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Black Box Network Services is your source for more than 118,000 networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 30 seconds or less.

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LGC5108C-R4 Rev. 1

50-80825BB-00 Rev. A0

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LGC5845C-R3 LGC5108C-R4
LGC5844C-R3 LGC5184C-R3
LGC5846C-R3 LGC5109C-R4
LGC5847C-R3

High Density Media Converter System II Layer 1 Module

**Connects 1000BASE-T twisted-pair
to 1000BASE-SX/LX fiber.**



**Customer
Support
Information**

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500)
FREE technical support 24 hours a day, 7 days a week: Call 877-877-2269 or fax
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PA 15055-1018 • Web site: www.blackbox.com • E-mail: info@blackbox.com

FCC and Industry Canada RF Interference Statements

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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


This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

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

9. Electrostatic Discharge Precautions

Electrostatic discharge (ESD) can cause damage to any product, add-in modules or stand alone units containing electronic components. Always observe the following precautions when installing or handling these kinds of products.

- 1. Do not remove unit from its protective packaging until ready to install.
- 2. Wear an ESD wrist grounding strap before handling any module or component. If the wrist strap is not available, maintain grounded contact with the system unit throughout any procedure requiring ESD protection.
- 3. Hold the units by the edges; do not touch the electronic components or gold connectors.
- 4. After removal, always place the boards on a grounded, static-free surface, ESD pad or in a proper ESD bag. Do not slide the modules or stand alone units over any surface.



WARNING! Integrated circuits and fiber optic components are extremely susceptible to electrostatic discharge damage. Do not handle these components directly unless you are a qualified service technician and use tools and techniques that conform to accepted industry practices.

8. Fiber Optic Cleaning Guidelines

Fiber Optic transmitters and receivers are extremely susceptible to contamination by particles of dirt or dust, which can obstruct the optic path and cause performance degradation. Good system performance requires clean optics and connector ferrules.

1. Use fiber patch cords (or connectors, if you terminate your own fiber) only from a reputable supplier; low-quality components can cause many hard-to-diagnose problems in an installation.
2. Dust caps are installed at Black Box to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device. If you need to disconnect the fiber device, reinstall the protective dust caps.
3. Store spare caps in a dust-free environment such as a sealed plastic bag or box so that when reinstalled they do not introduce any contamination to the optics.
4. If you suspect that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

Certifications



Class 1 Laser product, Luokan 1 Laserlaite,
Laser Klasse 1, Appareil A' Laser de Classe

European Directive 2002/96/EC (WEEE) requires that any equipment that bears this symbol on product or packaging must not be disposed of with unsorted municipal waste. This symbol indicates that the equipment should be disposed of separately from regular household waste. It is the consumer's responsibility to dispose of this and all equipment so marked through designated collection facilities appointed by government or local authorities. Following these steps through proper disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about proper disposal, please contact local authorities, waste disposal services, or the point of purchase for this equipment.



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7. Contacting Black Box

Black Box Customer Service

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Mail order: Black Box Corporation
1000 Park Drive, Lawrence, PA 15055-1018

Web site: www.blackbox.com

E-mail: info@blackbox.com

6. Troubleshooting

- During installation, first test the fiber and twisted pair connections with all troubleshooting features disabled, then enable these features, if desired, just before final installation. This will reduce the features' interference with testing.
- If using a high powered device (which is designed for long distance installations) for a short distance installation, the fiber transmitters may overdrive the receivers and cause data loss. If this is the case, an optical attenuator may need to be added to the connection.
- For fiber specifications, visit the Black Box Web site at: www.blackbox.com or contact Black Box at 877-877-2269 or info@blackbox.com for more information.

