassis, order...</b>	
Rackmount Brackets	<b>LMC5167A-RM</b>
Rackmount Shelf	<b>LMC5165A-RM</b>
Wallmount Brackets	<b>LMC5166A-WM</b>
<b>You may also need...</b>	
North American Power Adapter Clip	<b>LMC5216A</b>
European Power Adapter Clip	<b>LMC5215A</b>

## 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 module to any High-Density Media Converter System II.

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.



## TECH SPECS

**Approvals** — FCC Class B, Part 15; CE

**Operation** — Half- or full duplex

**Speed** — Bandwidth can be set in 1-kbps increments up to 10 Mbps (with a bandwidth setting accuracy of +0% to -5%)

**Connectors** — Network: (2) shielded RJ-45 (10BASE-T); Serial DTE: (1) DB9 F (RS-232)

**Indicators** — (4) LEDs: LINK, RCV, XMT, HDX/FDX

**Power** — From the High-Density Media Converter System II Chassis

Item	Code
Bandwidth Manager	LE1028C

## LAYER 1 MEDIA CONVERTER MODULES

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 pushbutton 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.



LMC5014C-R2

Item	Code
High-Density Media Converter System II Layer 1 Media Converter Modules	
10BASE-T to 10BASE-FL	
Multimode, 850-nm, 4 km	
ST	<b>LMC5014C-R2</b>
SC	<b>LMC5015C-R2</b>
Multimode, 1300-nm, 10 km	
ST	<b>LMC5016C-R2</b>
SC	<b>LMC5017C-R2</b>
Single-Mode, 1310-nm, 20 km	
ST	<b>LMC5018C</b>
SC	<b>LMC5019C</b>
Single-Mode Plus, 1310-nm, 40 km	
ST	<b>LMC5020C-R2</b>
SC	<b>LMC5021C-R2</b>
100BASE-TX to 100BASE-FX	
Multimode, 850-nm, 300 m	
ST	<b>LMC5182C</b>
SC	<b>LMC5181C</b>
Multimode, 1300-nm, 2 km	
ST	<b>LMC5022C</b>
SC	<b>LMC5023C</b>
MT-RJ	<b>LMC5183C</b>
Single-Mode Plus, 1310-nm, 40 km	
ST	<b>LMC5026C</b>
SC	<b>LMC5027C</b>
Single-Mode Long, 1310-nm, 80 km	
ST	<b>LMC5111C</b>
SC	<b>LMC5110C</b>
Single-Mode Long, 1550-nm, 100 km	
SC	<b>LMC5180C</b>

Item	Code
High-Density Media Converter System II Layer 1 Media Converter Modules (Continued)	
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	<b>LMC5113C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LMC5114C</b>
Single-Mode Plus SC, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	<b>LMC5116C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LMC5117C</b>
1000BASE-TX to 1000BASE-SX	
Multimode, 850-nm, 200 meters	
SC	<b>LGC5108C-R2</b>
1000BASE-TX to 1000BASE-LX	
Single-Mode Plus, 1310-nm, 10 km	
SC	<b>LGC5184C</b>
Single-Mode Plus, 1310-nm, 40 km	
SC	<b>LGC5109C-R2</b>
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	<b>LGC5844C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LGC5845C</b>
Single-Mode Plus, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	<b>LGC5846C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LGC5847C</b>



## LAYER 2 MEDIA CONVERTER MODULES

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 autonegotiate 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/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 (24.9 or 43.5 mi.) 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 80 kilometers (49.7 mi.) over a single fiber strand. Maximum fiber utilization plus autosensing 10/100/1000 ports make this an extremely versatile choice for your fiber infrastructure.

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	<b>LMC5040C</b>
ST	<b>LMC5041C</b>
SC	
Multimode, 1300-nm, 2 km	<b>LMC5196C</b>
ST	<b>LMC5195C</b>
SC	
Single-Mode, 1310-nm, 40 km	<b>LMC5194C</b>
ST	<b>LMC5193C</b>
SC	
10BASE-T/100BASE-TX to 100BASE-FX Multimode, 300-nm, 2 km	<b>LMC5118C</b>
ST	<b>LMC5119C</b>
SC	
Single-Mode, 1310-nm, 40 km	<b>LMC5120C</b>
ST	<b>LMC5121C</b>
SC	

