# MediaConverter Series

## Operation Manual

# FCC Radio Frequency Interference Statement

## MediaConverter/1 and /4

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

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits. This digital apparatus does not exceed the Class B limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

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

## MediaConverter/8 and /12

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

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

The use of non-shielded I/O cables may not guarantee compliance with FCC RFI limits. 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 the Canadian Department of Communications.

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

# Limited Lifetime Warranty

Effective for products of B+B SmartWorX shipped on or after May 1, 2013, B+B SmartWorX warrants that each such product shall be free from defects in material and workmanship for its lifetime. This limited lifetime warranty is applicable solely to the original user and is not transferable.

This warranty is expressly conditioned upon proper storage, installation, connection, operation and maintenance of products in accordance with their written specifications.

Pursuant to the warranty, within the warranty period, B+B SmartWorX, at its option will:

1. Replace the product with a functional equivalent;

2. Repair the product; or

3. Provide a partial refund of purchase price based on a depreciated value.

Products of other manufacturers sold by B+B SmartWorX are not subject to any warranty or indemnity offered by B+B SmartWorX, but may be subject to the warranties of the other manufacturers.

Notwithstanding the foregoing, under no circumstances shall B+B SmartWorX have any warranty obligations or any other liability for: (i) any defects resulting from wear and tear, accident, improper use by the buyer or use by any third party except in accordance with the written instructions or advice of the B+B SmartWorX or the manufacturer of the products, including without limitation surge and overvoltage conditions that exceed specified ratings, (ii) any products which have been adjusted, modified or repaired by any party other than B+B SmartWorX or (iii) any descriptions, illustrations, figures as to performance, drawings and particulars of weights and dimensions contained in the B+B SmartWorX' catalogs, price lists, marketing materials or elsewhere since they are merely intended to represent a general idea of the products and do not form part of this price quote and do not constitute a warranty of any kind, whether express or implied, as to any of the B+B SmartWorX' products.

THE REPAIR OR REPLACEMENT OF THE DEFECTIVE ITEMS IN ACCORDANCE WITH THE EXPRESS WARRANTY SET FORTH ABOVE IS B&B ELECTRONIC' SOLE OBLIGATION UNDER THIS WARRANTY.  THE WARRANTY CONTAINED IN THIS SECTION SHALL EXTEND TO THE ORIGINAL USER ONLY, IS IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND ALL SUCH WARRANTIES AND INDEMNITIES ARE EXPRESSLY DISCLAIMED, INCLUDING WITHOUT LIMITATION (I) THE IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND OF MERCHANTABILITY AND (II) ANY WARRANTY THAT THE PRODUCTS ARE DO NOT INFRINGE OR VIOLATE THE INTELLECTUAL PROPERTY RIGHTS OF ANY THIRD PARTY.  IN NO EVENT SHALL B+B SMARTWORX BE LIABLE FOR LOSS OF BUSINESS, LOSS OF USE OR OF DATA INTERRUPTION OF BUSINESS, LOST PROFITS OR GOODWILL OR OTHER SPECIAL, INCIDENTAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES.   B&B ELECTRONIC SHALL DISREGARD AND NOT BE BOUND BY ANY REPRESENTATIONS, WARRANTIES OR INDEMNITIES MADE BY ANY OTHER PERSON, INCLUDING WITHOUT LIMITATION EMPLOYEES, DISTRIBUTORS, RESELLERS OR DEALERS OF B&B ELECTRONIC WHICH ARE INCONSISTENT WITH THE WARRANTY, SET FORTH ABOVE.

**Table of Contents**

**About the Modular Media Converters & Chassis**

The Modular Media Converter Series includes modules that convert copper to single-mode or multi-mode fiber at Ethernet, Fast Ethernet and Gigabit speeds.  All Modules are unmanaged media converters, to allow simple installation.