Part Numbers

Part Number	Description
LGC5108C-R4	MM850-SC
LGC5184C-R3	SM1310-SC
LGC5109C-R4	SM1310/PLUS-SC
LGC5844C-R3	SM1310-SC (1310xmt/1550rcv)
LGC5845C-R3	SM1550-SC (1550xmt/1310rcv)
LGC5846C-R3	SM1310/PL-SC (1310xmt/1550rcv)
LGC5847C-R3	SM1550/PL-SC (1550xmt/1310rcv)

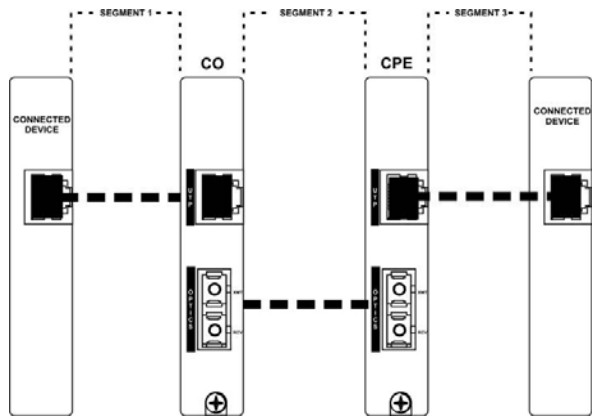
1. Specifications

Operating Temperature	+32°F to +122°F (0°C to +50°C)
Storage Temperature	-13°F to +158°F (-25°C to +70°C)
Humidity	5 - 95% (non-condensing)
Power Consumption (Typical)	0.55 Amp
Fiber Optic	For fiber optic specifications, please visit: http://www.blackbox.com

5.3 LED Operation

Each High Density Media Converter System II Layer 1 Module features diagnostic LEDs that provide information on features and ports.

- LNK/ACT** Glows green when a twisted pair link is established.
Blinks green when activity is detected. Located on RJ-45 connector.
- FDX** Glows amber when port is operating in Full-Duplex Mode on the RJ-45 connector.
- FXLL** Glows green when FX LinkLoss is enabled on the port.
Blinks when a fault occurs on the fiber port and actively disables the copper port.
- TXLL** Glows green when TX LinkLoss is enabled on the port.
Blinks when a fault occurs on the copper port and actively disables the fiber port.
- LNK** Glows green when fiber link is established.
- FA** Glows amber when FiberAlert is enabled.
Blinks when a fault occurs on the RCV fiber line and actively disables the XMT fiber line.



Regardless if there is a break in segment 1, 2 or 3, the link will drop on the switches at both ends. The link fault is passed through the media conversion and is observed at each end. It acts just like it would if the devices were directly connected.

5.2 Additional Gigabit Features

5.2.1 Preferred/Forced Mode

The High Density Media Converter System II Layer 1 Module also includes a Preferred/Forced Modes for Master/Slave negotiation. Preferred Mode helps determine whether the module should act as a Master or Slave. Forced Mode should typically only be used when connecting to some legacy switches, or when there is difficulty establishing a link. The default is Preferred Mode (S1-1 is ON). This feature is hardware configurable only.

Since most switches today typically function as Masters, Black Box recommends configuring High Density Media Converter System II Layer 1 Module as indicated in the table.

DIP Switch	Default Setting
S1-1	ON (Preferred) OFF (Forced)

5.2.2 AutoCross Feature for Twisted Pair Connection

All twisted pair ports on the High Density Media Converter System II Layer 1 Module include AutoCross, a feature that automatically selects between a crossover workstation and a straight-through connection depending on the connected device.

2. Overview: About the High Density Media Converter System II Layer 1 Module

The SNMP manageable High Density Media Converter System II Layer 1 Module provides a single conversion between 1000 Base-T twisted pair and 1000 Base-SX/LX fiber. Each High Density Media Converter System II Layer 1 Module includes one RJ-45 connector and one pair of SC fiber optic connectors. High Density Media Converter System II Layer 1 Modules install into any modular, SNMP manageable High-Density Media Converter System II Chassis.

3. Configuration

High Density Media Converter System II Layer 1 Modules have user-configurable features. Refer to the matrix for configuring both managed (via an SNMP compatible management application such as iView²) and unmanaged High Density Media Converter System II Layer 1 Modules.

3.1 Managed Modules

To manage one or more High Density Media Converter System II Layer 1 Modules, an SNMP agent must be present in the chassis: To configure Managed Modules, install the module first, and then configure using the management software.

transmitting data and the link signal until a signal or link pulse is received. The result is that the link LED on BOTH sides of the fiber connection will go out indicating a fault somewhere in the fiber loop. Using FiberAlert, a local site administrator is notified of a fault and can quickly determine where a cable fault is located.