Item	Code
High-Density Media Converter System II Layer 2 Media Converter Modules (Continued)	
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	<b>LMC5123C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LMC5124C</b>
Single-Mode Plus, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	<b>LMC5126C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LMC5127C</b>
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-SX, Multimode, 850-nm, 300 m	
SC	<b>LGC5950C</b>
10BASE-T/100BASE-TX/1000BASE-T to 1000BASE-LX Twisted Pair/LX 1310-nm Single-Mode SC, 10 km	<b>LGC5951C</b>
Twisted Pair/LX 1310-nm Single-Mode Plus SC, 40 km	<b>LGC5952C</b>
Twisted Pair/LX 1550-nm Single-Mode Long SC, 70 km	<b>LGC5953C</b>
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	<b>LGC5940C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LGC5841C</b>
Single-Mode, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	<b>LGC5942C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LGC5943C</b>
Single-Mode, 60 km (Order one of each.)	
1490-nm Transmit/1550-nm Receive, SC	<b>LGC129A</b>
1550-nm Transmit/1490-nm Receive, SC	<b>LGC130A</b>
Single-Mode, 80 km (Order one of each.)	
1490-nm Transmit/1550-nm Receive, SC	<b>LGC131A</b>
1550-nm Transmit/1490-nm Receive, SC	<b>LGC132A</b>

## T1/E1/J1 MODULES

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. This eliminates the worry of whether to use straight- or cross-pinned cabling.

### TECH SPECS

**Encoding** — AMI, B8ZS, HDB3

**Fiber Type** — 50/125- $\mu$ m or 62.5/125- $\mu$ m multimode; or 9/125- $\mu$ 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 the High-Density Media Converter System II chassis

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	<b>LME001A</b>
SC	<b>LME002A</b>
MT-RJ	<b>LME003A</b>
Twisted Pair (RJ-48) to Single-Mode, 1310-nm, 40 km	
ST	<b>LME004A</b>
SC	<b>LME005A</b>
Twisted Pair (RJ-48) to Single-Mode, 1310-nm, 80 km	
ST	<b>LME006A</b>
SC	<b>LME007A</b>
Twisted Pair (RJ-48) to Single-Mode, 1550-nm, 100 km	
SC	<b>LME008A</b>
Twisted Pair (RJ-48) to Single-Strand Single-Mode, 20 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	<b>LMC5192C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LMC5191C</b>
Twisted Pair (RJ-48) to Single-Strand Single-Mode, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC	<b>LMC5190C</b>
1550-nm Transmit/1310-nm Receive, SC	<b>LMC5189C</b>

## DS3/E3/STS-1 MODULES

DS3/E3/STS-1 Modules for the High-Density Media Converter System II provide conversion from BNC coax cable to fiber for DS3, E3, 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) and support half- or full duplex operation. 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 include FiberAlert for troubleshooting the fiber link and a transmit data source diagnostic feature, which by sending specific patterns of data, enables you to identify problems with the attached cable.

### TECH SPECS

**Fiber Type** — 50/125- $\mu$ m or 62.5/125- $\mu$ m multimode; or 9/125- $\mu$ 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 the High-Density Media Converter System II chassis

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



## 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.

### TECH SPECS

**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

**Power** — From the High-Density Media Converter System II chassis

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	<b>LMC5178C</b>
VDSL-LAN Extender/Customer Premise Equipment (CPE), 200 m–2 km	<b>LMC5177C</b>
VDSL LAN Extenders (Modules premounted in High-Density Media Converter System II Chassis)	
CPE	
Standard (LMC5177C mounted in LMC5101A chassis)	<b>LMC5221A</b>
Multi-Power (LMC5177C mounted in LMC5103A chassis)	<b>LMC5224A</b>
CO	
Standard (LMC5178C mounted in LMC5101A chassis)	<b>LMC5222A</b>
Multi-Power (LMC5178C mounted in LMC5103A chassis)	<b>LMC5225A</b>
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)	<b>LMC5220A</b>
Multi-Power (LMC5177C and LMC5178C, each mounted in LMC5103A chassis)	<b>LMC5223A</b>

## FIBER MODE CONVERSION MODULES

These protocol-independent modules convert multimode to single-mode fiber. Use them to add extra distance—up to 70 kilometers (43.5 miles)—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 daisy-chained 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.



LMC5032C

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	LMC5032C
ST/ST	
Multimode, 850-nm to Single-Mode, 1310-nm, 2 km Multimode/80 km Single-Mode	LMC5034C
ST/ST	
SC/SC	LMC5035C
Multimode, 1300-nm to Single-Mode, 1310-nm, 2 km Multimode/40 km Single-Mode	LMC5028C
ST/ST	
SC/SC	LMC5029C
Multimode, 1300-nm to Single-Mode, 1310-nm, 2 km Multimode/80 km Single-Mode	LMC5030C
ST/ST	
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	LMC5036C
SC/SC	
Multimode, 850-nm to Single-Mode, 1310-nm, 2 km Multimode/40 km Single-Mode	LMC5011C
SC/SC	
Multimode, 850-nm to Single-Mode, 1550-nm, 2 km Multimode/70 km Single-Mode	LMC5012C
SC/SC	
Single-Strand Multimode to Single-Strand Single-Mode, 40 km (Order one of each.)	
1310-nm Transmit/1550-nm Receive, SC/SC	LMC5169C
1550-nm Transmit/1310-nm Receive, SC/SC	LMC5168C
Fiber Repeater Modules	
Single-Mode Plus, 1310-nm to Single-Mode Plus, 1310-nm, 40 km	
SC	LE1029C