Modular Media Converter series chassis provide power to media converter modules, and are available with one, four, eight or twelve slots for installing any combination of McPIMs (10Mbps Ethernet), McLIMs (100 Mbps Fast Ethernet), McLIM TP-TX/FX (Switching 10/100 Mbps) and McGigabit modules (1.25 Gbps Ethernet). All chassis include internal AC power, and a country-specific power cord is included with each chassis.

| Media Converter | Description |
|---|---|
| 1 | Is a standalone chassis which includes one media conversion module slot, and a fixed, internal 115/230 VAC power supply. |
| 4 | Is a standalone chassis which includes four media conversion module slots, and a fixed, internal 120/240 VAC power supply. |
| 8 | Is a 1U high, Rackmountable chassis that includes eight media module slots and a fixed 120/240 VAC power supply. |
| 12 | Is a Rackmountable chassis and includes twelve media conversion module slots and a 115/230 VAC power supply.  MediaConverter/12 is 1U high and has the power on the rear of the chassis with media conversion module slots on the front. For redundancy a second power supply maybe installed. |

**About McPIMs**

McPIMs (Media Converter Port Interface Modules) are 10 Mbps Ethernet modules which provide a single-conversion between 10Base-T twisted pair and 10Base-FL single-mode or multi-mode fiber.  McPIMs include one RJ-45 connector and one pair of ST or SC fiber optic connectors.  Each McPIM requires one slot in a media converter chassis.

**About McLIMs**

McLIMs (Media Converter Link Interface Modules) are 100 Mbps Fast Ethernet modules which provide a single-conversion between 100Base-TX twisted pair and 100Base-FX (McLIM TX/FX) or 100Base-SX (McLIM TX/SX) fiber and support Half or Full-Duplex.

McLIM TP-TX/FX is an Auto Negotiating, switching media converter which offers plug-and-play operation to convert 10 Mbps or 100 Mbps, Half-or-Full-Duplex twisted pair to 100Base-FX, Full-Duplex fiber. McLIM TP-TX/FX allows jumbo packets of up to 1916 bytes.

McLIMs include one RJ-45 connector for the twisted pair port and one pair of fiber connectors for the fiber port. McLIMs are also available in single-strand fiber versions which include one SC fiber connector. Each McLIM requires one slot in a media converter chassis.

**About McGigabit**

McGigabit is a Gigabit Ethernet module which provides a single-conversion between 1000Base-SX (multi-mode) or LX (single-mode) fiber and 1000Base-T copper. McGigabit offers plug-and-plan operation, and always operates at Full-Duplex. McGigabit modules include one RJ-45 connector for the twisted pair port and one pair of SC fiber connectors. Single-strand single-mode fiber versions are also available. Each McGigabit requires one slot in a media converter chassis.

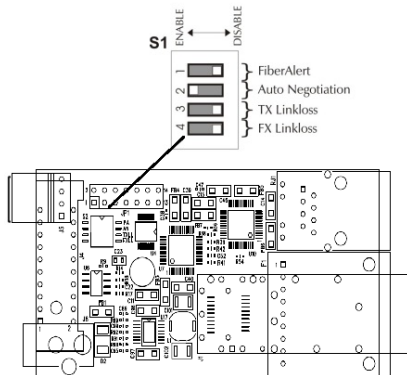| NOTE |
|------|
| This Manual refers to McPIM, McLIM and McGigabit modules as "Media Conversion Modules" except where differences require indication. |

**Configuring Media Conversion Modules**

The McPIMs and McLIMs can be configured for a variety of features before installation (see board Diagrams/Configuration Table for specific information). **McLIM TP-TX/FX and McGigabit have plug-and-play operation and require no configuration.** The illustrations show the location of the configuration jumpers and switches on the various Media Conversion Modules.
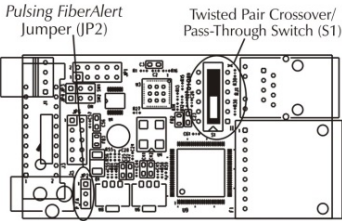
McPIM 10Mbps board