WARNING
Enable FiberAlert on one side of a media conversion only. Enabling it on both sides would keep both transmitters off indefinitely.

Modules ship from the factory with troubleshooting features disabled.

5.1.4 FX Auto Negotiation on High Density Media Converter System II Layer 1 Module

The High Density Media Converter System II Layer 1 Module includes a FX Auto Negotiation feature that negotiates duplex mode. This feature must be enabled or disabled on both ends of the connection or there may be difficulty establishing a link. If the device being connected to the High Density Media Converter System II Layer 1 Module does not support Auto Negotiation, disabling the feature on the High Density Media Converter System II Layer 1 Module forces the link up.

DIP Switch settings for FX AN:

DIP Switch	Default Setting
S1-5	FX AN = ON

5.1.5 FX LinkLoss (FXLL)

FX LinkLoss is a troubleshooting feature. When a fault occurs on the fiber segment of a conversation, FX LinkLoss detects the fault and passes this information to the twisted pair segment. If a media converter is not receiving a fiber link, FX LinkLoss disables the transmitter on the media converter's twisted pair port. This results in a loss of link on the device connected to the twisted pair port, and the FXLL LED will blink.

5.1.6 SFP Speed Select LOW

It is possible to install a dual speed fiber SFP 100/1000 Mbps. If the SFP speed is set to 100 Mbps, DSW #7 must be set to ON.

5.1.7 Link Fault Pass-Through (LFPT)

Link Fault Pass-Through (LFPT) is a troubleshooting feature that combines TX and FX LinkLoss from both the local and remote High Density Media Converter System II Layer 1 Modules. LFPT is enabled by turning on both FX and TX LinkLoss on both modules. This feature allows either end of the conversion to detect a link fault occurring at the other end of the media conversion chain.

5. Operation

5.1 LinkLoss, FiberAlert and Link Fault Pass-Through

High Density Media Converter System II Layer 1 Modules include the troubleshooting features FiberAlert, TXLL, FXLL and LFPT that help locate *silent failures* on a network. Before attempting to install the module(s), understand how these features work and react to a specific network configuration. Modules ship from the factory with troubleshooting features disabled.

WARNING
<i>Installing modules without understanding the effects of LinkLoss and FiberAlert can cause functioning units to appear flawed or even non functional.</i>

5.1.1 Link Integrity

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices. When a Black Box media converter receives valid link pulses, it knows that the device to which it is connected is up and sending pulses, and that the copper or fiber cable coming from that device is intact. The appropriate “LNK” (link) LED is lit to indicate this.

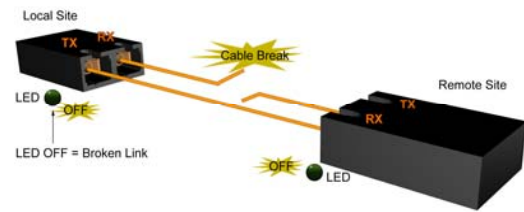
The media converter also sends out link pulses from its copper and fiber transmitters, but normally has no way of knowing whether the cable to the other device is intact and the link pulses are reaching the other end. The combination of FiberAlert and LinkLoss allows this information to be obtained, even when physical access to a remote device (and its link integrity LED) is not available.

5.1.2 TX LinkLoss (TXLL)

TX LinkLoss is a troubleshooting feature. When a fault occurs on the twisted pair segment of a conversion, TX LinkLoss detects the fault and passes this information to the fiber segment. If a media converter is not receiving a twisted pair link, TX LinkLoss disables the transmitter on the media converter's fiber port. This results in a loss of the link on the device connected to the fiber port, and the TXLL LED will blink.

5.1.3 FiberAlert (FA)

FiberAlert minimizes the problems associated with the loss of one strand of fiber. If a strand is not available, the Black Box device at the receiver end notes the loss of link. The device will then stop



3.1.1 Configuration Control

Some SNMP Manageable Modules offer Configuration Control; labels on the front faceplate are identified as such. Configuration Control has been implemented to assist the end user by retaining the latest configuration regardless of how that configuration was implemented (via DIP Switch settings or SNMP).