## MANAGED 10/100 COPPER TO 10/100 FIBER CONVERTERS • MANAGED 10/100 TO 10/100 MODULE

The 10BASE-T/100BASE-TX to 10BASE-FL/100BASE-FX Modules offer both media conversion and SNMP management. They're great for campus applications where you need to bridge twisted-pair and fiber optic media in your High-Density Media Converter System II Chassis platform.

Working point-to-point, the modules ensure end-to-end data integrity with both points connected over highly reliable and secure optical cable. They enable you to provide your users with transparent LAN connectivity while keeping them completely separate from management data traffic sent to a remote LAN.

In a typical application, you'd use them in pairs, with one module configured as a host and installed at head-end of your network and the other module configured as a remote unit and situated at a remote location on a network's edge.

Or you can use an individual 10BASE-T/100BASE-TX to 10BASE-FL/100BASE-FX Module as a single CPE solution, situated as a standalone converter linked to a media converter at the CO or directly to a fiber optic switch. In this setup, you'd manage the module from the central office.

The media converters enable you to reduce equipment costs. You can, for instance, deploy two low-cost copper switches at the ends of the fiber run instead of extending more costly fiber to individual network segments or users.

### SNMP management agent included.

The 10BASE-T/100BASE-TX to 10BASE-FL/100BASE-FX Modules include an SNMP management agent that allows you to monitor the status and activity on its copper and fiber ports at the remote end.

With this, you can observe end points of a fiber-connected network, as well as the fiber link between them, and control each point as part of a single management entity—not as separate elements within a network.

You can also remotely configure the devices and even set up alerts to notify you of any problems occurring on a long-haul fiber run.

To monitor the link as well as the local and remote units themselves, just access the modules' management tool. Vital information on the link's condition and data traffic statistics are easy to retrieve through this interface. You can also receive real-time port and link information, optimize bandwidth, create a secure domain to isolate data, and more.

For initial setup of the unit, as well as modifications in the field, you can use the included iView2 SNMP application or a Telnet, TFTP, or local serial connection.

In addition to a 100BASE-FX fiber port and a 10BASE-T/100BASE-TX copper port, each module has a 10BASE/

100BASE-X copper port (labeled "TX EXT") for management. This port also functions as a serial port.

All copper ports match the speed and duplex of the connected twisted-pair segments automatically. Plus, the converters feature FDX flow control and back pressure flow control. For troubleshooting the fiber link, the modules feature LinkLoss and FiberAlert functions as well as loopbacks.

### VLAN and data traffic prioritization capabilities.

IEEE 802.1Q VLAN compliant, the 10BASE-T/100BASE-TX to 10BASE-FL/100BASE-FX Modules support VLAN trunking with up to 10 VLAN IDs for data—plus an additional one for SNMP—as well as port-based VLAN tagging. While operating in transparency mode, they allow you to set up VLAN and non-VLAN traffic on same port. You can mix VLAN tagged and untagged traffic regardless of VLAN tag info.

And as 802.1p compliant devices, the modules provide you with a two-tier queue for differential prioritization of both inbound and outbound traffic, which makes them great for VoIP and other applications in which you need to give certain traffic higher priority. You can even set up QoS (Quality of Service) policies for different types of traffic.

### Copper-only module also available.

In addition to the 10BASE-T/100BASE-TX to 10BASE-FL/100BASE-FX Modules, we also offer a manageable 10BASE-T/100BASE-TX to 10BASE-T/100BASE-TX module that doesn't convert media interfaces, but does enable you to extend SNMP management capabilities across copper links on either the local or remote side of your application. It can also be used to bridge 10- and 100-Mbps segments connected to a High-Density Media Converter System II Chassis.

The copper-only model autonegotiates for speed and duplex set, is 801.1Q and 802.1p compliant, supports bidirectional bandwidth control, and keeps management traffic separate from data traffic.

Item	Code
High-Density Media Converter System II Managed Converters, 10BASE-T/100BASE-TX to 10BASE-FL/100BASE-FX Multimode 1300-nm, 2 km	
ST	LMC530C
SC	LMC531C
Single-Mode 1310-nm, 40 km	
ST	LMC532C
SC	LMC533C
10BASE-T/100BASE-TX to 10BASE-T/100BASE-TX RJ-45	LMC545C