McLIM 100Mbps board

| NOTE |
| --- |
| Jumper settings apply only to 10Mbps and 100Mbps boards.  10/100 Switching modules and Gigabit modules sets do not require any configuration and are not shown above. |

| Media Converter Jumper/DIP Switch Configuration Table | | | | | |
| --- | --- | --- | --- | --- | --- |
| **Module/Board** | **Feature** | **Jumper Position** | **ON (pins)** | **OFF (pins)** | **Factory Default** |
| McPIM 10Mbps with Pulsing FiberAlert Jumpers | Pulsing FiberAlert TP LinkLoss FO LinkLoss | JP2 N/A N/A | 1-2 ALWAYS ENA ALWAYS ENA | 2-3 N/A N/A | OFF ALWAYS ENA ALWAYS ENA |
| McLIM TX/FX 100Mbps  with AutoCross MDI-II/MDI-X DIP Switch | FiberAlert Auto Negotiation TX LinkLoss FX LinkLoss | S1 S2 S3 S4 | N/A | N/A | OFF ON OFF OFF |

## Twisted Pair Crossover/Straight-Through Connections

Whether using crossover or straight-through CAT5 twisted pair cabling, all Switching Modules will support both types of connections by one of the following methods:

| | |
|---|---|
| **AutoCross** | McLIM TX/FX (100Mbps) and McGigabit include AutoCross, a feature that automatically selects between a crossover workstation or straight-through connection depending on the connected device. |
| **MDI-II/MDI-X Switch** | All McPIMs (10Mbps)feature a 2-position switch, located at position S1 (see table for location on boards), for selecting a crossover workstation connection or straight-through connection. |
| | The switch is labeled with "X" for a crossover connection (factory default) and an "II" for a straight-through connection.  Select the appropriate setting by moving the switch to the proper position before installing the media conversion module.  If uncertain whether crossover or straight-through is needed, set the switch to the position that makes the link LED glow. |

## LinkLoss, FiberAlert and Link Fault Pass-Through

McPIM TP/FO and McLIM TX/FX and TX/SX include the following features:

- FO/FX LinkLoss (Fiber LinkLoss)
- TP/TX LinkLoss (Twisted Pair LinkLoss)
- FiberAlert and Pulsing FiberAlert

FiberAlert and LinkLoss are advanced troubleshooting features that can help you locate "silent failures" on your network.  However, it is vital to understand exactly how FiberAlert and LinkLoss work, and how they will react in the network configuration, before attempting to install the enclosed module(s).

| WARNING |
|---|
| Installing modules without understanding the effects of FiberAlert and LinkLoss can cause perfectly functioning units to appear flawed or non-functional. |

**Link Integrity**

During normal operation, link integrity pulses are transmitted by all point-to-point Ethernet devices.  When an B+B SmartWorX 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 B+B SmartWorX 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.
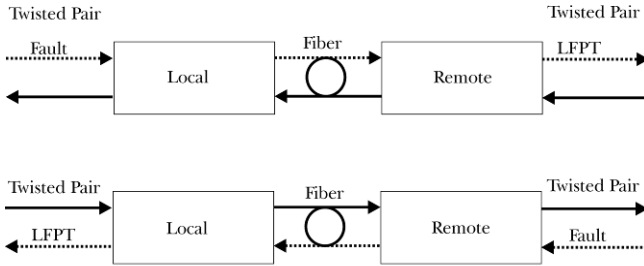
**FO/FX LinkLoss**

FO/FX LinkLoss is a troubleshooting feature.  When a fault occurs on the fiber segment of a conversion, FO/FX LinkLoss detects the fault and passes this information to the twisted pair segment.  If a media converter is not receiving a fiber link, FO/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.