Historically, SNMP would override DIP Switch settings. If changes are made via DIP Switch settings, then hardware settings determine the configuration of the board. If changes are made to the module via iView², the SNMP settings determine the configuration of the board.

Using Configuration Control, the end user has three conditions under which the configuration of the SNMP Manageable Module may be impacted:

- Installing an High Density Media Converter System II Layer 1 Module into a chassis already loaded with SNMP Manageable Modules or replacing an High Density Media Converter System II Layer 1 Module
 - The SNMP Manageable Module will transfer its saved configurations. The High Density Media Converter System II Layer 1 Module will not override the module's configuration.
- Replacing the same type of SNMP Manageable Module
 - If the DIP Switch settings are the same as the settings on the removed SNMP Manageable Module, the High Density Media Converter System II Layer 1 Module determines the configuration settings.
 - If the DIP Switch settings are different, then the configuration of the module is determined by the DIP Switch settings. (The settings are forwarded to the High Density Media Converter System II Layer 1 Module and the value is saved.)
- Installing a new model of SNMP Manageable Module
 - If another type of module is installed into the same slot in a chassis, the High Density Media Converter System II Layer 1 Module clears the memory of the previous configuration for that slot; the settings of a new module are adopted and stored in the High Density Media Converter System II Layer 1 Module

The SNMP Write Lock switch does not impact any SNMP Manageable Module with Configuration Control. Removing and installing a new SNMP Management Module will no longer impact these modules either. However, if there is a mixture of SNMP Manageable Modules with and without Configuration Control, the Write Lock Switch and a new SNMP Management Module must be taken into consideration.

If the command cleandb is applied to an SNMP Management Module, all the settings for the modules will be removed, but the Configuration Control modules

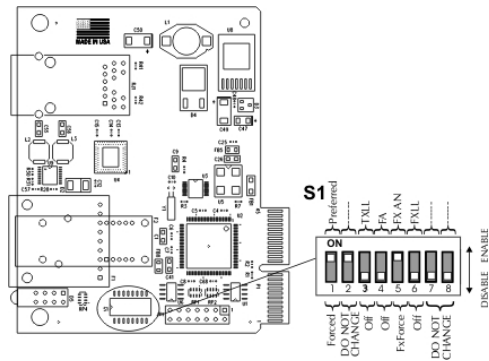
will still be based on the last change made, while those without Configuration Control will be set to their default settings.

NOTE

If the end user has a mixture of standard SNMP Manageable Modules as well as Configuration Control SNMP Manageable Modules, it is important to understand how SNMP and DIP Switches will impact the cards depending on their capability. Standard SNMP Manageable Modules cannot be upgraded to Configuration Control capability, so it is strongly recommended to set the DIP Switches on the modules and then configure them via software to match the same settings.

3.2 Unmanaged Modules

Before installing, configure the High Density Media Converter System II Layer 1 Module for desired features. The diagram indicates the available features and settings for the module. After configuring the switch for the desired settings, install the module and connect the appropriate cables. For further information, refer to the Installing an SNMP Manageable Module section.



DIP Switch on S1	Feature	Default Setting
1	Preferred / Forced	ON
2	Factory use – Do Not Change	ON
3	TX Link Loss (TXLL)	OFF
4	Fiber Alert (FA)	OFF
5	FX Auto Negotiation	ON
6	FX Link Loss (FXLL)	OFF
7	Factory set (Program)	OFF
8	Factory set (Program)	OFF

4. Install the High Density Media Converter System II Layer 1 Module

SNMP Manageable Modules install in Black Box's High-Density Media Converter System II Chassis.

To install an SNMP Manageable Module:

1. Remove the blank bracket covering the slot where the module is to be installed by removing the screws on the outside edges of the bracket.
2. Slide the SNMP Manageable Module into the chassis, via the cardguides, until the module is seated securely in the connector.
3. Secure the module to the chassis by tightening the captive screw.
4. Save any “blanks” removed during installation for future use if the configuration requirements change.