**TP/TX LinkLoss**

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

## Link Fault Pass Through

Link Fault Pass Through (LFPT) is a troubleshooting feature that combines TX and FX LinkLoss from both the local and remote media converter modules (only available on the McLIM,100Mbps TX/FX.  LFPT is enabled by turning on both FX and TX LinkLoss on each module if installed as a pair.  This feature allows both end segments of the conversion to detect link faults occurring in the media conversion chain.
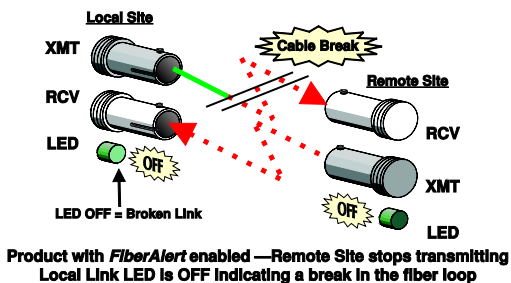


**FX and TX LinkLoss enabled on both modules will enable LFPT**

## FiberAlert

FiberAlert minimizes the problems associated with the loss of one strand of fiber.  If a strand is unavailable, the B+B SmartWorX device at the receiver end notes the loss of link.  The device will then stop 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.
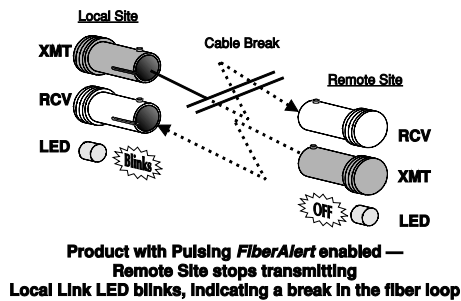
| WARNING |
|---|
| Enable FiberAlert on ONE side of a media conversion only; enabling it on both sides will keep both transmitters off indefinitely! |



**Product with *FiberAlert* enabled —Remote Site stops transmitting Local Link LED is OFF indicating a break in the fiber loop**

**Pulsing FiberAlert**

Pulsing FiberAlert minimizes the problems associated with the loss of one strand of fiber.  If a strand is unavailable, the device at the receiver end notes the loss of link.  The device will stop transmitting data and start sending link pulses.  Until a valid link is received, the fiber link LED will be OFF on the device on the receiver side of the fiber strand with the fault while the fiber Link LED on the other unit will blink.  Pulsing FiberAlert notifies a local site administrator of a fault, allowing quick determination of where a cable fault resides.

| NOTE |
|---|
| Pulsing FiberAlert can be enabled on BOTH sides of a conversion. |



**Product with Pulsing *FiberAlert* enabled —
Remote Site stops transmitting
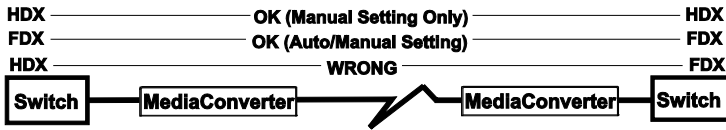Local Link LED blinks, indicating a break in the fiber loop**

**Auto Negotiation**

The following chart states the availability of the Auto Negotiation feature on media conversion modules.

| Auto Negotiation Product Comparison | | |
|---|---|---|
| 10 Mbps Modules | Auto Negotiation | N/A |
| 100 Mbps Modules | Auto Negotiation | DIP Switch Selectable |
| 10/100 Mbps Modules | Auto Negotiation | Always Enabled |

**Auto Negotiation on 100Mbps, 10/100Mbps  Modules**

When Auto Negotiation is enabled, the media converter negotiates as a 100 Mbps Full-Duplex device; if the device the media converter is connected to can operate at 100 Mbps Full-Duplex, a link will be established. If the twisted pair port on the other device does not have the ability to Auto Negotiate, or if a 100 Mbps Half-Duplex connection is desired, Auto Negotiation on the media converter must be disabled.  Half- and Full-Duplex settings must be manually set and match on both end devices to which the media converters are connected.  The diagram below shows a typical application, followed by a table with three possible configurations.

| HDX ———————————— OK (Manual Setting Only) ———————————— HDX |
| FDX ———————————— OK (Auto/Manual Setting) ———————————— FDX |
| HDX ———————————— WRONG ———————————— FDX |

**Switch** — **MediaConverter** —/— **MediaConverter** — **Switch**

| End to End Connection | End Device | Media Converter |
|---|---|---|
| Half-Duplex | Manually configure HDX | Auto Negotiation Off |
| Full-Duplex | Manually configure FDX | Auto Negotiation Off |
| Full-Duplex | Auto Negotiation On | Auto Negotiation On |

**Installing Media Converter Modules**

The media conversion modules can be installed in any available slot in a media converter chassis.  Media conversion modules are hot-swappable.

Media conversion modules include screws on the faceplate for securing them to the media converter chassis.  To install a module, simply unscrew the blank bracket converting the slot where the module is installed.  Slide the module into the chassis, via the card guides, until the module is seated securely in the connector.  Hand tighten the thumb screw until snug.  Finish tightening the thumb screw using a screw driver, being careful to not over-tighten.
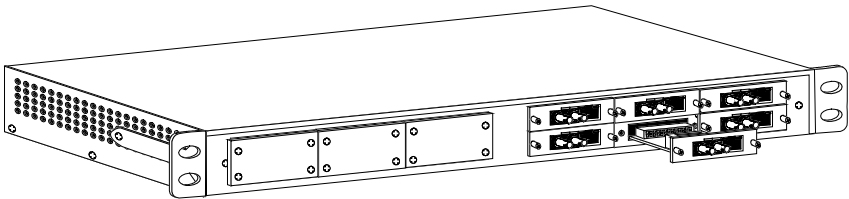


| NOTE |
|---|
| Media converter chassis ship with all but one media conversion module slot covered with "blank" brackets.  Be sure to keep unused slots covered for EMI containment.  It is a good idea to save any "blanks" removed during installation for future use if configuration requirements change. |

| Installation Tip |
|---|
| Since single-strand fiber products use optics that transmit and receive on two different wavelengths,  the single-strand fiber products must be deployed in pairs, or connect two compatible B+B SmartWorX single-strand fiber products.  For example, connect Compact Media Converter, TX/SSFX-SM1310-SC (which has 1310 xmt and 1550 rcv) to a product which has 1550 xmt and 1310 rcv, e.g. 100 Mbps TX/SSFX-SM1550-SC Module.  The two connected products must also have the same speed and distance capabilities (i.e. both are single-mode [20 km] or both are single/PLUS [40 km]). |

## Power Supply Installation

When installing a redundant power supply module into a powered-on 12-Slot chassis, B+B SmartWorX recommends setting the ON/OFF switch on the module (if present) to OFF.  After installing the power supply, turn its switch ON.

If the redundant power supply module does NOT have an ON/OFF switch, B+B SmartWorX recommends powering-down the chassis before installing the power supply. Turn the chassis back ON after installing the power supply.

## LED Operation

Each media conversion module features diagnostic LEDs (see diagrams below) that provide information on features and ports.

## LEDs on on McPIM TP/FO

The LED functions for McPIM TP/FO with fiber ports are as follows:
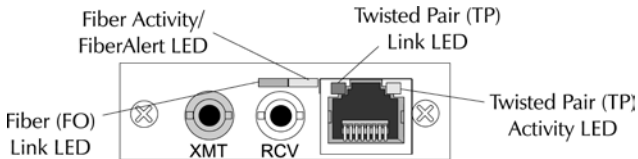


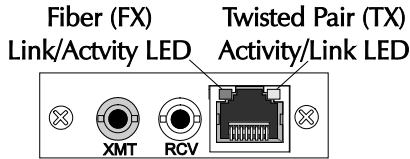| FO LINK | Glows green when link is established on the fiber port. |
|---|---|
| FIBERALERT | Glows amber when *FiberAlert* is enabled |
| TP LINK | Glows green when link is established on the TP port. |
| ACTIVITY | Blinks amber when data is being passed on either port. |

**LEDs on McPIM TP/FO (10Mbps)**

The LED functions on McPIM TP/FO  are as follows:
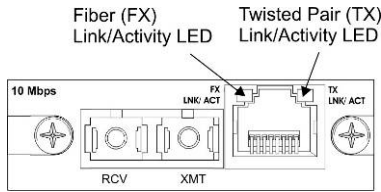


| FO LINK/ACT | Glows green when link is established on the FO port; blinks green when activity is detected on the port. |
|---|---|
| TP LINK/ACT | Glows amber when link is established on the TP port; blinks amber when activity is detected on the port. |

**LEDs on McLIM TP-TX/FX (10/100Mbps)**

The LED functions on McLIM TP-TX/FX are as follows:



| FX LINK/ACT | Glows green when link is established on the FX port; blinks green when activity is detected on the port. |
|---|---|
| TX LINK/ACT | Glows green when link is established on the TP/TX port; blinks green when activity is detected on the port. |

**LEDs on McLIM TX/FX and TX/SX**

The LED functions on McLIM TX/FX are as follows:
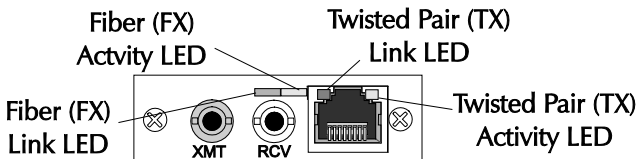


| FX LINK | Glows green when link is established on the FX port. |
|---|---|
| FX ACTIVITY | Glows amber if data is being passed on the FX port. |
| TX PAIR LINK | Glows green if link is established on the TX port. |
| TX ACTIVITY | Glows amber when data is being passed on the TX port. |

**LEDs on McGigabit**

The LED functions on McGigabit and McLIM TX/FX and TX/SX Modules are as follows:
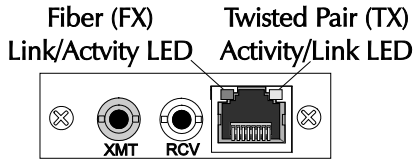
Fiber (FX)            Twisted Pair (TX)
Link/Actvity LED    Activity/Link LED

| FX LINK/ACT | Glows green when link is established on the FX port; blinks green when activity is detected on the port. |
|---|---|
| TX LINK/ACT | Glows amber when link is established on the TX port; blinks amber when activity is detected on the port. |
| ACTIVITY | Glows green in normal operation. |

**MediaConverter Series Chassis**

The MediaConverter Series Chassis are available in one, four, eight and twelve slot chassis. The one, four and eight include one power supply. The twelve slot chassis includes one power supply and has an available slot to purchase and populate a second slot for redundant power.

All Modules, McPIM, McLIM, McLIM 10/100 and McGigabit, can be installed in the chassis and in any combination.

**LEDs on MediaConverter Chassis**

4-Slot and 8-Slot chassis include LEDs on the back of the chassis. The LEDs will only light if a 10Mbps McPIM is installed. All Modules offer port interface LEDs for link and activity; do not rely on the chassis LEDs other than the power LED.

**LEDs on Power Supplies**

Power supplies include the following LEDs:

| POWER | Glows green when chassis has power. |
|---|---|
| ACTIVITY | This LED blinks green when data is being passed on either port of a module that does not include Link/Activity LEDs; applicable to modules only. |

## Installation Troubleshooting

The following information assists in troubleshooting the Modular Media Converters:

- 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.

- When working with units where the features cannot be connect, establish BOTH the twisted pair and fiber connections in order to establish link LEDs.

- To test a media converter by itself, have an appropriate fiber patch cable, then follow these steps to test:

1. Connect the media converter to the twisted pair device with a twisted pair cable.

2. Loop a single strand of fiber from the transmit port to the receive port of the media converter.

3. Verify that both the twisted pair and the fiber link (see LEDs, below) on the media converter.

| NOTE |
|------|
| Use caution when conducting a loopback test; it is possible to create a network loop if connecting the twisted pair port to an active network switch.  B+B SmartWorX recommends connecting the twisted pair cable to a PC for this type of test. |

- Make sure to use the appropriate twisted pair cable, and have the crossover/straight-through switch set correctly if the media converter does not include AutoCross.

- 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.

## Rackmount Instructions

| | |
|---|---|
| Elevated Operating Ambient | If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient.  Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer. |
| Reduced Air Flow | Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. |
| Circuit Overloading | Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over current protection and supply wiring.  Approximate consideration of equipment nameplate ratings should be used when addressing this concern. |
| Reliable Grounding | Reliable grounding of Rackmounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips). |

## Specifications

### Operating Temperature

+32°F to +122°F (0°C to +50°C); 5% to 95% (non-condensing), 0 – 10,000 ft. altitude

### Storage Temperature

-13°F to +158°F (-25°C to +70°C); 5% to 95% (non-condensing)

*Some products may support lower operating and storage temperatures.

### Electrical

| Media Converter Chassis | AC Input Load | Maximum Heat Generated |
|---|---|---|
| 1 | 115/230 or 120-240 VAC , 50/60Hz, 0.3A/0.15A | 51 BTU/hour |
| 4 | 120/240 VAC , 50/60Hz, 1A/0.5A | 67 BTU/hour |
| 8 | 120/240 or 100-240 VAC, 50/60Hz, 1.6/0.8A | 137 BTU/hour |
| 12 | 115/230 or 120-240 VAC, 50/60Hz, 1.2/0.6A | 137 BTU/hour |

| Media Converter Chassis | AC Power Supply |
|---|---|
| 1 | 20 Watts |
| 4 | 20 Watts |
| 8 | 40 Watts |
| 12 | 40 Watts |

### Dimensions

| MediaConverter/1 | H=1.6″ | x | W= 4.8″ | x | D=4.5″ | (4 x 12.1 x 11.5 cm) |
|---|---|---|---|---|---|---|
| MediaConverter/4 | H=1.7″ | x | W= 9.1″ | x | D=5″ | (4.4 x 23.1 x 12.6cm) |
| MediaConverter/8 | H=1.7″ | x | W= 17.4″ | x | D=5″ | (4.4 x 44.2 x 12.8 cm) |
| MediaConverter/12 | H=1.7″ | x | W= 19″ | x | D=9″ | (4.4 x 48.3 x 22.9 cm) |

|          |                                         |
|---------:|-----------------------------------------|
| **Tel:** | (800) 346-3119 (in the U.S. and Canada) |
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|          | Monday through Friday 8:00am - 5:00pm GMT |
| **Fax:** | (815) 433-5109 U.S. and Canada          |
|          | +353 91-79244S5 Europe                  |
| **E-Mail:** | support@bb-elec.com U.S. and Canada  |
|          | techsupport@bb-elec.com Europe          |
| **Web:** | www.imcnetworks.com                     |

**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 B+B SmartWorX to ensure factory-clean optical devices. These protective caps should not be removed until the moment of connecting the fiber cable to the device.  Should it be necessary 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 it is suspected that the optics have been contaminated, alternate between blasting with clean, dry, compressed air and flushing with methanol to remove particles of dirt.

**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 chassis 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.

## Safety Certifications

UL/CUL: Listed to Safety of Information Technology Equipment, including Electrical Business Equipment.

CE: The products described herein comply with the Council Directive on Electromagnetic Compatibility (2004/108/EC) and the Council Directive on Electrical Equipment Designed for use within Certain Voltage Limits (2006/95/EC). Certified to Safety of Information Technology Equipment, Including Electrical Business Equipment. For further details, contact B+B SmartWorX.



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

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.

# B+B SmartWorx

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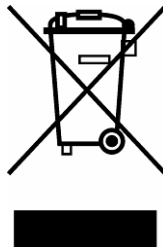
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